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REPORT ON

2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT WINYAH GENERATING STATION; CLOSED UNIT 2 SLURRY POND AND NEW CLASS 3 LANDFILL GEORGETOWN, SOUTH CAROLINA

by Haley & Aldrich, Inc.
Greenville, South Carolina

for South Carolina Public Service Authority (Santee Cooper)
Moncks Corner, South Carolina

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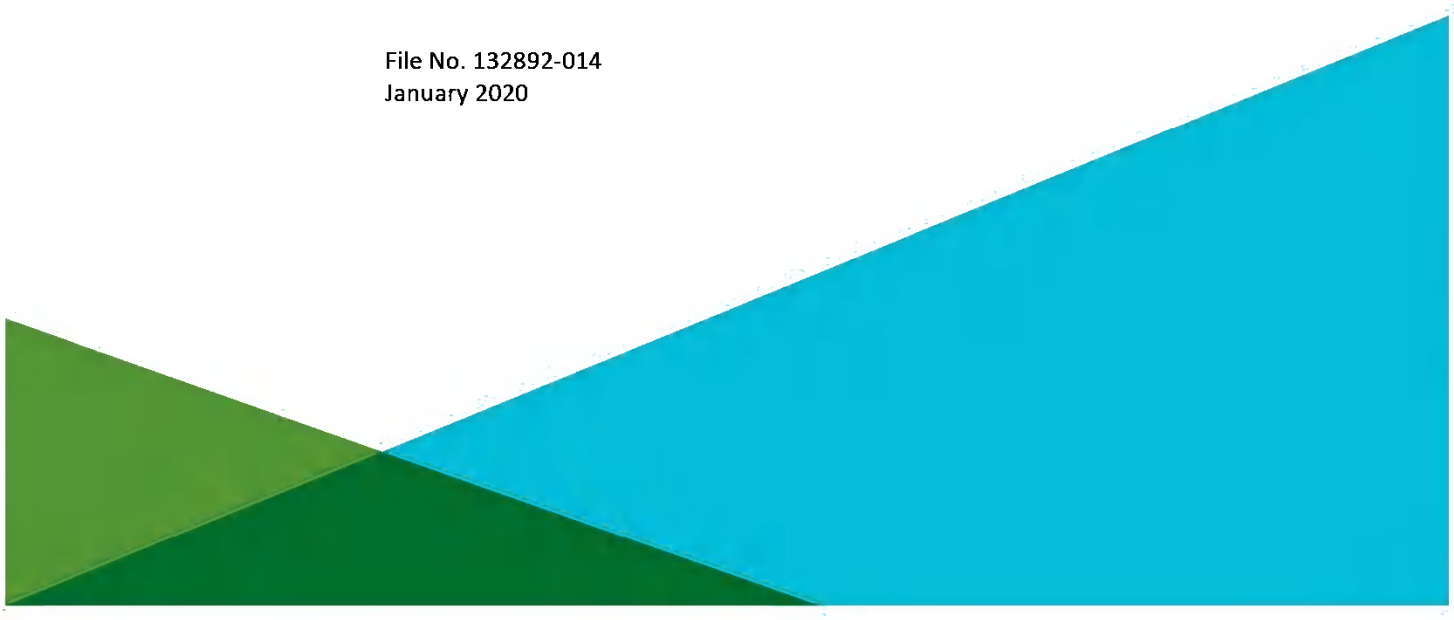

Annual Groundwater Monitoring Report Summary

Haley & Aldrich, Inc. (Haley & Aldrich) has prepared this 2019 Annual Groundwater Monitoring Corrective Action Report for the Winyah Generating Station (WGS). This 2019 Annual Report was developed to comply with the United States Environmental Protection Agency (USEPA) Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals (CCR) from Electric Utilities, 40 CFR Part 257, Subpart D dated 17 April 2015 (Rule), specifically subsection §257.90(e)(1) through (5). South Carolina Public Service Authority (Santee Cooper) operated the closed coal combustion residuals (CCR) management unit referred to as the Unit 2 Slurry Pond and currently operates the new Class 3 Landfill located at WGS in Georgetown South Carolina.

The closed Unit 2 Slurry Pond was previously classified as an inactive surface impoundment as defined by 40 CFR §257.53. However, on 5 August 2016, the EPA issued a "Direct Final Rule" effective on 4 October 2016, constituting a vacatur of 40 CFR §257.100. The Direct Final Rule applies the requirements of existing surface impoundments that had been previously declared inactive. As a result, owners and operators of inactive CCR surface impoundments must comply with the groundwater monitoring requirements for existing CCR surface impoundments.

Santee Cooper filed a Notice of Intent (NOI) to initiate closure of the Unit 2 Slurry Pond and placed the NOI in the facility's operating record in December 2015. The South Carolina Department of Health and Environmental Control (SC DHEC) certified Pond closure was complete in accordance with State regulations on 9 November 2017. After the Unit 2 Slurry Pond was certified closed, Santee Cooper constructed a new Class 3 Landfill at the site within the footprint of the closed Unit 2 Slurry Pond. Because both units (former Unit 2 Slurry Pond and new Class 3 Landfill) occupy the same space, the groundwater monitoring network installed to monitor the new Class 3 Landfill is also appropriate for the closed Unit 2 Slurry Pond and complies with §257.91.

This annual report addresses the groundwater monitoring requirements for both units at WGS (former Unit 2 Slurry Pond and new Class 3 Landfill). The Groundwater Monitoring System Certification was placed in the facility's operating record on 1 November 2018 for the Class 3 Landfill and amended 12 December 2019 to include reference to the closed Unit 2 Slurry Pond. The certification was posted on the facility's website as required by §257.107(h)(2).

To report on the groundwater monitoring activities conducted at the closed Unit 2 Slurry Pond new Class 3 Landfill and document compliance with the Rule, the specific requirements listed in §257.90(e)(1) through (5) are provided below in bold/italic type followed by a short narrative addressing how that specific requirement was met.

§257.90 APPLICABILITY

§257.90(e) Annual groundwater monitoring and corrective action report. For existing CCR landfills and existing CCR surface impoundments, no later than January 31, 2018, and annually thereafter, the owner or operator must prepare an annual groundwater monitoring and corrective action report. For new CCR landfills, new CCR surface impoundments, and all lateral expansions of CCR units, the owner or operator must prepare the initial annual groundwater monitoring and corrective action report no

later than January 31 of the year following the calendar year a groundwater monitoring system has been established for such CCR unit as required by this subpart, and annually thereafter. For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. For purposes of this section, the owner or operator has prepared the annual report when the report is placed in the facility's operating record as required by §257.105(h)(1).

As required, this annual report documents the status of the groundwater monitoring program for the closed Unit 2 Slurry Pond and the new Class 3 Landfill at WGS and summarizes key actions completed in 2019.

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

§257.90(e)(1) AERIAL IMAGE OF GROUNDWATER MONITORING PROGRAM

§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 location of the closed Unit 2 Slurry Pond, the new Class 3 Landfill and associated upgradient and downgradient monitoring wells is included in this report as Figure 1. This groundwater monitoring network meets the requirements of §257.91.

§257.90(e)(2) ADJUSTMENTS TO GROUNDWATER MONITORING PROGRAM

§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;

To comply with the requirements of §257.91, a groundwater monitoring network comprised of seven (7) monitoring wells was installed for the closed Unit 2 Slurry Pond and the new Class 3 Landfill at WGS. As described in the Groundwater Monitoring System for the New Class 3 CCR Area 1 report prepared by Santee Cooper, WBW-A1-1 serves as the background well for the network. The six downgradient wells include WAP-7 and WLF-A1-1 through WLF-A1-5.

§257.90(e)(3) SUMMARY OF GROUNDWATER ANALYSIS

§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* [upgradient] *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 §257.94(b), a minimum of eight independent samples from each upgradient and downgradient monitoring well were collected from the groundwater monitoring network at

the closed Unit 2 Slurry Pond and new Class 3 Landfill prior to placing CCR in the new landfill as required. Baseline sampling was completed prior to the initial receipt of CCR on November 1, 2018. A summary of the groundwater monitoring program for the closed Unit 2 Slurry Pond and the new Class 3 Landfill, including the analytical results for the Appendix III and Appendix IV list of constituents, is presented in Table 1. Assessment monitoring sampling results for the Closed Unit 2 Slurry Pond are provided in Table 2 of this report.

§257.90(e)(4) CURRENT GROUNDWATER MONITORING PROGRAM

§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);

As required by §257.93(h) of the Federal CCR Rule, Haley & Aldrich performed a statistical analysis of the Appendix III constituents detected in groundwater downgradient of the new Class 3 Landfill and closed Unit 2 Slurry Pond to evaluate the potential for statistically significant increases (SSIs) of the Appendix III constituents to exist above background. A summary of the statistical evaluation is provided in Appendix A of this report. Findings from this evaluation indicated that SSIs for boron, calcium, chloride, pH, sulfate, and total dissolved solids (TDS) were present at one or more downgradient wells. However, as described in Appendix B of this report, and recognizing that the new Class 3 Landfill was constructed in the footprint of the closed Unit 2 Slurry Pond, and had not received CCR prior to completing detection monitoring, Haley & Aldrich conducted an evaluation to demonstrate that a source other than the Class 3 Landfill caused the statistically significant increase over background, consistent with §257.94(e)(2).

This alternate source demonstration (ASD) concluded that the closed Unit 2 Slurry Pond is the source for the Appendix III SSIs detected downgradient of the two units, and as a result, the new Class 3 Landfill remains in detection monitoring while the closed unit 2 Slurry Pond has triggered for assessment monitoring. Notification that an assessment monitoring program has been initiated for the closed Unit 2 Slurry Pond was posted on the facilities CCR website on 12 December 2019. The assessment monitoring program has been established to meet the requirements of 40 CFR § 257.95.

§257.90(e)(5) OTHER REQUIRED INFORMATION

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

This initial Annual Groundwater Monitoring and Corrective Action Report for the closed Unit 2 Slurry Pond and the new Class 3 Landfill documents activities conducted to comply with Sections §257.90 through §257.95 of the Rule. There are no applicable requirements from Sections §257.96 through §257.98 at this time.

Attachments

Table I. Summary of Analytical Results – Class III Landfill
Table II. Summary of Analytical Results – Closed Unit 2 Slurry Pond
Figure 1. Monitoring Well Locations
Appendix A. Summary of Statistical Analysis
Appendix B. Alternate Source Demonstration (ASD) Memorandum for the Appendix III Constituents at the Class 3 Landfill; Winyah Generating Station

