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THE ELM CONSULTING GROUP INTERNATIONAL LLC

ENVIRONMENTAL AUDIT IN SUPPORT OF THE COURT APPOINTED MONITOR

Asheville Steam Station
Arden, North Carolina
USA

May 2019

Final Report Issued to:

Duke Energy and the Court Appointed Monitor

Prepared By:

Advanced GeoServices Corp.
and
The Elm Consulting Group International LLC

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1.0 INTRODUCTION

Advanced GeoServices Corp. (Advanced GeoServices) and The Elm Consulting Group International LLC (Elm) (collectively, the Audit Team) are conducting environmental compliance audits (the Audits) of certain coal combustion residuals (CCR) management locations owned or operated by Duke Energy Business Services LLC, Duke Energy Carolinas, LLC, and Duke Energy Progress, Inc. (collectively, Duke Energy). The Audits are being conducted under the direction of Mr. Benjamin Wilson, the Court Appointed Monitor, pursuant to an Order issued by the U.S. District Court, Eastern District of North Carolina, in case numbers 5:15-CR-62-H, 5:15-CR-67-H, and 5:15-CR-68-H.

The scope of the Audits is set forth in the plea agreements entered into by Duke Energy and the United States in the above cases, the Court's judgments in these cases, and a written audit scoping document agreed to by Duke Energy and the United States.

1.1 BACKGROUND INFORMATION

The subject of this report is the Audit completed at Duke Energy's Asheville Steam Station in Arden, North Carolina (Asheville Facility). The Audit was conducted on March 13-14, 2019 for a total of two days on-site. The Audit Team included the following senior auditors:

• Mr. Christopher Reitman, P.E., AGC	Project Director, Audit Team Leader, Sr. Subject Matter Expert (on-site)
• Mr. Joseph Cotier, CPEA, Elm	Sr. Environmental Auditor (on-site)
• Mr. Bernie Beegle, P.G., AGC	Sr. Subject Matter Expert (off-site)

The facility was represented by:

- Mr. Matt Pickett , CCP System Owner
- Mr. Tim Hill, General Manager, Carolinas West Region, CCP Operations and Maintenance
- Mr. Mike Clough, CCP Engineering & Closure Engineering
- Mr. Henry Duperier, CCP Projects
- Ms. Tina Woodward, EHS CCP Permitting and Compliance
- Mr. John Toepfer, EHS CCP Waste & Groundwater
- Ms. Bryson Sheetz, EHS CCP Waste & Groundwater
- Ms. Tammy Jett, EHS CCP Waste & Groundwater (by phone)
- Ms. Diana Kooser, Regulatory Affairs
- Mr. Andrew Stroud, Environmental Rover, EHS CCP Compliance
- Mr. Michael Phillips, Manager, EHS CCP Compliance
- Mr. Chuck Cranford, EHS CCP Environmental Field Support
- Ms. Teresa Williams, Station Environmental Field Support
- Mr. Ron Hollifield, EHS CCP H&S Field Support
- Mr. Ken Tadlock, Station H&S Field Support
- Mr. Garry Whisnant, Station General Manager
- Mr. Jeff McFee, Maintenance Superintendent
- Mr. Matt Fields, Anchor Environmental
- Mr. Keith Higgins, EHS CCP Compliance

1.2 FACILITY OVERVIEW

The Asheville Facility is located at 200 CP&L Drive, Arden, North Carolina. The Operations and Maintenance Manual states the Asheville Facility is located on 786 acres spanning across United States Interstate I-26. The Asheville Facility power generating units are located along the east side of the French Broad River and west of Lake Julian. According to the overview provided by Duke Energy personnel, the Asheville Facility began power generation in 1964. Lake Julian provides cooling water for the Asheville Facility coal-fired generating units.

Two coal-fired generating units are currently in operation at the Asheville Facility, Unit 1 (1964, 191 MW) and Unit 2 (1971, 185 MW). The Asheville Facility also operates two natural gas/fuel oil-fired combustion turbines, Units 3 and 4, which provide a total of 324 MWs. Units 1 and 2 were operating during the Audit Team's visit. The existing coal fired units will retire no later than January 2020.

1.2.1 Ash Management Activities

According to the 2015 Update to the Coal Ash Excavation Plan and Duke Energy personnel, ash generated by coal combustion was placed in the following areas on-site:

- 1964 Ash Basin – The 1964 Ash Basin was put into service in 1964 and originally had an impoundment area of 41 acres. The 1964 Ash Basin is unlined and active and receives sluiced ash/water from the Asheville Facility's generating units. Sluice water goes through the rim ditch which includes a decant basin and then is pumped to the settling basin pond/Outfall 001 with inline pH adjustment in the pipes prior to discharge to the French Broad River.

- 1982 Ash Basin – The 1982 Ash Basin had an impounded area of 54 acres. The excavation of the CCR within the 1982 Ash Basin was completed in 2016. In accordance with the design submitted to NCDEQ, the 1982 Ash Basin dam was intentionally breached to prevent it from impounding water in the future. In September 2016, preparation activities began for the construction of a combined cycle natural gas plant which is projected to come on-line in January 2020. The Audit Team observed construction of significant infrastructure associated with the planned combined cycle natural gas plant being installed within the former 1982 Ash Basin area during the 2019 Audit.

The North Carolina Coal Ash Management Act of 2014 (CAMA) originally required the CCR in the 1982 and 1964 Ash Basins at the Asheville Facility to be removed by August 1, 2019. However, the North Carolina Mountain Energy Act of 2015 was subsequently passed and extended the CCR removal date for the 1964 Ash Basin to August 1, 2022. As noted above, the CCR in the 1982 Ash Basin has already been removed and the dam has been intentionally breached to eliminate the potential for impounding water.

1.2.2 Environmental Permits and Programs

The Asheville facility operates under a number of environmental permits and programs, including:

– **National Pollutant Discharge Elimination System (NPDES) Wastewater Permitting –** During the period of review the Asheville Facility operated under two separate NPDES permits, as well as the recently issued Special Order by Consent (SOC). The NPDES permits and the SOC are described below.

1. The North Carolina Department of Environmental Quality (NCDEQ) issued NPDES Permit No. NC0000396 for the Asheville Facility on January 1, 2006. A modification to the Permit became effective November 1, 2007. The permit expired on December 31, 2010, but a timely permit renewal application was submitted to NCDEQ on June 11, 2010, which extended the effective date of the Permit until NCDEQ acts on the renewal application. Duke submitted a permit application amendment on July 30, 2014 to address seepage waters that had been identified at the facility during 2014. A second permit renewal supplement was submitted to NCDEQ on December 1, 2016, requesting inclusion of additional seeps, removal of internal Outfall 005, removal of

industrial stormwater outfalls (which were covered in an individual stormwater permit issued during 2016), and modification of the process water flow path prior to the discharge at Outfall 001. A third permit renewal supplement was submitted on December 7, 2017, requesting removal of the 1982 Ash Basin from the permit and inclusion of the 1964 Ash Basin toe drain seeps as separate outfalls, and noting that 1964 Ash Basin interstitial waters would be directed to the rim ditch for treatment in the Asheville Facility treatment system.

The permit covered the following outfalls:

- Outfall 001 – the Ash Basin treatment system which discharges to the French Broad River;
- Outfall 002 – the once through cooling water which discharges to Lake Julian;
- Internal Outfall 004 – the process waters which discharge to the Ash Basin treatment system (which in turn discharge to outfall 001); and
- Internal Outfall 005 – the wet scrubber water which discharges to outfall 001.

During 2011 and 2012, Outfall 001 was relocated from immediately west of the 1964 Ash Basin to a location northwest of the 1964 Ash Basin, allowing modifications of the 1964 Ash Basin Dam. NCDEQ approval for this relocation was received by the Asheville Facility on May 13, 2015. The seep collection system near the former Outfall 001 location pumps the seep water back to the Ash Basin where it is treated with other process waters generated by the facility.

As discussed more below, a renewed NPDES Permit No. NC0000396 was issued on November 8, 2018 and became effective on December 1, 2018. The new NPDES Permit has eliminated the groundwater monitoring requirements included in the earlier NPDES permit. However, the new NPDES Permit states an exceedance of groundwater standards at or beyond the compliance boundary is subject to remedial action in accordance with 15A NCAC 02L.0106(c), (d), or (e) as well as enforcement actions in accordance with North Carolina General Statute sections 143-215.6A through 143-215.6C. An updated groundwater compliance boundary map was provided in the new NPDES Permit. The updated permit does not include a compliance boundary for the 1982 Ash Basin.

2. The renewed NPDES Permit No. NC0000396 was issued on November 8, 2018 and became effective on December 1, 2018. The permit carries an expiration date of November 30, 2023. Changes to the NPDES permit included:

    - Outfall 001 – Treated Ash Pond water which flows through the Rim Ditch and discharges from the 1964 Ash Basin to the French Broad River. For this outfall, the permit requires physical-chemical treatment. There is also a requirement to discontinue discharge if arsenic, selenium, mercury, nickel, or lead reach 85% of allowable levels. Monitoring for pH and total suspended solids (TSS) must be continuous and be shut off automatically if TSS exceeds one-half of the daily maximum limit or if pH is monitored outside the 6.1 to 8.9 standard units range.
    - Outfall 005 – an internal outfall for wet scrubber wastewater from the flue-gas desulfurization (FGD) unit to the ash basin and the Outfall 001. As noted below, this wastewater now goes to the local publicly owned

treatment works (POTW) under the Buncombe County-issued Significant Industrial User permit, eliminating Outfall 005.

- Outfall 101 – a constructed seep which collects seep water from 3 separate seeps and pumps it back to the 1964 Ash Basin which flows to a building for pH control and then to the stilling pond which is where the Outfall 001 sample is collected. Pumping back to the 1964 Ash Basin will continue until commencement of decanting from the rim ditch. At that time, the Asheville Facility may begin direct discharge from Outfall 101 to French Broad River.

