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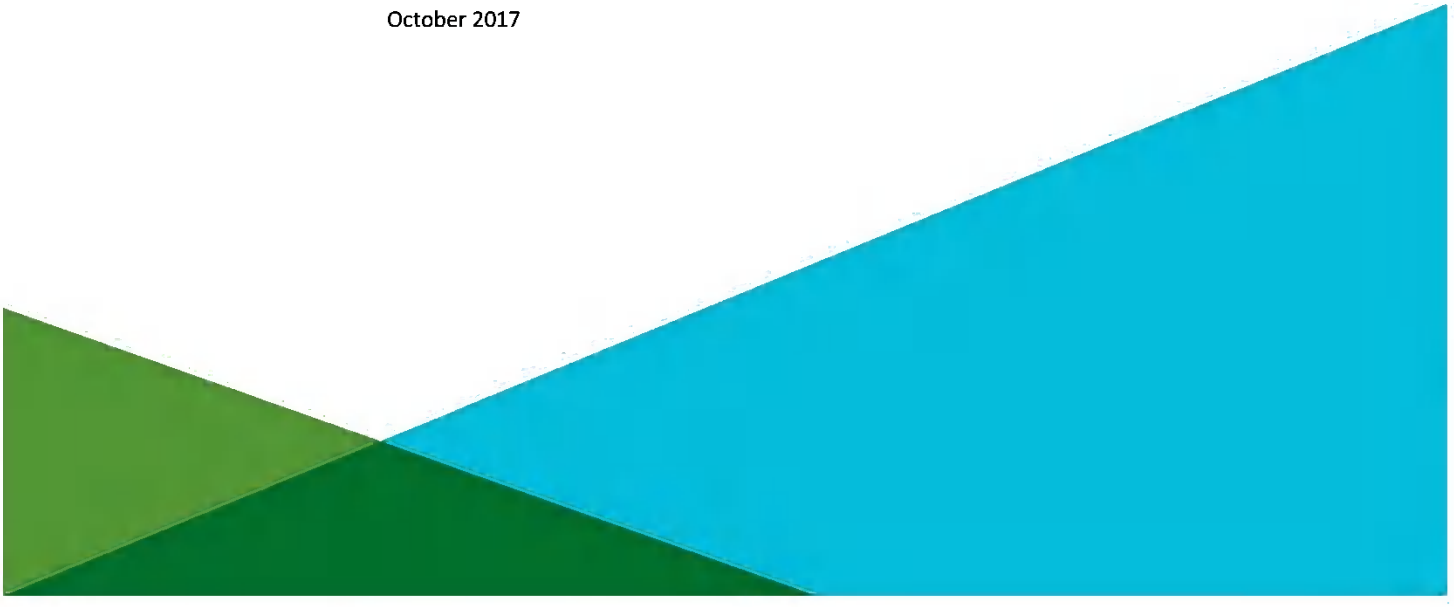
REPORT ON

GROUNDWATER MONITORING PROGRAM
CROSS GENERATING STATION
CROSS, SOUTH CAROLINA

by Haley & Aldrich, Inc.
Greenville, South Carolina

for Santee Cooper
Moncks Corner, South Carolina

File No. 42122-000
October 2017



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16 October 2017
File No. 42122-000

Santee Cooper
1 Riverwood Drive
P.O. Box 2946101
Moncks Corner, SC 29461

Attention: Ms. Melanie Goings, Geologist

Subject: Groundwater Monitoring Program
Cross Generating Station
Cross, South Carolina

Dear Ms. Goings:

Haley & Aldrich, Inc. (Haley & Aldrich) is pleased to submit this Groundwater Monitoring Program (GMP) report for the Cross Generating Station coal ash pond and landfill. This GMP was developed to comply with the United States Environmental Protection Agency (USEPA) Coal Combustion Residual (CCR) Rule dated 17 April 2015 (Rule), and is based on our review of the existing data on hydrogeology and groundwater quality and considering other site conditions at the Cross Generating Station. This GMP addresses the Detection Monitoring step specified in the CCR Rule, which requires monitoring for existing CCR management facilities, or units, and includes specifications for location of the monitoring wells, sampling and chemical analysis procedures, and collection of groundwater quality data for the Appendix III and Appendix IV list of constituents for statistical analysis to determine if the next step of groundwater monitoring (Assessment Monitoring) is required.

Sincerely yours,
HALEY & ALDRICH, INC.

Mark Miesfeldt, P.G.
Hydrogeologist

Jeffrey A. Klaiber, P.E.
Senior Vice President

Enclosures

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1. Introduction

Haley & Aldrich, Inc. (Haley & Aldrich) was retained by Santee Cooper to perform technical services associated with development of a groundwater monitoring program (GMP) that is compliant with the April 17, 2015 Coal Combustion Residuals (CCR) Rule (Rule) published by the U.S. Environmental Protection Agency (USEPA). Haley & Aldrich has prepared this GMP on behalf of the South Carolina Public Service Authority (Santee Cooper) for the Cross Generating Station (CGS; Site) located in Berkeley County near the communities of Cross and Pineville, South Carolina. Under the CCR Rule, the first step in groundwater monitoring at existing CCR units is Detection Monitoring, which requires construction of an adequate groundwater monitoring network established in the uppermost aquifer from which a minimum of 8 rounds of hydrological and groundwater quality data can be obtained by October 17, 2017 as defined in the CCR Rule §257.94, which are considered to be representative of the groundwater quality in the uppermost aquifer. This GMP was prepared in general accordance with the USEPA "Sampling and Analysis Plan Guidance and Template" (USEPA, 2000), to establish a groundwater monitoring program for Detection Monitoring at the Site that complies with the groundwater monitoring requirements of the USEPA CCR Rule for existing CCR units. The groundwater monitoring requirements of the Rule are provided in Appendix A of this document, as outlined in 40 CFR §257.90 through §257.98, including the accompanying list of constituents in Appendices III and IV for the analysis of groundwater.

There are three groundwater monitoring components referenced in the CCR Rule that together describe the groundwater monitoring activities required to be undertaken. One component is the GMP which provides a summary of relevant background information and Site geology and hydrogeology along with a detailed description of the groundwater monitoring network and sampling program. The second component is groundwater sampling and analysis (GWSAP) which is based on the CCR Rule specifications in §257. 93 and describes the sampling and chemical analysis procedures and processes that are followed to obtain representative and technically defensible groundwater monitoring results. The third component describes the methods for the statistical analysis of the collected groundwater quality data as required by the Rule to determine whether a Statistically Significance Increase (SSI) of Appendix III constituents in the downgradient wells, compared to upgradient/background well(s), has occurred (SDAP). The statistical methodology is provided separately and is based on the CCR Rule-specified statistical methods in §257.93 paragraphs f(1) through f(5).

1.1 SITE SETTING

The CGS is located north of the diversion canal that connects Lake Marion, northwest of the plant, to Lake Moultrie, southeast of the plant. The location of the CGS is shown on Figure 1. The Site located within the Lower Coastal Plain of the Atlantic Coastal Plain physiographic province in South Carolina between the towns Surry Scarp to the west and the Summerville Scarp to the east. The Site is relatively flat with natural ground surface elevations varying from 79- to 83-feet above mean sea level (msl). Surface water runoff occurs via sheet flow to low lying areas surrounding the Site and into storm water drainage canals located adjacent to the primary and secondary roads and parking areas.

1.2 SITE HISTORY

The CGS is an electric power generating station with four steam units which utilize coal as the primary fuel source. Santee Cooper currently owns the land and operates the station for supplying electric

power to electric cooperatives throughout the state and to the industrial, commercial, and residential customers in its service territory. The CGS is Santee Cooper's largest generating station in its fleet of power plants. CGS began commercial operations with Cross Unit 2 coming online in 1983. Cross Unit 1 came online in May 1995; Cross Unit 3 came online in 2007; and Cross Unit 4 came online in October 2008.

CCR is currently managed on the Site in a 79-acre State permitted Ash Pond (NPDES Permit # SC0037401) and a new State permitted Class 3 landfill that began operation in January 2016. In addition, the 91-acre State Permitted Class 2 Landfill (Industrial Solid Waste Permit # IWP-186), which was closed at the end of 2015, is also regulated under the Rule. The new Class 3 landfill was constructed contiguous to the east side of the closed Class 2 landfill. A Site Index Map is provided as Figure 2.

The original ash pond was constructed with a granular bentonite clay liner to protect groundwater. When the second unit was constructed, Ash Pond 2 was constructed with a bentonite geotextile liner to minimize the potential for releases of CCR constituents into groundwater and the original ash pond was converted to a decant pond. Both liners are of very low permeability and have a protective granular layer on top to protect the integrity of the liner. The coal pile and coal pile runoff pond were constructed on compacted clay soils. The closed Class 2 Landfill was constructed in 1982 for disposal of Poz-o-Tec, a proprietary fixated mixture of FGD sludge, fly ash and lime; and gypsum filtrate pond sludge. Since the CGS was up-fitted with a forced oxidation scrubber system, the landfill was permitted to receive fixated fly ash and scrubber sludge. The existing Class 3 landfill is currently permitted to receive all coal combustion residuals.

2. Site Geology and Hydrogeology

The Site geology and hydrogeology is described in the *Site Hydrogeologic Characterization Report* prepared by Garrett & Moore in March 2012 and in the *Sampling and Analysis Plan* prepared by Santee Cooper in October 2013.

2.1 SITE GEOLOGY

The Site is located between Lake Marion and Lake Moultrie north of the Diversion Canal that connects the two water bodies. In addition to the ongoing, recent deposition of fluvial sediments and organic matter in low-lying areas or streams, previous investigations have described four geologic units beneath the Site. From youngest to oldest these units include the Wicomico Formation, the Raysor Formation, the Santee Limestone, and the Black Mingo Group. The four geologic units encountered beneath the Site are described below for reference, with emphasis on the Wicomico Formation and the Raysor Formation, which make up the uppermost aquifer and, as required by the Rule, is the focus of the detection groundwater monitoring program. Beginning at ground surface and continuing downward from youngest to oldest, the geologic units beneath the site are described as follows:

Formation Name	Age	Hydrogeologic Unit	Description	Thickness in Feet
Wicomico Formation	Pleistocene	Uppermost Aquifer	Unconsolidated, upward-fining sequences of poorly sorted sand, silt, and clay deposited in a near-shore marine depositional setting that includes barrier island and back-barrier depositional environments. This depositional setting produces soil types that grade laterally and vertically from more sandy types to more clayey soil types.	12-23
Raysor Formation	Pleistocene	Uppermost Aquifer	Unconsolidated or weakly cemented, discontinuous layer of sandy limestone that contains abundant weathered mollusk shells deposited in a shallow marine-shelf environment.	0-17
Santee Limestone	Eocene	Intermediate Aquifer	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, soft to hard, medium to light gray, shelly to muddy limestone.	23-47
Black Mingo Group	Eocene	Lower Aquifer	These sediments are generally described as dark greenish gray sands with intervals of silty fine sand and silty clay.	100-125

2.2 SITE HYDROGEOLOGY

The groundwater flow characteristics in the vicinity of the CCR units were developed based on information contained in the existing reports prepared by others and reviewed by Haley & Aldrich. Hydrogeologic units are defined on the basis of their ability to transmit groundwater or serve as confining units between zones of groundwater. The uppermost aquifer at CGS includes saturated sediments of the Wicomico and Raysor Formation (uppermost deposits). In the western portion of the site recharge to the uppermost aquifer occurs through direct surface infiltration as well as recharge from Lake Marion. In the vicinity of the CCR units recharge to the uppermost aquifer occurs by direct surface infiltration. Groundwater discharge to surface water is interpreted to occur at the diversion canal to the south and Lake Moultrie to the northeast.

Piezometric data recorded from the existing on-site monitoring wells shows that the unconfined, uppermost aquifer is relatively flat and that variable recharge in the vicinity of storm water conveyances and retention areas can have a short-term effect on groundwater flow patterns. Under low water table conditions, which is interpreted to represent baseline or equilibrium flow conditions, groundwater flow in the vicinity of the closed Class 2 Landfill and existing Class 3 Landfill expansion is radial (Figure 3). As shown on Figure 3, groundwater flow in the vicinity of the permitted Ash Pond is predominantly to the east-northeast, north, and west-northwest (Figure 3). Groundwater flow velocity in the uppermost aquifer is calculated to be approximately 30-feet per year. This groundwater flow pattern does not appear to be influenced by surface topography but instead it appears to be controlled by the configuration of the underlying Santee Limestone (Figure 4). Figure 5 compares the water table configuration to the top of the Santee Limestone. As shown, under equilibrium groundwater flow conditions, groundwater flows away from areas where the elevation of the Santee Limestone is high into surrounding areas where the elevation of the top of the Santee Limestone is low, with the primary direction of baseline flow to be toward the west-northwest, north, and northeast.

3. Groundwater Monitoring Program

Haley & Aldrich developed the Detection Monitoring Program outlined below after reviewing and evaluating the existing hydrogeologic and groundwater quality data provided by Santee Cooper, and taking into account the performance standards provided in the CCR Rule §257.91. The Detection Monitoring Program includes a sufficient number of wells installed at appropriate locations and depths to obtain representative groundwater samples from the uppermost aquifer. Groundwater sampling locations have been established to accurately represent background groundwater quality, not affected by the potential releases from the CCR unit(s) as well as the quality of groundwater passing the waste boundary of the CCR units. Haley & Aldrich has evaluated the construction details of the on-site wells and taken into consideration the use of existing monitoring wells for the Ash Pond while relying on a combination of new and existing wells for the closed Class 2 landfill. New monitoring wells have been installed for the new Class 3 landfill expansion.

There are three CCR facilities subject to the CCR Rule-required groundwater monitoring at CGS; one for the Ash Pond, one for the closed Class 2 landfill and one for the new Class 3 landfill, as depicted on Figure 6. The closed Class 2 landfill stopped receiving CCR constituents at the end of 2015 but will still be monitored under the CCR rule. The new Class 3 Landfill began receiving CCR constituents in January 2016 and it is permitted to receive all coal combustion residuals. As a result of Haley & Aldrich review of the existing hydrogeological and groundwater monitoring data, Haley & Aldrich has concluded that the CCR landfill units can be monitored separately and that downgradient wells for each of the two landfills are appropriately placed and monitored to collect the initial Detection Monitoring Program data. Details of the Detection Monitoring program for the CCR units at CGS are further described below.

3.1 GROUNDWATER MONITORING NETWORK FOR THE ASH POND

The Ash Pond at the CGS is located to the north side of the coal pile area and has been monitored under the existing NPDES Permit # SC0037401. As can be seen on Figure 4, groundwater flow in the uppermost aquifer in the area of the Ash Pond is primarily toward the west-northwest, north and east - northeast. Thus, to be properly located, downgradient wells are needed along most of the perimeter of the unit. Haley & Aldrich concluded that the five existing downgradient monitoring wells (CAP-1, CAP-3, CAP-5, CAP-7, and CAP-9), located at the boundary of the unit, and screened in the uppermost aquifer, will adequately monitor the release and migration of ash constituents from the pond, should that occur. The location of these five downgradient groundwater monitoring wells is shown on Figure 6. Well placement has been determined based on interpretations of site-specific hydrogeology including groundwater flow directions and rates of groundwater movement. The groundwater monitoring well network for the existing Ash Pond complies with the Rule by monitoring the uppermost aquifer at the CCR facility. Based on the groundwater flow pattern in the area of the Ash Pond, the upgradient (unaffected by the CCR unit) background monitoring well is identified as PM-1 located on the south side of the power plant property as shown in Figure 6, which is also installed in the uppermost aquifer. In addition, another upgradient/background well, CBW-1 (shown in Figure 6), has been installed in the uppermost aquifer; thus, there will be two upgradient/background groundwater wells for the Detection Monitoring Program. The second upgradient well provides for understanding the spatial variability in the background groundwater quality and increases the statistical power of the data analysis. Therefore, the complete groundwater network for the CCR Rule for the Ash Pond consists of five downgradient wells and two upgradient/background wells. A summary of the monitoring network constructed for the CGS Ash Pond along with well construction details is provided in Table 1.

3.2 GROUNDWATER MONITORING NETWORK FOR THE TWO ASH LANDFILLS

For the closed Class 2 Landfill, three downgradient groundwater monitoring wells have been installed (see Figure 6). For the new Class 3 Landfill Expansion Area B, the five downgradient monitoring wells shown in Figure 6 (CLF1B-1, CLF1B-2, CLF1B-3, CLF1B-4, and CLF1B-5) were installed. The same two upgradient/background wells identified for the Ash Pond (PM-1 and CBW-1) will also be used in the Detection Monitoring Program network of wells for the two landfills, as they also fulfill the requirements of background wells for these units. Well placement has been determined based on interpretations of site-specific hydrogeology including groundwater flow direction and rate of groundwater movement and exceeds the CCR Rule requirement for at least one background monitoring well. These upgradient/background wells' water quality is not impacted or affected by the CCR management units at the CGS. The groundwater monitoring well network for the two landfills has been designed to comply with the Rule by monitoring the uppermost aquifer at the CCR unit boundary. A summary of the monitoring network constructed for the CGS landfills along with well construction details is provided in Table 1.

3.3 MONITORING WELL CONSTRUCTION AND DOCUMENTATION

As described above, the Detection Monitoring program includes five existing monitoring wells located around the Ash Pond (CAP-1, CAP-3, CAP-5, CAP-7, and CAP-9), one existing monitoring well north of the closed Class 2 Landfill (POZ-4), and one existing upgradient/background well on the south side of the facility (PM-1). Boring logs and well construction diagrams for these wells are included in Appendix B. These existing groundwater monitoring wells have been supplemented with two additional downgradient wells at the closed Class 2 Landfill (POZ-6 and POZ-7), five downgradient wells east of the new Class 3 Landfill expansion (Area B) (CLF1B-1, CLF1B-2, CLF1B-3, CLF1B-4, and CLF1B-5), and one upgradient/background well to the southwest of the facility (CBW-1).

With respect to the landfill area, the new wells for detection monitoring have been constructed with 2-inch Inside Diameter (ID) Schedule 40 PVC casing; a 10-foot long, 0.01-inch machine slotted PVC screen; and a locking, anodized aluminum, 5-foot long protective casing. The well screens were placed so that the encountered water table is approximately five feet above the top of the well screen. Seasonal low water table elevations were used to determine if sufficient space was available to maintain five feet of water above the well screens and remain within the uppermost aquifer. Boring logs and construction diagrams for the monitoring wells are provided in Appendix B of this report.

Haley & Aldrich reviewed and evaluated the construction details for the existing monitoring wells recommended for compliance with the CCR Rule and concluded that they are appropriately constructed to provide representative groundwater quality results. While in some instances the well screens of the existing wells are not fully submerged below the water table, low flow sampling will minimize the drawdown in the well and prevent aeration of the sample which could alter the chemistry of the groundwater. In addition, since these existing wells are constructed with 15-foot well screens and the groundwater samples are collected from the mid-point of the screens, the groundwater samples obtained from the existing wells will be collected at depth of approximately 7-feet below the water table consistent with the groundwater samples collected from the newly installed wells.

