SOUTH CAROLINA ELECTRIC & GAS

SCANA®
POWER FOR LIVING

POST-CLOSURE PLAN

FOR THE

WILLIAMS STATION
CLASS III LANDFILL

BERKELEY COUNTY, SOUTH CAROLINA

SEPTEMBER 2016

SOUTH CAROLINA
GARRETT AND MOORE, INC
No. C3371
CERTIFICATE OF AUTHORIZATION

GARRETT & MOORE
Engineering for the Power and Waste Industries

SOUTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
22411
9/26/16
J. STEFAN BRAY

1 OVERVIEW

The EPA Administrator, Gina McCarthy, signed the Disposal of Coal Combustion Residuals from Electric Utilities final rule on December 19, 2014, and it was published in the Federal Register (FR) on April 17, 2015. The regulations provide a comprehensive set of requirements for the safe disposal of coal combustion residuals (CCRs), commonly known as coal ash, from coal-fired power plants. The rule will be administered as part of the Resource Conservation and Recovery Act [RCRA, 42 United States Code (U.S.C.) §6901 et seq.], using the Subtitle D approach.

South Carolina Electric & Gas (SCE&G) is subject to the CCR Rule. Based on SCE&G's review of the rule, the **Class Three Landfill** at **SCE&G Williams Station** has been determined to be an existing CCR landfill subject to the CCR rule requirements.

2 PURPOSE

The purpose of this report is to document that the Williams Station Class Three Landfill Post-Closure Plan meets the requirements of CCR rule §257.104 – *Post-Closure Plan.*

3 APPLICABLE REGULATIONS

CCR rule §257.104 – *Post-Closure Plan* states the following:

(d) Written post-closure plan. (1) Content of the plan. The owner or operator of a CCR unit must prepare a written post-closure plan that includes, at a minimum, the information specified in paragraphs (d)(1)(i) through (d)(1)(iii) of this section.

> (i) A description of the monitoring and maintenance activities required in paragraph (b) of this section for the CCR unit, and the frequency at which these activities will be performed;
>
> (ii) The name, address, telephone number, and e-mail address of the person or office to contact about the facility during the post-closure care period; and
>
> (iii) A description of the planned uses of the property during the post-closure period. Post-closure use of the property shall not disturb the integrity of the final cover, liner(s), or any other component of the containment system, or the function of the monitoring systems unless necessary to comply with the requirements in this subpart. Any other disturbance is allowed if the owner or operator of the CCR unit demonstrates that disturbance of the final cover, liner, or other component of the containment system, including any removal of CCR, will not increase the potential threat to human health or the environment. The demonstration must be certified by a qualified professional engineer, and notification shall be provided to the State Director that the demonstration has been placed in the operating record and on the owners or operator's publicly accessible internet site.

Regarding the monitoring and maintenance activities required in paragraph in paragraph (d)(1)(i) above, rule §257.104(b) states the following:

(b) Post-closure care maintenance requirements. Following closure of the CCR unit, the owner or operator must conduct post-closure care for the CCR unit, which must consist of at least the following:

> (1) Maintaining the integrity and effectiveness of the final cover system, including making repairs to the final cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the final cover;
>
> (2) If the CCR unit is subject to the design criteria under § 257.70, maintaining the integrity and effectiveness of the leachate collection and removal system and operating the leachate collection and removal system in accordance with the requirements of § 257.70; and
>
> (3) Maintaining the groundwater monitoring system and monitoring the groundwater in accordance with the requirements of §§ 257.90 through 257.98.

4 CLASS THREE LANDFILL DESCRIPTION

Williams Station is coal-fired electric generation plant electric generation plant located in Bushy Park, Berkeley County, South Carolina. The Class Three Landfill associated with Williams Station is located on SC 9 approximately 5 miles east of the intersection of Highway 52 and SC 9.

Within the boundary of the Williams Station landfill property, SCE&G owns and operates Phase 1, consisting of Cell 1 through Cell 4, of the Class Three Landfill. The Phase 1 disposal unit was constructed in accordance with the construction permit (permit LF3-00001) issued from the South Carolina Department of Health and Environmental Control (DHEC) on September 30, 2008. The Phase 1 disposal unit was placed into operation in accordance with an operation approval issued by DHEC on June 23, 2010.

5 POST-CLOSURE PLAN

A Post-Closure Plan has been prepared and regulatory approved for the post-closure care of the Class Three Landfill. The Post-Closure Plan was approved by SCDHEC Bureau of Land and Waste Management in September 2008 (solid waste permit # LF3-00001). A copy of the approved Post-Closure Plan is presented in Attachment 1.

The Post-Closure Plan includes a description of the monitoring and maintenance activities and the frequency at which these activities will be performed, to include discussions of care procedures for maintaining the integrity and effectiveness of the final cover system, as well as maintaining the groundwater monitoring system and monitoring the groundwater. The Groundwater Sampling and Analysis Plan, prepared accordance with the requirements of §§ 257.90 through 257.98, is presented in

the Closure Plan Addendum, which is presented in Appendix 2. A discussion of the requirements for maintaining the leachate collection removal system is also presented in the Closure Plan Addendum. The discussion presented in this paragraph inclusive of the Closure Plan Addendum satisfies the requirement of §257.104 (d)(1) paragraph (i).

The Post-Closure Plan also includes name and address of the contact person to contact about the facility during the post-closure care period. The telephone number and e-mail address of the contact person is presented in the Closure Plan Addendum (Attachment 2). The discussion presented in this paragraph inclusive of the Closure Plan Addendum satisfies the requirement of §257.104 (d)(1) paragraph (ii).

The Post-Closure Plan includes a description of the end use of the property and satisfies the requirement of §257.104 (d)(1) paragraph (iii).

8 CONCLUSION

Based on the discussions above, the Williams Station Class Three Landfill Post-Closure Plan meets the requirements of CCR rule §257.104 – *Post-Closure Plan.*

ATTACHMENT 1

POST-CLOSURE PLAN

Section 8 - Post-Closure Plan Contents

Section 8

Section 8
Post-Closure Plan

8.1 Introduction

This section is prepared in accordance with R.61-107.16.61 of the South Carolina Department of Health and Environmental Control (DHEC or Department) Department of Solid Waste that requires owners/operators of industrial solid waste landfill (ISWLF) units to prepare a post-closure plan. The purpose of the plan is to provide the necessary information for preserving the integrity of the landfill facility in its post-closure life. This post-closure plan specifically addresses maintenance activities for the closure cap, ground water monitoring wells, and erosion and sedimentation control system to be installed at the Highway 52 ISWLF. This plan also addresses certification and financial assurance requirements.

Post-closure care will begin immediately following final closure of the landfill. Post-closure care may be decreased from the minimum time period of 30 years specified in the regulations if SCE&G can demonstrate that the reduced period will pose no threat to human health or the environment. However, the Department reserves the right to increase the post-closure care period if it is deemed necessary to protect human health and the environment.