A monthly instream monitoring requirement has also been added. Section A.10 requires monitoring for thirteen parameters at a point upstream (approximately 5500 feet) and downstream (approximately 2900 feet) from the discharge at Outfall 001.

3. Special Order by Consent EMC SOC WQ S17-010 was signed by the Chair of the North Carolina Environmental Management Commission on October 10, 2018. The SOC includes requirements related to non-constructed seeps identified at the Asheville Facility. Non-constructed seeps are defined as seeps that are not on or within the dam structure or that do not convey wastewater via pipe or constructed channel directly to a receiving stream. Twenty-five individual non-constructed seeps are identified in the SOC, including: 5 seeps which require no monitoring per the SOC but are represented by Outfall 101 in the Asheville Facility NPDES permit (64EO-01, 64EO-02, 64EO-03, C-03, C-05); 3 dispositioned seeps (K-02, P-01, SD-01); and 17 active seeps (A-01, A-02, B-01, C-01, C-02, D-01, E-01, F-01, F-02, F-03, K-01, M-01, N-01, Ponded Water F, 82EO-01, 82EO-02, DD-Pipe). Pursuant to the representative sampling locations outlined in the SOC, quarterly sampling for parameters

listed in Attachment B of the SOC is required at A-01, B-01, C-01, E-01, F-01, F-02, N-01, and instream (both upstream and downstream in French Broad River). The first round of monitoring was conducted during the fourth quarter of 2018 on November 28, 2018.

As noted above, any discharge from seeps 64EO-01, 64EO-02, and 64EO-03 are collected at the NPDES Outfall 101 and pumped back to the 1964 Ash Basin until commencement of decanting from the rim ditch. At that time, the Asheville Facility may commence direct discharge from Outfall 101 to French Broad River.

Newly identified non-constructed seeps reported to NCDEQ per the SOC and CAMA (which would be in accordance with the NCDEQ-approved Discharge Identification Plan for the Asheville Facility) are deemed covered by the SOC.

Additional reports must also be submitted to NCDEQ as follows:

– Interim Seep Report	April 30, 2020
– Seep Characterization Report	June 30, 2020
– Amended Groundwater Corrective Action Plan and/or Closure Plan	August 31, 2020
– Quarterly Reports on Status of Decanting, Dewatering and Other Activities Related to Closure	January 30 April 30 July 30 October 30

Pursuant to the representative sampling locations outlined in the SOC, quarterly sampling for parameters listed in Attachment B of the SOC is required at A-01, B-01, C-01, E-01, F-01, F-02, N-01, and instream (both upstream and downstream in the French Broad River). As of the date of the Audit, one round of quarterly sampling and analysis had been completed with discharge monitoring reports (DMRs) having been submitted to NCDEQ.

Monitoring parameters and in some cases specific discharge limits are listed in the Interim Action Level (IAL) column of Attachment A of the SOC for the seeps. For instream monitoring required by the SOC, "N/A-2B Standards Apply" is listed in this column. Because of the inclusion of this language, it was unclear whether or not the 2B standards (15A NCAC 2B) apply and how Duke Energy would determine compliance with the SOC monitoring requirements.

It was also unclear to the Audit Team how the 2B standards would be applied, if deemed applicable by NCDEQ. For example, many metals include both an acute and a chronic standard (e.g., arsenic, beryllium, cadmium, copper, etc.). The SOC is silent on how these standards would be applied to monitoring of seeps at the Asheville Facility.

Duke Energy initiated correspondence with NCDEQ in an email dated March 25, 2019 requesting clarification of the applicability of the 2B standards. NCDEQ responded in an email dated March 29, 2019 that any specific limit noted in the IAL column would be enforceable under the SOC. For example, the IAL column for seep E-01 includes a nickel limit of 60 µg/L. An exceedance of the nickel would trigger stipulated penalties and increased monitoring at E-01 under the SOC. NCDEQ also stated that if there were no specific limits listed, then there was no IAL (indicated by "N/A" in that column) and the 2B limits would apply. NCDEQ further stated that an exceedance of a 2B standard under this monitoring scenario would not constitute a violation of the SOC and that "…compliance oversight will be performed separate from that of the SOC." Compliance oversight by NCDEQ is understood to refer to the agency's day-to-day execution of their regulatory duties.

A copy of the Asheville Facility NPDES Permit, SOC, and reports required by the SOC must be posted on Duke Energy's external website.

- **NPDES Stormwater Permitting –** NCDEQ issued Individual Stormwater Permit No. NCS000575 to the facility with an effective date of May 24, 2016 and an expiration date of April 30, 2021. Duke Energy submitted a permit modification request on May 3, 2017. The modification was granted by NCDEQ on June 22, 2017 and eliminated Outfall SW002, as well as all monitoring requirements for PCBs. The Permit includes two stormwater outfalls to Lake Julian: SW001 and SW003. These outfalls service the haul road along the east side of the 1982 Ash Basin.

A Storm Water Pollution Prevention Plan (SWPPP) was developed and implemented in November 2016 and revised in August 2018.

The stormwater permit lists 18 individual parameters for purposes of qualitative monitoring. Each parameter is paired with a benchmark value. The stormwater permit states that an exceedance of a benchmark value is not a permit violation but instead should be used as a guideline for implementing a facility's SWPPP. The stormwater permit outlines specific measures to take and required documentation related to exceedance of any benchmark values. The measures include investigation of the exceedance's cause and a sampling frequency increase from quarterly to monthly for all parameters at that outfall.

Monitoring for SW003 during the third quarter of 2018 (sample date September 26, 2018) returned a TSS result of 200 mg/L which exceeds the permit benchmark value of 100 mg/L, putting the Asheville Facility in Tier One status. All required measures were documented and completed. With completion of three consecutive monitoring results for TSS below 100 mg/L (sampling dates October 26, 2018, November 9, 2018, December 20, 2018), SW003 is no longer considered Tier One for TSS. However, the November 9, 2018 monitoring results for SW003 returned a result for copper of 0.0587 mg/L; copper carries a benchmark value of 0.010 mg/L. Required measures were implemented and the fourth quarter 2018 monitoring results showed copper at 0.00997 mg/L (sampling date December 20, 2018). There was inadequate flow during sampling attempts in January and February 2019, so SW003 remains in Tier One status for copper.

- **NPDES Stormwater Construction Permitting –** There are no NCDEQ-issued stormwater construction permits governing activities related to CCR management in effect at the Asheville Facility. Previously issued permits were closed during NCDEQ inspections on June 14, 2018 and November 29, 2018.

- **POTW Permitting –** Buncombe County has issued a Significant Industrial User Permit for the discharge of flue-gas desulfurization (FGD) wastewater to the local POTW. Permit No. S-074-017 was issued January 1, 2017 and expires December 31, 2021. This permit and the associated discharge eliminated the former NPDES internal Outfall 005, described above.

- **Title V Permitting** – Western North Carolina Regional Air Quality Agency (WNCRAQA) issued Title V Permit No. 11-628-16A to the Asheville Facility with an effective date of January 9, 2017 and an expiration date of July 31, 2021. Insignificant sources identified in the Title V permit include: coal handling/coal pile/ash handling and ash ponds, the gypsum handling system, and diesel generators for the filter pump and the seep pump. Fugitive dust control was included in Section MM of the permit and reflects the WNCRAQA Code 4.0540. The Annual Compliance Certification for 2018 was submitted to WNCRAQA on January 28, 2019

- **Spill Prevention, Control and Countermeasure (SPCC) Plan** – Activities related to coal ash or basin management were addressed in a Waste Management, Inc. SPCC Plan that covered oil storage related to the 1964 Ash Basin closure. The SPCC Plan was dated August 2017. The SPCC Plan was revised March 4, 2019 and is awaiting final certification by the Professional Engineer before being fully implemented. Waste Management operates as a contractor to Duke Energy.

- **Hazardous Chemicals Inventory Reporting on Tier II for 2018** – Duke Energy submitted a Tier II report on February 5, 2019.

- **CAMA Statute** – CAMA requirements include identification of drinking water supply wells within a half mile of the facility, submission of Groundwater Assessment Plans, installation of groundwater assessment wells and multiple rounds of sampling, submission of Groundwater Assessment Reports summarizing groundwater investigations, submission of an Annual Groundwater Protection and Restoration Report, submission of Discharge Assessment Plans to characterize seeps, submission of a Groundwater Corrective Action Plan, and Ash Basin closure/removal.

On October 11, 2017, NCDEQ issued to Duke Energy approval of provisional background threshold values (PBTVs) for the Asheville Facility. Duke Energy is scheduled to submit the CAMA Comprehensive Site Assessment Update in June 2020 for the Asheville Facility.

On December 20, 2017, under CAMA, NCDEQ issued Revised Interim Monitoring Plans (IMPs) to Duke Energy requiring groundwater monitoring at 14 Duke Energy facilities located in North Carolina, including the Asheville Facility. The revised facility IMPs require groundwater monitoring on a quarterly basis commencing the fourth quarter of calendar year 2017 pursuant to 15A NCAC 02L.0110, until Corrective Action Plans are accepted for the individual facilities or as directed otherwise by the NCDEQ. The quarterly sampling events will be conducted in conjunction with planned compliance monitoring sampling events for three quarters during the calendar year, supplemented with an additional sampling event conducted at each facility in order to provide four rounds of monitoring data to evaluate seasonal fluctuations during a year-long timeframe. The Asheville Facility CAMA groundwater monitoring network consists of 66 wells. On December 21, 2018, NCDEQ issued Duke Energy optimized Interim Monitoring Plans (IMPs) for all the 14 Duke Energy Facilities with groundwater sampling to begin in the first quarter of 2019.

Under CAMA, Duke Energy submitted to the NCDEQ the 2018 Groundwater Protection and Restoration Annual Report on January 25, 2019 and the 2018 Surface Water Protection and Restoration Annual Report on January 21, 2019 for the Asheville Facility.

Duke Energy submitted to NCDEQ a Technical Report of Geochemical and Isotope Characterization of Surface and Groundwater in and around the Asheville Facility dated April 26, 2018. One of the report's conclusions was that no significant difference in boron or strontium composition occurs in French Broad River samples from upstream to downstream of the Asheville Facility.