At each monitoring well, the top of the PVC well casing has been surveyed by a certified surveyor in the state of South Carolina to within 0.01 foot, and the ground surface has been surveyed to 0.1 foot. The surveyed top of the well casing, identified on each well, has been used for the purpose of measuring and

recording water levels. Each sample location has been surveyed to North American Datum of 1988 (NAD88). A summary of the survey results for the monitoring wells, with horizontal and vertical coordinates, is presented in Table 1.

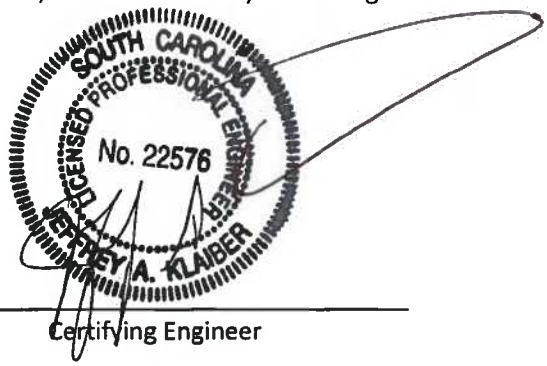
All downhole drilling equipment was cleaned prior to use at the next well location. Decontamination fluids were contained and placed into the Ash Pond that is regulated under NPDES Permit # SC0037401. Well casing and screens were new and either protected by factory packaging or cleaned prior to use. Monitoring wells were installed according to the procedures described below.

Wells were installed using conventional hollow-stem auger drilling techniques. Soil sampling was performed while advancing the borehole using split-spoon sampling on five-foot centers to provide samples for soil descriptions and to estimate the depth to groundwater. After the borehole was advanced approximately 15 feet below the water table, well casing and screen was placed through the augers to the bottom of the borehole. Filter sand was added either by gravity or tremie pipe to approximately 2 feet above the top of the well screen as the augers were withdrawn from the borehole. The filter pack was surged as the sand is emplaced to promote proper packing and to minimize the potential for settlement of the filter pack following placement of the bentonite seal. Approximately 2 feet of bentonite pellets was added by gravity above the sand pack to seal the well screen against surface water infiltration. A neat cement grout was emplaced by tremie pipe or poured into the remaining annular space. Risers extend approximately 2 or 3 feet above the ground surface. The depth of the filter sand, bentonite seal, and annular space seal was carefully measured to 0.1 feet prior to the installation of the next layer. The risers were vented by drilling a weep hole near the top of the casing, as to allow the water level in the well to stabilize. A locking anodized aluminum protective casing was stabilized in place with a 3-foot by 3-foot square concrete pad sloping away from the casing. A weep hole was drilled at the base of the protective casing just above the concrete pad to evacuate rainwater that may have entered the casing. In addition, at least three steel bollards were installed around each newly installed well to protect it from being damaged.

The newly installed groundwater monitoring wells were developed after construction by surging and purging each well with a pump. The pump was decontaminated by submersing the pump and pumping through a soapy water solution, followed by a distilled water rinse. For wells that cannot be purged dry, development was considered complete when a minimum of ten well volumes of groundwater was removed and purge water was free of turbidity. For wells that purge dry, a minimum of four well volumes of groundwater were removed.

3.4 CERTIFICATION

Pursuant to CFR Title 40 Chapter I Subchapter I Part 257 Subpart D §257.91(f), I certify that the groundwater monitoring system for the Bottom Ash Pond, Class 2 Landfill and Class 3 Landfill have been designed and constructed to meet the requirements of §257.91. The certification for each unit provided in Appendix C is, to the best of my knowledge accurate and complete.



Signed:_____
Certifying Engineer

Print Name: Jeffrey A. Klaiber, P.E.
South Carolina License No.: 22576
Title: Principal Consultant
Company: Haley & Aldrich, Inc.

4. Groundwater Monitoring Program

This section includes an explanation of activities required to comply with the Detection Monitoring step of groundwater monitoring outlined in the Rule only. Assessment Monitoring will only be implemented if one or more of the constituents listed in Appendix III of the Rule is detected at a SSI over background levels in a downgradient well located at the waste boundary of a CCR unit once the first 8 rounds of data have been collected, as specified in §257.93. Initiation of Corrective Measures in accordance with §257.96 will commence within 90 days of finding that constituents listed in Appendix IV have been detected at statistically significant levels exceeding the groundwater protection standard defined under §257.95(h) during the Assessment Monitoring or immediately upon detection of a release from the CCR facility.

4.1 DETECTION MONITORING

For existing CCR landfills and existing CCR impoundments Detection Monitoring is the first step in carrying out the groundwater monitoring program at a CCR facility, as required by §257.94 in the CCR Rule. An initial Detection Monitoring program is required to collect and analyze a minimum of eight independent samples from background and downgradient wells for the constituents listed in Appendix III and IV of the Rule. The timeframe for completion of this initial step is no later than October 17, 2017. Procedures for sampling and chemical analysis methods are provided in a separate GWSAP report. Similarly, methods for statistical analysis of the groundwater quality data will also be presented in a separate Statistical Data Analysis Plan (SDAP) for the CGS. As described above, five new monitoring wells were installed to monitor groundwater downgradient of the new Class 3 Landfill expansion (Area B) (CLF1B-1, CLF1B-2, CLF1B-3, CLF1B-4, and CLF1B-5). These are in addition to the one existing monitoring well (POZ-4) and the two new monitoring wells (POZ-6 and POZ-7) installed at the closed Class 2 Landfill unit, as shown on Figure 6. There are five existing groundwater monitoring wells in downgradient locations for the Ash Pond (CAP-1, CAP-3, CAP-5, CAP-7, and CAP-9). There is one existing upgradient/background well located on the south side of the CGS property (PM-1), and a second upgradient/background well installed on the southwest side of the property (CBW-1). Groundwater monitoring locations are shown on Figure 6.

4.1.1 Sampling Schedule and Frequency

The CCR Rule requires that a total of eight independent samples from each upgradient/background and downgradient monitoring well for each existing CCR landfill and surface impoundment must be collected no later than October 17, 2017.

A schedule for collection of the eight independent samples is not established within the Rule. However, Santee Cooper has collected samples from background and downgradient monitoring wells beginning in October 2015 and approximately quarterly thereafter. Groundwater sampling methods are described in the GWSAP, which is provided under separate cover.

New CCR landfills, CCR surface impoundments, and all lateral expansions of CCR units added after the effective date of the CCR Rule (April 17, 2015) also require a minimum of eight independent baseline groundwater quality samples to be collected and analyzed before the disposal unit can receive CCR materials. Both the upgradient and the downgradient wells need to be sampled and analyzed for both the Appendix III and Appendix IV constituents prior to receiving CCR material for disposal.

For the Detection Monitoring step, all upgradient/background and downgradient monitoring wells are sampled and analyzed for Appendix III constituents on a semi-annual basis for the life of each CCR unit regardless of triggering or not triggering an Assessment Monitoring program and after the collection of the initial eight independent samples.

4.1.2 Chemical Analysis

Groundwater samples collected for chemical analysis will be analyzed for constituents listed in Appendix III and Appendix IV of the Rule. Analytical methods are described in the GWSAP, provided under separate cover. The Appendix III and Appendix IV constituents consist of the following:

Appendix III Constituents	**Appendix IV Constituents**	
Boron	Antimony	Lead
Calcium	Arsenic	Lithium
Chloride	Barium	Mercury
Fluoride	Beryllium	Molybdenum
pH	Cadmium	Selenium
Sulfate	Chromium	Thallium
Total Dissolved Solids	Cobalt	Radium 226 and 228 combined
	Fluoride	

4.1.3 Sampling and Analysis Plan

The GWSAP identifies the site-specific activities and methodologies for groundwater sampling for the groundwater monitoring program as defined in §257.93 of the Rule. The GWSAP includes field data collection, sample collection, sample preservation and shipment, interpretation, laboratory analytical methods, and reporting for all groundwater sampling at each CCR unit. The administrative procedures and frequency for collection of groundwater elevation measurement, flow direction, and gradient are provided in the GWSAP.

Laboratory results from the eight initial Detection Monitoring events for each CCR unit will be statistically analyzed for each of the Appendix III constituents by selecting one of the statistical methods specified in paragraphs (f)(1) through (5) of §257.93 of the Rule. The statistical methods used for the evaluation of groundwater monitoring data are described in the SDAP. The SDAP identifies the appropriate statistical analyses to be applied to the groundwater quality data based on the sample population distribution as defined in §257.93 of the Rule, and guidance provided by USEPA in the RCRA Statistical Analysis of Groundwater Monitoring Data Unified Guidance Document (USEPA, 2009).

4.1.4 Trigger for Assessment Monitoring

Assessment Monitoring is triggered for the CCR unit when statistical analysis of the groundwater quality data collected under the Detection Monitoring program for constituents in Appendix III indicates that a SSI over background levels for one or more of the Appendix III constituents has been detected at any downgradient well during Detection Monitoring at the waste boundary.

However, one may demonstrate that a source other than the CCR unit caused the SSI over the background levels for a constituent. In this case a written demonstration report, certified by a qualified

professional engineer verifying the accuracy of the information, must be submitted within 90-days of the determination of an SSI. Successful demonstration of the alternative source of impact allows the CCR unit to continue with Detection Monitoring.

4.2 ASSESSMENT MONITORING

Pursuant to 40 CFR § 257.95(a), assessment monitoring is conducted whenever a SSI over background levels has been detected for one or more of the constituents listed in Appendix III of the Rule. Within 90 days of triggering assessment monitoring, and annually thereafter, groundwater samples will be analyzed for the constituents listed in Appendix IV of the Rule. Within 90 days of obtaining the results from the initial assessment monitoring samples, semi-annual sampling will begin for all wells installed pursuant 40 CFR § 257.91; these samples will be analyzed for constituents listed in Appendices III and IV of the Rule. Field methods and procedures detailed in the GWSAP will be followed for the collection of the assessment monitoring groundwater samples.

If within 90 days of finding that any constituents listed in Appendix IV of the Rule have been detected at a SSL over the Groundwater Protection Standard (GWPS), which is defined as the Maximum Concentration Limit (MCL) or background for those constituents that do not have an MCL, Santee Cooper must initiate an assessment of corrective measures to prevent further releases and define the nature and extent of the release.

As shown on Figure 7, there are three independent, yet related, components to comply with the groundwater requirements of the Rule should Appendix IV constituents be detected at SSLs above their respective GWPSs. These components include:

1. Conduct the necessary investigation activities to determine the nature and extent of contamination (Figure 8);
2. Assess corrective measures, conduct a meeting to the public to discuss the selected corrective measure and then implement the corrective measure (Figure 9); and
3. Implement CCR management unit closure if it meets the definition of an unlined unit (Figure 10).

4.3 GROUNDWATER ELEVATION MEASUREMENT

The depth to groundwater has been measured in each well immediately prior to purging, each time groundwater samples were collected. Groundwater measurements from monitoring wells surrounding each CCR unit have been recorded within a period of time short enough to avoid temporal variations in groundwater conditions. The measured groundwater levels were converted to groundwater elevations for subsequent interpretation of groundwater flow direction and rate.

4.3.1 Procedures for Groundwater Elevation Measurement

The water level in each well have been measured using an electric water level indicator. Water level measurements have been made from a surveyed fixed reference point marked on the well. The fixed reference point is located on the top of the well casing or on the top of the water level access point into the well, depending on the completion of the well at the surface. If a surveyed mark is not present, the reference point was established and marked on the north side of the well casing. More details for groundwater measurement procedures are in the GWSAP.

4.3.2 Frequency

The depth to groundwater, in wells which monitor the same CCR unit, have been measured within a period of time short enough to avoid temporal variations in groundwater conditions which could preclude accurate determination of groundwater flow rate and direction.

4.4 GROUNDWATER FLOW DIRECTION AND GRADIENT

The groundwater elevations are used to determine the gradient and direction of groundwater flow each time groundwater is sampled.

4.4.1 Procedures for Calculation

Groundwater flow direction and gradient are calculated using one of several computer programs such as Surfer, AutoCAD, or equivalent. Groundwater flow direction and gradient can also be calculated without the use of a computer program by the following steps:

- Determine the groundwater surface elevation by subtracting the water level measurement (depth to water) from the surveyed measuring point elevation at each well.
- Determine the difference in groundwater surface elevation between each of the wells by subtracting the groundwater elevation of a well with a higher elevation from the groundwater elevation of a well with a lower elevation. The elevation differences are divided up into equal increments. Repeat this step between multiple wells. Groundwater elevation contours can be drawn at corresponding elevation increments between wells.
- Determine groundwater flow direction by drawing a line perpendicular to the groundwater contour lines from higher elevations to lower elevations.
- Determine the hydraulic gradient by dividing the groundwater elevation change in the direction of flow by the horizontal difference between measurement points.

4.4.2 Frequency

The gradient and direction of groundwater flow within each CCR unit have been calculated upon completion of each groundwater sampling event.

5. Reporting

5.1 DATA MANAGEMENT

A project database that incorporates hydrogeologic and groundwater quality data has been established to allow efficient management of chemical and physical data collected in the field and received from the laboratories. Laboratories conducting groundwater analyses for this program have been supplied with specific formats for electronic data deliverables to ensure compatibility with the project database requirements. Qualified personnel have conducted quality assurance/quality control (QA/QC) reviews for each dataset generated. The database is integrated with a geographical information system to allow for presentation of spatial information and data, such as site features, ownership boundaries, and sample locations. Each sample location has been surveyed to North American Datum of 1988 (NAD88).

5.2 ANNUAL REPORTING

Per the CCR Rule, Santee Cooper, or a designated representative, will prepare an annual groundwater monitoring report for each CCR unit. The Detection Monitoring Program reports will be completed by 31 January 2018 and annually thereafter for existing CCR units. An annual groundwater monitoring report will be completed by January 31 of each year following the calendar year that a new CCR landfill, new CCR surface impoundment, and all lateral expansions are constructed and have received CCR. The annual groundwater monitoring report summarizes key actions completed, for the previous year; describes any problems that may have encountered, and the corresponding actions to resolve the problems. At a minimum, the annual groundwater monitoring report includes the following:

- A detailed site map showing the CCR units, including all background and downgradient monitoring wells;
- Identification of any monitoring wells installed or decommissioned during the preceding year;
- A summary of all groundwater monitoring activities, including number of samples collected, specific analysis for each groundwater sample, field procedures followed during sample collection activities, and dates of sampling events;
- Discussion of any transition between monitoring programs, including dates of transition, cause for transition, identification of constituents detected at a SSI over background levels; and
- Any other pertinent information regarding the groundwater monitoring system or groundwater monitoring program.

The annual groundwater monitoring report must comply with recordkeeping requirements specified in §257.105 and Section 6 of this Work Plan.

The annual groundwater monitoring reports will be prepared for the CGS under the required reporting schedule, as identified above.

6. Documentation

6.1 RECORDKEEPING

Per the CCR Rule, Santee Cooper, or a designated representative, must maintain adequate information in a written operating record at the subject facility, as described in §257.105. The operating record must be retained for at least five years following the date of each occurrence, measurement, sampling event, maintenance activity, corrective action, or report for each CCR unit. One operating record may be kept for multi-unit facilities, provided that each CCR unit is clearly identified. The operating record may be maintained in a variety of methods, such as saved on a computer, computer storage devices, or equivalent system that ensure that adequate information is kept for the required timeframe. Documentation must be submitted to the state director or tribal authority upon request when such documentation is not available on Santee Cooper's maintained website, as described in Section 6.3, below. The following information pertinent to the groundwater monitoring network and the groundwater monitoring program must be placed in the operating record:

- The annual groundwater monitoring report, as required by §257.90(e);
- Documentation of the design, installation, development, and decommissioning of any monitoring well, piezometer, and other measurement or sampling device as required under §257.91(e)(1);
- The groundwater monitoring system certification, as required under §257.91(f);
- Selection of the statistical method certification (SDAP), as required under §257.93(f)(6);
- Notification of establishing an Assessment Monitoring program (within 30 days of triggering), as required under §257.94.(e)(3);
- Results of Appendix III and IV constituent concentrations, as required under §257.95(d)(1);
- Notification of returning to Detection Monitoring (within 30 days), as required under §257.95(e);
- Notification of detection of one or more Appendix IV constituents at statistically significant levels above the groundwater protection standard (within 30 days), as required by §257.95(g). Note - Appendix III constituents are not assessed above the groundwater protection standards but are assessed against the upgradient/background concentrations;
- Notification of initiating the assessment of Corrective Measures (within 30 days), as required under §257.95(g)(5);
- Completed assessment of Corrective Measures, as required under §257.96(d);
- Documents prepared by owner/operator recording the public meeting for Corrective Measures assessment, as required under §257.96(e);
- The semi-annual report documenting the progress in selecting and designing the remedy and the selection of remedy report, as required under §257.97(a); and
- Notification of completing the remedy (within 30 days), as required under §257.98(e).

6.2 NOTIFICATION

Notifications must be provided to the relevant State Director before the close of business on the day the notification is required to be completed, as specified under §257.106. The State must be notified when information is added or placed in the operating recorded and on Santee Cooper's publicly accessible internet site. Notification must be made to the relevant authority of any design or operating criteria

modifications or actions specified under §257.106(f) and §257.106(g) of the Rule. Notification of the availability of the annual groundwater monitoring report is specified under §257.105(h)(1).

For the CGS, contact information for the current relevant State Director is as follows:

Ms. Daphne Neel
Bureau Chief, Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Neel, Daphne G. (neeldg@dhec.sc.gov)

6.3 POSTING INFORMATION TO THE INTERNET

A publicly accessible Internet website (CCR website) must be maintained, titled "CCR Rule Compliance Data and Information," and must contain the information specified under §257.107 of the Rule. One CCR website may be kept for multi-unit facilities provided the name or identification number of each unit is clearly specified. All information must be made available to the public within 30 days of placing the information in the operating record and for at least five years following the date on which the information was first posted to the CCR website. Notification information provided to the relevant State Director must be posted on the CCR website as specified under §257.106.

References

1. United States Environmental Protection Agency (USEPA), 2000. Sampling and Analysis Plan Guidance and Template, R9QA/002.1. April 2000.

2. United States Environmental Protection Agency (USEPA), 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance, EPA 530/R-09-007. March 2009.