8.2 Maintenance and Monitoring Activities

Post-closure maintenance and monitoring activities for the Highway 52 ISLWF will include the following activities:

8.2.1 Final Cover (Cap) System

Inspection of the closure cap will take place quarterly. The inspection will consist of a field observation survey of the entire closure cap. Items of concern to be noted by the inspector include but are not limited to: signs of erosion (ruts, sediment deposits, etc.), patches of stressed or dead vegetation, animal burrows, recessed areas or ponding, upheaving, leachate seepage stains and/or flowing leachate, cracks in the cap, and tree saplings (especially species with tap roots). Following each inspection, a summary report of the condition of the cap and the items of concern should be recorded in the post-closure logbook of the facility. Areas that require further attention should be photographed and delineated on a map of the facility. These items should also be entered in the logbook. Since post-closure inspection personnel will most likely change during the post-closure period, the post-closure log book should be keep in a standardized format that allows for new inspection personnel to easily review the results of past post-closure inspections of the site.

Action should be taken immediately to address any items of concern identified during the inspection. Obvious repair items should be performed under the supervision of the post-closure maintenance manager. If an item of concern requires further study to determine a course of action, the engineer responsible for closure design should be contacted for consultation.

The vegetative cover should be mowed approximately twice a year to suppress weed and brush growth. If vegetative cover is not adequate in any particular area, fertilizer should be applied and the area re-seeded in order to re-establish vegetation. Insecticides may be used to eliminate insect populations that are detrimental to the

vegetation. Animal burrows and eroded or depressed areas should be filled in with compacted soil and reseeded.

8.2.2 Groundwater Monitoring Wells

Inspection of the ground water monitoring wells will take place semi-annually during sampling events. The inspection will consist of verifying the condition of the monitoring wells to ensure that they are providing representative samples of the ground water being collected. The inspector should note the following:

1) The total depth of the well should be recorded every time a water sample is collected or a water level reading is taken to check if sediment has accumulated at the bottom. If sediment build-up has occurred, the sediment should be removed by pumping or bailing.
2) If turbid samples are collected from a well, redevelopment of the well will be necessary.
3) The aboveground protective casing should be inspected for damage. The protective casing should be of good structural integrity and free of any cracks or corrosion. The lockable cover and lock should also be checked at this time.
4) The surface seals should be inspected for settling and cracking. If the seal is damaged in any way, the seal should be replaced.
5) The well casing and cap should be inspected. The casing and cap should be of good structural integrity and free of any cracks or corrosion. Any debris should be removed from around the cap to prevent it from entering the well.

The condition of the ground water monitoring system should be recorded in the post-closure logbook following each sampling event. In the event a decision is made to abandon and replace a well, abandonment should generally be accomplished by removing the existing casing and well screen, and grouting the borehole to surface grade using a Portland Type I cement in accordance with the South Carolina Well Standards and Regulations R.61-71.10. The replacement well should be constructed in close proximity to the abandoned well, in accordance with previous well specifications. The location of the original well should be permanently marked and labeled. Prior to abandonment, SCDHEC will be notified of any proposed abandonment/replacement activities.

Monitoring of the groundwater wells shall be conducted as described in the approved Groundwater Monitoring Plan.

8.3 Erosion and Sedimentation Control System

Inspection of the erosion and sedimentation control system should occur quarterly and after major storm events. During each inspection, the elements of the system including ditches, pipes, ponds, and inlet/outlet structures should be checked for obstructions and damage. The ditches should be inspected for obstructions, erosion of side slopes, loss of vegetative cover, shifting of riprap, excessive buildup of sediment, or any other item that may prevent the proper functioning of the ditch. Drainage piping should be checked for blockages and the inlets/outlets should be inspected for undercutting and rutting.

The sediment level in the detention ponds should be measured to determine if removal is required. The condition of the riser/barrel should be checked including making sure adequate gravel surrounds the riser and that the barrel is not latent with sediment. The berms of each pond should be inspected for stability. Following each inspection, a summary report should be entered in the post-closure logbook along with photographs of any items of concern.

Maintenance and/or repairs should be performed as prescribed by the inspectors review.

8.4 Certification of Post-Closure

Following completion of the post-closure care period, a certification verifying that post-closure care was performed in accordance with the post-closure plan and signed by a registered professional engineer will be made part of the operating record. SCE&G will notify the Department that the certification has been placed in the operating record.

8.5 Name of Individual Responsible for Post-Closure Maintenance of the Site:

Jean-Claude Younan

South Carolina Electric & Gas Co.

Mail Code P05

Columbia, South Carolina 29218

8.6 Planned Use of Landfill After Closure

There are no current planned uses for the landfill site after closure. The property will remain SCE&G property, maintained by the SCE&G, with public access prohibited. Any post-closure use of the property shall not disturb the integrity of the final cover, liner(s), or any other components of the containment system, or the function of the monitoring systems unless necessary to comply with the requirements in Part 61. The Department may approve any other disturbance of the containment system if the owner or operator demonstrates that disturbance of the final cover, liner or other component of the containment system, including any removal of waste, will not increase the potential threat to human health or the environment.

8.7 Financial Assurance

SCE&G will submit a financial assurance package to the Department. A detailed cost estimate for post-closure care has been prepared and is included at the end of this section. The cost estimate will be included in the financial assurance package. The cost estimate is based on 30 years of post-closure care. Each year, the estimate will be adjusted for inflation and any changes to the activities of post-closure care. Owner demonstration of financial assurance shall be provided in accordance with the allowable mechanisms provided in R.61-107.19, Part I, Section E.4.

ENGINEER'S OPINION OF COSTS
FOR 30-YEAR POST-CLOSURE CARE OF
WILLIAMS STATION'S HIGHWAY 52 LANDFILL

Item Number	Description	Estimated Quantity	Unit Price	Extended Total	Annual Quantity	Annual Costs	30 Yr Cost
1	Administration/Recordkeeping	40 Hrs/Yr	$ 100.00 /HR	$ 4,000.00	1 /Yr	$ 4,000.00	$ 120,000.00
2	Groundwater Monitoring	6 EA	$ 850.00 /EA	$ 5,100.00	2 /Yr	$ 10,200.00	$ 306,000.00
3	Stormwater Samples	3 EA	$ 1,500.00 /EA	$ 4,500.00	2 /Yr	$ 9,000.00	$ 270,000.00
4	Final Cover System Maintenace (mowing)	109 AC	$ 100.00 /AC	$ 10,900.00	2 /Yr	$ 21,800.00	$ 654,000.00
5	Stormwater Structures Repair	1 EA	$ 7,500.00 /EA	$ 7,500.00	3 /Yr	$ 22,500.00	$ 675,000.00
6	Final Cover System Repair	1 EA	$ 10,000.00 /AC	$ 10,000.00	5 /Yr	$ 50,000.00	$ 1,500,000.00
7	Groundwater Monitoring Well Repair/Replace	1 EA	$ 5,000.00 /EA	$ 5,000.00	1 /Yr	$ 5,000.00	$ 150,000.00
				Total Post Closure Cost		$122,500.00	**$ 3,675,000.00**

All cost estimates assume third-party general contractor to perform the work.

ATTACHMENT 2

POST-CLOSURE PLAN ADDENDUM

The purpose of this document is to supplement the Cope Station Class Three Landfill Post-Closure Plan (as presented in the solid waste permit application document, prepared September 2007, revised August 2008, and SCDHEC-approved September 2008, permit# LF3-00001) to provide any information to satisfy the requirements of CCR rule §257.104 (b). This document serves as an Addendum Supplement to the Post-Closure Plan.

A. GROUNDWATER MONITORING

CCR rule §257.104 (b)(3) states the owner or operator must conduct post-closure care for the CCR unit to include maintaining the groundwater monitoring system and monitoring the groundwater in accordance with the requirements of §§ 257.90 through 257.98.

