

**2019 ANNUAL GROUNDWATER MONITORING  
AND CORRECTIVE ACTION REPORT  
ASH PONDS A AND B  
WINYAH GENERATING STATION**

**by Santee Cooper  
Moncks Corner, South Carolina**

**January 2020**

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## 1. 40 CFR § 257.90 Applicability

### 1.1 40 CFR § 257.90(a)

***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 § 257.99.***

The Ash Ponds A and B at Winyah Generating Station (WGS) is subject to the groundwater monitoring and corrective action requirements set forth by the Environmental Protection Agency (EPA) in the Code of Federal Regulations Title 40 (40 CFR) § 257.90 through § 257.99. This document satisfies the requirement under § 257.90(e) which requires the CCR Unit Owner/Operator to prepare an Annual Report.

### 1.2 40 CFR § 257.90(e) - SUMMARY

***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).***

This Annual Report documents the activities completed in 2019 for the Ash Ponds A and B at WGS as required by the Groundwater Monitoring and Corrective Action regulations. Groundwater sampling and analysis was conducted per the requirements of § 257.93, and the status of the groundwater monitoring program, set forth in § 257.95, is provided in this report.

#### 1.2.1 Status of the Groundwater Monitoring and Corrective Action Program

Statistically significant increases (SSI) of Appendix III constituents were identified downgradient of the Ash Ponds A and B, and the notification was provided on January 15, 2018. An alternate source demonstration (ASD) was conducted by Haley & Aldrich, Inc, and a report was provided to Santee Cooper in April 2018. The review by Haley & Aldrich did not identify contributing sources that could serve as an ASD for the SSI's observed in the CCR well network for the WGS Ash Ponds A and B. As a result, an Assessment Monitoring program was initiated as required by § 257.94(e)(2). The notification was placed in the facility's operating record as required by 257.106(h)(4).

As required by § 257.93(h)(2), the statistical evaluation of the Appendix IV constituents detected were determined to be statistically significant exceedance of groundwater protection standards, specifically arsenic and lithium at Ash Pond A, and arsenic, lithium, and molybdenum at Ash Pond B. Therefore, an assessment of corrective measures and nature and extent was initiated per §257.95(g)(3). Due to

inclement weather, limited accessibility of the testing area, and limited trained personnel, discussed in depth at 1.2.3, there was difficulty in scheduling the implementation of this assessment so utilized the 60-day extension allowed under § 257.95(a). Santee Cooper initiated an evaluation of the horizontal and vertical nature and extent of the SSLs (arsenic, lithium, and molybdenum) downgradient of Ash Ponds A and B, including the installation of monitoring wells at the downgradient property line. Groundwater sampling from the newly installed monitoring wells showed that the extent of the SSLs is confined to the uppermost aquifer on-site and does not extend north and east of the Cooling Water Pond. Lithium has been detected in one of the intermediate monitoring wells north of Ash Pond A (WAP-22), however, vertical delineation of the remaining SSLs have been below any RSL. Haley & Aldrich (H & A) was hired to create the Corrective Measures Assessment (CMA) report considering the presence and distribution of arsenic, lithium, and molybdenum, Ash Ponds A and B's configuration and operational history, hydrogeologic setting, and the results of the evaluation of the nature and extent available at the time of the CMA. This CMA discussed both remedial alternatives and their threshold criteria provided in § 257.97(b), and then compared to the balancing criteria listed in § 257.97(c)(1), of the CCR Rule. This CMA is filed in the Santee Cooper CCR operating record and on the Santee CCR Rule public website. The associated tables of analytical results and figures of sampling locations are provided in the appendix of this report. A public meeting was held on December 10, 2019 to discuss six alternatives for a remedy per § 257.96(e). The path forward will include selecting the final remedy, implementing the remedy, monitoring the progress, making any adjustments to the groundwater monitoring programs or remedy, if needed, and reporting the results.

### 1.2.2 Key Actions Completed

The following key actions were completed in 2019:

- Completed statistical evaluation to determined statistically significant exceedance of groundwater protection standards for Appendix IV constituents that were detected and initiated assessment of corrective measures for Ash Ponds A and B pursuant to § 257.95(g)(3).
- Prepared 2018 Annual Report including:
  - The Annual Report was placed in the facility's operating record pursuant to § 257.105(h)(1);
  - Pursuant to § 257.106(h)(1), the notification was sent to the relevant State Director within 30 days of the Annual Report being placed in the facility's operating record [§ 257.106(d)];
  - Pursuant to § 257.107(h)(1), the Annual Report was posted to the CCR Website within 30 days of the Annual Report being placed in the facility's operating record [§ 257.107(d)];
- Placed a notification of initiation of assessment of corrective measures for Ash Ponds A and B in the operating record, as required by § 257.95(g)(5).
- Notification to the state and notice placed on public CCR website that assessment of corrective measures had been initiated, as required by § 257.106(h)(7)
- Scheduling challenges and difficulty due to scheduling appropriate certified well drillers, delays due to field accessibility, and unforeseen weather events, required utilization of the 60-day extension § 257.95(a) (Appendix A) for completion of the assessment of corrective measures per § 257.95(e)
- Initiated a characterization of the nature and extent of Appendix IV constituents identified at statistically significant levels above the GWPS in accordance with § 257.95(g)(1).

- Completed assessment of corrective measures and nature and extent per § 257.95(e) (Appendix B)
- Provided notification of completion of assessment of corrective measures and nature and extent to state; and place completed assessment on website per § 257.106(h)(8) and 257.107(h)(8)
- Collected and analyzed two rounds of groundwater monitoring (February and June) (Table 1) in accordance with § 257.95(b) and § 257.95(d)(1) and recorded the concentrations in the facility's operating record as required by § 257.95(d)(1); and
- Completed statistical evaluation to determine statistically significant exceedance of GWPS for Appendix IV in accordance with § 257.93(h)(2) (Appendix C)
- Held a public meeting December 10, 2019 to discuss proposed alternatives for corrective measures § 257.96(e).

### 1.2.3 Problems Encountered

It was difficult to get qualified and South Carolina certified well drillers for the field work scheduled at the appropriate times because multiple utilities were implementing the CCR Rule concurrently and there are a limited number of certified well drillers for South Carolina. There were also accessibility issues, as many parts of property boundaries and areas of investigation were heavily wooded with undergrowth which had to be cleared and surveyed. Lastly, unforeseen weather events prohibited field work during some phases. This led to the delays.

Delays and second mobilizations at another station held up both South Carolina Certified Drillers and field geologist.

Detection monitoring analyte Boron was inadvertently not analyzed for WAP-18, 19 and 20.

### 1.2.4 Actions to Resolve Problems

Emergency procurement measures were implemented to secure and hire an additional drilling company. Consultants were used to provide geologists to oversee the field work at Winyah Generating Station.

Chains of custody, specific to each well, have been compiled to ensure that all analytes are captured for each groundwater monitoring event.

### 1.2.5 Project Key Activities for Upcoming Year

Key activities to be completed in 2020 include the following:

- Respond to any comments or questions brought up at the Public Meeting
- Consider the need for groundwater remedial interim measures § 257.98(e)(3)
- Selection of the remedy and preparation of Selection of Remedy Report (including schedules for implementing and completing remedial activities) § 257.97 (d)
- Initiate Groundwater Remedial Activities (within 90 days of selecting the remedy) which includes a reevaluation of the current groundwater monitoring plan § 257.98 (a)
- Collect Groundwater Remedy Engineering and Design Data which may include additional borings and/or groundwater monitoring wells § 257.98 (a)(1)

- Develop the Corrective Action Groundwater Monitoring Program (MNA Sampling Protocol) § 257.98 (a)(1)
- Field implementation (of the remedy with any associated additional groundwater ASD or monitoring activities)
- Conduct semi-annual groundwater monitoring § 257.95(d)(1)
- CMA Semi-Annual Progress Report § 257.97 (a), 257.105 (h)(12)
- Additional nature and extent activities, as needed § 257.95(g)(1)
- Prepare the 2020 annual report; place it in the record as required by § 257.105(h)(1), notify the state [§ 257.106(d)]; and post to website [§ 257.107(d)].

### 1.3 40 CFR § 257.90(e) - INFORMATION

***At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:***

#### 1.3.1 40 CFR § 257.90(e)(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;***

As required by § 257.90(e)(1), a map showing the locations of the CCR unit and associated upgradient and downgradient monitoring wells for Ash Ponds A and B are presented as Figure 1. In addition, this information is presented in the CCR Groundwater Monitoring Plan, which was placed in the facility's operating record by 17 October 2017 as required by § 257.105(h)(2).

#### 1.3.2 40 CFR § 257.90(e)(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;***

Groundwater monitoring wells were installed in 2019, as part of the Corrective Measures Assessment and Nature and Extent. WAP-22, 23, and 24 are groundwater wells installed in the deeper aquifer around Ash Ponds A and B. WAP-25 and WAP-26 are groundwater wells installed to monitor the shallow aquifers near the property boundary.

#### 1.3.3 40 CFR § 257.90(e)(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;***

In accordance with § 257.95(b) and § 257.95(d)(1), two independent samples from each background and downgradient monitoring well were collected and analyzed. A summary table including the sample names, dates of sample collection, reason for sample collection, and monitoring data obtained for the groundwater monitoring program for the Ash Ponds A and B is presented in Table 1 of this report. In addition, and in accordance with § 257.95(d)(3), Table 1 includes the groundwater protection standards established under § 257.95(d)(2).

#### **1.3.4 40 CFR § 257.90(e)(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***

As required by § 257.93(h) a statistical analysis of the Appendix III constituents was completed by January 15, 2018. Baseline analytical data collected from background monitoring wells WBW-1 and WAP-1 were combined to develop Upper Tolerance Limits (UTLs). The UTLs for each Appendix III constituent were compared to the analytical results for the downgradient monitoring wells WAP-9, WAP-17, WAP-18, and WAP-19. Constituents with analytical results exceeding the UTLs were identified as SSIs over background for the respective Appendix III constituent. This statistical analysis determined that statistically significant increases of boron, calcium, chloride, fluoride, pH, sulfate, total and dissolved solids were present downgradient of Ash Ponds A and B. An evaluation of alternate sources was initiated and completed on April 13, 2018 as provided in § 257.94(e)(2). A source causing the SSI over background levels other than the CCR unit was not identified at that time and an Assessment Monitoring program was initiated on July 16, 2018.

The Assessment Monitoring program has been established to meet the requirements of 40 CFR § 257.95. As required by § 257.93(h)(2), the statistical evaluation of the detected Appendix IV constituents determined a statistically significant exceedance of groundwater protection standards, specifically for arsenic and lithium at Ash Pond A, and arsenic, lithium, and molybdenum at Ash Pond B. Therefore, per §257.95(g)(3), an assessment of corrective measures and nature and extent was initiated on April 15, 2019. The Corrective Measures Assessment (CMA) report was created considering the presence and distribution of arsenic, lithium, and molybdenum, Ash Ponds A and B's configuration and operational history, hydrogeologic setting, and the results of the evaluation of the nature and extent available at the time of the CMA. Based on the statistical evaluation for the 2019 data, there are no new SSLs or SSIs identified (Appendix C).

#### **1.3.5 40 CFR § 257.90(e)(5)**

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

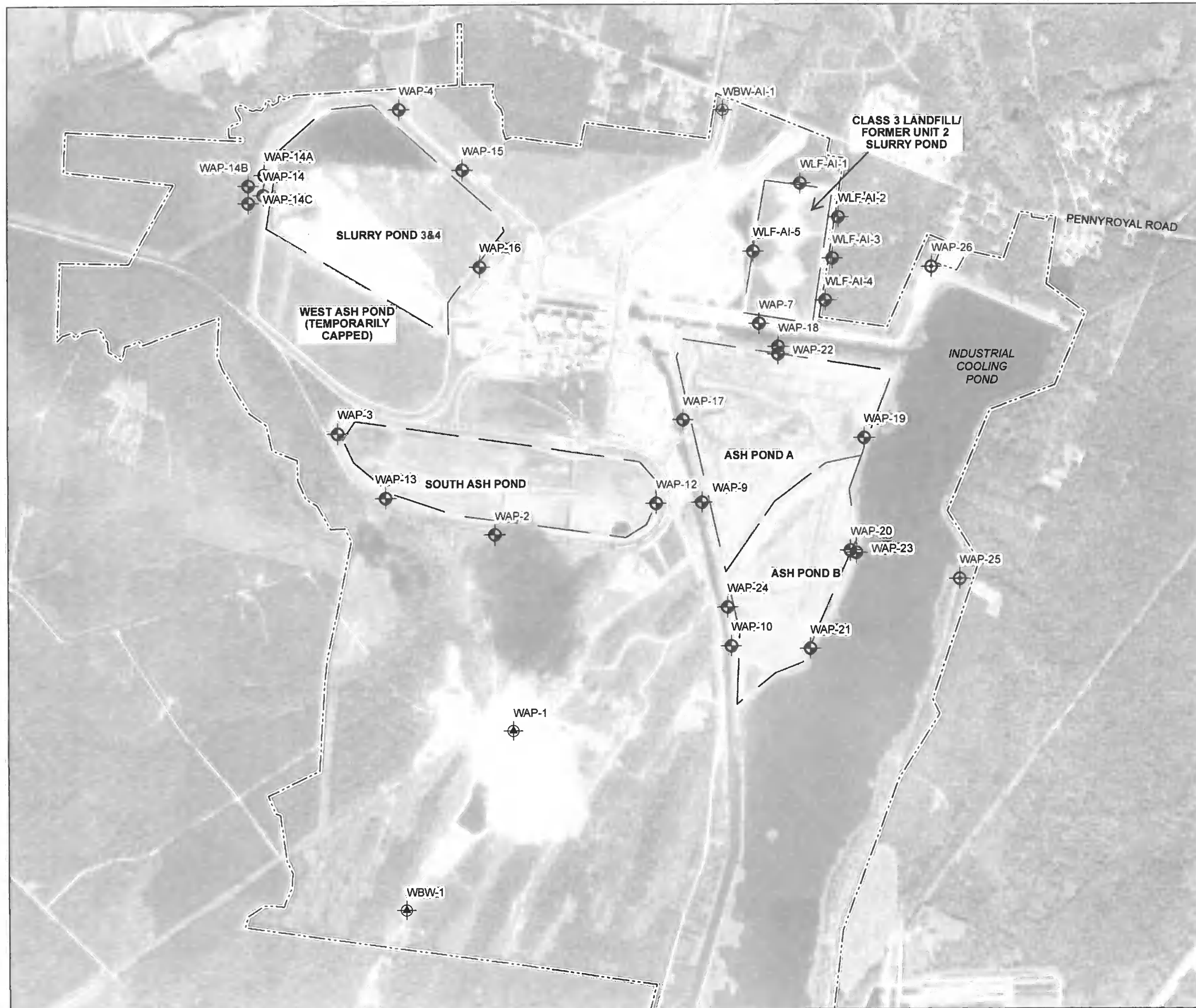
Other information including development of groundwater protection standards, recording groundwater monitoring results in the operating record, and an evaluation of alternate sources is discussed in preceding sections.

