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CCR RULE ASSESSMENT OF CORRECTIVE MEASURES REPORT

CLOSED GYPSUM POND

CROSS GENERATING STATION

CROSS STATION ROAD
PINEVILLE, SC 29468

OCTOBER 30, 2023

PREPARED FOR

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ACM	Assessment of Corrective Measures
ASD	Alternate Source Demonstration
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
CGP	Closed Gypsum Pond
COC	Constituent of Concern
CSM	Conceptual Site Model
GWPS	Groundwater Protection Standard
MNA	Monitored Natural Attenuation
NPDES	National Pollutant Discharge Elimination System
RCRA	Resource Conservation and Recovery Act
Site	Cross Generating Station
PRB	Permeable Reactive Barrier
SCDHEC	South Carolina Department of Health and Environmental Control
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
USEPA	U.S. Environmental Protection Agency

1.0 INTRODUCTION AND REQUIREMENTS

This report about the Closed Gypsum Pond (CGP) at Santee Cooper's Cross Generating Station (site) in Pineville, South Carolina (Figure 1), was prepared to meet the requirements of the U.S. Environmental Protection Agency (USEPA) Coal Combustion Residuals (CCR) Rule, Title 40 Code of Federal Regulations (CFR) § 257.96. That section of the CCR Rule requires an Assessment of Corrective Measures (ACM) be initiated when constituents listed in Appendix IV (Appendix IV to Part 257 – Constituents for Assessment Monitoring) of the CCR Rule have been detected at Statistically Significant Levels (SSLs) greater than the established Groundwater Protection Standard (GWPS), as defined in 40 CFR § 257.95(h).

Appendix IV constituents (beryllium, cobalt, lead, and lithium) were identified at SSLs greater than the GWPS at the CGP. The ACM process was initiated for the CGP in June 2023. This report provides details about the Appendix IV constituents observed at SSLs greater than the GWPSs for the CGP and documents the fulfillment of the requirement to conduct an ACM.

1.1 Requirements for ACM Preparation in 40 CFR § 257.96(a)

The CCR Rule in 40 CFR § 257.96(a) requires that an owner or operator initiate an ACM to prevent further release, to remediate releases, and to restore affected area(s) to original conditions in the event that an Appendix IV constituent has been detected at an SSL greater than a GWPS. The ACM must be completed within 90 days after initiating the ACM. The CCR Rule allows up to an additional 60 days to complete the ACM if a demonstration shows that more time is needed because of site-specific conditions or circumstances. A certification from a qualified professional engineer attesting that the demonstration is accurate is required. The owner or operator must include the certified demonstration in the annual groundwater monitoring and corrective action report required by 40 CFR § 257.90(e).

Santee Cooper required an additional 60 days to complete the ACM for the CGP because of drilling delays and the need for nature and extent investigations to properly develop the Conceptual Site Model (CSM). A comprehensive CSM is critical in order to complete a thorough evaluation of potential corrective measures. The demonstration, certified by a professional engineer in August 2023, will be included in the 2023 Annual Groundwater Monitoring and Corrective Action Report.

1.2 Requirements for ACM Content in 40 CFR § 257.96(c)

The CCR Rule in 40 CFR § 257.96(c) states that:

> *The assessment under paragraph (a) of this section must include an analysis of the effectiveness of potential corrective measures in meeting all of the requirements and objectives of the remedy as described under § 257.97 addressing at least the following:*
>
> *(1) The performance, reliability, ease of implementation, and potential impacts of appropriate potential remedies, including safety impacts,*

cross-media impacts, and control of exposure to any residual contamination;

(2) The time required to begin and complete the remedy;

(3) The institutional requirements, such as state or local permit requirements or other environmental or public health requirements that may substantially affect implementation of the remedy(s).

Those requirements form the basis for the evaluation of potential corrective measure remedial technologies outlined in this report. Potential remedial technologies are listed in Section 4.3 and described in Appendix A. Potential technologies are evaluated against these requirements in Appendix B, as described in Section 4.4 and summarized in Tables 1A and 1B.

1.3 Requirements for Remedy Selection in 40 CFR § 257.97

After preparation of this ACM Report and the public meeting required in 40 CFR § 257.96(e), the process of selecting a remedy or remedies that meet(s) the requirements of 40 CFR § 257.97(b) of the CCR Rule will begin. The standards in 40 CFR § 257.97(c) will be considered, and the schedule and other factors specified in 40 CFR § 257.97(d) will be addressed. Once a remedy is selected, a final remedy selection report must document details of the selected remedy and how the selected remedy meets 40 CFR § 257.97 requirements. The selection of remedy requirements found in 40 CFR § 257.97 is outlined in Appendix C. If a final remedy cannot be selected without further study or consideration, 40 CFR § 257.97 requires the preparation of a semiannual report that documents progress toward remedy selection and design.

2.0 SITE BACKGROUND AND CHARACTERISTICS

On April 17, 2015, USEPA published 40 CFR Parts 257 and 261: Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule (USEPA, 2015). That regulation addresses the safe disposal of CCR as solid waste under Subtitle D of the Resource Conservation and Recovery Act (RCRA) and is referred to herein as the CCR Rule. The CCR Rule, which became effective on October 19, 2015, provides national minimum criteria for "the safe disposal of CCR in new and existing CCR landfills, surface impoundments, and lateral expansions, design and operating criteria, groundwater monitoring and corrective action, closure requirements and post-closure care, and recordkeeping, notification, and internet posting requirements." As part of the CCR Rule, groundwater monitoring is required for new and existing CCR landfills, CCR surface impoundments, and lateral expansions of CCR units.

The CGP was an active CCR unit for a brief period of time after the effective date of the CCR Rule. State-led approval of the closure plan met the requirements of 40 CFR § 257.102(b) (closure by removal) and was initiated on March 10, 2016. As of October 17, 2016, CCR material was removed from the CGP; however, closure of the CGP was not certified by the state until March 22, 2017, making the CGP subject to the CCR Rule requirements. Although the unit was closed, groundwater monitoring under the CCR rule was necessary to meet the requirements of the CCR Rule and to follow the process into groundwater corrective action after SSLs greater than GWPSs were identified downgradient of the CGP.

2.1 Site Description

The Cross Generating Station (Figure 1) is a coal fired power plant with four steam units that produce power primarily using bituminous coal. The Plant began commercial operations in 1983, and three additional units came online in 1995, 2007, and 2008. Historically, ash was sluiced to the bottom ash pond, which ceased receiving waste in April 2021. Currently, CCR materials are disposed of in the on-site Class 3 Landfill or transported off-site for beneficial reuse.

There are four CCR Rule regulated units at the Cross Generating Station: Bottom Ash Pond, Class 2 Landfill, Class 3 Landfill, and the CGP (Figure 1). The site, located in the Lower Coastal Plain physiographic province, is bordered by the Diversion Canal that flows to Lake Moultrie to the southwest, and by Lake Moultrie to the east. Private landowners border the site to the northwest. The electricity-generating unit are located on the southern portion of the site just northeast of the Diversion Canal, which connects Lake Marion and Lake Moultrie. The coal pile is located to the northeast of the coal-fired units, southwest of the Bottom Ash Pond. The Class 2 and Class 3 Landfills are located on the northernmost portion of the site. The CGP is located just below the southern corner of the coal pile, adjacent to plant operations.

2.2 CCR Unit Description – Closed Gypsum Pond

The CGP, located adjacent to plant operations (Figure 2) in an active industrial area, was a permitted industrial wastewater surface impoundment with an engineered perimeter dike, approximately 1 acre in size. Scrubber slurry and gypsum were placed in the CGP and eventually removed for disposal in the on-site landfill or hauled off-site for beneficial reuse. Various industrial wastewater streams were also managed in the CGP. Waste placement ceased on March 10, 2016, and closure by removal was initiated. Excavated material primarily consisted of gypsum and limestone slurry, in addition to approximately 1 foot of subsurface soils. Currently, a portion of the CGP sits beneath the wastewater treatment facility, which was built in 2018. Plans to expand the wastewater treatment facility are being developed.

2.3 Conceptual Site Model

The CSM is a descriptive summary of the hydrogeological conditions and constituent interactions related to the CCR unit and provides an understanding of the distribution of constituents attributed to the CCR unit and the applicability of potential remedies. To support that understanding, the CSM includes examinations of site-specific geology and hydrogeology as well as geochemical processes that control the presence and migration of constituents in various media. This information is also considered with respect to exposure pathways to potential human and ecological receptors.

A detailed evaluation of site geology and hydrology is presented in the *Site Hydrogeologic Characterization Report* (Garrett & Moore, 2011) and the *Cross Station Groundwater Monitoring Plan* (Santee Cooper, 2022). Findings from those investigations are summarized below.

2.3.1 Hydrostratigraphic Units

The groundwater system beneath the site has been extensively investigated; geology is divided into the following three units to distinguish the connected aquifer system: the surficial aquifer, the Santee Limestone Aquifer, and the Black Mingo Aquifer.

- Surficial Aquifer (uppermost) – A combination of deposits from near-shore marine environments (Wicomico Formation) and shallow marine-shelf environments (Raysor Formation). The Wicomico Formation consists of unconsolidated, upward-fining sequences of poorly sorted sand, silt, and clay. This depositional setting produces soil types that grade laterally and vertically from more sandy types to more clayey soil types. The Raysor Formation consists of a discontinuous layer of unconsolidated sandy limestone with weathered mollusk shells.
- Santee Limestone Aquifer (intermediate) – Thin highly weathered layer consisting of relatively dense partially indurated shelly, fine to medium sand. This thin layer is underlain by a thick consolidated layer of variably weathered crystalline shelly to muddy limestone. The upper sediments of the Black Mingo

Group are typically fine-grained and serve as a confining unit between the Santee Limestone Aquifer and the deeper Black Mingo Aquifer.

- Black Mingo Aquifer (deep) – Sediments are generally described as dark greenish-gray sands with intervals of silty fine sand and silty clay.

The confining unit was not encountered during installation of waste boundary or characterization wells associated with the CGP.

2.3.2 Hydrogeologic Setting

The site is relatively flat with little to no topographic relief and a shallow water table. Extensive wetlands at the site act as groundwater drainage features. Natural ground surface elevations vary from approximately 79 to 83 feet above mean sea level (Santee Cooper, 2022). Groundwater elevations fluctuate seasonally, with lows in the summer and highs in the winter (Santee Cooper, 2022). Groundwater flow direction at the site varies as a result of seasonal fluctuations. There are no perennial streams in the vicinity of the CGP.

A site-wide potentiometric map based on June 2023 synoptic water levels in the uppermost aquifer is presented in Figure 3. Groundwater flow direction generally flows to the west and southwest toward the Diversion Canal and east toward Lake Moultrie. Additional observations from historical water-level data indicate changes in groundwater flow directions have occurred because of extensive closure activities at the site (Santee Cooper, 2022).

To provide a more precise evaluation of groundwater flow direction in the area, groundwater elevation contours specific to the CGP are shown on Figure 4. Synoptic water levels collected in CGP monitoring wells on June 6, 2023, depict groundwater beneath the CGP flowing to the southeast and discharging to the wetlands, with a component of radial flow in the vicinity of monitoring well CGYP-5 (Figure 4). Depth to groundwater beneath the CGP ranges from 6 feet below ground surface to 18 feet below ground surface.

These contours support the overall groundwater flow system described in the CSM and indicate the direction of constituent migration in groundwater.

2.3.3 Potential Receptors

The are no potable water supply receptors, on-site or off-site, downgradient of the CGP. Surface water bodies considered potential receptors downgradient of the CGP include a wetland complex southeast of the CGP and Lake Moultrie to the east of the Gypsum Pond.

2.4 Summary of State-Led Closure Activities

Prior to closure, the CGP was required to comply with state regulations under the National Pollutant Discharge Elimination System (NPDES) Permit No. SC0037401. No groundwater assessments at the CGP have been required by the South Carolina Department of Health and Environmental Control (SCDHEC). However, closure of the CGP was initiated and implemented in accordance with an SCDHEC-approved closure plan. The removal plan was based on samples taken from the underlying soil which confirmed adequate source removal. SCDHEC approved the closure on March 22, 2017. As part of the closure approval, a land use covenant that restricts the disturbance of soil in the footprint of the CGP was implemented.

3.0 SITE GROUNDWATER MONITORING AND CHARACTERIZATION SUMMARY

CCR groundwater monitoring of the CGP has been implemented in accordance with the federal CCR Rule. Results from monitoring indicate groundwater quality has been altered by CCR-related constituents from the CGP. Appendix IV constituents with groundwater concentrations greater than GWPSs are primarily observed east and southeast of the CGP.

3.1 Summary of Groundwater Monitoring

The CCR Rule groundwater monitoring system for the CGP consists of two background wells and six waste boundary monitoring wells. Upgradient monitoring wells PM-1 and CBW-1 were installed during previous site assessments in April 1983 and September 2015, respectively, to monitor background groundwater concentrations at the site. Four downgradient wells (CGYP-1, CGYP-2, CGYP-6, and CGYP-7) and two (CGYP-3 and CGYP-4) that fluctuate between upgradient and side-gradient of the CGP were installed between 2020 and 2022.

In 2021, CGYP-5 was removed from the monitoring well network because groundwater elevations indicated CGYP-5 was upgradient of the CGP (Figure 3) and analytical results from baseline sampling events indicated groundwater was not affected by the CCR unit. Current groundwater elevations identify a radial flow component in the vicinity of CGYP-5; that well is currently used as a water-level-only well to aid in site-wide groundwater elevation contours.

Downgradient waste boundary monitoring well CGYP-7 was installed in September 2022 to adjust for observed water levels in monitoring wells CGYP-3 and CGYP-4 being more side-gradient than downgradient of the CCR unit. CGYP-7 will be added to the monitoring network once eight rounds of baseline sampling are complete. The location of the CCR groundwater monitoring system for the CGP is presented on Figure 2.

Eight rounds of baseline monitoring for Appendix III and Appendix IV constituents were performed between May 2020 and August 2020. Because Appendix III constituents were detected at Statistically Significant Increases (SSI) greater than background concentrations in monitoring wells downgradient of the CGP, Santee Cooper established an assessment monitoring program in September 2022.

3.2 Appendix IV Constituents Greater than GWPS

An initial assessment monitoring event to sample and analyze the groundwater for Appendix IV constituents was conducted in June 2022 in accordance with 40 CFR § 257.95(b).

As part of the groundwater monitoring requirements under the CCR Rule, § 257.95 of the rule requires that analytical data collected from waste boundary monitoring wells be statistically evaluated and compared to the established GWPSs for the site. In accordance with the USEPA Unified Guidance (USEPA, 2009), confidence intervals (lower and upper confidence limits) were established for each Appendix IV constituent using groundwater data collected from May 2020

through February 2023 in waste boundary monitoring wells. When the lower confidence limit or the entire confidence interval is greater than the GWPS, an SSL is identified.

A comparison of lower confidence limits that were calculated using groundwater data collected from May 2020 through February 2023 is provided in Table 2. An SSL indicates that a calculated lower confidence limit of an Appendix IV constituent is greater than its corresponding GWPS. Lower confidence limits for the following constituents were observed to be greater than the established GWPS:

- Beryllium – CGYP-1, CGYP-3, CGYP-4, and CGYP-6
- Cobalt – CGYP-1, CGYP-2, CGYP-3, CGYP-4, and CGYP-6
- Lead – CGYP-2 and CGYP-3
- Lithium – CGYP-3, CGYP-4, and CGYP-6

A map depicting the waste boundary well locations with SSLs greater than the GWPS for Appendix IV constituents is provided as Figure 5.

Data collected for waste boundary monitoring wells during the second 2023 CCR Rule semiannual monitoring event (June 2023) had not yet been statistically evaluated at the time this report was prepared. In addition, lower confidence limits were not yet calculated for CGYP-7 because eight baseline samples have not yet been collected for the waste boundary well. Once eight rounds of data have been collected, CGYP-7 will be incorporated into the monitoring well network and confidence intervals will be used to determine if concentrations are greater than the GWPS. If an SSL is identified for a constituent other than the ones previously listed, a notification will be placed on the public website.

3.3 Groundwater Characterization Required by CFR 40 § 257.95(g)

Since assessment monitoring was established, the CCR Rule in 40 CFR § 257.95(g)(1) states that the owner or operator of the CCR unit must:

> *Characterize the nature and extent of the release and any relevant site conditions that may affect the remedy ultimately selected. The characterization must be sufficient to support a complete and accurate assessment of the corrective measures necessary to effectively clean up all releases from the CCR unit pursuant to § 257.96.*

Initial characterization of the nature and extent has been conducted as described in this section. Additional site investigations may be required to determine the depth to a confining unit, the potential influence site activities may have on groundwater beneath the CGP, and to better understand aquifer and constituent characteristics. Data gaps are further detailed in Section 5.1. Additional characterization will be conducted in appropriate phases during the selection of remedy process.

3.4 Summary of Groundwater Characterization

Because of the presence of Appendix IV SSLs, further characterization of the nature and extent of the release to groundwater is necessary. According to the CCR Rule in 40 CFR § 257.95(g)(1):

> *Characterization of the release includes the following minimum measures:*
>
> *(i) Install additional monitoring wells necessary to define the contaminant plume(s);*
>
> *(ii) Collect data on the nature and estimated quantity of material released including specific information on the constituents listed in appendix IV of this part and the levels at which they are present in the material released;*
>
> *(iii) Install at least one additional monitoring well at the facility boundary in the direction of contaminant migration and sample this well in accordance with paragraph (d)(1) of this section; and*
>
> *(iv) Sample all wells in accordance with paragraph (d)(1) of this section to characterize the nature and extent of the release.*

Several characterization wells have already been installed; however, additional characterization is anticipated and will be conducted in appropriate phases in the future.

3.4.1 Installation of Nature and Extent Monitoring Wells

Five CCR characterization monitoring wells were installed in May 2023 downgradient to the east and southeast of the CCR Unit (Figure 5) so that the horizontal and vertical extent of the SSLs greater than GWPS could be characterized. Given the time frame to complete this ACM, only two monitoring events were conducted for the newly installed wells. Analytical results are presented in Table 3 and were used to aid in a preliminary characterization of Appendix IV constituents. Additional characterization will be conducted once four rounds of samples are collected and confidence intervals are calculated. Characterization monitoring wells and a description of each are provided below.

- CCMGP-1 was installed adjacent to CGYP-2 in the intermediate aquifer, to characterize the vertical extent of concentrations greater than GWPSs in CGYP-2, CGYP-3, and CGYP-4. Preliminary evaluation of analytical results indicates the vertical extent of SSLs identified in CGYP-2, CGYP-3, and CGYP-4 is adequately delineated.
- CCMGP-2 was installed in the uppermost aquifer to characterize the horizontal extent of concentrations greater than GWPSs in CGYP-2, CGYP-3, CGYP-4, and CGYP-7. Preliminary evaluation of analytical results indicates the horizontal extent of SSLs identified in CGYP-2, CGYP-3, CGYP-4, and CGYP-7 is adequately delineated, except for cobalt.

- CCMGP-3 was installed in the uppermost aquifer to characterize the horizontal extent of concentrations greater than GWPSs in CGYP-1. Preliminary evaluation of analytical results indicates cobalt and beryllium concentrations greater than the GWPS; However, preliminary results from CCGMP-5, installed further downgradient at the property boundary, adequately delineates cobalt and beryllium in CCGMP-3.
- CCMGP-4 was installed in the intermediate aquifer to characterize the vertical extent of concentrations greater than GWPSs in CGYP-1. Preliminary evaluation of analytical results indicates the vertical extent of SSLs identified in waste boundary monitoring wells is adequately delineated, except for cobalt, at a concentration only slightly greater than the GWPS.
- CCMGP-5 was installed in the uppermost aquifer at the downgradient property boundary, to the east, as required by 40 CFR § 257.95(g)(1)(iii). Preliminary evaluation of analytical results indicate that concentrations of Appendix IV constituents are less than GWPSs, adequately characterizing the vertical extent of Appendix IV concentrations identified greater than the GWPS at the waste boundary.

Data for those wells were collected in June and August 2023, and the results are presented in Table 3. A minimum of four samples are required to calculate confidence intervals; therefore, analytical results are compared to GWPSs for preliminary evaluation only. Lab reports from the June and August 2023 sampling events are included in Appendix D.

3.5 Summary of Alternate Source Demonstration

An Alternate Source Demonstration (ASD) has not been performed for the CGP; however, if further investigation of groundwater beneath the CGP indicates Appendix IV constituents at concentrations greater than GWPSs are naturally occurring or from another source, an ASD may be performed.

4.0 ASSESSMENT OF CORRECTIVE MEASURES

CCR groundwater monitoring downgradient of the CGP has included the detection of Appendix IV constituents at SSLs greater than the GWPS defined under 40 CFR § 257.95(h). Consequently, an assessment of corrective measures is necessary. Performing a thorough assessment of corrective measures requires identification and evaluation of technologies and methods that may be used as elements of remedial actions to meet the requirements of the CCR Rule. Potential source control methods are described in Section 4.2. Various groundwater remedial technologies selected to be evaluated for potential implementation are identified in Section 4.3. Additional remedial technologies may also be evaluated if determined to be applicable and appropriate. The ACM evaluation to meet requirements of 40 CFR § 257.96 is described in Section 4.4. The ACM evaluation is provided in Appendix B and Tables 1A and 1B.

4.1 Objectives of Remedial Measures Evaluation

As indicated in 40 CFR § 257.96(a), the objectives of the corrective measures evaluated in this ACM report are "to prevent further releases [from the CGP], to remediate any releases, and to restore affected area to original conditions." As required in 40 CFR § 257.97(b), corrective measures, at minimum, must:

(1) Be protective of human health and the environment;

(2) Attain the groundwater protection standard as specified pursuant to § 257.95(h);

(3) Control the source(s) of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of constituents in appendix IV to this part into the environment;

(4) Remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems;

(5) Comply with standards for management of wastes as specified in § 257.98(d).

The following evaluation is provided to meet these objectives.

4.2 Potential Source Control Measures

The objective of source control measures is to prevent further releases from the source (*i.e.*, the CGP). According to Page 21406 of 40 CFR § 257,

> *Source control measures need to be evaluated to limit the migration of the plume, and to ensure an effective remedy. The regulation does not limit the definition of source control to exclude any specific type of measures to achieve this. Remedies must control the source of the contamination to reduce or eliminate further releases by identifying and locating the cause of the release. Source control measures may include the following: Modifying the operational procedures (e.g., banning waste disposal); undertaking more extensive and effective maintenance activities (e.g., excavate waste to repair a liner failure); or, in extreme cases, excavation of deposited wastes for treatment and/ or offsite disposal. Construction and operation requirements also should be evaluated.*

Closure by removal of CCR material was selected as the source control measure. In adherence with state and federal regulatory requirements and timelines, Santee Cooper initiated closure of the CGP in 2016; closure was confirmed on March 17, 2017.

4.3 Potential Remedial Technologies

While there are numerous technologies for remediating organic constituents, fewer options exist for addressing inorganic constituents, such as those found at the CGP. The range of inorganic constituents with variable geochemical reactivity poses potential remediation challenges.

The focus of corrective measures for the CCR Rule is on Appendix IV constituents detected at SSLs greater than GWPSs. As summarized in Section 3.2, the following Appendix IV constituents were detected at SSLs greater than their GWPSs in one or more downgradient CCR waste boundary monitoring wells: beryllium, cobalt, lead, and lithium.

The following is a broad list of groundwater remedial technologies that could be used to address the Appendix IV constituents identified for the CGP:

- In situ technologies
    - Groundwater migration barriers
    - In situ chemical stabilization
    - Permeable Reactive Barriers (PRBs)
    - Monitored Natural Attenuation (MNA)
- Groundwater extraction
    - Conventional vertical well systems
    - Horizontal/Angular well systems
    - Trenching systems
    - Stimulated wells
    - Phytoremediation
- Treatment of extracted groundwater
    - pH adjustment
    - Precipitation technologies
    - Adsorption technologies
    - Exchange technologies
    - Membrane technologies
    - Biological treatment and oxidation

A full description of each technology is provided in Appendix A. These technologies are considered as part of the ACM evaluation described in Section 4.4. The evaluation is provided in Appendix B and summarized in Tables 1A and 1B.

4.4 Evaluation to Meet Requirements in 40 CFR § 257.96(c)

Requirements for the ACM are outlined in 40 CFR § 257.96. Each of the potential remedial technologies identified in Section 4.3 will be screened against evaluation criteria requirements in 40 CFR § 257.96(c) listed below.