Maintenance of the groundwater monitoring system is addressed in the Post-Closure Plan. Monitoring of the groundwater is to be performed in accordance with the Groundwater Sampling and Analysis Plan prepared for the facility. A copy of the Groundwater Sampling and Analysis Plan is provided as an attachment to this addendum document.

B. LEACHATE COLLECTION AND REMOVAL SYSTEM

CCR rule §257.104 (b)(3) states the owner or operator must conduct post-closure care for the CCR unit to include maintaining the integrity and effectiveness of the leachate collection and removal system. The following provides a discussion of the leachate collection and removal system maintenance procedures:

The leachate collection system will be maintained and operated in accordance with the approved *Operation and Maintenance Plan* for the period designated for post-closure care unless otherwise approved by the Department.

The leachate collection system (i.e. clean-outs, exposed piping, and wastewater ponds) will be inspected on a quarterly basis. Flows to the containment facility (wastewater ponds) will be observed and monitored. Any disruptions will be noted and recorded and maintained in the logbook. For contingency or in the event of an interruption to the collection system, the leachate collection lines shall be viewed via camera to identify any visible issues that may exist and or jet cleaned to remove any blockage to the system and monitored going forward.

The clean-outs shall be inspected for accessibility and performance. The exposed portion of each clean out should be checked for damage and the cap should be checked for proper operation.

If problems with the leachate collection system are discovered, or abnormally high or low flows are observed, evaluation and repairs shall be initiated immediately.

C. CONTACT PERSON DURING THE POST-CLOSURE CARE PERIOD

As presented in the Post-Closure Plan, the contact person during post-closure care period is:

Jean-Claude Younan
South Carolina Electric & Gas
220 Operation Way Mail Code C221
Cayce, SC 29033

The contact person's (above) phone number is 803-217-9617. The contact person's e-mail address is jyounan@scana.com

Nautilus Geologic Consulting, PLLC

Groundwater Sampling and Analysis Plan
EPA CCR Rule Compliance Monitoring Wells

Williams Generating Station:
Highway 52 Class Three Landfill

May 2016

Prepared by:

Brian S. Boutin, PG
Nautilus Geologic Consulting, PLLC

Stefan Bray, PE
Garrett & Moore, Inc.

Prepared for:
South Carolina Electric & Gas Company
220 Operation Way
Mail Code C221
Cayce, SC 29033

11112 BRANDING IRON PLACE, WENDELL, NC 27591
919-366-3663 Office • 919-995-0363 Cell • nautilusgeocon@gmail.com

Table of Contents

FIGURES

TABLES

APPENDICES

11112 BRANDING IRON PLACE, WENDELL, NC 27591
919-366-3663 Office • 919-995-0363 Cell • nautilusgeocon@gmail.com

1.0 INTRODUCTION

This document presents a Groundwater Sampling and Analysis Plan (SAP) to function as a guidance document for groundwater quality monitoring in compliance with the EPA CCR Rule (40 CFR Part 257.93) at the Williams Generating Station Highway 52 Class Three Landfill in Goose Creek, Berkeley County, South Carolina (**Figure 1**).

This document presents standard protocols for field data collection, as well as collection of representative groundwater samples. Protocols are presented that cover all field data and sample collection procedures to be employed, sample preservation and shipment, chain of custody control, as well as quality assurance and quality control, and chain-of-custody procedures.

Specific monitoring requirements are presented in the following sections and include:

- A site map showing all monitoring well locations.
- A list of all monitoring well locations.
- Sampling frequency.
- Laboratory analytical parameters and methods.
- Required parameters to be measured in the field.
- Sampling methods to be employed for all monitoring well locations.
- Standard protocols for field data collection.
- Field equipment decontamination procedures.
- Standard protocols for collection of representative groundwater samples.
- Quality Assurance/Quality Control requirements.
- Chain of custody procedures.

2.0 GROUNDWATER SAMPLING

A site map showing the locations of the EPA CCR Rule compliance monitoring wells at the Williams Station Highway 52 Class Three Landfill is presented as **Figure 2**. Monitoring well construction specifications, as well as PVC casing elevations and northing and easting location data (SC State Plane Coordinate System) for the monitoring wells are presented in **Table 1**. Groundwater samples are to be collected for laboratory analysis from EPA CCR Rule compliance monitoring wells GW-20 through GW-26, GW-22D and GW-23D during each monitoring event.

Site information shall be collected prior to groundwater sampling (e.g., well condition, well logs, construction drawings, historic water level information, COCs, groundwater flow direction, etc.) to ensure the use of appropriate purging and sample collection techniques. A scaled site map on which the locations of the wells scheduled for sampling and all important site features are shown shall be available for review and use in the field. Prior sampling information shall be reviewed, including field notes, typical stability measurements and purge rates, indicating typical conditions at the wells. Health and safety issues, worker protection requirements, and handling of purge waters in accordance with site specific requirements shall be identified and reviewed prior to sampling.

Field documentation shall be made in a bound field logbook. All pages in the logbook shall be consecutively numbered and include, at a minimum, the date, project name, personnel on site for the sampling event, weather conditions at the time of sampling, and a description of the scope of work to be conducted. Specific information regarding sampling at each monitoring well (e.g., purge volumes, indicator parameter values, etc.) shall also be recorded on separate field data sheets. An example field data sheet is included in **Appendix A**.

Prior to sampling, all monitoring wells shall be inspected to ensure that they are structurally sound and in compliance with the SCDHEC and EPA well specification requirements. Each well shall include a well identification plate which documents the construction information about the well, including well identification, date of installation, total depth, screen interval, sand pack interval, construction material and diameter. The well casing shall include a reference mark to be used for depth to groundwater elevation measurements. The well casing should be intact, capped and locked, the well pad should be intact and the well should be vertical, and immobile. If the condition of any well is found to be in a state of deterioration, these conditions shall be noted in the bound field logbook and a picture taken to document the condition.

2.1 Sampling Procedures

Groundwater sampling procedures will generally consist of the following: (1) measurement of depth to groundwater and total well depth; (2) well purging; and, (3) sample withdrawal and collection. Monitoring wells that are determined to have very low purge rates such that the wells purge dry under typical conditions shall be purged early in the day when samples are to be collected. This will allow adequate time for groundwater recovery, so that sampling is conducted within 24-hours of purging in all cases.

All monitoring equipment used in the field shall be operated and calibrated in accordance with the manufacturer's instructions. Equipment failing to meet manufacturer's minimum specifications shall be removed from service immediately and kept out of service until the problem is identified and resolved. All field equipment will be stored in a clean, controlled environment (as necessary) prior to use. Reusable equipment will be decontaminated as soon as reasonably possible after use in accordance with the procedures outlined in **Section 2.1.4**. To minimize the potential for cross-contamination, clean disposable latex or nitrile gloves will be worn while handling equipment and samples and shall be changed between each well and discarded in an appropriate manner. Supplies of clean, unused gloves and bottles of distilled/deionized water for decontamination shall be stored in clean re-sealable containers between uses and during transport in the field.

2.1.1 Static Groundwater Level and Total Depth Measurements

The total depth of each well is required to calculate the volume of standing water in the well and to document the amount of sediment accumulation that may be present in the well. Total well depths and depth to groundwater must be measured to the nearest one hundredth of a foot using an electronic water level meter with an indicator tape graduated in hundredths of a foot. The total well depth should be measured once per year for the life of the well or when the well produces results inconsistent with historical data. Total well depth may also be measured on alternate dates in between sampling dates.