\\haleyaldrich.com\share\grn_common\42122 Santee Cooper\000\Cross Generating Station\Groundwater Monitoring Report\Text\2017-1017_HAI_CGS-GMP_F.docx

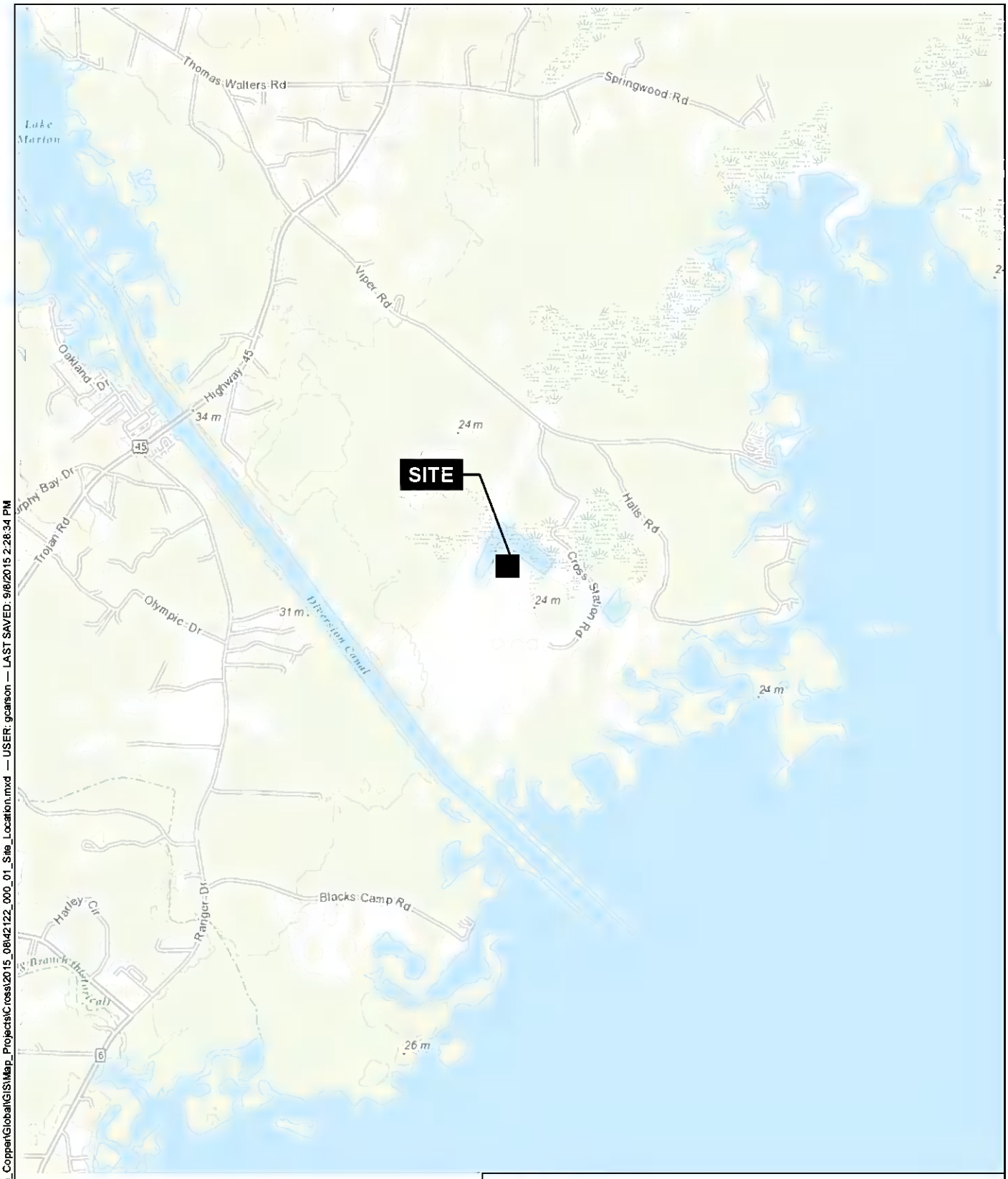
Tables

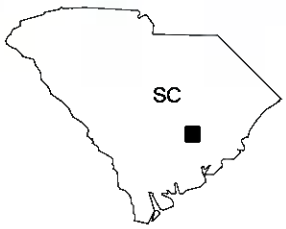
TABLE 1
GROUNDWATER MONITORING WELL LOCATION AND CONSTRUCTION DETAILS
CROSS GENERATING STATION
CROSS, SOUTH CAROLINA

	CCR Unit	Easting	Northing	Top of Pad Elevation (ft msl)	Top of Casing Elevation (ft msl)	Surface Grout (ft bgs)	Bentonite (ft bgs)	Sand Pack (ft bgs)	Screen Zone (ft bgs)	Screen Length (ft)	Well Radius (in)
New Wells											
POZ-6	Class 2 Landfill	2269287.95	566614.56	81.26	83.84	0.0 - 7.0	7.0 - 10.0	10.0 - 22.0	12.0 - 22.0	10	2.00
POZ-7	Class 2 Landfill	2267307.49	564191.76	79.58	82.02	0.0 - 7.0	7.0 - 9.0	9.0 - 22.0	12.0 - 22.0	10	2.00
CLF 1B-1	Landfill Area B	2269405.80	562783.74	81.14	83.76	0.0 - 7.0	7.0 - 10.0	10.0 - 22.0	12.0 - 22.0	10	2.00
CLF 1B-2	Landfill Area B	2269878.70	563433.85	79.17	82.04	0.0 - 7.0	7.0 - 10.0	10.0 - 22.0	12.0 - 22.0	10	2.00
CLF 1B-3	Landfill Area B	2270241.55	564197.57	80.03	82.75	0.0 - 5.0	5.0 - 8.0	8.0 - 20.0	10.0 - 20.0	10	2.00
CLF 1B-4	Landfill Area B	2270500.35	564741.79	80.23	82.74	0.0 - 6.0	6.0 - 9.0	9.0 - 22.0	12.0 - 22.0	10	2.00
CLF 1B-5	Landfill Area B	2270719.74	565586.20	78.52	81.09	0.0 - 8.0	8.0 - 10.0	10.0 - 22.0	12.0 - 22.0	10	2.00
CBW-1	Background	2268633.71	560527.87	83.17	85.80	0.0 - 8.0	8.0 - 11.0	11.0 - 24.0	14.0 - 24.0	10	2.00
Existing Wells											
PM-1	Background	2269801.59	558532.71	81.62	83.24	0.0 - 2.0	2.0 - 3.5	3.5 - 24.0	4.0 - 24.0	20	2.25
POZ-4	Class 2 Landfill	2269831.74	566155.14	80.27	82.70	0.0 - 7.5	7.5 - 8.5	8.5 - 14.5	9.5 - 14.5	5	2.00
CAP-1	Ash Pond	2273089.38	561223.22	82.92	82.70	0.0 - 3.0	3.0 - 4.5	4.5 - 19.2	5.0 - 19.0	14	2.50
CAP-3	Ash Pond	2272207.61	562513.70	89.62	91.49	0.0 - 12.6	12.6 - 14.6	14.6 - 30.6	15.6 - 30.6	15	2.25
CAP-5	Ash Pond	2272846.82	563697.10	89.80	91.78	0.0 - 12.6	12.6 - 14.6	14.6 - 30.6	15.6 - 30.6	15	2.25
CAP-7	Ash Pond	2274081.72	562969.45	89.54	91.64	0.0 - 12.0	12.0 - 14.0	14.0 - 32.0	15.6 - 30.6	15	2.25
CAP-9	Ash Pond	2274593.46	561813.37	89.60	91.59	0.0 - 12.6	12.6 - 14.6	14.6 - 30.6	15.6 - 30.6	15	2.25

Notes:
bgs = below ground surface
ft = feet
in = inches
msl = mean sea level
Datum of Elevations in NAVD 88

Figures





MAP SOURCE: ESRI

HALEY ALDRICH

SANTEE COOPER
CROSS GENERATING STATION
CROSS, SOUTH CAROLINA

SITE LOCATION MAP

APPROXIMATE SCALE: 1 IN = 2000 FT
SEPTEMBER 2015

FIGURE 1

GIS FILE PATH: G:\Projects\42122_Santee_Cooper\Global\GIS\Map_Projects\Cross\2015_08\42122_000_01_Site_Location.mxd — USER: gcarson — LAST SAVED: 9/8/2015 2:28:34 PM

NOTE:

IMAGE SOURCE: GOOGLE EARTH (DIGITAL GLOBE) 2015

N

0 1,000 2,000

SCALE IN FEET

HALEY ALDRICH

SANTEE COOPER
CROSS GENERATING STATION
CROSS, SOUTH CAROLINA

SITE INDEX MAP

SEPTEMBER 2015

FIGURE 2

GIS FILE PATH: G:\Projects\42122_Santee_Cooper\Global\GIS\Map_Projects\Cross\2015_08\42122_000_02_Index_Map.mxd — USER: gcarson — LAST SAVED: 9/9/2015 12:18:55 PM

LEGEND

ESTIMATED GROUNDWATER ELEVATION
CONTOUR FEET - ABOVE MEAN SEA LEVEL

INTERPRETED GROUNDWATER
FLOW DIRECTION

NOTE:

IMAGE SOURCE: GOOGLE EARTH (DIGITAL GLOBE) 2015

N

0 1,000 2,000
SCALE IN FEET

HALEY ALDRICH

SANTEE COPPER
CROSS GENERATING STATION
CROSS, SOUTH CAROLINA

WATER TABLE CONFIGURATION MAP

AUGUST 2015

FIGURE 3

GIS FILE PATH: G:\Projects\42122_Santee_Cooper\Global\GIS\Map_Projects\2015_08\42122_000_03_Water_Table_Contours.mxd — USER: gcarson — LAST SAVED: 8/19/2015 12:18:08 PM

LEGEND

ESTIMATED ELEVATION CONTOUR - TOP OF SANTEE LIMESTONE

NOTE:

IMAGE SOURCE: GOOGLE EARTH (DIGITAL GLOBE) 2015

N

0 1,000 2,000

SCALE IN FEET

HALEY ALDRICH

SANTEE COPPER
CROSS GENERATING STATION
CROSS, SOUTH CAROLINA

TOP OF SANTEE LIMESTONE

AUGUST 2015

FIGURE 4

GIS FILE PATH: G:\Projects\42122_Santee_Copper\Global\GIS\Map_Projects\2015_08\42122_000_04_Top_Santee_Limestone.mxd — USER: gcarson — LAST SAVED: 8/20/2015 9:36:09 AM

LEGEND

ESTIMATED ELEVATION CONTOUR - TOP OF SANTEE LIMESTONE

ESTIMATED GROUNDWATER ELEVATION CONTOUR - FEET ABOVE MEAN SEA LEVEL

NOTE:

IMAGE SOURCE: GOOGLE EARTH (DIGITAL GLOBE) 2015

N

0 1,000 2,000

SCALE IN FEET

HALEY ALDRICH

SANTEE COPPER
CROSS GENERATING STATION
CROSS, SOUTH CAROLINA

OVERLAY OF WATER TABLE WITH TOP OF SANTEE LIMESTONE

AUGUST 2015

FIGURE 5

GIS FILE PATH: G:\Projects\42122_Santee_Cooper\Global\GIS\Map_Projects\2015_08\42122_000_05_Limestone_Water_Table.mxd — USER: gcarson — LAST SAVED: 8/20/2015 9:37:53 AM

LEGEND

UPGRADIENT WELLS
- EXISTING
- NEW

CLASS II LANDFILL WELLS
- EXISTING
- NEW

ASH POND WELLS
- EXISTING

LANDFILL EXPANSION WELLS - AREA B
- NEW

NOTE:

IMAGE SOURCE: GOOGLE EARTH (DIGITAL GLOBE) 2015

N

0 1,000 2,000
SCALE IN FEET

HALEY ALDRICH

SANTEE COOPER
CROSS GENERATING STATION
CROSS, SOUTH CAROLINA

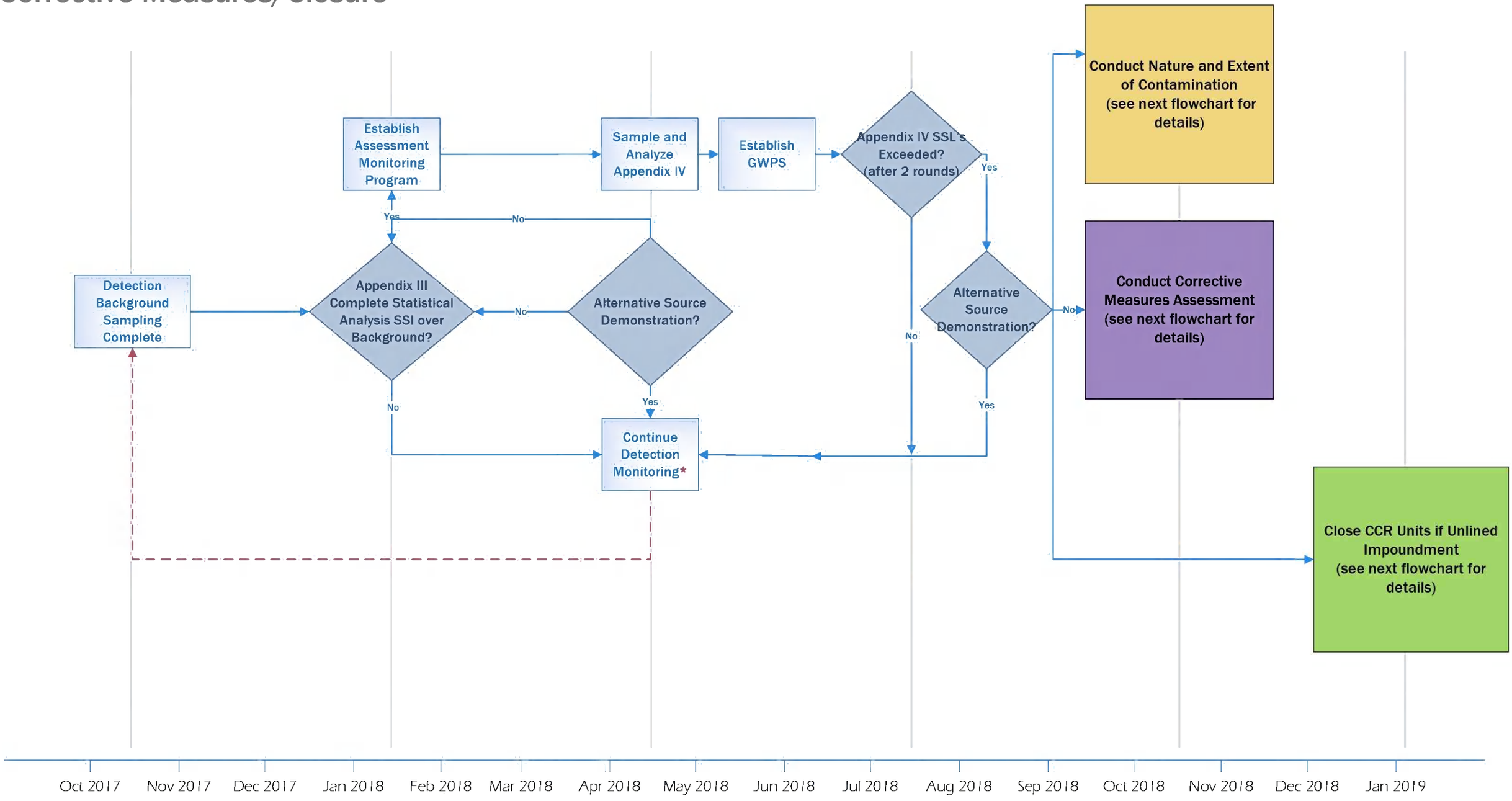
GROUNDWATER MONITORING LOCATIONS FOR COMPLIANCE WITH RULE

SEPTEMBER 2015

FIGURE 6

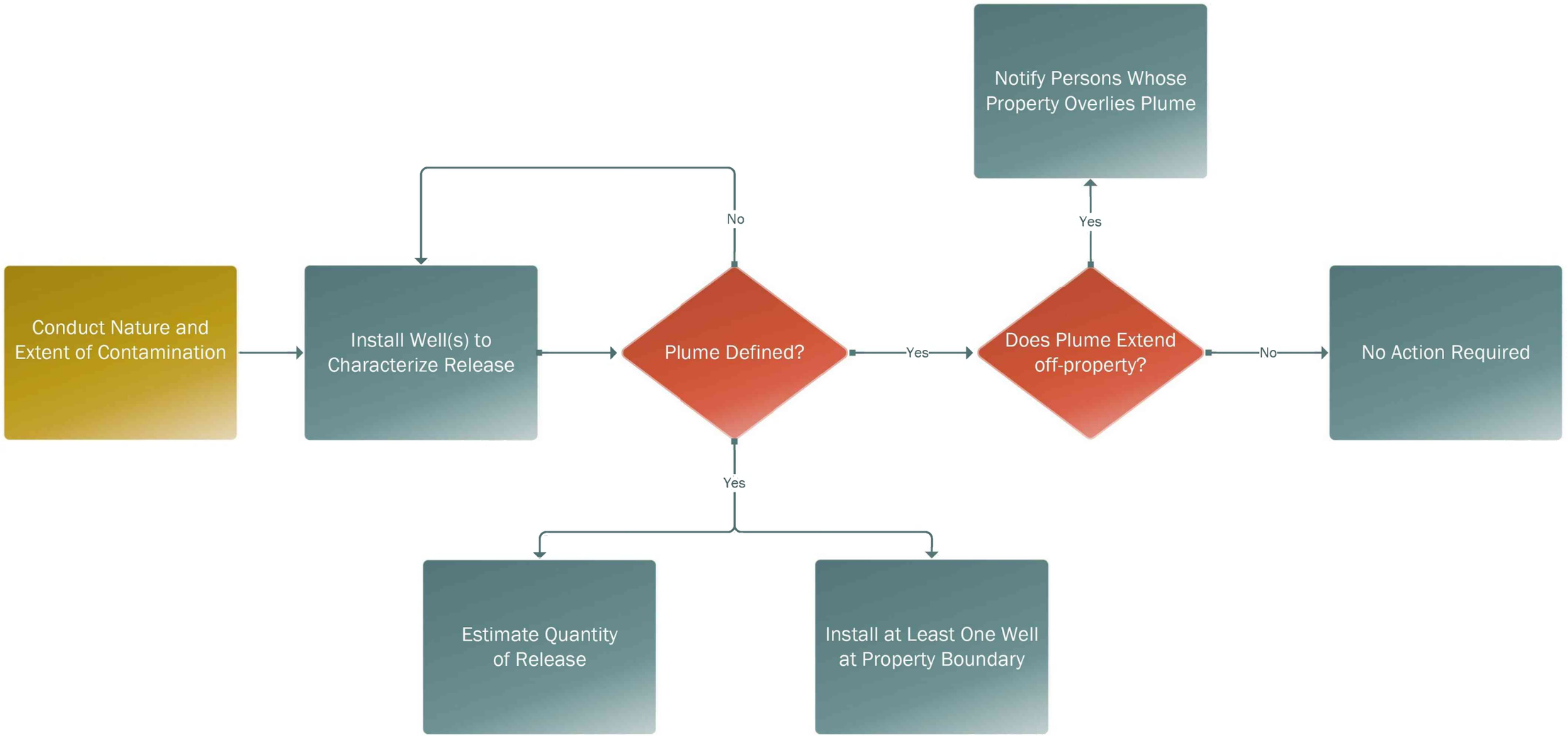
GIS FILE PATH: G:\Projects\42122_Santee_Cooper\Global\GIS\Map_Projects\Cross\2015_08\42122_000_06_GW_Monitoring.mxd — USER: gcarson — LAST SAVED: 9/3/2015 9:53:49 AM

Figure 7 - Initial CCR Rule Groundwater Program Through Corrective Measures/Closure



* Continue semi-annual sampling and analysis (begin process again) for unit during active period and/or during 30 year post-closure care period if closure-in-place.