40 CFR § 257.96(c) states that:

> *The assessment under paragraph (a) of this section must include an analysis of the effectiveness of potential corrective measures in meeting all of the requirements and objectives of the remedy as described under § 257.97 addressing at least the following:*
>
> *(1) The performance, reliability, ease of implementation, and potential impacts of appropriate potential remedies, including safety impacts, cross-media impacts, and control of exposure to any residual contamination;*
>
> *(2) The time required to begin and complete the remedy;*
>
> *(3) The institutional requirements, such as state or local permit requirements or other environmental or public health requirements that may substantially affect implementation of the remedy(s).*

The evaluation of potential remedies using these criteria from 40 CFR § 257.96(c) is provided in Appendix B. Results from the Appendix B evaluation are summarized in Table 1A and 1B. In the selection of remedy processes that will follow this ACM, the selected remedy must take into account the considerations outlined in 40 CFR § 257.97. The selection of remedy requirements found in 40 CFR § 257.97 is outlined in Appendix C.

This ACM Report provides a high-level assessment of groundwater remedial technologies that could potentially address Appendix IV constituents greater than GWPS under current site conditions. Santee Cooper must begin the remedy selection process and ultimately select a remedy after publication of this ACM Report. The remedy selection process and selected remedy must satisfy standards listed in 40 CFR § 257.97(b) with consideration to evaluation factors listed in 40 CFR § 257.97(c).

5.0 SELECTION OF REMEDY PROCESS

The remedy selection begins after completion of the ACM report. Groundwater characterization data gaps that should be addressed before final evaluation of potential remedial technologies and remedial approaches are described in Section 5.1. The process for selecting a remedial technology or remedial approach including additional reporting requirements is described in Section 5.2. The requirement to conduct a public meeting prior to final remedy selection is discussed in Section 5.3. Reporting requirements after the selection of a final remedy are discussed in Section 5.4.

40 CFR § 257.97(a) states that:

> *Based on the results of the corrective measures assessment conducted under § 257.96, the owner or operator must, as soon as feasible, select a remedy that, at a minimum, meets the standards listed in paragraph (b) of this section. This requirement applies to, not in place of, any applicable standards under the Occupational Safety and Health Act. The owner or operator must prepare a semiannual report describing the progress in selecting and designing the remedy. Upon selection of a remedy, the owner or operator must prepare a final report describing the selected remedy and how it meets the standards specified in paragraph (b) of this section. The owner or operator must obtain a certification from a qualified professional engineer that the remedy selected meets the requirements of this section. The report has been completed when it is placed in the operating record as required by § 257.105(h)(12).*

5.1 Data Gaps

Ongoing sampling of the CCR monitoring system (waste boundary and characterization wells) should continue to determine whether the horizontal and vertical extent of Appendix IV constituents greater than GWPSs is adequately delineated and to evaluate constituent concentration trends over time.

In May 2023, five CCR characterization monitoring wells were installed downgradient to the east and southeast of the CGP so that the horizontal and vertical extent of beryllium, cobalt, lead, and lithium could be delineated (Section 3.4). Given the time frame to initiate an ACM, only two rounds of sampling have been conducted since monitoring well installation. The initial analytical results aid in preliminary characterization of constituents released from the CCR unit and were a critical component in the development of a thorough ACM. Based on preliminary evaluation of groundwater in characterization wells, no new SSLs are anticipated to be identified. However, additional data (a minimum of four samples) are needed in order to determine statistical concentration trends, calculate confidence intervals, and identify SSLs greater than GWPSs. In addition, groundwater samples must be collected over a period of time to capture seasonal and natural variations of naturally occurring constituents at the site.

Beryllium, cobalt, and lithium identified in waste boundary monitoring well CGYP-6 are greater than the GWPS and the extent has not been adequately delineated. CGYP-6 is installed in an active industrial area with underground utilities and above-ground wastewater treatment facilities and equipment, which makes the installation of a downgradient characterization well difficult in this area. In addition, plans to expand the wastewater treatment facility to comply with new Steam Electric Effluent Limitations Guidelines (ELG) regulations require CGYP-6 to be replaced. Once CGYP-6 has been replaced and construction for the new facility is complete, characterization of beryllium, cobalt, and lithium in the vicinity of CGYP-6 should be conducted.

Other potential data gaps include site investigations needed to support selecting an appropriate remedy(s) to achieve GWPS in a reasonable time frame. Groundwater flow and transport modeling may be needed to estimate the timeframe to achieve GWPSs for different remediation scenarios. Addition geochemical evaluations could support the understanding of aquifer geochemistry and the nature of constituent mobility under current groundwater conditions. Further geologic investigations may be needed to determine the depth of a confining unit beneath the CGP. Additional hydrogeologic investigations and groundwater characterization would be conducted in appropriate phases during the remedy selection process. Implementation feasibility study(s) would also be conducted to account for infrastructure that may be beneficial or a limiting factor to the implementation of potential remedial options.

5.2 Selection of Remedy

The process of selecting a remedy or remedial approach begins after completion of this ACM Report. The owner or operator must select a remedy and begin implementing that remedy as soon as feasible. Progress toward selecting a preferred remedy must be documented in a semiannual report in accordance with 40 CFR § 257.97. Bench-scale and on-site pilot testing may be required to evaluate the effectiveness of one or more remedial technologies under site-specific conditions. One or more preferred remedial approaches should be developed based on technology effectiveness under site conditions, ease of implementation, cost-effectiveness, and other considerations. A public meeting with citizen and government stakeholders should be scheduled once one or more preferred remedial approach(s) are identified. Requirements for conducting public meetings are presented in Section 5.3.

5.3 Public Meeting Requirement in 40 CFR § 257.96(e)

Santee Cooper must hold a public meeting to discuss ACM results, the remedy selection process, and selection of one or more preferred remedial approaches. The public meeting must be conducted in accordance with 40 CFR § 257.96(e). The public meeting must be conducted at least 30 days prior to selection of a final remedy. Santee Cooper will notify citizen and governmental stakeholders when the public meeting is scheduled.

5.4 Final Remedy Selection

A report documenting the remedy selection process must be prepared after the selection of a final remedy. The report must demonstrate how the remedy selection process and the selected remedial approach satisfy 40 CFR § 257.97 requirements. Requirements for remedy selection are outlined in Appendix C.

6.0 REFERENCES

Garett and Moore. (2011). *Site Hydrogeologic Characterization Report – Cross Generating Station*. October 27, 2011.

Santee Cooper. (2022). *Groundwater Monitoring Program Plan – Cross Generating Station*. December 30, 2022.

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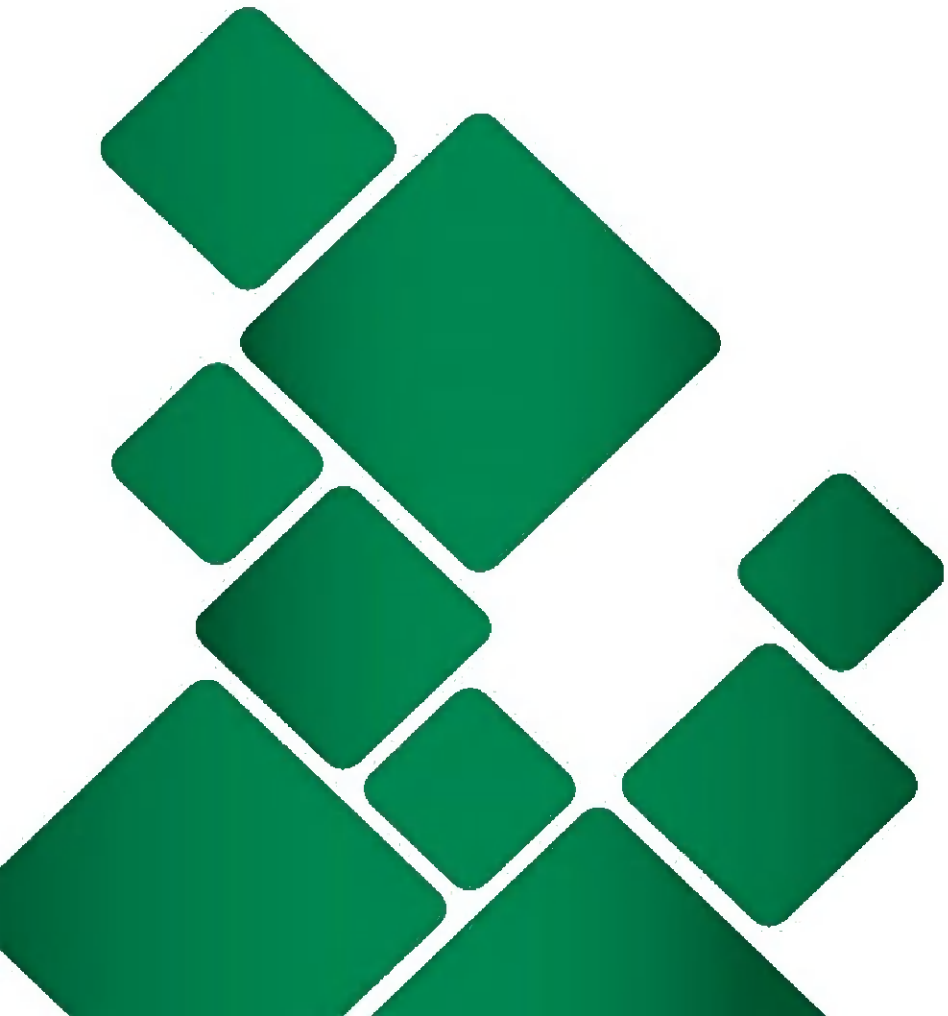
FIGURES



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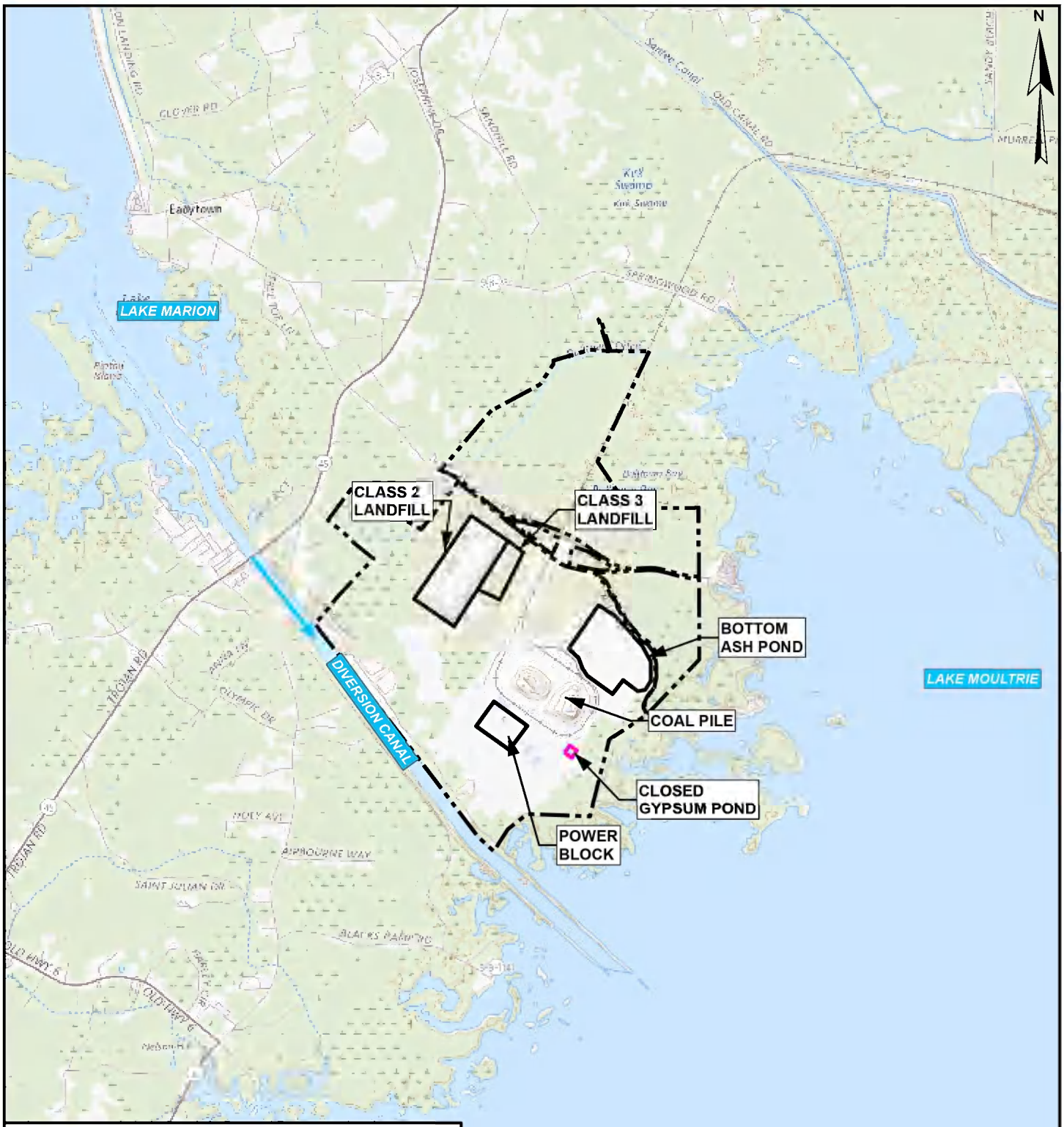

NOTES:

1. ALL BOUNDARIES ARE APPROXIMATE.
2. USGS TOPOGRAPHIC MAP OBTAINED FROM ESRI. LAST UPDATED JUNE 2022.
3. DRAWING HAS BEEN SET WITH A PROJECTION OF SOUTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3900 (NAD83).

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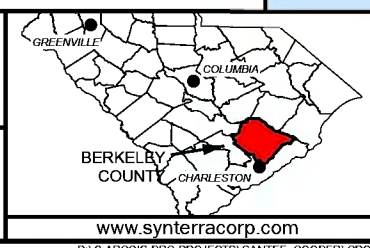

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FIGURE 1
SITE LOCATION MAP
CLOSED GYPSUM POND
ASSESSMENT OF CORRECTIVE MEASURES REPORT
CROSS GENERATING STATION
PINEVILLE, SOUTH CAROLINA

DRAWN BY: T. KING	DATE: 10/13/2022
REVISED BY: T. KING	DATE: 10/24/2023
CHECKED BY: K. FERRI	DATE: 10/24/2023
APPROVED BY: K. FERRI	DATE: 10/24/2023
PROJECT MANAGER: K. FERRI	

GRAPHIC SCALE
2,000 1,000 0 2,000
(IN FEET)

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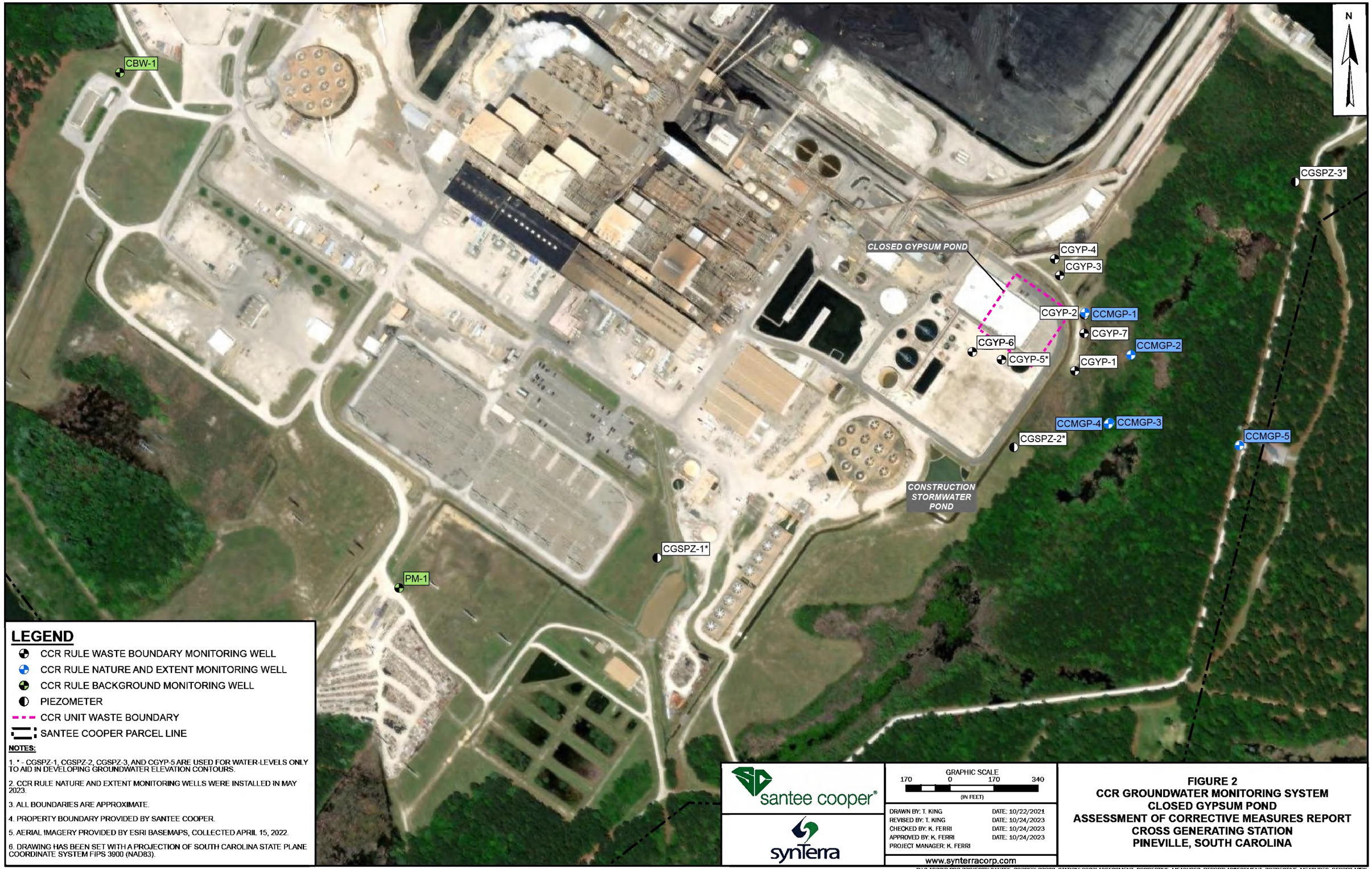

LEGEND

- CCR RULE WASTE BOUNDARY MONITORING WELL
- CCR RULE NATURE AND EXTENT MONITORING WELL
- CCR RULE BACKGROUND MONITORING WELL
- PIEZOMETER
- CCR UNIT WASTE BOUNDARY
- SANTEE COOPER PARCEL LINE

NOTES:

1. * - CGSPZ-1, CGSPZ-2, CGSPZ-3, AND CGYP-5 ARE USED FOR WATER-LEVELS ONLY TO AID IN DEVELOPING GROUNDWATER ELEVATION CONTOURS.
2. CCR RULE NATURE AND EXTENT MONITORING WELLS WERE INSTALLED IN MAY 2023.
3. ALL BOUNDARIES ARE APPROXIMATE.
4. PROPERTY BOUNDARY PROVIDED BY SANTEE COOPER.
5. AERIAL IMAGERY PROVIDED BY ESRI BASEMAPS, COLLECTED APRIL 15, 2022.
6. DRAWING HAS BEEN SET WITH A PROJECTION OF SOUTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3900 (NAD83).

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GRAPHIC SCALE
170 0 170 340
(IN FEET)

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CHECKED BY: K. FERRI	DATE: 10/24/2023
APPROVED BY: K. FERRI	DATE: 10/24/2023
PROJECT MANAGER: K. FERRI	

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FIGURE 2
CCR GROUNDWATER MONITORING SYSTEM
CLOSED GYPSUM POND
ASSESSMENT OF CORRECTIVE MEASURES REPORT
CROSS GENERATING STATION
PINEVILLE, SOUTH CAROLINA

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FIGURE 3
SITE-WIDE POTENTIOMETRIC MAP
UPPERMOST AQUIFER (JUNE 2023)
CLOSED GYPSUM POND
ASSESSMENT OF CORRECTIVE MEASURES REPORT
CROSS GENERATING STATION
PINEVILLE, SOUTH CAROLINA

GRAPHIC SCALE
600 0 600 1200
IN FEET

DRAWN BY: J. CHASTAIN	DATE: 10/24/2023
REVISED BY:	DATE:
CHECKED BY: K. FERRI	DATE: 10/24/2023
APPROVED BY: K. FERRI	DATE: 10/24/2023
PROJECT MANAGER: K. FERRI	

FILE NAME:
LAYOUT: FIG 3 BACKUP SITEWIDE
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LAST SAVED DATE: 10/24/2023 11:03 AM
PLOT DATE: 10/24/2023 11:19 AM

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CROSS GENERATING STATION
PINEVILLE, SOUTH CAROLINA

LAKE MARION
LAKE MOULTRIE
DIVERSION CANAL
TROJAN RD (SC HWY 46)
EADIE LN
VIPER ROAD
BULLTOWN DITCH
FLOW
BULLTOWN #2 NM
BULLTOWN #1 NM
CCMLF-1 76.17
CCMLF-2 75.45
CGSPZ-5 76.00
POZ-6 76.37
POZ-4 76.54
CLF1B-5 75.88
CAP-13 75.38
CGSPZ-4 75.77
POZ-3 76.58
CLASS 2 LANDFILL
CLASS 3 LANDFILL
CLF1B-4 76.14
CROSS STATION RD
CCMAP-6 74.82
CCMAP-8 74.92
MOFFS LANDING
POZ-7 75.96
CLF1B-3 76.22
CCMAP-5 76.20
CCMAP-4 76.01
CGS-PSE-4 DRY
CAP-5 75.90
CLF1B-2 76.27
CLF1B-1 76.34
CGS-PSE-5 76.71
CAP-7 75.90
CAP-3 76.15
BOTTOM ASH POND
CGS-PSE-3 81.57
CAP-9 76.62
CGS-PSE-6 74.64
COAL PILE
CAP-1 76.38
DECANT POND
CGS-PSE-2 89.99
HALLS RD
HALLS SUBDIVISION
CBW-1 76.15
CGYP-4 75.76
CAP-11 77.00
CCMAP-7 73.86
CGYP-3 75.27
CLOSED GYPSUM POND
CGYP-5 76.43
CGYP-2 75.18
CGSPZ-3 74.11
CGYP-7 75.16
CGYP-6 75.34
CCMGP-2 75.05
CGYP-1 75.08
CGS-PSE-1 74.81
CCMGP-5 73.07
CGSPZ-1 75.40
CCMGP-3 74.69
BM-1 75.33
CONSTRUCTION STORM WATER POND
CGSPZ-2 74.85
DIVERSION CANAL
LAKE MOULTRIE

LEGEND

- CLF1B-1 76.34 — MONITORING WELL UPPERMOST AQUIFER WATER LEVEL IN FEET (NAVD88)
- CGS-PSE-6 74.64 — SURVEYED SURFACE WATER ELEVATIONS (UNLINED PONDS) WATER LEVEL IN FEET (NAVD88)
- INFERRED GROUNDWATER CONTOUR IN FEET (NAVD88)
- GROUNDWATER FLOW DIRECTION
- SANTEE COOPER PARCEL LINE
- CCR UNIT WASTE BOUNDARY

NOTES:
MAP IS PROJECTED IN SOUTH CAROLINA STATE PLANE NAD83 (INTERNATIONAL FEET) AND NAVD88
MONITORING WELLS LOCATIONS WERE PROVIDED BY SANTEE COOPER IN NAD83 AND NAVD88 DATUMS.
JANUARY 2021 AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH PRO.
MONITORING WELL WATER LEVELS WERE GAUGED JUNE 6, 2023, AND SURFACE WATER ELEVATION WERE GAUGED ON JUNE 6, 2023. THIS DATA WAS PROVIDED BY SANTEE COOPER.

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LEGEND

- CGYP-5 76.43 — CCR RULE WASTE BOUNDARY MONITORING WELL WATER LEVEL IN FEET (NAVD88)
- CCGMP-2 75.05 — CCR RULE NATURE AND EXTENT MONITORING WELL WATER LEVEL IN FEET (NAVD88)
- CGSPZ-3 74.11 — PIEZOMETER WATER LEVEL IN FEET (NAVD88)
- *CGS-PSE-1 74.81* — SURVEYED SURFACE WATER ELEVATIONS (UNLINED PONDS) WATER LEVEL IN FEET (NAVD88)
- 75 — INFERRED GROUNDWATER CONTOUR IN FEET (NAVD88)
- GENERALIZED GROUNDWATER FLOW DIRECTION
- PW #1 — PRODUCTION WELL
- SANTEE COOPER PARCEL LINE
- CCR UNIT WASTE BOUNDARY
- 80 — MAJOR CONTOUR (10 FOOT)
- 76 — MINOR CONTOUR (2 FEET)

NOTES:

MAP IS PROJECTED IN SOUTH CAROLINA STATE PLANE NAD83 (INTERNATIONAL FEET) AND NAVD88

MONITORING WELLS LOCATIONS WERE PROVIDED BY SANTEE COOPER IN NAD83 AND NAVD88 DATUMS.