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TABLES

TABLE 1 - Summary of Analytical Results

Well ID	Purpose	Date of Sample Event		Appendix III Constituents							Field Parameters							
				Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS	Depth to Groundwater	Groundwater Elevation	pH	Specific Conductivity	Temp	Oxidation Reduction Potential	Turbidity	Dissolved Oxygen
			Unit	ug/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L	Feet (btoc)	Feet (msl)	SU	uS	C	mv	NTU	ppm
			Method	EPA 6010D	EPA 6010D	EPA 300.0	EPA 300.0		EPA 300.0	SM 2540C						SM2580		
Site Background Wells																		
WAP-1	Baseline	06/04/2018		0.019	9.6	8.99	0.13	-	< 2	55	12.66	16.78	6.19	96	27.9	0	0	0.63
WAP-1	Baseline	09/10/2018		0.055	2.57	10.6	< 0.1	-	8.24	43.33	11.02	18.42	4.63	71	28.86	80	0	0.72
WAP-1	Resample TDS	09/21/2018		-	-	-	-	-	-	135								
WAP-1	Detection	01/23/2019		-	3.1	9.88	< 0.1	-	17.3	56.25	6.86	22.58	4.58	97.0	19.18	86.0	0	0.970
WAP-1	Detection	05/30/2019		0.054	1.9	5.08	< 0.1	-	16	43.75	6.76	22.68	4.57	73.0	28.14	167	0	0.780
WAP-1	**total samples**			**5**	**5**	**5**	**5**	**5**	**5**	**5**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
WBW-1	Detection	06/04/2018		0.018	400	4.38	< 0.1	-	4.77	25	5.45	26.52	4.35	46	24.57	77	0	1.43
WBW-1	Assessment	09/10/2018		0.022	< 0.5	5.68	< 0.1	-	4.96	-	6.7	25.27	4.14	48	26.67	86	0	0.98
WBW-1	Detection	01/23/2019		-	-	-	< 0.1	-	-	-	5.65	26.32	4.40	40.0	17.49	78.0	1.8	1.22
WBW-1	Detection	05/30/2019		0.085	< 0.5	2.71	< 0.1	-	5.64	21.25	5.34	26.63	4.02	38.0	28.07	169	0	0.580
WBW-1	**total samples**			**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
WBW-A1-1	Baseline	6/12/2018		0.036	0.032	7.43	< 0.1	-	102	203.8	7.28	20.86	4.7	269	24.91	95	3.7	0.74
WBW-A1-1	Baseline	07/11/2018		0.078	54.8	67.5	< 0.1	-	100	352.5	6.71	21.43	4.47	418	25.12	100	0	0.75
WBW-A1-1	Baseline	07/17/2018		0.035	59.5	9.48	< 0.1	-	180	291.2	7.27	20.87	4.52	432	26.08	77	4	0.96
WBW-A1-1	Baseline	07/26/2018		0.036	49	9.25	< 0.1	-	146	272.5	5.31	22.83	4.4	369	22.82	147	0	0.84
WBW-A1-1	Baseline	07/31/2018		0.034	45.1	9.31	< 0.1	-	138	247.5	6.36	21.78	4.58	280	26.38	124	0	0.77
WBW-A1-1	Baseline	08/07/2018		0.042	38.5	8.51	< 0.1	-	119	196.2	5.81	22.33	4.46	308	23.84	66	0	0.88
WBW-A1-1	Baseline	08/15/2018		0.038	36.4	8.72	< 0.1	-	114	203.8	6.36	21.78	4.58	280	26.38	124	0	0.77
WBW-A1-1	Baseline	08/22/2018		0.037	47.2	9.49	< 0.1	-	149	256.2	6.8	21.34	4.38	376	24.58	89	0	0.84
WBW-A1-1	Detection	01/22/2019		0.029	32	12.3	< 0.1	-	106	226.2	5.88	22.26	4.26	413	16.59	102	0.100	1.03
WBW-A1-1	Detection	6/24/2019		-	65	16.4	-	-	171	335.	6.05	22.09	4.56	422	21.5	-	0	0.37
WBW-A1-1	**total samples**			**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**
Closed Unit 2 Slurry Pond/ Class 3 Landfill																		
WLF-A1-1	Baseline	06/13/2018		4.1	0.62	270	< 0.1	-	978	2480	17.74	23.61	6.43	2520	24.61	58	0	0.7
WLF-A1-1	Baseline	07/11/2018		3.9	609	253	< 0.1	-	942	2392	18.77	22.58	6.47	2650	28.1	37	1	0.56
WLF-A1-1	Baseline	07/17/2018		4	746	205	< 0.1	-	1040	2339	18.12	23.33	6.47	2340	27.35	6	0	
WLF-A1-1	Baseline	07/26/2018		3.6	596	173	< 0.1	-	1060	2321	16.21	25.14	6.4	2480	22.45	41	0	0.72
WLF-A1-1	Baseline	08/01/2018		3.7	487	175	< 0.1	-	1070	2214	16.41	24.94	6.41	2310	26.24	36	0	0.76
WLF-A1-1	Baseline	08/08/2018		3.5	575	147	< 0.1	-	1060	2058	16.14	25.21	6.29	2350	25.04	39	0	0.68
WLF-A1-1	Baseline	08/13/2018		3.9	550	143	< 0.1	-	1028	2175	16.41	25.04	6.41	2310	26.24	36	0	0.76
WLF-A1-1	Baseline	08/22/2018		3.8	509	142	< 0.1	-	1000	2165	16.79	24.56	6.36	2130	27.83	9	0	0.65
WLF-A1-1	Detection	01/22/2019		4	460	131	< 0.1	-	919	1721	16.67	24.68	6.32	2320	18.56	3.00	0	0.870
WLF-A1-1	Detection	6/26/2019		3	480	95	< 0.1	-	917	1811	17.37	23.98	6.3	2020	22.97	-	1.1	0.43

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				Appendix III Constituents							Field Parameters							
Well ID	Purpose	Date of Sample Event		Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS	Depth to Groundwater	Groundwater Elevation	pH	Specific Conductivity	Temp	Oxidation Reduction Potential	Turbidity	Dissolved Oxygen
			Unit	ug/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L	Feet (btoc)	Feet (msl)	SU	uS	C	mv	NTU	ppm
			Method	EPA 6010D	EPA 6010D	EPA 300.0	EPA 300.0		EPA 300.0	SM 2540C						SM2580		
WLF-A1-1	**total samples**			**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**8**
WLF-A1-2	Baseline	06/12/2018		0.37	0.06	38.6	0.11	-	62.5	359.4	6.53	22.68	6.25	386	22.01	85	0	0.76
WLF-A1-2	DUPLICATE	07/11/2018		0.66	104	65.2	< 0.1	-	97.1	470								
WLF-A1-2	Baseline	07/11/2018		0.64	104	-	0.13	-	-	477.5	6.21	23	6.6	666	22.52	52	0	0.69
WLF-A1-2	Baseline	07/17/2018		0.72	102	211	< 0.1	-	1040	430	6.81	22.4	6.49	645	23.09	105	0	0.82
WLF-A1-2	Baseline	07/26/2018		0.61	151	32.4	0.12	-	306	612.5	2.61	26.6	6.55	636	26.99	68	0	0.66
WLF-A1-2	Baseline	07/31/2018		0.72	153	44.5	0.14	-	256	642.5	4.11	25.1	6.29	781	25.78	66	0	0.89
WLF-A1-2	Baseline	08/07/2018		1.8	187	122	< 0.1	-	238	890	2.96	26.25	6.67	1030	28.82	81	0	0.63
WLF-A1-2	Baseline	08/15/2018		0.55	160	27.1	< 0.1	-	316	616.2	4.11	25.1	6.29	781	25.78	66	0	0.89
WLF-A1-2	Baseline	08/23/2018		0.2	152	28	< 0.1	-	323	628.8	4.88	24.33	6.14	821	22.79	46	5.3	0.94
WLF-A1-2	Detection	01/23/2019		0.28	51	24.6	< 0.1	-	101	303.8	4.50	24.71	6.08	374	16.44	84.0	1.20	1.42
WLF-A1-2	Detection	6/25/2019		0.16	28	11.2	< 0.1	-	67	123.8	5.55	23.66	5.15	222	22.41	-	0	0.53
WLF-A1-2	**total samples**			**10**	**10**	**10**	**10**	**10**	**10**	**10**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**
WLF-A1-3	Baseline	06/12/2018		0.073	0.0065	2.81	< 0.1	-	43	90.62	6.14	22.17	4.2	128	23.58	119	0	0.8
WLF-A1-3	Baseline	07/11/2018		0.097	8.46	6.58	< 0.1	-	160	101.2	6.35	21.96	4.23	144	26.52	56	0	0.81
WLF-A1-3	Baseline	07/18/2018		0.095	8.12	59.3	< 0.1	-	159	86.25	7.81	20.5	3.91	146	24.04	135	0.1	0.96
WLF-A1-3	Baseline	07/26/2018		0.086	7.45	3.67	< 0.1	-	40.2	88.75	3.27	25.04	4.13	129	26.08	128	0	0.73
WLF-A1-3	Baseline	07/31/2018		0.069	6.83	3.89	< 0.1	-	41.6	96.25	4.01	24.3	4.12	137	27.05	82	0	0.77
WLF-A1-3	Baseline	08/07/2018		0.1	7.36	3.98	< 0.1	-	43	83.75	3.19	25.12	4.15	132	28.61	111	4.4	0.81
WLF-A1-3	Baseline	08/15/2018		0.11	9.74	4	< 0.1	-	49.5	111.2	4.01	22.15	4.12	137	27.05	82	0	0.77
WLF-A1-3	Baseline	08/23/2018		0.48	13.8	3.44	< 0.1	-	57.7	90	4.51	23.8	4.1	160	25.15	57	6.3	0.84
WLF-A1-3	Detection	01/22/2019		0.13	18	5.56	< 0.1	-	77.9	127.5	4.63	23.68	4.59	231	15.87	10.0	0	0.940
WLF-A1-3	Detection	6/25/2019		0.075	20	5.09	< 0.1	-	75.7	115.	5.45	22.86	4.11	194	26.67	-	0	0.44
WLF-A1-3	**total samples**			**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**
WLF-A1-4	Baseline	06/12/2018		0.36	0.13	5.32	< 0.1	-	105	455	5.64	22.6	6.58	597	22.34	91	0	0.76
WLF-A1-4	DUPLICATE	06/12/2018		0.37	0.13	5.22	< 0.1	-	102	455								
WLF-A1-4	Baseline	07/11/2018		0.39	133	4.3	< 0.1	-	103	458.8	5.76	22.48	6.38	614	26.46	19	0	0.67
WLF-A1-4	DUPLICATE	07/18/2018		0.42	137	6.86	< 0.1	-	127	475								
WLF-A1-4	Baseline	07/18/2018		0.42	135	6.96	< 0.1	-	127	526.2	6.22	22.02	6.02	584	28.45	1	0	0.67
WLF-A1-4	DUPLICATE	07/26/2018		0.37	145	9.62	< 0.1	-	185	515								
WLF-A1-4	Baseline	07/26/2018		0.37	148	9.42	< 0.1	-	182	496.2	2.3	25.94	5.9	779	22.21	107	0	0.76
WLF-A1-4	DUPLICATE	07/31/2018		0.28	140	8.44	< 0.1	-	187	507.5								
WLF-A1-4	Baseline	07/31/2018		0.27	130	7.82	< 0.1	-	171	480	3.51	24.73	6.62	752	25.67	101	0	0.69
WLF-A1-4	DUPLICATE	08/07/2018		1.1	199	40.2	< 0.1	-	336	753.8								
WLF-A1-4	Baseline	08/07/2018		1.2	212	41.3	< 0.1	-	366	755	3.11	25.13	6.45	1060	27.21	-74	0	0.66
WLF-A1-4	DUPLICATE	08/15/2018		0.65	169	18	< 0.1	-	259	647.5								
WLF-A1-4	Baseline	08/15/2018		0.55	186	16	< 0.1	-	245	600	3.51	22.52	6.62	752	25.67	101	0	0.69
WLF-A1-4	DUPLICATE	08/23/2018		0.5	161	12.4	< 0.1	-	220	618.8								