Duke Energy submitted to NCDEQ a Bedrock Flow System Evaluation Update Report dated October 2018. The purpose of the evaluation was to determine the location and characteristics of bedrock fractures in wells between the Asheville Facility ash basins and the French Broad River, to evaluate the hydraulic connectivity of bedrock fractures, and to identify potential for groundwater affected by the ash basins to migrate beneath the French Broad River and affect groundwater quality on the west side of the river. The pump tests were conducted at wells MW-16BRL, MW-26BRL, and MW-20BR between May 8, 2018 and July 12, 2018, with a pump test observation well at residential well AS-14. General conclusions were the bedrock groundwater flow system downgradient of the 1964 Ash Basin is connected to the French Broad River as would be expected based on the fundamental hydrogeological principals that main stem river systems are groundwater discharge zones. The horizontal extent of connectivity of the flow system within the area of impacted groundwater is defined. The bedrock flow system downgradient of the 1982 Ash Basin has limited connectivity to the French Broad River. Water levels from residential well AS-14 indicated the well was affected by the pumping test at the MW-20BR location.

- **CCR Rule** – The Coal Combustion Residuals Rule (CCR Rule, 40 CFR, part 257, Subpart D) identifies standards for the disposal of CCR in landfills and surface impoundments. The 1964 and 1982 Ash Basins are subject to the CCR Rule because the Asheville Facility currently produces electricity. A groundwater monitoring well network has been established at both the 1964 Ash Basin and the 1982 Ash Basin and the required detection monitoring sampling events were completed. The CCR groundwater monitoring networks are comprised of 6 background wells and a combined 20 downgradient wells for the 1964 and 1982 Ash Basins.

On March 14, 2018, Duke Energy provided notice on Duke Energy's public website that the 1964 and 1982 Ash Basins are now in the CCR assessment monitoring program due to statistically significant increases over the background values of the Appendix III parameters.

On November 7, 2018, Duke Energy posted the required location restrictions for impoundments which stated the 1964 Ash Basin did not meet the surface impoundment standard for placement above the uppermost aquifer (40 C.F.R. § 257.60(a)) or for wetlands (40 C.F.R. § 257.61(a)). Since the wetland restriction was not met, closure would normally be required by April 12, 2019. It was the understanding of the Audit Team that Duke Energy planned on extending the time required to closure in accordance with Alternative Closure provisions identified in provisions of 40 C.F.R. § 257.103. The specific details of the Alternative Closure request were not reviewed by the Audit Team.

On December 14, 2018, Duke Energy provided notice on Duke Energy's public website that the following CCR Rule Appendix IV constituents were detected at levels above the applicable Groundwater Protection Standard (GWPS) at the 1964 and 1982 Ash Basins.

- Cobalt
- Radium 226 and 228 combined

On January 18, 2019, Duke Energy submitted to NCDEQ the 2018 CCR Annual Groundwater Monitoring and Corrective Action Reports for the 1964 and 1982 Ash Basins.

On February 19, 2019, Duke Energy provided notice on Duke Energy's public website that an assessment of corrective measures was initiated for the 1964 and 1982 Ash Basins in accordance with 40 C.F.R. § 257.96(a).

Duke Energy has also developed numerous other submittals for each CCR unit in accordance with the CCR Rule identified on Tables 1A and 1B.

Although all the CCR materials have been removed from the 1982 Ash Basin, closure under the CCR rule will not be considered complete until groundwater standards are met in the groundwater beneath the basin.

1.2.3 Dam and Other Structural Permits and Approvals

The 1964 Ash Basin has an active dam. The dam was grandfathered under North Carolina's Session Law 2009-390 (Senate Bill 1004, effective date January 1, 2010). Under this grandfathering, the original design of the dams is not subject to the current design standards for new construction, although modifications after the effective date may be subject to these standards.

According to the 2018 Annual Inspection Report, the 1964 Ash Basin Dam (BUNCO – 97) has a length of 2,100 feet with a maximum height of 100 feet, a crest width of 12 feet, a crest elevation of about 2,158 feet above mean sea level (msl), and a reported pond area of 30 acres. The dam is classified as a very large high hazard dam under North Carolina regulations. At the time of the NCDEQ Annual Inspection on June 20, 2018, the 1964 Ash Basin impoundment held approximately 2,676,600 tons of CCR and 6.5 million gallons of water (not including interstitial water) and had additional storage capacity of 311 acre-feet.

According to the 2018 Annual Inspection Report, the 1982 Ash Basin Dam (BUNCO – 089) has been removed from the upstream slope and within the ash basin. The decommissioning of the 1982 Ash Basin dam has been completed and the Certificate of Final Approval for the basin was provided by the state on March 15, 2018.

Duke Energy also made modifications to the discharge structure of the 1964 Ash Basin, in the "Duck Pond" area of the basin and the spillway. Duke Energy submitted the Engineer of Record Certification Report associated with these modifications to NCDEQ on March 6, 2019. Duke Energy reported after the Audit that Final Approval from Dam Safety for this modification was provided on March 20, 2019.

1.2.4 Recent Activities and Audit Observations

While on-site, the Audit Team observed the continued repurposing of the 1982 Ash Basin. As noted in last year's report, Duke Energy received NCDEQ's approval of their CCR removal activities on February 28, 2018. The 1982 Ash Basin repurposing activities call for the installation of two Combined Cycle Units (560 MW total).

Duke Energy personnel reported about 1,500,000 tons of CCR had been removed from the 1964 Ash Basin at the time of the audit. A fleet of over 100 trucks was being used to transport the CCR to the Waste Management R&B Landfill in Homer, Georgia. The remaining 2,100,000 tons of CCR (including generated ash) (estimated as of January 2019) will need to be removed from the 1964 Ash Basin by August 1, 2022 to comply with the schedule in the Mountain Energy Act of 2015.

Duke Energy is planning on developing an on-site area west of the 1964 Ash Basin for landfilling a portion of the remaining CCR materials. Duke Energy is preparing a site stability and design associated with this project, and both documents are currently anticipated to be submitted in the Spring of 2019.

The use of accelerated remediation of groundwater at the Asheville Facility continues. The system was originally anticipated to include two extraction wells. However, the accelerated remediation system comprises only one well, which became operational on March 19, 2018, because all additional installed wells were dry. The remediation system groundwater pumping rate for the single well system is approximately 5 to 15 gallons per minute. Duke Energy submitted the accelerated remediation system annual report to NCDEQ during April 2018. The accelerated remediation system was shut down for the off-site pump tests conducted in the Asheville Facility area from May 2018 to July 2018. After the pump tests, Duke Energy attempted to restart the accelerated remediation system and found the pump motor was inoperable. Investigations conducted by Duke Energy indicated the unit may have been struck by lightning. In addition, other mechanical issues were identified and Duke Energy was not able to procure the required parts and restart the system until February 18, 2019.

2.0 AUDIT SCOPE AND SUBJECT MATTER

The Audit was completed in accordance with the court documents and the audit scoping document agreed to by Duke Energy and the United States. A description of the scope is provided as Attachment A. The Audit included ash management activities, including aspects of generation that affect the nature of the waste streams from the point of generation into surface impoundments or ash management basins, landfills, and/or storage piles. The Audit focused on the activities at the facility since the date of the last Audit, which was March 14-15, 2018.

3.0 AUDIT FINDINGS

The following Findings were identified by the Audit Team.

3.1 EXCEEDANCES OF THE STATE GROUNDWATER QUALITY STANDARDS

Requirement - The state groundwater rules establish maximum contaminant levels for groundwater at or beyond the compliance boundaries for the 1964 and 1982 Ash Basins. *See* 15A NCAC 02L.0202 (Groundwater Standards). 15A NCAC 2L.0103(d) provides that "[n]o person shall conduct or cause to be conducted, any activity which causes the concentration of any substance to exceed that specified" under the Class GA standards or the interim maximum acceptable concentrations (IMACs) established for groundwater quality in 15A NCAC 2L.0202. Further, under NCGS § 143- 215.1(i), "[a]ny person ... who is required to obtain an individual permit ... for a disposal system under the authority of G.S. 143-215.1 [water pollution control] ... shall have a compliance boundary ... beyond which groundwater quality standards may not be exceeded." *See also* 15A NCAC 2L.0102(3) (defining "compliance boundary" as "a boundary around a disposal system at and beyond which groundwater quality standards may not be exceeded").

In addition, under NCGS § 143-215.6A(a)(l), civil penalties may be assessed against any person who violates any standard established by the NCDEQ under the authority of NCGS § 143-214.1, which covers groundwater standards.

Finding - Constituents exceeding the state standards for Class GA waters, established in 15A NCAC 2L.0202 were documented in monitoring wells located at or beyond the compliance boundaries for the 1964 and 1982 Ash Basins at the facility. The CAMA groundwater monitoring network consists of 66 wells. Based on the review of the 2018 CAMA groundwater monitoring analyses, boron, chloride, cobalt, iron, manganese, sulfate, vanadium, and total dissolved solids (TDS) were observed to exceed the 2L groundwater standards, the Interim Maximum Allowable

Concentration (IMAC) groundwater standards or the NCDEQ approved provisional background threshold values (PBTVs), if the PBTV was greater than the 02L or IMAC groundwater standards, one or more times at or beyond the compliance boundaries of the 1964 Ash Basin and/or 1982 Ash Basin. The 2018 CAMA groundwater data and a site layout map are provided in Attachment B.

Duke Energy has stated its opinion that, pursuant to a September 2015 Settlement Agreement with the NCDEQ, "Duke Energy is not subject to any further financial penalties for exceedances of groundwater standards" and "Duke Energy is not subject to any further enforcement action based on exceedances of groundwater standards as long as it remains in substantial compliance with CAMA groundwater requirements."

The CAM has advised the Audit Team that the Audit scope does not include an evaluation of compliance with the September 2015 Settlement Agreement, and therefore the Audit Team does not take a position on Duke Energy's opinion.