JANUARY 2021 AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH PRO.

MONITORING WELL WATER LEVELS AND SURFACE WATER ELEVATION WERE PROVIDED BY SANTEE COOPER AND GAUGED ON JUNE 6, 2023.

THE TWO PRODUCTION WELL (PW #1 & PW #2)LOCATIONS WERE BASED ON THE *PUBLIC WATER SYSTEM OPERATING PERMIT*, NUMBER 0830019, DATED OCTOBER 8, 2008.

2017 SC DNR LIDAR DATA OBTAINED FROM NOAA DIGITAL COAST: ACCESS VIEWER AT https://coast.noaa.gov/dataviewer/#/lidar/search/

CCR RULE CHARACTERIZATION MONITORING WELLS WERE INSTALLED IN MAY 2023.

COAL PILE 76.7+/-
CGSPZ-3 74.11
CGYP-4 75.76
CGYP-3 75.27
CLOSED GYPSUM POND
CURRENT STORM WATER DITCH
FORMER STORM WATER DITCH
CGYP-2 75.18
CGYP-7 75.16
CCGMP-2 75.05
CGYP-6 75.34
CGYP-5 76.43
CGYP-1 75.08
CCGMP-3 74.69
CCGMP-5 73.07
CGSPZ-2 74.85
CGS-PSE-1 74.81
CONSTRUCTION STORM WATER POND
PW #1
PW #2
CGSPZ-1 75.40

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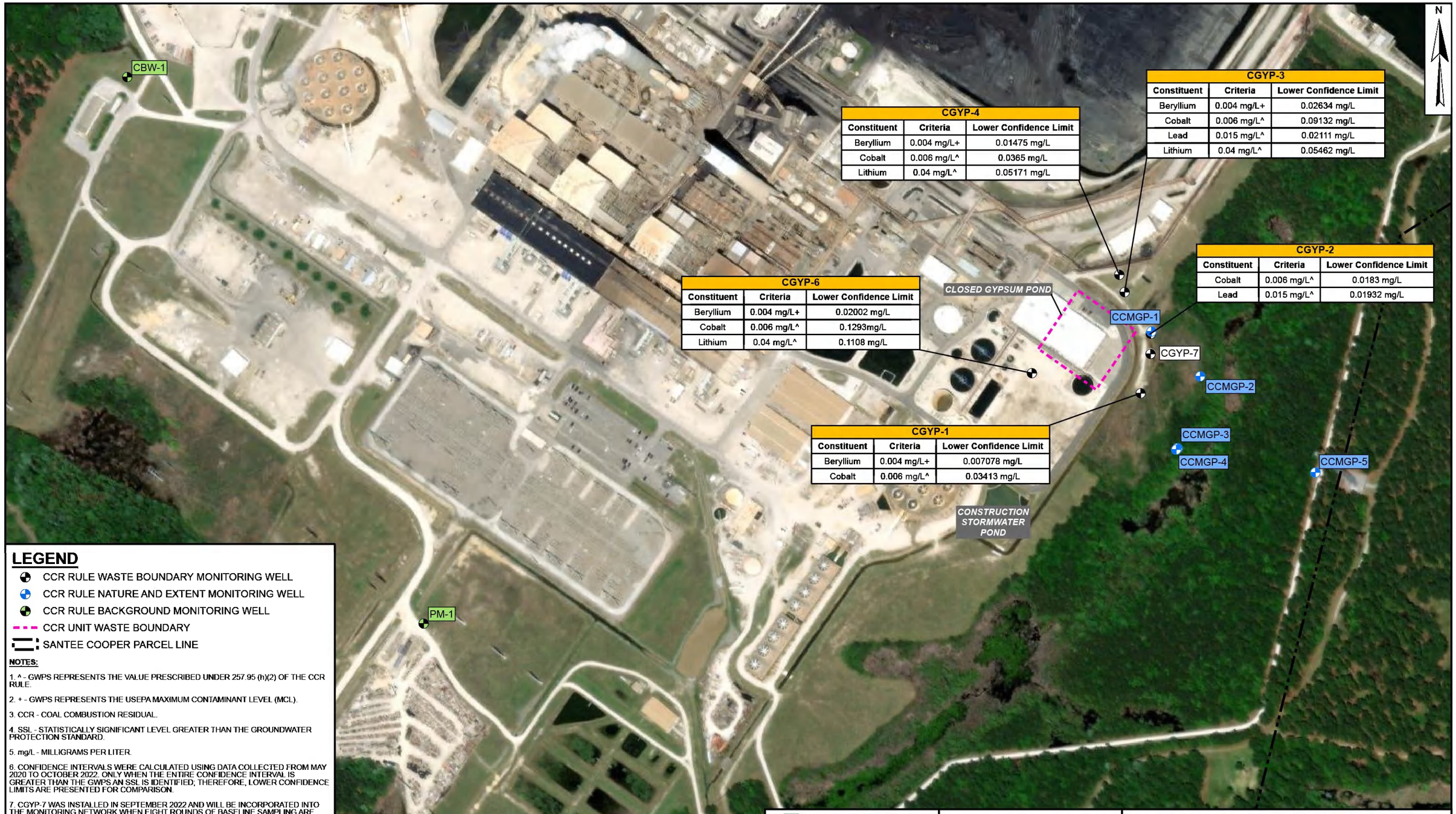
CROSS GENERATING STATION
PINEVILLE, SOUTH CAROLINA

GRAPHIC SCALE
100 0 100 200
IN FEET

FIGURE 4
CLOSED GYPSUM POND POTENTIOMETRIC MAP
UPPERMOST AQUIFER (JUNE 2023)
CLOSED GYPSUM POND
ASSESSMENT OF CORRECTIVE MEASURES REPORT
CROSS GENERATING STATION
PINEVILLE, SOUTH CAROLINA

DRAWN BY: J. CHASTAIN	DATE: 10/24/2023
REVISED BY:	DATE:
CHECKED BY: K. FERRI	DATE: 10/24/2023
APPROVED BY: K. FERRI	DATE: 10/24/2023
PROJECT MANAGER: K. FERRI	

FILE NAME:
LAYOUT: FIG 4 (CGYP WL MAP-JUNE 6-2023)
LAST SAVED BY: JCHASTAIN
LAST SAVED DATE: 10/24/2023 11:03 AM
PLOT DATE: 10/24/2023 11:18 AM



CGYP-4		
Constituent	Criteria	Lower Confidence Limit
Beryllium	0.004 mg/L+	0.01475 mg/L
Cobalt	0.006 mg/L^	0.0365 mg/L
Lithium	0.04 mg/L^	0.05171 mg/L

CGYP-3		
Constituent	Criteria	Lower Confidence Limit
Beryllium	0.004 mg/L+	0.02634 mg/L
Cobalt	0.006 mg/L^	0.09132 mg/L
Lead	0.015 mg/L^	0.02111 mg/L
Lithium	0.04 mg/L^	0.05462 mg/L

CGYP-2		
Constituent	Criteria	Lower Confidence Limit
Cobalt	0.006 mg/L^	0.0183 mg/L
Lead	0.015 mg/L^	0.01932 mg/L

CGYP-6		
Constituent	Criteria	Lower Confidence Limit
Beryllium	0.004 mg/L+	0.02002 mg/L
Cobalt	0.006 mg/L^	0.1293mg/L
Lithium	0.04 mg/L^	0.1108 mg/L

CGYP-1		
Constituent	Criteria	Lower Confidence Limit
Beryllium	0.004 mg/L+	0.007078 mg/L
Cobalt	0.006 mg/L^	0.03413 mg/L

LEGEND

- CCR RULE WASTE BOUNDARY MONITORING WELL
- CCR RULE NATURE AND EXTENT MONITORING WELL
- CCR RULE BACKGROUND MONITORING WELL
- CCR UNIT WASTE BOUNDARY
- SANTEE COOPER PARCEL LINE

NOTES:

1. ^ - GWPS REPRESENTS THE VALUE PRESCRIBED UNDER 257.95 (h)(2) OF THE CCR RULE.
2. + - GWPS REPRESENTS THE USEPA MAXIMUM CONTAMINANT LEVEL (MCL).
3. CCR - COAL COMBUSTION RESIDUAL.
4. SSL - STATISTICALLY SIGNIFICANT LEVEL GREATER THAN THE GROUNDWATER PROTECTION STANDARD.
5. mg/L - MILLIGRAMS PER LITER.
6. CONFIDENCE INTERVALS WERE CALCULATED USING DATA COLLECTED FROM MAY 2020 TO OCTOBER 2022. ONLY WHEN THE ENTIRE CONFIDENCE INTERVAL IS GREATER THAN THE GWPS AN SSL IS IDENTIFIED; THEREFORE, LOWER CONFIDENCE LIMITS ARE PRESENTED FOR COMPARISON.
7. CGYP-7 WAS INSTALLED IN SEPTEMBER 2022 AND WILL BE INCORPORATED INTO THE MONITORING NETWORK WHEN EIGHT ROUNDS OF BASELINE SAMPLING ARE COMPLETE.
8. ALL BOUNDARIES ARE APPROXIMATE.
9. PROPERTY BOUNDARY PROVIDED BY SANTEE COOPER.
10. CONFIDENCE INTERVALS FOR NEWLY INSTALLED CCR RULE NATURE AND EXTENT MONITORING WELLS WERE NOT AVAILABLE AT THE TIME OF THIS REPORT.
11. AERIAL IMAGERY PROVIDED BY ESRI BASEMAPS, COLLECTED APRIL 15, 2022.
12. DRAWING HAS BEEN SET WITH A PROJECTION OF SOUTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3900 (NAD83).

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GRAPHIC SCALE
150 0 150 300
(IN FEET)

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REVISED BY: T. KING	DATE: 10/24/2023
CHECKED BY: K. FERRI	DATE: 10/24/2023
APPROVED BY: K. FERRI	DATE: 10/24/2023
PROJECT MANAGER: K. FERRI	

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FIGURE 5
APPENDIX IV SSLs FOR UPPERMOST AQUIFER
CLOSED GYPSUM POND
ASSESSMENT OF CORRECTIVE MEASURES REPORT
CROSS GENERATING STATION
PINEVILLE, SOUTH CAROLINA

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TABLES

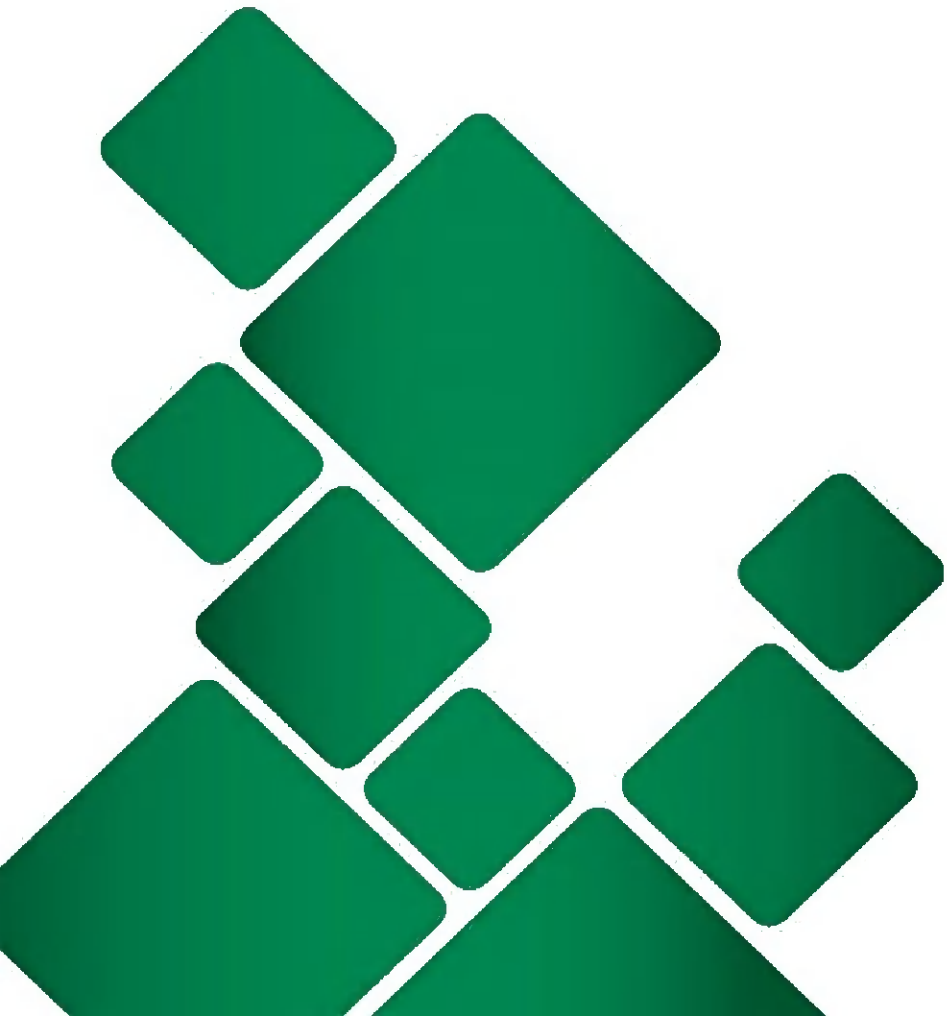

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TABLE 1A
REMEDIAL ALTERNATIVES SCREENING MATRIX - 40 CFR § 257.96 REQUIREMENTS
CLOSED GYPSUM POND
ASSESSMENT OF CORRECTIVE MEASURES REPORT
CROSS GENERATING STATION
PINEVILLE, SOUTH CAROLINA

		In-situ Technologies				*Groundwater Extraction Technologies*				*Continued Groundwater Monitoring Action*
	Excavation and Removal*	**Monitored Natural Attenuation**	**Groundwater Migration Barriers**	**In-situ Chemical Stabilization**	**Permeable Reactive Barrier**	**Conventional Vertical Well System**	**Horizontal/ Angular Well System**	**Trenching System**	**Phytoremediation/ TreeWell**	**Groundwater Monitoring Wells**
257.96(c)(1)										
Performance	High; Eliminates CCR (primary source).	Low to medium; Varies depending on COC.^	Medium; Depends on site conditions.^	Low to high; Depends on COC and hydrogeologic conditions.^	Low to high; Depends on COC, site and hydrogeologic conditions.^ Requires periodic replacement of reactive media.	High; Can reduce COC concentrations effectively.	Medium to high; Can reduce COC concentrations effectively.	Medium; Depends on site/hydrogeologic conditions.^	Low to high; Depends on COC and hydrogeologic conditions.^	High
Reliability	High	Low to Medium; Varies depending on COC.^	Low to medium due to the likelihood of flow above and around the barriers.	Low to high; Depends on COC and hydrogeologic conditions.^	Low to high; Depends on COC, site and hydrogeologic conditions.^	Medium to high; Typically moderate to high maintenance requirements.	Medium to high; Typically low maintenance systems.	Medium to high; Typically low maintenance systems.	Low to high; Depends on COC and hydrogeologic conditions.^	High
Ease of implementation	Medium to high; Operating landfill already in place at time of excavation.	High; Incorporates existing monitoring wells.	Low; Can be difficult due to depth to suitable lower geologic units and undergrown utilities.	Low; Varying site and hydrogeologic conditions can increase implementation difficulties.	Low; Varying site and hydrogeologic conditions can increase implementation difficulties.	Medium; Requires conveyance and possible treatment of extracted groundwater.	Medium; Requires conveyance and possible treatment of extracted groundwater.	Low to medium; Varying site and hydrogeologic conditions can increase implementation difficulties. Requires conveyance and possible treatment of collected groundwater.	Medium to high	High
Potential impacts of appropriate potential remedies: safety impacts	Medium due to minimal quantity of CCR transported.	Low	High due to construction of barrier.	Low	High due to construction of barrier.	Low	Low	High due to construction of trench.	Low	Low
Potential impacts of appropriate potential remedies: cross-media impacts	Medium due to minimal quantity of CCR transported.	Low	Medium; could change groundwater flow direction and expose previously unexposed soil or surface water.	Low	Low	Medium due to the potential for cross contamination in the event of equipment failure.	Medium due to the potential for cross contamination in the event of equipment failure.	Medium due to the potential for cross contamination in the event of equipment failure.	Medium	Low
Potential impacts of appropriate potential remedies: control of exposure to residual contamination	Low; Material is stored in an on-site lined landfill, which allows for safe storage in an engineered facility.	Low	Low	Low	Low	Low	Low	Medium	Low	Low
257.96(c)2)										
Time required to begin remedy	6 to 12 months	3 months to 1 year	1 to 2 years	6 months to 1 year; Requires pilot testing.	1 to 1.5 years; Requires bench testing.	1 to 2 years	1 to 2 years	1 to 2 years	6 –12 months	Currently Installed
Time required to complete remedy	Excavation is complete; this portion of the remedy was completed in 19 months.	Varies depending on COC^ and groundwater flow velocities.								Currently Installed

TABLE 1A
REMEDIAL ALTERNATIVES SCREENING MATRIX - 40 CFR § 257.96 REQUIREMENTS
CLOSED GYPSUM POND
ASSESSMENT OF CORRECTIVE MEASURES REPORT
CROSS GENERATING STATION
PINEVILLE, SOUTH CAROLINA

		In-situ Technologies				*Groundwater Extraction Technologies*				*Continued Groundwater Monitoring Action*
	Excavation and Removal*	**Monitored Natural Attenuation**	**Groundwater Migration Barriers**	**In-situ Chemical Stabilization**	**Permeable Reactive Barrier**	**Conventional Vertical Well System**	**Horizontal/ Angular Well System**	**Trenching System**	**Phytoremediation/ TreeWell**	**Groundwater Monitoring Wells**
257.96(c)(3)										
State, local or other environmental permit requirements that may substantially affect implementation	Requires permitting of new CCR unit and compliance with state required closure plan approval process. Excavation is complete.	None	Requires state permits, natural resources survey prior to design, and a construction permit.	Requires underground injection permit by state.	Requires construction permit.	Requires discharge permit.	Requires discharge permit.	Requires construction permit and discharge permit.	None to minor	None
Comments	Excavation removes CCR source from current area and provides management in an on-site lined landfill, which allows for safe storage in an engineered facility.	Time to achieve goals may be long. Time must be compared to other options. May need to be combined with other measures.	May require additional extraction system to maintain integrity of barrier.	Measure not effective with soluble COCs. Reapplication may be required.	Measure may not be effective with all soluble COCs.	Relatively quick implementation and operation. May require treatment of extracted groundwater.	Potentially more difficult to implement than vertical well system. May require treatment of extracted groundwater.	May require extraction system and potential treatment of extracted groundwater.	Green remediation. Measure may not be effective for all COCs and site conditions.	Monitoring system already installed and has been sampled since 2020.

Prepared by: KHF Checked by: KWW

Notes:

* - Excavation and closure of the Closed Gypsum Pond is complete.

^ - Denotes current data gaps. Additional assessments will be conducted during the remedy selection phase.

COC - Constituent of Concern (Appendix IV constituent)

GWPS - Groundwater Protection Standards

CCR - Coal Combustion Residuals

TABLE 1B
WATER TREATMENT TECHNOLOGIES FOR APPENDIX IV SSLs
CLOSED GYPSUM POND
ASSESSMENT OF CORRECTIVE MEASURES REPORT
CROSS GENERATING STATION
PINEVILLE, SOUTH CAROLINA

Water Treatment Technology	Appendix IV SSLs			
	Beryllium	Cobalt	Lithium	Lead
Coagulation/Filtration	x		x	x
Reverse Osmosis	x	x	x	x
Co-precipitation			x	x
Lime Precipitation	x			x
Sulfide Precipitation				
Ion Exchange	x	x	x	x
Activated Carbon Adsorption		x		x
Activated Alumina Adsorption	x			x
Other Adsorbents		x	x	x
Membrane Filtration		x		x
Iron Oxide Adsorption				
Oxyhydroxide Adsorption				x
Oxidation				
Biological Treatment				

Prepared by: KHF Checked by GTC

Notes

SSL - Statistically significant levels greater than groundwater protection standards.

References:

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https://nepis.epa.gov/Exe/ZyNET.exe/91018HWZ.txt?ZyActionD=ZyDocument&Client=EPA&Index=1976%20Thru%201980&Docs=&Query=%28lead%29%20OR%20FNAME%3D%2291018HWZ.txt%22%20AND%20FNAME%3D%2291018HWZ.txt%22&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5CZYFILES%5CINDEX%20DATA%5C76THRU80%5CTXT%5C00000025%5C91018HWZ.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=2&SeekPage=f

https://www.dynamicadsorbents.com/aluminalead/

https://nepis.epa.gov/Exe/ZyNET.exe/91018HWZ.txt?ZyActionD=ZyDocument&Client=EPA&Index=1976%20Thru%201980&Docs=&Query=%28lead%29%20OR%20FNAME%3D%2291018HWZ.txt%22%20AND%20FNAME%3D%2291018HWZ.txt%22&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5CZYFILES%5CINDEX%20DATA%5C76THRU80%5CTXT%5C00000025%5C91018HWZ.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=2&SeekPage=f

TABLE 2
ASSESSMENT MONITORING RESULTS COMPARISON TO GWPSs
SHALLOW FLOW ZONE
CLOSED GYPSUM POND
ASSESSMENT OF CORRECTIVE MEASURE REPORT
CROSS GENERATING STATION
PINEVILLE, SOUTH CAROLINA

Analytical Parameter		Appendix III Parameters CCR Rule 257.95 (d)(1)							Appendix IV Parameters CCR Rule 257.95 (d)(1)														
		pH	Boron	Calcium	Chloride	Fluoride	Sulfate	Total Dissolved Solids	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium	Total Radium
Reporting Units		S.U.	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pCi/L
Comparison Criteria		4.09 - 5.58*	0.049*	36.31*	13.5*	0.3*	115*	200.1*	0.025#	0.016#	2+	0.004+	0.005+	0.1+	0.006^	4+	0.015^	0.04^	0.002+	0.1^	0.05+	0.002+	16.3#
Well ID	Sample Collection Date	Lower Confidence Limit																					
CGYP-1	2/7/2023	4.38	**11.1**	**264**	7.21	**1.28**	**476**	**1764**	ND	0.01362	0.03684	**0.007078**	0.0022	ND	**0.03413**	0.7963	0.007209	0.01	0.0002	ND	0.0025	ND	3.144
CGYP-2	2/6/2023	**4.01**	**0.602**	**301**	**46**	**1.12**	**958**	**1474**	ND	0.01394	0.01747	0.003136	0.0014	ND	**0.0183**	0.4828	**0.01932**	0.005	ND	ND	0.0025	ND	1.924
CGYP-3	2/6/2023	**3.77**	**23.9**	**737**	**1270**	**3.08**	**928**	**3838**	ND	0.01318	0.03447	**0.02634**	0.00062	0.005426	**0.09132**	1.152	**0.02111**	**0.05462**	0.0002	ND	0.0025	ND	4.638
CGYP-4	2/6/2023	**4.01**	**5.67**	**266**	**417**	**1.58**	**557**	**1689**	ND	0.007649	0.02721	**0.01475**	0.0005	ND	**0.0365**	1.037	0.01021	**0.05171**	NA	ND	0.0025	ND	3.425
CGYP-6	2/7/2023	**3.80**	**9.49**	**520**	**1150**	**0.89**	**163**	**2959**	ND	NA	0.2978	**0.02002**	0.0005	ND	**0.1293**	0.5448	0.007367	**0.1108**	NA	ND	ND	ND	3.813

Prepared by: DAT Checked by: AMH/KHF

Notes:

- Blue highlighted cells with bold values indicate the reported concentration for the Appendix III parameter is greater than the comparison criteria (for pH, greater than or less than the comparison criteria range).

- Orange highlighted cells with bold values indicate the lower confidence limit for the Appendix IV parameter is greater than the comparison criteria.