Static groundwater-level data shall be used to monitor site hydrogeologic conditions and to calculate the volume of water to be purged prior to sampling. All groundwater level measurements must be measured to the nearest one hundredth of a foot using the electronic water level meter as described above. Each well shall have a permanent, easily identified reference point on the top of casing (TOC) from which all water level

measurements will be made. The reference point will be permanently marked and the elevation determined by a registered land surveyor to an accuracy of 0.01 feet. All measurements shall be made in reference to the TOC elevation. The time and date of measurement, point of reference, measurement method, depth to groundwater, and any calculations must be properly recorded on the field sampling sheet and in the bound field logbook. The depth to groundwater must be measured prior to well purging and sampling on the day of sampling. The well cap will be removed and the well allowed to stand open for a sufficient period of time prior to measuring the depth to groundwater to allow the groundwater in the well to equilibrate to atmospheric pressure. In addition, information such as tidal cycle, identification of pumping wells operating near the well or site, rainfall data, barometric pressure, etc. shall be evaluated either as routine information or determined to be inapplicable to the site.

The probe and tape of the electronic water level meter must be decontaminated prior to and following each use with a non-phosphate soap and water wash followed in order by multiple rinses with tap water and distilled/deionized water.

At the Williams Station Highway 52 Class Three Landfill, the following monitoring wells are to be gauged for water levels during each monitoring event: GW-10 through GW-16; GW-20 through GW-26; and GW-22D and GW-23D.

2.1.2 Well Purging

Purging is the process of removing stagnant water from a monitoring well, immediately prior to sampling, causing its replacement by groundwater from the adjacent formation, which is representative of actual aquifer conditions. In order to determine when a well has been adequately purged, field personnel shall: 1) monitor the pH, specific conductance, temperature, turbidity, dissolved oxygen (DO) and oxidation-reduction potential (ORP) of the groundwater removed during purging; and 2) observe and record the volume of water removed.

Prior to initiating the purge, the amount of water standing in the water column (water inside the well riser and screen) shall be determined. To do this, the diameter of the well shall be determined and the water level and total depth of the well measured and recorded. Once this information is obtained, the volume of water to be purged can be determined using one of several methods. For example:

$V = 0.041\ d^*h$

Where: h = depth of water in feet

d = diameter of well in inches
V = volume of water in gallons

Alternatively, the volume may be determined using a casing volume per foot factor for the appropriate diameter well. The water level is subtracted from the total depth, providing the length of the water column.

With respect to volume, an adequate purge is normally achieved when three to five times the volume of standing water in the well has been removed. However, when using the low flow/low stress purging/sampling technique, parameter stabilization may be achieved prior to three well volumes being removed indicating that an adequate purge has been achieved and sample collection may commence. The field notes shall reflect the single well volume calculations or determinations, according to one of the above methods, and a reference to the appropriate multiplication of that volume (e.g., a minimum three well volumes) or parameter stabilization clearly identified as a purge volume goal. A five-gallon bucket marked with one-gallon increments will be used to contain purge water as a guide to determine the volume of water removed.

Field measurements shall be made using properly calibrated field test meters, operated and maintained in accordance with the manufacturer's instructions. Turbidity measurements will be collected using a separate field test meter. Field measurements collected during purging activities will be recorded in the field logbook and on well purging/groundwater sampling forms.

With respect to the groundwater chemistry, an adequate purge is achieved when the pH, specific conductance, and temperature of the groundwater have stabilized and the turbidity has either stabilized or is below 10 Nephelometric Turbidity Units (NTUs). If possible, depending on the purge method used, a flow-through cell shall be used in conjunction with field meters during purging to prevent groundwater from being exposed to ambient atmospheric conditions while field parameters are measured.

Stabilization occurs when pH measurements remain constant within 0.2 Standard Units (SU), the specific conductance varies no more than 10 percent, the temperature remains constant within 0.2° C and the turbidity either is below 10 NTUs or (if the turbidity cannot be reduced below 10 NTU) varies no more than 5 NTU for at least three consecutive readings. There are no criteria establishing how many sets of measurements are adequate for the determination of stability. If the calculated purge volume is small, the measurements should be taken frequently (e.g., every three to five

minutes) to provide a sufficient number of measurements to evaluate stability. If the purge volume is large, measurements taken every 15 minutes may be sufficient.

If, after three well volumes have been removed, the chemical parameters have not stabilized according to the above criteria, additional well volumes (up to five well volumes), shall be removed. If the parameters have not stabilized within five volumes, it is at the discretion of the field technician whether or not to collect a sample or to continue purging. If after five well volumes, pH and conductivity have been stabilized and the turbidity is still decreasing and approaching an acceptable level, additional purging should be considered to obtain the best sample possible. The conditions of sampling should be noted in the field logbook and on the well purging/groundwater sampling forms.

In some situations, even with slow purge rates, a well may be pumped or bailed dry (evacuated). In these situations, this generally constitutes an adequate purge and the well can be sampled following sufficient recovery (enough volume to allow filling of all sample containers). I t is not necessary that the well be evacuated three times before it is sampled. The pH, specific conductance, temperature, and turbidity shall be measured during collection of the sample from the recovered volume as the measurements of record for the sampling event.

Attempts should be made to avoid purging wells to dryness. This can be accomplished, for example, by slowing the purge rate. If a well is pumped dry, it may result in the sample being comprised partially of water contained in the sand pack, which may be reflective, at least in part, of initial, stagnant conditions. In addition, as water re-enters a well that is in an evacuated condition, it may cascade down the sand pack or the well screen, introducing soil fines into the water column.

Well purging shall begin in the existing, up gradient, natural background well and will proceed progressively to the detection monitoring wells from the up gradient area to the down gradient area. It is particularly important that wells be sampled as soon as possible after purging. If adequate volume is available, the well must be sampled immediately. If not, sampling should occur as soon as adequate volume has recovered.

Four methods of well purging are discussed below: portable peristaltic pump, dedicated bladder pump, submersible pump, and bailing. The method selected for purging will depend on the depth to groundwater and the yield of the monitoring well, among other factors.

2.1.2.1 Portable Peristaltic Pump

For those wells in which the static water level is less than 25 feet in total depth below the top of the well casing, low flow rate purging with a peristaltic pump is the preferred method. The peristaltic pump is a device designed to move water through suction produced by mechanical peristalsis. The pump may be powered from an internal NiCad battery or an external 12-volt DC source. The only materials that come in contact with the groundwater are the interior surfaces of the purging/sampling tube and the sample bottles. Dedicated or new polyethylene tubing and medical grade silicone tubing will be used for purging each well. If dedicated tubing is used, it should be replaced approximately every two years.

The purge/sample tube intake will be set at approximately the mid-point of the top half of the saturated screen interval, and at least 2-feet above the bottom of the well. Flow rates should not exceed the recharge rate of the aquifer. This is monitored by measuring the top of the water column with an electronic water level meter or similar device while pumping. The depth to water should be maintained within 0.05' of the static water depth during the purging process. The cumulative volume of water purged must be recorded on the purging/groundwater sampling forms each time field parameters are measured.