4.0 OPEN LINES OF INQUIRY

Open Lines of Inquiry are items identified by the Audit Team while on-site that, due to limited available information or the need for additional research, could not be determined as being in compliance or out of compliance. There were no Open Lines of Inquiry identified as part of this Audit.

5.0 AUDIT APPROACH

5.1 ON-SITE ACTIVITIES

During its time on-site, the Audit Team conducted an opening conference with facility personnel to discuss the scope of work and the plan for accomplishing necessary tasks while at the facilities. A site tour of the coal ash management and program support areas was subsequently completed. Following the tour, the Audit Team conducted a review of pertinent files, interviews with facility representatives, and verification of facility activities related to the ECPs, written programs and permits. A debrief was conducted each audit day to advise the facility representatives of audit progress, open lines of inquiry, possible audit findings, and needs for the next day. At the completion of the Audit, the Audit Team led a verbal discussion of draft Audit findings with facility representatives.

5.2 STANDARDS OF PRACTICE

The fieldwork portion of the Audit was conducted on March 13-14, 2019 with compliance reporting commencing May 14, 2015, the date of the Court's judgments. The Audit focused on the activities at the facility since the date of the last Audit, which was March 14-15, 2018. The Audit was based on:

- Physical inspections of the facility;
- Examination of selected administrative and operating records made available by facility staff at the Audit Team's request;
- Interviews and discussions with key facility management and staff; and
- Verification procedures designed to assess the facility's application of, and adherence to, terms of the Probation, environment laws and regulations and site policies and procedures. In addition, the Audit Team reviewed the facility's adherence to good management practices.

The Audit followed established audit protocols and procedures. It should be understood that the Audit consisted of evaluating a sample of practices and was conducted over a short period of time. Efforts were made toward sampling major facets of environmental performance during the period under review. This method is intended to uncover major system deficiencies and the Audit may not have identified all potential problems.

To support the overall independence of the Audit process, the Audit included an auditing professional certified by the Board of Environmental, Health and Safety Auditor Certifications (BEAC). BEAC is an accredited professional certification board that issues the Certified Professional Environmental Auditor (CPEA) designation to qualified auditors. Under BEAC, auditor independence is a key criterion for the implementation of an effective third-party audit program. The Audit was implemented in accordance with the standards related to auditor independence.

The process by which the Audit was conducted was consistent with the general state of the art of environment auditing and the best professional judgment of the Audit Team. To conduct the Audit, the team implemented a formal approach, drawing on process guidance from both BEAC and the Auditing Roundtable (AR) guidance documents. Guidance documents included:

- *Standards for the Professional Practice of Environmental, Health and Safety Auditing*. Prepared by the Board of Environmental, Health and Safety Auditor Certifications, 2008.

- ISO 19011:2002 – Guidelines for Quality and/or Environmental Management Systems Auditing. Prepared by the International Organization for Standardization, 2002.

- Standard for the Design and Implementation of an Environmental, Health and Safety Audit Program. Prepared by The Auditing Roundtable, Inc., 1995.

- Minimum Criteria for the Conduct of Environmental, Health and Safety Audits, Prepared by The Auditing Roundtable, Inc.

5.3 REPRESENTATIVE SAMPLING

When confronted with a large population of data to review or equipment to inspect, auditors employed representative sampling techniques to evaluate records over the Audit period requested, and as necessary, for physical inspection of some types of common equipment. The sample size for records reviews or equipment inspections required professional judgment.

The auditor's judgement considered the following:

- The outcome of the evaluation of the records sampled. If problems are found in the representative sample, more records may need to be examined to evaluate compliance status.
- Potential for or severity of non-compliance.
- The general appearance and observed practices of certain operating areas.
- Information obtained during an interview that indicates a potential problem.
- Other specific information or guidance from the CAM.
- Time available during the Audit.

Auditors also employed the following types of sampling techniques, depending upon the characteristics of a specific population:

- Random sampling – every item has an equal chance of being selected.

- Interval sampling – select every nth item, (e.g., every third manifest in chronological order as contained in facility files).

- Block sampling – auditor uses his/her judgment to select a specific block of items, (e.g., petroleum storage tank inspections from April to October).

- Stratified sampling – population is divided into groups, which are then sampled through random or judgmental techniques.

TABLES

I/A

TABLE 1A
1964 Ash Basin - Plans and Reports Posted by Duke Energy under the CCR Rule

Document Name	Category	Release Date
CCR Annual Groundwater Monitoring and Corrective Action Report 2018	Groundwater Monitoring and Corrective Action	03/01/2019
Notice of Initiation of Assessment of Corrective Measures	Groundwater Monitoring and Corrective Action	02/19/2019
Notice of Groundwater Protection Standard Exceedance 2018	Groundwater Monitoring and Corrective Action	12/14/2018
Annual Fugitive Dust Control Report 2018	Operating Criteria	12/05/2018
Wetlands	Location Restriction	11/07/2018
Unstable Areas	Location Restriction	11/07/2018
Seismic Impact Zones	Location Restriction	11/07/2018
Fault Areas	Location Restriction	11/07/2018
Placement Above Uppermost Aquifer	Location Restriction	11/07/2018
Emergency Action Plan for Asheville 1964 Ash Pond	Design Criteria	10/01/2018
CCR Annual Surface Impoundment Inspection Report 2018	Operating Criteria	08/31/2018
Inflow Design Flood Control System Plan	Operating Criteria	06/06/2018
Annual Meeting with Local Emergency Responders 2018	Design Criteria	05/23/2018
CCR History of Construction	Design Criteria	04/03/2018
Notice of Establishment of an Assessment Monitoring Program - Asheville 1964 Ash Basin	Groundwater Monitoring and Corrective Action	03/14/2018
CCR Annual Grounds Water Monitoring and Corrective Action Report	Groundwater Monitoring and Corrective Action	02/06/2018
Asheville Inundation Maps	Design Criteria	01/25/2018

TABLE 1A
(Continued)

Document Name	Category	Release Date
2017 Annual CCR Fugitive Dust Control Report-Asheville	Operating Criteria	11/29/2017
Groundwater Sampling and Analysis Program Selection of Statistical Method Certification-Asheville 1964 Ash Basin	Groundwater Monitoring and Corrective Action	10/25/2017
Asheville Groundwater Monitoring System Certification-Asheville 1964 Basin	Groundwater Monitoring and Corrective Action	10/25/2017
Emergency Action Plan for Asheville 1964 and 1982 Ash Ponds Revision 007A	Design Criteria	10/06/2017
CCR Annual Surface Impoundment Inspection Report 2017	Operating Criteria	09/12/2017
Annual Meeting with Local Emergency Responders 2017	Design Criteria	05/24/2017
Closure Plan Impoundments - 1964 Ash Basin and 1982 Ash Basin, Revision 1	Closure and Post Closure Care	03/16/2017
Coal Combustion Residuals Fugitive Dust Control Plan - Asheville Plant - Revision 1	Operating Criteria	01/12/2017
Annual Fugitive Dust Control Report 2016	Operating Criteria	12/05/2016
Initial Structural Stability Assessment	Design Criteria	11/16/2016
Initial Factor of Safety Assessment	Design Criteria	11/15/2016
Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016
Inflow Design Flood Control System	Operating Criteria	11/03/2016
History of Construction	Design Criteria	10/25/2016
Initial Hazard Classification Assessment Certification	Design Criteria	10/12/2016
Existing Liner Design Criteria	Design Criteria	10/11/2016
Annual Surface Impoundment Report 2016	Operating Criteria	09/13/2016
Annual Surface Impoundment Report (Initial) for Asheville Plant	Operating Criteria	02/16/2016

*This summary of reports was downloaded on March 6, 2019

I/A

TABLE 1B
1982 Ash Basin - Plans and Reports Posted by Duke Energy under the CCR Rule

Document Name	Category	Release Date
CCR Annual Groundwater Monitoring and Corrective Action Report 2018	Groundwater Monitoring and Corrective Action	03/01/2019
Notice of Initiation of Assessment of Corrective Measures	Groundwater Monitoring and Corrective Action	02/19/2019
Notice of Groundwater Protection Standard Exceedance 2018	Groundwater Monitoring and Corrective Action	12/14/2018
Annual Fugitive Dust Control Report 2018	Operating Criteria	12/05/2018
Wetlands	Location Restriction	11/07/2018
Unstable Areas	Location Restriction	11/07/2018
Seismic Impact Zones	Location Restriction	11/07/2018
Fault Areas	Location Restriction	11/07/2018
Placement Above Uppermost Aquifer	Location Restriction	11/07/2018
CCR Annual Surface Impoundment Inspection Report 2018	Operating Criteria	08/31/2018
Annual Meeting with Local Emergency Responders 2018	Design Criteria	05/23/2018
CCR History of Construction	Design Criteria	04/03/2018
Emergency Action Plan Asheville 1964 Ash Pond and 1982 Ash Pond	Design Criteria	03/21/2018
Hazard Potential Classification Assessment Certification - Asheville 1982 Ash Basin	Design Criteria	03/14/2018
Notice of Establishment of an Assessment Monitoring Program - Asheville 1982 Ash Basin	Groundwater Monitoring and	03/14/2018

TABLE 1B
(Continued)