## TABLES



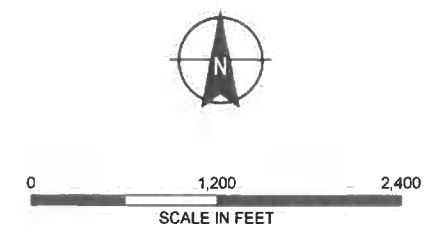


## FIGURES



- LEGEND**
- BACKGROUND WELL
  - PROPERTY BOUNDARY WELL
  - MONITORING WELL
  - CCR UNIT BOUNDARY
  - PROPERTY BOUNDARY

- NOTES**
1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
  2. AERIAL IMAGERY SOURCE: ESRI



SANTEE COOPER  
 WINYAH GENERATING STATION  
 GEORGETOWN, SOUTH CAROLINA

**LOCATION OF GROUNDWATER  
 MONITORING WELLS FOR  
 CCR COMPLIANCE - 2019**

JANUARY 2020 FIGURE 1

**Appendix A – Corrective Measures Assessment 60-Day Extension**

**SANTEE COOPER  
WINYAH GENERATING STATION ASH POND A  
CERTIFICATION OF 60-DAY EXTENSION OF ASSESSMENT OF CORRECTIVE MEASURES**

The South Carolina Public Service Authority (Santee Cooper) is implementing the April 17, 2015 U.S. EPA Federal Coal Combustion Residuals (CCR) Rule (40 CFR 257 and 261) for the Ash Pond A at Winyah Generating Station, located near the city of Georgetown, South Carolina.

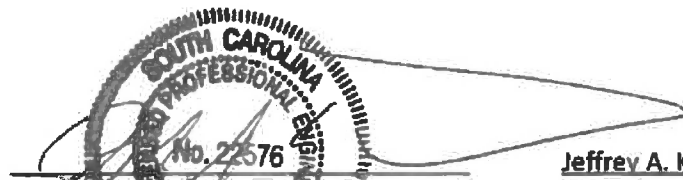

In accordance with 40 CFR 257.95 Santee Cooper initiated an Assessment of Corrective Measures (ACM) for the Ash Pond A. Statistical analysis indicated arsenic and lithium were present at statistically significant levels above the respective groundwater protection standards in one or more monitoring well downgradient of the Ash Pond A.

Pursuant to 40 CFR 257.96(a), Santee Cooper requires the deadline to complete the Assessment of Corrective Measures to be extended an additional 60 days, until September 11, 2019, due to site-specific conditions and circumstances.

The 60-day extension is required because activities are on-going to characterize the nature and extent of the arsenic, lithium, and relevant site conditions. Evaluation of the site is in progress in accordance with the CCR Rule. The collected data will be incorporated into the conceptual site model (CSM). A representative CSM is necessary for a complete evaluation of the corrective measures that have, and will be, undertaken to meet the requirements of 40 CFR 257.96(c). The need for the extension is also due to weather events impacting accessibility of the site, lack of availability of South Carolina certified well drillers, a lack of availability of the appropriate drilling equipment for heavily wooded remote areas, and delays in receipt of analytical data from certified analytical laboratories. The assessment is in progress as allowed under 40 CFR 257.96(a). An additional 60 days will enable the preparation of the ACM based on a more thorough evaluation of technical data to develop the most appropriate solutions for the protection of groundwater quality.

Pursuant to CFR Title 40 Chapter I Subchapter I Part 257 Subpart D §257.96(a), I certify that the optional 60-day extension to the deadline for the completion of the Assessment of Corrective measures is demonstrated, as described above. The certification submitted is, to the best of my knowledge accurate and complete.

HALEY & ALDRICH, INC.

Signature  

Jeffrey A. Klaiber, P.E

Name

22576

Date

Professional Engineer Registration Number

**SANTEE COOPER  
WINYAH GENERATING STATION ASH POND B  
CERTIFICATION OF 60-DAY EXTENSION OF ASSESSMENT OF CORRECTIVE MEASURES**

The South Carolina Public Service Authority (Santee Cooper) is implementing the April 17, 2015 U.S. EPA Federal Coal Combustion Residuals (CCR) Rule (40 CFR 257 and 261) for the Ash Pond B at Winyah Generating Station, located near the city of Georgetown, South Carolina.


In accordance with 40 CFR 257.95 Santee Cooper initiated an Assessment of Corrective Measures (ACM) for the Ash Pond B. Statistical analysis indicated arsenic, lithium, and molybdenum were present at statistically significant levels above the respective groundwater protection standards in one or more monitoring well downgradient of the Ash Pond B.

Pursuant to 40 CFR 257.96(a), Santee Cooper requires the deadline to complete the Assessment of Corrective Measures to be extended an additional 60 days, until September 11, 2019, due to site-specific conditions and circumstances.

The 60-day extension is required because activities are on-going to characterize the nature and extent of the arsenic, lithium, molybdenum, and relevant site conditions. Evaluation of the site is in progress in accordance with the CCR Rule. The collected data will be incorporated into the conceptual site model (CSM). A representative CSM is necessary for a complete evaluation of the corrective measures that have, and will be, undertaken to meet the requirements of 40 CFR 257.96(c). The need for the extension is also due to weather events impacting accessibility of the site, lack of availability of South Carolina certified well drillers, a lack of availability of the appropriate drilling equipment for heavily wooded remote areas, and delays in receipt of analytical data from certified analytical laboratories. The assessment is in progress as allowed under 40 CFR 257.96(a). An additional 60 days will enable the preparation of the ACM based on a more thorough evaluation of technical data to develop the most appropriate solutions for the protection of groundwater quality.

Pursuant to CFR Title 40 Chapter I Subchapter I Part 257 Subpart D §257.96(a), I certify that the optional 60-day extension to the deadline for the completion of the Assessment of Corrective measures is demonstrated, as described above. The certification submitted is, to the best of my knowledge accurate and complete.

HALEY & ALDRICH, INC.

  
\_\_\_\_\_  
7/9/19

Jeffrey A. Klaiber, P.E

Name

22576

Professional Engineer Registration Number

Date

**Appendix B – Corrective Measures Assessment Tables and Figures**

**TABLE 1**  
**DETECTION MONITORING ANALYTICAL RESULTS**  
**WINYAH GENERATING STATION - ASH POND A & B**  
**SANTEE COOPER**  
**GEORGETOWN, SOUTH CAROLINA**

Chemical Group				Detection Monitoring - EPA Appendix III Constituents						Field Parameters						
Impoundment	Location	Sample Date	Sample Type	Chemical Name	Boron, Total	Calcium, Total	Chloride	Fluoride	Sulfate	Total Dissolved Solids (TDS)	Conductivity	Dissolved Oxygen	ORP	pH	Temperature	Turbidity
				MCL/RSL Units	- mg/L	- mg/L	- mg/L	4 mg/L	- mg/L	- mg/L	- uS/cm	- mg/L	- mv	- pH units	- Deg C	- NTU
Background	WAP-1	11/10/2015	N		0.0269	1	5.1	< 0.1	9.2	27.5	58	1.78	358	4.14	19.88	0
Background	WAP-1	01/11/2016	N		0.0289	0.61	5.17	< 0.1	9.57	30	58	1.5	380	3.68	15.33	9.6
Background	WAP-1	04/26/2016	N		0.0222	0.555	4.39	< 0.1	9.14	< 100	51	0.42	264	4.15	18.94	0
Background	WAP-1	06/20/2016	N		0.0348	26.9	7.93	0.14	< 2	234	326	0.84	-170	7.61	19.09	0
Background	WAP-1	10/18/2016	N		0.0269	0.507	4.91	< 0.1	15.5	98.33	53	0.97	99	4.31	21.87	0
Background	WAP-1	01/09/2017	N		0.0284	< 0.5	4.98	< 0.1	8.3	51.25	60	1.45	321	4.11	12.74	8.8
Background	WAP-1	04/10/2017	N		0.023	< 0.5	6.13	< 0.1	7.26	36.25	56	0.89	105	4.39	20.64	0.4
Background	WAP-1	07/18/2017	N		-	2.8	11.6	-	4.62	18	71	0.86	88	4.84	22.52	0
Background	WAP-1	09/18/2017	N		0.037	2.6	9.7	< 0.1	3.77	42	63	0.79	90	4.7	24.91	0
Background	WAP-1	10/02/2017	N		0.03	2.1	9.9	< 0.1	3.54	40	61	0.82	90	4.83	22.28	2.5
Background	WAP-1	01/30/2018	N		-	2	8.31	-	< 2	68.57	51	0.95	88	5.25	17.3	2.4
Background	WBW-1	11/10/2015	N		< 0.03	< 0.5	2.71	< 0.1	4.95	8	38	4.85	294	4.08	19.58	0
Background	WBW-1	01/11/2016	N		< 0.03	< 0.5	3.07	< 0.1	6.38	15.83	40	4.39	323	3.55	14.07	1.8
Background	WBW-1	04/26/2016	N		0.0153	< 0.5	2.44	< 0.1	5.35	< 33.3	38	3.18	179	4.07	19.59	0
Background	WBW-1	06/20/2016	N		< 0.015	< 0.5	2.57	< 0.1	5.14	22.5	40	3.69	241	4	22.3	0
Background	WBW-1	10/17/2016	N		< 0.015	< 0.5	2.72	< 0.1	5.3	30	36	2.42	318	4.15	25.1	0
Background	WBW-1	01/09/2017	N		< 0.075	< 0.5	3.45	< 0.1	4.86	45	49	3.09	252	3.83	9.96	17
Background	WBW-1	04/10/2017	N		0.023	< 0.5	4.96	0.1	4.26	52.5	48	3.84	95	4.08	17.85	0
Background	WBW-1	09/18/2017	N		0.019	< 0.5	6.77	< 0.1	4.4	158	55	2.16	166	4	25.27	0
Background	WBW-1	10/02/2017	N		0.022	0.3	6.47	< 0.1	5.34	40	57	1.94	112	4.17	24.58	0
Ash Pond A	WAP-8	01/31/2018	N		-	447	560	-	1090	2570	3490	1.04	-94	7.05	19.04	6.6
Ash Pond A	WAP-9	11/11/2015	N		5.39	200	205	< 0.1	234	1018	1062	0.36	-141	5.76	22.48	0
Ash Pond A	WAP-9	01/19/2016	N		5.72	170	229	< 0.1	357	927.5	1460	1.1	-164	5.84	14.91	5.9
Ash Pond A	WAP-9	01/19/2016	FD		5.63	160	172	< 0.1	251	942.5	-	-	-	-	-	-
Ash Pond A	WAP-9	04/26/2016	N		4.92	165	141	< 0.1	201	915	1280	0.29	-107	5.84	21.86	0
Ash Pond A	WAP-9	06/20/2016	N		5.26	138	167	< 0.1	252	888	1240	0.49	-139	5.82	23.49	0
Ash Pond A	WAP-9	10/18/2016	N		5.16	453	120	< 0.1	170	875	1280	0.52	-184	5.71	22.51	0
Ash Pond A	WAP-9	01/10/2017	N		5.46	143	117	< 0.1	132	858.8	1210	0.66	-117	5.88	16.24	0
Ash Pond A	WAP-9	04/10/2017	N		5.8	133	109	0.11	103	792.5	1130	0.57	-69	5.96	23.14	2.7
Ash Pond A	WAP-9	06/19/2017	N		-	147	108	-	118	803.8	1230	0.79	31	5.85	19.86	0
Ash Pond A	WAP-9	09/18/2017	N		5.2	157	99.2	< 0.1	126	790	1180	0.9	11	5.95	23.86	0.7
Ash Pond A	WAP-9	10/02/2017	N		5.1	130	100	< 0.1	133	782	1220	0.64	-37	6.03	22.93	6
Ash Pond A	WAP-9	01/31/2018	N		-	148	108	-	119	838.6	1210	0.81	-114	6.03	15.93	0
Ash Pond A	WAP-17	11/11/2015	N		14.2	580	769	< 0.1	1140	3140	4018	0.44	5	5.92	27.72	8.1
Ash Pond A	WAP-17	01/19/2016	N		9.43	330	377	0.25	740	1735	2620	1.23	-94	6.01	15.77	1.6
Ash Pond A	WAP-17	04/26/2016	N		5.45	325	329	0.1	787	1615	2340	0.37	-11	6.03	23.26	0
Ash Pond A	WAP-17	04/26/2016	FD		5.76	326	332	0.1	791	1735	-	-	-	-	-	-
Ash Pond A	WAP-17	06/20/2016	N		5.61	309	311	0.11	757	1722	2340	0.75	-35	6.02	27.93	0
Ash Pond A	WAP-17	06/20/2016	FD		5.21	319	302	0.17	730	1696	-	-	-	-	-	-
Ash Pond A	WAP-17	10/18/2016	N		6.79	424	416	0.14	900	1952	2930	0.52	-135	5.9	25.94	0
Ash Pond A	WAP-17	10/18/2016	FD		6.7	429	421	0.14	911	2038	-	-	-	-	-	-
Ash Pond A	WAP-17	01/10/2017	N		6.66	379	347	0.14	844	1856	2580	0.7	-69	6.04	19.8	9.7
Ash Pond A	WAP-17	01/10/2017	FD		5.63	368	357	0.17	878	1920	-	-	-	-	-	-
Ash Pond A	WAP-17	04/10/2017	N		4.9	359	614	0.17	1810	1840	2480	0.72	-2	6.1	24.08	6.8
Ash Pond A	WAP-17	04/10/2017	FD		4.7	364	339	0.17	939	1794	-	-	-	-	-	-
Ash Pond A	WAP-17	09/18/2017	N		6	361	332	< 0.1	965	1986	2560	0.68	17	6.14	26.16	0
Ash Pond A	WAP-17	10/02/2017	N		5.7	350	326	< 0.1	973	1856	2610	0.85	10	6.1	26.31	0
Ash Pond A	WAP-17	10/02/2017	FD		5.6	350	332	< 0.1	989	1820	-	-	-	-	-	-
Ash Pond A	WAP-18	11/11/2015	N		4.81	480	81	< 0.1	960	1692	1089	0.43	-25	6.15	23.97	0
Ash Pond A	WAP-18	01/12/2016	N		1.85	370	15.3	1.06	903	1452	1790	0.86	-68	6.28	18.8	15.1
Ash Pond A	WAP-18	01/12/2016	FD		2.51	360	15.3	1.1	902	1452	-	-	-	-	-	-
Ash Pond A	WAP-18	04/27/2016	N		1.21	448	49	0.71	1060	1760	1810	0.66	34	6.27	24.57	3.4