Only when the entire confidence interval is greater than the comparison criteria a statistically significant level (SSL) is identified, therefore, lower confidence limits are presented for comparison.
Background wells: PM-1 and CBW-1
* - Appendix III parameters comparison criteria are interwell prediction limits calculated using pooled upgradient well data collected between 2015 and 2023.
^ - GWPS represents the value prescribed under 257.95(h)(2) of the CCR Rule.
+ - GWPS represents the USEPA maximum contaminant level (MCL).
# - GWPS for the constituent is the upper tolerance limit (UTL) calculated using upgradient well data collected from October 2015 through October 2022. The UTL for the constituent is greater than the MCL.
CGYP-7 was installed in September 2022 and will be incorporated into the monitoring network when eight rounds of baseline sampling are complete.
NC - not calculated
CCR - coal combustion residuals
GWPS - Groundwater Protection Standard
µg/L - micrograms per liter
mg/L - milligrams per liter
ND - non-detect
pCi/L - picocuries per liter
S.U. - standard units
Total Radium - Radium-226 and Radium-228 combined
USEPA - United States Environmental Protection Agency

TABLE 3
PRELIMINARY CHARACTERIZATION MONITORING WELL RESULTS COMPARISON TO GWPSs
CLOSED GYPSUM POND
ASSESSMENT OF CORRECTIVE MEASURE REPORT
CROSS GENERATING STATION
PINEVILLE, SOUTH CAROLINA

Analytical Parameter		Appendix III Parameters CCR Rule 257.95 (d)(1)							Appendix IV Parameters CCR Rule 257.95 (d)(1)														
		pH	Boron	Calcium	Chloride	Fluoride	Sulfate	Total Dissolved Solids	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium	Total Radium
Reporting Units		S.U.	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pCi/L
Comparison Criteria		4.09 - 5.58*	0.049*	36.31*	13.5*	0.3*	115*	200.1*	0.025#	0.016#	2+	0.004+	0.005+	0.1+	0.006^	4+	0.015^	0.04^	0.002+	0.1^	0.05+	0.002+	16.3#
Well ID	Sample Collection Date	Analytical Results																					
June 2023																							
CCMGP-1	6/6/2023	**7.08**	**0.823**	**151**	**125**	0.15	56.4	**771.2**	ND	ND	0.226	ND	ND	ND	ND	0.15	ND	0.0255	ND	ND	ND	ND	1.39
CCMGP-2	6/6/2023	4.96	**0.412**	**159**	**244**	**1.16**	**438**	**1045**	ND	0.0154	0.0166	0.00185	ND	ND	**0.0787**	1.16	0.00188	ND	ND	ND	ND	ND	4.25
CCMGP-3	6/6/2023	**3.81**	**0.0815**	**44.6**	**34.5**	**2.69**	**198**	**378.8**	ND	0.0115	.0196	**0.00759**	ND	ND	**0.0766**	2.69	0.00983	0.00855	ND	ND	ND	ND	1.34
CCMGP-4	6/6/2023	**6.39**	**1.95**	**233**	**283**	0.16	48.9	**1370**	ND	ND	0.457	ND	ND	0.059	**0.00849**	0.16	ND	0.0158	ND	0.0146	ND	ND	2.00
CCMGP-5	6/6/2023	**6.12**	0.0179	**66.6**	**23.9**	0.12	5.84	**388.8**	ND	ND	0.660	ND	ND	ND	0.00570	0.12	ND	ND	ND	ND	ND	ND	3.01
August 2023																							
CCMGP-1	8/2/2023	**6.74**	**0.475**	**133**	**108**	0.12	34.8	**660.0**	ND	ND	0.301	ND	ND	ND	ND	0.12	ND	0.0211	ND	ND	ND	ND	1.10
CCMGP-2	8/1/2023	**4.04**	**0.337**	**734**	**240**	**0.94**	**422**	**956.2**	ND	0.0120	0.0218	0.00318	0.00082	ND	**0.0847**	0.94	0.0134	0.00675	ND	ND	ND	ND	3.04
CCMGP-3	8/1/2023	**3.80**	**0.0775**	**274**	**28.5**	**2.84**	**205**	**16130**	ND	.00766	0.0305	**0.00729**	0.00062	ND	**0.0606**	2.84	0.00941	0.00897	ND	ND	ND	ND	1.46
CCMGP-4	8/1/2023	**6.34**	**1.67**	**222**	**273**	0.10	49.8	**1184**	ND	ND	0.510	ND	ND	ND	**0.0774**	0.10	ND	0.00169	ND	0.00698	ND	ND	2.24
CCMGP-5	8/1/2023	**6.35**	0.0172	**67.5**	**27.4**	0.10	2.34	**312.5**	ND	ND	0.851	ND	ND	ND	**0.00635**	0.10	ND	0.00653	ND	ND	ND	ND	2.30

Prepared by: KHF Checked by: AMH

Notes:

- Blue highlighted cells with bold values indicate the reported concentration for the Appendix III parameter is greater than the comparison criteria (for pH, greater than or less than the comparison criteria range).
- Orange highlighted cells with bold values indicate the analytical results for the Appendix IV parameter is greater than the comparison criteria.

This table presents a preliminary evaluation of groundwater data collected in June and August 2023 and is not an accurate representation of SSLs identified greater than the GWPS. Addition data is required to calculate confidence intervals and establish SSLs greater than GWPSs.

CGYP-7 is a waste boundary monitoring well. CCMGP-1 through CCMGP-5 are downgradient characterization wells.

Background wells: PM-1 and CBW-1

* - Appendix III parameters comparison criteria are interwell prediction limits calculated using pooled upgradient well data collected between 2015 and 2023.

^ - GWPS represents the value prescribed under 257.95(h)(2) of the CCR Rule.

+ - GWPS represents the USEPA maximum contaminant level (MCL).

- GWPS for the constituent is the upper tolerance limit (UTL) calculated using upgradient well data collected from October 2015 through October 2022. The UTL for the constituent is greater than the MCL.

CCR - coal combustion residuals

GWPS - Groundwater Protection Standard

µg/L - micrograms per liter

mg/L - milligrams per liter

ND - non-detect

pCi/L - picocuries per liter

SSL - statistically significant level greater that the GWPS

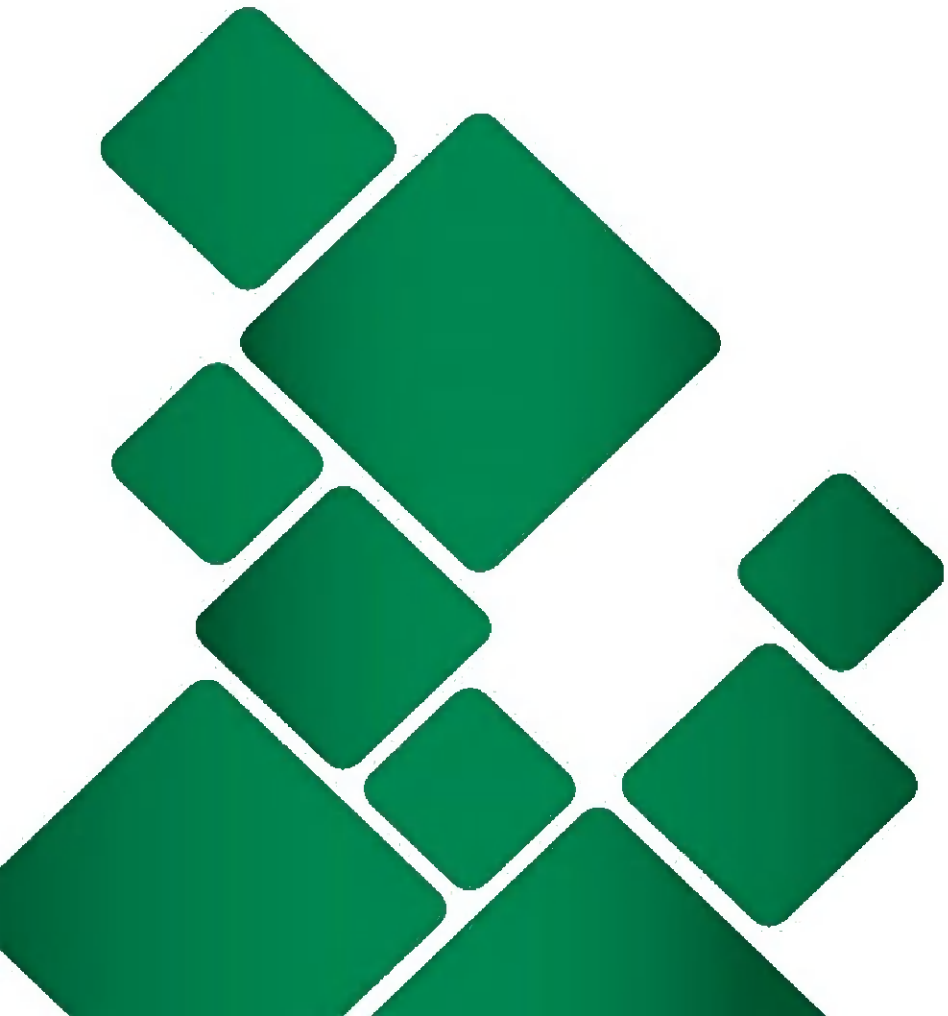
S.U. - standard units

Total Radium - Radium-226 and Radium-228 combined

USEPA - United States Environmental Protection Agency

APPENDIX A

POTENTIAL REMEDIES



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APPENDIX A

POTENTIAL REMEDIES

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The following remedies are considered part of the Assessment of Corrective Measures (ACM) evaluation described in Section 4.0. The evaluation is provided in Appendix B and summarized in Tables 1A and 1B. Additional potential remedies may also be evaluated if determined to be applicable and appropriate.

Source control is the primary remedy that has been implemented and removal of the source has prevented further release of coal combustion residuals (CCR) constituents to groundwater. The following groundwater corrective measures are for consideration in addition to closure by removal of CCR material.

1.1 Continued Groundwater Monitoring Remedial Action

If constituents are not reported at concentrations greater than Groundwater Protection Standards (GWPS) during multiple sampling events or successful Alternative Source Demonstrations (ASDs) have been conducted, it is scientifically valid to consider a continued groundwater monitoring action with continued groundwater monitoring as the correct and prudent remedy alternative.

It is expected that the requirements in 40 CFR § 257.98 (c) would be met and demonstrated through continued groundwater monitoring. It is expected that groundwater monitoring would continue to show either no constituent concentrations at SSLs greater than GWPSs or concentrations at SSLs greater than the GWPS are not attributed to the Closed Gypsum Pond (CGP). As noted previously, ASDs would be completed as necessary.

1.2 In-Situ Technologies

Groundwater remediation technologies that are implemented in-situ, or in place, are discussed here.

1.2.1 Groundwater Migration Barriers

Low permeability barriers can be installed below the ground surface to prevent groundwater flow from reaching the CCR unit waste boundary or locations that pose a threat to receptors. Barriers can be installed with continuous trenching techniques using bentonite or other slurries as the low permeable barrier material to prevent migration of groundwater. Barriers of cement/concrete and sheet piling can also be used. Barriers are most effective at preventing flow to or from relatively small areas or protecting receptors. Protecting larger areas is possible if the constituents of concern (COCs) are not highly soluble and cannot follow a diverted groundwater flow pattern. The barrier would change the groundwater flow conditions, and at some point, the increased head (pressure) would cause a change in flow patterns. This is generally around the ends or beneath the barrier.

Barriers have been useful for prevention/retardation of non-aqueous phase constituent migration, such as petroleum releases. They are less effective with soluble constituents that may travel with the water around or beneath the barrier. In cases where the

altered flow pattern may include downward flow beneath the barrier, their use creates additional challenges. The altered flow paths may result in deeper impacts.

To prevent groundwater flow beneath the barrier, it must be sealed at an underlying low permeable or impermeable layer such as clay or competent bedrock. It may be difficult to construct an effective seal depending upon the geologic conditions.

Groundwater migration barriers are often used in conjunction with groundwater extraction systems. The barriers are used to restrict flow to allow extraction systems upgradient of the barrier to collect groundwater. However, the challenges discussed above for creating a competent seal may still apply.

Site specific conditions that may not be conducive to groundwater migration barriers must be considered, such as the presence or absence of a confining geologic unit, the location of underground utilities, and plant operations.

1.2.2 In-Situ Chemical Stabilization

The placement of chemical reactants to immobilize dissolved phase constituents through precipitation or sorption can be an effective approach to reducing downgradient migration. Reagents such as ferrous sulfate, calcium polysulfide, zero-valent iron, organo-phosphorous mixtures, and sodium dithionate have been evaluated as potentially effective for coal ash related constituents.

Two considerations with this technology are permanence of the reaction product insolubility and the ability to inject the reactants sufficiently so that contact is adequate with the COCs.

Most stabilization reactions can be reversible depending on environmental conditions such as pH and oxidation state. Given the long periods of time for which the reaction products must remain insoluble, it may be difficult to predict future conditions sufficiently to address the permanence of this technology. Recurring treatment, based on intermittent testing, may be an option.

Contact between reagents and COCs is also a relevant consideration. This technology is best considered as a source reduction technology than a capture or barrier technology.

1.2.3 Permeable Reactive Barrier

Permeable Reactive Barriers (PRBs) can be an effective in-situ groundwater treatment technology. General design involves excavation of a narrow trench perpendicular to groundwater flow similar to a groundwater interceptor trench and then backfilling the trench with a reactive material that either removes or transforms COCs as the groundwater passes through the PRB. The PRB can be designed to include impermeable sections to funnel the flow through a more narrow and permeable reactive zone. This limits the potential of altered flow paths.

The ability to maintain adequate and reactive reagent concentrations at depth over an extended period of time is an operational and performance consideration. As with other in-situ approaches, reconstruction or regeneration may be needed on a periodic basis.

COCs may respond differently under basic water chemistry changes (*i.e.*, pH and E_H) and pilot testing is recommended. The technology may not be appropriate for relatively non-reactive COCs.

1.2.4 Monitored Natural Attenuation

Monitored Natural Attenuation (MNA) is a strategy and set of procedures used to demonstrate that physiochemical and/or biological processes in an aquifer will reduce concentrations of COCs to levels below regulatory standards or criteria. These processes attenuate the concentrations of inorganics in groundwater by physical and chemical means (*e.g.*, dispersion, dilution, sorption, and/or (co)precipitation). Dilution from recharge to shallow groundwater, mineral precipitation, and COC adsorption will occur over time, thus further reducing COC concentrations through attenuation. MNA is effective following source control and in combination with other groundwater remediation technologies. Regular monitoring of groundwater is conducted to confirm COC concentrations in groundwater are attenuating over space and time.

1.3 Groundwater Extraction

Groundwater extraction removes constituent mass from the groundwater and can provide hydraulic control to reduce or prevent groundwater constituent migration. Groundwater can be removed from the aquifer through the use of conventional vertical extraction wells, angled wells, horizontal wells, or collection trenches and associated pumping systems. The efficacy of each method is dependent upon specific site conditions, such as proximity to off-site water supply wells and long-term operation capabilities, which need to be considered.

1.3.1 Conventional Vertical Well Systems

Conventional vertical wells can usually be used in most cases unless accessibility is limited. Well spacing and depths depend upon the aquifer characteristics. If flow production from the aquifer is extremely limited, conventional wells may not be feasible because of the extremely close spacing and limited yields tend to be inefficient at mass removal but could create adequate hydraulic control. Vertical wells may be used at any depth and screened in unconsolidated soils.

1.3.2 Horizontal/Angular Well Systems

Horizontal or angled extraction wells are an alternative where access is constrained or for relatively shallow applications. They can cover a significant horizontal cross-section and, in some cases, may be much more efficient than vertical wells. They are not well suited to aquifers with significant temporal static water level variability. Cost can be prohibitive for deep installations.

1.3.3 Trenching Systems

Horizontal collection trenches function similar to horizontal wells but are installed with excavation techniques. They can be more cost-effective at shallow depths, and particularly, with higher flow regimes. They may not be cost-effective for deep applications.

1.3.5 Phytoremediation

Phytoremediation is the direct use of various living plants as a containment, degradation, or extraction technique for COCs found in soils, surface water, or groundwater. This technique is often more effective when COCs are at relatively low to moderate concentrations over a large area and at shallow depths. Phytotoxicity of target and non-target constituents, ability of a plant to uptake constituents, the natural growth rate of selected plant species, and growing season can be limiting factors for the effectiveness of this technique. Maintenance can include fertilizing, regular monitoring, and harvesting.

TreeWell® technology-based remediation is a newer, innovative vegetative remediation approach that employs traditional phytoremediation as well as technology that enhances the aggressive rooting ability of selected trees and other vegetation by managing root growth to extract groundwater at depths of up to 50 feet. This approach also makes it possible to direct the root growth to target a specific horizon in the aquifer while excluding other water sources. The primary means of realizing these goals is by utilizing a root sleeve liner that is installed to direct root development and water consumption. This TreeWell liner restricts lateral root growth and promotes vertical rooting development, allowing the roots to grow to the top of the water table. The groundwater would flow into the TreeWell® column of treatment media (*e.g.*, organic matter, zero valent iron) and up to the top of the water table to be extracted by the plant roots. Remediation processes typically take place in the treatment media (both anaerobic and aerobic) before the water reaches the tree roots in the aerobic vadose zone. In some cases, COCs (*e.g.*, boron) are taken up by the plant and subsequently sequestered in the plant tissues or transpired into the atmosphere to be photo-oxidized.

1.4 Treatment of Extracted Groundwater

Several technologies exist for treatment of extracted groundwater to remove or immobilize constituents ex-situ, or above ground. The following technologies could be considered if treatment of extracted groundwater is needed under a National Pollutant Discharge Elimination System (NPDES) permit. These groundwater treatment technologies are scalable for small to large flow rates.

1.4.1 pH Adjustment

Adjustment of the pH of extracted groundwater, which may be required prior to discharge, is a well-proven technology. For acidic water with a pH of less than 6, which is the most common for coal-ash-related groundwater, metered addition of sodium or

calcium hydroxide may allow reliable adjustment to within the constraints of discharge requirements. The current permitted pH adjustment system may be evaluated to determine if the existing storage capacity and adjustment process are applicable.

1.4.2 Precipitation Technologies

Precipitation of metals and other inorganic constituents has been used extensively in treating affected groundwater. The process involves the conversion of soluble (dissolved) constituents to insoluble particles that precipitate such as hydroxides, carbonates, or sulfides. For some constituents, an additional oxidation step is needed to convert the constituent to a less soluble and more easily precipitated form. The insoluble particles are then removed by physical methods such as clarification and/or filtration. The process usually uses pH adjustment, addition of a precipitant, and flocculation. The solubilities of the specific constituents and the effluent quality requirements will determine the process specifics. The process is well-proven, and equipment is readily available. For many constituents, low effluent concentrations can be achieved.

Current on-site wastewater clarifiers would be evaluated to determine if the existing storage capacity and additives used could be considered as part of the design. However, potential interference with treatment goals for current wastewater streams would also be considered.

1.4.3 Adsorption Technologies

Groundwater containing dissolved constituents can be passed through columns filled with adsorption media that attract and accumulate the target ions onto the adsorbent surface and reduce their concentration in the bulk fluid phase. When adsorption sites become filled, the column must be regenerated or disposed of and replaced with new media. Common adsorbent media include activated alumina, copper-zinc granules, granular ferric hydroxide, ferric oxide-coated sand, greensand, zeolite, and other proprietary materials. This technology can produce a significant regeneration waste stream. No adsorption systems are currently operating on-site. System design and permitting requirements would need to be considered.

1.4.4 Exchange Technologies

Ion exchange is a well-proven technology for removing metals from groundwater. With some constituents, ion exchange can achieve very low effluent concentrations. Its effectiveness is sensitive to a variety of untreated water characteristics. It is used less frequently than precipitation and is often used as a polishing step in water treatment processes. Ion exchange is a physical process in which ions held electrostatically on the surface of a solid are exchanged for target ions of similar charge in a solution. The medium used for ion exchange is typically a resin made from synthetic organic materials, inorganic materials, or natural polymeric materials that contain ionic functional groups to which exchangeable ions are attached. After accumulation and

saturation of the resin with the target ions, the resin must be regenerated, which involves treatment of the resin with a concentrated solution, often containing sodium or hydrogen ions (acid). The regeneration waste stream may contain a much higher concentration of the target metal. One limitation of this technology is the need for a feasible and economical method to dispose of the regeneration effluent. A second limitation, as mentioned above, is that groundwater influent streams may have characteristics that result in interference in the ion exchange process. Pretreatment may be possible but adds complexity and cost. No ion exchange systems are currently operating on-site. System design and permitting requirements would need to be considered.

1.4.5 Membrane Technologies

There are several permeable membrane technologies that can be used to treat affected groundwater for metals and other constituents. The most common is reverse osmosis, although microfiltration, ultrafiltration, and nanofiltration are also used. All four technologies use pressure to force affected water through a permeable membrane that rejects the target constituents. The differences in the technologies are based on the size of the molecules rejected and the corresponding pressures needed to allow the permeate to pass through. These technologies can capture a number of target compounds simultaneously and can achieve low effluent concentrations but are also sensitive to fouling and may require a pretreatment step. Like ion exchange, they also result in a relatively high volume reject effluent which may require additional treatment prior to disposal. These technologies typically have relatively high capital costs.

1.4.6 Biological Treatment and Oxidation

Several biological treatment methods and other oxidation methods have been used to treat metals and other coal ash constituents. One proprietary system uses biological sulfate reduction to precipitate arsenic and heavy metals. Nitrate, selenium, and mercury may also be removed in the process. An organic nutrient is continuously added to feed the bacteria. Biological systems for arsenic removal require a relatively long residence time, such as 4 to 8 hours. This biological process has been successful with both high-TDS [35,000 milligrams per liter (mg/L)] and low-temperature (4°C) waters.

Another system for arsenic removal uses biological formation of bioscorodite ($FeAsO4{\cdot}2H2O$). Bacteria oxidize iron and available arsenic to ferric iron and arsenate. An in-situ bio-oxidation process using air produces bioscorodite, which is reportedly highly stable. The process has been used with arsenic concentrations greater than 1,000 mg/L.

In general, biological systems are used to alter the oxidation state of the constituent so that it is less soluble and may be removed through adsorption or other means.

APPENDIX B

EVALUATION OF POTENTIAL REMEDY EFFECTIVENESS
§ 257.96(C)

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Due to groundwater concentrations for one or more CCR Appendix IV constituents detected at SSLs above their GWPS, an assessment of corrective measures is necessary for the Cross Station Closed Gypsum Pond (CGP). Requirements for the assessment of corrective measures are outlined in 40 CFR § 257.96, and requirements for the selection of remedy, outlined in 40 CFR § 257.97, must also be considered in evaluating potential corrective measures. Each of the potential remedial technologies described in Appendix A are screened against requirements in 40 CFR § 257.96 in Appendix B and summarized in Tables 1A and 1B. For consideration in the remedy selection process that follows this ACM, the selected remedy must take into account the considerations outlined in 40 CFR § 257.97.

This ACM provides a high-level assessment of measures that address SSLs and site conditions. Based on the results of the ACM conducted under § 257.96, Santee Cooper must, as soon as feasible, select a remedy that, at a minimum, meets the standards listed in § 257.97(b) with consideration to evaluation factors listed in § 257.97(c). § 257.96(e) requires that Sante Cooper hold a public meeting at least 30 days prior to remedy selection, as mentioned in Section 5.3.

1.0 REQUIREMENTS FOR ACM ANALYSIS IN 40 CFR § 257.96(c)

In section 257.96(c) of the CCR Rule, the Assessment of Corrective Measures (ACM) must include an analysis of the effectiveness of potential corrective measures to meet at least the following factors:

(1) Performance of the potential remedy

(2) Reliability of the potential remedy

(3) Ease of implementation

(4) Potential safety impacts of the remedy

(5) Cross-media impacts

(6) Control of exposure to residual contamination

(7) Time required to begin the remedy

(8) Time to complete the remedy

(9) The institutional requirements, such as state or local permit requirements or other environmental or public health requirements that may substantially affect implementation of the remedy(s)

The evaluation of appropriate remedies to meet the requirements of § 257.96(c) of the CCR Rule is provided in the subsections below and is summarized in Tables 1A and 1B. The relative assessments in Table 1A (low, medium, high) are based on experience and professional judgement.

2.0 PERFORMANCE OF REMEDY

This criterion includes the ability of the remedies to effectively achieve the specified goal of corrective measures to prevent further releases, to remediate releases, and to restore the affected area to original conditions.

2.1 Source Control by Excavation and Removal

Source control by excavation was initiated and completed in 2016 and was administratively completed in 2017. Ceasing wastewater inflows to the unit, which contributes to mass loading, is proven effective at preventing further release of CCR constituents to groundwater. Additionally, removing existing wastewater (decanting or dewatering) reduces the hydraulic head, limiting downward migration of CCR constituents; therefore, source control by excavation is an effective remedy.

2.2 In-Situ Technologies

Low permeability groundwater migration barriers, Permeable Reactive Barriers (PRBs), and in-situ chemical stabilization are proven technologies that could be deployed within the waste boundary with source control by excavation. However, in-situ technologies deployed beyond the waste boundary may have limited effectiveness in restoring groundwater quality at the waste boundary.

In addition to the closure method, and access to the area of treatment at or within the waste boundary, geologic conditions and the constituent(s) of concern may or may not be suitable for in-situ technologies. The permeability of the uppermost aquifer and the reactivity or solubility of the constituents are considerations.