The discharge tube from the peristaltic pump shall be attached to a flow-through cell (if possible) equipped with a calibrated multi-parameter meter in which the temperature, pH, specific conductance, DO and ORP are measured during purging. The discharge tube from the flow-through cell will be used to collect water samples for measuring turbidity. Turbidity will be measured with a separate turbidity meter.

The need to containerize purge water will be based on the analytical results from the previous sampling events. Uncontaminated purge water will be discharged at least 20 feet down gradient of the well being sampled. Purge water which contains contaminant levels that are greater than the maximum contaminant level (MCL) may require alternate handling, collection, and disposal.

2.1.2.2 Dedicated Bladder Pump

A dedicated bladder pump is often used in cases where groundwater lifts greater than 25-feet are required, and is one of the preferred pumps for use in wells exhibiting low groundwater yield. Such pumps are powered by compressed gas and flow controller. Pneumatic bladder pumps operate via timed on/off cycles of compressed air that alternately squeezes the flexible bladder to displace water out of the pump, and releases it to allow the pump to refill by submergence, while minimizing disturbance that

could affect sample chemistry. Bladder pumps can accommodate low rates for extended times. The bladder prevents contact between the pump drive air and the groundwater sample, and the only materials that come in contact with the groundwater are the pump bladder, the interior surfaces of the dedicated purging/sampling tube and the sample bottles.

Flow rates should not exceed the recharge rate of the aquifer. This is monitored by measuring the top of the water column with an electronic water level meter or similar device while pumping. The depth to water should be maintained within 0.05' of the static water depth during the purging process. The cumulative volume of water purged must be recorded on the purging/groundwater sampling forms each time field parameters are measured.

The discharge tube from the bladder pump shall be attached to a flow-through cell (if possible) equipped with a calibrated multi-parameter meter in which the temperature, pH, specific conductance, DO and ORP are measured during purging. The discharge tube from the flow-through cell will be used to collect water samples for measuring turbidity. Turbidity will be measured with a separate turbidity meter.

The need to containerize purge water will be based on the analytical results from the previous sampling events. Uncontaminated purge water will be discharged at least 20 feet down gradient of the well being sampled. Purge water which contains contaminant levels that are greater than the maximum contaminant level (MCL) may require alternate handling, collection, and disposal.

2.1.2.3 Submersible Pump

An electric submersible pump is often used in cases where groundwater lifts greater than 25-feet are required. Such pumps are powered by a generator or single phase, 110-volt power supply. Prior to and following use, the pump must be cleaned at a minimum by washing in a laboratory detergent solution, followed by rinses with tap water and deionized/distilled water. After cleaning, the pump shall be placed in a clean plastic bag or wrapped in foil.

New high density polyethylene (HDPE) tubing must be used for purging each well if the well is not equipped with a dedicated submersible pump. The intake of the submersible pump will be set at the approximate mid-point of the top half of the saturated screen interval if possible, or at least 2-feet above the bottom of the well. Flow rates shall be adjusted to minimize deflection of the water table and introducing soil fines into the water column.

Discharge from the submersible pump will be collected in a clean, dedicated cup for measuring field parameters (i.e., temperature, pH, specific conductance, DO and ORP). Field parameters will be measured using a calibrated multiparameter meter. Turbidity will be measured with a separate turbidity meter.

The need to containerize purge water will be based on the analytical results from the previous sampling events. Uncontaminated purge water will be discharged at least 20 feet down gradient of the well being sampled. Purge water, which contains contaminant levels that are greater than the maximum contaminant level (MCL) may require alternate handling, collection, and disposal.

2.1.2.4 Bailer

For situations that require purging by bailer, only disposable polyethylene (PE) or Teflon® bailers will be used. The bailer must be secured with new nylon rope, lowered into top of the water column, allowed to fill, and removed. It is critical that bailers be slowly and gently immersed into the top of the water column, particularly during final stages of purging, to minimize turbidity and disturbance of volatile organic constituents (if applicable). The use of bailers for purging and sampling is discouraged because the correct technique is highly operator dependent.

Purge water from the bailer will be collected in a clean, dedicated cup for measuring field parameters (i.e., temperature, pH, specific conductance, DO and ORP). Field parameters will be measured using a calibrated multiparameter meter. Turbidity will be measured with a separate turbidity meter.

The need to containerize purge water will be based on the analytical results from the previous sampling events. Uncontaminated purge water will be collected in 5-gallon plastic buckets and discharged at least 20 feet down gradient of the well being sampled. Purge water, which contains contaminant levels that are greater than the maximum contaminant level (MCL) may require alternate handling, collection, and disposal.

2.1.3 Sample Collection

2.1.3.1 Portable Peristaltic Pump

After the required volume of groundwater has been purged from the well and indicator parameters have stabilized, the groundwater sample will be collected using the portable peristaltic pump under low flow/low stress conditions. The discharge tubing must be removed from the flow-through cell (if applicable) and used for collecting the sample. The sample will be collected when the pump is running, taking care that the discharge tubing does not touch the sample container. The pump shall remain in operation until all

samples have been collected. The only materials that contact the sample should be the interiors of the medical grade silicone tubing line and the polyethylene intake and discharge tubing. Care must be exercised not to overfill sample bottles containing preservatives to prevent the sample and preservative from spilling. Containers will be filled in the following sequence of decreasing stability or turbidity constraints: total metals, total dissolved solids, sulfates, chloride, fluoride, pH, and specific conductivity. The sample containers will then be placed directly into an ice-chilled cooler for shipment to the laboratory.

2.1.3.2 Dedicated Bladder Pump

After the required volume of groundwater has been purged from the well and indicator parameters have stabilized, the groundwater sample will be collected using the bladder pump under low flow/low stress conditions. The sample will be collected directly with the discharge tubing when the pump is running, taking care that the discharge tubing does not touch the sample container. The pump shall remain in operation until all samples have been collected. The only materials that contact the sample should be the pump bladder, the interior surfaces of the dedicated purging/sampling tube and the sample bottles. Care must be exercised not to overfill sample bottles containing preservatives to prevent the sample and preservative from spilling. Containers will be filled in the following sequence of decreasing stability or turbidity constraints: total metals, total dissolved solids, sulfates, chloride, fluoride, pH, and specific conductivity. The sample containers will then be placed directly into an ice-chilled cooler for shipment to the laboratory.

2.1.3.3 Submersible Pump

After the required volume of groundwater has been purged from the well and indicator parameters have stabilized, the groundwater sample will be collected using the submersible pump under low flow/low stress conditions (if achievable with the equipment used). The sample will be collected when the pump is running, taking care that the discharge tubing does not touch the sample container. Care must be exercised not to overfill sample bottles containing preservatives to prevent the sample and preservative from spilling. Containers will be filled in the following sequence of decreasing stability or turbidity constraints: total metals, total dissolved solids, sulfates, chloride, fluoride, pH, and specific conductivity. The sample containers will then be placed directly into ice-chilled coolers for shipment to the laboratory.

2.1.3.4 Bailer

After the required volume of groundwater has been purged from the well and indicator parameters have stabilized, the sample will be collected using either a disposable

polyethylene (PE) or Teflon® bottom-loading bailer with a standard ball and socket joint bottom. The samples will then be decanted directly into the appropriately prepared containers, as supplied by the laboratory. Containers will be filled in the following sequence of decreasing stability or turbidity constraints: total metals, total dissolved solids, sulfates, chloride, fluoride, pH, and specific conductivity. During sample collection, the bailers must be lowered in a manner to ensure that agitation and aeration of the groundwater will be minimized.