**TABLE 1  
DETECTION MONITORING ANALYTICAL RESULTS  
WINYAH GENERATING STATION - ASH POND A & B  
SANTEE COOPER  
GEORGETOWN, SOUTH CAROLINA**

Chemical Group				Detection Monitoring - EPA Appendix III Constituents						Field Parameters					
Chemical Name				Boron, Total	Calcium, Total	Chloride	Fluoride	Sulfate	Total Dissolved Solids (TDS)	Conductivity	Dissolved Oxygen	ORP	pH	Temperature	Turbidity
MCL/RSL Units				- mg/L	- mg/L	- mg/L	4 mg/L	- mg/L	- mg/L	- uS/cm	- mg/L	- mv	- pH units	- Deg C	- NTU
Impoundment	Location	Sample Date	Sample Type												
Ash Pond A	WAP-18	06/21/2016	N	2.5	488	92.6	0.8	1160	2182	2160	0.54	-33	6.31	23.24	63.7
Ash Pond A	WAP-18	10/20/2016	N	3.75	509	70.2	0.85	1020	1793	2020	0.55	-63	6.26	23.4	0
Ash Pond A	WAP-18	01/12/2017	N	3.9	493	67	0.91	941	1711	1930	0.41	-74	6.48	20.79	0
Ash Pond A	WAP-18	03/13/2017	RS	-	-	-	-	-	-	2230	3.67	-80	6.66	17.58	2.5
Ash Pond A	WAP-18	04/12/2017	N	5.8	463	260	1.5	845	2016	2440	0.74	-8	6.55	22.46	0.2
Ash Pond A	WAP-18	09/21/2017	N	8.2	422	231	1.2	962	2018	2370	1.02	31	6.54	28.11	0
Ash Pond A	WAP-18	09/21/2017	FD	7.8	427	223	1.3	950	1970	-	-	-	-	-	-
Ash Pond A	WAP-18	10/04/2017	N	7.7	360	149	2	754	1668	2210	0.74	-69	6.63	24.28	4.4
Ash Pond B	WAP-10	11/12/2015	N	8.6	620	769	< 0.1	816	3118	4050	0.58	-62	6.55	21.74	0
Ash Pond B	WAP-10	01/19/2016	N	8.2	560	807	< 0.1	867	2770	4310	1.47	-94	6.52	15	27.9
Ash Pond B	WAP-10	01/19/2016	FD	8.93	560	779	< 0.1	826	2870	-	-	-	-	-	-
Ash Pond B	WAP-10	04/26/2016	N	8.3	575	802	< 0.1	795	3435	3860	0.39	-55	6.5	22.24	0
Ash Pond B	WAP-10	04/26/2016	FD	8.58	593	859	< 0.1	875	3305	-	-	-	-	-	-
Ash Pond B	WAP-10	06/20/2016	N	8.68	566	782	< 0.1	774	3172	4010	0.81	-64	6.57	25	0
Ash Pond B	WAP-10	06/20/2016	FD	9.3	546	763	< 0.1	747	3342	-	-	-	-	-	-
Ash Pond B	WAP-10	10/18/2016	N	9.15	574	748	< 0.1	737	1763	3990	0.77	-92	6.41	20.16	0
Ash Pond B	WAP-10	01/10/2017	N	9.59	544	734	0.15	734	3135	4050	2.37	-77	6.55	15.7	7.7
Ash Pond B	WAP-10	01/10/2017	FD	9.96	541	734	< 0.1	737	3112	-	-	-	-	-	-
Ash Pond B	WAP-10	04/10/2017	N	8.8	547	722	0.12	707	2874	3720	0.77	-85	6.56	21.61	0.8
Ash Pond B	WAP-10	04/10/2017	FD	9.2	559	715	0.12	702	2835	-	-	-	-	-	-
Ash Pond B	WAP-10	06/19/2017	N	-	539	722	-	659	2995	3710	3.42	-44	6.5	20.91	0
Ash Pond B	WAP-10	09/18/2017	N	8.6	58.8	747	< 0.1	727	3018	3580	0.65	5	6.54	24.04	0.2
Ash Pond B	WAP-10	10/02/2017	N	8.7	500	727	< 0.1	733	2936	3840	5.65	-38	6.44	22.4	0
Ash Pond B	WAP-10	10/02/2017	FD	8.6	500	729	< 0.1	743	2932	-	-	-	-	-	-
Ash Pond B	WAP-10	01/31/2018	N	-	529	738	-	691	2847	3900	1.02	-63	6.67	15.27	1.7
Ash Pond B	WAP-19	11/11/2015	N	6.19	480	375	< 0.1	874	2128	2075	0.5	-2	6.14	24.19	0
Ash Pond B	WAP-19	11/11/2015	FD	6.77	470	380	< 0.1	879	2132	-	-	-	-	-	-
Ash Pond B	WAP-19	01/12/2016	N	3.9	320	233	< 0.1	674	1526	2080	0.73	-37	6.43	20.13	9.3
Ash Pond B	WAP-19	04/27/2016	N	1.99	360	155	0.17	880	1525	1870	1.47	47	6.31	21.81	0
Ash Pond B	WAP-19	06/21/2016	N	2.65	350	134	< 0.1	841	1684	1770	0.65	47	6.18	25.61	19.1
Ash Pond B	WAP-19	10/20/2016	N	4.61	396	240	0.11	837	1612	2190	0.6	11	5.97	24.59	0
Ash Pond B	WAP-19	01/12/2017	N	4.3	315	227	0.19	658	1571	1940	0.7	12	6.18	20.95	0
Ash Pond B	WAP-19	03/13/2017	RS	-	-	-	-	-	-	2020	0.81	-18	6.43	16	6.2
Ash Pond B	WAP-19	04/12/2017	N	3.3	321	222	0.34	716	1570	2020	0.71	26	6.38	20.73	11
Ash Pond B	WAP-19	09/21/2017	N	4.6	371	212	< 0.1	960	1776	2260	1.18	54	6.16	25.83	2
Ash Pond B	WAP-19	10/04/2017	N	4.6	340	193	0.18	954	1736	2210	0.81	52	6.08	23.97	2.5
Ash Pond B	WAP-20	11/12/2015	N	4.97	130	161	0.51	237	722	1120	0.55	-11	5.99	24.33	164
Ash Pond B	WAP-20	11/12/2015	FD	5.1	120	161	0.52	235	726	-	-	-	-	-	-
Ash Pond B	WAP-20	01/13/2016	N	2.74	180	248	0.42	378	897.5	1660	0.86	4	5.94	19.59	16.6
Ash Pond B	WAP-20	01/13/2016	FD	2.85	180	251	0.43	373	845	-	-	-	-	-	-
Ash Pond B	WAP-20	04/27/2016	N	2.25	177	200	0.34	358	945	1400	0.7	26	6	20.68	109
Ash Pond B	WAP-20	06/21/2016	N	3.43	211	263	0.4	745	1290	1370	0.54	29	5.95	27.9	289
Ash Pond B	WAP-20	10/20/2016	N	2.29	59.4	32.6	0.73	99.4	255	472	0.86	24	5.82	22.69	5.9
Ash Pond B	WAP-20	01/12/2017	N	2.36	97.7	74.2	0.57	158	480	7200	0.58	-6	6.09	21.05	3.6
Ash Pond B	WAP-20	03/13/2017	RS	-	-	-	-	-	-	1350	3.29	-10	6.1	17.51	58.1
Ash Pond B	WAP-20	04/13/2017	N	2.6	122	87.1	0.58	247	645	962	0.79	88	6.04	19.75	16.4
Ash Pond B	WAP-20	09/21/2017	N	1.1	69.3	31.3	0.46	135	420	587	0.87	50	5.96	24.54	3.2
Ash Pond B	WAP-20	10/04/2017	N	1.5	61	27.1	0.72	117	368	511	0.99	40	6.03	24.81	6.8
Ash Pond B	WAP-21	11/11/2015	N	13.4	610	802	< 0.1	1070	3098	4005	0.48	-55	5.95	21.83	8.6
Ash Pond B	WAP-21	11/11/2015	FD	13	620	803	< 0.1	67.4	3222	-	-	-	-	-	-
Ash Pond B	WAP-21	01/13/2016	N	8.21	380	718	< 0.1	1180	1865	3080	1.25	19	6.05	19.97	2.4
Ash Pond B	WAP-21	04/27/2016	N	6.08	341	375	< 0.1	707	1820	2440	0.51	35	6.21	21.76	4.6

**TABLE 1  
DETECTION MONITORING ANALYTICAL RESULTS  
WINYAH GENERATING STATION - ASH POND A & B  
SANTEE COOPER  
GEORGETOWN, SOUTH CAROLINA**

Chemical Group				Detection Monitoring - EPA Appendix III Constituents						Field Parameters					
Chemical Name				Boron, Total	Calcium, Total	Chloride	Fluoride	Sulfate	Total Dissolved Solids (TDS)	Conductivity	Dissolved Oxygen	ORP	pH	Temperature	Turbidity
MCL/RSL Units				-	-	-	4	-	-	-	-	-	-	-	
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	uS/cm	mg/L	mv	pH units	Deg C	NTU
Impoundment	Location	Sample Date	Sample Type												
Ash Pond B	WAP-21	06/21/2016	N	7	325	350	< 0.1	764	2052	2200	0.5	70	5.59	27.03	164
Ash Pond B	WAP-21	10/19/2016	N	7.31	363	359	< 0.1	748	1745	2270	0.62	21	5.9	26.21	6.5
Ash Pond B	WAP-21	10/19/2016	FD	6.45	353	358	< 0.1	757	1730	-	-	-	-	-	-
Ash Pond B	WAP-21	01/10/2017	N	7.47	293	333	< 0.1	838	1566	2210	0.8	-24	6.23	17.58	0
Ash Pond B	WAP-21	04/13/2017	N	5.9	334	297	< 0.1	721	1776	2190	0.66	68	6.17	22.74	1.1
Ash Pond B	WAP-21	09/21/2017	N	6.2	341	317	< 0.1	882	1766	2290	0.8	48	5.97	23.77	6
Ash Pond B	WAP-21	09/21/2017	FD	6.1	337	314	< 0.1	884	1762	-	-	-	-	-	-
Ash Pond B	WAP-21	10/04/2017	N	5.6	300	298	< 0.1	811	1658	2260	0.88	55	5.82	23.11	3.3

**ABBREVIATIONS AND NOTES:**

- mg/L: milligram per liter
- uS/cm: microSiemen per centimeter
- mv: millivolt
- NTU: Nephelometric Turbidity Units
- < 0.005: Analyte not detected above detection limit
- : Not Analyzed
- MCL/RSL: The applicable Maximum Contaminant Level (MCL) or Regional Screening Level (RSL) is shown. Dashed where a standard is not provided.
- FD: Field duplicate
- RS: Resample
- N: Normal sample
- Highlighted where a result exceeds the applicable MCL/RSL.
- Criteria used for cobalt, lithium, and molybdenum are RSL for Tapwater where THQ=1.0 (May 2018).
- USEPA. 2016. Final Rule: Disposal of Coal Combustion Residuals from Electric Utilities. July 26. 40 CFR Part 257. <https://www.epa.gov/coalash/coal-ash-rule>