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Well ID	Purpose	Date of Sample Event		Appendix III Constituents							Field Parameters							
				Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS	Depth to Groundwater	Groundwater Elevation	pH	Specific Conductivity	Temp	Oxidation Reduction Potential	Turbidity	Dissolved Oxygen
			Unit	ug/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L	Feet (btoc)	Feet (msl)	SU	uS	C	mv	NTU	ppm
			Method	EPA 6010D	EPA 6010D	EPA 300.0	EPA 300.0		EPA 300.0	SM 2540C						SM2580		
WLF-A1-4	Baseline	08/23/2018		0.56	153	11.8	< 0.1	-	216	613.8	4.21	24.03	6.57	717	26.63	63	5.7	0.76
WLF-A1-4	Detection	01/22/2019		0.35	120	7.73	< 0.1	-	169	462.5	4.46	23.78	6.74	693	16.20	-23.0	0	0.990
WLF-A1-4	DUPLICATE	01/22/2019		0.35	120	7.63	< 0.1	-	167	426.2								
WLF-A1-4	Detection	6/25/2019		0.27	86	6.83	< 0.1	-	105	328.8	-	22.85	6.29	452	21.41	-	0	0.48
WLF-A1-4	DUPLICATE	6/25/2019		0.27	85	6.87	< 0.1	-	104	322.5								
WLF-A1-4	**total samples**			**10**	**10**	**10**	**10**	**10**	**10**	**10**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
WLF-A1-5	Baseline	06/13/2018		2.2	0.21	107	< 0.1	-	299	1049	15.91	21.73	6.85	1090	24.32	70	0	0.92
WLF-A1-5	Baseline	07/11/2018		1.8	175	80.7	< 0.1	-	246	786.2	15.82	21.82	6.98	863	28.53	71	0	0.65
WLF-A1-5	Baseline	07/17/2018		3	263	170	< 0.1	-	380	1150	16	21.64	6.82	1390	26.67	70	1.6	0.73
WLF-A1-5	Baseline	07/26/2018		3	273	175	< 0.1	-	401	1252	13.66	23.98	6.86	1520	21.83	73	0	0.7
WLF-A1-5	Baseline	08/01/2018		2.8	242	148	0.11	-	366	1040	14.11	23.53	6.95	1120	23.34	35	0	0.84
WLF-A1-5	Baseline	08/08/2018		2.1	183	106	< 0.1	-	314	826.2	13.82	23.82	6.89	1150	24.22	53	0	0.78
WLF-A1-5	Baseline	08/15/2018		2.7	233	156	< 0.1	-	368	1119	14.11	21.05	6.95	1120	23.34	35	0	0.84
WLF-A1-5	Baseline	08/22/2018		2.8	259	174	< 0.1	-	384	1162	14.96	22.68	6.86	1220	27.65	147	0	0.75
WLF-A1-5	Detection	01/22/2019		1.7	180	79.9	< 0.1	-	279	707.5	15.96	21.68	6.86	1150	15.46	89.0	0	1.24
WLF-A1-5	Detection	6/26/2019		1.5	200	102.	< 0.1	-	312	887.5	15.95	21.69	7.03	1080	25.04	-	0	0.4
WLF-A1-5	**total samples**			**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**
WAP-7	Baseline	06/13/2018		0.8	520	21.7	< 0.1	-	984	1789	9.99	19.95	6.25	1790	26.57	51	0	0.78
WAP-7	Baseline	07/11/2018		0.89	565	21.8	< 0.1	-	1220	1870	10.1	19.84	6.32	1920	28.24	39	0.4	0.62
WAP-7	Baseline	07/17/2018		0.91	575	24.6	< 0.1	-	1120	1936	10.16	19.78	6.24	2030	28.62	124	7.6	0.65
WAP-7	Baseline	07/26/2018		0.11	132	11.8	< 0.1	-	273	540	8.82	21.12	5.38	671	27.74	187	0	1.8
WAP-7	Baseline	08/01/2018		0.11	127	11.6	< 0.1	-	257	500	8.79	21.15	5.92	1340	27.15	77	19.4	1.58
WAP-7	Baseline	08/08/2018		0.12	108	7.53	< 0.1	-	250	433.8	8.52	21.42	5.36	613	27.94	123	4	1.7
WAP-7	Baseline	08/15/2018		0.45	313	14.1	< 0.1	-	612	1151	8.79	21.15	5.92	1340	27.15	77	19.4	1.58
WAP-7	Baseline	08/22/2018		0.64	346	15	< 0.1	-	707	1289	8.92	21.02	6.1	1420	27.89	123	0	1.1
WAP-7	Detection	01/22/2019		0.85	228	12.7	< 0.1	-	485	578.8	9.58	20.36	6.01	225	15.49	-8.00	4.70	2.54
WAP-7	Detection	6/24/2019		-	72	4.67	-	-	170	308.8	9.47	20.47	5.51	418	30.22	-	0	1.41
WAP-7	**total samples**			**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**

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TABLE 2 - Summary of Analytical Results

			Appendix III Constituents							Appexdix IV Constituents										
Well ID	Purpose	Date of Sample Event	Boron	Calcium	Chloride	Fluoride	Sulfate	Total Dissolved Solids	pH	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Fluoride	Lead	Lithium	Mercury
			ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	SU	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L
			EPA 6010D	EPA 6020B	EPA 300.0	EPA 300.0	EPA 300.0	SM 2540C		EPA 6020B	EPA 6020B	EPA 6020B	EPA 6020B	EPA 6020B	EPA 6020B	EPA 6020B	EPA 300.0	EPA 6020B	EPA 6010D	EPA 7470
Site Background Wells																				
WBW-A1-1	Assessment	12/16/2019	38	66.1	16.8	<0.10	169	286.2	-	<5.0	<5.0	111	<0.50	<0.50	<5.0	<0.50	<0.10	<1.0	<10	<0.2
WBW-A1-1	**total samples**		**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
Closed Unit 2 Slurry Pond																				
WLF-A1-1	Assessment	12/16/2019	2000	445	51.8	<0.10	671	1545	-	<5.0	<5.0	33.1	<0.50	<0.50	<5.0	<0.50	<0.10	<1.0	<10	<0.2
WLF-A1-1	**total samples**		**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
WLF-A1-2	Assessment	12/16/2019	260	98.5	5.91	<0.10	126	428.8	-	<5.0	<5.0	42.7	<0.50	<0.50	<5.0	<0.50	<0.10	<1.0	<10	<0.2
WLF-A1-2	**total samples**		**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
WLF-A1-3	Assessment	12/16/2019	90	26.4	4.67	<0.10	87.9	142.5	-	<5.0	<5.0	33.9	<0.50	<0.50	<5.0	<0.50	<0.10	<1.0	<10	<0.2
WLF-A1-3	**total samples**		**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
WLF-A1-4	Assessment	12/16/2019	140	20.3	12.0	<0.10	45.5	95.00	-	<5.0	<5.0	35.8	<0.50	<0.50	<5.0	<0.50	<0.10	<1.0	<10	<0.2
WLF-A1-4	DUPLICATE	12/16/2019	140	20.8	11.8	<0.10	44.9	98.75	-	<5.0	<5.0	36.2	<0.50	<0.50	<5.0	<0.50	<0.10	<1.0	<10	<0.2
WLF-A1-4	**total samples**		**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
WLF-A1-5	Assessment	12/16/2019	1500	254	96.5	<0.10	424	1000	-	<5.0	<5.0	38.8	<0.50	<0.50	<5.0	<0.50	<0.10	<1.0	<10	<0.2
WLF-A1-5	**total samples**		**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
WAP-7	Assessment	12/16/2019	42	96.1	3.48	<0.10	211	373.8	-	<5.0	<5.0	18.3	<0.50	<0.50	<5.0	<0.50	<0.10	<1.0	<10	<0.2
WAP-7	**total samples**		**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

DATA PROVIDED BY SANTEE COOPER

TABLE 2 - Summary of Analytical Results

									Field Parameters							
Well ID	Purpose	Date of Sample Event	Molybdenum	Radium 226	Radium 228	Radium 226/228 Combined	Selenium	Thallium	Depth to Groundwater	Groundwater Elevation	pH	Specific Conductivity	Temp	Oxidation Reduction Potential	Turbidity	Dissolved Oxygen
			ug/L	pCi/L	pCi/L	pCi/L	ug/L	ug/L	Feet (btoc)	Feet (msl)	SU	uS	C	mv	NTU	ppm
			EPA 6010D	EPA 900.1 Mod	EPA 904.0	EPA 903.1	EPA 6020B	EPA 6020B						SM2580		
Site Background Wells																
WBW-A1-1	Assessment	12/16/2019	<10	1.05	1.20	2.250	<10.0	<1.0	6.06	22.08	4.58	407	21.80	131	3.64	0.520
WBW-A1-1	**total samples**		**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
Closed Unit 2 Slurry Pond																
WLF-A1-1	Assessment	12/16/2019	<10	0.329	<3.00	0.329	<10.0	<1.0	17.08	24.27	6.27	1700	22.10	15.1	3.44	0.460
WLF-A1-1	**total samples**		**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
WLF-A1-2	Assessment	12/16/2019	<10	0.131	<3.00	0.131	<10.0	<1.0	5.49	23.72	6.13	478	19.90	67.4	5.42	0.350
WLF-A1-2	**total samples**		**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
WLF-A1-3	Assessment	12/16/2019	<10	1.21	2.34	3.550	<10.0	<1.0	5.47	22.84	4.23	221	20.00	139	4.74	0.420
WLF-A1-3	**total samples**		**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
WLF-A1-4	Assessment	12/16/2019	<10	1.36	0.722	2.090	<10.0	<1.0	5.81	22.43	5.16	160	21.40	123	8.43	0.350
WLF-A1-4	DUPLICATE	12/16/2019	<10	0.818	0.119	0.936	<10.0	<1.0								
WLF-A1-4	**total samples**		**2**	**2**	**2**	**2**	**2**	**2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
WLF-A1-5	Assessment	12/16/2019	<10	1.45	0.396	1.840	<10.0	<1.0	15.86	21.78	6.60	1167	22.20	-14.7	4.39	0.540
WLF-A1-5	**total samples**		**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
WAP-7	Assessment	12/16/2019	<10	0.699	1.10	1.800	<10.0	<1.0	9.93	20.01	5.47	452	19.70	142	6.17	2.40
WAP-7	**total samples**		**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

DATA PROVIDED BY SANTEE COOPER

FIGURES

LEGEND

CCR MONITORING WELL

PROPERTY BOUNDARY

NOTES

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

N

0 1,100 2,200

SCALE IN FEET

HALEY ALDRICH

SANTEE COOPER
WINYAH GENERATING STATION
GEORGETOWN, SOUTH CAROLINA

MONITORING WELL LOCATIONS

JANUARY 2020

FIGURE 1

GIS FILE PATH: \\haleyaldrich.com\share\grn_common\131539 - Santee Cooper\GIS\Maps\2020_01\132892_008_0001_MONITORING_WELL_LOCATIONS.mxd — USER: hwachholz — LAST SAVED: 1/20/2020 1:26:37 PM

APPENDIX A
SUMMARY OF STATISTICAL ANALYSIS

HALEY & ALDRICH, INC.
400 Augusta Street
Suite 130
Greenville, SC 29601
864.214.8750

TECHNICAL MEMORANDUM

January 30, 2020
File No. 131539-003

TO: South Carolina Public Service Authority (Santee Cooper)
Melanie Goings, P.G.

FROM: Haley & Aldrich, Inc.
Jeffrey Klaiber, P.E., Engineering Principal
Mark Miesfeldt, P.G., Senior Hydrogeologist

SUBJECT: Summary of Appendix III Groundwater Monitoring Results Pursuant to 40 CFR § 257.93 and 40 CFR § 257.94
Winyah Generating Station
New Class 3 Landfill and Closed Unit 2 Slurry Pond

The South Carolina Public Service Authority (Santee Cooper) is implementing the April 17, 2015 U.S. Environmental Protection Agency (U.S. EPA) Federal Coal Combustion Residuals (CCR) Rule (40 CFR § 257 and 261) for the Winyah Generating Station, located in Georgetown County, South Carolina. Santee Cooper provided Haley & Aldrich with groundwater monitoring data collected from a groundwater monitoring system that meets the requirements of 40 CFR §257.91. This memorandum documents the results of statistical tests conducted to determine if Appendix III groundwater monitoring constituents detected in downgradient wells are at levels that exhibit a statistically significant increase above background or upgradient wells consistent with the requirements in 40 CFR § 257.94.

Collection dates for the baseline sampling rounds from the CCR Unit span from June 4, 2018 through August 23, 2018. The data satisfy the CCR Rule requirement of collecting a minimum of 8 rounds of hydrological and groundwater quality data from upgradient wells. The initial detection monitoring event was conducted in January 2019. The Upper Tolerance Limit (UTL) statistical analysis was used as specified in the certification statement of 31 July 2019. The UTL is an accepted method under the CCR Rule and is the upper endpoint of a tolerance interval that is designed to contain a pre-specified proportion (e.g. 95 percent) of the background dataset.

Data from the January 2019 detection monitoring event from the downgradient monitoring wells for the new Class 3 Landfill and closed Unit 2 Slurry Pond unit were compared to the UTL calculated from the background data (Table 1) from upgradient wells for the Appendix III constituents (boron, calcium, chloride, fluoride, pH, sulfate, and total dissolved solids).

Statistical Evaluation of Appendix III Constituents

The Rule, 40 CFR §257.93(f) (1-4), provides four specific options to statistically evaluate whether water quality downgradient of the CCR Unit represents an SSI of Appendix III parameters compared to background water quality of the CCR Unit. The Upper Tolerance Limit (UTL) was used to evaluate potential SSIs. A 95% Upper Tolerance Limit for 99% coverage was calculated to compare to downgradient groundwater analytical results for this evaluation.

UTL STATISTICAL ANALYSIS

The UTL is an accepted statistical method identified in the CCR Rule to evaluate the groundwater analytical data at CCR Units. A tolerance interval is a concentration range, with some confidence level, designed to contain a pre-specified proportion (e.g., 99 percent) of the underlying population from which the statistical sample is drawn (background). The upper endpoint of a tolerance interval is called the upper tolerance limit or UTL. Depending on the assumed distribution of background, parametric or non-parametric procedures were used to develop the UTL. Parametric tolerance limits utilize assumed distributions of the sample background data to develop the UTL, and non-parametric limits utilize order statistics or bootstrap methods to develop the UTL. The UTL was calculated using the U.S. EPA's ProUCL 5.1 software from the background well data after testing for outlier sample results that would warrant removal from the data set based on likely error in sampling or measurement. Both visual and statistical outlier tests for the background data were performed using ProUCL, and a visual inspection of the data was performed for the downgradient sample data. With the exception of calcium and chloride at well WBW-A1-1, no sample data were deemed as outliers that warranted removal from the data set.