Document Name	Category	Release Date
	Corrective Action	
CCR Annual Grounds Water Monitoring and Corrective Action Report	Groundwater Monitoring and Corrective Action	02/06/2018
Asheville Inundation Maps	Design Criteria	01/25/2018
2017 Annual CCR Fugitive Dust Control Report-Asheville	Operating Criteria	11/29/2017
Groundwater Sampling and Analysis Program Selection of Statistical Method Certification-Asheville 1982 Ash Basin	Groundwater Monitoring and Corrective Action	10/25/2017
Asheville Groundwater Monitoring System Certification-Asheville 1982 Basin	Groundwater Monitoring and Corrective Action	10/25/2017
Emergency Action Plan for Asheville 1964 and 1982 Ash Ponds Revision 007A	Design Criteria	10/06/2017
CCR Annual Surface Impoundment Inspection Report 2017	Operating Criteria	09/12/2017
Annual Meeting with Local Emergency Responders 2017	Design Criteria	05/24/2017
Notification of Intent to Close Asheville 1982 Ash Basin	Operating Criteria	03/16/2017
Closure Plan Impoundments - 1964 Ash Basin and 1982 Ash Basin, Revision 1	Closure and Post Closure Care	03/16/2017
Coal Combustion Residuals Fugitive Dust Control Plan - Asheville Plant - Revision 1	Operating Criteria	01/12/2017
Annual Fugitive Dust Control Report 2016	Operating Criteria	12/05/2016
Notice of Intent to Close Asheville 1982 Ash Basin	Closure-Post Closure Care	11/22/2016
Initial Structural Stability Assessment	Design Criteria	11/16/2016
Initial Factor of Safety Assessment	Design Criteria	11/15/2016

TABLE 1B
(Continued)

Document Name	Category	Release Date
Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016
Inflow Design Flood Control System	Operating Criteria	11/03/2016
History of Construction	Design Criteria	10/25/2016
Initial Hazard Classification Assessment Certification	Design Criteria	10/12/2016
Existing Liner Design Criteria	Design Criteria	10/11/2016
Annual Surface Impoundment Report 2016	Operating Criteria	09/13/2016
Annual Surface Impoundment Report (Initial)	Operating Criteria	02/16/2016

*This summary of reports was downloaded on March 6, 2019

ATTACHMENT A

ATTACHMENT A
AUDIT SCOPE

A-1 GENERAL AUDIT SCOPE ITEMS

The general audit scope items included:

- Review and evaluation of documentation for maintenance and repair of structures and equipment used for coal ash disposal,
- Review and evaluation of documentation of modifications, failures, leaks, damage, disrepair and other problems at the coal ash management units,
- Review and evaluation of documentation of efforts to correct failures, leaks, damage, disrepair and other problems where they determine that employee/contractor actions were likely a primary or contributing cause to a compliance finding,
- Review and evaluation of documentation of communication of the items above within the organization,
- Review and evaluation of documentation associated with the specific environmental compliance items described below and laws, regulations, and policies associated these items and
- Review of compliance with administrative aspects and regulatory submissions related to coal ash management-specific regulations, including:

–	Coal Combustion Residuals	40 CFR Part 257 Subpart D
–	NC Coal Ash Management Act of 2014	NC General Statutes Chapter 130A, Article 9

More specific items which were addressed in the audits to comply with the General Audit Scope are described below.

A-2 SPECIFIC COMPLIANCE WITH THE ECP-NC

The following items related to specific ECP-NC compliance were reviewed as part of the audit:

1. Verify maintenance and sufficient funding of corporate compliance organizations (ABSAT, CCP organization, National Ash Management Advisory Board). Where a root cause of a compliance finding appears in an auditor's judgment to result from inadequate funding, the Advanced GeoServices/ELM audit team will identify this in the audit finding.

2. Verify timely production of satisfactory Compliance Officer (CO) reports to the CAM relating to the development, implementation, and enforcement of the ECP-NC. No auditing work is associated with this work at this time.

3. Evaluate existence and efficacy of toll-free hotline/e-mail inbox for violation reporting, including the appropriateness of the follow-up investigation and disposition of each reported matter. This requirement will be evaluated for the first year of audits and then reassessed.

4. Evaluate completion and efficacy of periodic notices (via Internet, Intranet, email, notices in employee work areas, and publication in community outlets) to employees and the public of the availability of the toll-free hotline and electronic mail inbox.

5. Evaluate training materials and curricula utilized in the mandated training program, particularly those tailored to employee's specific job descriptions, to determine whether it advances the goal of "ensuring that every domestic employee of Duke Energy Corporation and its wholly-owned or operated affiliates understands applicable compliance policies and is able to integrate the compliance objectives in the performance of his/her job." Ensure that the subjects specifically named in the plea agreements are covered by the training (namely, notice and reporting requirements in the event of a release or discharge and the safe and proper handling of pollutants, hazardous substances and/or wastes.)

6. Evaluate whether Defendants are using "Best Efforts" to comply with the obligations under the ECP-NC. Where the Audit Team makes compliance findings, the audit team will, upon request, provide their opinion on whether this best efforts standard applies, and if so, whether best efforts have been used.

7. Verify compliance at each facility with the specific procedures and protocols set forth in the ECP-NC.

A-3 SPECIFIC COMPLIANCE WITH OTHER PROVISIONS OF THE PLEA AGREEMENT

The following items related to specific items in the Plea Agreement were reviewed as part of the audit:

1. Determine whether Defendants have opened, expanded, or reopened any coal ash or coal ash wastewater impoundment and, if so, verify that they are lined and do not allow unpermitted discharges of coal ash or coal ash wastewater to waters of the United States.

2. Verify that Defendants have determined the volume of wastewater and coal ash in each wet-storage coal ash impoundment in North Carolina as described in the plea agreements and that written or electronic records of this information is maintained in a location available to facility staff and employees responsible for making environmental or emergency reports.

3. Review citations/notices of violation/notices of deficiency related to violations of federal, state, or local law to assure that they have been properly relayed to the Court and, as appropriate under the plea agreements, determine their materiality.

4. Evaluate Defendants' efforts to close coal ash impoundments at Dan River, Riverbend, Asheville, and Sutton for legal compliance.

5. Note any observations made during the audit that cause concern regarding the assets and/or security available to the Defendants to meet the obligations imposed by the Judgment in this case.

A-4 GENERAL ENVIRONMENTAL COMPLIANCE SUBJECT AREAS

The following items related to General Environmental Compliance were reviewed as part of the audit:

1. Assess all waste streams from Duke Energy facilities with coal ash impoundments. Review Duke Energy's processes, procedures, and practices, as well as compliance with those processes, procedures, and practices, for:

    a. identifying waste streams (especially, but not limited to, waste streams with discharge points into bodies of water),
    b. identifying and communicating any modifications or changes, or potential modifications or changes, to waste streams,
    c. ensuring proper handling/disposal of waste streams,
    d. identifying, preventing, and mitigating any risks or hazards that could affect waste streams and/or the disposal of waste streams, and
    e. ensuring proper permitting for waste streams.

For Item 1.d., the Audit Team evaluated such risk/hazard issues where there were compliance findings associated with waste streams.

2. Review and evaluate documentation of:

    a. Maintenance and repair of structures and equipment related to coal ash disposal,
    b. Modification of the coal ash impoundments and related pollution prevention equipment and structures,
    c. Failures, leaks, damage, disrepair, and other problems,
    d. Communication of the information described in a-c within the organization, and
    e. Efforts to correct failures, leaks, damage, disrepair, and other problems.

3. Assess the employees responsible for inspection, maintenance, and repair of coal ash basins and related structures and equipment. The assessment included an assessment of the workloads of such employees to assure that Duke Energy's facilities are adequately staffed. These assessments were made where the Audit Team determined that employee/contractor actions were likely a primary or contributing cause to a compliance finding.

4. Review the results and recommendations of any other audits (internal or external/state mandated) and assess Duke Energy's implementation of those recommendations.

5. Review and assess Duke Energy's processes, procedures, and practices for identifying, communicating, and addressing problems and potential problems at its coal ash basins (leaks, unpermitted discharges, etc.).

6. Review and assess Duke Energy's policies, procedures, practices, and equipment for handling emergency releases from its coal Ash Basins and evaluate the personnel with duties in such situations.

7. Verify that Duke Energy is complying with its NPDES wastewater and stormwater permits, as well as other relevant environmental permits. This should include verifying Duke Energy's timely submission of permit applications, permit renewal applications, and responses to requests for additional information from the relevant regulatory authority.

8. Review and assess any actions or measures Duke Energy has undertaken to assure accountability and prevent recurrences when problems and/or failures occur (i.e.

disciplinary actions, re-training, revision to policies and procedures, etc.). This review will be completed where the audit team determines that employee/contractor actions were likely a primary or contributing cause to a compliance finding.

9. Review and assess compliance with the following environmental regulations, as applicable to the management of coal ash:

a.	Wastewater Discharges	40 CFR 122; 15A NCAC 2H .0100 *et seq*
b.	Stormwater Discharges	40 CFR 122.26; 15A NCAC 2H .1000 *et seq;* NC General Permit (Construction) No. NCG010000
c.	NC Groundwater Standards	15A NCAC 02L .0202(h)
d.	Hazardous Waste Management	15A NCAC 13A .0100 to 13A .0107
e.	Oil Pollution Prevention	40 CFR Part 112
f.	Air Pollution (Title V)	WNCRAQA Chapt. 17 and Sect. 4.0540, and
g.	Hazardous Chemicals (Tier II)	40 CFR Part 370.

Reviews also included an analysis of overall compliance and the status and security of the asset. Subsequent reviews of individual facilities will evaluate the movement towards compliance. The Audit did not include an evaluation of compliance with the September 2015 Settlement Agreement with NCDEQ.

A–5 LIST OF PERMITS AND PROGRAMS DEEMED TO BE EITHER DIRECTLY OR INDIRECTLY IN SUPPORT OF ASH MANAGEMENT

During the audit, the Audit Team reviewed a variety of written programs developed and implemented by Duke Energy and facility staff. State-issued permits and supporting documentation relative to environmental programs and geotechnical aspects of ash basin management were also requested and reviewed.

Requested documents, pertinent to management of ash in basins, landfills, ponds, etc. were outlined in the pre-audit questionnaire for each facility and included, but were not limited to:

1. The Compliance Register developed for ETrac for the Site.
2. The Duke Energy Operations Manual for the facility.
3. A site plan, site map, or aerial photo which shows the entire facility and key features, of the facility including NPDES outfalls associated environmental monitoring locations, storage tanks, etc.
4. Most recent 2 years of maintenance, monitoring, and inspection records for each coal ash/CCR basin (just the physical inspections, not the groundwater records).
5. A "Phase 1 and Phase 2" summary of ash basin conditions prepared by an outside consultant.
6. Duke Energy's permitting plans for addressing ash impoundments and landfills at this facility.
7. Applicable pages from the Duke Energy basin-by-basin coal ash/CCR project tracking document for this facility.
8. Original basin/landfill/coal ash management unit construction records.