**QUALIFIERS:**

- J: Estimated result

TABLE 2  
ASSESSMENT MONITORING ANALYTICAL RESULTS  
WYNAH GENERATING STATION - ASH POND A & B  
SANTEE COOPER  
GEORGETOWN, SOUTH CAROLINA

Impoundment	Location	Sample Date	Sample Type	Assessment Monitoring - EPA Appendix IV Constituents													Radiological					
				Chemical Group		Antimony, Total 0.005 mg/L	Arsenic, Total 0.01 mg/L	Barium, Total 2 mg/L	Beryllium, Total 0.004 mg/L	Cadmium, Total 0.005 mg/L	Chromium, Total 0.1 mg/L	Cobalt, Total 0.005 mg/L	Fluoride 4 mg/L	Lead, Total 0.015 mg/L	Lithium, Total 0.04 mg/L	Mercury, Total 0.002 mg/L	Molybdenum, Total 0.1 mg/L	Selenium, Total 0.05 mg/L	Thallium, Total 0.002 mg/L	Radium-226 pCi/L	Radium-228 pCi/L	Radium-226 & 228 5 pCi/L
				Chemical Name	MCL/RSL, Units																	
Background	WAP-1	06/04/2018	N	< 0.025	< 0.005	0.025	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.0005	0.13	< 0.001	< 0.01	< 0.0002	< 0.01	< 0.01	< 0.0001	1 U	3 U	4 U	
Background	WAP-1	09/10/2018	N	< 0.005	< 0.005	0.0456	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.01	< 0.01	< 0.0001	1 U	3 U	4 U		
Background	WAP-1	09/21/2018	N	< 0.005	< 0.005	0.0437	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.01	< 0.01	< 0.0001	1 U	3 U	1.87		
Background	WAP-1	01/23/2019	N	< 0.005	< 0.005	0.0399	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.01	< 0.01	< 0.0001	0.742	3 U	1.37		
Background	WAP-1	05/30/2019	N	< 0.005	< 0.005	0.0908	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.01	< 0.01	< 0.0001	1 U	3 U	4 U		
Background	WBW-1	09/10/2018	N	< 0.025	< 0.005	0.0103	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.05	< 0.01	< 0.0001	1.26	3 U	4.28 J		
Background	WBW-1	01/23/2019	N	< 0.005	< 0.005	0.0095	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.01	< 0.01	< 0.0001	1 U	3 U	1.43		
Background	WBW-1	05/30/2019	N	< 0.005	< 0.005	0.0124	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.01	< 0.01	< 0.0001	1 U	3 U	0.664		
Background	WBW-A1-1	08/12/2018	N	< 0.025	< 0.005	0.078	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.01	< 0.01	< 0.0001	1 U	3 U	4 U		
Background	WBW-A1-1	07/11/2018	N	< 0.005	< 0.005	0.108	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.05	< 0.01	< 0.0001	1 U	3 U	4 U		
Background	WBW-A1-1	07/17/2018	N	< 0.005	< 0.005	0.111	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.01	< 0.01	< 0.0001	1.74	3 U	4.74 J		
Background	WBW-A1-1	07/26/2018	N	< 0.005	< 0.005	0.0941	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.01	< 0.01	< 0.0001	1 U	3 U	4 U		
Background	WBW-A1-1	07/31/2018	N	< 0.005	< 0.005	0.087	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.01	< 0.01	< 0.0001	1.03	3 U	4.83 J		
Background	WBW-A1-1	08/07/2018	N	< 0.005	< 0.005	0.0771	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.01	< 0.01	< 0.0001	1.18	3 U	4.16 J		
Background	WBW-A1-1	08/15/2018	N	< 0.005	< 0.005	0.0853	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.01	< 0.01	< 0.0001	1.24	3 U	4.24 J		
Background	WBW-A1-1	08/22/2018	N	< 0.005	< 0.005	0.098	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.01	< 0.01	< 0.0001	2.07	3 U	5.07 J		
Background	WBW-A1-1	01/22/2019	N	< 0.005	< 0.005	0.098	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.01	< 0.01	< 0.0001	2.07	3 U	5.07 J		
Ash Pond A	WAP-8	08/06/2018	N	< 0.025	0.492	0.22	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	0.001	< 0.001	< 0.0002	< 0.01	< 0.01	< 0.0001	1.1	3 U	4.1 J		
Ash Pond A	WAP-9	08/05/2018	N	< 0.025	0.146	0.086	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	0.056	< 0.0002	< 0.01	< 0.01	< 0.0001	1.1	3 U	4.1 J		
Ash Pond A	WAP-9	09/10/2018	N	< 0.025	0.113	0.0623	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	0.065	< 0.0002	< 0.01	< 0.01	< 0.0001	1.1	3 U	4.1 J		
Ash Pond A	WAP-9	02/05/2019	N	< 0.005	0.172	0.0683	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	0.07	< 0.0002	< 0.01	< 0.01	< 0.0001	1.42	3 U	2.77		
Ash Pond A	WAP-9	05/30/2019	N	< 0.005	0.189 / 0.19	0.079 / 0.077	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	0.062	< 0.0002	< 0.01	< 0.005 / < 0.005	< 0.0001	1.07	3 U	1.07		
Ash Pond A	WAP-17	08/05/2018	N	< 0.025	0.094	0.043	< 0.0005	< 0.0005	< 0.005	< 0.0005	0.16	< 0.001	0.22	< 0.0002	0.04	< 0.01	< 0.0001	1 U	3 U	4 U		
Ash Pond A	WAP-17	08/05/2018	FD	< 0.025	0.096	0.044	< 0.0005	< 0.0005	< 0.005	< 0.0005	0.16	< 0.001	0.22	< 0.0002	0.038	< 0.01	< 0.0001	1 U	3 U	4 U		
Ash Pond A	WAP-17	09/11/2018	N	< 0.025	0.108	0.0448	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	0.24	< 0.0002	0.069	< 0.01	< 0.0001	1 U	3 U	4 U		
Ash Pond A	WAP-17	09/11/2018	FD	< 0.025	0.107	0.0427	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	0.23	< 0.0002	0.067	< 0.01	< 0.0001	1 U	3 U	4 U		
Ash Pond A	WAP-17	02/05/2019	N	< 0.005	0.138	0.0439	< 0.0005	< 0.0005	< 0.005	< 0.0005	0.17	< 0.001	0.29	< 0.0002	0.058	< 0.01	< 0.0001	1 U	3 U	1.56		
Ash Pond A	WAP-17	02/05/2019	FD	< 0.005	0.143	0.0438	< 0.0005	< 0.0005	< 0.005	< 0.0005	0.18	< 0.001	0.28	< 0.0002	0.06	< 0.01	< 0.0001	1 U	3 U	1.78		
Ash Pond A	WAP-17	05/30/2019	N	< 0.005	0.119 / 0.11	0.052 / 0.048	< 0.0005	< 0.0005	< 0.005	< 0.0005	0.23	< 0.001	0.25	< 0.0002	0.06	< 0.01	< 0.0001	1 U	3 U	0.476		
Ash Pond A	WAP-17	05/30/2019	FD	< 0.005	0.117 / 0.11	0.051 / 0.048	< 0.0005	< 0.0005	< 0.005	< 0.0005	0.14	< 0.001	0.24	< 0.0002	0.06	< 0.01	< 0.0001	1 U	3 U	0.65		
Ash Pond A	WAP-18	08/06/2018	N	< 0.025	1.32	0.091	< 0.0005	< 0.0005	< 0.005	< 0.0005	1.67	< 0.001	0.32	< 0.0002	0.27	< 0.01	< 0.0001	1 U	3 U	4 U		
Ash Pond A	WAP-18	08/17/2018	N	< 0.025	1	0.0992	< 0.0005	< 0.0005	< 0.005	< 0.0005	1.46	< 0.001	0.4	< 0.0002	1.3	< 0.01	< 0.0001	1 U	3 U	4 U		
Ash Pond A	WAP-18	02/07/2019	N	< 0.005	0.835	0.0934	< 0.0005	< 0.0005	< 0.005	< 0.0005	1.88	< 0.001	0.38	< 0.0002	0.71	< 0.01	< 0.0001	1 U	3 U	1.05		
Ash Pond A	WAP-18	08/05/2019	N	< 0.005	0.482	0.0945	< 0.0005	< 0.0005	< 0.005	< 0.0005	0.12	< 0.001	0.33	< 0.0002	0.71	< 0.01	< 0.0001	1 U	3 U	1.38		
Ash Pond B	WAP-10	08/05/2018	N	< 0.025	< 0.005	0.247	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	0.022	< 0.0002	< 0.01	< 0.01	< 0.0001	2.66	3 U	5.88 J		
Ash Pond B	WAP-10	08/05/2018	FD	< 0.025	< 0.005	0.248	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	0.022	< 0.0002	< 0.01	< 0.01	< 0.0001	2.66	3 U	5.88 J		
Ash Pond B	WAP-10	09/10/2018	N	< 0.005	< 0.005	0.254	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	0.022	< 0.0002	< 0.01	< 0.01	< 0.0001	3.7	3 U	6.7 J		
Ash Pond B	WAP-10	09/10/2018	FD	< 0.005	< 0.005	0.248	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	0.023	< 0.0002	< 0.01	< 0.01	< 0.0001	1.22	3 U	4.22 J		
Ash Pond B	WAP-10	02/05/2019	N	< 0.005	0.0635	0.234	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	0.03	< 0.0002	< 0.01	< 0.01	< 0.0001	2.66	3 U	3.22		
Ash Pond B	WAP-10	02/05/2019	FD	< 0.005	0.0661	0.218	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	0.032	< 0.0002	< 0.01	< 0.01	< 0.0001	1.78	3 U	2.09		
Ash Pond B	WAP-10	05/30/2019	N	< 0.005	0.0669	0.254	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	0.021	< 0.0002	< 0.01	< 0.01	< 0.0001	2.27	3 U	3.47		
Ash Pond B	WAP-10	05/30/2019	FD	< 0.005	0.0666	0.235	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.001	0.022	< 0.0002	< 0.01	< 0.01	< 0.0001	2.01	3 U	3.59		
Ash Pond B	WAP-19	08/08/2018	N	< 0.025	0.231	0.055	< 0.0005	< 0.0005	< 0.005	< 0.0005	0.36	< 0.001	0.25	< 0.0002	0.065	< 0.01	< 0.0001	1 U	3 U	4 U		
Ash Pond B	WAP-19	09/17/2018	N	< 0.025	0.0199	0.051	< 0.0005	< 0.0005	< 0.005	< 0.0005	0.12	< 0.001	0.23	< 0.0002	0.05	< 0.01	< 0.0001	1 U	3 U	4 U		
Ash Pond B	WAP-1																					

**TABLE 2  
ASSESSMENT MONITORING ANALYTICAL RESULTS  
WINYAH GENERATING STATION - ASH POND A & B  
SANTEE COOPER  
GEORGETOWN, SOUTH CAROLINA**