RESULTS OF APPENDIX III DOWNGRADIENT STATISTICAL COMPARISONS

The sample concentrations at the downgradient wells for each of the Appendix III constituents from the January 23, 2019 detection monitoring sampling event were compared to their respective UTLs. A sample concentration greater than the UTL is considered to represent a statistically significant increase. Based on these comparisons, boron, calcium, chloride, pH, sulfate, and total dissolved solids from one or more downgradient sample(s) indicated a statistically significant increase above background. However, recognizing that the new Class 3 Landfill was constructed in the footprint of the closed Unit 2 Slurry Pond, and had not received CCR prior to completing detection monitoring, Haley & Aldrich conducted an evaluation to demonstrate that a source other than the Class 3 Landfill caused the statistically significant increase over background, consistent with §257.94(e)(2).

This alternate source demonstration (ASD) concluded that the closed Unit 2 Slurry Pond is the source for the Appendix III SSIs detected downgradient of the two units, and as a result, the new Class 3 Landfill remains in detection monitoring while the closed unit 2 Slurry Pond has triggered for assessment monitoring. Notification that an assessment monitoring program has been initiated for the closed Unit 2 Slurry Pond was posted on the facilities CCR website on December 12, 2019. The assessment monitoring program for the closed Unit 2 Slurry Pond has been established to meet the requirements of 40 CFR § 257.95.

Following completion of the certified ASD in October 2019, a second round of detection monitoring was conducted for the new Class 3 Landfill. Consistent with the Unified Guidance and in response to the certified ASD conducted for the Appendix III SSI's, an intra-well statistical analysis, which compares the most recent detection monitoring result to the background values calculated for the individual constituent/wells, was performed (Table II). This evaluation did not identify SSI's of Appendix III constituents and as a result the new Class 3 Landfill remains in detection monitoring. The statistical evaluation of the assessment monitoring results for the closed Unit 2 Slurry Pond will be completed in April 2020.

Tables:

Table I – Summary of Detection Monitoring Statistical Evaluation – January 2019
Table II – Summary of Detection Monitoring Statistical Evaluation – June 2019

TABLES

Winyah Class III Landfill and Closed Unit 2 Slurry Pond
Detection Monitoring Statistical Analysis Summary

																			Inter-well Analysis	
Location Id	Frequency of Detection	Percent Non-Detects	Range of Non-Detect	Mean	50th Percentile (Median)	95th Percentile	Maximum Detect	Variance	Standard Deviation	Coefficient of Variance	CCR MCL/RSL	Report Result Unit	Detection Exceedances (Y/N)	Number of Detection Exceedances	Number of Non-Detection Exceedances	Outlier Presence	Outlier Removed	Trend	Distribution Well*	March 2019 Concentration (mg/L)	Upper Prediction Limit (mg/L)	Exceedance above Background at Individual Well
CCR Appendix-III: Boron, Total (mg/L)																						
WBW-A1-1	9/9	0%	-	0.0406	0.036	0.0636	0.078	0.000209	0.01446	0.3565	NA	mg/L	N	0	0	Yes	No	Stable	Non-parametric		0.078	
WAP-07	9/9	0%	-	0.542	0.64	0.902	0.91	0.1234	0.3513	0.6479	NA	mg/L	N	0	0	No	No	Stable	Normal	0.85		Y
WLF-A1-1	9/9	0%	-	3.83	3.9	4.06	4.1	0.04	0.2	0.05217	NA	mg/L	N	0	0	No	No	Stable	Normal	4.00		Y
WLF-A1-2	9/9	0%	-	0.654	0.61	1.368	1.8	0.2202	0.4693	0.717	NA	mg/L	N	0	0	Yes	No	Stable	Normal	0.28		Y
WLF-A1-3	9/9	0%	-	0.138	0.097	0.34	0.48	0.01681	0.1297	0.941	NA	mg/L	N	0	0	Yes	No	Stable	Non-parametric	0.13		Y
WLF-A1-4	9/9	0%	-	0.497	0.39	0.944	1.2	0.0783	0.2798	0.5634	NA	mg/L	N	0	0	Yes	No	Stable	Non-parametric	0.35		Y
WLF-A1-5	9/9	0%	-	2.46	2.7	3	3	0.2603	0.5102	0.2078	NA	mg/L	N	0	0	No	No	Stable	Normal	1.70		Y
CCR Appendix-III: Calcium, Total (mg/L)																						
WBW-A1-1	9/9	0%	-	40.3	45.1	57.62	59.5	304.3	17.44	0.433	NA	mg/L	N	0	0	Yes	Yes	Decrease	Normal		64.10	
WAP-07	10/10	0%	-	297	270.5	570.5	575	39690	199.2	0.6712	NA	mg/L	N	0	0	Yes	No	Stable	Normal	228		Y
WLF-A1-1	9/9	0%	-	504	550	691.2	746	42610	206.4	0.4099	NA	mg/L	N	0	0	Yes	No	Stable	Normal	460		Y
WLF-A1-2	9/9	0%	-	118	151	176.2	187	3606	60.05	0.5098	NA	mg/L	N	0	0	Yes	No	Stable	Normal	51		N
WLF-A1-3	9/9	0%	-	8.86	8.12	16.32	18	24.52	4.952	0.5587	NA	mg/L	N	0	0	Yes	No	Stable	Normal	18		N
WLF-A1-4	9/9	0%	-	135	135	201.6	212	3433	58.59	0.4333	NA	mg/L	N	0	0	Yes	No	Stable	Normal	120		Y
WLF-A1-5	9/9	0%	-	201	233	269	273	7107	84.3	0.4196	NA	mg/L	N	0	0	Yes	No	Stable	Normal	180		Y
CCR Appendix-III: Chloride (mg/L)																						
WBW-A1-1	9/9	0%	-	15.8	9.31	45.42	67.5	377.9	19.44	1.232	NA	mg/L	N	0	0	Yes	Yes	Stable	Normal		12.10	
WAP-07	10/10	0%	-	16.4	14.55	23.92	24.6	34.8	5.899	0.3599	NA	mg/L	N	0	0	No	No	Stable	Normal	12.7		Y
WLF-A1-1	9/9	0%	-	182	173	263.2	270	2549	50.49	0.2772	NA	mg/L	N	0	0	No	No	Decreasing	Normal	131.0		Y
WLF-A1-2	8/8	0%	-	66	35.5	179.9	211	4453	66.73	1.011	NA	mg/L	N	0	0	No	No	Stable	Non-parametric	24.6		Y
WLF-A1-3	9/9	0%	-	10.4	3.98	38.21	59.3	338.1	18.39	1.775	NA	mg/L	N	0	0	Yes	No	Stable	Non-parametric	5.6		N
WLF-A1-4	9/9	0%	-	12.3	7.82	31.18	41.3	130.7	11.43	0.9298	NA	mg/L	N	0	0	Yes	No	Stable	Non-parametric	7.7		N
WLF-A1-5	9/9	0%	-	133	148	174.6	175	1566	39.57	0.2976	NA	mg/L	N	0	0	No	No	Stable	Normal	79.9		Y
CCR Appendix-III: Fluoride (mg/L)																						
WBW-A1-1	0/9	100%	0.1-0.1	0.1	0.1	0.1		5.204E-18	2.281E-09	2.281E-08	4	mg/L	N	0	0	NA	NA	NA	NA		0.1	
WAP-07	0/9	100%	0.1-0.1	0.1	0.1	0.1		5.204E-18	2.281E-09	2.281E-08	4	mg/L	N	0	0	NA	NA	NA	NA	0.1		N
WLF-A1-1	0/9	100%	0.1-0.1	0.1	0.1	0.1		5.204E-18	2.281E-09	2.281E-08	4	mg/L	N	0	0	NA	NA	NA	NA	0.1		N
WLF-A1-2	4/9	56%	0.1-0.1	0.111	0.1	0.136	0.14	0.0002361	0.01537	0.1383	4	mg/L	N	0	0	No	No	Stable	Normal	0.1		N
WLF-A1-3	0/9	100%	0.1-0.1	0.1	0.1	0.1		5.204E-18	2.281E-09	2.281E-08	4	mg/L	N	0	0	NA	NA	NA	NA	0.1		N
WLF-A1-4	0/9	100%	0.1-0.1	0.1	0.1	0.1		5.204E-18	2.281E-09	2.281E-08	4	mg/L	N	0	0	NA	NA	NA	NA	0.1		N
WLF-A1-5	1/9	89%	0.1-0.1	0.101	0.1	0.106	0.11	0.00001111	0.003333	0.03297	4	mg/L	N	0	0	NA	NA	NA	NA	0.1		N
CCR Appendix-III: pH, Field (pH units)																						
WBW-A1-1	9/9	0%	-	4.49	4.47	4.652	4.7	0.01583	0.1258	0.02805	NA	pH units	N	0	0	No	No	Stable	Normal		0.005	
WAP-07	10/10	0%	-	6.02	6.045	6.523	6.69	0.1681	0.41	0.06813	NA	pH units	N	0	0	No	No	Stable	Normal	6.0		Y
WLF-A1-1	9/9	0%	-	6.39	6.41	6.47	6.47	0.005386	0.07339	0.01149	NA	pH units	N	0	0	No	No	Decreasing	Normal	6.3		Y
WLF-A1-2	9/9	0%	-	6.37	6.29	6.642	6.67	0.04497	0.2121	0.03328	NA	pH units	N	0	0	No	No	Stable	Normal	6.1		Y
WLF-A1-3	9/9	0%	-	4.17	4.13	4.44	4.58	0.03151	0.1775	0.04256	NA	pH units	N	0	0	Yes	No	Stable	Normal	4.6		Y
WLF-A1-4	9/9	0%	-	6.43	6.57	6.692	6.74	0.08279	0.2877	0.04474	NA	pH units	N	0	0	No	No	Stable	Normal	6.7		Y
WLF-A1-5	9/9	0%	-	6.89	6.88	6.968	6.98	0.00295	0.05431	0.007879	NA	pH units	N	0	0	No	No	Stable	Normal	6.9		Y
CCR Appendix-III: Sulfate (mg/L)																						
WBW-A1-1	9/9	0%	-	128	119	167.6	180	723.7	26.9	0.2098	NA	mg/L	N	0	0	No	No	Stable	Normal		186	
WAP-07	10/10	0%	-	735	659.5	1341	1440	188700	434.4	0.5911	NA	mg/L	N	0	0	No	No	Stable	Normal	485		Y
WLF-A1-1	9/9	0%	-	1010	1028	1066	1070	2981	54.6	0.05402	NA	mg/L	N	0	0	No	No	Stable	Normal	919		Y
WLF-A1-2	8/8	0%	-	330	281	789	1040	91840	303	0.9175	NA	mg/L	N	0	0	Yes	No	Stable	Non-parametric	101		N
WLF-A1-3	9/9	0%	-	74.7	49.5	159.6	160	2452	49.51	0.6632	NA	mg/L	N	0	0	No	No	Stable	Non-parametric	78		N
WLF-A1-4	9/9	0%	-	187	171	317.6	366	6779	82.33	0.44	NA	mg/L	N	0	0	No	No	Stable	Normal	169		N
WLF-A1-5	9/9	0%	-	337	366	394.2	401	2947	54.28	0.1609	NA	mg/L	N	0	0	No	No	Stable	Normal	279		Y
CCR Appendix-III: Total Dissolved Solids (TDS) (mg/L)																						
WBW-A1-1	9/9	0%	-	250	247.5	328	352.5	2561	50.6	0.2024	NA	mg/L	N	0	0	No	No	Stable	Normal		360	
WAP-07	10/10	0%	-	1220	1220	2059	2159	462200	679.9	0.5551	NA	mg/L	N	0	0	No	No	Stable	Normal	579		Y
WLF-A1-1	9/9	0%	-	2210	2214	2445	2480	50050	223.7	0.1014	NA	mg/L	N	0	0	No	No	Decreasing	Normal	1721		Y
WLF-A1-2	9/9	0%	-	551	612.5	791	890	31910	178.6	0.3241	NA	mg/L	N	0	0	No	No	Stable	Normal	304		N
WLF-A1-3	9/9	0%	-	97.3	90.62	121	127.5	199.8	14.13	0.1453	NA	mg/L	N	0	0	No	No	Stable	Normal	128		N
WLF-A1-4	9/9	0%	-	539	496.2	698.5	755	10100	100.5	0.1866	NA	mg/L	N	0	0	No	No	Stable	Normal	463		Y
WLF-A1-5	9/9	0%	-	1010	1049	1216	1252	36370	190.7	0.1888	NA	mg/L	N	0	0	No	No	Stable	Normal	708		Y