The altered flow paths associated with a low permeability migration barrier may result in deeper constituent transport of mobile constituents under the barrier if not coupled with an effective groundwater extraction system.

The ability of a PRB to maintain adequate reactive reagent concentrations over an extended period of time is an operational and performance consideration for constituents being treated.

Considerations for in-situ chemical stabilization include placement at or within the waste boundary, whether the reagents can be adequately distributed into the aquifer, and to predict environmental conditions (*e.g.*, pH and oxidation state) to maintain the insolubility of the constituents. For multiple constituents targeted for corrective measures, the approach may need to include different reagent applications to effectively treat the variety of constituents.

2.3 Groundwater Extraction

Groundwater extraction is a technology with wide applicability for mobile constituents, under various geologic conditions, within, at or beyond the waste boundary. Conventional vertical wells are the most commonly used. Extraction wells can control

mobile constituent migration and remove constituent mass from the groundwater. Horizontal and angular well systems can be used effectively to similarly provide hydraulic control and mass removal. Maintenance considerations include iron or iron bacteria fouling of well screens, pumps and piping. Routine maintenance such as well redevelopment or minimizing the water level drawdown to a depth above the screened interval are measures to sustain performance.

Groundwater extraction from trenching systems perform similar to horizontal wells for shallow groundwater.

Phytoremediation tree-well systems are a favorable option under relatively shallow groundwater conditions, less mobile constituents, and relatively low constituent concentrations. TreeWell® technology-based remediation overcomes some of the limitations of traditional phytoremediation with the ability to treat at greater depths. The treatment media in the TreeWell® column can also be effective in treating CCR constituents in-situ.

2.4 Treatment of Extracted Groundwater

Groundwater treatment is a consideration in combination with groundwater extraction. Groundwater treatment technologies are scalable for small to large flow rates. The requirements for treatment would depend on discharge permit requirements and the constituents requiring treatment. Treatment technologies referenced in Appendix A, Section 1.3 (*i.e.*, pH adjustment, precipitation technologies, adsorption technologies, exchange technologies, membrane technologies, and biological treatment) could be implemented to effectively reduce constituent concentrations to less than permit limits. For some of the technologies, a backwash or reject waste stream is generated requiring further treatment or off-site disposal.

2.5 Monitored Natural Attenuation

Monitored Natural Attenuation (MNA) can be effectively used at a site to verify constituent concentration reductions over time through natural processes of physical and geochemical attenuation. Most constituents are subject to attenuation mechanisms and would be anticipated to attenuate naturally over time. Existing monitoring wells could be supplemented with additional, strategically placed monitoring wells to effectively monitor constituent trends over time. This technology largely relies upon processes in the natural environment. As such, it is expected that MNA performance would be strong for constituents subject to chemical attenuation and less strong for constituents that rely predominately on physical attenuation. Due to the slow nature of attenuation processes and the constituent levels observed, the goal of reaching the GWPS for each Appendix IV constituent at the waste boundary may take a significant amount of time.

3.0 RELIABILITY OF REMEDY

This criterion includes the degree of certainty that the remedies would achieve the specified goal of corrective measures over time.

3.1 Source Control by Excavation and Removal

Source control by excavation is complete and is proven to be a reliable source control measure.

3.2 In-Situ Technologies

Low permeability groundwater migration barriers and PRBs would generally be expected to be reliable technologies except for potential migration into deeper fractured media. Operations, maintenance and monitoring features would be anticipated to confirm reliability over time.

Similar operations, maintenance and monitoring features would be anticipated to confirm the reliability associated with in-situ chemical stabilization technology. Changing geochemical conditions or variable constituent patterns could make certain reagents less effective, or effective for certain constituents but not others. Pilot testing could be used to verify reliability prior to implementation.

3.3 Groundwater Extraction

Groundwater extraction is reliable for hydraulic control and removing constituent mass from the subsurface. Conventional vertical wells are often installed as a line, series, or group with overlapping radii of influence such that complete coverage of extraction across a constituent migration pathway may be achieved. Although there is operation and maintenance for effective performance, systems can be adjusted and adapted to changing site conditions. An extraction system could be installed along or near the downgradient waste boundary to target locations of GWPS exceedances if consistently detected. The reliability of horizontal or angular wells is similar to vertical wells, though their application is less common.

Phytoremediation relies upon the health and uptake of the plant species, which can be variable. If corrective measure implementation persists for an extended period of time, plants may need periodic replacement.

3.4 Treatment of Extracted Groundwater

Groundwater treatment of extracted groundwater is considered highly reliable, as a wide variety of options exist to treat the target constituents. As mentioned in Appendix A, Section 1.3, treatment would depend upon permit limits for extracted groundwater discharge.

3.5 Monitored Natural Attenuation

Since MNA relies upon natural processes, which are in themselves reliable, this option would be considered reliable. However, since geochemical conditions are subject to potential change over time, it would be necessary to consistently monitor geochemical conditions over time to confirm effectiveness. If changes in geochemical conditions result in MNA becoming ineffective at achieving the goal of corrective measures, other corrective measures could be introduced.

4.0 EASE OF IMPLEMENTATION

This criterion includes the ease with which the remedies can be implemented at the site. The existing infrastructure developed over and around the CGP may be the biggest consideration with regards to the ease of implementation of the various technologies.

4.1 Source Control by Excavation and Removal

Excavation and removal of the CGP is complete; therefore, evaluating the ease of remedy implementation is not applicable.

4.2 In-Situ Technologies

Construction of low permeability groundwater migration barriers and PRBs can require a significant amount of time, cost, effort, and disturbance at the site. The implementation considerations include the existing infrastructure of the wastewater treatment system. However, once constructed, the technology is passive and could operate immediately. In-situ chemical stabilization could be more easily implemented, with less time and effort involved than with barrier technologies. As with most solutions, in-situ technologies would also require permitting from appropriate regulatory authorities and periodic monitoring and maintenance to confirm effectiveness.

4.3 Groundwater Extraction

Groundwater extraction through use of extraction wells (vertical, horizontal, or angular) would require permitting, design, and possible pilot testing. However, the technologies are not difficult to implement.

Groundwater extraction through the use of stimulated wells could be viable, but likely not applicable.

Groundwater collection trenches could also be installed due to the shallow depth of groundwater.

Phytoremediation could also be implemented at the site.

4.4 Treatment of Extracted Groundwater

Existing wastewater treatment facilities or a new groundwater treatment system could be implemented if needed. Depending on the requirements for groundwater treatment, a temporary or permanent treatment facility could be mobilized or constructed,

requiring permitting. Pilot testing may also be required. Treatment or disposal of backwash or reject streams would decrease the ease of implementation of some technologies.

4.5 Monitored Natural Attenuation

MNA would be the easiest of potential corrective measures to implement. Existing monitoring wells could be incorporated into an effectiveness monitoring program to monitor the natural attenuation processes over time. Some additional monitoring wells may also need to be installed as part of the monitoring program. Otherwise, MNA relies upon natural processes which are already active at the site.

5.0 POTENTIAL SAFETY IMPACTS

This criterion includes potential safety effects that may result from implementation and use of the remedies at the site. Safety considerations during the implementation are related to on-site workers.

5.1 Source Control by Excavation and Removal

No current or future safety impacts of source removal are anticipated because excavation is complete.

5.2 In-Situ Technologies

Low permeability hydraulic migration barriers and PRBs require construction effort and use of large equipment. A relatively high risk of potential safety exists during construction. However, the barrier technologies are passive during use and would have few potential safety effects following construction.

Potential safety concerns related to in-situ chemical stabilization are minimal. The potential for incident during injection well construction or unintended worker contact with the chemicals used for treatment would be the primary safety concerns associated with the technology.

5.3 Groundwater Extraction

Groundwater extraction through use of extraction wells would involve drilling, construction, and installation of extraction wells, pumps, and associated control wiring and piping. Potential safety concerns exist with the activities associated with installation of the extraction system as well as the ongoing operations and maintenance of the system, including inspection, maintenance, or replacement of the various system components.

Trenching systems would require use of large construction equipment and present worker safety concerns during construction.

Phytoremediation would present few safety concerns during implementation, though forms of manual or mechanical equipment would be required for installation. Ongoing use of the system would present minimal safety concerns.

5.4 Treatment of Extracted Groundwater

Groundwater treatment assumes the groundwater has been extracted, so the same potential safety impacts exist as those effects associated with construction of a groundwater extraction system through vertical, horizontal, or angular wells. In addition, potential safety impacts would exist with the mobilization or construction of a treatment facility and piping at the site. Operational safety considerations may also exist with the components of the treatment facility and potential for unintended worker contact with the chemicals used for treatment.

5.5 Continued Groundwater Monitoring Action

Potential safety impacts associated with MNA are minimal and are primarily associated with the installation of additional groundwater monitoring wells. Minimal safety concerns associated with ongoing groundwater monitoring would be common among all potential corrective measure options evaluated.

6.0 POTENTIAL CROSS-MEDIA IMPACTS

This criterion includes potential cross-media effects that may result from implementation and use of the remedies at the site.

6.1 Source Control by Excavation and Removal

No current or future cross-media impacts are anticipated because excavation is complete.

6.2 In-Situ Technologies

Low permeability hydraulic migration barriers and PRBs pose minimal risk of cross-media effects, as they primarily involve an intended directional change in groundwater flow. In the case of PRBs, constituent mass is also removed from the groundwater through use of reagents. In the case of either barrier technology, there could be some risk associated with increased soil impacts if the migration causes affected groundwater to migrate deeper, however design plans could minimize this potential.

In-situ chemical stabilization poses a minor degree of potential cross-media effect risk associated with introduction of non-native chemicals into the subsurface. However, the chemical application is intentional for addressing existing effects and is not anticipated to involve chemical use rates or application areas that would pose unacceptable risk.

6.3 Groundwater Extraction

Groundwater extraction poses a minimal risk of cross-media effects. Since affected groundwater is extracted from the subsurface, the possibility for soil effects is reduced. A potential for cross-media effects could exist for the surface water to which the

extracted groundwater would be discharged. However, it is anticipated that discharged groundwater would be treated to meet discharge permit limits designed to limit risk to surface waters. Therefore, the potential for surface water effects is low.

Phytoremediation may result in some amount of constituent uptake by the vegetative species used for groundwater uptake.

6.4 Treatment of Extracted Groundwater

The potential for cross-media effects for groundwater treatment is limited, similar to groundwater extraction via conventional extraction wells. Waste material or spent treatment media resulting from the treatment processes may require disposal in a permitted landfill facility. However, permitted disposal should not pose additional risk of cross-media effects.

6.5 Monitored Natural Attenuation

MNA is also not likely to have significant cross-media impact potential. In a MNA scenario, the potential for contaminant sorption to subsurface particles would continue to exist, and the potential for surface water impact could exist if impacted groundwater migrated beyond the current distribution pattern. However, it is unlikely that sorption or migration would create cross-media impacts.

7.0 CONTROL OF EXPOSURE TO RESIDUAL CONTAMINATION

This criterion includes the ability to control exposure of humans and the environment to residual contamination through implementation and use of the remedies at the site.

7.1 Source Control by Excavation and Removal

No current or future exposure to residual contamination is anticipated because excavation is complete.

7.2 In-Situ Technologies

Since in-situ technologies involve placement or injection of a structure or reagent to treat affected groundwater in-place, there is no increased risk of exposure of humans and the environment to residual effects.

7.3 Groundwater Extraction

Groundwater extraction involves bringing affected groundwater from the subsurface to the surface for potential treatment and discharge. As such, the potential for exposure of humans or the environment to affected groundwater exists. However, the groundwater would be conveyed through an engineered system of wells, pumps, and piping designed to prevent introduction of water into the environment where risk to human health or the environment could occur. The extracted groundwater would be discharged to surface waters according to permit requirements, including meeting permit limits established to control risk to human health and the environment. Therefore, the potential for exposure to effects associated with groundwater extraction is unlikely.

Similar to in-situ technologies, phytoremediation treats affected groundwater in-place, and thus there is no increased risk of exposure of humans and the environment to residual contamination.

7.4 Treatment of Extracted Groundwater

Groundwater treatment presumes that the affected groundwater has been extracted and brought to the surface. Therefore, limited risks exist similar to groundwater extraction. However, the objective of groundwater treatment is to positively treat the affected groundwater to levels that meet discharge permit limits. As such, groundwater treatment serves to further reduce the possibility of human or environmental exposure to affected groundwater.

7.5 Monitored Natural Attenuation

MNA is also not likely to have significant potential for human or environmental exposure to impacted groundwater. In a MNA scenario, the potential for impacted groundwater to discharge into surface water could exist. However, it is unlikely that migration could occur at high enough rates and distances to create problematic exposure to humans or the environment.

8.0 TIME REQUIRED TO BEGIN REMEDY

This criterion includes the time necessary for planning, pilot testing, design, permitting, procurement, installation, and startup of the remedies at the site.

8.1 Source Control by Excavation and Removal

The excavation of the CGP was completed in 2017. Therefore, no additional time is required to implement this source control measure.

8.2 In-Situ Technologies

Migration barriers and PRBs take time to design, permit, install and for groundwater to respond. Either technology would involve regulatory permitting. The implementation time could take one to two years.

In-situ chemical stabilization would likely involve a similar level of regulatory permitting as for barrier technologies. Pilot testing would also be necessary prior to full implementation. It is anticipated that implementation of the injection system would be a shorter process than for barriers.

8.3 Groundwater Extraction

Design and installation of groundwater extraction systems could be completed in 1 to 2 years but would be highly dependent on the regulatory approval and permitting process. If additional discharge permitting is required, the time before startup could be longer. Phytoremediation systems could be designed and installed in 6 to 12 months with full benefit after multiple growing seasons.

8.4 Treatment of Extracted Groundwater

The time required to implement a groundwater treatment system would not be significant. The design and installation of the system could be completed in 12 to 24 months but would be highly dependent on the regulatory approval and permitting process. If additional discharge permitting is required, the time before startup could be longer.

8.5 Monitored Natural Attenuation

The time required for implementation of an MNA program would likely be less than one year using the existing monitoring well network. Procedures for collection, analysis, and reporting of results are currently in place. This potential remedy would require the least amount of time to implement.

9.0 TIME REQUIRED TO COMPLETE REMEDY

This criterion includes the estimated time necessary to achieve the stated goals of corrective measures to prevent further releases from the site, to remediate any releases, and to restore the affected area to original conditions.

9.1 Source Control by Excavation and Removal

Excavation of the CGP was completed in 2017. Therefore, no additional time is required to complete source control.

9.2 In-Situ Technologies

The geochemistry and constituent mix create much uncertainty with regards to the time potentially required to achieve GWPS at the waste boundary. It is anticipated that it would take longer to reach remedial goals with migration barriers than with PRBs since PRBs include chemical reagents to reduce concentrations. If an in-situ chemical immobilization option can effectively treat all constituents with SSLs greater than the GWPS at the waste boundary, it has the potential to treat groundwater more quickly than barrier technologies. The total time required to reach the goals could be predicted through geochemical modeling as part of the remedy selection process.

9.3 Groundwater Extraction

Groundwater extraction can also take a significant period of time particularly with relatively immobile Appendix IV constituents. The length of time required to reach remedial goals would depend on the efficiency of the system, including the number, location, and pumping capacity of the wells. Similar to in-situ technologies, the total time required to reach the goals could be predicted through a groundwater model.

It would generally be anticipated that extraction through phytoremediation would be a slow process. However, the addition of amendments within the boreholes combines the benefits of hydraulic control and removal with in-situ stabilization.

The time frames for trenching may be similar to extraction with wells; however, a trench may provide a more complete barrier.

9.4 Treatment of Extracted Groundwater

Since groundwater treatment focuses on already extracted groundwater, the time for remedial goals to be achieved is dependent upon the efficiency and results of the groundwater extraction system implemented. The amount of time required to complete the remedy would be the same as for groundwater extraction unless the rate of extraction is limited by the rate of treatment and discharge.

9.5 Monitored Natural Attenuation

MNA likely requires the longest period of time to reach remedial goals. However, modeling of the other options compared to MNA is needed to estimate the time difference.

10.0 STATE, LOCAL, OR OTHER ENVIRONMENTAL PERMIT REQUIREMENTS THAT MAY SUBSTANTIALLY AFFECT IMPLEMENTATION

This criterion includes anticipation of state or local permit requirements or other environmental or public health requirements that may substantially affect implementation of the remedies at the site.

10.1 Source Control by Excavation and Removal

Excavation and closure of the CGP was permitted and approved by the South Carolina Department of Health and Environmental Control (SCDHEC).

10.2 In-Situ Technologies

Migration barriers and PRBs require installation of barrier walls and associated components into the aquifer. Therefore, permitting through applicable water resources agencies, including the SCDHEC, would be anticipated and may include 6-12 months of review and approval. Also, because of surficial disturbance at the ground surface associated with barrier installation, permitting through applicable erosion and sedimentation control agencies would be anticipated. These permitting requirements would likely take 6-12 months for associated permitting and design document preparation, submittal, review, and approval.

In-situ chemical stabilization would also likely require similar permitting as barrier technologies. If pilot testing were required, an additional 6-12 months would likely be required for the associated regulatory review and concurrence prior to and following pilot testing.

Upon regulatory acceptance of MNA, it is anticipated that this option would require the least amount of regulatory permitting and approvals. Monitoring wells that would be used for the MNA effectiveness monitoring program already exist. New monitoring wells would require well installation permitting with SCDHEC.

10.3 Groundwater Extraction

Groundwater extraction through conventional pumping wells would require pump tests and basis of design submittals to SCDHEC. It is anticipated that it would take 6-12 months to develop a pump test work plan, receive approval, perform the pump test, and produce a test report. In light of the pump test and site knowledge, a basis of design report could be submitted to and approved by SCDHEC within 6-12 months, depending on the length of SCDHEC approval process and the number of design report iterations necessary to reach approval. It is anticipated that another 6-12 months would be necessary to drill the extraction wells and install the extraction system. The extraction well system start-up could then commence after an additional, roughly 6-month period of testing and preparation, likely requiring final regulatory approval before system start-up can begin. This iterative process of regulatory permitting and approvals anticipates that system start-up could occur roughly 1-3 years after final remedy selection, which is generally longer than other potential corrective measures.

Phytoremediation design and permitting timeframe are similar to groundwater extraction.

10.4 Treatment of Extracted Groundwater

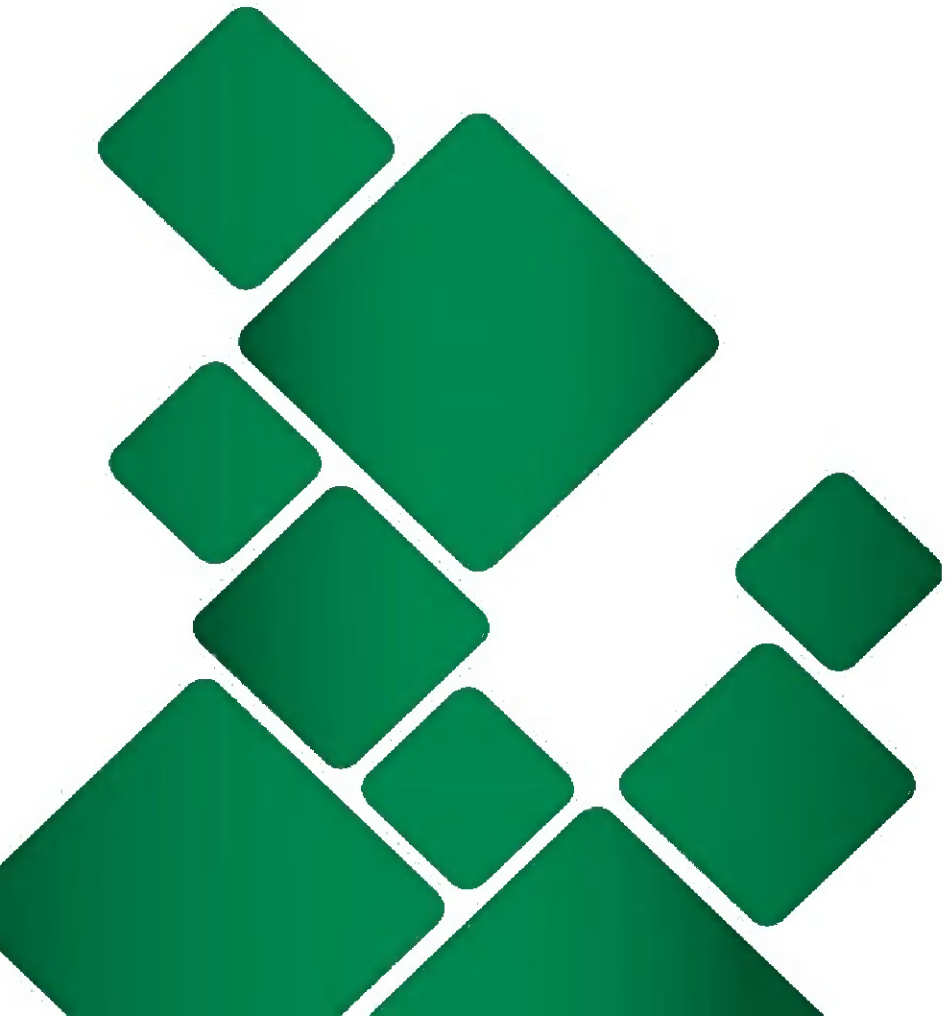
The groundwater treatment option for corrective measures would include all the initial regulatory and permitting steps referenced for groundwater extraction but would also require permitting and approval for treatment system installation and effluent discharge. It is anticipated this may be a 6-12 month process with SCDHEC to achieve an NPDES permit modification, though this process could likely occur in parallel with the processes associated with groundwater extraction. Therefore, it is anticipated that the potential effects from regulatory requirements may be similar to groundwater extraction, with the potential for additional effects if the discharge permitting process becomes challenging and lengthy.

10.5 Monitored Natural Attenuation

It is anticipated that this option would require the least amount of regulatory permitting and approvals. Monitoring wells that would be used for the MNA effectiveness monitoring program already exist. New monitoring wells would require permitting with SCDHEC. The permitting process associated with installation of new monitoring wells is typically less than a month.

APPENDIX C

SELECTION OF REMEDY REQUIREMENTS IN 40 CFR § 257.97



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Requirements for the selection of remedy process under the Coal Combustion Residuals (CCR) Rule are outlined in 40 CFR § 257.97. After preparation of this Assessment of Corrective Measures (ACM) *Report*, and based upon assessment results, a corrective measure remedy must be selected as soon as feasible. However, before the final remedy can be selected, a public meeting to discuss ACM results with interested and affected parties must be held at least 30 days prior to remedy selection (Section 5.3 of ACM report).

40 CFR § 257.97(a) states that:

> *Based on the results of the corrective measures assessment conducted under § 257.96, the owner or operator must, as soon as feasible, select a remedy that, at a minimum, meets the standards listed in paragraph (b) of this section. This requirement applies to, not in place of, any applicable standards under the Occupational Safety and Health Act. The owner or operator must prepare a semiannual report describing the progress in selecting and designing the remedy. Upon selection of a remedy, the owner or operator must prepare a final report describing the selected remedy and how it meets the standards specified in paragraph (b) of this section. The owner or operator must obtain a certification from a qualified professional engineer that the remedy selected meets the requirements of this section. The report has been completed when it is placed in the operating record as required by § 257.105(h)(12).*

The performance standards of remedy selection in 40 CFR § 257.97(b) require that remedies must:

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

The remedy selection must consider the evaluation factors in 40 CFR § 257.97(c) which include the following:

> *(1) The long- and short-term effectiveness and protectiveness of the potential remedy(s), along with the degree of certainty that the remedy will prove successful based on consideration of the following:*
>
> > *(i) Magnitude of reduction of existing risks*
> >
> > *(ii) Magnitude of residual risks in terms of likelihood of further releases due to CCR remaining following implementation of a remedy*
> >
> > *(iii) The type and degree of long-term management required, including monitoring, operation, and maintenance*
> >
> > *(iv) Short-term risks that might be posed to the community or the environment during implementation of such a remedy, including potential threats to human health and the environment associated with excavation, transportation, and redisposal of contaminant;*
> >
> > *(v) Time until full protection is achieved*
> >
> > *(vi) Potential for exposure of humans and environmental receptors to remaining wastes, considering the potential threat to human health and the environment associated with excavation, transportation, re-disposal, or containment*
> >
> > *(vii) Long-term reliability of the engineering and institutional controls*
> >
> > *(viii) Potential need for replacement of the remedy.*
>
> *(2) The effectiveness of the remedy in controlling the source to reduce further releases based on consideration of the following factors:*
>
> > *(i) The extent to which containment practices will reduce further releases*
> >
> > *(ii) The extent to which treatment technologies may be used*
>
> *(3) The ease or difficulty of implementing a potential remedy(s) based on consideration of the following types of factors:*
>
> > *(i) Degree of difficulty associated with constructing the technology*
> >
> > *(ii) Expected operational reliability of the technologies*
> >
> > *(iii) Need to coordinate with and obtain necessary approvals and permits from other agencies*
> >
> > *(iv) Availability of necessary equipment and specialists*
> >
> > *(v) Available capacity and location of needed treatment, storage, and disposal services*

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

A schedule(s) for remedial activities must be specified in accordance with 40 CFR § 257.97(d). The schedule must require the completion of remedial activities within a reasonable period taking into consideration the following factors:

(1) Extent and nature of contamination, as determined by the characterization required under § 257.95(g)

(2) Reasonable probabilities of remedial technologies in achieving compliance with the groundwater protection standards established under § 257.95(h) and other objectives of the remedy

(3) Availability of treatment or disposal capacity for CCR managed during implementation of the remedy

(4) Potential risks to human health and the environment from exposure to contamination prior to completion of the remedy

(5) Resource value of the aquifer including:

(i) Current and future uses;

(ii) Proximity and withdrawal rate of users;

(iii) Groundwater quantity and quality;

(iv) The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to CCR constituents;

(v) The hydrogeologic characteristic of the facility and surrounding land; and

(vi) The availability of alternative water supplies; and

(6) Other relevant factors.