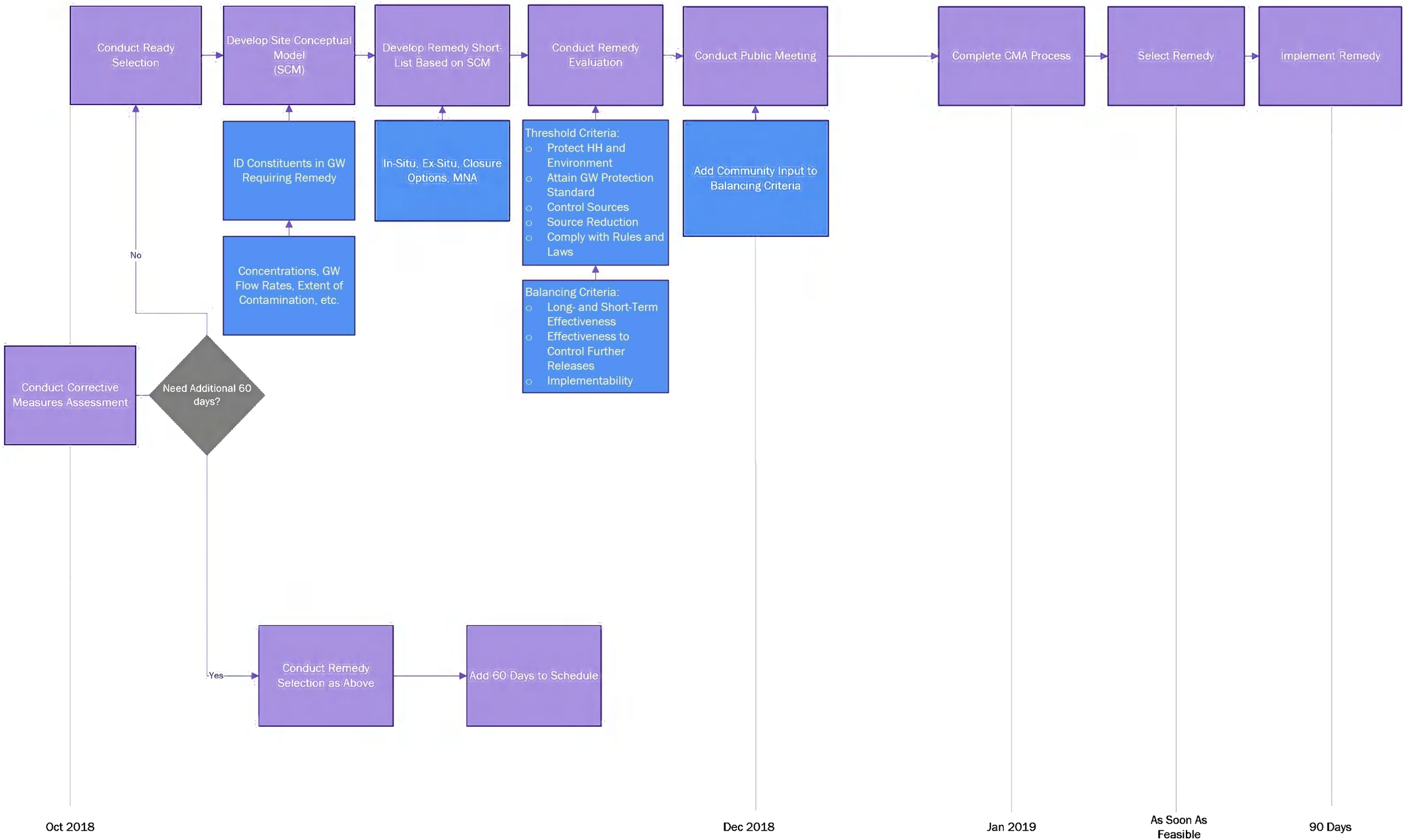
Figure 8 - Nature and Extent of Contamination



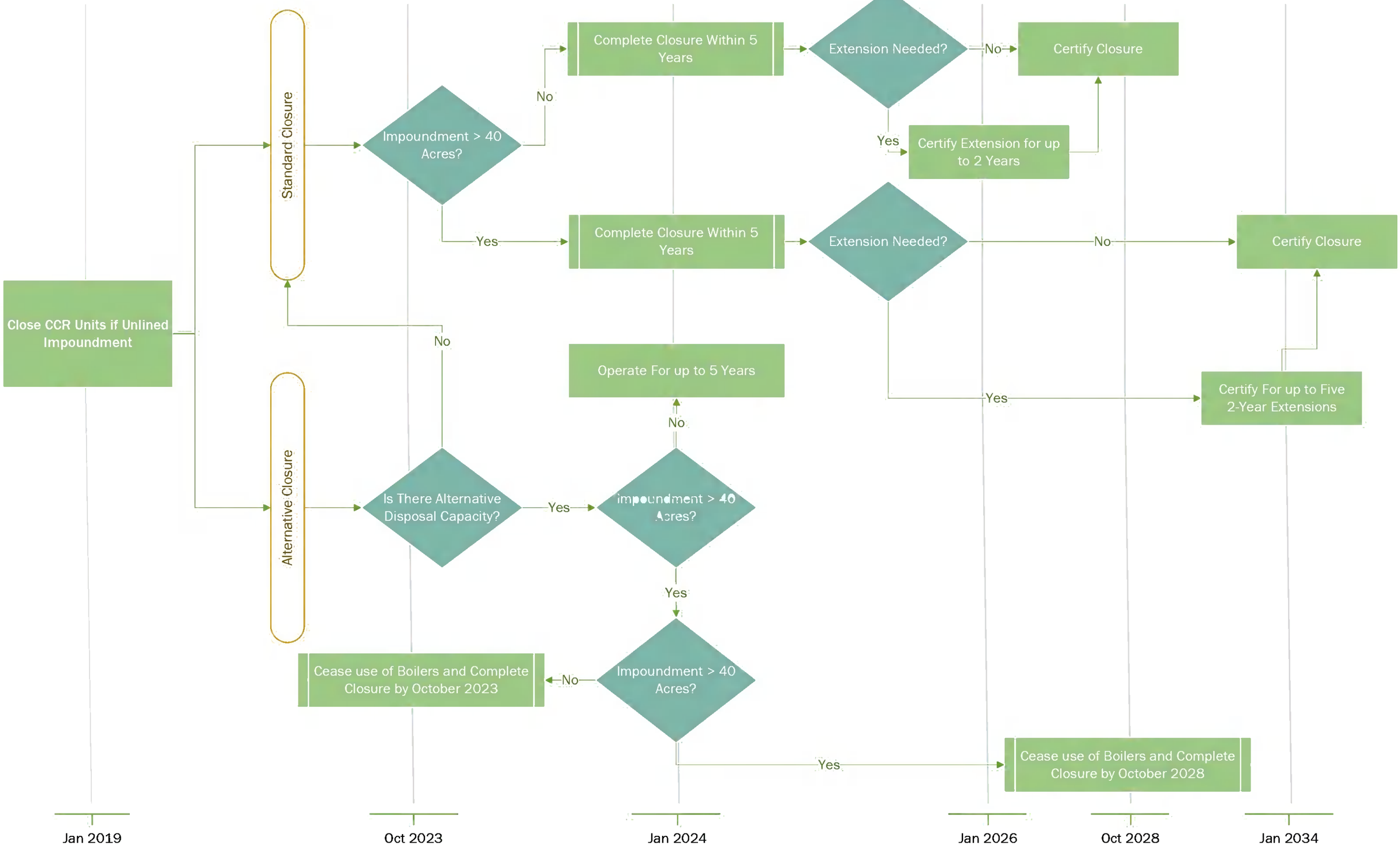
Note: 1) No timeframe for completion is specified in the rule.

2) Sampling and analysis for “plume” well will require similar statistics to detection and assessment monitoring.

Figure 9 - Corrective Measures Assessment



IFigure 10 - Impoundment Closure Timing Due to Groundwater Appendix IV SSL



APPENDIX A

40 CFR §257.90 through §257.98 and Appendices III and IV

following the date of initial receipt of CCR in the CCR unit.

(4) *Frequency of inspections.* (i) Except as provided for in paragraph (b)(4)(ii) of this section, the owner or operator of the CCR unit must conduct the inspection required by paragraphs (b)(1) and (2) of this section on an annual basis. The date of completing the initial inspection report is the basis for establishing the deadline to complete the first subsequent inspection. Any required inspection may be conducted prior to the required deadline provided the owner or operator places the completed inspection report into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing subsequent inspection reports is based on the date of completing the previous inspection report. For purposes of this section, the owner or operator has completed an inspection when the inspection report has been placed in the facility's operating record as required by § 257.105(g)(6).

(ii) In any calendar year in which both the periodic inspection by a qualified professional engineer and the quinquennial (occurring every five years) structural stability assessment by a qualified professional engineer required by §§ 257.73(d) and 257.74(d) are required to be completed, the annual inspection is not required, provided the structural stability assessment is completed during the calendar year. If the annual inspection is not conducted in a year as provided by this paragraph (b)(4)(ii), the deadline for completing the next annual inspection is one year from the date of completing the quinquennial structural stability assessment.

(5) If a deficiency or release is identified during an inspection, the owner or operator must remedy the deficiency or release as soon as feasible and prepare documentation detailing the corrective measures taken.

(c) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in § 257.105(g), the notification requirements specified in § 257.106(g), and the internet requirements specified in § 257.107(g).

§ 257.84 Inspection requirements for CCR landfills.

(a) *Inspections by a qualified person.* (1) All CCR landfills and any lateral expansion of a CCR landfill must be examined by a qualified person as follows:

(i) At intervals not exceeding seven days, inspect for any appearances of actual or potential structural weakness and other conditions which are disrupting or have the potential to disrupt the operation or safety of the CCR unit; and

(ii) The results of the inspection by a qualified person must be recorded in the facility's operating record as required by § 257.105(g)(8).

(2) *Timeframes for inspections by a qualified person*—(i) *Existing CCR landfills.* The owner or operator of the CCR unit must initiate the inspections required under paragraph (a) of this section no later than October 19, 2015.

(ii) *New CCR landfills and any lateral expansion of a CCR landfill.* The owner or operator of the CCR unit must initiate the inspections required under paragraph (a) of this section upon initial receipt of CCR by the CCR unit.

(b) *Annual inspections by a qualified professional engineer.* (1) Existing and new CCR landfills and any lateral expansion of a CCR landfill must be inspected on a periodic basis by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards. The inspection must, at a minimum, include:

(i) A review of available information regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record (*e.g.*, the results of inspections by a qualified person, and results of previous annual inspections); and

(ii) A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit.

(2) *Inspection report.* The qualified professional engineer must prepare a report following each inspection that addresses the following:

(i) Any changes in geometry of the structure since the previous annual inspection;

(ii) The approximate volume of CCR contained in the unit at the time of the inspection;

(iii) Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit; and

(iv) Any other change(s) which may have affected the stability or operation of the CCR unit since the previous annual inspection.

(3) *Timeframes for conducting the initial inspection*—(i) *Existing CCR landfills.* The owner or operator of the CCR unit must complete the initial inspection required by paragraphs (b)(1) and (2) of this section no later than January 18, 2016.

(ii) *New CCR landfills and any lateral expansion of a CCR landfill.* The owner or operator of the CCR unit must complete the initial annual inspection required by paragraphs (b)(1) and (2) of this section no later than 14 months following the date of initial receipt of CCR in the CCR unit.

(4) *Frequency of inspections.* The owner or operator of the CCR unit must conduct the inspection required by paragraphs (b)(1) and (2) of this section on an annual basis. The date of completing the initial inspection report is the basis for establishing the deadline to complete the first subsequent inspection. Any required inspection may be conducted prior to the required deadline provided the owner or operator places the completed inspection report into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing subsequent inspection reports is based on the date of completing the previous inspection report. For purposes of this section, the owner or operator has completed an inspection when the inspection report has been placed in the facility's operating record as required by § 257.105(g)(9).

(5) If a deficiency or release is identified during an inspection, the owner or operator must remedy the deficiency or release as soon as feasible and prepare documentation detailing the corrective measures taken.

(c) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in § 257.105(g), the notification requirements specified in § 257.106(g), and the internet requirements specified in § 257.107(g).

Groundwater Monitoring and Corrective Action

§ 257.90 Applicability.

(a) Except as provided for in § 257.100 for inactive CCR surface impoundments, all CCR landfills, CCR surface impoundments, and lateral expansions of CCR units are subject to the groundwater monitoring and corrective action requirements under §§ 257.90 through 257.98.

(b) *Initial timeframes*—(1) *Existing CCR landfills and existing CCR surface impoundments.* No later than October 17, 2017, the owner or operator of the CCR unit must be in compliance with the following groundwater monitoring requirements:

(i) Install the groundwater monitoring system as required by § 257.91;

(ii) Develop the groundwater sampling and analysis program to include selection of the statistical

procedures to be used for evaluating groundwater monitoring data as required by § 257.93;

(iii) Initiate the detection monitoring program to include obtaining a minimum of eight independent samples for each background and downgradient well as required by § 257.94(b); and

(iv) Begin evaluating the groundwater monitoring data for statistically significant increases over background levels for the constituents listed in appendix III of this part as required by § 257.94.

(2) *New CCR landfills, new CCR surface impoundments, and all lateral expansions of CCR units.* Prior to initial receipt of CCR by the CCR unit, the owner or operator must be in compliance with the groundwater monitoring requirements specified in paragraph (b)(1)(i) and (ii) of this section. In addition, the owner or operator of the CCR unit must initiate the detection monitoring program to include obtaining a minimum of eight independent samples for each background well as required by § 257.94(b).

(c) Once a groundwater monitoring system and groundwater monitoring program has been established at the CCR unit as required by this subpart, the owner or operator must conduct groundwater monitoring and, if necessary, corrective action throughout the active life and post-closure care period of the CCR unit.

(d) In the event of a release from a CCR unit, the owner or operator must immediately take all necessary measures to control the source(s) of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of contaminants into the environment. The owner or operator of the CCR unit must comply with all applicable requirements in §§ 257.96, 257.97, and 257.98.

(e) *Annual groundwater monitoring and corrective action report.* For existing CCR landfills and existing CCR surface impoundments, no later than January 31, 2018, and annually thereafter, the owner or operator must prepare an annual groundwater monitoring and corrective action report. For new CCR landfills, new CCR surface impoundments, and all lateral expansions of CCR units, the owner or operator must prepare the initial annual groundwater monitoring and corrective action report no later than January 31 of the year following the calendar year a groundwater monitoring system has been established for such CCR unit as required by this subpart, and annually thereafter. For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. For purposes of this section, the owner or operator has prepared the annual report when the report is placed in the facility's operating record as required by § 257.105(h)(1). At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:

(1) A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;

(2) Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;

(3) In addition to all the monitoring data obtained under §§ 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;

(4) A narrative discussion of any transition between monitoring programs (*e.g.*, the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels); and

(5) Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.

(f) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in § 257.105(h), the notification requirements specified in § 257.106(h), and the internet requirements specified in § 257.107(h).

§ 257.91 Groundwater monitoring systems.

(a) *Performance standard.* The owner or operator of a CCR unit must install a groundwater monitoring system that consists of a sufficient number of wells, installed at appropriate locations and depths, to yield groundwater samples from the uppermost aquifer that:

(1) Accurately represent the quality of background groundwater that has not been affected by leakage from a CCR unit. A determination of background quality may include sampling of wells that are not hydraulically upgradient of the CCR management area where:

(i) Hydrogeologic conditions do not allow the owner or operator of the CCR unit to determine what wells are hydraulically upgradient; or

(ii) Sampling at other wells will provide an indication of background groundwater quality that is as representative or more representative than that provided by the upgradient wells; and

(2) Accurately represent the quality of groundwater passing the waste boundary of the CCR unit. The downgradient monitoring system must be installed at the waste boundary that ensures detection of groundwater contamination in the uppermost aquifer. All potential contaminant pathways must be monitored.

(b) The number, spacing, and depths of monitoring systems shall be determined based upon site-specific technical information that must include thorough characterization of:

(1) Aquifer thickness, groundwater flow rate, groundwater flow direction including seasonal and temporal fluctuations in groundwater flow; and

(2) Saturated and unsaturated geologic units and fill materials overlying the uppermost aquifer, materials comprising the uppermost aquifer, and materials comprising the confining unit defining the lower boundary of the uppermost aquifer, including, but not limited to, thicknesses, stratigraphy, lithology, hydraulic conductivities, porosities and effective porosities.

(c) The groundwater monitoring system must include the minimum number of monitoring wells necessary to meet the performance standards specified in paragraph (a) of this section, based on the site-specific information specified in paragraph (b) of this section. The groundwater monitoring system must contain:

(1) A minimum of one upgradient and three downgradient monitoring wells; and

(2) Additional monitoring wells as necessary to accurately represent the quality of background groundwater that has not been affected by leakage from the CCR unit and the quality of groundwater passing the waste boundary of the CCR unit.

(d) The owner or operator of multiple CCR units may install a multiunit groundwater monitoring system instead of separate groundwater monitoring systems for each CCR unit.

(1) The multiunit groundwater monitoring system must be equally as capable of detecting monitored constituents at the waste boundary of

the CCR unit as the individual groundwater monitoring system specified in paragraphs (a) through (c) of this section for each CCR unit based on the following factors:

(i) Number, spacing, and orientation of each CCR unit;

(ii) Hydrogeologic setting;

(iii) Site history; and

(iv) Engineering design of the CCR unit.

(2) If the owner or operator elects to install a multiunit groundwater monitoring system, and if the multiunit system includes at least one existing unlined CCR surface impoundment as determined by § 257.71(a), and if at any time after October 19, 2015 the owner or operator determines in any sampling event that the concentrations of one or more constituents listed in appendix IV to this part are detected at statistically significant levels above the groundwater protection standard established under § 257.95(h) for the multiunit system, then all unlined CCR surface impoundments comprising the multiunit groundwater monitoring system are subject to the closure requirements under § 257.101(a) to retrofit or close.