Winyah Class III Landfill and Closed Unit 2 Slurry Pond
Detection Monitoring Statistical Analysis Summary

Location Id	Frequency of Detection	Percent Non-Detects	Range of Non-Detect	Mean	50th Percentile (Median)	95th Percentile	Maximum Detect	Variance	Standard Deviation	Coefficient of Variance	CCR MCL/RSL	Report Result Unit	Detection Exceedances (Y/N)	Number of Detection Exceedances	Number of Non-Detection Exceedances	Outlier Presence	Outlier Removed	Trend	Distribution Well*	June 2019 Concentration (mg/L)	Intra-well Analysis	
																					Background Limit (Upper Prediction Limit) mg/L	SSI
CCR Appendix-III: Boron, Total (mg/L)																						
WBW-A1-1	9/9	0%	-	0.0406	0.036	0.0636	0.078	0.000209	0.01446	0.3565	NA	mg/L	N	0	0	Yes	No	Stable	Non-parametric			
WAP-07	9/9	0%	-	0.542	0.64	0.902	0.91	0.1234	0.3513	0.6479	NA	mg/L	N	0	0	No	No	Stable	Normal	NA	2.12	N
WLF-A1-1	10/10	0%	-	3.74	3.85	4.055	4.1	0.1227	0.3502	0.09365	NA	mg/L	N	0	0	No	No	Stable	Normal	2.90	4.74	N
WLF-A1-2	10/10	0%	-	0.605	0.58	1.314	1.8	0.2202	0.4692	0.7756	NA	mg/L	N	0	0	Yes	No	Stable	Normal	0.16	2.89	N
WLF-A1-3	10/10	0%	-	0.131	0.096	0.3225	0.48	0.01534	0.1238	0.9417	NA	mg/L	N	0	0	Yes	No	Stable	Non-parametric	0.08	0.48	N
WLF-A1-4	10/10	0%	-	0.474	0.38	0.912	1.2	0.07474	0.2734	0.5768	NA	mg/L	N	0	0	Yes	No	Stable	Non-parametric	0.27	1.20	N
WLF-A1-5	10/10	0%	-	2.36	2.45	3	3	0.3227	0.568	0.2407	NA	mg/L	N	0	0	No	No	Stable	Normal	1.50	4.62	N
CCR Appendix-III: Calcium, Total (mg/L)																						
WBW-A1-1	10/10	0%	-	42.8	46.15	62.53	65	331.6	18.21	0.4259	NA	mg/L	N	0	0	Yes	Yes	Decrease	Normal			
WAP-07	11/11	0%	-	276	228	570	575	40310	200.8	0.7265	NA	mg/L	N	0	0	Yes	No	Stable	Normal	72	1319.80	N
WLF-A1-1	10/10	0%	-	501	529.5	684.3	746	37930	194.8	0.3885	NA	mg/L	N	0	0	Yes	No	Stable	Normal	480	1513.05	N
WLF-A1-2	10/10	0%	-	109	127.5	174.9	187	4011	63.33	0.5821	NA	mg/L	N	0	0	Yes	No	Stable	Normal	28	392.42	N
WLF-A1-3	10/10	0%	-	9.98	8.29	19.1	20	34.2	5.848	0.5862	NA	mg/L	N	0	0	Yes	No	Stable	Normal	20	25.16	N
WLF-A1-4	10/10	0%	-	130	134	200.3	212	3294	57.4	0.4404	NA	mg/L	N	0	0	Yes	No	Stable	Normal	86	421.68	N
WLF-A1-5	10/10	0%	-	201	216.5	268.5	273	6317	79.48	0.3958	NA	mg/L	N	0	0	Yes	No	Stable	Normal	200	613.07	N
CCR Appendix-III: Chloride (mg/L)																						
WBW-A1-1	10/10	0%	-	15.8	9.395	44.51	67.5	336	18.33	1.157	NA	mg/L	N	0	0	Yes	Yes	Stable	Normal			
WAP-07	11/11	0%	-	15.3	14.1	23.85	24.6	43.81	6.619	0.4319	NA	mg/L	N	0	0	No	No	Stable	Normal	4.7	46.63	N
WLF-A1-1	10/10	0%	-	173	160	262.4	270	3026	55.01	0.3173	NA	mg/L	N	0	0	No	No	Decreasing	Normal	94.9	416.39	N
WLF-A1-2	9/9	0%	-	59.9	32.4	175.4	211	4231	65.04	1.085	NA	mg/L	N	0	0	No	No	Stable	Non-parametric	11.2	211.00	N
WLF-A1-3	10/10	0%	-	9.83	3.99	35.58	59.3	303.3	17.42	1.771	NA	mg/L	N	0	0	Yes	No	Stable	Non-parametric	5.1	59.30	N
WLF-A1-4	10/10	0%	-	11.7	7.775	29.92	41.3	119.1	10.92	0.9291	NA	mg/L	N	0	0	Yes	No	Stable	Non-parametric	6.8	41.30	N
WLF-A1-5	10/10	0%	-	130	127.5	174.6	175	1488	38.57	0.297	NA	mg/L	N	0	0	No	No	Stable	Normal	102.0	306.49	N
CCR Appendix-III: Fluoride (mg/L)																						
WBW-A1-1	0/9	100%	0.1-0.1	0.1	0.1	0.1		5.204E-18	2.281E-09	2.281E-08	4	mg/L	N	0	0	NA	NA	NA	NA			
WAP-07	0/9	100%	0.1-0.1	0.1	0.1	0.1		5.204E-18	2.281E-09	2.281E-08	4	mg/L	N	0	0	NA	NA	NA	NA	0.1	0.10	N
WLF-A1-1	0/10	100%	0.1-0.1	0.1	0.1	0.1		6.168E-18	2.484E-09	2.484E-08	4	mg/L	N	0	0	NA	NA	NA	NA	0.1	0.10	N
WLF-A1-2	4/10	60%	0.1-0.1	0.11	0.1	0.1355	0.14	0.0002222	0.01491	0.1355	4	mg/L	N	0	0	No	No	Stable	Normal	0.1	0.18	N
WLF-A1-3	0/10	100%	0.1-0.1	0.1	0.1	0.1		6.168E-18	2.484E-09	2.484E-08	4	mg/L	N	0	0	NA	NA	NA	NA	0.1	0.10	N
WLF-A1-4	0/10	100%	0.1-0.1	0.1	0.1	0.1		6.168E-18	2.484E-09	2.484E-08	4	mg/L	N	0	0	NA	NA	NA	NA	0.1	0.10	N
WLF-A1-5	1/10	90%	0.1-0.1	0.101	0.1	0.1055	0.11	0.00001	0.003162	0.03131	4	mg/L	N	0	0	NA	NA	NA	NA	0.1	0.11	N
CCR Appendix-III: pH, Field (pH units)																						
WBW-A1-1	10/10	0%	-	4.49	4.495	4.646	4.7	0.01462	0.1209	0.02691	NA	pH units	N	0	0	No	No	Stable	Normal			
WAP-07	11/11	0%	-	5.97	5.99	6.505	6.69	0.1746	0.4179	0.06999	NA	pH units	N	0	0	No	No	Stable	Normal	5.5	3.7, 8.32	N
WLF-A1-1	10/10	0%	-	6.38	6.405	6.47	6.47	0.005578	0.07468	0.01171	NA	pH units	N	0	0	No	No	Decreasing	Normal	6.3	6.11, 6.7	N
WLF-A1-2	10/10	0%	-	6.25	6.29	6.639	6.67	0.1894	0.4352	0.06962	NA	pH units	N	0	0	No	No	Stable	Normal	5.2	5.45, 7.37	N
WLF-A1-3	10/10	0%	-	4.16	4.125	4.423	4.58	0.02838	0.1685	0.04045	NA	pH units	N	0	0	Yes	No	Stable	Normal	4.1	3.64, 4.6	N
WLF-A1-4	10/10	0%	-	6.42	6.51	6.686	6.74	0.07558	0.2749	0.04284	NA	pH units	N	0	0	No	No	Stable	Normal	6.3	4.99, 7.8	N
WLF-A1-5	10/10	0%	-	6.91	6.885	7.008	7.03	0.00449	0.06701	0.009701	NA	pH units	N	0	0	No	No	Stable	Normal	7.0	6.61, 7.18	N
CCR Appendix-III: Sulfate (mg/L)																						
WBW-A1-1	10/10	0%	-	133	128.5	175.9	180	826.3	28.75	0.2169	NA	mg/L	N	0	0	No	No	Stable	Normal			
WAP-07	11/11	0%	-	683	612	1330	1440	198800	445.9	0.6524	NA	mg/L	N	0	0	No	No	Stable	Normal	170	2969	N
WLF-A1-1	10/10	0%	-	1000	1014	1066	1070	3529	59.41	0.05932	NA	mg/L	N	0	0	No	No	Stable	Normal	917	1229	N
WLF-A1-2	9/9	0%	-	301	256	753.2	1040	88080	296.8	0.986	NA	mg/L	N	0	0	Yes	No	Stable	Non-parametric	67	1040	N
WLF-A1-3	10/10	0%	-	74.8	53.6	159.6	160	2179	46.68	0.6244	NA	mg/L	N	0	0	No	No	Stable	Non-parametric	76	160	N
WLF-A1-4	10/10	0%	-	179	170	311.5	366	6700	81.85	0.4575	NA	mg/L	N	0	0	No	No	Stable	Normal	105	590	N
WLF-A1-5	10/10	0%	-	335	340	393.4	401	2684	51.81	0.1547	NA	mg/L	N	0	0	No	No	Stable	Normal	312	587	N
CCR Appendix-III: Total Dissolved Solids (TDS) (mg/L)																						
WBW-A1-1	10/10	0%	-	258	251.9	344.6	352.5	2999	54.76	0.2118	NA	mg/L	N	0	0	No	No	Stable	Normal			
WAP-07	11/11	0%	-	1140	1151	2048	2159	492300	701.6	0.6147	NA	mg/L	N	0	0	No	No	Stable	Normal	309	46140	N
WLF-A1-1	10/10	0%	-	2170	2195	2440	2480	60190	245.3	0.1132	NA	mg/L	N	0	0	No	No	Decreasing	Normal	1811	2901	N
WLF-A1-2	10/10	0%	-	508	545	778.6	890	46630	215.9	0.4247	NA	mg/L	N	0	0	No	No	Stable	Normal	124	1327	N
WLF-A1-3	10/10	0%	-	99.1	93.43	121.9	127.5	209	14.46	0.1459	NA	mg/L	N	0	0	No	No	Stable	Normal	115	135	N
WLF-A1-4	10/10	0%	-	518	488.1	691.5	755	13380	115.7	0.2235	NA	mg/L	N	0	0	No	No	Stable	Normal	329	1018	N
WLF-A1-5	10/10	0%	-	998	1045	1212	1252	33830	183.9	0.1843	NA	mg/L	N	0	0	No	No	Stable	Normal	888	1796	N