Sufficient sample volume is to be collected to perform all required analyses and to provide for quality control samples. Sample bottles containing preservatives must not be overfilled. The laboratory performing the analyses shall be consulted prior to the sampling event to confirm volume requirements.

2.1.4 Decontamination Procedures

In the event that a bailer not dedicated to a single well is used for purging/sampling, proper cleaning and decontamination procedures will be followed for all equipment prior to use or reuse. Decontamination solutions will be prepared and transported to the field for cleaning the sampling equipment. The decontamination procedure for sampling equipment includes the following steps:

1. Clean equipment with dilute non-phosphate detergent and tap water using a brush, if necessary, to remove particulate matter and surface films.
2. Rinse with tap water.
3. Rinse thoroughly with distilled/deionized water.
4. Repeat rinse and air dry as appropriate.
5. Containerize equipment if appropriate to prevent contamination during storage or transportation.

Field decontamination of field parameter measurement equipment that contacts groundwater will be performed in the same manner, with wipe down as necessary.

Note: In order to avoid the need to decontaminate bailers, disposable polyethylene bailers may be used for well purging and sampling.

In the event that a submersible pump not dedicated to a single well is used for purging/sampling, the following decontamination procedure should be followed:

1. Prepare a laboratory-grade, non-phosphate detergent and potable water solution in a clean bucket, garbage can, or 55-gallon drum.

2. Flush the pump with the detergent solution and discard the tubing. Replacement tubing and any required fittings should be obtained from the pump manufacturer, or suitable alternative source.
3. Flush the pump with distilled/deionized water
4. Place the pump on plastic sheeting.
5. Wipe any pump-related equipment (e.g., electrical lines, cables, and discharge hose) that enters the well with a clean cloth/wipe and detergent solution and rinse or wipe with a clean cloth/wipe and distilled/deionized water.
6. Air dry.
7. Wrap equipment in a suitable material (e.g., clean plastic bag).

3.0 SAMPLE PRESERVATION AND SHIPMENT

Sample containers shall be supplied by the contracted laboratory based on the analyses required. Sample containers of appropriate volume and composition will be received from the laboratory pre-labeled with the analysis to be performed, and, containing appropriate quantities of preservatives as necessary to ensure consistency with EPA analysis protocol. To ensure sample quality, preservation and shipment procedures will be carefully monitored. Generally, ice and chemical additives will be used as sample preservatives, as recommended by the EPA. If the analytical laboratory is located a considerable distance from the site, samples shall be shipped daily via a 24-hour delivery service to ensure that sample holding times are not exceeded. Otherwise, the samples will be transported by the sampler to the laboratory.

Shipment of samples will be coordinated with the laboratory. Proper storage and transport conditions must be maintained in order to preserve the integrity of the sample. Once taken, samples will be immediately placed on ice and cooled to a temperature of 4°C. Samples are to be packed in coolers so as to inhibit breakage or accidental spills. Custody seals may be placed on the outside of the cooler, in a manner that will allow detection of tampering. The laboratory shall immediately notify the owner/operator of any samples that arrive with custody seals broken.

4.0 CHAIN OF CUSTODY

It is required that an accurate record of sample collection, transport, analysis, and disposal be maintained and documented. Therefore, chain-of-custody procedures will be instituted and followed throughout the sampling program. This is needed to document sample possession from the time of collection until disposal. The chain-of-custody procedure will generally include the following steps:

1. The chain-of-custody record will originate at the laboratory with shipment of sample bottles and trip blanks as necessary;
2. Samples shall be accompanied by a chain of custody record that notes the date and time of collection and the name(s) of sampling personnel;
3. All samples shall be properly labeled to prevent misidentification of samples;
4. Notable field conditions shall be included on the Chain of Custody form to provide pertinent information about each sample;
5. Requested sample analyses shall be indicated on the Chain of Custody form;
6. Sample custody seals may be used to indicate any tampering of samples;
7. All records pertaining to the shipment of a sample shall be retained (freight bills, post office receipts, and bills of lading).

The laboratory shall not accept samples for analysis without a correctly prepared chain-of-custody form. The laboratory shall be responsible for maintaining chain of custody of the sample(s) from time of receipt to disposal. Each individual who possesses the samples shall sign the chain of custody form.

5.0 FIELD AND LABORATORY QUALITY ASSURANCE/QUALITY CONTROL

The reliability and validity of the field and analytical laboratory data will be monitored as part of the quality assurance/quality control (QA/QC) program used in the laboratory. Sample blanks will be collected to check sampling protocol and to account for any changes that occur after sampling. A field blank will be collected in the vicinity of a well in which environmental and/or weather conditions are determined unstable, and/or, site operations are actively being conducted. The QA/QC program will stipulate the use of standards, laboratory blanks, and duplicates for identification of matrix interferences and analytical consistency.

5.1 Field Blanks

Field blanks provide a means of determining if any air particulates have altered the samples being collected. Field blanks will be collected at locations where unstable environmental and/or weather conditions occur at the time of sampling. A field blank consists of deionized water poured into a sample container in the field under the same conditions that field samples are collected, which is then preserved and shipped to the laboratory with the field samples. The field blank samples will be collected at a frequency of one sample per sampling event.

5.2 Equipment Rinsate Blanks

To evaluate the effectiveness of the decontamination procedures if Teflon® bailers or other non-dedicated sampling equipment is used, an equipment rinsate blank will be collected. The sample will be collected by passing deionized water through the sampling equipment after decontamination has been completed. Equipment blanks will be collected at a minimum of one per day of groundwater sampling activities. A rinsate blank will not be required if dedicated tubing or disposable bailers are used.

5.3 Field Duplicate Samples

Collection of field duplicate samples provides for evaluation of consistency of the laboratory analytical and field sampling procedures by comparing analytical results of two samples collected from the same location at the same approximate time. Duplicate samples are used to develop criteria for acceptable variations in the physical and chemical composition of samples that could result from the sampling procedure. Duplicate results give an indication of the precision of the sampling and analytical methods. One field duplicate sample will be collected for laboratory analysis during each groundwater monitoring event.

The field duplicate samples shall be collected for each required monitoring parameter. The duplicate sample bottles shall be filled as closely as possible to the time the primary samples are taken. All containers shall be filled as close together in time as practical with a sampling stream that is steady and continuous. Each duplicate sample shall be collected after the primary sample for each parameter group is collected. For example, after the primary trace metal sample is collected, the duplicate trace metal sample shall be collected, etc. All of the duplicate samples shall be collected from the same well as the primary samples; essentially, two sample sets shall be collected at one of the wells during the sampling event. The duplicate samples shall be assigned identification aliases on the sample bottle label and on the chain-of-custody form to avoid alerting laboratories that the sample is a duplicate. The true identity of the samples shall be recorded on the groundwater sampling form and in the bound field book.

Duplicate samples are used to develop criteria for acceptable variations in the physical and chemical composition of samples that could result from the sampling procedure. Duplicate results are utilized by the QA officer and the project manager to give an indication of the precision of the sampling and analytical methods.

6.0 LABORATORY ANALYTICAL PARAMETERS AND METHODS

The laboratory analytical parameters for EPA CCR Rule compliance monitoring are presented in 40 CFR Part 257 Appendix III and Appendix IV. Following is a list of the laboratory analytical parameters included in Appendix III and Appendix IV, as well as the laboratory analytical methods to be used, for compliance monitoring.