9. Documentation of changes to these units.

10. Coal ash unit construction permit application and approval.

11. State-issued permits and application materials for permits associated with coal ash/CCR management (including, e.g., dam permits).

12. Any currently effective state order, consent order, or similar state direction that addresses coal ash/CCR management at the site.

13. Records required to be maintained in the site's operating record under the federal CCR regulation and/or any state CCR regulatory program.

14. Records of off-site ash shipments from May 2015 forward.

15. Stormwater permit application and approval for all outfalls.

16. Industrial wastewater (NPDES/POTW) permit application and approval for all outfalls/discharges.

17. Industrial and stormwater sampling and monitoring records, and any corrective action plans (last 2 years).

18. Stormwater pollution prevention plan.

19. Landfill operating permit with maintenance and monitoring requirements.

20. Landfill leak detection and groundwater monitoring records from the last 2 years along with any workplans that describes the rationale for the monitoring system at the Site.

21. Landfill operating permit with maintenance and monitoring requirements.

22. Copies of any air permits and applications for coal ash units and ancillary operations.

23. Any testing and monitoring records completed to comply with the air permits.

24. Any notices of violation~~s~~ associated with the coal ash/CCR management activities received over the last 2 years.

25. Copy of SPCC Plan.

26. Community Right-to-Know

    a. Copies of lists of hazardous chemicals or MSDSs submitted;
    b. Copies of Tier I or II reports; and
    c. Copies of Form R (toxic release inventory) reports.

27. Copies of communications with employees and the public regarding availability of toll-free hotline and electronic mail inbox for reporting suspected environmental violations.

28. Management Systems:

    a. List of responsible party for each environmental activity.
    b. All environmental-related training records.
    c. All environmental policies and procedures.
    d. Organization chart.
    e. Site diagram identifying storage areas, tanks, etc.

29. Employee training records related to environmental programs and ash management policies.

I/A

ATTACHMENT B

2018 CAMA Groundwater Data and a Site Layout Map Groundwater 2L Exceedance Locations

I/A

SOURCES:

1.) MARCH 16, 2015 AERIAL PHOTOGRAPH OBTAINED FROM NC GEOSPATIAL PORTAL AT http://data.nconemap.gov/geoportal/catalog/main/home.page

2.) DRAWING HAS BEEN SET WITH A PROJECTION OF NORTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3200 (NAD 83).

3.) PARCEL BOUNDARY WAS OBTAINED FROM BUNCOMBE COUNTY GIS DATA.

4.) COMPLIANCE MONITORING WELL LOCATIONS AND WASTE BOUNDARY FROM FCA OF NC, SURVEY DATED MARCH 2009. COMPLIANCE WELLS CB-3R, CB-9 AND SG-1 SURVEYED BY FCA OF NC, SURVEY DATED 2012-11-28.

5.) ADDITIONAL MONITORING WELL AND PIEZOMETER LOCATIONS WERE BASED ON DATA PROVIDED BY PROGRESS ENERGY.

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DRAWN BY:	JOHN CHASTAIN	DATE:	08/07/2016
CHECKED BY:	TODD PLATING	DATE:	08/07/2016
PROJECT MANAGER:	KATHY WEBB		
LAYOUT NAME:	FIG 1-2 (SITE LAYOUT MAP)		

DUKE ENERGY PROGRESS

ASHEVILLE PLANT
200 CP & L DRIVE
ARDEN, NORTH CAROLINA

FIGURE 1-2
SITE LAYOUT MAP

08/29/2016 12:52 PM P:\Duke Energy Progress.1026\102. Asheville Ash Basin GW Assessment Plan\19.EG_CSASUP\DWG\DE ASHEVILLE CSASUP BASE MAP.dwg

I/A

ASHEVILLE
01/24/2019
BRANDON RUSSO
TODD PLATING

	PARAM	ED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)									IONUCLI
Reporting Units	**S.U.**	**ug/L**	**mg/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**pCi/L**
15A NCAC 02L Standard	**6.5-8.5**	**700**	**250**	**250**	**500**	**1***	**10**	**10**	**1***	**300**	**50**	**20**	**0.2***	**0.3***	**5^**
Provisional Background (Alluvial Unit)	**4.6-5.1**	**50**	**15**	**4.6**	**56**	**1**	**0.42**	**5**	**4.29**	**598**	**363**	**1**	**0.2**	**0.3**	**4.17**
Provisional Background (Saprolite Unit)	**4.3-5.8**	**50**	**14**	**50**	**104.9**	**1**	**1.313**	**5**	**6.9**	**941**	**725**	**1.88**	**0.2**	**0.625**	**6.832**
Provisional Background (Transition Unit)	**3.9-7.0**	**50**	**6.7**	**5.467**	**72.77**	**1**	**0.261**	**1.32**	**4.608**	**779**	**380**	**1**	**0.2**	**0.41**	**6.61**
Provisional Background (Bedrock Unit)	**4.1-8.1**	**50**	**6.5**	**5.6**	**131.5**	**1**	**0.423**	**1.3**	**1**	**1246**	**93**	**1**	**0.2**	**0.632**	**5.8**