APPENDIX B
ALTERNATE SOURCE DEMONSTRATION

HALEY ALDRICH

www.haleyaldrich.com

REPORT ON

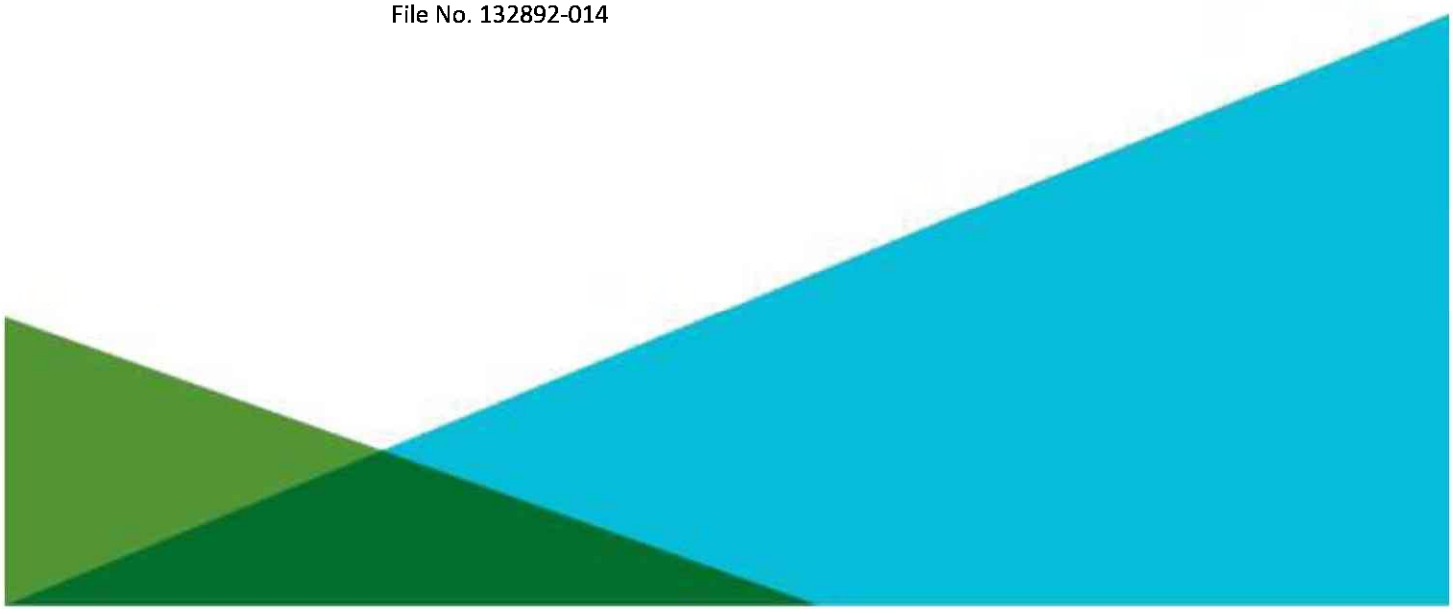
ALTERNATE SOURCE DEMONSTRATION (ASD) MEMORANDUM

WINYAH GENERATING STATION; CLASS 3 LANDFILL
GEORGETOWN, SOUTH CAROLINA

by Haley & Aldrich, Inc.
Greenville, South Carolina

for South Carolina Public Service Authority (Santee Cooper)
Moncks Corner, South Carolina

File No. 132892-014



Alternate Source Demonstration (ASD) Memorandum for the Appendix III Constituents at the Class 3 Landfill; Cross Generating Station

This Alternate Source Demonstration (ASD) memorandum was prepared by Haley & Aldrich to demonstrate that the closed Unit 2 Slurry Pond, which was located at this same location for 41-years prior to constructing the new Class 3 Landfill Area 1, is the source of the statistically significant increases of Appendix III constituents and that the new Class 3 Landfill is not the source. This was accomplished by comparing groundwater quality conditions downgradient of the Class 3 Landfill, prior to receiving CCRs, to observed Appendix III constituent concentrations detected after the Class 3 Landfill began operation.

BACKGROUND

The Winyah Generating Station (WGS) is located approximately ten (10) miles from the Atlantic Ocean between Pennyroyal Creek and Turkey Creek in Georgetown, South Carolina. WGS is located within the Lower Coastal Plain of the Atlantic Coastal Plain physiographic province in South Carolina. The Site and surrounding area is relatively flat with natural ground surface elevations between 15 and 30 feet above mean sea level (msl). The lower lying areas are typically marshy year-round.

Extensive earthwork across the site such as roads, dikes, and foundation preparation has altered much of the original grade in the vicinity of the plant and CCR management units. Nearly all surface and storm water on the Site is collected and directed to the industrial cooling pond. Other runoff ultimately flows to the Sampit River, located approximately two miles north of the Site. Pennyroyal Creek is a tributary to the Sampit River and borders the western boundary of the plant property. Another tributary, Turkey Creek, located east of the plant flows north and joins Pennyroyal Creek about one mile north of the Site. During plant construction, a portion of Turkey Creek was relocated to a man-made channel along the east side of the Industrial Cooling Pond.

The newly constructed Class 3 Landfill Area 1 at the WGS, was constructed in the footprint of the closed Unit 2 Slurry Pond. The Unit 2 Slurry Pond was regulated by the state of South Carolina and permitted by SCDHEC, Permit # SC0022471. Groundwater was monitored under a SCDHEC approved groundwater monitoring program prior to the implementation of the CCR Rule. Closure was completed by removing all coal combustion residuals (CCRs), specifically FGD slurry, and conducting analytical testing of the residual soil to confirm removal. SC DHEC certified closure of the Unit 2 Slurry Pond on November 9, 2017. The Class 3 Landfill Area 1 received approval from SC DHEC to begin placing waste within the constructed cells on November 2, 2018. The closed Unit 2 Slurry Pond was previously classified as an inactive surface impoundment as defined by 40 CFR §257.100 and as such the Unit 2 Slurry Pond was not considered to be subject to the groundwater monitoring and corrective action requirements in the Rule. However, on 5 August 2016, the EPA issued a "Direct Final Rule" effective on 4 October 2016, constituting a vacatur of 40 CFR §257.100. The Direct Final Rule applies the requirements of existing surface impoundments that had been previously declared inactive. Owners and operators of inactive CCR surface impoundments must comply with the groundwater monitoring requirements for existing CCR surface impoundments under a modified schedule. As a result, the groundwater monitoring network established for the new Class 3 Landfill has also been certified to meet the requirements of §257.91 for the closed Unit 2 Slurry Pond.

Historical groundwater monitoring results for the Appendix III constituents collected under the SCDHEC approved monitoring program for the closed Unit 2 Slurry Pond are summarized in Table 1. The Class 3 Landfill Area 1 was constructed of lined cells with a geocomposite drainage net and sand drainage layer to facilitate removal of leachate water from the landfill.

In accordance with 257.91 and 257.93, five new groundwater monitoring wells were installed downgradient of the new Class 3 Landfill Area 1 and the closed Unit 2 Slurry Pond. These new groundwater monitoring wells combined with the existing downgradient well WAP-7 and background well WBW-A1-1 formed the CCR Rule compliant monitoring network for the new Class 3 Landfill and the closed Unit 2 Slurry Pond. The groundwater monitoring network is provided on Figure 1.

Prior to placing CCR in the newly constructed landfill, 8-rounds of groundwater samples were collected to establish baseline groundwater quality conditions that represents the condition of the groundwater prior to placement of CCR in the landfill and the landfill going into operation. Per baseline sampling requirements in 257.94(b), eight independent sampling events were completed at the background well and at each downgradient well. These eight independent samples were analyzed for the Appendix III and Appendix IV constituents consistent with the Rule. Baseline sampling was completed prior to the initial receipt of CCR on November 2, 2018.

As required by §257.93(h) of the Federal CCR Rule, Haley & Aldrich performed a statistical analysis of the Appendix III constituents detected in groundwater downgradient of the Class 3 Landfill and closed Unit 2 Slurry Pond to evaluate the potential for statistically significant increases (SSIs) of the Appendix III constituents to exist above background. Findings from this evaluation indicated that SSIs for boron, calcium, chloride, pH, sulfate, and total dissolved solids (TDS) were present at one or more downgradient wells. However, as described below and consistent with §257.94(e)(2), Haley & Aldrich conducted an evaluation to demonstrate that a source other than the Class 3 Landfill caused the statistically significant increase over background. This memorandum documents the findings and conclusions of this evaluation.

FINDINGS AND CONCLUSIONS

Haley & Aldrich has concluded that the closed Unit 2 Slurry Pond is the alternate source for the Appendix III SSIs detected downgradient of the new Class 3 Landfill. The analysis supporting this conclusion is provided below.

Hydrogeology

- The new monitoring wells installed to establish baseline groundwater quality downgradient of the Class 3 Landfill Areas 1 are also located downgradient of the former Unit 2 Slurry Pond as the landfill was placed in the exact footprint of the Unit 2 Slurry Pond. All Unit 2 Slurry Pond CCRs were removed prior to landfill construction
- The new monitoring wells installed downgradient of the Class 3 Landfill were constructed to monitor groundwater quality in the uppermost aquifer and are screened in the same hydrostratigraphic unit as the existing wells that historically monitored groundwater during operation of the Unit 2 Slurry Pond.

- The distance between the downgradient boundary of the Class 3 Landfill and the closed Unit 2 Slurry Pond and the groundwater monitoring network varies from approximately 100-feet to 150-feet. Groundwater flow velocity for the WGS is approximately 15-feet per year. This represents between 7- and 10-years for a release from the former Unit 2 Slurry Pond to reach the CCR monitoring network. Knowing that the closed Unit 2 Slurry Pond was constructed in 1977 (42 years ago), one would conclude that there has been a sufficient amount of time for releases from the former Unit 2 Slurry Pond to have migrated beyond the new Class 3 Landfill monitoring locations. Conversely, one would conclude that there has not been enough time for a release from the new Class 3 Landfill to have reached the downgradient monitoring wells, even if that release occurred on the first day of operation.

Groundwater Quality

- As shown on Table 1, the concentration of the Appendix III constituents detected in monitoring well WAP-7 during baseline sampling in 2018 prior to receiving CCR, are less than or equal to the historical sampling results obtained while the Unit 2 Slurry Pond was in operation.
- The detection monitoring results obtained in January 2019, after the landfill began receiving CCR, are comparable to the concentrations observed during baseline sampling and do not indicate a release from the new landfill (see Table 2).
- During operation of the Unit 2 Slurry Pond, calcium concentrations in the downgradient wells averaged 185 mg/L with a maximum detected concentration of 746 mg/L. As expected, samples collected from the newly installed wells around the Class 3 Landfill, following closure of the Unit 2 Slurry Pond, yield lower concentrations for calcium ranging from 18 to 460 mg/L.
- During operation of the Unit 2 Slurry Pond concentrations of TDS and sulfate were measured at concentrations up to 2,480 mg/L and 1070 mg/L, respectively. The newly installed Class 3 Landfill wells record lower concentrations, ranging from 78 to 1721 mg/L and 78 to 919 mg/L, respectively.
- Historical concentrations of boron in the downgradient monitoring wells observed prior to receiving CCR in the Class 3 Landfill averaged 1.36 mg/L with a maximum detected concentration of 4.1 mg/L. The newly installed Class 3 Landfill wells recorded lower or comparable concentrations for boron ranging from 0.13 to 4.0 mg/L, again documenting the positive impact closure of the Unit 2 Slurry Pond has had on groundwater quality.
- Lastly, chloride concentrations in the downgradient monitoring wells detected prior to receiving CCR in the Class 3 Landfill averaged 73 mg/L with a maximum detected value of 270 mg/L. After the Class 3 Landfill began operations concentrations ranged from 5.56 to 131 mg/L which is comparable or lower to previous detections.
- While statistically significant increases of Appendix III constituents above background are present downgradient of the new Class 3 Landfill, the decreasing concentration trends do not indicate a release from the new Class 3 Landfill. Instead they show an improvement in groundwater quality following closure by removal of the former Unit 2 Slurry Pond.

Consistent with§257.94(e)(2), this written successful demonstration, which includes obtaining a certification from a qualified professional engineer (certification follows), has been completed within 90-days of detecting a SSI above background levels. As a result, and consistent with §257.94(e)(2), the Class 3 Landfill at the CGS will remain in detection monitoring, while the closed Unit 2 Slurry Pond will enter into assessment monitoring.

HALEY & ALDRICH, INC.
400 Augusta Street
Suite 130
Greenville, SC 29601
864-214-8750

12 September 2019
File No. 132892-016

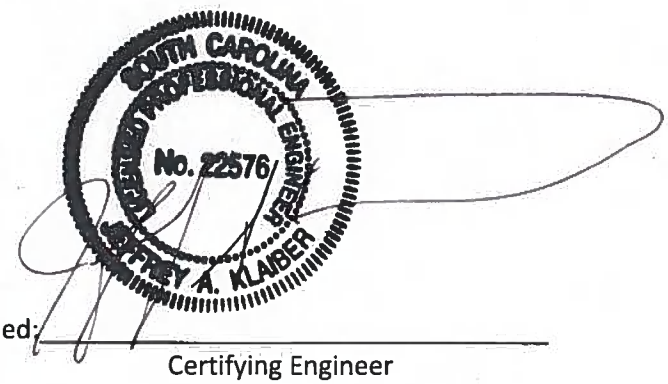
SUBJECT: Winyah Generating Station Appendix IV Alternative Source Demonstration for the Slurry Pond 3 and 4, Santee Cooper

Pursuant to 40 CFR §257.95(g)(3)(ii), Haley & Aldrich, Inc. conducted an alternative source evaluation to determine if a source other than Slurry Pond 3 and 4 caused the statistically significant level over background identified during assessment monitoring for this unit. I certify that this report and included attachments were prepared by me or under my direct supervision. I am a licensed professional engineer registered in the State of South Carolina.