APPENDIX III

Parameter	Analytical Method
Boron	EPA 200.7
Calcium	EPA 200.7
Chlorides	EPA 300.0
Fluoride	EPA 300.1
Sulfate	EPA 300.0
Total Dissolved Solids	SM 2540C
pH	SM 4500HB

APPENDIX IV

Parameter	Analytical Method
Antimony	EPA 200.8
Arsenic	EPA 200.8
Barium	EPA 200.8
Beryllium	EPA 200.7
Cadmium	EPA 200.8
Chromium	EPA 200.8
Cobalt	EPA 200.8
Fluoride	EPA 300.1
Lead	EPA 200.8
Lithium	EPA 200.7
Mercury	EPA 245.2
Molybdenum	EPA 200.8
Selenium	EPA 200.8
Thallium	EPA 200.8
Radium 226 and 228 Combined	EPA 903.1/904.0

The required analytical parameters depend on the phase of monitoring being conducted. A brief synopsis of the analytical parameters required for each monitoring phase and the required frequency of monitoring is presented below.

Initial Background Monitoring

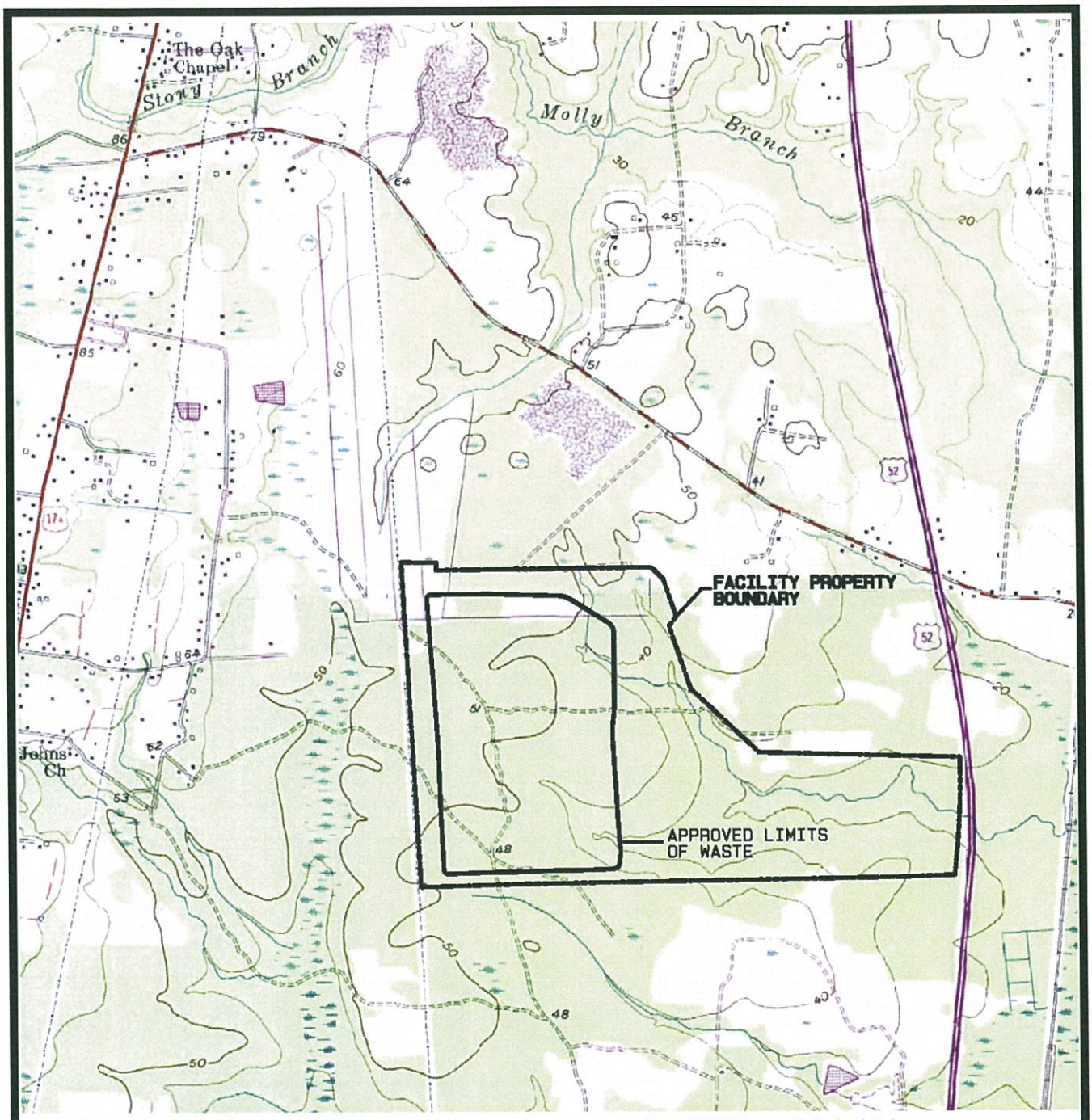
In accordance with 40 CFR Part 257.94(b), a minimum of ***eight independent samples*** from each background and down gradient EPA CCR Rule compliance monitoring well must be collected and analyzed for the constituents listed in Appendix III and Appendix IV ***no later than October 17, 2017***. The purpose of the monitoring is to establish background groundwater quality conditions for each regulated unit that can be used as part of statistical analysis and evaluation of detection monitoring results for determining whether a statistically significant release of constituents has occurred.

Detection Monitoring

In accordance with 40 CFR Part 257.94(a), the owner or operator of a CCR unit must conduct detection monitoring at all EPA CCR Rule compliance groundwater monitoring wells. The detection monitoring program includes groundwater monitoring for all constituents listed in Appendix III of 40 CFR Part 257. The detection 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.

Assessment Monitoring

In accordance with 40 CFR Part 257.95(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. Further, in accordance with 40 CFR Part 257.95(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. Finally, in accordance with 40 CFR 257.95(d), within 90 days of obtaining the results from the initial assessment monitoring event (and on at least a semiannual basis thereafter), the owner or operator must resample all wells, conduct analyses for all parameters in Appendix III and for those constituents in Appendix IV that are detected in the initial assessment monitoring event, and record their concentrations in the facility operating record.