Chemical Group				Field Parameters						
Impoundment	Location	Sample Date	Sample Type	Chemical Name	Conductivity	Dissolved Oxygen	ORP	pH	Temperature	Turbidity
				MCL/RSL Units	uS/cm	mg/L	mv	pl units	Deg C	NTU
Background	WAP-1	06/04/2018	N		97	6.65	-3	6.19	27.99	0
Background	WAP-1	09/10/2018	N		71	0.72	80	4.63	28.86	0
Background	WAP-1	06/21/2018	N							
Background	WAP-1	01/23/2019	N		95	0.91	80	4.63	19.25	0
Background	WAP-1	05/30/2019	N		73	0.78	164	4.58	28.25	0.4
Background	WBW-1	06/04/2018	N		47	1.5	78	4.35	24.13	0
Background	WBW-1	09/10/2018	N		48	0.98	86	4.14	26.67	0
Background	WBW-1	01/23/2019	N		40	1.16	79	4.4	17.48	0
Background	WBW-1	05/30/2019	N		37	0.67	173	4.02	28.26	0
Background	WBW-A1-1	06/12/2018	N		269	0.74	95	4.7	24.91	3.7
Background	WBW-A1-1	07/11/2018	N		418	0.75	100	4.47	25.12	0
Background	WBW-A1-1	07/17/2018	N		432	0.86	77	4.52	26.08	4
Background	WBW-A1-1	07/28/2018	N		369	0.84	147	4.4	22.82	0
Background	WBW-A1-1	07/31/2018	N		280	0.77	124	4.58	26.38	0
Background	WBW-A1-1	08/07/2018	N		308	0.88	66	4.46	23.84	0
Background	WBW-A1-1	08/15/2018	N		280	0.77	124	4.58	26.38	0
Background	WBW-A1-1	08/22/2018	N		376	0.84	89	4.38	24.58	0
Background	WBW-A1-1	01/22/2019	N		423	1.01	99	4.28	16.7	0
Ash Pond A	WAP-8	06/06/2018	N		3230	0.86	-86	7.02	27.9	0
Ash Pond A	WAP-9	06/05/2018	N		1030	0.85	29	5.96	27.1	0
Ash Pond A	WAP-9	06/10/2018	N		1080	0.69	0	5.89	28.26	0
Ash Pond A	WAP-9	02/05/2019	N		1130	0.74	-98	5.96	23.77	0
Ash Pond A	WAP-9	05/30/2019	N		1070	0.69	39	6.85	26.71	0.5
Ash Pond A	WAP-17	06/05/2018	N		2170	0.88	133	6.04	22.75	0
Ash Pond A	WAP-17	06/05/2018	FD							
Ash Pond A	WAP-17	09/11/2018	N		1940	0.64	99	6.03	26.46	0
Ash Pond A	WAP-17	09/11/2018	FD							
Ash Pond A	WAP-17	02/05/2019	N		2080	1.1	46	6.11	22.2	2
Ash Pond A	WAP-17	02/05/2019	FD							
Ash Pond A	WAP-17	05/30/2019	N		2210	0.84	30	6.03	27.38	0
Ash Pond A	WAP-17	05/30/2019	FD							
Ash Pond A	WAP-18	06/06/2018	N		2280	0.84	28	6.8	27.62	0
Ash Pond A	WAP-18	06/17/2018	N		2060	0.75	103	6.35	25.82	0
Ash Pond A	WAP-18	02/07/2019	N		1720	0.89	25	6.73	23.68	7.9
Ash Pond A	WAP-18	08/05/2019	N		1880	0.86	-69	6.57	21.33	57.8
Ash Pond B	WAP-10	06/05/2018	N		3470	0.74	7	6.49	25.56	0
Ash Pond B	WAP-10	06/05/2018	FD							
Ash Pond B	WAP-10	09/10/2018	N		3460	0.77	19	6.38	27.12	0
Ash Pond B	WAP-10	09/10/2018	FD							
Ash Pond B	WAP-10	02/05/2019	N		3660	0.99	-50	6.53	19.67	7
Ash Pond B	WAP-10	02/05/2019	FD							
Ash Pond B	WAP-10	05/30/2019	N		3700	0.87	-45	6.46	23.32	0.1
Ash Pond B	WAP-10	05/30/2019	FD							
Ash Pond B	WAP-19	06/06/2018	N		2210	0.83	82	6.27	22.5	49.4
Ash Pond B	WAP-19	09/17/2018	N		1980	0.82	114	6.79	24.47	0
Ash Pond B	WAP-19	02/07/2019	N		1600	0.9	70	6.34	24.41	5.8
Ash Pond B	WAP-19	06/06/2019	N		2000	0.47	-16	6.37	22.46	1.5
Ash Pond B	WAP-20	06/06/2018	N		1320	0.81	75	6.01	25.95	3.8
Ash Pond B	WAP-20	09/17/2018	N		585	0.96	95	6.53	23.31	0
Ash Pond B	WAP-20	02/07/2019	N		446	1.82	87	6.09	21.42	6
Ash Pond B	WAP-20	06/05/2019	N		783	0.87	-42	6.07	24.63	161
Ash Pond B	WAP-21	06/06/2018	N		2140	0.9	110	6.91	21.01	0
Ash Pond B	WAP-21	09/17/2018	N		1940	0.88	106	6.81	23.01	0
Ash Pond B	WAP-21	02/06/2019	N		1480	1.04	25	6.22	20.66	0
Ash Pond B	WAP-21	06/11/2019	N		1400	0.5	-1	6.1	20.05	8.7

**ABBREVIATIONS AND NOTES:**  
 mg/L: milligram per liter  
 uS/cm: microSiemen per centimeter  
 mv: millivolt  
 NTU: Nephelometric Turbidity Units  
 < 0.005: Analyte not detected above detection limit  
 -: Not Analyzed  
 MCL/RSL: The applicable Maximum Contaminant Level (MCL) or Regional Screening Level (RSL) is shown. Dashed where a standard is not provided.  
 FD: Field duplicate  
 N: Normal sample  
 /: Multiple results reported due to multiple methods  
 - Highlighted where a result exceeds the applicable MCL/RSL.  
 - Criteria used for cobalt, lithium, and molybdenum are RSL for Tapwater where THQ=1.0 (May 2018)  
 - USEPA 2016: Final Rule Disposal of Coal Combustion Residuals from Electric Utilities July 26 40 CFR Part 257  
<https://www.epa.gov/coalash/coal-ash-rule>

**QUALIFIERS:**  
 J: Estimated result

**TABLE 3**  
**SUMMARY OF GROUNDWATER MEASUREMENTS**  
**WINYAH GENERATING STATION - ASH POND A & B**  
**SANTEE COOPER**  
**GEORGETOWN, SOUTH CAROLINA**

Location	Measurement Date	Depth to Water	Groundwater Elevation
WBW-1	11/10/2015	3.96	28.01
WBW-1	1/11/2016	6.04	25.93
WBW-1	4/26/2016	6.69	25.28
WBW-1	6/20/2016	6.58	25.39
WBW-1	10/17/2016	4.99	26.98
WBW-1	1/9/2017	5.95	26.02
WBW-1	4/10/2017	6.24	25.73
WBW-1	9/18/2017	5.02	26.95
WBW-1	10/2/2017	5.85	26.12
WBW-1	6/4/2018	5.45	26.52
WBW-1	9/10/2018	6.70	25.27
WBW-1	1/23/2019	5.65	26.32
WBW-1	5/30/2019	5.34	26.63
WAP-1	11/10/2015	3.00	26.44
WAP-1	1/11/2016	4.84	24.60
WAP-1	4/26/2016	5.89	23.55
WAP-1	6/20/2016	5.90	23.54
WAP-1	10/18/2016	4.21	25.23
WAP-1	1/9/2017	4.42	25.02
WAP-1	4/10/2017	4.61	24.83
WAP-1	7/18/2017	4.88	24.56
WAP-1	9/18/2017	6.12	23.32
WAP-1	10/2/2017	7.45	21.99
WAP-1	1/30/2018	13.14	16.30
WAP-1	6/4/2018	12.66	16.78
WAP-1	9/10/2018	11.02	18.42
WAP-1	1/23/2019	6.86	22.58
WAP-1	5/30/2019	6.76	22.68
WAP-2	11/10/2015	2.28	21.41
WAP-2	1/11/2016	3.45	20.24
WAP-2	4/28/2016	4.09	19.60
WAP-2	6/20/2016	3.21	20.48
WAP-2	10/18/2016	3.10	20.59
WAP-2	1/9/2017	3.38	20.31
WAP-2	4/10/2017	3.75	19.94
WAP-2	6/19/2017	3.79	19.90
WAP-2	9/20/2017	3.00	20.69
WAP-2	10/2/2017	3.04	20.65
WAP-2	1/30/2018	3.41	20.28
WAP-2	6/4/2018	3.09	20.60
WAP-2	9/10/2018	4.25	19.44
WAP-2	1/23/2019	3.32	20.37
WAP-2	6/20/2019	3.51	20.18
WAP-3	11/11/2015	5.20	14.23
WAP-3	1/11/2016	6.17	13.26
WAP-3	4/26/2016	6.99	12.44
WAP-3	6/22/2016	7.51	11.92
WAP-3	10/19/2016	6.48	12.95
WAP-3	1/12/2017	6.50	12.93
WAP-3	4/12/2017	6.81	12.62
WAP-3	6/19/2017	7.05	12.38
WAP-3	9/20/2017	6.64	12.79
WAP-3	10/3/2017	7.12	12.31
WAP-3	2/6/2018	6.71	12.72
WAP-3	6/4/2018	7.12	12.31
WAP-3	9/11/2018	8.16	11.27
WAP-3	2/6/2019	6.82	12.61
WAP-3	6/24/2019	6.70	12.73
WAP-4	11/12/2015	6.78	13.56
WAP-4	1/14/2016	8.49	11.85

Haley & Aldrich, Inc.  
 \\haleyaldrich.com\share\gim\_common\13\1539 - Santee Cooper Winyah Generating Station\Deliverables\CMVAsh Ponds A & B\Tables\2019-0629-HAI-  
 WGS\_WaterLevels\_AshPondAB\_FromClient.xlsx

September 2019

**TABLE 3**  
**SUMMARY OF GROUNDWATER MEASUREMENTS**  
**WINYAH GENERATING STATION - ASH POND A & B**  
**SANTEE COOPER**  
**GEORGETOWN, SOUTH CAROLINA**

Location	Measurement Date	Depth to Water	Groundwater Elevation
WAP-4	5/2/2016	9.21	11.13
WAP-4	6/22/2016	8.65	11.69
WAP-4	10/17/2016	6.99	13.35
WAP-4	1/11/2017	7.35	12.99
WAP-4	4/11/2017	7.62	12.72
WAP-4	6/19/2017	7.88	12.46
WAP-4	9/19/2017	7.03	13.31
WAP-4	10/3/2017	8.02	12.32
WAP-4	2/5/2018	7.35	12.99
WAP-4	6/7/2018	7.24	13.10
WAP-4	9/17/2018	4.96	15.38
WAP-4	1/22/2019	7.21	13.13
WAP-4	6/18/2019	7.02	13.32
WAP-7	1/14/2016	9.21	20.73
WAP-7	6/22/2016	10.70	19.24
WAP-7	1/17/2017	9.87	20.07
WAP-7	6/19/2017	9.93	20.01
WAP-7	1/31/2018	10.14	19.80
WAP-7	6/13/2018	9.99	19.95
WAP-7	7/11/2018	10.10	19.84
WAP-7	7/17/2018	10.16	19.78
WAP-7	7/26/2018	8.82	21.12
WAP-7	7/31/2018	8.79	21.15
WAP-7	8/7/2018	8.52	21.42
WAP-7	8/13/2018	8.79	21.15
WAP-7	8/22/2018	8.92	21.02
WAP-7	1/22/2019	9.58	20.36
WAP-7	6/24/2019	9.47	20.47
WAP-9	11/11/2015	6.91	19.27
WAP-9	1/19/2016	8.12	19.92
WAP-9	4/26/2016	6.10	20.08
WAP-9	6/20/2016	8.91	19.13
WAP-9	10/18/2016	7.82	20.22
WAP-9	1/10/2017	8.56	19.48
WAP-9	4/10/2017	9.64	18.40
WAP-9	6/19/2017	9.22	18.82
WAP-9	9/18/2017	8.40	19.64
WAP-9	10/2/2017	8.87	19.17
WAP-9	1/31/2018	9.89	18.15
WAP-9	6/5/2018	9.63	18.41
WAP-9	9/10/2018	9.09	18.95
WAP-9	2/5/2019	8.76	19.28
WAP-9	5/30/2019	9.48	18.56
WAP-10	11/12/2015	3.20	22.91
WAP-10	1/19/2016	3.84	22.27
WAP-10	4/26/2016	5.13	20.98
WAP-10	6/20/2016	4.18	21.93
WAP-10	10/18/2016	3.52	22.59
WAP-10	1/10/2017	3.85	22.26
WAP-10	4/10/2017	4.65	21.46
WAP-10	6/19/2017	4.25	21.86
WAP-10	9/18/2017	3.68	22.43
WAP-10	10/2/2017	4.04	22.07
WAP-10	1/31/2018	4.67	21.44
WAP-10	6/5/2018	4.52	21.59
WAP-10	9/10/2018	4.45	21.66
WAP-10	2/5/2019	4.57	21.54
WAP-10	5/30/2019	5.15	20.96
WAP-12	11/10/2015	5.87	24.97
WAP-12	1/12/2016	6.78	24.06

**TABLE 3  
SUMMARY OF GROUNDWATER MEASUREMENTS  
WINYAH GENERATING STATION - ASH POND A & B  
SANTEE COOPER  
GEORGETOWN, SOUTH CAROLINA**

Location	Measurement Date	Depth to Water	Groundwater Elevation
WAP-12	4/26/2016	7.26	23.58
WAP-12	6/20/2016	7.09	23.75
WAP-12	10/19/2016	6.32	24.52
WAP-12	1/11/2017	6.95	23.89
WAP-12	4/12/2017	7.37	23.47
WAP-12	9/20/2017	6.56	24.28
WAP-12	10/3/2017	6.81	24.03
WAP-12	6/5/2018	7.22	23.62
WAP-12	9/11/2018	7.06	23.78
WAP-12	2/5/2019	7.16	23.68
WAP-12	6/20/2019	7.02	23.82
WAP-13	11/10/2015	4.08	17.89
WAP-13	1/12/2016	4.88	17.09
WAP-13	4/28/2016	6.57	15.40
WAP-13	6/22/2016	4.18	17.79
WAP-13	10/19/2016	5.79	16.18
WAP-13	1/12/2017	5.91	16.06
WAP-13	4/12/2017	5.94	16.03
WAP-13	9/20/2017	5.57	16.40
WAP-13	10/3/2017	6.00	15.97
WAP-13	6/4/2018	5.84	16.13
WAP-13	9/11/2018	6.41	15.56
WAP-13	2/6/2019	5.72	16.25
WAP-13	6/24/2019	5.53	16.44
WAP-14	11/12/2015	3.40	11.29
WAP-14	1/14/2016	4.09	10.60
WAP-14	5/2/2016	5.17	9.52
WAP-14	6/21/2016	4.51	10.18
WAP-14	10/17/2016	3.85	10.84
WAP-14	1/11/2017	4.06	10.63
WAP-14	4/11/2017	4.63	10.06
WAP-14	9/19/2017	4.21	10.48
WAP-14	10/3/2017	5.41	9.28
WAP-14	6/7/2018	4.65	10.04
WAP-14	9/21/2018	3.91	10.78
WAP-14	1/22/2019	4.14	10.55
WAP-14	6/18/2019	4.65	10.04
WAP-14A	6/18/2019	3.18	10.77
WAP-14B	6/19/2019	5.26	3.97
WAP-14C	6/18/2019	9.95	3.93
WAP-15	11/12/2015	6.04	14.37
WAP-15	1/13/2016	7.16	13.25
WAP-15	5/2/2016	7.78	12.63
WAP-15	6/22/2016	7.43	12.98
WAP-15	10/17/2016	7.02	13.39
WAP-15	1/11/2017	7.09	13.32
WAP-15	4/11/2017	7.24	13.17
WAP-15	9/19/2017	7.07	13.34
WAP-15	10/4/2017	7.79	12.62
WAP-15	6/7/2018	7.21	13.20
WAP-15	9/17/2018	5.68	14.73
WAP-15	1/22/2019	6.98	13.43
WAP-15	6/11/2019	6.74	13.67
WAP-16	11/12/2015	5.52	19.56
WAP-16	1/13/2016	5.90	19.18
WAP-16	5/2/2016	6.04	19.04
WAP-16	6/22/2016	5.90	19.18
WAP-16	10/17/2016	5.68	19.40
WAP-16	1/11/2017	5.88	19.20
WAP-16	4/11/2017	7.38	17.70