Following preparation of this ACM Report, the process of remedy selection will take place to select an effective remedy that meets the requirements of 40 CFR § 257.97(b) and considers the factors of 40 CFR § 257.97(c). Paragraph (a) of 40 CFR § 257.97 requires that a semiannual report be prepared to document progress toward remedy selection and design. Once a remedy is selected, a final remedy selection report must be prepared to describe the selected remedy and how it meets 40 CFR § 257.97(b) requirements. A qualified professional engineer must certify the remedy selected meets the standards in 40 CFR § 257.97(b). The report must be placed in the operating record and on the publicly accessible website.

The final remedy selection report will include an assessment of how the remedy meets the performance standards in 40 CFR § 257.97(b) and how the remedy selection process considered the remedy evaluation factors in 40 CFR § 257.97(c). The following paragraphs further describe the aspects of the performance standards and evaluation factors.

Performance Standards [§ 257.97(b)]

1. **Protection of Human Health and the Environment**
This criterion includes the effectiveness of the remedy to be protective of human health and the environment. While assessment findings demonstrate that there are no imminent hazards to public health and safety or the environment, corrective action is necessary because constituent concentrations greater than regulatory standards. It is also critical to assess whether a potential remedial alternative will contribute to continued protection of human health and the environment in the future.

   Technologies and remedial alternatives will be assessed to determine whether they can contribute to continued protection of human health and the environment, in both the short-term and long-term, from unacceptable risks posed by constituents of interest present at the Site by eliminating, reducing, or controlling exposures to levels consistent with remediation goals. Continuing overall protection of human health and the environment draws on the assessments of other evaluation criteria, especially long-term effectiveness and permanence, short-term effectiveness, and compliance with applicable regulations.

2. **Attainment of Groundwater Protection Standards (GWPS)**
This criterion includes the ability of the remedy to result in attainment of GWPSs for Appendix IV constituents within a reasonable period at the CCR unit waste boundary and within the extent of affected groundwater that lie beyond the groundwater monitoring well system established under 40 CFR § 257.91. This objective supports the corrective measure goal of restoring the affected area to its original condition.

3. **Control of Source**
This criterion includes the ability of the remedy to result in attainment of source control within a reasonable period at the CCR unit. This objective supports the corrective measure goal of preventing further releases from the CCR unit to the maximum extent feasible.

4. **Removal of Affected Material**
This criterion includes the effectiveness of the remedy to remove from the environment as much of the affected material that was released from the CCR unit as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems.

5. Compliance with Waste Management Standards – 40 CFR § 257.98(d)
This criterion includes the ability of the technology to comply with standards for waste management specified in 40 CFR § 257.98(d).

Remedy Evaluation Factors [§ 257.97(c)]

1. Reduction of Existing Risks
This evaluation factor includes the magnitude of existing risk reduction achieved by implementation of the remedy at the Site.

2. Magnitude of Remaining Residual Risks
This evaluation factor includes the magnitude of remaining residual risk, in terms of the likelihood of further releases because of CCR remaining following implementation of the remedy at the Site.

3. Long-Term Management
This consideration evaluation factor includes the type and degree of long-term management required for monitoring, operation, and maintenance related to use of the remedy at the Site.

4. Short-Term Implementation Risks
This evaluation factor includes the implications of short-term risks to the community or environment during implementation of the technology at the Site. These short-term risks could include potential risks posed by excavation, transportation, and re-disposal of constituents.

5. Timeframe Until Full Protection
This evaluation factor includes the amount of time anticipated to achieve full protection through use of the technology at the Site.

6. Potential Exposure of Receptors to Remaining Wastes
This evaluation factor includes the potential for receptors to be exposed to remaining wastes, considering the potential threat to receptors associated with excavation, transportation, re-disposal, or containment.

7. Long-Term Reliability
This evaluation factor includes long-term reliability of the engineering and institutional controls associated with use of the technology at the Site.

8. Potential for Remedy Replacement
This evaluation factor includes the degree of potential need for the technology to be replaced.

9. Reduction of Further Releases
This evaluation factor includes the effectiveness of the technology in controlling the source to reduce further releases based on the extent to which containment practices will reduce further releases.

10. Extent of Treatment Technology Use
This evaluation factor includes the effectiveness of the technology in controlling the source to reduce further releases based on the extent to which treatment technologies may be used.

11. Constructability
This evaluation factor includes the ease or difficulty of implementation at the Site, considering technical difficulties and unknowns associated with the construction of the technology.

12. Expected Operational Reliability
This evaluation factor includes the ease or difficulty of implementation at the Site, considering technical difficulties and unknowns associated with the operation of the technology.

13. Need for Permits and Approvals
This evaluation factor includes the ease or difficulty of implementation at the Site, considering technical difficulties and unknowns associated with the need to coordinate with and obtain necessary approvals and permits from regulatory agencies. This includes the anticipated time required to obtain any necessary approvals and permits.

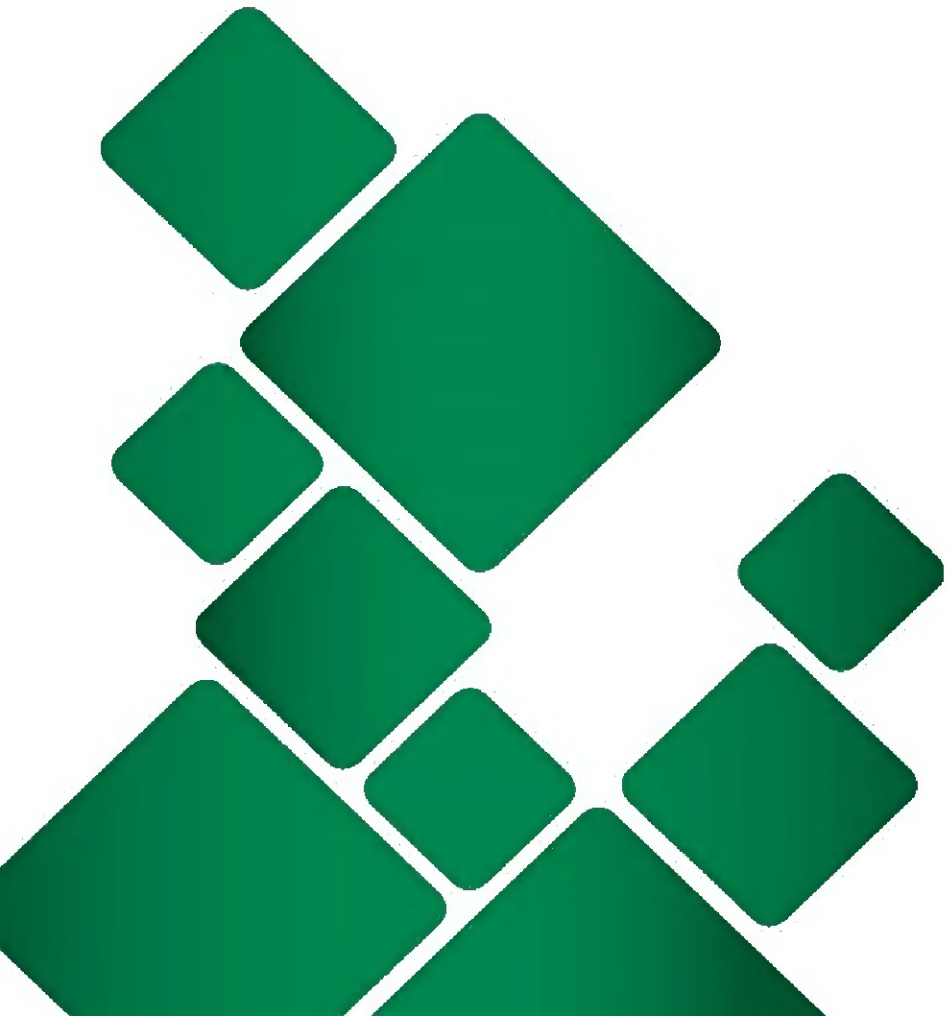
14. Equipment and Specialist Availability
This evaluation factor includes the ease or difficulty of implementation at the Site, considering availability of equipment and specialists necessary to implement the remedy at the Site.

15. Availability and Location of Treatment, Storage, and Disposal Services
This evaluation factor includes the availability of adequate treatment, storage capacity, and disposal capacity and services; as well as provisions to ensure any necessary additional resources.

16. Addressment of Community Concerns
This evaluation factor includes the degree to which community concerns are addressed by a potential remedy. This assessment includes determining which components of the alternatives interested persons in the community support, have reservations about, or oppose. This assessment may not be fully informed until comments on the proposed plan are received from the required public meeting. However, some general assumptions of how an alternative will be accepted by the community may be made. As stated earlier, before the final remedy can be selected, a public meeting to discuss ACM results with interested and affected parties must be held at least 30 days prior to remedy selection.

APPENDIX D

LAB REPORTS



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Ground Water Monitoring Report

Lab Parameters

Sample ID	Location Code	Comments	Sample Date	Arsenic	Barium	Beryllium	Calcium	Cadmium	Cobalt	Chromium	Lead	Antimony	Selenium	Thallium	Boron	Lithium	Molybdenum
				ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
AF66425	CGYP-1		6/6/23	8.35	39.2	3.98	181	<0.5	31.5	<5.0	1.44	<5.0	<10.0	<1.0	191	7.79	<5.0
AF66426	CGYP-2		6/7/23	13.1	9.76	3.41	254	<0.5	22.4	<5.0	16.6	<5.0	<10.0	<1.0	781	13.9	<5.0
AF66427	CGYP-2	DUP	6/7/23	13.5	9.88	3.44	259	<0.5	22.7	<5.0	15.9	<5.0	<10.0	<1.0	770	14.6	<5.0
AF66428	CGYP-3		6/7/23	11.4	24.3	22.1	508	<0.5	31.1	8.0	18.1	<5.0	<10.0	<1.0	16700	70.1	<5.0
AF66429	CGYP-4		6/7/23	5.14	25.5	15.1	254	<0.5	19.9	<5.0	8.96	<5.0	<10.0	<1.0	5530	76.6	<5.0
AF66430	CGYP-6		6/7/23	<5.0	204	27.9	486	<0.5	138	<5.0	13.2	<5.0	<10.0	<1.0	8850	181	<5.0
AF66431	CGYP-7		6/7/23	22.1	14.7	7.91	377	<0.5	17.8	<5.0	23.4	<5.0	<10.0	<1.0	11200	11.5	<5.0

				Mercury	Total Dissolved Solids	Fluoride	Chloride	Sulfate	Radium 226	Radium 228	Radium 226/228 Combined Calculation
				ug/L	mg/L	mg/L	mg/L	mg/L	pCi/L	pCi/L	pCi/L
AF66425	CGYP-1		6/6/23	<0.2	1584	0.89	679	282	1.32	2.61	3.94
AF66426	CGYP-2		6/7/23	<0.2	1451	0.53	55.9	904	0.809	0.960	1.77
AF66427	CGYP-2	DUP	6/7/23	<0.2	1442	0.69	56.1	907	0.875	1.56	2.44
AF66428	CGYP-3		6/7/23	<0.2	2906	1.60	872	964	1.16	4.17	5.33
AF66429	CGYP-4		6/7/23	<0.2	1445	1.16	353	538	0.153	1.51	1.67
AF66430	CGYP-6		6/7/23	<0.2	2774	0.68	1070	129	1.16	4.53	5.69
AF66431	CGYP-7		6/7/23	<0.2	2355	0.91	683	813	2.81	3.78	6.60

Field Parameters

Sample ID	Location Code	Sample Date	pH	Spec. Cond.	Oxidation Reduction Potential	Dissolved Oxygen	Turbidity	Temp	Depth	Elevation
			SU	uS	mv	ppm	NTU	C	Feet	Feet
AF66425	CGYP-1	6/6/23	4.66	2520	155	0.590	16.5	28.28	16.79	75.10
AF66426	CGYP-2	6/7/23	4.00	1690	222	0.740	0	22.91	9.71	75.17
AF66428	CGYP-3	6/7/23	3.67	4010	206	0.660	7.60	23.91	8.71	75.24
AF66429	CGYP-4	6/7/23	4.13	2120	238	0.780	5.40	29.28	7.73	75.76
AF66430	CGYP-6	6/7/23	3.74	3900	259	0.730	3.50	24.84	7.79	75.44
AF66431	CGYP-7	6/7/23	3.92	3550	229	0.740	0	23.09	10.21	75.16

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SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF66425 **Location:** GW Well CGYP-1 **Date:** 06/06/2023 **Sample Collector:** WK/ML

Loc. Code CGYP-1 **Time:** 13:29

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	8.35	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Barium	39.2	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Beryllium	3.98	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Calcium	181	mg/L	07/05/2023	SKJACOBS	EPA 6020B
Cadmium	<0.5	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Cobalt	31.5	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Chromium	<5.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Lead	1.44	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Antimony	<5.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Selenium	<10.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Thallium	<1.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Boron	191	ug/L	07/07/2023	SKJACOBS	EPA 6010D
Lithium	7.79	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Molybdenum	<5.0	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	06/22/2023	EUROFINS SAV	EPA 7470
Sulfate	282	mg/L	06/08/2023	KCWELLS	EPA 300.0
Chloride	679	mg/L	06/08/2023	KCWELLS	EPA 300.0
Fluoride	0.89	mg/L	06/08/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	1584	mg/L	06/14/2023	KCWELLS	SM 2540C
Radium 226	1.32	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
Radium 228	2.61	pCi/L	06/29/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	3.94	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
pH	4.66	SU	06/06/2023	WJK/ML	

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America" - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Linda Williams Validation date: 08/02/2023

Linda Williams - Manager Analytical Services

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SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF66426 **Location:** GW Well CGYP-2 **Date:** 06/07/2023 **Sample Collector:** WJK/ML

Loc. Code CGYP-2 **Time:** 10:04

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	13.1	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Barium	9.76	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Beryllium	3.41	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Calcium	254	mg/L	07/05/2023	SKJACOBS	EPA 6020B
Cadmium	<0.5	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Cobalt	22.4	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Chromium	<5.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Lead	16.6	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Antimony	<5.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Selenium	<10.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Thallium	<1.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Boron	781	ug/L	07/05/2023	SKJACOBS	EPA 6010D
Lithium	13.9	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Molybdenum	<5.0	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	06/22/2023	EUROFINS SAV	EPA 7470
Sulfate	904	mg/L	06/13/2023	KCWELLS	EPA 300.0
Chloride	55.9	mg/L	06/13/2023	KCWELLS	EPA 300.0
Fluoride	0.53	mg/L	06/13/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	1451	mg/L	06/14/2023	KCWELLS	SM 2540C
Radium 226	0.809	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
Radium 228	0.960	pCi/L	06/29/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	1.77	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
pH	4.00	SU	06/07/2023	WJK/ML	

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America" - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Linda Williams Validation date: 08/02/2023

Linda Williams - Manager Analytical Services

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SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF66427 **Location:** GW Well CGYP-2 **Date:** 06/07/2023 **Sample Collector:** WJK/ML

Loc. Code CGYP-2 DUP **Time:** 10:09

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	13.5	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Barium	9.88	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Beryllium	3.44	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Calcium	259	mg/L	07/05/2023	SKJACOBS	EPA 6020B
Cadmium	<0.5	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Cobalt	22.7	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Chromium	<5.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Lead	15.9	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Antimony	<5.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Selenium	<10.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Thallium	<1.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Boron	770	ug/L	07/05/2023	SKJACOBS	EPA 6010D
Lithium	14.6	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Molybdenum	<5.0	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	06/22/2023	EUROFINS SAV	EPA 7470
Sulfate	907	mg/L	06/13/2023	KCWELLS	EPA 300.0
Chloride	56.1	mg/L	06/13/2023	KCWELLS	EPA 300.0
Fluoride	0.69	mg/L	06/13/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	1442	mg/L	06/14/2023	KCWELLS	SM 2540C
Radium 226	0.875	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
Radium 228	1.56	pCi/L	06/29/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	2.44	pCi/L	07/07/2023	GEL	EPA 903.1 Mod

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America " - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117 ; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Linda Williams Validation date: 08/02/2023

Linda Williams - Manager Analytical Services

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SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF66428 **Location:** GW Well CGYP-3 **Date:** 06/07/2023 **Sample Collector:** WJK/ML

Loc. Code CGYP-3 **Time:** 11:35

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	11.4	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Barium	24.3	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Beryllium	22.1	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Calcium	508	mg/L	07/05/2023	SKJACOBS	EPA 6020B
Cadmium	<0.5	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Cobalt	31.1	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Chromium	8.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Lead	18.1	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Antimony	<5.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Selenium	<10.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Thallium	<1.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Boron	16700	ug/L	07/05/2023	SKJACOBS	EPA 6010D
Lithium	70.1	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Molybdenum	<5.0	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	06/22/2023	EUROFINS SAV	EPA 7470
Sulfate	964	mg/L	06/13/2023	KCWELLS	EPA 300.0
Chloride	872	mg/L	06/13/2023	KCWELLS	EPA 300.0
Fluoride	1.60	mg/L	06/13/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	2906	mg/L	06/14/2023	KCWELLS	SM 2540C
Radium 226	1.16	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
Radium 228	4.17	pCi/L	07/03/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	5.33	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
pH	3.67	SU	06/07/2023	WJK/ML	

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America" - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117 ; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Linda Williams Validation date: 08/02/2023

Linda Williams - Manager Analytical Services

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SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF66429 **Location:** GW Well CGYP-4 **Date:** 06/07/2023 **Sample Collector:** WJK/ML

Loc. Code CGYP-4 **Time:** 12:27

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	5.14	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Barium	25.5	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Beryllium	15.1	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Calcium	254	mg/L	07/05/2023	SKJACOBS	EPA 6020B
Cadmium	<0.5	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Cobalt	19.9	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Chromium	<5.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Lead	8.96	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Antimony	<5.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Selenium	<10.0	ug/L	07/07/2023	SKJACOBS	EPA 6020B
Thallium	<1.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Boron	5530	ug/L	07/05/2023	SKJACOBS	EPA 6010D
Lithium	76.6	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Molybdenum	<5.0	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	06/22/2023	EUROFINS SAV	EPA 7470
Sulfate	538	mg/L	06/13/2023	KCWELLS	EPA 300.0
Chloride	353	mg/L	06/13/2023	KCWELLS	EPA 300.0
Fluoride	1.16	mg/L	06/13/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	1445	mg/L	06/14/2023	KCWELLS	SM 2540C
Radium 226	0.153	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
Radium 228	1.51	pCi/L	06/29/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	1.67	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
pH	4.13	SU	06/07/2023	WJK/ML	

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America" - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Linda Williams Validation date: 08/02/2023

Linda Williams - Manager Analytical Services

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SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF66430 **Location:** GW Well CGYP-6 **Date:** 06/07/2023 **Sample Collector:** WJK/ML

Loc. Code CGYP-6 **Time:** 13:37

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	<5.0	ug/L	07/06/2023	SKJACOBS	EPA 6020B
Barium	204	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Beryllium	27.9	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Calcium	486	mg/L	07/06/2023	SKJACOBS	EPA 6020B
Cadmium	<0.5	ug/L	07/06/2023	SKJACOBS	EPA 6020B
Cobalt	138	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Chromium	<5.0	ug/L	07/06/2023	SKJACOBS	EPA 6020B
Lead	13.2	ug/L	07/06/2023	SKJACOBS	EPA 6020B
Antimony	<5.0	ug/L	07/06/2023	SKJACOBS	EPA 6020B
Selenium	<10.0	ug/L	07/07/2023	SKJACOBS	EPA 6020B
Thallium	<1.0	ug/L	07/06/2023	SKJACOBS	EPA 6020B
Boron	8850	ug/L	07/05/2023	SKJACOBS	EPA 6010D
Lithium	181	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Molybdenum	<5.0	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	06/22/2023	EUROFINS SAV	EPA 7470
Sulfate	129	mg/L	06/13/2023	KCWELLS	EPA 300.0
Chloride	1070	mg/L	06/13/2023	KCWELLS	EPA 300.0
Fluoride	0.68	mg/L	06/13/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	2774	mg/L	06/14/2023	KCWELLS	SM 2540C
Radium 226	1.16	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
Radium 228	4.53	pCi/L	06/29/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	5.69	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
pH	3.74	SU	06/07/2023	WJK/ML	

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America" - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Linda Williams Validation date: 08/02/2023

Linda Williams - Manager Analytical Services

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SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF66431 **Location:** GW Well CGYP-7 **Date:** 06/07/2023 **Sample Collector:** WJK/ML

Loc. Code CGYP-7 **Time:** 09:04

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	22.1	ug/L	07/06/2023	SKJACOBS	EPA 6020B
Barium	14.7	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Beryllium	7.91	ug/L	07/06/2023	SKJACOBS	EPA 6020B
Calcium	377	mg/L	07/06/2023	SKJACOBS	EPA 6020B
Cadmium	<0.5	ug/L	07/06/2023	SKJACOBS	EPA 6020B
Cobalt	17.8	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Chromium	<5.0	ug/L	07/06/2023	SKJACOBS	EPA 6020B
Lead	23.4	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Antimony	<5.0	ug/L	07/06/2023	SKJACOBS	EPA 6020B
Selenium	<10.0	ug/L	07/07/2023	SKJACOBS	EPA 6020B
Thallium	<1.0	ug/L	07/06/2023	SKJACOBS	EPA 6020B
Boron	11200	ug/L	07/05/2023	SKJACOBS	EPA 6010D
Lithium	11.5	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Molybdenum	<5.0	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	06/26/2023	EUROFINS SAV	EPA 7470
Sulfate	813	mg/L	06/13/2023	KCWELLS	EPA 300.0
Chloride	683	mg/L	06/13/2023	KCWELLS	EPA 300.0
Fluoride	0.91	mg/L	06/13/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	2355	mg/L	06/14/2023	KCWELLS	SM 2540C
Radium 226	2.81	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
Radium 228	3.78	pCi/L	06/29/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	6.60	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
pH	3.92	SU	06/07/2023	WJK/ML	

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America" - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Linda Williams Validation date: 08/02/2023

Linda Williams - Manager Analytical Services

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Chain of Custody

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Cross
CCR/Closed Gypsum Pond

(CGYP-1, CGYP-2, CGYP-3 , CGYP-4, CGYP-6 , CCMGP-1, CCMGP-2, CCMGP-3, CCMGP-4, CCMGP-5 with Duplicate CGYP-2)

Customer/Send Report To: Melanie Goings/A203

Need Results By (Date Needed): 3 Weeks 6128

Project/Task/Unit # 125915 JM02.09.G01.1 / 36500

Contract Lab Due Date (Lab Only) :

Labworks ID Number	Sample Location / Description	Collection Date	Collection Time	By	Sample Type Grab/Comp	Sample Type Matrix	Number of Containers	Sample Analysis Requested (Method): As, Ba, Be, Cd, Co, Cr, Pb, Sb, Se, Tl	B, Li, Mo, Hg	TDS	F, Cl, SO4	Ra.226, Ra 228
Preservative								1	1	1	1	1,2
Bottle Type (Glass/Plastic)								P	P	P	P	P
AF66431	CGYP-7	6/7/23	~~0954~~ 1004	WSK/MW	G	GW	6	1	1	1	1	2
AF66426	CGYP-2		1004									
AF66427	CGYP-2 DUP		1009									
AF66428	CGYP-3		1135									
AF66429	CGYP-4		1227									
AF66430	CGYP-6		1337									