(e) Monitoring wells must be cased in a manner that maintains the integrity of the monitoring well borehole. This casing must be screened or perforated and packed with gravel or sand, where necessary, to enable collection of groundwater samples. The annular space (*i.e.*, the space between the borehole and well casing) above the sampling depth must be sealed to prevent contamination of samples and the groundwater.

(1) The owner or operator of the CCR unit must document and include in the operating record the design, installation, development, and decommissioning of any monitoring wells, piezometers and other measurement, sampling, and analytical devices. The qualified professional engineer must be given access to this documentation when completing the groundwater monitoring system certification required under paragraph (f) of this section.

(2) The monitoring wells, piezometers, and other measurement, sampling, and analytical devices must be operated and maintained so that they perform to the design specifications throughout the life of the monitoring program.

(f) The owner or operator must obtain a certification from a qualified professional engineer stating that the groundwater monitoring system has been designed and constructed to meet the requirements of this section. If the groundwater monitoring system includes the minimum number of monitoring wells specified in paragraph (c)(1) of this section, the certification must document the basis supporting this determination.

(g) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in § 257.105(h), the notification requirements specified in § 257.106(h), and the internet requirements specified in § 257.107(h).

§ 257.92 [Reserved]

§ 257.93 Groundwater sampling and analysis requirements.

(a) The groundwater monitoring program must include consistent sampling and analysis procedures that are designed to ensure monitoring results that provide an accurate representation of groundwater quality at the background and downgradient wells required by § 257.91. The owner or operator of the CCR unit must develop a sampling and analysis program that includes procedures and techniques for:

(1) Sample collection;

(2) Sample preservation and shipment;

(3) Analytical procedures;

(4) Chain of custody control; and

(5) Quality assurance and quality control.

(b) The groundwater monitoring program must include sampling and analytical methods that are appropriate for groundwater sampling and that accurately measure hazardous constituents and other monitoring parameters in groundwater samples. For purposes of §§ 257.90 through 257.98, the term *constituent* refers to both hazardous constituents and other monitoring parameters listed in either appendix III or IV of this part.

(c) Groundwater elevations must be measured in each well immediately prior to purging, each time groundwater is sampled. The owner or operator of the CCR unit must determine the rate and direction of groundwater flow each time groundwater is sampled. Groundwater elevations in wells which monitor the same CCR management area must be measured within a period of time short enough to avoid temporal variations in groundwater flow which could preclude accurate determination of groundwater flow rate and direction.

(d) The owner or operator of the CCR unit must establish background groundwater quality in a hydraulically upgradient or background well(s) for each of the constituents required in the particular groundwater monitoring program that applies to the CCR unit as determined under § 257.94(a) or § 257.95(a). Background groundwater quality may be established at wells that are not located hydraulically upgradient from the CCR unit if it meets the requirements of § 257.91(a)(1).

(e) The number of samples collected when conducting detection monitoring and assessment monitoring (for both downgradient and background wells) must be consistent with the statistical procedures chosen under paragraph (f) of this section and the performance standards under paragraph (g) of this section. The sampling procedures shall be those specified under § 257.94(b) through (d) for detection monitoring, § 257.95(b) through (d) for assessment monitoring, and § 257.96(b) for corrective action.

(f) The owner or operator of the CCR unit must select one of the statistical methods specified in paragraphs (f)(1) through (5) of this section to be used in evaluating groundwater monitoring data for each specified constituent. The statistical test chosen shall be conducted separately for each constituent in each monitoring well.

(1) A parametric analysis of variance followed by multiple comparison procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's mean and the background mean levels for each constituent.

(2) An analysis of variance based on ranks followed by multiple comparison procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's median and the background median levels for each constituent.

(3) A tolerance or prediction interval procedure, in which an interval for each constituent is established from the distribution of the background data and the level of each constituent in each compliance well is compared to the upper tolerance or prediction limit.

(4) A control chart approach that gives control limits for each constituent.

(5) Another statistical test method that meets the performance standards of paragraph (g) of this section.

(6) The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer stating that the selected statistical method is appropriate for evaluating the groundwater monitoring data for the CCR management area. The certification must include a narrative description of the statistical method selected to evaluate the groundwater monitoring data.

(g) Any statistical method chosen under paragraph (f) of this section shall comply with the following performance standards, as appropriate, based on the statistical test method used:

(1) The statistical method used to evaluate groundwater monitoring data shall be appropriate for the distribution of constituents. Normal distributions of data values shall use parametric methods. Non-normal distributions shall use non-parametric methods. If the distribution of the constituents is shown by the owner or operator of the CCR unit to be inappropriate for a normal theory test, then the data must be transformed or a distribution-free (non-parametric) theory test must be used. If the distributions for the constituents differ, more than one statistical method may be needed.

(2) If an individual well comparison procedure is used to compare an individual compliance well constituent concentration with background constituent concentrations or a groundwater protection standard, the test shall be done at a Type I error level no less than 0.01 for each testing period. If a multiple comparison procedure is used, the Type I experiment wise error rate for each testing period shall be no less than 0.05; however, the Type I error of no less than 0.01 for individual well comparisons must be maintained. This performance standard does not apply to tolerance intervals, prediction intervals, or control charts.

(3) If a control chart approach is used to evaluate groundwater monitoring data, the specific type of control chart and its associated parameter values shall be such that this approach is at least as effective as any other approach in this section for evaluating groundwater data. The parameter values shall be determined after considering the number of samples in the background data base, the data distribution, and the range of the concentration values for each constituent of concern.

(4) If a tolerance interval or a predictional interval is used to evaluate groundwater monitoring data, the levels of confidence and, for tolerance intervals, the percentage of the population that the interval must contain, shall be such that this approach is at least as effective as any other approach in this section for evaluating groundwater data. These parameters shall be determined after considering the number of samples in the background data base, the data distribution, and the range of the concentration values for each constituent of concern.

(5) The statistical method must account for data below the limit of detection with one or more statistical procedures that shall at least as effective as any other approach in this section for evaluating groundwater data. Any practical quantitation limit that is used in the statistical method shall be the lowest concentration level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions that are available to the facility.

(6) If necessary, the statistical method must include procedures to control or correct for seasonal and spatial variability as well as temporal correlation in the data.

(h) The owner or operator of the CCR unit must determine whether or not there is a statistically significant increase over background values for each constituent required in the particular groundwater monitoring program that applies to the CCR unit, as determined under § 257.94(a) or § 257.95(a).

(1) In determining whether a statistically significant increase has occurred, the owner or operator must compare the groundwater quality of each constituent at each monitoring well designated pursuant to § 257.91(a)(2) or (d)(1) to the background value of that constituent, according to the statistical procedures and performance standards specified under paragraphs (f) and (g) of this section.

(2) Within 90 days after completing sampling and analysis, the owner or operator must determine whether there has been a statistically significant increase over background for any constituent at each monitoring well.

(i) The owner or operator must measure "total recoverable metals" concentrations in measuring groundwater quality. Measurement of total recoverable metals captures both the particulate fraction and dissolved fraction of metals in natural waters. Groundwater samples shall not be field-filtered prior to analysis.

(j) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in § 257.105(h), the notification requirements specified in § 257.106(h), and the Internet requirements specified in § 257.107(h).

§ 257.94 Detection monitoring program.

(a) The owner or operator of a CCR unit must conduct detection monitoring at all groundwater monitoring wells consistent with this section. At a minimum, a detection monitoring program must include groundwater monitoring for all constituents listed in appendix III to this part.

(b) Except as provided in paragraph (d) of this section, the monitoring frequency for the constituents listed in appendix III to this part shall be at least semiannual during the active life of the CCR unit and the post-closure period. For existing CCR landfills and existing CCR surface impoundments, a minimum of eight independent samples from each background and downgradient well must be collected and analyzed for the constituents listed in appendix III and IV to this part no later than October 17, 2017. For new CCR landfills, new CCR surface impoundments, and all lateral expansions of CCR units, a minimum of eight independent samples for each background well must be collected and analyzed for the constituents listed in appendices III and IV to this part during the first six months of sampling.

(c) The number of samples collected and analyzed for each background well and downgradient well during subsequent semiannual sampling events must be consistent with § 257.93(e), and must account for any unique characteristics of the site, but must be at least one sample from each background and downgradient well.

(d) The owner or operator of a CCR unit may demonstrate the need for an alternative monitoring frequency for repeated sampling and analysis for constituents listed in appendix III to this part during the active life and the post-closure care period based on the availability of groundwater. If there is not adequate groundwater flow to sample wells semiannually, the alternative frequency shall be no less than annual. The need to vary monitoring frequency must be evaluated on a site-specific basis. The demonstration must be supported by, at a minimum, the information specified in paragraphs (d)(1) and (2) of this section.

(1) Information documenting that the need for less frequent sampling. The alternative frequency must be based on consideration of the following factors:

(i) Lithology of the aquifer and unsaturated zone;

(ii) Hydraulic conductivity of the aquifer and unsaturated zone; and

(iii) Groundwater flow rates.

(2) Information documenting that the alternative frequency will be no less effective in ensuring that any leakage from the CCR unit will be discovered within a timeframe that will not materially delay establishment of an assessment monitoring program.

(3) The owner or operator must obtain a certification from a qualified

professional engineer stating that the demonstration for an alternative groundwater sampling and analysis frequency meets the requirements of this section. The owner or operator must include the demonstration providing the basis for the alternative monitoring frequency and the certification by a qualified professional engineer in the annual groundwater monitoring and corrective action report required by § 257.90(e).

(e) If the owner or operator of the CCR unit determines, pursuant to § 257.93(h) that there is a statistically significant increase over background levels for one or more of the constituents listed in appendix III to this part at any monitoring well at the waste boundary specified under § 257.91(a)(2), the owner or operator must:

(1) Except as provided for in paragraph (e)(2) of this section, within 90 days of detecting a statistically significant increase over background levels for any constituent, establish an assessment monitoring program meeting the requirements of § 257.95.

(2) The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels to include obtaining a certification from a qualified professional engineer verifying the accuracy of the information in the report. If a successful demonstration is completed within the 90-day period, the owner or operator of the CCR unit may continue with a detection monitoring program under this section. If a successful demonstration is not completed within the 90-day period, the owner or operator of the CCR unit must initiate an assessment monitoring program as required under § 257.95. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

(3) The owner or operator of a CCR unit must prepare a notification stating that an assessment monitoring program has been established. The owner or operator has completed the notification when the notification is placed in the facility's operating record as required by § 257.105(h)(5).

(f) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in § 257.105(h), the notification requirements specified in § 257.106(h), and the Internet requirements specified in § 257.107(h).

§ 257.95 Assessment monitoring program.

(a) Assessment monitoring is required whenever a statistically significant increase over background levels has been detected for one or more of the constituents listed in appendix III to this part.

(b) Within 90 days of triggering an assessment monitoring program, and annually thereafter, the owner or operator of the CCR unit must sample and analyze the groundwater for all constituents listed in appendix IV to this part. The number of samples collected and analyzed for each well during each sampling event must be consistent with § 257.93(e), and must account for any unique characteristics of the site, but must be at least one sample from each well.

(c) The owner or operator of a CCR unit may demonstrate the need for an alternative monitoring frequency for repeated sampling and analysis for constituents listed in appendix IV to this part during the active life and the post-closure care period based on the availability of groundwater. If there is not adequate groundwater flow to sample wells semiannually, the alternative frequency shall be no less than annual. The need to vary monitoring frequency must be evaluated on a site-specific basis. The demonstration must be supported by, at a minimum, the information specified in paragraphs (c)(1) and (2) of this section.

(1) Information documenting that the need for less frequent sampling. The alternative frequency must be based on consideration of the following factors:

(i) Lithology of the aquifer and unsaturated zone;

(ii) Hydraulic conductivity of the aquifer and unsaturated zone; and

(iii) Groundwater flow rates.

(2) Information documenting that the alternative frequency will be no less effective in ensuring that any leakage from the CCR unit will be discovered within a timeframe that will not materially delay the initiation of any necessary remediation measures.

(3) The owner or operator must obtain a certification from a qualified professional engineer stating that the demonstration for an alternative groundwater sampling and analysis frequency meets the requirements of this section. The owner or operator must include the demonstration providing the basis for the alternative monitoring frequency and the certification by a qualified professional engineer in the annual groundwater monitoring and corrective action report required by § 257.90(e).

(d) After obtaining the results from the initial and subsequent sampling events required in paragraph (b) of this section, the owner or operator must:

(1) Within 90 days of obtaining the results, and on at least a semiannual basis thereafter, resample all wells that were installed pursuant to the requirements of § 257.91, conduct analyses for all parameters in appendix III to this part and for those constituents in appendix IV to this part that are detected in response to paragraph (b) of this section, and record their concentrations in the facility operating record. The number of samples collected and analyzed for each background well and downgradient well during subsequent semiannual sampling events must be consistent with § 257.93(e), and must account for any unique characteristics of the site, but must be at least one sample from each background and downgradient well;

(2) Establish groundwater protection standards for all constituents detected pursuant to paragraph (b) or (d) of this section. The groundwater protection standards must be established in accordance with paragraph (h) of this section; and

(3) Include the recorded concentrations required by paragraph (d)(1) of this section, identify the background concentrations established under § 257.94(b), and identify the groundwater protection standards established under paragraph (d)(2) of this section in the annual groundwater monitoring and corrective action report required by § 257.90(e).

(e) If the concentrations of all constituents listed in appendices III and IV to this part are shown to be at or below background values, using the statistical procedures in § 257.93(g), for two consecutive sampling events, the owner or operator may return to detection monitoring of the CCR unit. The owner or operator must prepare a notification stating that detection monitoring is resuming for the CCR unit. The owner or operator has completed the notification when the notification is placed in the facility's operating record as required by § 257.105(h)(7).

(f) If the concentrations of any constituent in appendices III and IV to this part are above background values, but all concentrations are below the groundwater protection standard

established under paragraph (h) of this section, using the statistical procedures in § 257.93(g), the owner or operator must continue assessment monitoring in accordance with this section.

(g) If one or more constituents in appendix IV to this part are detected at statistically significant levels above the groundwater protection standard established under paragraph (h) of this section in any sampling event, the owner or operator must prepare a notification identifying the constituents in appendix IV to this part that have exceeded the groundwater protection standard. The owner or operator has completed the notification when the notification is placed in the facility's operating record as required by § 257.105(h)(8). The owner or operator of the CCR unit also must:

(1) 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. 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.

(2) Notify all persons who own the land or reside on the land that directly overlies any part of the plume of contamination if contaminants have migrated off-site if indicated by sampling of wells in accordance with paragraph (g)(1) of this section. The owner or operator has completed the notifications when they are placed in the facility's operating record as required by § 257.105(h)(8).

(3) Within 90 days of finding that any of the constituents listed in appendix IV to this part have been detected at a statistically significant level exceeding the groundwater protection standards the owner or operator must either:

(i) Initiate an assessment of corrective measures as required by § 257.96; or

(ii) Demonstrate that a source other than the CCR unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Any such demonstration must be supported by a report that includes the factual or evidentiary basis for any conclusions and must be certified to be accurate by a qualified professional engineer. If a successful demonstration is made, the owner or operator must continue monitoring in accordance with the assessment monitoring program pursuant to this section, and may return to detection monitoring if the constituents in appendices III and IV to this part are at or below background as specified in paragraph (e) of this section. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

(4) If a successful demonstration has not been made at the end of the 90 day period provided by paragraph (g)(3)(ii) of this section, the owner or operator of the CCR unit must initiate the assessment of corrective measures requirements under § 257.96.

(5) If an assessment of corrective measures is required under § 257.96 by either paragraph (g)(3)(i) or (g)(4) of this section, and if the CCR unit is an existing unlined CCR surface impoundment as determined by § 257.71(a), then the CCR unit is subject to the closure requirements under § 257.101(a) to retrofit or close. In addition, the owner or operator must prepare a notification stating that an assessment of corrective measures has been initiated.

(h) The owner or operator of the CCR unit must establish a groundwater protection standard for each constituent in appendix IV to this part detected in the groundwater. The groundwater protection standard shall be:

(1) For constituents for which a maximum contaminant level (MCL) has been established under §§ 141.62 and 141.66 of this title, the MCL for that constituent;

(2) For constituents for which an MCL has not been established, the background concentration for the constituent established from wells in accordance with § 257.91; or

(3) For constituents for which the background level is higher than the MCL identified under paragraph (h)(1) of this section, the background concentration.

(i) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in § 257.105(h), the notification requirements specified in § 257.106(h), and the Internet requirements specified in § 257.107(h).

§ 257.96 Assessment of corrective measures.

(a) Within 90 days of finding that any constituent listed in appendix IV to this part has been detected at a statistically significant level exceeding the groundwater protection standard defined under § 257.95(h), or immediately upon detection of a release from a CCR unit, the owner or operator must initiate an assessment of corrective measures to prevent further releases, to remediate any releases and to restore affected area to original conditions. The assessment of corrective measures must be completed within 90 days, unless the owner or operator demonstrates the need for additional time to complete the assessment of corrective measures due to site-specific conditions or circumstances. The owner or operator must obtain a certification from a qualified professional engineer attesting that the demonstration is accurate. The 90-day deadline to complete the assessment of corrective measures may be extended for no longer than 60 days. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

(b) The owner or operator of the CCR unit must continue to monitor groundwater in accordance with the assessment monitoring program as specified in § 257.95.

(c) 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).

(d) The owner or operator must place the completed assessment of corrective measures in the facility's operating record. The assessment has been completed when it is placed in the facility's operating record as required by § 257.105(h)(10).

(e) The owner or operator must discuss the results of the corrective measures assessment at least 30 days prior to the selection of remedy, in a public meeting with interested and affected parties.

(f) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in § 257.105(h), the notification requirements specified in § 257.106(h), and the Internet requirements specified in § 257.107(h).

§ 257.97 Selection of remedy.

(a) 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).

(b) Remedies must:

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

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

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

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

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

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

(1) The long- and short-term effectiveness and protectiveness of the potential remedy(s), along with the degree of certainty that the remedy will prove successful based on consideration of the following:

(i) Magnitude of reduction of existing risks;

(ii) Magnitude of residual risks in terms of likelihood of further releases due to CCR remaining following implementation of a remedy;

(iii) The type and degree of long-term management required, including monitoring, operation, and maintenance;

(iv) Short-term risks that might be posed to the community or the environment during implementation of such a remedy, including potential threats to human health and the environment associated with excavation, transportation, and re-disposal of contaminant;

(v) Time until full protection is achieved;

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

(vii) Long-term reliability of the engineering and institutional controls; and

(viii) Potential need for replacement of the remedy.

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

(i) The extent to which containment practices will reduce further releases; and

(ii) The extent to which treatment technologies may be used.