**TABLE 3**  
**SUMMARY OF GROUNDWATER MEASUREMENTS**  
**WINYAH GENERATING STATION - ASH POND A & B**  
**SANTEE COOPER**  
**GEORGETOWN, SOUTH CAROLINA**

Location	Measurement Date	Depth to Water	Groundwater Elevation
WAP-16	9/21/2017	7.11	17.97
WAP-16	10/3/2017	7.34	17.74
WAP-16	6/7/2018	6.78	18.30
WAP-16	9/21/2018	6.47	18.61
WAP-16	1/22/2019	6.95	18.13
WAP-16	6/19/2019	6.91	18.17
WAP-17	11/11/2015	3.99	25.28
WAP-17	1/19/2016	5.15	24.12
WAP-17	4/26/2016	6.46	22.81
WAP-17	6/20/2016	5.45	23.82
WAP-17	10/18/2016	4.42	24.85
WAP-17	1/10/2017	5.71	23.56
WAP-17	4/10/2017	6.44	22.83
WAP-17	9/18/2017	5.14	24.13
WAP-17	10/2/2017	5.62	23.65
WAP-17	6/5/2018	6.15	23.12
WAP-17	9/11/2018	6.39	22.88
WAP-17	2/5/2019	6.54	22.73
WAP-17	5/30/2019	7.18	22.09
WAP-18	11/11/2015	14.31	28.74
WAP-18	1/12/2016	14.26	28.79
WAP-18	4/27/2016	17.09	25.96
WAP-18	6/21/2016	16.36	26.69
WAP-18	10/20/2016	14.47	28.58
WAP-18	1/12/2017	16.58	26.47
WAP-18	4/12/2017	18.54	24.51
WAP-18	9/21/2017	17.42	25.63
WAP-18	10/4/2017	18.69	24.36
WAP-18	6/6/2018	20.18	22.87
WAP-18	9/17/2018	17.28	25.77
WAP-18	2/7/2019	21.15	21.90
WAP-18	6/5/2019	24.46	18.59
WAP-19	11/11/2015	15.15	28.24
WAP-19	1/12/2016	16.51	26.88
WAP-19	4/27/2016	19.45	23.94
WAP-19	6/21/2016	17.45	25.94
WAP-19	10/20/2016	15.77	27.62
WAP-19	1/12/2017	18.25	25.14
WAP-19	4/12/2017	19.87	23.52
WAP-19	9/21/2017	18.50	24.89
WAP-19	10/4/2017	18.91	24.48
WAP-19	6/6/2018	19.41	23.98
WAP-19	9/17/2018	17.77	25.62
WAP-19	2/7/2019	20.25	23.14
WAP-19	6/6/2019	22.46	20.93
WAP-20	11/12/2015	13.51	29.57
WAP-20	1/13/2016	15.76	27.32
WAP-20	4/27/2016	19.59	23.49
WAP-20	6/21/2016	19.10	23.98
WAP-20	10/20/2016	16.08	27.00
WAP-20	1/12/2017	18.40	24.68
WAP-20	4/13/2017	19.03	24.05
WAP-20	9/21/2017	17.01	26.07
WAP-20	10/4/2017	18.18	24.90
WAP-20	6/6/2018	19.84	23.24
WAP-20	9/17/2018	16.01	27.07
WAP-20	2/7/2019	19.72	23.36
WAP-20	6/5/2019	20.76	22.32
WAP-21	11/11/2015	14.46	28.60
WAP-21	1/13/2016	15.51	27.55

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 WGS\_WaterLevels\_AshPondAB\_FromClient.xlsx



**TABLE 3**  
**SUMMARY OF GROUNDWATER MEASUREMENTS**  
**WINYAH GENERATING STATION - ASH POND A & B**  
**SANTEE COOPER**  
**GEORGETOWN, SOUTH CAROLINA**

Location	Measurement Date	Depth to Water	Groundwater Elevation
WAP-21	4/27/2016	19.51	23.55
WAP-21	6/21/2016	16.50	26.56
WAP-21	10/19/2016	15.11	27.95
WAP-21	1/10/2017	15.81	27.25
WAP-21	4/13/2017	17.66	25.40
WAP-21	9/21/2017	15.34	27.72
WAP-21	10/4/2017	16.24	26.82
WAP-21	6/6/2018	15.74	27.32
WAP-21	9/17/2018	16.47	26.59
WAP-21	2/6/2019	19.61	23.45
WAP-21	6/11/2019	20.55	22.51
WAP-22	6/5/2019	24.71	18.66
WAP-23	6/5/2019	21.56	21.67
WAP-24	6/19/2019	6.44	22.33
WAP-25	6/6/2019	8.95	18.15
WAP-26	6/11/2019	7.97	19.59
WBW-A1-1	6/12/2018	7.28	20.86
WBW-A1-1	7/11/2018	6.71	21.43
WBW-A1-1	7/17/2018	7.27	20.87
WBW-A1-1	7/26/2018	5.31	22.83
WBW-A1-1	7/31/2018	6.36	21.78
WBW-A1-1	8/7/2018	5.81	22.33
WBW-A1-1	8/15/2018	6.36	21.78
WBW-A1-1	8/22/2018	6.80	21.34
WBW-A1-1	1/22/2019	5.88	22.26
WBW-A1-1	6/24/2019	6.05	22.09
WLF-A1-1	6/13/2018	17.74	23.61
WLF-A1-1	7/11/2018	18.77	22.58
WLF-A1-1	7/17/2018	18.12	23.33
WLF-A1-1	7/26/2018	16.21	25.14
WLF-A1-1	8/1/2018	16.41	24.94
WLF-A1-1	8/8/2018	16.14	25.21
WLF-A1-1	8/13/2018	16.41	25.04
WLF-A1-1	8/22/2018	16.79	24.56
WLF-A1-1	1/22/2019	16.67	24.68
WLF-A1-1	6/26/2019	17.37	23.98
WLF-A1-2	6/12/2018	6.53	22.68
WLF-A1-2	7/11/2018	6.21	23.00
WLF-A1-2	7/17/2018	6.81	22.40
WLF-A1-2	7/26/2018	2.61	26.60
WLF-A1-2	7/31/2018	4.11	25.10
WLF-A1-2	8/7/2018	2.96	26.25
WLF-A1-2	8/15/2018	4.11	25.10
WLF-A1-2	8/23/2018	4.88	24.33
WLF-A1-2	1/23/2019	4.50	24.71
WLF-A1-2	6/25/2019	5.55	23.66
WLF-A1-3	6/12/2018	6.14	22.17
WLF-A1-3	7/11/2018	6.35	21.96
WLF-A1-3	7/18/2018	7.81	20.50
WLF-A1-3	7/26/2018	3.27	25.04
WLF-A1-3	7/31/2018	4.01	24.30
WLF-A1-3	8/7/2018	3.19	25.12
WLF-A1-3	8/15/2018	4.01	22.15
WLF-A1-3	8/23/2018	4.51	23.80
WLF-A1-3	1/22/2019	4.63	23.68
WLF-A1-3	6/25/2019	5.45	22.86
WLF-A1-4	6/12/2018	5.64	22.60
WLF-A1-4	7/11/2018	5.76	22.48
WLF-A1-4	7/18/2018	6.22	22.02
WLF-A1-4	7/26/2018	2.30	25.94

**TABLE 3  
SUMMARY OF GROUNDWATER MEASUREMENTS  
WINYAH GENERATING STATION - ASH POND A & B  
SANTEE COOPER  
GEORGETOWN, SOUTH CAROLINA**

Location	Measurement Date	Depth to Water	Groundwater Elevation
WLF-A1-4	7/31/2018	3.51	24.73
WLF-A1-4	8/7/2018	3.11	25.13
WLF-A1-4	8/15/2018	3.51	22.52
WLF-A1-4	8/23/2018	4.21	24.03
WLF-A1-4	1/22/2019	4.46	23.78
WLF-A1-4	6/25/2019	5.39	22.85
WLF-A1-5	6/13/2018	15.91	21.73
WLF-A1-5	7/11/2018	15.82	21.82
WLF-A1-5	7/17/2018	16.00	21.64
WLF-A1-5	7/26/2018	13.66	23.98
WLF-A1-5	8/1/2018	14.11	23.53
WLF-A1-5	8/8/2018	13.82	23.82
WLF-A1-5	8/15/2018	14.11	21.05
WLF-A1-5	8/22/2018	14.96	22.68
WLF-A1-5	1/22/2019	15.96	21.68
WLF-A1-5	6/26/2019	15.95	21.69

**Notes and Abbreviations:**

**TABLE 4**  
**SUMMARY OF GROUNDWATER ANALYTICAL RESULTS FOR NATURE AND EXTENT**  
**WINYAH GENERATING STATION - ASH POND A & B**  
**SANTEE COOPER**  
**GEORGETOWN, SOUTH CAROLINA**

Chemical Group				Detection Monitoring - EPA Appendix III Constituents						Assessment Monitoring - EPA Appendix IV Constituents								Radiological				
Impoundment	Location	Sample Date	Sample Type	Boron, Total	Calcium, Total	Chloride	Fluoride	Sulfate	Total Dissolved Solids (TDS)	Arsenic, Total	Barium, Total	Cadmium, Total	Chromium, Total	Cobalt, Total	Fluoride	Lead, Total	Lithium, Total	Molybdenum, Total	Selenium, Total	Radium-226	Radium-228	Radium-226 & 228
				MCL/RSL Units	mg/L	mg/L	mg/L	4 mg/L	mg/L	mg/L	mg/L	mg/L	0.01 mg/L	2 mg/L	0.005 mg/L	0.1 mg/L	0.006 mg/L	4 mg/L	0.015 mg/L	0.04 mg/L	0.1 mg/L	0.05 mg/L
Background	WAP-1	05/30/2019	N	0.054	1.9	3.08	< 0.1	16	43.75	< 0.005	0.0399	< 0.0005	< 0.005	0.00059	< 0.1	< 0.01	< 0.01	< 0.01	< 0.01	0.742	-	1.37
Background	WBW-1	05/30/2019	N	0.085	< 0.5	2.71	< 0.1	5.64	21.25	< 0.005	0.0124	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.01	< 0.01	< 0.01	< 0.01	-	-	0.564
Ash Pond A	WAP-9	05/30/2019	N	5.6	130	92.3	< 0.1	82.2	737.5	0.189 / 0.19	0.079 / 0.077	< 0.002 / < 0.004	< 0.01 / < 0.01	-	< 0.1	< 0.002 / < 0.05	0.062	< 0.01	< 0.005 / < 0.05	1.07	-	1.07
Ash Pond A	WAP-17	05/30/2019	N	3.7	340	249	0.23	739	1656	0.119 / 0.11	0.052 / 0.048	-	-	-	0.23	-	0.25	-	-	-	-	0.475
Ash Pond A	WAP-17	05/30/2019	FD	3.8	340	262	0.14	790	1632	0.117 / 0.11	0.051 / 0.048	-	-	-	0.14	-	0.24	-	-	-	-	0.65
Ash Pond A	WAP-18	06/05/2019	N	-	302	7.63	0.12	6.69	1532	0.492	0.0945	-	-	-	0.12	-	0.33	-	-	-	-	1.38
Ash Pond A	WAP-22	06/05/2019	N	-	270	330	-	415	1611	0.0148	-	-	-	-	-	-	0.051	-	-	-	-	-
Ash Pond A	WAP-26	06/11/2019	N	-	22.5	7.8	-	73.2	165	< 0.005	-	-	-	-	-	-	< 0.01	-	-	-	-	-
Ash Pond B	WAP-10	05/30/2019	N	8.6	490	745	< 0.1	670	3309	0.0059	0.254	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.01	0.021	< 0.01	< 0.01	2.27	-	3.47
Ash Pond B	WAP-10	05/30/2019	FD	8.8	472	747	< 0.1	676	3338	0.0066	0.235	< 0.0005	< 0.005	< 0.0005	< 0.1	< 0.01	0.022	< 0.01	< 0.01	2.01	-	3.59
Ash Pond B	WAP-19	06/06/2019	N	-	250	213	0.23	588	1411	0.123	0.0401	-	-	-	0.23	-	0.24	-	-	1.5	-	2.18
Ash Pond B	WAP-20	06/05/2019	N	-	78.3	24.8	0.66	172	443.8	0.0625	0.0389	-	-	< 0.001	0.66	-	0.15	0.0366	-	-	-	1.68
Ash Pond B	WAP-21	06/11/2019	N	4.2	178	172	< 0.1	468	995	< 0.005	0.043	-	-	< 0.01	< 0.1	-	< 0.01	< 0.01	-	-	-	0.845
Ash Pond B	WAP-23	06/05/2019	N	-	140	70.9	-	105	642.5	< 0.005	-	-	-	-	-	-	0.034	< 0.01	-	-	-	-
Ash Pond B	WAP-24	06/19/2019	N	-	43	28.5	-	< 2	277.5	< 0.005	-	-	-	-	-	-	< 0.01	< 0.01	-	-	-	-
Ash Pond B	WAP-25	06/06/2019	N	-	59.2	11.1	-	2.69	260	< 0.005	-	-	-	-	-	-	< 0.01	0.00147	-	-	-	-