Fill in the Number of Containers for each Test

Matrix Code: GW-Groundwater, DW-Drinking Water, SW-Surface Water, WW-Wastewater, BW-Boiler Water, L-Limestone, O-Oil, S-Soil, SL-Solid, C-Coal, G-Gypsum, FA-Fly Ash, BA-Bottom Ash, M-Misc (Describe in Comments)

Preservation used: 1-<4°C, 2-HNO_3, 3-H_2SO_4, 4-HCL 5-$Na_2S_2O_3$, 6-Other (Specify)

Bottle Type: (G) Glass (P) Plastic

Sample Type: (G) Grab, (C) Composite

Temperature Checks: Internal Use Only

TEMP (°C)	INIT
4.3	SJB

Comments

Lot # 1122100
Batch # 033023-01
1:1 Nitric Acid (HNO3)
santee cooper 6/8/23 @ 0949 SJB

Composite Samples:
Start Date/Time:
End Date/Time:

Date	Time
6/8/23	0730

Preservative Record Correct pH: ~~RAD~~ Yes No If preserved, Lot# A20CC-212/0117201H Date/Time/Int LOT#222845 GEL 5/26/23

Relinquished by: (To Person / Lockbox)	Employee #	Date	Time	Received by: (From Person / Lockbox)	Employee #
[signature]	37981	6/8/23	730	[signature] Brown	35594
Relinquished by: (To Person / Lockbox)	Employee #	Date	Time	Received by: (From Person / Lockbox)	Employee #
Relinquished by: (To Person / Lockbox)	Employee #	Date	Time	Received by: (From Person / Lockbox)	Employee #

Available Analyses:

TOC / DOC
TP, TPO4, NH3-N
F, Cl, NO2, Br, NO3, SO4, OPO4
TDS, TSS
Sulfide
BTEX, Napthalene, MTBE, VOC
Rad 226, Rad 228
Oil & Grease
E.coli, Total Coliform

Metals: Ag, Al, As, B, Be, Ba, Ca, Cd, Co, Cr Cu, Fe, Hg, K, Li, Mg, Mn, Mo, Na, Ni, Pb, Sb Se, Sn, Tl, V, Zn, P, S, SiO2, Sr, Ti, CrVI

Dissolved Metals: As, Fe

pH

Wallboard Gyp: AIM, TOC, Total and Soluble Metals, Purity, % Moisture, Sulfites, pH, Chloride, Particle Size
Daily Gyp: Free Moisture, Purity (CaSO4)
Limestone Analysis: Acid Insoluble Matter, Total Metals, LOI, Purity (CaCO3), % Moisture
Flyash: Ammonia, LOI, % Carbon, Free CaO, Mineral Analysis

Coal Short Prox: % Moisture, Ash, Sulfur, BTUs
Coal Ultimate: % Moisture, Ash, Sulfur, BTUs , Volatile Matter, CHN
XRF Scan Hardgrove Grindability Index
Sieve Analysis Pulverizer Fineness Particulate Matter Analysis

Oil Quality: % Moisture, Color, Acidity Dielectric Strength, Interfacial Tension Density
Togas: Dissolved Gases in Oil
Metals (Oil): As, Cd, Cr, Ni, Pb, Hg
Flash point, Total Halogens, PCB
Gofer Oil:#GOFER **Used Oil:**#USED OIL

santee cooper

Chain of Custody

Cross
CCR/Closed Gypsum Pond

(CGYP-1, CGYP-2, CGYP-3 , CGYP-4, CGYP-6 , CCMGP-1, CCMGP-2, CCMGP-3, CCMGP-4, CCMGP-5 with Duplicate CGYP-2)

Customer/Send Report To: Melanie Goings/A203

Need Results By (Date Needed): ~~3 Weeks~~ 6/28/23

Project/Task/Unit # 125915 JM02.09.G01.1 / 36500

Contract Lab Due Date (Lab Only) :

Labworks ID Number	Sample Location / Description	Collection Date	Collection Time	By	Sample Type Grab/Comp	Sample Type	Number of Containers	Sample Analysis Requested (Method) Preservative	Preservative	Preservative	Preservative	Preservative
								1	1	1	1	1,2
								Bottle Type (Glass/Plastic)	P	P	P	P	P
								As, Ba, Be, Ca, Cd, Co, Cr, Pb, Sb, Se, Tl	B, Li, Mo, Hg	TDS	F, Cl, SO4	Ra 226, Ra 228
								Fill in the Number of Containers for each Test				
AF66418	LCM6P-2	6/6/23	1007	WSK/mc	G	GW	6	1	1	1	1	2
AF66419	LCM6P-3		1117									
AF66420	LCM6P-4		1217									
AF66425	LCM6P-1		1329									
AF66421	LCM6P-5		1438									
AF66417	LCM6P-1		1545									

Temperature Checks: Internal Use Only

TEMP (°C)	INIT
5.1	SJB

Comments

Lot # 1122100
Batch # 033023-01
1:1 Nitric Acid (HNO3)
6/7/23 @ 0858 SJB

Matrix Code: GW-Groundwater, DW-Drinking Water, SW-Surface Water, WW-Wastewater, BW-Boiler Water, L-Limestone, O-Oil, S-Soil, SL-Solid, C-Coal, G-Gypsum, FA-Fly Ash, BA-Bottom Ash, M-Misc (Describe in Comments)

Preservation used: 1-~~4°C~~ 2-~~HNO3~~ 3-~~H2SO4~~ 4-~~HCl~~ 5-~~Na2S2O3~~ 6-Other (Specify)

Bottle Type: (G) Glass (P) Plastic

Sample Type: (G) Grab, (C) Composite

Composite Samples:
Start Date/Time:
End Date/Time:

Preservative Record Correct pH: ~~RAD~~ (Yes) No If preserved, Lot# A20OC-212/01172011 Date/Time/Int LOT#222845 GEL 5/26/23

Relinquished by: (To Person / Lockbox)	Employee #	Date	Time	Received by: (From Person / Lockbox)	Employee #	Date	Time
	37991	6/7/23	719	SJ Brown	35594	6/7/23	0719
Relinquished by: (To Person / Lockbox)	Employee #	Date	Time	Received by: (From Person / Lockbox)	Employee #	Date	Time
Relinquished by: (To Person / Lockbox)	Employee #	Date	Time	Received by: (From Person / Lockbox)	Employee #	Date	Time

Available Analyses:
TOC / DOC
TP, TPO4, NH3-N
F, Cl, NO2, Br, NO3, SO4, OPO4
TDS, TSS
Sulfide
BTEX, Napthalene, MTBE, VOC
Rad 226, Rad 228
Oil & Grease
E.coli, Total Coliform

Metals: Ag, Al, As, B, Be, Ba, Ca, Cd, Co, Cr Cu, Fe, Hg, K, Li, Mg, Mn, Mo, Na, Ni, Pb, Sb Se, Sn, Tl, V, Zn, P, S, SiO2, Sr, Ti, CrVI

Dissolved Metals: As, Fe

pH

Wallboard Gyp: AIM, TOC', Total and Soluble Metals, Purity, % Moisture, Sulfites, pH, Chloride, Particle Size
Daily Gyp: Free Moisture, Purity (CaSO4)
Limestone Analysis: Acid Insoluble Matter, Total Metals, LOI, Purity (CaCO3), % Moisture
Flyash: Ammonia, LOI, % Carbon, Free CaO, Mineral Analysis

Coal Short Prox: % Moisture, Ash, Sulfur, BTUs
Coal Ultimate: % Moisture, Ash, Sulfur, BTUs , Volatile Matter, CHN
XRF Scan Hardgrove Grindability Index
Sieve Analysis Pulverizer Fineness Particulate Matter Analysis

Oil Quality: % Moisture, Color, Acidity Dielectric Strength, Interfacial Tension Density
Togas: Dissolved Gases in Oil
Metals (Oil): As, Cd, Cr, Ni, Pb, Hg
Flash point, Total Halogens, PCB
Gofer Oil:#GOFER **Used Oil:**#USED OIL

santee cooper

Ground Water Monitoring Report

Lab Parameters

Sample ID	Location Code	Comments	Sample Date	Arsenic	Barium	Beryllium	Calcium	Cadmium	Cobalt	Chromium	Lead	Antimony	Selenium	Thallium	Boron	Lithium	Molybdenum
				ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
AF66417	CCMGP-1		6/6/23	<5.0	226	<0.5	151	<0.5	<0.5	<5.0	<1.0	<5.0	<10.0	<1.0	823	25.5	<5.0
AF66418	CCMGP-2		6/6/23	15.4	16.6	1.85	159	<0.5	78.7	<5.0	1.88	<5.0	<10.0	<1.0	412	<5.0	<5.0
AF66419	CCMGP-3		6/6/23	11.5	19.6	7.59	44.6	<0.5	76.6	<5.0	9.83	<5.0	<10.0	<1.0	81.5	8.55	<5.0
AF66420	CCMGP-4		6/6/23	<5.0	457	<0.5	233	<0.5	8.49	5.9	<1.0	<5.0	<10.0	<1.0	1950	15.8	14.6
AF66421	CCMGP-5		6/6/23	<5.0	660	<0.5	66.6	<0.5	5.70	<5.0	<1.0	<5.0	<10.0	<1.0	17.9	<5.0	<5.0

				Mercury	Total Dissolved Solids	Fluoride	Chloride	Sulfate	Radium 226	Radium 228	Radium 226/228 Combined Calculation
				ug/L	mg/L	mg/L	mg/L	mg/L	pCi/L	pCi/L	pCi/L
AF66417	CCMGP-1		6/6/23	<0.2	771.2	0.15	125	56.4	0.824	0.568	1.39
AF66418	CCMGP-2		6/6/23	<0.2	1045	1.16	244	438	0.661	3.59	4.25
AF66419	CCMGP-3		6/6/23	<0.2	378.8	2.69	34.5	198	0.583	0.760	1.34
AF66420	CCMGP-4		6/6/23	<0.2	1370	0.16	283	48.9	1.26	0.736	2.00
AF66421	CCMGP-5		6/6/23	<0.2	388.8	0.12	23.9	5.84	1.85	1.16	3.01

Field Parameters

Sample ID	Location Code	Sample Date	pH	Spec. Cond.	Oxidation Reduction Potential	Dissolved Oxygen	Turbidity	Temp	Depth	Elevation
			SU	uS	mv	ppm	NTU	C	Feet	Feet
AF66417	CCMGP-1	6/6/23	7.08	827	-67.0	1.92	2.50	29.99	9.09	75.21
AF66418	CCMGP-2	6/6/23	4.96	1630	122	0.740	16.2	21.64	21.68	75.05
AF66419	CCMGP-3	6/6/23	3.81	503	345	0.650	32.7	21.53	9.73	74.71
AF66420	CCMGP-4	6/6/23	6.39	1650	69.0	0.710	9.70	22.85	9.44	75.38
AF66421	CCMGP-5	6/6/23	6.12	390	77.0	0.660	50.6	22.49	5.90	74.01

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SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF66417 **Location:** GW Well CCMGP-1 **Date:** 06/06/2023 **Sample Collector:** WK/ML

Loc. Code CCMGP-1 **Time:** 15:45

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	<5.0	ug/L	07/18/2023	SKJACOBS	EPA 6020B
Barium	226	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Beryllium	<0.5	ug/L	07/18/2023	SKJACOBS	EPA 6020B
Calcium	151	mg/L	07/21/2023	SKJACOBS	EPA 6020B
Cadmium	<0.5	ug/L	07/18/2023	SKJACOBS	EPA 6020B
Cobalt	<0.5	ug/L	07/18/2023	SKJACOBS	EPA 6020B
Chromium	<5.0	ug/L	07/18/2023	SKJACOBS	EPA 6020B
Lead	<1.0	ug/L	07/18/2023	SKJACOBS	EPA 6020B
Antimony	<5.0	ug/L	07/18/2023	SKJACOBS	EPA 6020B
Selenium	<10.0	ug/L	07/18/2023	SKJACOBS	EPA 6020B
Thallium	<1.0	ug/L	07/18/2023	SKJACOBS	EPA 6020B
Boron	823	ug/L	07/05/2023	SKJACOBS	EPA 6010D
Lithium	25.5	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Molybdenum	<5.0	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	06/22/2023	EUROFINS SAV	EPA 7470
Sulfate	56.4	mg/L	06/08/2023	KCWELLS	EPA 300.0
Chloride	125	mg/L	06/08/2023	KCWELLS	EPA 300.0
Fluoride	0.15	mg/L	06/08/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	771.2	mg/L	06/14/2023	KCWELLS	SM 2540C
Radium 226	0.824	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
Radium 228	0.568	pCi/L	06/29/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	1.39	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
pH	7.08	SU	06/06/2023	WJK/ML	

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America" - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Linda Williams Validation date: 08/02/2023

Linda Williams - Manager Analytical Services

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SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF66418 **Location:** GW Well CCMGP-2 **Date:** 06/06/2023 **Sample Collector:** WK/ML

Loc. Code CCMGP-2 **Time:** 10:07

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	15.4	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Barium	16.6	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Beryllium	1.85	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Calcium	159	mg/L	07/05/2023	SKJACOBS	EPA 6020B
Cadmium	<0.5	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Cobalt	78.7	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Chromium	<5.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Lead	1.88	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Antimony	<5.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Selenium	<10.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Thallium	<1.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Boron	412	ug/L	07/05/2023	SKJACOBS	EPA 6010D
Lithium	<5.0	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Molybdenum	<5.0	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	06/22/2023	EUROFINS SAV	EPA 7470
Sulfate	438	mg/L	06/08/2023	KCWELLS	EPA 300.0
Chloride	244	mg/L	06/08/2023	KCWELLS	EPA 300.0
Fluoride	1.16	mg/L	06/08/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	1045	mg/L	06/14/2023	KCWELLS	SM 2540C
Radium 226	0.661	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
Radium 228	3.59	pCi/L	06/29/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	4.25	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
pH	4.96	SU	06/06/2023	WJK/ML	

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America" - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Linda Williams Validation date: 08/02/2023

Linda Williams - Manager Analytical Services

Authorized Signature Only- Not Valid Unless Signed

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SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF66419 **Location:** GW Well CCMGP-3 **Date:** 06/06/2023 **Sample Collector:** WK/ML

Loc. Code CCMGP-3 **Time:** 11:17

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	11.5	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Barium	19.6	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Beryllium	7.59	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Calcium	44.6	mg/L	07/05/2023	SKJACOBS	EPA 6020B
Cadmium	<0.5	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Cobalt	76.6	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Chromium	<5.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Lead	9.83	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Antimony	<5.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Selenium	<10.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Thallium	<1.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Boron	81.5	ug/L	07/05/2023	SKJACOBS	EPA 6010D
Lithium	8.55	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Molybdenum	<5.0	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	06/22/2023	EUROFINS SAV	EPA 7470
Sulfate	198	mg/L	06/08/2023	KCWELLS	EPA 300.0
Chloride	34.5	mg/L	06/08/2023	KCWELLS	EPA 300.0
Fluoride	2.69	mg/L	06/08/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	378.8	mg/L	06/14/2023	KCWELLS	SM 2540C
Radium 226	0.583	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
Radium 228	0.760	pCi/L	06/29/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	1.34	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
pH	3.81	SU	06/06/2023	WJK/ML	

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America" - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Linda Williams Validation date: 08/02/2023

Linda Williams - Manager Analytical Services

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SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF66420 **Location:** GW Well CCMGP-4 **Date:** 06/06/2023 **Sample Collector:** WK/ML

Loc. Code CCMGP-4 **Time:** 12:17

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	<5.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Barium	457	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Beryllium	<0.5	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Calcium	233	mg/L	07/05/2023	SKJACOBS	EPA 6020B
Cadmium	<0.5	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Cobalt	8.49	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Chromium	5.9	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Lead	<1.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Antimony	<5.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Selenium	<10.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Thallium	<1.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Boron	1950	ug/L	07/05/2023	SKJACOBS	EPA 6010D
Lithium	15.8	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Molybdenum	14.6	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	06/22/2023	EUROFINS SAV	EPA 7470
Sulfate	48.9	mg/L	06/08/2023	KCWELLS	EPA 300.0
Chloride	283	mg/L	06/08/2023	KCWELLS	EPA 300.0
Fluoride	0.16	mg/L	06/08/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	1370	mg/L	06/14/2023	KCWELLS	SM 2540C
Radium 226	1.26	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
Radium 228	0.736	pCi/L	06/29/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	2.00	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
pH	6.39	SU	06/06/2023	WJK/ML	

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America " - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117 ; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Linda Williams Validation date: 08/02/2023

Linda Williams - Manager Analytical Services

Authorized Signature Only- Not Valid Unless Signed

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SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF66421 **Location:** GW Well CCMGP-5 **Date:** 06/06/2023 **Sample Collector:** WK/ML

Loc. Code CCMGP-5 **Time:** 14:38

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	<5.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Barium	660	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Beryllium	<0.5	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Calcium	66.6	mg/L	07/05/2023	SKJACOBS	EPA 6020B
Cadmium	<0.5	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Cobalt	5.70	ug/L	06/20/2023	SKJACOBS	EPA 6020B
Chromium	<5.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Lead	<1.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Antimony	<5.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Selenium	<10.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Thallium	<1.0	ug/L	07/05/2023	SKJACOBS	EPA 6020B
Boron	17.9	ug/L	07/05/2023	SKJACOBS	EPA 6010D
Lithium	<5.0	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Molybdenum	<5.0	ug/L	06/20/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	06/22/2023	EUROFINS SAV	EPA 7470
Sulfate	5.84	mg/L	06/08/2023	KCWELLS	EPA 300.0
Chloride	23.9	mg/L	06/08/2023	KCWELLS	EPA 300.0
Fluoride	0.12	mg/L	06/08/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	388.8	mg/L	06/14/2023	KCWELLS	SM 2540C
Radium 226	1.85	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
Radium 228	1.16	pCi/L	06/29/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	3.01	pCi/L	07/07/2023	GEL	EPA 903.1 Mod
pH	6.12	SU	06/06/2023	WJK/ML	

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America" - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Linda Williams Validation date: 08/02/2023

Linda Williams - Manager Analytical Services

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Chain of Custody

Cross
CCR/Closed Gypsum Pond
(CGYP-1, CGYP-2, CGYP-3 , CGYP-4, CGYP-6 , CCMGP-1, CCMGP-2, CCMGP-3, CCMGP-4, CCMGP-5 with Duplicate CGYP-2)

Customer/Send Report To: Melanie Goings/A203

Need Results By (Date Needed): ~~3 Weeks~~ 6/28/23

Project/Task/Unit # 125915 JM02.09.G01.1 / 36500

Contract Lab Due Date (Lab Only) : ____

Labworks ID Number	Sample Location / Description	Collection Date	Collection Time	By	Grab/Comp	Matrix	Number of Containers	Sample Analysis Requested (Method): As, Ba, Be, Ca, Cd, Co, Cr, Pb, Sb, Se, Tl (Preservative: 1, Bottle Type: P)	B, Li, Mo, Hg (1, P)	TDS (1, P)	F, Cl, SO4 (1, P)	Ra 226, Ra 228 (1,2, P)
AF66418	CCMGP-2	6/6/23	1007	WSK/MC	G	GW	6	1	1	1	1	2
AF66419	CCMGP-3		1117									
AF66420	CCMGP-4		1217									
AF66425	CGYP-1		1329									
AF66421	CCMGP-5		1438									
AF66417	CCMGP-1		1545									

Fill in the Number of Containers for each Test

✓ SJB

Temperature Checks: Internal Use Only

TEMP (°C)	INIT
5.1	SJB

Comments

Lot # 1122100
Batch # 033023-01
1:1 Nitric Acid (HNO3)
santee cooper 6/7/23 @ 0858 SJB

Matrix Code: GW-Groundwater, DW-Drinking Water, SW-Surface Water, WW-Wastewater, BW-Boiler Water, L-Limestone, O-Oil, S-Soil, SL-Solid, C-Coal, G-Gypsum, FA-Fly Ash, BA-Bottom Ash, M-Misc (Describe in Comments)

Preservation used: 1-4°C, 2-HNO3, 3-H2SO4, 4-HCL, 5-Na2S2O3, 6-Other (Specify)

Bottle Type: (G) Glass (P) Plastic

Sample Type: (G) Grab (C) Composite

Composite Samples:
Start Date/Time:
End Date/Time:

Preservative Record Correct pH: ~~RAD~~ (Yes) No If preserved, Lot# A20OC-212/0117201H Date/Time/Int LOT# 222845 GEL 5/26/23

Relinquished by: (To Person / Lockbox)	Employee #	Date	Time	Received by: (From Person / Lockbox)	Employee #	Date	Time
	37491	6/7/23	719		35594	6/7/23	0719
Relinquished by: (To Person / Lockbox)	Employee #	Date	Time	Received by: (From Person / Lockbox)	Employee #	Date	Time
Relinquished by: (To Person / Lockbox)	Employee #	Date	Time	Received by: (From Person / Lockbox)	Employee #	Date	Time

Available Analyses:

TOC / DOC
TP, TPO4, NH3-N
F, Cl, NO2, Br, NO3, SO4, OPO4
TDS, TSS
Sulfide
BTEX, Napthalene, MTBE, VOC
Rad 226, Rad 228
Oil & Grease
E.coli, Total Coliform

Metals: Ag, Al, As, B, Be, Ba, Ca, Cd, Co, Cr Cu, Fe, Hg, K, Li, Mg, Mn, Mo, Na, Ni, Pb, Sb Se, Sn, Tl, V, Zn, P, S, SiO2, Sr, Ti, CrVI

Dissolved Metals: As, Fe

pH

Wallboard Gyp: AIM, TOC', Total and Soluble Metals, Purity, % Moisture, Sulfites, pH, Chloride, Particle Size
Daily Gyp: Free Moisture, Purity (CaSO4)
Limestone Analysis: Acid Insoluble Matter, Total Metals, LOI, Purity (CaCO3), % Moisture
Flyash: Ammonia, LOI, % Carbon, Free CaO, Mineral Analysis

Coal Short Prox: % Moisture, Ash, Sulfur, BTUs
Coal Ultimate: % Moisture, Ash, Sulfur, BTUs , Volatile Matter, CHN
XRF Scan Hardgrove Grindability Index
Sieve Analysis Pulverizer Fineness Particulate Matter Analysis

Oil Quality: % Moisture, Color, Acidity
Dielectric Strength, Interfacial Tension
Density
Togas: Dissolved Gases in Oil
Metals (Oil): As, Cd, Cr, Ni, Pb, Hg
Flash point, Total Halogens, PCB
Gofer Oil:#GOFER **Used Oil:**#USED OIL

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Ground Water Monitoring Report

Lab Parameters

Sample ID	Location Code	Comments	Sample Date	Arsenic	Barium	Beryllium	Calcium	Cadmium	Cobalt	Chromium	Lead	Antimony	Selenium	Thallium	Boron	Lithium	Molybdenum
				ug/l	ug/L	ug/l	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
AF71891	CCMGP-1		7/19/23	<3	301	<0.5	133000	<0.5	<0.5	<5	<2.5	<5	<20	<1	475	21.1	<5.0
AF71892	CCMGP-1	DUP	7/19/23	<3	310	<0.5	139000	<0.5	<0.5	<5	<2.5	<5	<20	<1	481	26.7	<5.0
AF71893	CCMGP-2		8/1/23	12.0	21.8	3.18	73400	0.82	84.7	<5	13.4	<5	<20	<1	337	6.75	<5.0
AF71894	CCMGP-3		8/1/23	7.66	30.5	7.29	27400	0.62	60.6	<5	9.41	<5	<20	<1	77.5	8.97	<5.0
AF71895	CCMGP-4		8/1/23	<3	510	<0.5	222000	<0.5	7.74	<5	<2.5	<5	<20	<1	1670	16.9	6.98
AF71896	CCMGP-5		8/1/23	<3	851	<0.5	67500	<0.5	6.35	<5	<2.5	<5	<20	<1	17.2	6.53	<5.0
AF71897	CGYP-7		7/19/23	15.2	27.1	9.82	262000	0.56	61.5	<5	37.0	<5	<20	<1	9810	15.1	<5.0
AF71898	CGYP-7	DUP	7/19/23	14.0	26.3	9.79	262000	0.57	60.6	<5	36.6	<5	<20	<1	9470	14.1	<5.0
AF71899	POZ-3		7/19/23	<3	96.5	<0.5	159000	<0.5	2.39	<5	<2.5	<5	<20	<1	19.6	3.17	<5.0