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

(i) Degree of difficulty associated with constructing the technology;

(ii) Expected operational reliability of the technologies;

(iii) Need to coordinate with and obtain necessary approvals and permits from other agencies;

(iv) Availability of necessary equipment and specialists; and

(v) Available capacity and location of needed treatment, storage, and disposal services.

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

(d) The owner or operator must specify as part of the selected remedy a schedule(s) for implementing and completing remedial activities. Such a schedule must require the completion of remedial activities within a reasonable period of time taking into consideration the factors set forth in paragraphs (d)(1) through (6) of this section. The owner or operator of the CCR unit must consider the following factors in determining the schedule of remedial activities:

(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.

(e) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in § 257.105(h), the notification requirements specified in § 257.106(h), and the Internet requirements specified in § 257.107(h).

§ 257.98 Implementation of the corrective action program.

(a) Within 90 days of selecting a remedy under § 257.97, the owner or operator must initiate remedial activities. Based on the schedule established under § 257.97(d) for implementation and completion of remedial activities the owner or operator must:

(1) Establish and implement a corrective action groundwater monitoring program that:

(i) At a minimum, meets the requirements of an assessment monitoring program under § 257.95;

(ii) Documents the effectiveness of the corrective action remedy; and

(iii) Demonstrates compliance with the groundwater protection standard pursuant to paragraph (c) of this section.

(2) Implement the corrective action remedy selected under § 257.97; and

(3) Take any interim measures necessary to reduce the contaminants leaching from the CCR unit, and/or potential exposures to human or ecological receptors. Interim measures must, to the greatest extent feasible, be consistent with the objectives of and contribute to the performance of any remedy that may be required pursuant to § 257.97. The following factors must be considered by an owner or operator in determining whether interim measures are necessary:

(i) Time required to develop and implement a final remedy;

(ii) Actual or potential exposure of nearby populations or environmental receptors to any of the constituents listed in appendix IV of this part;

(iii) Actual or potential contamination of drinking water supplies or sensitive ecosystems;

(iv) Further degradation of the groundwater that may occur if remedial action is not initiated expeditiously;

(v) Weather conditions that may cause any of the constituents listed in appendix IV to this part to migrate or be released;

(vi) Potential for exposure to any of the constituents listed in appendix IV to this part as a result of an accident or failure of a container or handling system; and

(vii) Other situations that may pose threats to human health and the environment.

(b) If an owner or operator of the CCR unit, determines, at any time, that compliance with the requirements of § 257.97(b) is not being achieved through the remedy selected, the owner or operator must implement other methods or techniques that could feasibly achieve compliance with the requirements.

(c) Remedies selected pursuant to § 257.97 shall be considered complete when:

(1) The owner or operator of the CCR unit demonstrates compliance with the groundwater protection standards established under § 257.95(h) has been achieved at all points within the plume of contamination that lie beyond the groundwater monitoring well system established under § 257.91.

(2) Compliance with the groundwater protection standards established under § 257.95(h) has been achieved by demonstrating that concentrations of constituents listed in appendix IV to this part have not exceeded the groundwater protection standard(s) for a period of three consecutive years using the statistical procedures and performance standards in § 257.93(f) and (g).

(3) All actions required to complete the remedy have been satisfied.

(d) All CCR that are managed pursuant to a remedy required under § 257.97, or an interim measure required under paragraph (a)(3) of this section, shall be managed in a manner that complies with all applicable RCRA requirements.

(e) Upon completion of the remedy, the owner or operator must prepare a notification stating that the remedy has been completed. The owner or operator must obtain a certification from a qualified professional engineer attesting that the remedy has been completed in compliance with the requirements of paragraph (c) of this section. The report has been completed when it is placed in the operating record as required by § 257.105(h)(13).

(f) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in § 257.105(h), the notification requirements specified in § 257.106(h), and the internet requirements specified in § 257.107(h).

Closure and Post-Closure Care

§ 257.100 Inactive CCR surface impoundments.

(a) Except as provided by paragraph (b) of this section, inactive CCR surface impoundments are subject to all of the requirements of this subpart applicable to existing CCR surface impoundments.

(b) An owner or operator of an inactive CCR surface impoundment that completes closure of such CCR unit, and meets all of the requirements of either paragraphs (b)(1) through (4) of this section or paragraph (b)(5) of this section no later than April 17, 2018, is exempt from all other requirements of this subpart.

(1) *Closure by leaving CCR in place.* If the owner or operator of the inactive CCR surface impoundment elects to close the CCR surface impoundment by leaving CCR in place, the owner or operator must ensure that, at a minimum, the CCR unit is closed in a manner that will:

(i) Control, minimize or eliminate, to the maximum extent feasible, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere;

(ii) Preclude the probability of future impoundment of water, sediment, or slurry;

(iii) Include measures that provide for major slope stability to prevent the sloughing or movement of the final cover system; and

(iv) Minimize the need for further maintenance of the CCR unit.

(2) The owner or operator of the inactive CCR surface impoundment must meet the requirements of paragraphs (b)(2)(i) and (ii) of this section prior to installing the final cover system required under paragraph (b)(3) of this section.

(i) Free liquids must be eliminated by removing liquid wastes or solidifying the remaining wastes and waste residues.

(ii) Remaining wastes must be stabilized sufficient to support the final cover system.

(3) The owner or operator must install a final cover system that is designed to minimize infiltration and erosion, and at a minimum, meets the requirements of paragraph (b)(3)(i) of this section, or the requirements of an alternative final cover system specified in paragraph (b)(3)(ii) of this section.

(i) The final cover system must be designed and constructed to meet the criteria specified in paragraphs (b)(3)(i)(A) through (D) of this section.

(A) The permeability of the final cover system must be less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1×10^{-5} centimeters/second, whichever is less.

(B) The infiltration of liquids through the CCR unit must be minimized by the use of an infiltration layer that contains a minimum of 18 inches of earthen material.

(C) The erosion of the final cover system must be minimized by the use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth.

(D) The disruption of the integrity of the final cover system must be minimized through a design that accommodates settling and subsidence.

(ii) The owner or operator may select an alternative final cover system design, provided the alternative final cover system is designed and constructed to meet the criteria in paragraphs (b)(3)(ii)(A) through (C) of this section.

(A) The design of the final cover system must include an infiltration layer that achieves an equivalent reduction in infiltration as the infiltration layer specified in paragraphs (b)(3)(i)(A) and (B) of this section.

(B) The design of the final cover system must include an erosion layer that provides equivalent protection from wind or water erosion as the erosion layer specified in paragraph (b)(3)(i)(C) of this section.

deficiency or release specified under § 257.105(f)(11).

(11) The initial and periodic safety factor assessments specified under § 257.105(f)(12).

(12) The design and construction plans, and any revisions of them, specified under § 257.105(f)(13).

(g) *Operating criteria.* The owner or operator of a CCR unit subject to this subpart must place the following information on the owner or operator's CCR Web site:

(1) The CCR fugitive dust control plan, or any subsequent amendment of the plan, specified under § 257.105(g)(1) except that only the most recent plan must be maintained on the CCR Web site irrespective of the time requirement specified in paragraph (c) of this section.

(2) The annual CCR fugitive dust control report specified under § 257.105(g)(2).

(3) The initial and periodic run-on and run-off control system plans specified under § 257.105(g)(3).

(4) The initial and periodic inflow design flood control system plans specified under § 257.105(g)(4).

(5) The periodic inspection reports specified under § 257.105(g)(6).

(6) The documentation detailing the corrective measures taken to remedy the deficiency or release specified under § 257.105(g)(7).

(7) The periodic inspection reports specified under § 257.105(g)(9).

(h) *Groundwater monitoring and corrective action.* The owner or operator of a CCR unit subject to this subpart must place the following information on the owner or operator's CCR Web site:

(1) The annual groundwater monitoring and corrective action report specified under § 257.105(h)(1).

(2) The groundwater monitoring system certification specified under § 257.105(h)(3).

(3) The selection of a statistical method certification specified under § 257.105(h)(4).

(4) The notification that an assessment monitoring programs has been established specified under § 257.105(h)(5).

(5) The notification that the CCR unit is returning to a detection monitoring program specified under § 257.105(h)(7).

(6) The notification that one or more constituents in appendix IV to this part have been detected at statistically significant levels above the groundwater protection standard and the notifications to land owners specified under § 257.105(h)(8).

(7) The notification that an assessment of corrective measures has been initiated specified under § 257.105(h)(9).

(8) The assessment of corrective measures specified under § 257.105(h)(10).

(9) The semiannual reports describing the progress in selecting and designing remedy and the selection of remedy report specified under § 257.105(h)(12), except that the selection of the remedy report must be maintained until the remedy has been completed.

(10) The notification that the remedy has been completed specified under § 257.105(h)(13).

(i) *Closure and post-closure care.* The owner or operator of a CCR unit subject to this subpart must place the following information on the owner or operator's CCR Web site:

(1) The notification of intent to initiate closure of the CCR unit specified under § 257.105(i)(1).

(2) The annual progress reports of closure implementation specified under § 257.105(i)(2).

(3) The notification of closure completion specified under § 257.105(i)(3).

(4) The written closure plan, and any amendment of the plan, specified under § 257.105(i)(4).

(5) The demonstration(s) for a time extension for initiating closure specified under § 257.105(i)(5).

(6) The demonstration(s) for a time extension for completing closure specified under § 257.105(i)(6).

(7) The notification of intent to close a CCR unit specified under § 257.105(i)(7).

(8) The notification of completion of closure of a CCR unit specified under § 257.105(i)(8).

(9) The notification recording a notation on the deed as required by § 257.105(i)(9).

(10) The notification of intent to comply with the alternative closure requirements as required by § 257.105(i)(10).

(11) The annual progress reports under the alternative closure requirements as required by § 257.105(i)(11).

(12) The written post-closure plan, and any amendment of the plan, specified under § 257.105(i)(12).

(13) The notification of completion of post-closure care specified under § 257.105(i)(13).

(j) *Retrofit criteria.* The owner or operator of a CCR unit subject to this subpart must place the following information on the owner or operator's CCR Web site:

(1) The written retrofit plan, and any amendment of the plan, specified under § 257.105(j)(1).

(2) The notification of intent to comply with the alternative retrofit requirements as required by § 257.105(j)(2).

(3) The annual progress reports under the alternative retrofit requirements as required by § 257.105(j)(3).

(4) The demonstration(s) for a time extension for completing retrofit activities specified under § 257.105(j)(4).

(5) The notification of intent to retrofit a CCR unit specified under § 257.105(j)(5).

(6) The notification of completion of retrofit activities specified under § 257.105(j)(6).

■ 5. Amend part 257 by adding "Appendix III to Part 257" and "Appendix IV to Part 257" to read as follows:

Appendix III to Part 257—Constituents for Detection Monitoring

Common name [1]
Boron
Calcium
Chloride
Fluoride
pH
Sulfate
Total Dissolved Solids (TDS)

[1] Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.

Appendix IV to Part 257—Constituents for Assessment Monitoring

Common name [1]
Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Fluoride
Lead
Lithium
Mercury
Molybdenum
Selenium
Thallium
Radium 226 and 228 combined

[1] Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.

PART 261—IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

■ 6. The authority citation for part 261 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6921, 6922, 6924(y) and 6938.

■ 7. Section 261.4 is amended by revising paragraph (b)(4) to read as follows:

APPENDIX B

Boring Logs and Construction Diagrams

HALEY ALDRICH

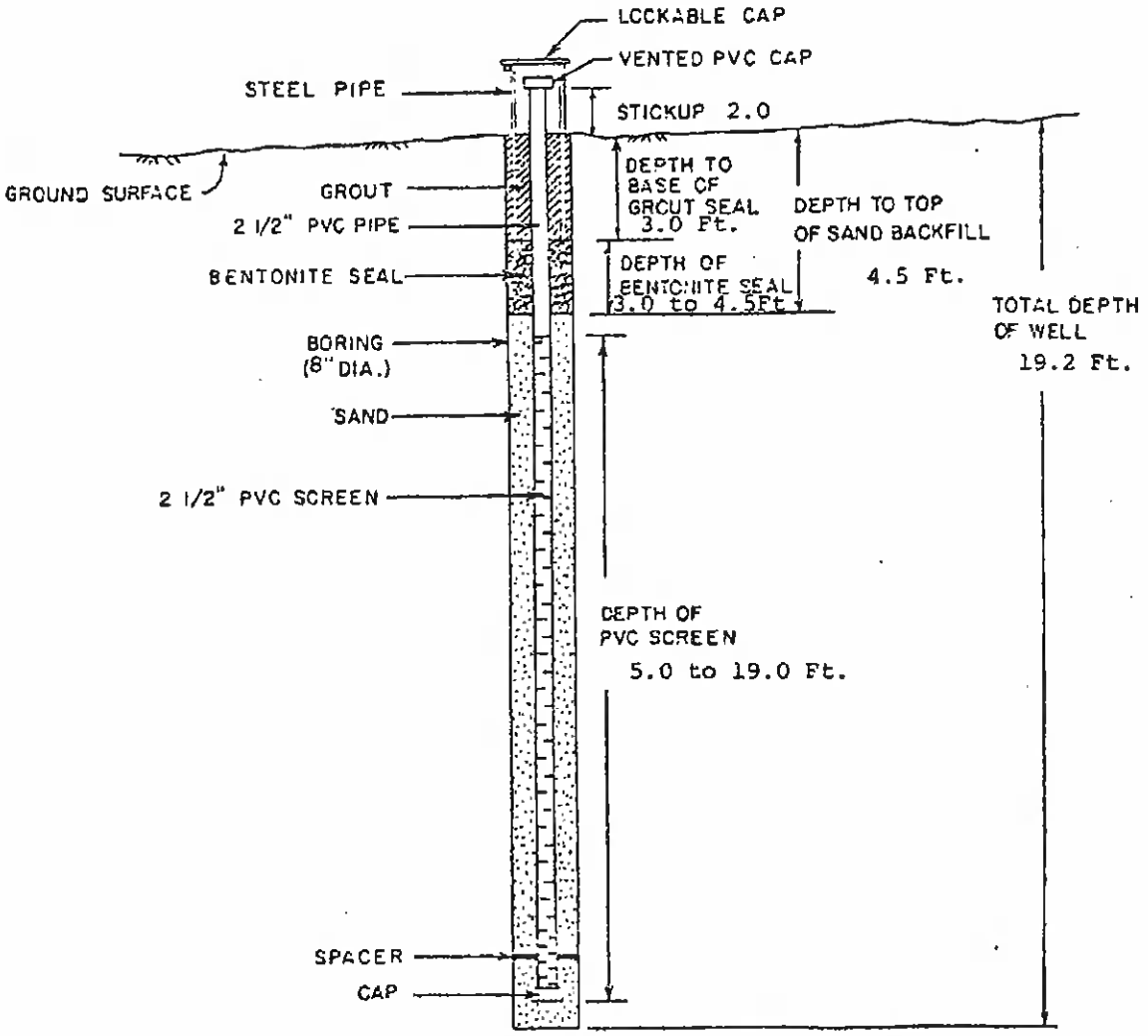
MONITORING WELL INSTALLATION RECORD

JOB NAME Cross Generating Station JOB NUMBER CH 4781 C

WELL NUMBER PM-3A GROUND SURFACE ELEVATION 82.3 Ft. (1)

LOCATION About 10 Ft. Plant Grid Northwest of PM-3 (2)

INSTALLATION DATE 5/25/83



NOTE: ALL PVC PIPE JOINTS HAVE SCREW CONNECTORS

(1) Elevation Furnished by Ruscon
(2) Ref: LETCo. Job No. Ch 4781A, Report to Ruscon dated May 3, 1983.

Ruscon Corporation Charleston, South Carolina	LAW ENGINEERING TESTING COMPANY CHARLOTTE, NORTH CAROLINA	MONITORING WELL INSTALLATION RECORD

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

Ground Water Protection Division | 2600 Bull Street | Columbia, S.C. 29201 | (803) 734-5331 | Water Well Record

CAP 3

1. LOCATION OF WELL

County: Berkeley System Name:

Latitude: ° ' " Longitude: ° ' "

Distance And Direction from Road Intersections

Cross Generating Station

Street address & City of Well Location

Sketch Map: (See example on back)

Horizontal Control
North: 13289.5179
East: 9276.5139

2. CUTTING SAMPLES ☐ Yes ☐ No

Geophysical Logs ☐ Yes (Please enclose) ☐ No

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
moist brown Sandy Clay	11'	11'
moist brown Silty Clayey Sand	2'	13'
moist brown Silty Sandy Clay	10'6"	23'6"
* Sat white, frag. limestone with Clay layers	3'6"	27'
* Sat. white fract. limestone with Clay	5'	32'

Indicate water bearing zones

(use a 2nd sheet if needed)

3. REMARKS

4. OWNER OF WELL:
Address Santee Cooper

Telephone No.

Engineer
Address PSC

Telephone No.

5. WELL DEPTH (Completed) 30'6" ft. Date Started: 9-21-94 Date Completed: 9-22-94

6. ☐ Mud Rotary ☐ Jetted ☑ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. USE:
☐ Domestic ☐ Public Supply Permit No. _____ ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☑ Test Well ☐ _____

8. CASING: ☑ Threaded ☐ Welded
Diam 2"
Type ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
+2'6" in. to _____ ft. depth
_____ in. to _____ ft. depth
Height: Above/Below
Surface _____ ft.
Weight _____ lbs./ft.
Drive Shoe? ☐ Yes ☐ No

9. SCREEN:
Type: PVC Diam 2¼"
Slot/Gauge .010 Length 15'
Set Between 15'6" ft. and 30'6" ft. NOTE: MULTIPLE SCREENS USE SECOND SHEET
_____ ft. and _____ ft.
Sieve Analysis ☐ Yes (Please enclose) ☑ No

10. STATIC WATER LEVEL
12' ft. below land surface after 24 hours

11. PUMPING LEVEL Below Land Surface
_____ ft. after _____ hrs. pumping _____ G.P.M.
Pumping Test: ☐ Yes (Please enclose) ☐ No
Yield _____

12. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please Enclose Lab Results.