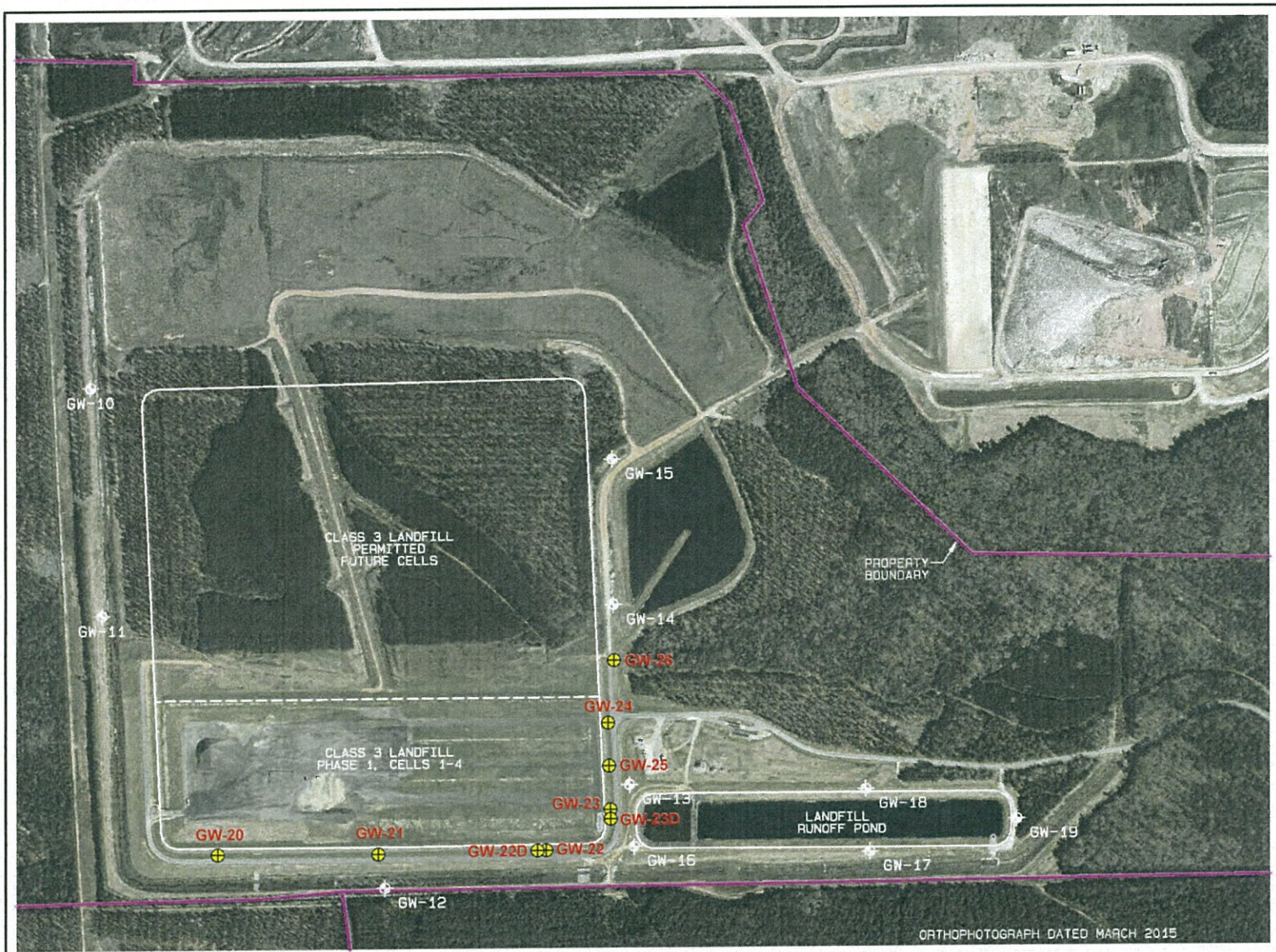
Source: USGS 7.5' Topographic Quadrangle Series
Moncks Corner and Mount Holly, SC 1997

Nautilus Geologic Consulting, PLLC
11112 Branding Iron Place
Wendell, NC 27591
Office: (919) 366-3663
Cell: (919) 995-0363

SITE LOCATION MAP

SCE&G Williams Station Highway 52 Class 3 ISW Landfill
Berkeley County, South Carolina

Drawn by:	Reviewed by:	Project #:	Drawing #:	Figure No.
USGS		Scale: 1:24,000	Drawing Date: 06/21/10	1



GW-10 GROUNDWATER MONITORING WELL

GW-20 Proposed CCR Rule Compliance Groundwater Monitoring Well

N

GRAPHIC SCALE 1"=500'

0 500 1000

REVISION	DATE
1)	
2)	
3)	
4)	

GARRETT & MOORE
Engineering for the Power and Waste Industries

1100 CRESCENT GREEN
CARY, N.C. 27518
TEL: 919 - 782 - 1900
FAX: 866 - 311 - 7206
www.garrett-moore.com

WILLIAMS STATION
HIGHWAY 52
CLASS THREE LANDFILL

EPA CCR Rule Compliance
Groundwater Monitoring Wells

JOB NUMBER

SHEET
2

Table 1
EPA CCR Rule Compliance Monitoring Well Construction Data and Specifications
South Carolina Electric & Gas
Williams Station Highway 52 Class Three Landfill

Williams Station Highway 52 Class Three Landfill

				Elevation Data			Test Boring Data		Monitoring Well Construction Data			
									Top of Well Screen		Bottom of Well Screen	
Monitoring Well ID	Boring Date	Northing	Easting	PVC Pipe Elev.	Ground Elev.	Stickup feet	Total Depth, ft.	Bottom Elevation	Depth, ft.	Elev.	Depth, ft.	Elev.
GW-10	10/27/2009	469470.302	2290419.95	52.28	49.62	2.66	18.2	31.42	8.20	41.42	18.20	31.42
GW-20	3/31/2016	467118.374	2291039.13	60.69	57.77	2.92	29.0	28.77	19.00	38.77	29.00	28.77
GW-21	3/31/2016	467117.56	2291773.29	56.11	53.35	2.76	25.0	28.35	15.00	38.35	25.00	28.35
GW-22	3/30/2016	467128.377	2292654.55	50.25	47.75	2.50	21.0	26.75	11.00	36.75	21.00	26.75
GW-22D	4/27/2016					0.00	31.5		15.00		30.00	
GW-23	3/30/2016	467333.297	2293006.41	49.85	47.14	2.71	20.0	27.14	10.00	37.14	20.00	27.14
GW-23D	4/27/2016					0.00	30.5		15.00		30.00	
GW-24	3/29/2016	467729.957	2292988.39	52.35	49.69	2.66	22.0	27.69	12.00	37.69	22.00	27.69
GW-25	3/30/2016	467523.598	2292996.9	50.84	48.25	2.59	21.0	27.25	11.00	37.25	21.00	27.25
GW-26	3/29/2016	468065.28	2293004.75	55.15	52.22	2.93	30.0	22.22	20.00	32.22	30.00	22.22

APPENDIX A

Example Field Data Sheet

Well/Piezo ID:

Ground Water Sample Collection Record

Client: _____ Date: ___ / /
Project No: _____ Time: Start _____ am/pm
Site Location: _____ Finish _____ am/pm
Weather Conds: _____ Collector(s) _____

WATER LEVEL DATA: (measured from Top of Casing) Well ☑ Piezometer ☐

a. Total Well Length _____ c. Casing Material _____ e. Length of Water Column _____ (a-b)

b. Water Table Depth _____ d. Casing Diameter _____ f. Calculated Well Volume (see back) _____

WELL PURGING DATA

a. Purge Method _____ Flow Rate_____

b. Acceptance Criteria defined (from workplan)
- Minimum Required Purge Volume (@ _____ well volumes) _____
- Maximum Allowable Turbidity _____ NTUs
- Stabilization of parameters _____

c. Field Testing Equipment Used: Make Model Serial Number

_____
_____

d. Field Testing Equipment Calibration Documentation Found in Field Notebook # _____ Page #_____

Time	Volume Removed (ml)	TEMP C	pH S.U.	Spec. Cond (umhos)	TURBIDITY NTUs	D.O. mg/l	ORP MV	Odor	DTW

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

_____
_____

SAMPLE COLLECTION: Method: PUMP TUBING

Sample ID	Container Type	No. of Containers	Preservation	Analysis	Time

Comments _____

_____

Signature _____ Date ___ / /