				Mercury	Total Dissolved Solids	Fluoride	Chloride	Sulfate	Radium 226	Radium 228	Radium 226/228 Combined Calculation
				ug/L	mg/L	mg/L	mg/L	mg/L	pCi/L	pCi/L	pCi/L
AF71891	CCMGP-1		7/19/23	<0.2	660.0	0.12	108	34.8	0.970	0.128	1.10
AF71892	CCMGP-1	DUP	7/19/23	<0.2	663.8	0.10	105	33.4	0.715	0.321	1.04
AF71893	CCMGP-2		8/1/23	<0.2	956.2	0.94	240	422	0.700	2.34	3.04
AF71894	CCMGP-3		8/1/23	<0.2	16130	2.84	28.5	205	0.474	0.983	1.46
AF71895	CCMGP-4		8/1/23	<0.2	1184	0.10	273	49.8	0.670	1.57	2.24
AF71896	CCMGP-5		8/1/23	<0.2	312.5	0.10	27.4	2.34	2.30	-0.250	2.30
AF71897	CGYP-7		7/19/23	<0.2	2252	0.44	648	810	1.70	1.85	3.55
AF71898	CGYP-7	DUP	7/19/23	<0.2	2155	0.57	676	805	0.706	3.63	4.34
AF71899	POZ-3		7/19/23	<0.2	653.8	0.14	12.2	25.2	0.706	0.477	1.18

Field Parameters

Sample ID	Location Code	Sample Date	pH	Spec. Cond.	Oxidation Reduction Potential	Dissolved Oxygen	Turbidity	Temp	Depth	Elevation
			SU	uS	mv	ppm	NTU	C	Feet	Feet
AF71891	CCMGP-1	7/19/23	6.74	754	-89.0	0.820	2.40	23.79	8.41	75.89
AF71893	CCMGP-2	8/1/23	4.04	1460	222	0.820	0	23.54	20.86	75.87
AF71894	CCMGP-3	8/1/23	3.80	505	306	0.780	1.70	25.78	8.92	75.52
AF71895	CCMGP-4	8/1/23	6.34	1640	-85.0	0.700	9.20	27.29	8.64	76.18
AF71896	CCMGP-5	8/1/23	6.35	420	-52.0	0.830	0	23.21	4.87	75.04
AF71897	CGYP-7	7/19/23	3.83	3340	232	0.660	0.800	24.69	9.47	75.90
AF71899	POZ-3	7/19/23	6.38	983	38.0	0.660	5.70	26.63	5.21	77.40

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SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF71891 **Location:** GW Well CCMGP-1 **Date:** 07/19/2023 **Sample Collector:** WJK/BB

Loc. Code CCMGP-1 **Time:** 09:03

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	<3	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Barium	301	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Beryllium	<0.5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Calcium	133000	ug/L	08/11/2023	EUROFINS SAV	EPA 6010D
Cadmium	<0.5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Cobalt	<0.5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Chromium	<5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Lead	<2.5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Antimony	<5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Selenium	<20	ug/L	08/11/2023	EUROFINS SAV	EPA 6010D
Thallium	<1	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Boron	475	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Lithium	21.1	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Molybdenum	<5.0	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	08/15/2023	EUROFINS SAV	EPA 7470
Fluoride	0.12	mg/L	08/05/2023	KCWELLS	EPA 300.0
Chloride	108	mg/L	08/05/2023	KCWELLS	EPA 300.0
Sulfate	34.8	mg/L	08/05/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	660.0	mg/L	08/04/2023	NTCHIN	SM 2540C
Radium 226	0.970	pCi/L	09/01/2023	GEL	EPA 903.1 Mod
Radium 228	0.128	pCi/L	08/22/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	1.10	pCi/L	09/01/2023	GEL	EPA 903.1 Mod
pH	6.74	SU	08/02/2023	WJK/BB	

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America" - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Linda Williams Validation date: 9/18/23

Linda Williams - Manager Analytical Services

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SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF71892 **Location:** GW Well CCMGP-1 **Date:** 07/19/2023 **Sample Collector:** WJK/BB

Loc. Code CCMGP-1 DUP **Time:** 09:08

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	<3	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Barium	310	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Beryllium	<0.5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Calcium	139000	ug/L	08/11/2023	EUROFINS SAV	EPA 6010D
Cadmium	<0.5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Cobalt	<0.5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Chromium	<5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Lead	<2.5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Antimony	<5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Selenium	<20	ug/L	08/11/2023	EUROFINS SAV	EPA 6010D
Thallium	<1	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Boron	481	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Lithium	26.7	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Molybdenum	<5.0	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	08/15/2023	EUROFINS SAV	EPA 7470
Fluoride	0.10	mg/L	08/05/2023	KCWELLS	EPA 300.0
Chloride	105	mg/L	08/05/2023	KCWELLS	EPA 300.0
Sulfate	33.4	mg/L	08/05/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	663.8	mg/L	08/04/2023	NTCHIN	SM 2540C
Radium 226	0.715	pCi/L	09/01/2023	GEL	EPA 903.1 Mod
Radium 228	0.321	pCi/L	08/22/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	1.04	pCi/L	09/01/2023	GEL	EPA 903.1 Mod

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America" - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Linda Williams - Manager Analytical Services Validation date: 9/18/23

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SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF71893 **Location:** GW Well CCMGP-2 **Date:** 08/01/2023 **Sample Collector:** WJK/BB

Loc. Code CCMGP-2 **Time:** 10:45

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	12.0	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Barium	21.8	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Beryllium	3.18	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Calcium	73400	ug/L	08/11/2023	EUROFINS SAV	EPA 6010D
Cadmium	0.82	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Cobalt	84.7	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Chromium	<5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Lead	13.4	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Antimony	<5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Selenium	<20	ug/L	08/11/2023	EUROFINS SAV	EPA 6010D
Thallium	<1	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Boron	337	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Lithium	6.75	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Molybdenum	<5.0	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	08/15/2023	EUROFINS SAV	EPA 7470
Fluoride	0.94	mg/L	08/05/2023	KCWELLS	EPA 300.0
Chloride	240	mg/L	08/05/2023	KCWELLS	EPA 300.0
Sulfate	422	mg/L	08/05/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	956.2	mg/L	08/04/2023	NTCHIN	SM 2540C
Radium 226	0.700	pCi/L	09/01/2023	GEL	EPA 903.1 Mod
Radium 228	2.34	pCi/L	08/22/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	3.04	pCi/L	09/01/2023	GEL	EPA 903.1 Mod
pH	4.04	SU	08/01/2023	WJK/BB	

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America" - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Validation date: 9/18/23

Linda Williams - Manager Analytical Services

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SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF71894 **Location:** GW Well CCMGP-3 **Date:** 08/01/2023 **Sample Collector:** WJK/BB

Loc. Code CCMGP-3 **Time:** 11:52

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	7.66	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Barium	30.5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Beryllium	7.29	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Calcium	27400	ug/L	08/11/2023	EUROFINS SAV	EPA 6010D
Cadmium	0.62	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Cobalt	60.6	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Chromium	<5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Lead	9.41	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Antimony	<5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Selenium	<20	ug/L	08/11/2023	EUROFINS SAV	EPA 6010D
Thallium	<1	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Boron	77.5	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Lithium	8.97	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Molybdenum	<5.0	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	08/15/2023	EUROFINS SAV	EPA 7470
Fluoride	2.84	mg/L	08/05/2023	KCWELLS	EPA 300.0
Chloride	28.5	mg/L	08/05/2023	KCWELLS	EPA 300.0
Sulfate	205	mg/L	08/05/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	16130	mg/L	08/04/2023	NTCHIN	SM 2540C
Radium 226	0.474	pCi/L	09/01/2023	GEL	EPA 903.1 Mod
Radium 228	0.983	pCi/L	08/22/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	1.46	pCi/L	09/01/2023	GEL	EPA 903.1 Mod
pH	3.80	SU	08/01/2023	WJK/BB	

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America" - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Validation date: 9/18/23

Linda Williams - Manager Analytical Services

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SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF71895 **Location:** GW Well CCMGP-4 **Date:** 08/01/2023 **Sample Collector:** WJK/BB

Loc. Code CCMGP-4 **Time:** 13:17

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	<3	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Barium	510	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Beryllium	<0.5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Calcium	222000	ug/L	08/11/2023	EUROFINS SAV	EPA 6010D
Cadmium	<0.5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Cobalt	7.74	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Chromium	<5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Lead	<2.5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Antimony	<5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Selenium	<20	ug/L	08/11/2023	EUROFINS SAV	EPA 6010D
Thallium	<1	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Boron	1670	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Lithium	16.9	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Molybdenum	6.98	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	08/15/2023	EUROFINS SAV	EPA 7470
Fluoride	0.10	mg/L	08/05/2023	KCWELLS	EPA 300.0
Chloride	273	mg/L	08/05/2023	KCWELLS	EPA 300.0
Sulfate	49.8	mg/L	08/05/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	1184	mg/L	08/04/2023	NTCHIN	SM 2540C
Radium 226	0.670	pCi/L	09/01/2023	GEL	EPA 903.1 Mod
Radium 228	1.57	pCi/L	08/22/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	2.24	pCi/L	09/01/2023	GEL	EPA 903.1 Mod
pH	6.34	SU	08/01/2023	WJK/BB	

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America" - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Linda Williams - Manager Analytical Services Validation date: 9/18/23

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Moncks Corner, SC 29461-2901
(843) 761-8000

SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF71896 **Location:** GW Well CCMGP-5 **Date:** 08/01/2023 **Sample Collector:** WJK/BB

Loc. Code CCMGP-5 **Time:** 09:53

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	<3	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Barium	851	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Beryllium	<0.5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Calcium	67500	ug/L	08/11/2023	EUROFINS SAV	EPA 6010D
Cadmium	<0.5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Cobalt	6.35	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Chromium	<5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Lead	<2.5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Antimony	<5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Selenium	<20	ug/L	08/11/2023	EUROFINS SAV	EPA 6010D
Thallium	<1	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Boron	17.2	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Lithium	6.53	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Molybdenum	<5.0	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	08/15/2023	EUROFINS SAV	EPA 7470
Fluoride	0.10	mg/L	08/05/2023	KCWELLS	EPA 300.0
Chloride	27.4	mg/L	08/05/2023	KCWELLS	EPA 300.0
Sulfate	2.34	mg/L	08/05/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	312.5	mg/L	08/04/2023	NTCHIN	SM 2540C
Radium 226	2.30	pCi/L	09/01/2023	GEL	EPA 903.1 Mod
Radium 228	-0.250	pCi/L	08/22/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	2.30	pCi/L	09/01/2023	GEL	EPA 903.1 Mod
pH	6.35	SU	08/01/2023	WJK/BB	

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America" - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Linda Williams - Manager Analytical Services Validation date: 9/18/23

Authorized Signature Only- Not Valid Unless Signed

santee cooper

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SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF71897 **Location:** GW Well CGYP-7 **Date:** 07/19/2023 **Sample Collector:** WJK/BB

Loc. Code CGYP-7 **Time:** 10:00

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	15.2	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Barium	27.1	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Beryllium	9.82	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Calcium	262000	ug/L	08/11/2023	EUROFINS SAV	EPA 6010D
Cadmium	0.56	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Cobalt	61.5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Chromium	<5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Lead	37.0	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Antimony	<5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Selenium	<20	ug/L	08/11/2023	EUROFINS SAV	EPA 6010D
Thallium	<1	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Boron	9810	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Lithium	15.1	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Molybdenum	<5.0	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	08/15/2023	EUROFINS SAV	EPA 7470
Fluoride	0.44	mg/L	08/05/2023	KCWELLS	EPA 300.0
Chloride	648	mg/L	08/05/2023	KCWELLS	EPA 300.0
Sulfate	810	mg/L	08/05/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	2252	mg/L	08/04/2023	NTCHIN	SM 2540C
Radium 226	1.70	pCi/L	09/01/2023	GEL	EPA 903.1 Mod
Radium 228	1.85	pCi/L	08/22/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	3.55	pCi/L	09/01/2023	GEL	EPA 903.1 Mod
pH	3.83	SU	08/02/2023	WJK/BB	

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America" - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Validation date: 9/18/23

Linda Williams - Manager Analytical Services

Authorized Signature Only- Not Valid Unless Signed

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SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF71898 **Location:** GW Well CGYP-7 **Date:** 07/19/2023 **Sample Collector:** WJK/BB

Loc. Code CGYP-7 DUP **Time:** 10:05

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	14.0	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Barium	26.3	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Beryllium	9.79	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Calcium	262000	ug/L	08/11/2023	EUROFINS SAV	EPA 6010D
Cadmium	0.57	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Cobalt	60.6	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Chromium	<5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Lead	36.6	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Antimony	<5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Selenium	<20	ug/L	08/11/2023	EUROFINS SAV	EPA 6010D
Thallium	<1	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Boron	9470	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Lithium	14.1	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Molybdenum	<5.0	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	08/15/2023	EUROFINS SAV	EPA 7470
Fluoride	0.57	mg/L	08/05/2023	KCWELLS	EPA 300.0
Chloride	676	mg/L	08/05/2023	KCWELLS	EPA 300.0
Sulfate	805	mg/L	08/05/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	2155	mg/L	08/04/2023	NTCHIN	SM 2540C
Radium 226	0.706	pCi/L	09/01/2023	GEL	EPA 903.1 Mod
Radium 228	3.63	pCi/L	08/22/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	4.34	pCi/L	09/01/2023	GEL	EPA 903.1 Mod

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America" - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117 ; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Validation date: 9/18/23

Linda Williams - Manager Analytical Services

Authorized Signature Only- Not Valid Unless Signed

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Moncks Corner, SC 29461-2901
(843) 761-8000

SANTEE COOPER ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

LAB CERTIFICATION #08552

Sample # AF71899 **Location:** GW Well POZ-3 **Date:** 07/19/2023 **Sample Collector:** WJK/BB

Loc. Code POZ-3 **Time:** 11:37

Analysis	Result	Units	Test Date	Analyst	Method
Arsenic	<3	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Barium	96.5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Beryllium	<0.5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Calcium	159000	ug/L	08/11/2023	EUROFINS SAV	EPA 6010D
Cadmium	<0.5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Cobalt	2.39	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Chromium	<5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Lead	<2.5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Antimony	<5	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Selenium	<20	ug/L	08/11/2023	EUROFINS SAV	EPA 6010D
Thallium	<1	ug/L	08/11/2023	EUROFINS SAV	EPA 6020B
Boron	19.6	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Lithium	3.17	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Molybdenum	<5.0	ug/L	08/28/2023	SKJACOBS	EPA 6010D
Mercury	<0.2	ug/L	08/15/2023	EUROFINS SAV	EPA 7470
Fluoride	0.14	mg/L	08/05/2023	KCWELLS	EPA 300.0
Chloride	12.2	mg/L	08/05/2023	KCWELLS	EPA 300.0
Sulfate	25.2	mg/L	08/05/2023	KCWELLS	EPA 300.0
Total Dissolved Solids	653.8	mg/L	08/04/2023	NTCHIN	SM 2540C
Radium 226	0.706	pCi/L	09/01/2023	GEL	EPA 903.1 Mod
Radium 228	0.477	pCi/L	08/22/2023	GEL	EPA 904.0
Radium 226/228 Combined Calculation	1.18	pCi/L	09/01/2023	GEL	EPA 903.1 Mod
pH	6.38	SU	08/02/2023	WJK/BB	

Comments:

Independent Laboratory Results: "GEL" - GEL Laboratories LLC - Lab ID # 10120; "Test America" - TestAmerica Laboratories, Inc. - Lab ID# 98001; "DavisBrown"- Davis & Brown Lab ID # 21117; "Shealy"- Shealy Environmental Services, Inc.- Lab ID# 32010 "ROGERSCALLCO"- Rogers & Callcot, Inc.- Lab ID # 23105001

Analysis Validated: Linda Williams Validation date: 9/18/23

Linda Williams - Manager Analytical Services

Authorized Signature Only- Not Valid Unless Signed

Cross

CCR CGP N&E

(CCMGP-1, CCMGP-2, CCMGP-3, CCMGP-4, CCMGP-5, with duplicate at CCMGP-1)

Chain of Custody

santee cooper

Customer/Send Report To: Melanie Goings/A203

Need Results By (Date Needed): 3 Weeks 8/25/23

Project/Task/Unit # 125915 JM02.09.G01.1 / 36500

Contract Lab Due Date (Lab Only) : _____

Sample Analysis Requested (Method)

Labworks ID Number	Sample Location / Description	Collection Date	Collection Time	Collection By	Sample Type: Grab/Comp	Sample Type: Matrix	Number of Containers	As, Ba, Be, Ca, Cd, Co, Cr, Pb, Sb, Se, Tl	B, Li, Mo, Hg	TDS	F, Cl, SO4	Ra 226, Ra 228
	Preservative							1	1	1	1	1,2
	Bottle Type (Glass/Plastic)							P	P	P	P	P
	Fill in the Number of Containers for each Test											
AF71891	CCMGP-1	8/2/23	903	WJB/BB	G	GW	6	1	1	1	1	2
AF71892	CCMGP-1 DUP		908									
AF71897	CGYP-7		1000									
AF71898	CGYP-7 DUP		1005									
AF71899	PDZ-3		1137									

Temperature Checks: Internal Use Only

TEMP (°C)	INIT
4.9	SJB

Comments

Lot # 1122100
Batch # 033023-01
1:1 Nitric Acid (HNO3)
8/2/23 @ 1341 SJB

Matrix Code: **GW**-Groundwater, **DW**-Drinking Water, **SW**-Surface Water, **WW**-Wastewater, **BW**-Boiler Water, **L**-Limestone, **O**-Oil, **S**-Soil, **SL**-Solid, **C**-Coal, **G**-Gypsum, **FA**-Fly Ash, **BA**-Bottom Ash, **M**-Misc (Describe in Comments)

Preservation used: 1-<4°C, 2-HNO_3, 3-H_2SO_4, 4-HCl, 5-$Na_2S_2O_3$, 6-Other (Specify)

Bottle Type: (G) Glass (P) Plastic

Sample Type: (G) Grab, (C) Composite

Composite Samples:

Start Date/Time:

End Date/Time:

Preservative Record Correct pH: RAD (Yes) No If preserved, Lot# 1000-1902-QC-10.0N20 Date/Time/Int 5/26/23 GEL

Relinquished by: (To Person / Lockbox)	Employee #	Date	Time	Received by: (From Person / Lockbox)	Employee #	Date	Time
	37981	8/2/23	1310	SJBrown	35594	8/2/23	1310
Relinquished by: (To Person / Lockbox)	**Employee #**	**Date**	**Time**	**Received by: (From Person / Lockbox)**	**Employee #**	**Date**	**Time**
Relinquished by: (To Person / Lockbox)	**Employee #**	**Date**	**Time**	**Received by: (From Person / Lockbox)**	**Employee #**	**Date**	**Time**

Available Analyses:

TOC / DOC
TP, TPO4, NH3-N
F, Cl, NO2, Br, NO3, SO4, OPO4
TDS, TSS
Sulfide
BTEX, Napthalene, MTBE, VOC
Rad 226, Rad 228
Oil & Grease
E.coli, Total Coliform

Metals: Ag, Al, As, B, Be, Ba, Ca, Cd, Co, Cr Cu, Fe, Hg, K, Li, Mg, Mn, Mo, Na, Ni, Pb, Sb Se, Sn, Tl, V, Zn, P, S, SiO2, Sr, Ti, CrVI

Dissolved Metals: As, Fe

pH

Wallboard Gyp: AIM, TOC, Total and Soluble Metals, Purity, % Moisture, Sulfites, pH, Chloride, Particle Size
Daily Gyp: Free Moisture, Purity (CaSO4)
Limestone Analysis: Acid Insoluble Matter, Total Metals, LOI, Purity (CaCO3), % Moisture
Flyash: Ammonia, LOI, % Carbon, Free CaO, Mineral Analysis

Coal Short Prox: % Moisture, Ash, Sulfur, BTUs
Coal Ultimate: % Moisture, Ash, Sulfur, BTUs , Volatile Matter, CHN
XRF Scan Hardgrove Grindability Index
Sieve Analysis Pulverizer Fineness Particulate Matter Analysis

Oil Quality: % Moisture, Color, Acidity Dielectric Strength, Interfacial Tension Density
Togas: Dissolved Gases in Oil
Metals (Oil): As, Cd, Cr, Ni, Pb, Hg
Flash point, Total Halogens, PCB
Gofer Oil:#GOFER **Used Oil:**#USED OIL

Cross

CCR CGP N&E

(CCMGP-1, CCMGP-2, CCMGP-3, CCMGP-4, CCMGP-5, with duplicate at CCMGP-1)

santee cooper

Chain of Custody

Customer/Send Report To: Melanie Goings/A203

Need Results By (Date Needed): 3 Weeks 8/25/23

Project/Task/Unit # 125915 JM02.09.G01.1 / 36500

Contract Lab Due Date (Lab Only) :

Labworks ID Number	Sample Location / Description	Collection Date	Collection Time	By	Sample Type: Grab/Comp	Sample Type: Matrix	Number of Containers	Sample Analysis Requested (Method): As, Ba, Be, Ca, Cd, Co, Cr, Pb, Sb, Se, Tl	B, Li, Mo, Hg	TDS	F, Cl, SO4	Ra 226, Ra 228
	Preservative							1	1	1	1	1,2
	Bottle Type (Glass/Plastic)							P	P	P	P	P
AF71896	CCMGP-5	8/1/23	953	WJK/SB	G	GW	6	1	1	1	1	2
AF71897	CCMGP-2	↓	1045	↓	↓	↓	↓	↓	↓	↓	↓	↓
AF71898	CCMGP-3	↓	1152	↓	↓	↓	↓	↓	↓	↓	↓	↓
AF71899	CCMGP-4	↓	1317	↓	↓	↓	↓	↓	↓	↓	↓	↓
								Fill in the Number of Containers for each Test				

Temperature Checks: Internal Use Only

TEMP (°C)	INIT
3.1	SJB

Comments

Lot # 1122100
Batch # 033023-01
1:1 Nitric Acid (HNO3)
santee cooper 8/1/23 @ 1610 SJB

Matrix Code: GW-Groundwater, DW-Drinking Water, SW-Surface Water, WW-Wastewater, BW-Boiler Water, L-Limestone, O-Oil, S-Soil, SL-Solid, C-Coal, G-Gypsum, FA-Fly Ash, BA-Bottom Ash, M-Misc (Describe in Comments)

Preservation used: 1-<4°C, 2-HNO_3, 3-H_2SO_4, 4-HCl, 5-$Na_2S_2O_3$, 6-Other (Specify) Bottle Type: (G) Glass (P) Plastic Sample Type: (G) Grab, (C) Composite

Composite Samples:
Start Date/Time:
End Date/Time:

Preservative Record	Correct pH: RAD (Yes) No	If preserved, Lot# 1000-1902-QC-10.0N20	Date/Time/Int 5/26/23 GEL

Relinquished by: (To Person / Lockbox)	Employee #	Date	Time	Received by: (From Person / Lockbox)	Employee #	Date	Time
[signature]	37981	8/1/23	1433	[signature]	35594	8/1/23	1433
Relinquished by: (To Person / Lockbox)	Employee #	Date	Time	Received by: (From Person / Lockbox)	Employee #	Date	Time
Relinquished by: (To Person / Lockbox)	Employee #	Date	Time	Received by: (From Person / Lockbox)	Employee #	Date	Time

Available Analyses:

TOC / DOC
TP, TPO4, NH3-N
F, Cl, NO2, Br, NO3, SO4, OPO4
TDS, TSS
Sulfide
BTEX, Napthalene, MTBE, VOC
Rad 226, Rad 228
Oil & Grease
E.coli, Total Coliform

Metals: Ag, Al, As, B, Be, Ba, Ca, Cd, Co, Cr Cu, Fe, Hg, K, Li, Mg, Mn, Mo, Na, Ni, Pb, Sb Se, Sn, Tl, V, Zn, P, S, SiO2, Sr, Ti, CrVI

Dissolved Metals: As, Fe

pH

Wallboard Gyp: AlM, TOC, Total and Soluble Metals, Purity, % Moisture, Sulfites, pH, Chloride, Particle Size
Daily Gyp: Free Moisture, Purity (CaSO4)
Limestone Analysis: Acid Insoluble Matter, Total Metals, LOI, Purity (CaCO3), % Moisture
Flyash: Ammonia, LOI, % Carbon, Free CaO, Mineral Analysis

Coal Short Prox: % Moisture, Ash, Sulfur, BTUs
Coal Ultimate: % Moisture, Ash, Sulfur, BTUs , Volatile Matter, CHN
XRF Scan Hardgrove Grindability Index
Sieve Analysis Pulverizer Fineness Particulate Matter Analysis

Oil Quality: % Moisture, Color, Acidity Dielectric Strength, Interfacial Tension Density
Togas: Dissolved Gases in Oil
Metals (Oil): As, Cd, Cr, Ni, Pb, Hg
Flash point, Total Halogens, PCB
Gofer Oil:#GOFER Used Oil:#USED OIL