					PARAM	ED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)									IONUCLI
Sample ID	**Location Description**	**Associated Unit**	**Location with Respect to Groundwater Flow Direction**	**Sample Collection Date**	**pH**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Manganese**	**Selenium**	**Thallium**	**Vanadium**	**Total Radium**
1159 Glen Bridge	1159 Glenn Bridge Road	---	West of French Broad River	01/15/2018	6.8	<50	1.2	0.1	38	<1	0.079	<1	<1	**1620**	46	<1	<0.2	<0.3	0.37
ABMW-11BR	On dam between 1964 and 1982 basins	1982 Basin	Ash Basin	02/08/2018	**9.1**	<50	3.1	43	130	<1	<0.025	8.86	<1	174	15	<1	<0.2	<0.3	NA
ABMW-11BR	On dam between 1964 and 1982 basins	1982 Basin	Ash Basin	04/18/2018	**8.7**	37.799 j	3.3	42	140	0.507 j	0.73	5.54	<1	268	22	<1	<0.2	**0.309**	NA
ABMW-11BR	On dam between 1964 and 1982 basins	1982 Basin	Ash Basin	07/10/2018	8.4	37.513 j	3.3	42	130	<1	<0.025	1.34	<1	105	22	<1	0.141 j	**0.403 B2**	NA
ABMW-11BR	On dam between 1964 and 1982 basins	1982 Basin	Ash Basin	11/14/2018	**10.5**	36.09 j	3.4	45	140	**2.31**	0.034	0.67 j	0.538 j	21	<5	<1	<0.2	**0.39**	NA
AMW-01B	SE of 1982 basin	1982 Basin	Downgradient	02/07/2018	7.3	346	8.3	110	230	<1	<0.025	<1	<1	**2800**	**196**	<1	<0.2	<0.3	1.411
AMW-01B	SE of 1982 basin	1982 Basin	Downgradient	04/18/2018	7.2	343	8.3	100	220	<1	<0.025	<1	<1	**2380**	**194**	<1	<0.2	0.111 j	1.575
AMW-01B	SE of 1982 basin	1982 Basin	Downgradient	07/10/2018	7.1	347	8.6	110	230	<1	<0.025	<1	<1	**1670**	**187**	<1	<0.2	**0.376 B2**	3.434
AMW-01B	SE of 1982 basin	1982 Basin	Downgradient	11/08/2018	7.3	327	8.3	100	240	<1	<0.025 M1,R1	<1	<1	**1440**	**208**	<1	<0.2	<0.3	3.205
AMW-02A	SE of 1982 basin	1982 Basin	Sidegradient	02/07/2018	**5.8**	233	9.3	67	130	<1	<0.025	<1	**7.37**	**4470**	**1250**	1.6	<0.2	<0.3	NA
AMW-02A	SE of 1982 basin	1982 Basin	Sidegradient	04/18/2018	**5.9**	205	8.9	47	150	<1	<0.025	<1	**7.26**	**21000**	**1440**	0.689 j	0.13 j	0.117 j	NA
AMW-02A	SE of 1982 basin	1982 Basin	Sidegradient	07/11/2018	**6.0**	179	9.2	53	210	<1	<0.025 M1	<1	**8.14**	**37100**	**1650**	0.369 j	0.182 j	<0.3	NA
AMW-02A	SE of 1982 basin	1982 Basin	Sidegradient	11/08/2018	**5.8**	212	9.3	57	150	<1	<0.025	<1	**4.97**	**4100**	**999**	1.72	<0.2	<0.3	NA
AMW-03B	SE of 1982 basin	1982 Basin	Background	02/06/2018	**6.4**	<50	0.61	0.96	62	<1	0.22	<1	<1	<10	<5	<1	<0.2	**0.331**	0.2934
AMW-03B CCR	SE of 1982 basin	1982 Basin	Background	02/06/2018	**6.4**	<50	0.6	0.95	57	<1	NA	<1	<1	NA	NA	<1	<0.2 B3	NA	0.578
AMW-03B	SE of 1982 basin	1982 Basin	Background	04/18/2018	**6.3**	<50	0.57	1	41	<1	0.21	<1	<1	4.8 j	<5	<1	<0.2	0.25 j	2.021
AMW-03B CCR	SE of 1982 basin	1982 Basin	Background	04/18/2018	**6.3**	<50	0.48	0.98	59	<1	NA	0.376 j	<1	NA	NA	<1	<0.2	NA	3.53135
AMW-03B	SE of 1982 basin	1982 Basin	Background	07/10/2018	**5.8**	<50	0.6	0.95	50	<1	0.23	0.341 j	<1	8.098 j	<5	<1	<0.2	**0.547 B2**	2.0416
AMW-03B	SE of 1982 basin	1982 Basin	Background	11/08/2018	**6.2**	<50	0.63	0.93	74	<1	0.24	0.344 j	<1	5.24 j	<5	<1	<0.2	0.192 j	1.848
AMW-03B CCR	SE of 1982 basin	1982 Basin	Background	11/08/2018	**6.2**	<50	0.53	0.87	40	<1	NA	0.391 j	<1	NA	NA	<1	<0.2	NA	1.876
AS-05BR	S of 1982 basin, off of New Rockwood Rd	1982 Basin	Sidegradient	01/10/2018	**12.7**	<50	6.2	19	**2200**	<1	**21.8**	**22.3**	<1	47	<5	2.13	<0.2 B3	**57**	2.208
AS-05BR	S of 1982 basin, off of New Rockwood Rd	1982 Basin	Sidegradient	04/19/2018	**12.8**	<50	5.7	16	**2200**	**2.5**	**21**	**27.5**	0.74 j	98	<5	1.6	0.087 j	**8.19**	NA
AS-05BR	S of 1982 basin, off of New Rockwood Rd	1982 Basin	Sidegradient	07/11/2018	**12.8**	<50	<0.1	15	**2400**	0.967 j	**13.4**	**12.4**	0.8 j	83	<5	1.49	0.176 j	**7.33**	NA
AS-05BR	S of 1982 basin, off of New Rockwood Rd	1982 Basin	Sidegradient	11/07/2018	**12.7**	<50	6.5	19	**2000**	0.714 j	**11.5**	8.55	0.808 j	49	<5	1.88	<0.2	**8.78**	NA
AS-05BRL	S of 1982 basin, off of New Rockwood Rd	1982 Basin	Sidegradient	01/10/2018	**11.0**	<50	11	37	250	<1	<0.025	3.01	<1	220	39	<1	<0.2 B3	**7.08**	2.175
AS-05BRL	S of 1982 basin, off of New Rockwood Rd	1982 Basin	Sidegradient	04/19/2018	**11.6**	32.24 j	12	57	340	0.632 j	0.08	**16.5**	<1	236	9	<1	<0.2	**4.37**	NA
AS-05BRL	S of 1982 basin, off of New Rockwood Rd	1982 Basin	Sidegradient	07/11/2018	**11.5**	39.51 j	12	71	420	0.597 j	0.12	0.707 j	<1	136	3.109 j	<1	**0.218**	**1.86**	NA
AS-05BRL	S of 1982 basin, off of New Rockwood Rd	1982 Basin	Sidegradient	11/07/2018	**11.5**	42.528 j	9.7	66	340	<1	0.09	1.99	<1	98	2.49 j	<1	<0.2	**1.95**	NA
CB-01	Between 1982 basin and Lake Julian	1982 Basin	Background	02/06/2018	**4.9**	<50	1.3	<0.1	<25	<1	<0.025	<1	**1.5**	<10	19	<1	<0.2	<0.3	-0.0134
CB-01 CCR	Between 1982 basin and Lake Julian	1982 Basin	Background	02/06/2018	**4.9**	<50	1.3	0.1	<25	<1	NA	<1	**1.44**	NA	NA	<1	<0.2 B3	NA	0.772
CB-01 IMP	Between 1982 basin and Lake Julian	1982 Basin	Background	04/17/2018	**4.7**	<50	1.8	0.18	<25	<1	<0.025	<1	**1.89**	54	25	<1	<0.2	0.102 j	2.968
CB-01	Between 1982 basin and Lake Julian	1982 Basin	Background	04/17/2018	**4.7**	<50	1.9	0.18	<25	<1	NA	<5	**1.89**	110	24	<1	<0.2	<0.3	NA
CB-01 CCR	Between 1982 basin and Lake Julian	1982 Basin	Background	04/17/2018	**4.7**	<50	1.9	0.28	<25	<1	NA	<1	**2**	NA	NA	<1	<0.2	NA	1.086
CB-01 IMP	Between 1982 basin and Lake Julian	1982 Basin	Background	07/09/2018	**5.0**	<50	2.1	0.21	<25	<1	<0.025	<1	**2.08**	33	24	<1	<0.2	0.237 j	1.2068
CB-01	Between 1982 basin and Lake Julian	1982 Basin	Background	07/09/2018	**5.0**	<50	2	0.4	<25	<1	NA	<5	**2.01**	49	24	<1	<0.2	<0.3	NA
CB-01BR	Between 1982 basin and Lake Julian	1982 Basin	Background	04/26/2018	**11.9**	<50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CB-01D	Between 1982 basin and Lake Julian	1982 Basin	Background	02/06/2018	**5.5**	<50	0.83	2.6	27	<1	0.069	<1	**1.44**	<10	**60**	<1	<0.2	<0.3	0.471
CB-01D CCR	Between 1982 basin and Lake Julian	1982 Basin	Background	02/06/2018	**5.5**	<50	0.78	2.6	29	<1	NA	<1	**1.41**	NA	NA	<1	<0.2 B3	NA	0.49603
CB-01D	Between 1982 basin and Lake Julian	1982 Basin	Background	04/17/2018	**5.3**	<50	0.83	2.3	<25	<1	0.035	<1	**1.51**	5.28 j	**58**	<1	<0.2	0.113 j	1.2023
CB-01D CCR	Between 1982 basin and Lake Julian	1982 Basin	Background	04/17/2018	**5.3**	<50	0.84	2.7	<25	<1	NA	<1	**1.66**	NA	NA	<1	<0.2	NA	1.81
CB-01D	Between 1982 basin and Lake Julian	1982 Basin	Background	07/10/2018	**4.6**	<50	0.85	3.2	<25	<1	0.053	<1	**2.04**	3.706 j	**51**	<1	0.088 j	**0.431 B2**	2.962
CB-02	W of cove area, N of Arden Dr	1982 Basin	Sidegradient	02/05/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CB-02	W of cove area, N of Arden Dr	1982 Basin	Sidegradient	04/17/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CB-02	W of cove area, N of Arden Dr	1982 Basin	Sidegradient	07/09/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CB-03R	Between 1982 basin and Arden Dr	1982 Basin	Downgradient	02/05/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CB-03R IMP	Between 1982 basin and Arden Dr	1982 Basin	Downgradient	04/17/2018	**5.0**	586	3.7	100	180	<1	<0.025	<1	**3.29**	11	**222**	4.55	**0.353**	<0.3	NA
CB-03R	Between 1982 basin and Arden Dr	1982 Basin	Downgradient	04/17/2018	**5.0**	591	3.6	110	160	<1	NA	<5	**3.27**	44	**217**	4.42	**0.299**	<0.3	NA
CB-03R CCR	Between 1982 basin and Arden Dr	1982 Basin	Downgradient	04/17/2018	**5.0**	609	3.7	110	160	<1	NA	<1	**3.33**	NA	NA	4.72	**0.251**	NA	4.96
CB-03R IMP	Between 1982 basin and Arden Dr	1982 Basin	Downgradient	07/09/2018	**5.0**	543	4.1	100	170	<1	0.029	<1	**3.22**	128	**195**	4.39	**0.258**	0.263 j	1.338
CB-03R	Between 1982 basin and Arden Dr	1982 Basin	Downgradient	07/09/2018	**5.0**	548	3.9	100	160	<1	NA	<5	**3.11**	67	**196**	4.46	**0.282**	<0.3	NA
CB-04	SW of 1982 basin, parallel to CB-05	1982 Basin	Downgradient	02/07/2018	**5.4**	415	2.6	87	140	<1	0.63	<1	**1.5**	**384**	**566**	4.93	<0.2	**0.625**	NA
CB-04 IMP	SW of 1982 basin, parallel to CB-05	1982 Basin	Downgradient	04/17/2018	**5.2**	361	1.8	81	98	<1	0.24	0.41 j	**1.06**	185	**405**	5.02	0.113 j	**0.313**	NA
CB-04	SW of 1982 basin, parallel to CB-05	1982 Basin	Downgradient	04/17/2018	**5.2**	364	1.8	87	100	<1	NA	<5	<1	162	**399**	4.87	<0.2	**0.341**	NA
CB-04 IMP	SW of 1982 basin, parallel to CB-05	1982 Basin	Downgradient	07/09/2018	**5.2**	261	1.8	67	110	<1	0.17	0.471 j	0.73 j	49	**296**	4.54	<0.2	**0.346**	0.783
CB-04	SW of 1982 basin, parallel to CB-05	1982 Basin	Downgradient	07/09/2018	**5.2**	237	1.7	64	76	<1	NA	<5	<1	120	**269**	4.5	<0.2	**0.355**	0
CB-04B	SW of 1982 basin, parallel to CB-05	1982 Basin	Downgradient	02/06/2018	7.0	<50	6.1	53	150	<1	0.032	<1	<1	**1150**	**68**	<1	<0.2	**0.368**	NA
CB-04B IMP	SW of 1982 basin, parallel to CB-05	1982 Basin	Downgradient	04/18/2018	6.9	25.666 j	6.2	53	120	<1	<0.025 M1	<1	<1	**751**	50	<1	<0.2	0.237 j	NA
CB-04B	SW of 1982 basin, parallel to CB-05	1982 Basin	Downgradient	04/18/2018	6.9	<50	6.1	55	120	<1	NA	<5	<1	**1040**	**64**	<1	<0.2	<0.3	NA
CB-04B IMP	SW of 1982 basin, parallel to CB-05	1982 Basin	Downgradient	07/09/2018	6.5	21.511 j	6.4	56	140	<1	<0.025	0.354 j	0.409 j	**999**	46	<1	<0.2	**0.347**	2.574
CB-04B	SW of 1982 basin, parallel to CB-05	1982 Basin	Downgradient	07/09/2018	6.5	<50	6.2	55	130	<1	NA	<5	<1	**517**	36	<1	<0.2	**0.34**	NA
CB-05	SE corner of CB between I-26 and French Broad	1982 Basin	Downgradient	02/08/2018	**5.5**	248	33	48	140	<1	<0.12 D3	<1	<1	**15700**	**574**	<1	<0.2	**0.317**	NA
CB-05 IMP	SE corner of CB between I-26 and French Broad	1982 Basin	Downgradient	04/17/2018	**5.1**	222	39	42	150	<1	<0.025	<1	0.707 j	**7870**	**584**	<1	<0.2	0.153 j	NA
CB-05	SE corner of CB between I-26 and French Broad	1982 Basin	Downgradient	04/17/2018	**5.1**	217	45	39	150	<1	NA	<5	<1	**19800**	**569**	<1	<0.2	**0.306**	NA
CB-05 IMP	SE corner of CB between I-26 and French Broad	1982 Basin	Downgradient	07/10/2018	**5.7**	310	46	48	180	<1	<0.025	0.784 j	0.653 j	**29400**	**567**	<1	<0.2	**0.528 B2**	NA
CB-05	SE corner of CB between I-26 and French Broad	1982 Basin	Downgradient	07/10/2018	**5.7**	292	45	42	170	<1	NA	<5	<1	**27900**	**537**	<1	<0.2	**0.36**	NA
CB-05 IMP	SE corner of CB between I-26 and French Broad	1982 Basin	Downgradient	11/13/2018	**5.9**	296	42	31	150	<1	<0.025	0.53 j	0.634 j	**19300**	**494**	<1	<0.2	**0.328**	NA
CB-05	SE corner of CB between I-26 and French Broad	1982 Basin	Downgradient	11/13/2018	**5.9**	301	45	28	170	<1	NA	<5	<1	**23500**	**506**	<1	<0.2	**0.422**	NA
CB-06	Approx. 1000 ft NE of CB-05	1964 Basin	Downgradient	02/08/2018	**3.9**	444	54	**310**	420	<1	<0.12 D3	<1	**17.3**	**10400**	**9810**	<1	<0.2	<0.3	NA
CB-06 IMP	Approx. 1000 ft NE of CB-05	1964 Basin	Downgradient	04/17/2018	**3.8**	477	73	250	440	<1	<0.025	0.37 j	**17.6**	**13700**	**8820**	<1	**0.213**	<0.3	NA
CB-06	Approx. 1000 ft NE of CB-05	1964 Basin	Downgradient	04/17/2018	**3.8**	451	66	**350**	420	<1	NA	<5	**19**	**4400**	**9650**	<1	<0.2	<0.3	NA
CB-06 IMP	Approx. 1000 ft NE of CB-05	1964 Basin	Downgradient	07/17/2018	**4.0**	649	89	250	440	<1	<0.025	<1	**10.6**	**16800**	**6440**	0.73 j	0.143 j	0.16 j	NA