This alternate source demonstration supports the conclusion that a source other than the CCR unit Slurry Pond 3 and 4 is the cause of the statistically significant level over background for Appendix IV constituents detected during assessment monitoring of this Unit.

The information contained in this evaluation is, to the best of my knowledge, true, accurate and complete.

HALEY & ALDRICH, INC.



Signed: _____
Certifying Engineer

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

TABLES

TABLE I
HISTORIC GROUNDWATER MONITORING RESULTS
WINYAH GENERATING STATION
SANTEE COOPER
GEORGETOWN, SOUTH CAROLINA

Chemical Group			Detection Monitoring - EPA Appendix III Constituents						
Chemical Name			Boron, Total	Calcium, Total	Chloride	Fluoride	pH (lab)	Sulfate	Total Dissolved Solids (TDS)
US EPA MCL/RSL (THQ=1.0)			-	-	-	4	-	-	-
Units			mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
Impoundment	**Location**	**Sample Date**							
Unit 2 Slurry Pond	WAP-6	12/06/1994	-	18.4	211.3	-	5.13	417.6	878
Unit 2 Slurry Pond	WAP-6	03/29/1995	-	195.7	262	-	4.81	462	916
Unit 2 Slurry Pond	WAP-6	10/10/1995	-	196.1	152	-	5.42	305	760
Unit 2 Slurry Pond	WAP-6	03/26/1996	-	195	316	-	5.14	385	1054
Unit 2 Slurry Pond	WAP-6	10/22/1996	-	161.6	159	-	4.86	217	544
Unit 2 Slurry Pond	WAP-6	02/04/1997	-	-	-	-	4.95	-	774
Unit 2 Slurry Pond	WAP-6	03/06/1997	-	144.3	198	-	5.01	223	692
Unit 2 Slurry Pond	WAP-6	04/03/1997	-	-	218	-	5.05	255	718
Unit 2 Slurry Pond	WAP-6	09/30/1997	-	121.6	223	-	4.66	285	790
Unit 2 Slurry Pond	WAP-6	03/24/1998	-	85	103	-	4.86	122	424
Unit 2 Slurry Pond	WAP-6	09/16/1998	-	12.9	10	-	4.78	32	72
Unit 2 Slurry Pond	WAP-6	05/12/1999	-	77.6	81	-	4.55	211	409
Unit 2 Slurry Pond	WAP-6	11/30/1999	-	21.3	25	-	4.36	66	152
Unit 2 Slurry Pond	WAP-6	05/08/2000	-	63.7	65	-	5.44	150	332
Unit 2 Slurry Pond	WAP-6	12/12/2000	-	53.8	45	-	5.7	137	243
Unit 2 Slurry Pond	WAP-6	04/25/2001	-	14.6	11.6	-	4.27	26	98
Unit 2 Slurry Pond	WAP-6	11/06/2001	-	52	41.5	-	4.02	105	274
Unit 2 Slurry Pond	WAP-6	05/06/2002	-	71.3	60.4	-	4.8	141	330
Unit 2 Slurry Pond	WAP-6	12/09/2002	-	4.59	17.7	-	4.22	30.6	74
Unit 2 Slurry Pond	WAP-6	05/16/2003	-	3.5	17	-	3.95	21	190
Unit 2 Slurry Pond	WAP-6	10/28/2003	-	144	25.9	-	4.01	43	112
Unit 2 Slurry Pond	WAP-6	05/04/2004	-	53	-	-	4.15	-	-
Unit 2 Slurry Pond	WAP-6	11/16/2004	-	13.3	41.2	-	3.94	26	520
Unit 2 Slurry Pond	WAP-6	06/20/2005	-	11.5	19.3	-	4.53	25.8	281
Unit 2 Slurry Pond	WAP-6	11/08/2005	-	6.3	31.1	-	3.72	37.7	83
Unit 2 Slurry Pond	WAP-6	05/02/2006	-	8.53	19.1	-	4.05	22	136
Unit 2 Slurry Pond	WAP-6	12/04/2006	-	34.2	35.3	-	4.36	70.5	178
Unit 2 Slurry Pond	WAP-6	06/05/2007	-	13.1	28.6	-	4.92	29.4	112
Unit 2 Slurry Pond	WAP-6	10/08/2007	-	41.1	35.37	-	5.49	80.87	2929
Unit 2 Slurry Pond	WAP-6	05/20/2008	-	15.5	18.02	-	5.97	33.64	88
Unit 2 Slurry Pond	WAP-6	09/22/2008	-	60.9	22.14	-	4.34	154.3	277
Unit 2 Slurry Pond	WAP-6	02/10/2009	-	45.6	21.89	-	5.53	111.4	194
Unit 2 Slurry Pond	WAP-6	08/20/2009	-	86.28	17.99	-	4.62	197.7	21540
Unit 2 Slurry Pond	WAP-6	12/17/2009	-	201.43	18.63	-	4.66	443	681
Unit 2 Slurry Pond	WAP-6	02/17/2010	-	9.303	19.97	-	4.52	39.07	70
Unit 2 Slurry Pond	WAP-6	07/26/2010	-	213.32	23.6817	-	4.36	604.35	856
Unit 2 Slurry Pond	WAP-6	02/01/2011	-	11.71	17	-	4.5	33.1	65
Unit 2 Slurry Pond	WAP-6	08/02/2011	-	406.839	-	-	4.69	-	1218
Unit 2 Slurry Pond	WAP-6	09/20/2011	-	-	20.18	-	4.84	78.99	-
Unit 2 Slurry Pond	WAP-6	01/10/2012	-	9.05	8.46	-	4.68	19	39
Unit 2 Slurry Pond	WAP-6	07/10/2012	-	37.75	5.46	-	4.49	83.8	133
Unit 2 Slurry Pond	WAP-6	01/11/2013	-	227.5	6.18	-	4.58	515	766
Unit 2 Slurry Pond	WAP-6	06/17/2013	< 0.1	31.75	3.47	-	4.52	172	< 125
Unit 2 Slurry Pond	WAP-6	01/14/2014	< 0.5	293.2	3.75	-	4.61	789	1150
Unit 2 Slurry Pond	WAP-6	06/17/2014	-	25.98	3.34	-	4.97	66.8	157.5
Unit 2 Slurry Pond	WAP-6	01/14/2015	-	14.45	18	-	4.6	32.5	115
Unit 2 Slurry Pond	WAP-6	01/30/2018	-	59.7	19.6	-	-	163	261.4
Unit 2 Slurry Pond	WAP-6	06/04/2018	-	15	11.6	-	-	39.3	107.5
Unit 2 Slurry Pond	WAP-7	10/10/1995	-	1612	17	-	7.02	1590	4966
Unit 2 Slurry Pond	WAP-7	03/26/1996	-	845	1514	-	6.86	1397	4138
Unit 2 Slurry Pond	WAP-7	10/22/1996	-	1547	1654	-	6.8	1511	4510
Unit 2 Slurry Pond	WAP-7	02/04/1997	-	-	-	-	6.37	-	4544
Unit 2 Slurry Pond	WAP-7	03/06/1997	-	1200	1671	-	6.87	1452	4584
Unit 2 Slurry Pond	WAP-7	04/03/1997	-	-	1712	-	6.87	1437	4561
Unit 2 Slurry Pond	WAP-7	09/30/1997	-	1087	1547	-	6.78	1534	4451
Unit 2 Slurry Pond	WAP-7	03/24/1998	-	662.2	1031	-	6.98	1277	3952
Unit 2 Slurry Pond	WAP-7	09/16/1998	-	478	448	-	7.07	1500	2984
Unit 2 Slurry Pond	WAP-7	05/12/1999	-	561.4	322	-	6.9	1610	2903
Unit 2 Slurry Pond	WAP-7	11/30/1999	-	794.6	540	-	6.77	1213	3171
Unit 2 Slurry Pond	WAP-7	05/09/2000	-	552	806	-	7.19	1541	3845
Unit 2 Slurry Pond	WAP-7	12/11/2000	-	746.5	427	-	7.55	1284	3014
Unit 2 Slurry Pond	WAP-7	04/24/2001	-	701	327	-	7.85	1370	2632
Unit 2 Slurry Pond	WAP-7	11/06/2001	-	695	302	-	6.55	1190	3034
Unit 2 Slurry Pond	WAP-7	05/06/2002	-	746	376	-	6.91	1390	3208
Unit 2 Slurry Pond	WAP-7	12/09/2002	-	731	162	-	6.71	1410	2516
Unit 2 Slurry Pond	WAP-7	05/13/2003	-	641	192	-	7.05	960	2266
Unit 2 Slurry Pond	WAP-7	10/27/2003	-	643	110	-	7.04	1500	2404
Unit 2 Slurry Pond	WAP-7	05/04/2004	-	700	-	-	6.85	-	-
Unit 2 Slurry Pond	WAP-7	11/16/2004	-	639	241	-	7.07	1256	2410
Unit 2 Slurry Pond	WAP-7	06/20/2005	-	576	95	-	6.72	1340	2455
Unit 2 Slurry Pond	WAP-7	11/08/2005	-	635	117	-	6.99	1230	1933
Unit 2 Slurry Pond	WAP-7	05/02/2006	-	642	79.7	-	6.76	1360	2354
Unit 2 Slurry Pond	WAP-7	12/04/2006	-	555	55.5	-	7.14	1181	2187
Unit 2 Slurry Pond	WAP-7	06/05/2007	-	574	69.9	-	7.03	1264	2184
Unit 2 Slurry Pond	WAP-7	10/08/2007	-	606	63.38	-	7.19	1224	2154
Unit 2 Slurry Pond	WAP-7	05/20/2008	-	524	66.78	-	6.93	1184	2086
Unit 2 Slurry Pond	WAP-7	09/22/2008	-	533	85.73	-	6.81	1170	2188
Unit 2 Slurry Pond	WAP-7	02/10/2009	-	457	28.51	-	6.75	1163	1689
Unit 2 Slurry Pond	WAP-7	08/20/2009	-	558.9	92.73	-	6.48	947.7	1843
Unit 2 Slurry Pond	WAP-7	12/17/2009	-	490.36	62.97	-	6.51	904.1	1586
Unit 2 Slurry Pond	WAP-7	02/17/2010	-	389.8	50.4	-	6.33	719.7	1225
Unit 2 Slurry Pond	WAP-7	07/26/2010	-	507.67	55.9676	-	6.59	1140	1934
Unit 2 Slurry Pond	WAP-7	02/01/2011	-	783.2	52.1	-	6.55	1210	2040
Unit 2 Slurry Pond	WAP-7	08/02/2011	-	502.542	-	-	6.49	-	1495
Unit 2 Slurry Pond	WAP-7	09/20/2011	-	-	54.26	-	6.62	1222	-
Unit 2 Slurry Pond	WAP-7	01/10/2012	-	547.45	44.3	-	6.71	1120	1828
Unit 2 Slurry Pond	WAP-7	07/10/2012	-	526.04	1050	-	6.26	914	1820
Unit 2 Slurry Pond	WAP-7	01/09/2013	-	540.1	33.6	-	6.78	983	1840
Unit 2 Slurry Pond	WAP-7	06/17/2013	1.3	528.6	30.2	-	7.12	1110	1968
Unit 2 Slurry Pond	WAP-7	01/08/2014	1.08	536.9	25	-	6.9	1200	2080