13. ARTIFICIAL FILTER (Gravel Pack) ☑ Yes ☐ No
Installed from 14'6" ft. to 30'6" ft.
Effective size #50 uniformity coefficient _____

14. WELL GROUTED? ☑ Yes ☐ No
Neat Cement ☑ Sand Cement ☐ Concrete ☐ Other ☐ Bentonite
Depth From 0 ft. to 14'6" ft.

15. NEAREST SOURCE OF POSSIBLE CONTAMINATION: _____ Feet _____ Direction _____ Type
Well disinfected upon completion ☐ Yes ☐ No Type _____ Amount _____

16. PUMP: Date Installed _____ ☐ not installed
Mfr. name _____ model no. _____
H.P. _____ volts _____ length of drop pipe _____ ft. capacity _____ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

17. WATER WELL CONTRACTOR'S CERTIFICATION: This well was drilled under my supervision and this report is true to the best of my knowledge and belief.
REGISTERED BUSINESS NAME: PSC
Signed _____ Date 9-22-94
AUTHORIZED REPRESENTATIVE

OHEC # 1903 (10/86) COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

Ground Water Protection Division | 2600 Bull Street | Columbia, S.C. 29201 | (803) 734-5331 | Water Well Record

CAP 5

1. LOCATION OF WELL

County: Berkeley | System Name:

Latitude: | Longitude:

Distance And Direction from Road Intersections

Street address & City of Well Location

Sketch Map: (See example on back)

Horizontal Control
North: 14625.6720
East: 9121.6129

4. OWNER OF WELL:

Address: Santee Cooper

Telephone No.

Engineer

Address

Telephone No.

5. WELL DEPTH (Completed) 30'6" ft. | Date Started: 10-25-94 | Date Completed: 10-26-94

6. ☐ Mud Rotary ☐ Jetted ☑ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. USE:

☐ Domestic ☐ Public Supply Permit No. _____ ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☑ Test Well ☐ _____

8. CASING ☑ Threaded ☐ Welded

Diam 2¼"
Type ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
+2'6" in. to 15'6" ft. depth
_____ in. to _____ ft. depth

Height: Above/Below Surface _____ ft.
Weight _____ lbs./ft.
Drive Shoe? ☐ Yes ☐ No

9. SCREEN:

Type: PVC | Diam 2¼"
Slot/Gauge 1010 | Length 15'
Set Between 15'6" ft. and 30'6" ft. NOTE: MULTIPLE SCREENS USE SECOND SHEET
_____ ft. and _____ ft.
Sieve Analysis ☐ Yes (Please enclose) ☑ No

10. STATIC WATER LEVEL

13' ft. below land surface after 24 hours

11. PUMPING LEVEL Below Land Surface

_____ ft. after _____ hrs. pumping _____ G.P.M.
Pumping Test: ☐ Yes (Please enclose) ☐ No
Yield _____

12. WATER QUALITY

Chemical Analysis ☐ Yes ☐ No | Bacterial Analysis ☐ Yes ☐ No
Please Enclose Lab Results.

13. ARTIFICIAL FILTER (Gravel Pack) ☑ Yes ☐ No

Installed from 14'6" ft. to 32' ft.
Effective size F×50 uniformity coefficient _____

14. WELL GROUTED? ☑ Yes ☐ No

Neat Cement ☑ | Sand Cement ☐ | Concrete ☐ | Other ☐ Bentonite
Depth From 0 ft. to 14'6" ft.

15. NEAREST SOURCE OF POSSIBLE CONTAMINATION: _____ Feet _____ Direction _____ Type
Well disinfected upon completion ☐ Yes ☐ No | Type _____ | Amount _____

16. PUMP: Date Installed _____ ☐ not installed
Mfr. name _____ model no. _____
H.P. _____ volts _____ length of drop pipe _____ ft. capacity _____ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

17. WATER WELL CONTRACTOR'S CERTIFICATION: This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

REGISTERED BUSINESS NAME: PSA Inc
Signed _____ AUTHORIZED REPRESENTATIVE

2. CUTTING SAMPLES ☐ Yes ☐ No

Geophysical Logs ☐ Yes (Please enclose) ☐ No

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
moist brown Sandy Clay	14'	14'
Very moist gray Silty Clay Sand	5'	19'
wet gray/green Clay with Silt	10'	29'
+ Sat gray Sand	3'	32'

Indicate water bearing zones

(use a 2nd sheet if needed)

3. REMARKS

DHEC # 1903 (10/86) COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

Ground Water Protection Division | 2600 Bull Street | Columbia, S.C. 29201 | (803) 734-5331 | Water Well Record

CAP7

1. LOCATION OF WELL

County: Berkeley | System Name:

Latitude: | Longitude:

Distance And Direction from Road Intersections: Cross Generating Station

Street address & City of Well Location:

Sketch Map: (See example on back)

Horizontal Control
North: 14737.5767
East: 10550.6447

2. CUTTING SAMPLES ☐ Yes ☐ No

Geophysical Logs ☐ Yes (Please enclose) ☐ No

FORMATION DESCRIPTION	THICKNESS IN 1' OF STRATUM	DEPTH TO BOTTOM OF STRATUM
moist brown Sandy Clay	11'	11'
moist gray yellow brown Sandy Clay (layers of Sand)	5'	16'
very moist light brown Silty Clay	11'	27'
* sat yellow brown SAND	5'	32'
dicate water bearing zones		
(use a 2nd sheet if needed)		

8. REMARKS

4. OWNER OF WELL:
Address: Santee Cooper
Telephone No.

Engineer
Address
Telephone No.

5. WELL DEPTH (Completed) 30'6" ft. | Date Started: 10-25-94 | Date Completed: 10-26-94

6. ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. USE: ☐ Domestic ☐ Public Supply Permit No. ____ ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☑ Test Well ☐ ____

8. CASING ☑ Threaded ☐ Welded
Diam. 2¼"
Type ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
+2'6" in. to 15'6" ft. depth
____ in. to ____ ft. depth
Height: Above/Below Surface ____ ft.
Weight ____ lbs./ft.
Drive Shoe? ☐ Yes ☐ No

9. SCREEN:
Type: PVC | Diam. 2¼"
Slot/Gauze: .010 | Length: 15'
Set Between 15'6" ft. and 30'6" ft.
____ ft. and ____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (Please enclose) ☑ No

10. STATIC WATER LEVEL
12' ft. below land surface after 24 hours

11. PUMPING LEVEL Below Land Surface
____ ft. after ____ hrs. pumping ____ G.P.M.
Pumping Test: ☐ Yes (Please enclose) ☐ No
Yield ____

12. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No | Bacterial Analysis ☐ Yes ☐ No
Please Enclose Lab Results.

13. ARTIFICIAL FILTER (Gravel Pack) ☑ Yes ☐ No
Installed from 14' ft. to 32' ft.
Effective size #X50 uniformity coefficient ____

14. WELL GROUTED? ☑ Yes ☐ No
Neat Cement ☑ Sand Cement ☐ Concrete ☐ Other ☐ 3' bentinite
Depth From 0 ft. to 14' ft.

15. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ Feet ____ Direction ____ Type
Well disinfected upon completion ☐ Yes ☐ No Type ____ Amount ____

16. PUMP: Date Installed ____ ☐ not installed
Mfr. name ____ model no. ____
H.P. ____ volts ____ length of drop pipe ____ ft. capacity ____ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

17. WATER WELL CONTRACTOR'S CERTIFICATION: This well was drilled under my supervision and this report is true to the best of my knowledge and belief.
REGISTERED ____
BUSINESS ____
NAME ____
Signed ____ AUTHORIZED REPRESENTATIVE

DHEC # 1903 (10/86) COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

Ground Water Protection Division | 2600 Bull Street | Columbia, S.C. 29201 | (803) 734-5331 | Water Well Record

CAP 9

1. LOCATION OF WELL

County: Berkeley | System Name:

Latitude: ° ' " | Longitude: ° ' "

Distance And Direction from Road Intersections

Cross Generating Station

Street address & City of Well Location

Sketch Map: (See example on back)

Horizontal Control

North: 14083.6910

East: 11632.7247

2. CUTTING SAMPLES ☐ Yes ☐ No

Geophysical Logs ☐ Yes (Please enclose) ☐ No

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
moist brown Sandy Clay	12'	12'
moist Brown Sandy Clay	5'	17'
moist brown Silty Clay with Sand	4'	21'
very moist lightbrown Sandy Silty Clay	5'	26'
very moist grays Silty Clay with Sand	2'	28'
very moist gray Clay	4'	32'

dicate water bearing zones

(use a 2nd sheet if needed)

3. REMARKS

4. OWNER OF WELL

Address: Santee Cooper

Telephone No.

Engineer

Address

Telephone No.

5. WELL DEPTH (Completed) 30'6" ft. Date Started: 10-26-94 Date Completed: 10-27-94

6. ☐ Mud Rotary ☐ Jetted ☑ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. USE: ☐ Domestic ☐ Public Supply-Permit No. ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☑ Test Well ☐

8. CASING ☑ Threaded ☐ Welded

Diam. 2¼"

Type ☑ PVC ☐ Galvanized ☐ Steel ☐ Other

+2'6" in. to ft. depth

in. to ft. depth

Height: Above/Below Surface ft.

Weight lbs./ft.

Drive Shoe? ☐ Yes ☐ No

9. SCREEN:

Type: PVC Diam 2¼"

Slot/Gauze .010 Length 15'

Set Between 15'6" ft. and 30'6" ft. NOTE: MULTIPLE SCREENS USE SECOND SHEET

ft. and ft.

Sieve Analysis ☐ Yes (Please enclose) ☑ No

10. STATIC WATER LEVEL

12' ft. below land surface after 24 hours

11. PUMPING LEVEL Below Land Surface

ft. after hrs. pumping G.P.M.

Pumping Test: ☐ Yes (Please enclose) ☐ No

Yield

12. WATER QUALITY

Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No

Please Enclose Lab Results.

13. ARTIFICIAL FILTER (Gravel Pack) ☑ Yes ☐ No

Installed from 14'6" ft. to 32' ft.

Effective size FX50 uniformity coefficient

14. WELL GROUTED? ☑ Yes ☐ No

Neat Cement ☑ Sand Cement ☐ Concrete ☐ Other ☐ 2' bentonite

Depth From 0 ft. to 14'6" ft.

15. NEAREST SOURCE OF POSSIBLE CONTAMINATION: Feet Direction Type

Well disinfected upon completion ☐ Yes ☐ No Type Amount

16. PUMP: Date Installed ☐ not installed

Mfr. name model no.

H.P. volts length of drop pipe ft. capacity gpm

TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

17. WATER WELL CONTRACTOR'S CERTIFICATION and this report is true to the best

REGISTERED BUSINESS NAME

Signed AUTHORIZED REPRESENTATIVE

OHEC # 1903 (10/86) COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

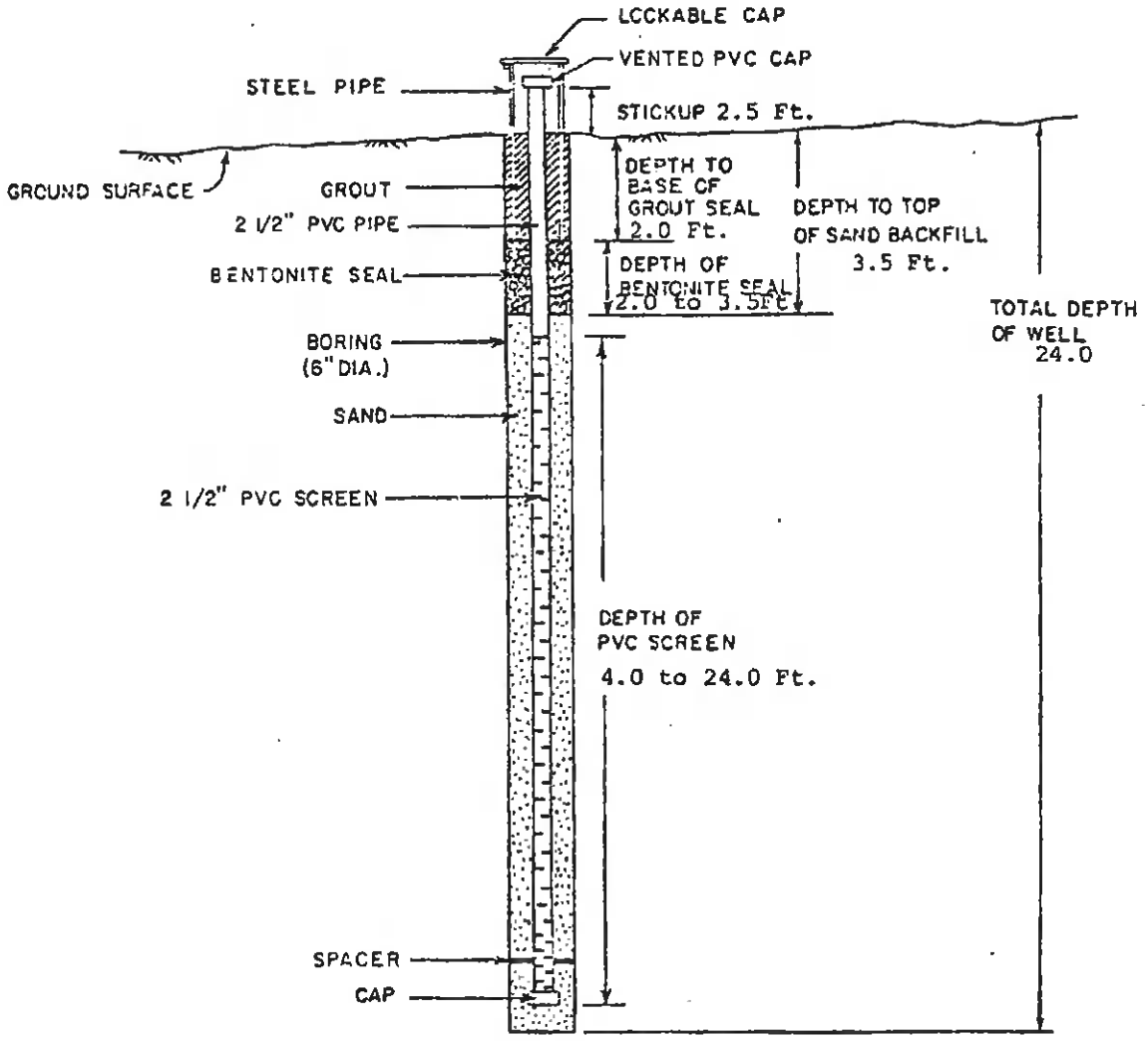
MONITORING WELL INSTALLATION RECORD

JOB NAME Cross Generating Station JOB NUMBER CH 4781 A

WELL NUMBER PM-1 GROUND SURFACE ELEVATION 82.3 Ft.

LOCATION N 86+47, E 95+80

INSTALLATION DATE 4/26/83



NOTE: ALL PVC PIPE JOINTS HAVE SCREW CONNECTORS

Plant Coordinates Indicated on Burns and Roe Sketches Referenced in Text of Accompanying Letter. Elevation Furnished by Ruscon

Ruscon Corporation Charleston, South Carolina	LAW ENGINEERING TESTING COMPANY CHARLOTTE, NORTH CAROLINA	MONITORING WELL INSTALLATION RECORD

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

DHEC — PROMOTE PROTECT PROSPER

1. WELL OWNER INFORMATION:
Name: SANTEE COOPER (last) (first)
Address: ONE RIVERWOOD DRIVE
City: MONCKS CORNER State: SC Zip: 29461
Telephone: Work: Home:

2. LOCATION OF WELL: SC **COUNTY:** BERKELEY
Name: CROSS GENERATING STATION
Street Address: 553 CROSS STATION ROAD
City: PINEVILLE Zip: 29468
Latitude: 33° 23' 10.94" Longitude: 80° 06' 56.66"

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:** CBW-1

4. ABANDONMENT: ☐ Yes ☑ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
TAN GRAVEL	3.0	3.0
BLACK SANDY CLAY	4.0	7.0
ORANGE SANDY CLAY	3.0	10.0
PINK/TAN SAND	14.0	24.0
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
BENTONITE SEAL FROM 8.0 TO 11.0 FEET

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other AUGER

7. PERMIT NUMBER:

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) 24.0 ft. Date Started: 09/16/15 Date Completed: 09/16/15

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2 INCH
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
2.0 in. to 14.0 ft. depth
_____ in. to _____ ft. depth
Height: Above ☑ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: SCH 40 PVC Diam.: 2 INCH
Slot/Gauge: .010 Length: 10.0 FEET
Set Between: 14.0 ft. and 24.0 ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☑ No

12. STATIC WATER LEVEL 8.0 ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☑ Yes ☐ No
Installed from 11.0 ft. to 24.0 ft.
Effective size 1.43 Uniformity Coefficient 1.30

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☐ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0.0 ft. to 8.0 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P._____ Volts_____ Length of drop pipe ___ ft. Capacity ____ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: JOHNNY BURR **CERT. NO.:** 01740
Address: (Print) 176 COMMERCE BLVD
STATESVILLE, NC 28625
Level: A B C D (circle one) ☐ ☐ ☑ ☐
Telephone No.: 704-872-7686 Fax No.: 704-872-0248

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.
Signed: Johnny Burr Date: 09/21/15
Well Driller

If D Level Driller, provide supervising driller's name:

DHEC 1903 (07/2003) **COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)**

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

DHEC — PROMOTE PROTECT PROSPER

1. WELL OWNER INFORMATION:
Name: SANTEE COOPER (last) (first)
Address: ONE RIVERWOOD DRIVE
City: MONCKS CORNER State: SC Zip: 29461
Telephone: Work: Home:

2. LOCATION OF WELL: SC **COUNTY:** BERKELEY
Name: CROSS GENERATING STATION
Street Address: 553 CROSS STATION ROAD
City: PINEVILLE Zip: 29468
Latitude: 33° 23' 10.94" Longitude: 80° 06' 56.66"

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:** CLF1B-1

4. ABANDONMENT: ☐ Yes ☑ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
BLACK TOPSOIL	3.0	3.0
ORANGE SANDY CLAY	5.0	8.0
TAN/GRAY SAND	9.0	17.0
GRAY CLAY/SHELLS	5.0	22.0
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: BENTONITE SEAL FROM 7.0 TO 10.0 FEET

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other AUGER

7. PERMIT NUMBER:

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) 22.0 ft. Date Started: 09/16/15 Date Completed: 09/16/15

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2 INCH
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
2.0 in. to 12.0 ft. depth
_____ in. to _____ ft. depth
Height: Above ☑ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: SCH 40 PVC Diam.: 2 INCH
Slot/Gauge: .010 Length: 10.0 FEET
Set Between: 12.0 ft. and 22.0 ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☑ No

12. STATIC WATER LEVEL 8.0 ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☑ Yes ☐ No
Installed from 10.0 ft. to 22.0 ft.
Effective size 1.43 Uniformity Coefficient 1.30

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☐ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0.0 ft. to 7.0 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P._____ Volts_____ Length of drop pipe ___ ft. Capacity ____ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: JOHNNY BURR **CERT. NO.:** 01740
Address: (Print) 176 COMMERCE BLVD
STATESVILLE, NC 28625
Level: A ☐ B ☐ C ☑ D ☐ (circle one)
Telephone No.: 704-872-7686 Fax No.: 704-872-0248

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: Johnny Burr (Well Driller) Date: 09/21/15

If D Level Driller, provide supervising driller's name:

DHEC 1903 (07/2003) **COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)**

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

DHEC — PROMOTE PROTECT PROSPER

1. WELL OWNER INFORMATION:
Name: SANTEE COOPER (last) (first)
Address: ONE RIVERWOOD DRIVE
City: MONCKS CORNER State: SC Zip: 29461
Telephone: Work: Home:

2. LOCATION OF WELL: SC **COUNTY:** BERKELEY
Name: CROSS GENERATING STATION
Street Address: 553 CROSS STATION ROAD
City: PINEVILLE Zip: 29468
Latitude: 33° 23' 10.94" Longitude: 80° 06' 56.66"

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:** CLF1B-2

4. ABANDONMENT: ☐ Yes ☑ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
BLACK CLAYEY SAND	8.0	8.0
TAN SANDY CLAY	4.0	12.0
YELLOW SAND	6.0	18.0
GRAY ROCK/SAND	4.0	22.0
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
BENTONITE SEAL FROM 7.0 TO 10.0 FEET

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other AUGER

7. PERMIT NUMBER:

8. USE:
☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) 22.0 ft. Date Started: 09/14/15 Date Completed: 09/14/15

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2 INCH
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
2.0 in. to 12.0 ft. depth
_____ in. to _____ ft. depth
Height: Above ☑ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: SCH 40 PVC Diam.: 2 INCH
Slot/Gauge: .010 Length: 10.0 FEET
Set Between: 12.0 ft. and 22.0 ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☑ No

12. STATIC WATER LEVEL 8.0 ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☑ Yes ☐ No
Installed from 10.0 ft. to 22.0 ft.
Effective size 1.43 Uniformity Coefficient 1.30

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☐ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0.0 ft. to 7.0 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P._____ Volts_____ Length of drop pipe ___ ft. Capacity ____ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: JOHNNY BURR **CERT. NO.:** 01740
Address: (Print) 176 COMMERCE BLVD
STATESVILLE, NC 28625
Level: A ☐ B ☐ C ☑ D ☐ (circle one)
Telephone No.: 704-872-7686 Fax No.: 704-872-0248

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: Johnny Burr (Well Driller) Date: 09/21/15

If D Level Driller, provide supervising driller's name:

DHEC 1903 (07/2003) **COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)**

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

DHEC — PROMOTE PROTECT PROSPER

1. WELL OWNER INFORMATION:
Name: SANTEE COOPER (last) (first)
Address: ONE RIVERWOOD DRIVE
City: MONCKS CORNER State: SC Zip: 29461
Telephone: Work: Home:

2. LOCATION OF WELL: SC **COUNTY:** BERKELEY
Name: CROSS GENERATING STATION
Street Address: 553 CROSS STATION ROAD
City: PINEVILLE Zip: 29468
Latitude: 33° 23' 10.94" Longitude: 80° 06' 56.66"

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:** CLF1B-3

4. ABANDONMENT: ☐ Yes ☑ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
BLACK TOPSOIL	1.0	1.0
ORANGE SANDY CLAY	7.0	8.0
TAN SANDY CLAY	4.0	12.0
GRAY STONE/SHELLS	10.0	22.0
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
BENTONITE SEAL FROM 5.0 TO 8.0 FEET

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other AUGER

7. PERMIT NUMBER:

8. USE:
☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 09/14/15
20.0 ft. Date Completed: 09/14/15

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2 INCH
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
2.0 in. to 10.0 ft. depth
_____ in. to _____ ft. depth
Height: Above ☑ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: SCH 40 PVC Diam.: 2 INCH
Slot/Gauge: .010 Length: 10.0 FEET
Set Between: 10.0 ft. and 20.0 ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☑ No

12. STATIC WATER LEVEL 8.0 ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☑ Yes ☐ No
Installed from 8.0 ft. to 20.0 ft.
Effective size 1.43 Uniformity Coefficient 1.30

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☐ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0.0 ft. to 5.0 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P._____ Volts_____ Length of drop pipe ___ ft. Capacity ___ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: JOHNNY BURR **CERT. NO.:** 01740
Address: (Print) 176 COMMERCE BLVD
STATESVILLE, NC 28625
Level: A ☐ B ☐ C ☑ D ☐ (circle one)
Telephone No.: 704-872-7686 Fax No.: 704-872-0248

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: Johnny Burr (Well Driller) Date: 09/21/15

If D Level Driller, provide supervising driller's name:

DHEC 1903 (07/2003) COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

DHEC — PROMOTE PROTECT PROSPER

1. WELL OWNER INFORMATION:
Name: SANTEE COOPER (last) (first)
Address: ONE RIVERWOOD DRIVE
City: MONCKS CORNER State: SC Zip: 29461
Telephone: Work: Home:

2. LOCATION OF WELL: SC **COUNTY:** BERKELEY
Name: CROSS GENERATING STATION
Street Address: 553 CROSS STATION ROAD
City: PINEVILLE Zip: 29468
Latitude: 33° 23' 10.94" Longitude: 80° 06' 56.66"

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:** CLF1B-4

4. ABANDONMENT: ☐ Yes ☑ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
BLACK TOPSOIL	3.0	3.0
ORANGE SANDY CLAY	5.0	8.0
TAN CLAY/SHELLS	14.0	22.0
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
BENTONITE SEAL FROM 6.0 TO 9.0 FEET

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other AUGER

7. PERMIT NUMBER:

8. USE:
☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) 22.0 ft. Date Started: 09/15/15 Date Completed: 09/15/15

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2 INCH
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
2.0 in. to 12.0 ft. depth
_____ in. to _____ ft. depth
Height: Above ☑ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: SCH 40 PVC Diam.: 2 INCH
Slot/Gauge: .010 Length: 10.0 FEET
Set Between: 12.0 ft. and 22.0 ft. NOTE: MULTIPLE SCREENS
_____ ft. and _____ ft. USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☑ No

12. STATIC WATER LEVEL 8.0 ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☑ Yes ☐ No
Installed from 9.0 ft. to 22.0 ft.
Effective size 1.43 Uniformity Coefficient 1.30

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☐ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0.0 ft. to 6.0 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P._____ Volts_____ Length of drop pipe ___ ft. Capacity ___ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: JOHNNY BURR **CERT. NO.:** 01740
Address: (Print) 176 COMMERCE BLVD
STATESVILLE, NC 28625
Level: A ☐ B ☐ C ☑ D ☐ (circle one)
Telephone No.: 704-872-7686 Fax No.: 704-872-0248

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: Johnny Burr (Well Driller) Date: 09/21/15

If D Level Driller, provide supervising driller's name:

DHEC 1903 (07/2003) **COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)**

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

DHEC — PROMOTE PROTECT PROSPER

1. WELL OWNER INFORMATION:
Name: SANTEE COOPER (last) (first)
Address: ONE RIVERWOOD DRIVE
City: MONCKS CORNER State: SC Zip: 29461
Telephone: Work: Home:

2. LOCATION OF WELL: SC **COUNTY:** BERKELEY
Name: CROSS GENERATING STATION
Street Address: 553 CROSS STATION ROAD
City: PINEVILLE Zip: 29468
Latitude: 33° 23' 10.94" Longitude: 80° 06' 56.66"

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:** CLF1B-5

4. ABANDONMENT: ☐ Yes ☑ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
BLACK TOPSOIL	2.0	2.0
ORANGE SANDY CLAY	6.0	8.0
GRAY CLAYEY SAND	4.0	12.0
WHITE/YELLOW SAND	4.0	16.0
GRAY SAND/SHELLS	6.0	22.0
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
BENTONITE SEAL FROM 8.0 TO 10.0 FEET

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other AUGER

7. PERMIT NUMBER:

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) 22.0 ft. Date Started: 09/15/15 Date Completed: 09/15/15

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2 INCH
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
2.0 in. to 12.0 ft. depth
_____ in. to _____ ft. depth
Height: Above ☑ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: SCH 40 PVC Diam.: 2 INCH
Slot/Gauge: .010 Length: 10.0 FEET
Set Between: 12.0 ft. and 22.0 ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☑ No

12. STATIC WATER LEVEL 8.0 ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☑ Yes ☐ No
Installed from 10.0 ft. to 22.0 ft.
Effective size 1.43 Uniformity Coefficient 1.30

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☐ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0.0 ft. to 8.0 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P._____ Volts_____ Length of drop pipe ___ ft. Capacity ___ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: JOHNNY BURR **CERT. NO.:** 01740
Address: (Print) 176 COMMERCE BLVD
STATESVILLE, NC 28625
Level: A ☐ B ☐ C ☑ D ☐ (circle one)
Telephone No.: 704-872-7686 Fax No.: 704-872-0248

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.
Signed: Johnny Burr Well Driller Date: 09/21/15

If D Level Driller, provide supervising driller's name:

DHEC 1903 (07/2003) **COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)**

DHEC
PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name: SANTEE COOPER (last) (first)
Address: ONE RIVERWOOD DRIVE
City: MONCKS CORNER State: SC Zip: 29461
Telephone: Work: Home:

2. LOCATION OF WELL: SC **COUNTY:** BERKELEY
Name: CROSS GENERATING STATION
Street Address: 553 CROSS STATION ROAD
City: PINEVILLE Zip: 29468
Latitude: 33° 23' 10.94" Longitude: 80° 06' 56.66"

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:** POZ-6

4. ABANDONMENT: ☐ Yes ☑ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
TAN GRAVEL	3.0	3.0
TAN SANDY CLAY	2.0	5.0
TAN/BROWN SAND	2.0	7.0
WHITE/GRAY SAND	1.0	8.0
TAN CLAYEY SAND	7.0	15.0
LIGHT GRAY SAND/SHELLS	3.5	18.5
GRAY STONE/SHELLS	3.5	22.0
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
BENTONITE SEAL FROM 7.0 TO 10.0 FEET

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other AUGER

7. PERMIT NUMBER:

8. USE:
☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) 22.0 ft. Date Started: 09/16/15 Date Completed: 09/16/15

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2 INCH
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
2.0 in. to 12.0 ft. depth
_____ in. to _____ ft. depth
Height: Above ☑ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: SCH 40 PVC Diam.: 2 INCH
Slot/Gauge: .010 Length: 10.0 FEET
Set Between: 12.0 ft. and 22.0 ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☑ No

12. STATIC WATER LEVEL 8.0 ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☑ Yes ☐ No
Installed from 10.0 ft. to 22.0 ft.
Effective size 1.43 Uniformity Coefficient 1.30

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☐ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0.0 ft. to 7.0 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: _____ ft. _____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P._____ Volts_____ Length of drop pipe ___ ft. Capacity ____ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: JOHNNY BURR **CERT. NO.:** 01740
Address: (Print) 176 COMMERCE BLVD
STATESVILLE, NC 28625
Level: A ☐ B ☐ C ☑ D ☐ (circle one)
Telephone No.: 704-872-7686 Fax No.: 704-872-0248

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: Johnny Burr (Well Driller) Date: 09/21/15

If D Level Driller, provide supervising driller's name:

DHEC 1903 (07/2003) **COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)**

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

DHEC — PROMOTE PROTECT PROSPER

1. WELL OWNER INFORMATION:
Name: SANTEE COOPER (last) (first)
Address: ONE RIVERWOOD DRIVE
City: MONCKS CORNER State: SC Zip: 29461
Telephone: Work: Home:

2. LOCATION OF WELL: SC **COUNTY:** BERKELEY
Name: CROSS GENERATING STATION
Street Address: 553 CROSS STATION ROAD
City: PINEVILLE Zip: 29468
Latitude: 33° 23' 10.94" Longitude: 80° 06' 56.66"

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:** POZ-7

4. ABANDONMENT: ☐ Yes ☑ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
BLACK TOPSOIL	1.0	1.0
TAN/ORANGE SANDY CLAY	4.0	5.0
BROWN SANDY CLAY	1.0	6.0
WHITE CLAYEY SAND	4.0	10.0
ORANGE SANDY CLAY	4.0	14.0
YELLOW SAND	6.0	20.0
GRAY STONE/SHELLS	2.0	22.0
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
BENTONITE SEAL FROM 7.0 TO 9.0 FEET

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other AUGER

7. PERMIT NUMBER:

8. USE:
☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) 22.0 ft. Date Started: 09/16/15 Date Completed: 09/16/15

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2 INCH
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
2.0 in. to 12.0 ft. depth
_____ in. to _____ ft. depth
Height: Above ☑ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: SCH 40 PVC Diam.: 2 INCH
Slot/Gauge: .010 Length: 10.0 FEET
Set Between: 12.0 ft. and 22.0 ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☑ No

12. STATIC WATER LEVEL 8.0 ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☑ Yes ☐ No
Installed from 9.0 ft. to 22.0 ft.
Effective size 1.43 Uniformity Coefficient 1.30

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☐ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0.0 ft. to 7.0 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P._____ Volts_____ Length of drop pipe ___ ft. Capacity ____ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: JOHNNY BURR **CERT. NO.:** 01740
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Telephone No.: 704-872-7686 Fax No.: 704-872-0248

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: Johnny Burr (Well Driller) Date: 09/21/15

If D Level Driller, provide supervising driller's name:

DHEC 1903 (07/2003) COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

APPENDIX C

Certification Statements

SANTEE COOPER
CROSS GENERATING STATION BOTTOM ASH POND
GROUNDWATER MONITORING SYSTEM CERTIFICATION

Santee Cooper operates the existing coal combustion residuals (CCR) management unit referred to as the Bottom Ash Pond at Cross Generating Station located in Pineville, South Carolina. This CCR unit is considered subject to the CCR Rule since it was active as of the effective date of the CCR Rule. This document addresses the requirements of §257.91 *Groundwater Monitoring Systems*, specifically section §257.91(f), of the US Environmental Protection Agency's (EPA's) Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, 40 CFR Part 257 (CCR Rule) effective 19 October 2015. This document serves as certification that the Bottom Ash Pond groundwater monitoring system has been designed and constructed to meet the requirements of §257.91. This certification has been prepared based in part upon information made accessible by Santee Cooper pursuant to §257.91(b) and (e)(1), including a detailed hydrogeologic study conducted by Garrett & Moore in March 2012.

The groundwater monitoring system at the Bottom Ash Pond exceeds the minimum requirement for one upgradient and three downgradient monitoring wells pursuant to §257.91(c). The actual number of wells used in the groundwater monitoring system for the Bottom Ash Pond includes two upgradient and five downgradient wells. This number of wells is sufficient and appropriate to characterize the quality of groundwater in the uppermost aquifer from background groundwater not affected by leakage from the CCR unit and groundwater passing the waste boundary of the Bottom Ash Pond based on site-specific conditions. The groundwater monitoring system was designed under my direction and constructed by a South Carolina certified well driller to monitor the uppermost aquifer at the Bottom Ash Pond.

Pursuant to CFR Title 40 Chapter I Subchapter I Part 257 Subpart D §257.91(f), I certify that the groundwater monitoring system for the Bottom Ash Pond has been designed and constructed to meet the requirements of §257.91. The certification submitted is, to the best of my knowledge accurate and complete.

Signature

October 16, 2017
Date

Jeffrey A. Klaiber, P.E
Name

22576
Professional Engineer Registration Number

SANTEE COOPER
CROSS GENERATING STATION CLASS 2 LANDFILL
GROUNDWATER MONITORING SYSTEM CERTIFICATION

Santee Cooper operates the existing coal combustion residuals (CCR) management unit referred to as the Class 2 Landfill at Cross Generating Station located in Pineville, South Carolina. This CCR unit is considered subject to the CCR Rule since it was active as of the effective date of the CCR Rule. This document addresses the requirements of §257.91 *Groundwater Monitoring Systems*, specifically section §257.91(f), of the US Environmental Protection Agency's (EPA's) Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, 40 CFR Part 257 (CCR Rule) effective 19 October 2015. This document serves as certification that the Class 2 Landfill groundwater monitoring system has been designed and constructed to meet the requirements of §257.91. This certification has been prepared based in part upon information made accessible by Santee Cooper pursuant to §257.91(b) and (e)(1), including a detailed hydrogeologic study conducted by Garrett & Moore in March 2012.

The groundwater monitoring system at the Class 2 Landfill exceeds the minimum requirement for one upgradient and three downgradient monitoring wells pursuant to §257.91(c). The actual number of wells used in the groundwater monitoring system for the Class 2 Landfill includes two upgradient and three downgradient wells. This number of wells is sufficient and appropriate to characterize the quality of groundwater in the uppermost aquifer from background groundwater not affected by leakage from the CCR unit and groundwater passing the waste boundary of the Class 2 Landfill based on site-specific conditions. The groundwater monitoring system was designed under my direction and constructed by a South Carolina certified well driller to monitor the uppermost aquifer at the Class 2 Landfill.

Pursuant to CFR Title 40 Chapter I Subchapter I Part 257 Subpart D §257.91(f), I certify that the groundwater monitoring system for the Class 2 Landfill has been designed and constructed to meet the requirements of §257.91. The certification submitted is, to the best of my knowledge accurate and complete.

Signature

October 16, 2017
Date

Jeffrey A. Klaiber, P.E
Name

22576
Professional Engineer Registration Number

SANTEE COOPER
CROSS GENERATING STATION CLASS 3 LANDFILL
GROUNDWATER MONITORING SYSTEM CERTIFICATION

Santee Cooper operates the existing coal combustion residuals (CCR) management unit referred to as the Class 3 Landfill at Cross Generating Station located in Pineville, South Carolina. This CCR unit is considered subject to the CCR Rule since it was active as of the effective date of the CCR Rule. This document addresses the requirements of §257.91 *Groundwater Monitoring Systems*, specifically section §257.91(f), of the US Environmental Protection Agency's (EPA's) Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, 40 CFR Part 257 (CCR Rule) effective 19 October 2015. This document serves as certification that the Class 3 Landfill groundwater monitoring system has been designed and constructed to meet the requirements of §257.91. This certification has been prepared based in part upon information made accessible by Santee Cooper pursuant to §257.91(b) and (e)(1), including a detailed hydrogeologic study conducted by Garrett & Moore in March 2012.

The groundwater monitoring system at the Class 3 Landfill exceeds the minimum requirement for one upgradient and three downgradient monitoring wells pursuant to §257.91(c). The actual number of wells used in the groundwater monitoring system for the Class 3 Landfill includes two upgradient and five downgradient wells. This number of wells is sufficient and appropriate to characterize the quality of groundwater in the uppermost aquifer from background groundwater not affected by leakage from the CCR unit and groundwater passing the waste boundary of the Class 3 Landfill based on site-specific conditions. The groundwater monitoring system was designed under my direction and constructed by a South Carolina certified well driller to monitor the uppermost aquifer at the Class 3 Landfill.

Pursuant to CFR Title 40 Chapter I Subchapter I Part 257 Subpart D §257.91(f), I certify that the groundwater monitoring system for the Class 3 Landfill has been designed and constructed to meet the requirements of §257.91. The certification submitted is, to the best of my knowledge accurate and complete.

Signature

October 16, 2017
Date

Jeffrey A. Klaiber, P.E
Name

22576
Professional Engineer Registration Number