**ABBREVIATIONS AND NOTES:**  
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 - Criteria used for cobalt, lithium, and molybdenum are RSL for Tapwater where THG=1.0 (May 2018).  
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<https://www.epa.gov/coalash/coal-ash-rule>

**QUALIFIERS:**  
 J: Estimated result

**TABLE 4**  
**SUMMARY OF GROUNDWATER ANALYTICAL RESULTS FOR NATURE AND EXTENT**  
**WINYAH GENERATING STATION - ASH POND A & B**  
**SANTEE COOPER**  
**GEORGETOWN, SOUTH CAROLINA**

Chemical Group				Field Parameters				Dissolved Metals											Total Me					
Chemical Name				Conductivity	Dissolved Oxygen	ORP	pH	Temperature	Turbidity	Arsenic, Dissolved	Barium, Dissolved	Calcium, Dissolved	Cobalt, Dissolved	Iron, Dissolved	Lithium, Dissolved	Magnesium, Dissolved	Manganese, Dissolved	Molybdenum, Dissolved	Potassium, Dissolved	Sodium, Dissolved	Aluminum, Total	Copper, Total	Iron, Total	Magnesium, Total
MCL/RSL Units				uS/cm	mg/L	mv	pH units	Deg C	NTU	0.01 mg/L	2 mg/L	mg/L	0.006 mg/L	mg/L	0.04 mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	1.3 mg/L	mg/L	mg/L	mg/L
Impoundment	Location	Sample Date	Sample Type																					
Background	WAP-1	05/30/2019	N	73	0.78	164	4.58	28.25	0.4	< 0.005	-	1.7	-	1.53	< 0.01	0.55	0.0083	< 10	< 0.5	4.1	1.3	< 0.005	1.71	0.62
Background	WBW-1	05/30/2019	N	37	0.57	173	4.02	28.26	0	< 0.005	-	< 0.5	-	0.215	< 0.01	0.24	0.006	< 10	< 0.5	2	< 0.5	< 0.005	0.303	0.24
Ash Pond A	WAP-9	05/30/2019	N	1070	0.69	39	5.85	26.71	0.5	0.192 / 0.19	-	130	-	1.05	0.063	28 / 29	0.185 / 0.19	-	18.4 / 16	60	0.677 / 0.72	< 0.01 / < 0.01	1.21 / 1.1	28.1 / 29
Ash Pond A	WAP-17	05/30/2019	N	2210	0.84	30	6.03	27.38	0	0.114 / 0.1	-	330	-	0.8	0.24	46 / 49	0.086 / 0.084	-	12.7 / 11	85	-	-	0.906 / 0.88	45.7 / 48
Ash Pond A	WAP-17	05/30/2019	FD	-	-	-	-	-	-	0.114 / 0.11	-	330	-	0.78	0.24	46.8 / 48	0.081 / 0.081	-	12.5 / 12	85	-	-	0.853 / 0.85	47.4 / 49
Ash Pond A	WAP-18	06/05/2019	N	1860	0.86	-69	6.57	21.33	57.6	0.383	0.0845	310	-	0.991	0.31	24	0.7	-	11.5	37.6	-	-	1.51	29.4
Ash Pond A	WAP-22	06/05/2019	N	2230	3.25	-64	6.73	25.4	87.1	< 0.005	-	267	-	2.57	0.051	21.2	0.33	-	8.45	144	-	-	5.54	22.6
Ash Pond A	WAP-26	06/11/2019	N	240	0.45	-19	5.49	22.26	0	< 0.005	-	20.4	-	2.38	< 0.01	1.64	0.048	-	1.29	15	-	-	2.4	1.61
Ash Pond B	WAP-10	05/30/2019	N	3700	0.87	-45	6.46	23.32	0.1	0.0054	-	488	-	16	0.021	62.7	0.545	< 10	20	135	< 0.5	< 0.005	19.3	72.8
Ash Pond B	WAP-10	05/30/2019	FD	-	-	-	-	-	-	0.0062	-	493	-	16.1	0.022	64	0.563	< 10	21	137	< 0.5	< 0.005	18.1	71.9
Ash Pond B	WAP-19	06/06/2019	N	2000	0.47	-16	6.37	22.46	1.5	0.0787	0.0354	237	-	2.07	0.23	34.6	0.44	-	12.9	72.9	-	-	0.00356	43.1
Ash Pond B	WAP-20	06/05/2019	N	783	0.87	-42	6.07	24.63	151	0.0224	0.0435	65.8	< 0.001	16.4	0.1	13.2	0.119	0.0208	7.2	18.9	-	-	11.8	12.2
Ash Pond B	WAP-21	06/11/2019	N	1400	0.5	-1	6.1	20.05	8.7	< 0.005	-	178	-	4.32	< 0.01	30	0.244	< 10	13.8	60.6	-	-	6.38	28.9
Ash Pond B	WAP-23	06/05/2019	N	987	0.52	-72	6.52	22.53	111	0.00562	-	144	-	1.32	0.032	6.74	0.201	-	2.01	45.4	-	-	2.74	7.09
Ash Pond B	WAP-24	06/19/2019	N	327	0.48	-203	7.55	23.8	85.7	-	-	-	-	-	-	-	-	-	-	-	-	-	0.228	3.99
Ash Pond B	WAP-25	06/06/2019	N	400	0.35	-125	6.86	20.62	14.5	< 0.005	-	55.6	-	0.285	< 0.01	3.43	0.125	0.00369	2.56	12.2	-	-	1.58	2.83

**ABBREVIATIONS AND NOTES:**

- mg/L: milligram per liter
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- /: Multiple results reported due to multiple methods
- Highlighted where a result exceeds the applicable MCL/RSL.
- Criteria used for cobalt, lithium, and molybdenum are RSL for Tapwater where THQ=1.0 (May 2018).
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**QUALIFIERS:**

J: Estimated result

**TABLE 4**  
**SUMMARY OF GROUNDWATER ANALYTICAL RESULTS FOR NATURE AND EXTENT**  
**WINYAH GENERATING STATION - ASH POND A & B**  
**SANTEE COOPER**  
**GEORGETOWN, SOUTH CAROLINA**

Impoundment	Location	Sample Date	Sample Type	Metals				Other					
				Chemical Name	Manganese, Total	Potassium, Total	Sodium, Total	Zinc, Total	Alkalinity, Bicarbonate	Alkalinity, Total (as CaCO3)	Dissolved Organic Carbon (DOC)	Sulfide	Total Organic Carbon (TOC)
				MCL/RSL Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Background	WAP-1	05/30/2019	N	0.0084	< 0.5	4.7	< 0.01	< 4	< 4	2.64	< 0.1	2.62	
Background	WBW-1	05/30/2019	N	0.0064	< 0.5	2.1	0.0101	< 4	< 4	1.13	< 0.1	1.02	
Ash Pond A	WAP-9	05/30/2019	N	0.19 / 0.19	18.8 / 16	59	0.028 / 0.017	327	327	56.9	< 0.1	48.5	
Ash Pond A	WAP-17	05/30/2019	N	0.085 / 0.084	12.8 / 12	85	-	35.8	35.8	9.63	< 0.1	9.53	
Ash Pond A	WAP-17	05/30/2019	FD	0.082 / 0.082	12.4 / 12	86	-	35.4	35.4	10.1	< 0.1	10.1	
Ash Pond A	WAP-18	06/05/2019	N	0.868	13.9	42.6	-	199	199	16.5	< 0.1	17.5	
Ash Pond A	WAP-22	06/05/2019	N	0.35	8.98	145	-	358	358	4.77	< 0.1	5.94	
Ash Pond A	WAP-26	06/11/2019	N	0.047	1.24	16.2	-	14.7	14.7	2.61	< 0.1	2.41	
Ash Pond B	WAP-10	05/30/2019	N	0.568	22.9	151	< 0.01	261	261	1.73	< 0.1	1.79	
Ash Pond B	WAP-10	05/30/2019	FD	0.568	22.4	151	< 0.01	263	263	1.46	< 0.1	1.83	
Ash Pond B	WAP-19	06/06/2019	N	0.547	15.7	77.1	-	209	209	5.27	< 0.1	5.81	
Ash Pond B	WAP-20	06/05/2019	N	0.119	8.24	12.4	-	110	110	5.13	< 0.1	5.44	
Ash Pond B	WAP-21	06/11/2019	N	0.239	13.6	69	-	135	135	8.3	< 0.1	9.37	
Ash Pond B	WAP-23	06/05/2019	N	0.211	2.08	44.2	-	312	312	2.24	< 0.1	2.41	
Ash Pond B	WAP-24	06/19/2019	N	0.01	2.61	17	-	135	135	1.12	< 0.1	1.02	
Ash Pond B	WAP-25	06/06/2019	N	0.108	2.19	11.7	-	198	198	2.94	< 0.1	2.92	

**ABBREVIATIONS AND NOTES:**

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**QUALIFIERS:**

J: Estimated result

GIS FILE PATH: \\haley\at\haleya\gim\_common\131830 - Santee Cooper\GIS\Maps\2019\_09\132892\_009\_0003\_MONITORING\_WELL\_LOCATIONS.mxd -- USER: hwechholz -- LAST SAVED: 9/10/2019 2:47:05 PM

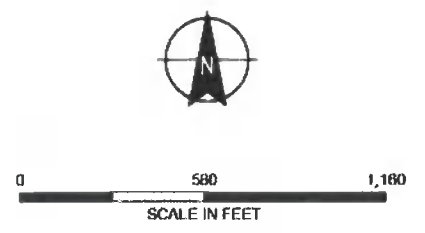


**LEGEND**

- ◆ CCR MONITORING WELL
- ◆ NATURE AND EXTENT MONITORING WELL
- PROPERTY BOUNDARY

**NOTES**

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI



**HALEY ALDRICH** Santee Cooper  
WYNAH GENERATING STATION  
GEORGETOWN, SOUTH CAROLINA

**LOCATION OF GROUNDWATER MONITORING WELLS FOR CCR COMPLIANCE - ASH POND A AND B**

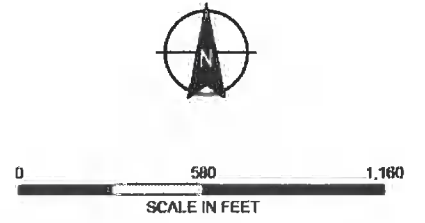
SEPTEMBER 2019 **FIGURE 3**

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- LEGEND**
- CCR MONITORING WELL
  - NATURE AND EXTENT MONITORING WELL
  - LOCATION WITH SSI
  - PROPERTY BOUNDARY

- NOTES**
- ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
  - AERIAL IMAGERY SOURCE: ESRI



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**LOCATION OF APPENDIX III SSIS**





SEPTEMBER 2019

**FIGURE 4**

GIS FILE PATH: \\haleyaldrich\halegrn\_common\131539 - Santee Cooper\GIS\Maps\2019\_06\132662\_08\_0005\_MONITORING\_WELL\_LOCATIONS\_SSL.mxd -- USER: hwalcholz -- LAST SAVED: 9/10/2019 2:33:06 PM

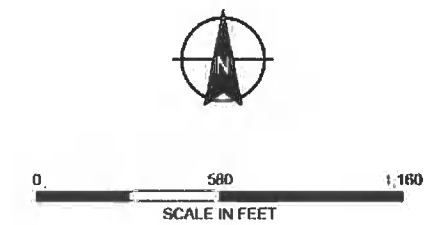


**LEGEND**

-  CCR MONITORING WELL
-  NATURE AND EXTENT MONITORING WELL
-  LOCATION WITH SSL
-  PROPERTY BOUNDARY

**NOTES**

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI



**HALEY  
ALDRICH**

SANTEE COOPER  
WYNAH GENERATING STATION  
GEORGETOWN, SOUTH CAROLINA

**LOCATION OF APPENDIX IV SSLS**

SEPTEMBER 2019

**FIGURE 5**



## **Appendix C – Statistical Analysis**



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## TECHNICAL MEMORANDUM

January 30, 2020  
File No. 132892-013

**SUBJECT:** 2019 Semi-annual Groundwater Assessment Monitoring Data  
Statistical Evaluation  
Winyah Generating Station  
Ash Pond A

Pursuant to Title 40 Code of Federal Regulations (40 CFR) § 257.93 and 257.95 (Rule), this memorandum summarizes the statistical evaluation of the analytical results for the 2019 semi-annual assessment monitoring groundwater sampling event for the Winyah Generating Station (WGS) Ash Pond A. The statistical evaluation discussed in this memorandum was conducted to determine if Appendix IV groundwater monitoring constituents have been detected in downgradient wells at concentrations that represent a statistically significant level (SSL) above background or upgradient wells consistent with the requirements in 40 CFR § 257.95.