TABLE I
HISTORIC GROUNDWATER MONITORING RESULTS
WINYAH GENERATING STATION
SANTEE COOPER
GEORGETOWN, SOUTH CAROLINA

Chemical Group			Detection Monitoring - EPA Appendix III Constituents						
Chemical Name			Boron, Total	Calcium, Total	Chloride	Fluoride	pH (lab)	Sulfate	Total Dissolved Solids (TDS)
US EPA MCL/RSL (THQ=1.0)			-	-	-	4	-	-	-
Units			mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
Impoundment	**Location**	**Sample Date**							
Unit 2 Slurry Pond	WAP-7	06/17/2014	-	**516.3**	**19.2**	-	**6.77**	**6.17**	**1950**
Unit 2 Slurry Pond	WAP-7	01/13/2015	-	**447.4**	**56.5**	-	**6.4**	**1020**	**1690**
Unit 2 Slurry Pond	WAP-7	01/31/2018	-	**53.9**	**23.1**	-	-	**1440**	**2159**
Unit 2 Slurry Pond	WAP-7	06/13/2018	**0.8**	**520**	**21.7**	< 0.1	-	**984**	**1789**
Unit 2 Slurry Pond	WAP-7	07/11/2018	**0.89**	**565**	**21.8**	< 0.1	-	**1220**	**1870**
Unit 2 Slurry Pond	WAP-7	07/17/2018	**0.91**	**575**	**24.6**	< 0.1	-	**1120**	**1936**
Unit 2 Slurry Pond	WAP-7	07/26/2018	**0.11**	**132**	**11.8**	< 0.1	-	**273**	**540**
Unit 2 Slurry Pond	WAP-7	07/31/2018	**0.11**	**127**	**11.6**	< 0.1	-	**257**	**500**
Unit 2 Slurry Pond	WAP-7	08/07/2018	**0.12**	**108**	**7.53**	< 0.1	-	**250**	**433.8**
Unit 2 Slurry Pond	WAP-7	08/13/2018	**0.45**	**313**	**14.1**	< 0.1	-	**612**	**1151**
Unit 2 Slurry Pond	WAP-7	08/22/2018	**0.64**	**346**	**15**	< 0.1	-	**707**	**1289**
Unit 2 Slurry Pond	WAP-7	01/22/2019	**0.85**	**228**	**12.7**	< 0.1	-	**485**	**578.8**

ABBREVIATIONS AND NOTES:
CFR: Code of Federal Regulations
RSL: Regional Screening Level
THQ: Target Hazard Quotient
mg/L: milligram per liter
NA: Not Applicable
US EPA: United States Environmental Protection Agency

QUALIFIERS:
U: Not detected, value is the laboratory reporting limit
J: Estimated value
B: Blank contamination

- 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

TABLE II
SUMMARY OF ANALYTICAL RESULTS
WINYAH GENERATING STATION
SANTEE COOPER
GEORGETOWN, SOUTH CAROLINA

Chemical Group		Detection Monitoring - EPA Appendix III Constituents						
Chemical Name		Boron, Total	Calcium, Total	Chloride	Fluoride	pH (lab)	Sulfate	Total Dissolved Solids (TDS)
EPA MCL/RSL (THQ=1.0)		-	-	-	4	-	-	-
Units		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
Location	**Sample Date**							
WAP-1	06/04/2018	**0.019**	**9.6**	**8.99**	**0.13**	**-**	< 2	**55**
WAP-1	09/10/2018	**0.055**	**2.57**	**10.6**	< 0.1	-	**8.24**	**43.33**
WAP-1	09/21/2018	-	-	-	-	-	-	**135**
WAP-1	01/23/2019	-	**3.1**	**9.88**	< 0.1	-	**17.3**	**56.25**
WAP-1	05/30/2019	**0.054**	**1.9**	**5.08**	< 0.1	-	**16**	**43.75**
WBW-1	06/04/2018	**0.018**	**400**	**4.38**	< 0.1	-	**4.77**	**25**
WBW-1	09/10/2018	**0.022**	< 0.5	**5.68**	< 0.1	-	**4.96**	-
WBW-1	01/23/2019	-	-	-	< 0.1	-	-	-
WBW-1	05/30/2019	**0.085**	< 0.5	**2.71**	< 0.1	-	**5.64**	**21.25**
WBW-A1-1	06/12/2018	**0.036**	**0.032**	**7.43**	< 0.1	-	**102**	**203.8**
WBW-A1-1	07/11/2018	**0.078**	**54.8**	**67.5**	< 0.1	-	**100**	**352.5**
WBW-A1-1	07/17/2018	**0.035**	**59.5**	**9.48**	< 0.1	-	**180**	**291.2**
WBW-A1-1	07/26/2018	**0.036**	**49**	**9.25**	< 0.1	-	**146**	**272.5**
WBW-A1-1	07/31/2018	**0.034**	**45.1**	**9.31**	< 0.1	-	**138**	**247.5**
WBW-A1-1	08/07/2018	**0.042**	**38.5**	**8.51**	< 0.1	-	**119**	**196.2**
WBW-A1-1	08/15/2018	**0.038**	**36.4**	**8.72**	< 0.1	-	**114**	**203.8**
WBW-A1-1	08/22/2018	**0.037**	**47.2**	**9.49**	< 0.1	-	**149**	**256.2**
WBW-A1-1	01/22/2019	**0.029**	**32**	**12.3**	< 0.1	-	**106**	**226.2**
WLF-A1-1	06/13/2018	**4.1**	**0.62**	**270**	< 0.1	-	**978**	**2480**
WLF-A1-1	07/11/2018	**3.9**	**609**	**253**	< 0.1	-	**942**	**2392**
WLF-A1-1	07/17/2018	**4**	**746**	**205**	< 0.1	-	**1040**	**2339**
WLF-A1-1	07/26/2018	**3.6**	**596**	**173**	< 0.1	-	**1060**	**2321**
WLF-A1-1	08/01/2018	**3.7**	**487**	**175**	< 0.1	-	**1070**	**2214**
WLF-A1-1	08/08/2018	**3.5**	**575**	**147**	< 0.1	-	**1060**	**2058**
WLF-A1-1	08/13/2018	**3.9**	**550**	**143**	< 0.1	-	**1028**	**2175**
WLF-A1-1	08/22/2018	**3.8**	**509**	**142**	< 0.1	-	**1000**	**2165**
WLF-A1-1	01/22/2019	**4**	**460**	**131**	< 0.1	-	**919**	**1721**
WLF-A1-2	06/12/2018	**0.37**	**0.06**	**38.6**	**0.11**	**-**	**62.5**	**359.4**
WLF-A1-2	07/11/2018	**0.66**	**104**	**65.2**	< 0.1	-	**97.1**	**470**
WLF-A1-2	07/11/2018	**0.64**	**104**	-	**0.13**	**-**	-	**477.5**
WLF-A1-2	07/17/2018	**0.72**	**102**	**211**	< 0.1	-	**1040**	**430**
WLF-A1-2	07/26/2018	**0.61**	**151**	**32.4**	**0.12**	**-**	**306**	**612.5**
WLF-A1-2	07/31/2018	**0.72**	**153**	**44.5**	**0.14**	**-**	**256**	**642.5**
WLF-A1-2	08/07/2018	**1.8**	**187**	**122**	< 0.1	-	**238**	**890**
WLF-A1-2	08/15/2018	**0.55**	**160**	**27.1**	< 0.1	-	**316**	**616.2**
WLF-A1-2	08/23/2018	**0.2**	**152**	**28**	< 0.1	-	**323**	**628.8**
WLF-A1-2	01/23/2019	**0.28**	**51**	**24.6**	< 0.1	-	**101**	**303.8**
WLF-A1-3	06/12/2018	**0.073**	**0.0065**	**2.81**	< 0.1	-	**43**	**90.62**
WLF-A1-3	07/11/2018	**0.097**	**8.46**	**6.58**	< 0.1	-	**160**	**101.2**
WLF-A1-3	07/18/2018	**0.095**	**8.12**	**59.3**	< 0.1	-	**159**	**86.25**
WLF-A1-3	07/26/2018	**0.086**	**7.45**	**3.67**	< 0.1	-	**40.2**	**88.75**
WLF-A1-3	07/31/2018	**0.069**	**6.83**	**3.89**	< 0.1	-	**41.6**	**96.25**
WLF-A1-3	08/07/2018	**0.1**	**7.36**	**3.98**	< 0.1	-	**43**	**83.75**
WLF-A1-3	08/15/2018	**0.11**	**9.74**	**4**	< 0.1	-	**49.5**	**111.2**
WLF-A1-3	08/23/2018	**0.48**	**13.8**	**3.44**	< 0.1	-	**57.7**	**90**
WLF-A1-3	01/22/2019	**0.13**	**18**	**5.56**	< 0.1	-	**77.9**	**127.5**
WLF-A1-4	06/12/2018	**0.37**	**0.13**	**5.22**	< 0.1	-	**102**	**455**
WLF-A1-4	06/12/2018	**0.36**	**0.13**	**5.32**	< 0.1	-	**105**	**455**
WLF-A1-4	07/11/2018	**0.39**	**133**	**4.3**	< 0.1	-	**103**	**458.8**
WLF-A1-4	07/18/2018	**0.42**	**137**	**6.86**	< 0.1	-	**127**	**475**
WLF-A1-4	07/18/2018	**0.42**	**135**	**6.96**	< 0.1	-	**127**	**526.2**
WLF-A1-4	07/26/2018	**0.37**	**145**	**9.62**	< 0.1	-	**185**	**515**
WLF-A1-4	07/26/2018	**0.37**	**148**	**9.42**	< 0.1	-	**182**	**496.2**
WLF-A1-4	07/31/2018	**0.28**	**140**	**8.44**	< 0.1	-	**187**	**507.5**
WLF-A1-4	07/31/2018	**0.27**	**130**	**7.82**	< 0.1	-	**171**	**480**
WLF-A1-4	08/07/2018	**1.1**	**199**	**40.2**	< 0.1	-	**336**	**753.8**
WLF-A1-4	08/07/2018	**1.2**	**212**	**41.3**	< 0.1	-	**366**	**755**
WLF-A1-4	08/15/2018	**0.65**	**169**	**18**	< 0.1	-	**259**	**647.5**
WLF-A1-4	08/15/2018	**0.55**	**186**	**16**	< 0.1	-	**245**	**600**
WLF-A1-4	08/23/2018	**0.5**	**161**	**12.4**	< 0.1	-	**220**	**618.8**
WLF-A1-4	08/23/2018	**0.56**	**153**	**11.8**	< 0.1	-	**216**	**613.8**
WLF-A1-4	01/22/2019	**0.35**	**120**	**7.73**	< 0.1	-	**169**	**462.5**
WLF-A1-4	01/22/2019	**0.35**	**120**	**7.63**	< 0.1	-	**167**	**426.2**
WLF-A1-5	06/13/2018	**2.2**	**0.21**	**107**	< 0.1	-	**299**	**1049**
WLF-A1-5	07/11/2018	**1.8**	**175**	**80.7**	< 0.1	-	**246**	**786.2**
WLF-A1-5	07/17/2018	**3**	**263**	**170**	< 0.1	-	**380**	**1150**
WLF-A1-5	07/26/2018	**3**	**273**	**175**	< 0.1	-	**401**	**1252**
WLF-A1-5	08/01/2018	**2.8**	**242**	**148**	**0.11**	**-**	**366**	**1040**
WLF-A1-5	08/08/2018	**2.1**	**183**	**106**	< 0.1	-	**314**	**826.2**
WLF-A1-5	08/15/2018	**2.7**	**233**	**156**	< 0.1	-	**368**	**1119**
WLF-A1-5	08/22/2018	**2.8**	**259**	**174**	< 0.1	-	**384**	**1162**
WLF-A1-5	01/22/2019	**1.7**	**180**	**79.9**	< 0.1	-	**279**	**707.5**
WAP-7	06/13/2018	**0.8**	**520**	**21.7**	< 0.1	-	**984**	**1789**
WAP-7	07/11/2018	**0.89**	**565**	**21.8**	< 0.1	-	**1220**	**1870**
WAP-7	07/17/2018	**0.91**	**575**	**24.6**	< 0.1	-	**1120**	**1936**
WAP-7	07/26/2018	**0.11**	**132**	**11.8**	< 0.1	-	**273**	**540**
WAP-7	08/01/2018	**0.11**	**127**	**11.6**	< 0.1	-	**257**	**500**
WAP-7	08/08/2018	**0.12**	**108**	**7.53**	< 0.1	-	**250**	**433.8**
WAP-7	08/15/2018	**0.45**	**313**	**14.1**	< 0.1	-	**612**	**1151**
WAP-7	08/22/2018	**0.64**	**346**	**15**	< 0.1	-	**707**	**1289**
WAP-7	01/22/2019	**0.85**	**228**	**12.7**	< 0.1	-	**485**	**578.8**

FIGURES

LEGEND

CCR MONITORING WELL

PROPERTY BOUNDARY

NOTES

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

N

0 1,100 2,200

SCALE IN FEET

HALEY ALDRICH

SANTEE COOPER
WINYAH GENERATING STATION
GEORGETOWN, SOUTH CAROLINA

MONITORING WELL LOCATIONS

JANUARY 2020

FIGURE 1

GIS FILE PATH: \\haleyaldrich.com\share\grn_common\131539 - Santee Cooper\GIS\Maps\2020_01\132892_008_0001_MONITORING_WELL_LOCATIONS.mxd — USER: hwachholz — LAST SAVED: 1/20/2020 1:26:37 PM