Utilizing interwell evaluations, data from the semi-annual groundwater sampling events for the downgradient monitoring wells were compared to the Groundwater Protection Standard (GWPS) established from the background dataset for the upgradient monitoring well (WAP-1 and WBW-1) for detected Appendix IV constituents. GWPS for each of the Appendix IV constituents have been set equal to the highest value of the maximum contaminant level, regional screening level, or background concentration. The Rule requires statistical evaluation of groundwater monitoring data to determine whether or not there is a statistically significant increase (SSI) above background values for each Appendix IV constituent and if one or more constituents are detected at SSLs above the GWPS. The results of the groundwater assessment monitoring statistical evaluation are discussed below and provided in Tables I and II.

### **Statistical Evaluation of Appendix IV Constituents**

The Rule provides four specific options for statistical evaluation of groundwater quality data collected at a coal combustion residual (CCR) unit (40 CFR §257.93(f) (1-4)). The statistical method used for these evaluations, tolerance limit (TL), was certified by Haley & Aldrich, Inc. on October 14, 2017. The TL method, as determined applicable for this sampling event, was used to evaluate potential SSLs above background. Background levels for each constituent listed in Appendix IV were computed as upper tolerance limits (UTL), and a minimum 95 percent confidence coefficient and 95 percent coverage. The most recent groundwater sampling event from each compliance well was compared to the corresponding background UTL to determine if a SSL existed.

## STATISTICAL EVALUATION

An interwell evaluation, which compares the most recent values from downgradient compliance wells against a background dataset composed of upgradient well data, was used. Because the CCR unit has transitioned into assessment monitoring, no statistical evaluations were conducted on Appendix III (detection monitoring) semi-annual assessment monitoring data.

The parametric TL methods were used to complete statistical evaluations of the referenced dataset. The TL procedure is one in which a concentration limit for each constituent is established from the distribution of the background data, with a minimum 95 percent confidence level. The upper endpoint of a tolerance interval is called the UTL. Depending on the data distribution, parametric or non-parametric TL procedures are used to evaluate groundwater monitoring data using this method. Parametric TLs utilize normally distributed data or normalized data via a transformation of the sample background data used to construct the limit. If the data are non-normal and a transformation is not indicated, non-parametric procedures (order statistics or bootstrap methods) are used to calculate the TL. If all the background data are non-detect, a maximum reporting limit may serve as an appropriate UTL.

These statistical evaluations were conducted using the background dataset for all detected Appendix IV constituents using parametric TL. If an Appendix IV constituent concentration from the semi-annual sampling events in 2019 was above the GWPS, the lower confidence limit (LCL) for the downgradient well constituent was used to evaluate if a SSL was present. The LCL is the lower end of the confident interval range, which is an estimated concentration range intended to contain the true mean or median of the population from which the sample is drawn. The confidence interval range is designed to locate the true population mean or median with a high degree of statistical confidence, or conversely, with a low probability of error.

The UTLs were calculated from the background well dataset using Chemstat software after testing for outlier sample results that would warrant removal from the dataset based on likely error in sampling or measurement. Both visual and statistical outlier tests for the background data were performed using Chemstat and U.S. Environmental Protection Agency's ProUCL 5.1 software, and a visual inspection of the data was performed using box plots and distribution plots for the downgradient sample data. No sample data were identified as outliers that warranted removal from the dataset.

## BACKGROUND DISTRIBUTIONS

The groundwater analytical results for each sampling event from the background sample location (WAP-1 and WBW-1) were combined to calculate the UTL for each detected Appendix IV constituent. The variability and distribution of the pooled dataset was evaluated to determine the method for UTL calculation. Per the document *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance, March 2009*, background concentrations were updated based on statistical evaluation of analytical results collected through 2018.

#### **RESULTS OF APPENDIX IV DOWNGRADIENT STATISTICAL COMPARISONS**

The sample concentrations from the downgradient wells for each of the detected Appendix IV constituents from the semi-annual assessment monitoring events of 2019 were compared to their respective background UTLs and GWPS (Tables I and II). A sample concentration greater than the GWPS is considered to represent a SSL. Based on previous compliance sampling event and statistical evaluations, interwell comparisons were utilized for all downgradient wells and constituents. Based on this statistical evaluation on the first semi-annual groundwater sampling event in 2019, SSLs above GWPS were identified at Ash Pond A (arsenic, lithium, and molybdenum) consistent with previous results.

Tables:

Table I – Summary of Assessment Monitoring Statistical Evaluation – February 2019

Table II – Summary of Assessment Monitoring Statistical Evaluation – May 2019

## **TABLES**













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## TECHNICAL MEMORANDUM

January 30, 2020  
File No. 132892-013

**SUBJECT:** 2019 Semi-annual Groundwater Assessment Monitoring Data  
Statistical Evaluation  
Winyah Generating Station  
Ash Pond B

Pursuant to Title 40 Code of Federal Regulations (40 CFR) § 257.93 and 257.95 (Rule), this memorandum summarizes the statistical evaluation of the analytical results for the 2019 semi-annual assessment monitoring groundwater sampling event for the Winyah Generating Station (WGS) Ash Pond B. The statistical evaluation discussed in this memorandum was conducted to determine if Appendix IV groundwater monitoring constituents have been detected in downgradient wells at concentrations that represent a statistically significant level (SSL) above background or upgradient wells consistent with the requirements in 40 CFR § 257.95.

Utilizing interwell evaluations, data from the groundwater sampling events for the downgradient monitoring wells were compared to the Groundwater Protection Standard (GWPS) established from the background dataset for the upgradient monitoring well (WAP-1 and WBW-1) for detected Appendix IV constituents. GWPS for each of the Appendix IV constituents have been set equal to the highest value of the maximum contaminant level, regional screening level, or background concentration. The Rule requires statistical evaluation of groundwater monitoring data to determine whether or not there is a statistically significant increase (SSI) above background values for each Appendix IV constituent and if one or more constituents are detected at SSLs above the GWPS. The results of the groundwater assessment monitoring statistical evaluation are discussed below and provided in Tables I and II.

### Statistical Evaluation of Appendix IV Constituents

The Rule provides four specific options for statistical evaluation of groundwater quality data collected at a coal combustion residual (CCR) unit (40 CFR §257.93(f) (1-4)). The statistical method used for these evaluations, tolerance limit (TL), was certified by Haley & Aldrich, Inc. on October 14, 2017. The TL method, as determined applicable for this sampling event, was used to evaluate potential SSLs above background. Background levels for each constituent listed in Appendix IV were computed as upper tolerance limits (UTL), and a minimum 95 percent confidence coefficient and 95 percent coverage. The most recent groundwater sampling event from each compliance well was compared to the corresponding background UTL to determine if a SSL existed.

### STATISTICAL EVALUATION

An interwell evaluation, which compares the most recent values from downgradient compliance wells against a background dataset composed of upgradient well data, was used. Because the CCR unit has transitioned into assessment monitoring, no statistical evaluations were conducted on Appendix III (detection monitoring) semi-annual assessment monitoring data.

The parametric TL methods were used to complete statistical evaluations of the referenced dataset. The TL procedure is one in which a concentration limit for each constituent is established from the distribution of the background data, with a minimum 95 percent confidence level. The upper endpoint of a tolerance interval is called the UTL. Depending on the data distribution, parametric or non-parametric TL procedures are used to evaluate groundwater monitoring data using this method. Parametric TLs utilize normally distributed data or normalized data via a transformation of the sample background data used to construct the limit. If the data are non-normal and a transformation is not indicated, non-parametric procedures (order statistics or bootstrap methods) are used to calculate the TL. If all the background data are non-detect, a maximum reporting limit may serve as an appropriate UTL.

These statistical evaluations were conducted using the background dataset for all detected Appendix IV constituents using parametric TL. If an Appendix IV constituent concentration from the semi-annual sampling events in 2019 was above the GWPS, the lower confidence limit (LCL) for the downgradient well constituent was used to evaluate if a SSL was present. The LCL is the lower end of the confident interval range, which is an estimated concentration range intended to contain the true mean or median of the population from which the sample is drawn. The confidence interval range is designed to locate the true population mean or median with a high degree of statistical confidence, or conversely, with a low probability of error.

The UTLs were calculated from the background well dataset using Chemstat software after testing for outlier sample results that would warrant removal from the dataset based on likely error in sampling or measurement. Both visual and statistical outlier tests for the background data were performed using Chemstat and U.S. Environmental Protection Agency's ProUCL 5.1 software, and a visual inspection of the data was performed using box plots and distribution plots for the downgradient sample data. No sample data were identified as outliers that warranted removal from the dataset.

## BACKGROUND DISTRIBUTIONS

The groundwater analytical results for each sampling event from the background sample location (WAP-1 and WBW-1) were combined to calculate the UTL for each detected Appendix IV constituent. The variability and distribution of the pooled dataset was evaluated to determine the method for UTL calculation. Per the document *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance, March 2009*, background concentrations were updated based on statistical evaluation of analytical results collected through 2018.

## RESULTS OF APPENDIX IV DOWNGRADIANT STATISTICAL COMPARISONS

The sample concentrations from the downgradient wells for each of the detected Appendix IV constituents from the semi-annual assessment monitoring events of 2019 were compared to their respective background UTLs and GWPS (Tables I and II). A sample concentration greater than the GWPS is considered to represent a SSL. Based on previous compliance sampling event and statistical evaluations, interwell comparisons were utilized for all downgradient wells and constituents. Based on this statistical evaluation on the semi-annual groundwater sampling events in 2019, SSLs above GWPS were identified at Ash Pond B (arsenic, lithium, and molybdenum) consistent with previous results.

Tables:

Table I – Summary of Assessment Monitoring Statistical Evaluation – February 2019

Table II – Summary of Assessment Monitoring Statistical Evaluation – May 2019

## **TABLES**









Winyah Ash Pond B  
 Assessment Monitoring Statistical Analysis Summary  
 Prepared: January 29, 2020

WAP-1	0/12	10%	0.01-0.05	0.013	0.01	0.028	0.0001327	0.01155	0.856	0.1	mg/L	N	0	0	0	0.020	0.10	FALSE
WAP-01	0/12	10%	0.01-0.01	0.01	0.01	0.01	5.914620	1.431610	2.437608	0.1	mg/L	N	0	0	0	0.020	0.10	FALSE
WAP-10	0/12	10%	0.01-0.01	0.01	0.01	0.01	5.914620	1.431610	2.437608	0.1	mg/L	N	0	0	0	0.020	0.10	FALSE
WAP-20	0/12	10%	0.01-0.01	0.01	0.01	0.01	0.397	0.0097	0.0097	0.1	mg/L	Y	0	0	0	0.020	0.10	FALSE
WAP-21	0/12	10%	0.01-0.05	0.013	0.01	0.01	0.002313	0.0115	0.005	0.1	mg/L	N	0	0	0	0.020	0.10	FALSE
CCT Appendix-16: Inorganic Nitrate, Total (mg/L)																		
WAP-1	6/12	50%	4-4	3.58	4	4.308	4.33	1.501	1.235	0.3427	5	pH/L	0	0	0	6.0	6.0	FALSE
WAP-01	7/12	49%	4-4	3.95	4	5.844	5.97	1.771	1.311	0.3166	5	pH/L	0	0	0	6.0	6.0	FALSE
WAP-10	12/12	0%	-	5.51	5.645	6.794	6.91	1.454	1.207	0.2391	5	pH/L	0	0	0	6.0	6.0	FALSE
WAP-20	5/12	58%	4-4	3.67	4	4.358	4.38	1.007	1.000	0.2721	5	pH/L	0	0	0	6.0	6.0	FALSE
WAP-21	8/12	73%	4-4	3.92	4.17	5.134	5.07	2.174	1.674	0.3764	5	pH/L	0	0	0	6.0	6.0	FALSE
CCT Appendix-16: Selenium, Total (mg/L)																		
WAP-1	0/12	100%	0.01-0.02	0.0128	0.01	0.02	0.00201496	0.000905	0.3423	0.05	mg/L	N	0	0	0	0.020	0.050	FALSE
WAP-01	0/12	100%	0.01-0.02	0.0115	0.01	0.02	0.00201441	0.000755	0.3325	0.05	mg/L	N	0	0	0	0.020	0.050	FALSE
WAP-10	0/12	100%	0.01-0.02	0.0115	0.01	0.02	0.00201441	0.000755	0.3325	0.05	mg/L	N	0	0	0	0.020	0.050	FALSE
WAP-20	0/10	100%	0.01-0.02	0.012	0.01	0.02	0.00201778	0.0009116	0.3514	0.05	mg/L	N	0	0	0	0.020	0.050	FALSE
WAP-21	0/10	100%	0.01-0.02	0.012	0.01	0.02	0.00201778	0.0009116	0.3514	0.05	mg/L	N	0	0	0	0.020	0.050	FALSE
CCT Appendix-16: Nitrate, Total (mg/L)																		
WAP-1	0/10	100%	0.001-0.01	0.001	0.001	0.001	0.113200001	0.0002646	0	0	mg/L	N	0	0	0	0.001	0.002	FALSE
WAP-01	0/10	100%	0.001-0.01	0.00091	0.001	0.001	0.113200001	0.0002646	0	0	mg/L	N	0	0	0	0.001	0.002	FALSE
WAP-10	0/10	100%	0.001-0.01	0.001	0.001	0.001	0.113200001	0.0002646	0	0	mg/L	N	0	0	0	0.001	0.002	FALSE
WAP-20	1/10	90%	0.001-0.01	0.00099	0.001	0.00132	0.00020916	0.0003897	0.179	0.002	mg/L	N	0	0	0	0.001	0.002	FALSE
WAP-21	0/10	100%	0.001-0.01	0.001	0.001	0.001	0	0	0	0	mg/L	N	0	0	0	0.001	0.002	FALSE