I/A

ASHEVILLE
01/24/2019
BRANDON RUSSO
TODD PLATING

	PARAM	ED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)									IONUCLI
Reporting Units	**S.U.**	**ug/L**	**mg/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**pCi/L**
15A NCAC 02L Standard	**6.5-8.5**	**700**	**250**	**250**	**500**	**1***	**10**	**10**	**1***	**300**	**50**	**20**	**0.2***	**0.3***	**5^**
Provisional Background (Alluvial Unit)	**4.6-5.1**	**50**	**15**	**4.6**	**56**	**1**	**0.42**	**5**	**4.29**	**598**	**363**	**1**	**0.2**	**0.3**	**4.17**
Provisional Background (Saprolite Unit)	**4.3-5.8**	**50**	**14**	**50**	**104.9**	**1**	**1.313**	**5**	**6.9**	**941**	**725**	**1.88**	**0.2**	**0.625**	**6.832**
Provisional Background (Transition Unit)	**3.9-7.0**	**50**	**6.7**	**5.467**	**72.77**	**1**	**0.261**	**1.32**	**4.608**	**779**	**380**	**1**	**0.2**	**0.41**	**6.61**
Provisional Background (Bedrock Unit)	**4.1-8.1**	**50**	**6.5**	**5.6**	**131.5**	**1**	**0.423**	**1.3**	**1**	**1246**	**93**	**1**	**0.2**	**0.632**	**5.8**

					PARAM	ED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)									IONUCLI
Sample ID	**Location Description**	**Associated Unit**	**Location with Respect to Groundwater Flow Direction**	**Sample Collection Date**	**pH**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Manganese**	**Selenium**	**Thallium**	**Vanadium**	**Total Radium**
CB-06	Approx. 1000 ft NE of CB-05	1964 Basin	Downgradient	07/17/2018	**4.0**	619	120	**260**	440	<1	NA	<5	**11.5**	**12700**	**6350**	<1	<0.2	<0.3	NA
CB-06 IMP	Approx. 1000 ft NE of CB-05	1964 Basin	Downgradient	11/13/2018	**5.0**	550	59	190	330	<1	<0.025	<1	**9.49**	**10900**	**5510**	0.74 j	0.104 j	<0.3	NA
CB-06	Approx. 1000 ft NE of CB-05	1964 Basin	Downgradient	11/13/2018	**5.0**	550	63	190	350	<1	NA	<5	**9.11**	**13000**	**5720**	<1	<0.2	<0.3	NA
CB-07	Approx. 1000 ft NE of CB-06	1964 Basin	Downgradient	02/06/2018	**5.7**	<50	37	32	140	<1	<0.025	<1	<1	56	<5	14.3	<0.2	**0.332**	NA
CB-07 IMP	Approx. 1000 ft NE of CB-06	1964 Basin	Downgradient	04/17/2018	**5.6**	137	120	35	300	<1	0.036 M1	<1	<1	13	4.235 j	15.4	**0.21**	0.234 j	NA
CB-07	Approx. 1000 ft NE of CB-06	1964 Basin	Downgradient	04/17/2018	**5.6**	134	120	35	250	<1	NA	<5	<1	19	<5	16.6	<0.2	**0.318**	NA
CB-07 IMP	Approx. 1000 ft NE of CB-06	1964 Basin	Downgradient	07/17/2018	**5.3**	216	150	35	420	<1	0.19	0.336 j	<1	18	17	1.24	0.169 j	0.225 j	NA
CB-07	Approx. 1000 ft NE of CB-06	1964 Basin	Downgradient	07/17/2018	**5.3**	212	160	31	400	<1	NA	<5	<1	16	16	1.22	<0.2	**0.375**	NA
CB-07 IMP	Approx. 1000 ft NE of CB-06	1964 Basin	Downgradient	11/13/2018	**5.6**	159	68	38	180	<1	0.04	0.539 j	<1	82	11	4.22	<0.2	**0.454**	NA
CB-07	Approx. 1000 ft NE of CB-06	1964 Basin	Downgradient	11/13/2018	**5.6**	161	70	39	190	<1	NA	<5	<1	29	9	3.66	<0.2	**0.304**	NA
CB-08	NW of 1964 basin and SW stilling pond	1964 Basin	Downgradient	02/08/2018	**5.3**	**1490**	47	120	290	<1	5	5.35	**1.15**	<10	**343**	10.6	<0.2	<0.3	NA
CB-08 IMP	NW of 1964 basin and SW stilling pond	1964 Basin	Downgradient	04/17/2018	**5.3**	**1150**	47	87	250	0.49 j	2.3	2.69	**1.23**	62	**393**	8.51	0.084 j	0.294 j	NA
CB-08	NW of 1964 basin and SW stilling pond	1964 Basin	Downgradient	04/17/2018	**5.3**	**1110**	48	87	210	<1	NA	<5	**1.07**	16	**373**	7.5	<0.2	<0.3	NA
CB-08 IMP	NW of 1964 basin and SW stilling pond	1964 Basin	Downgradient	07/10/2018	**5.2**	**800**	38	59	190	<1	0.81 P4	0.953 j	**1.09**	5.31 j	**415**	5.42	0.125 j	**0.495 B2**	1.644
CB-08	NW of 1964 basin and SW stilling pond	1964 Basin	Downgradient	07/10/2018	**5.2**	**803**	37	60	160	<1	NA	<5	**1.14**	<10	**401**	5.68	<0.2	<0.3	NA
CB-08BR	NW of 1964 basin and SW stilling pond	1964 Basin	Downgradient	02/08/2018	6.8	531	55	50	310	<1	<0.025	<1	<1	**511**	**987**	3.59	<0.2	**0.481**	**5.35**
CB-08BR	NW of 1964 basin and SW stilling pond	1964 Basin	Downgradient	04/17/2018	6.8	467	42	44	260	0.51 j	<0.025	<1	0.355 j	202	**886**	2.59	<0.2	**0.576**	**8.591**
CB-08BR	NW of 1964 basin and SW stilling pond	1964 Basin	Downgradient	07/10/2018	6.8	108	26	29	190	<1	<0.025	<1	<1	**355**	**548**	<1	0.112 j	**0.503 B2**	**7.8**
CB-09	N of 1964 basin and settling pond	1964 Basin	Background	02/05/2018	**5.0**	<50	6.5	0.1	45	<1	0.13	<1	<1	10	32	<1	<0.2	<0.3	NA
CB-09 CCR	N of 1964 basin and settling pond	1964 Basin	Background	02/05/2018	**5.0**	<50	6.8	<0.1	52	<1	NA	<1	<1	NA	NA	<1	<0.2 B3	NA	2.39
CB-09 IMP	N of 1964 basin and settling pond	1964 Basin	Background	04/18/2018	**4.8**	<50	6.9	0.13	<25	<1	0.08	<1	0.878 j	6.037 j	34	<1	0.083 j	0.124 j	NA
CB-09	N of 1964 basin and settling pond	1964 Basin	Background	04/18/2018	**4.8**	<50	7	0.18	<25	<1	NA	<5	<1	<10	32	<1	<0.2	<0.3	NA
CB-09 CCR	N of 1964 basin and settling pond	1964 Basin	Background	04/18/2018	**4.8**	<50	6.7	0.23	<25	<1	NA	<1	0.864 j	NA	NA	<1	0.145 j	NA	0.904
CB-09 IMP	N of 1964 basin and settling pond	1964 Basin	Background	07/10/2018	**5.0**	<50	6.9	0.13	<25	<1	0.087	<1	0.872 j	66	36	<1	0.095 j	**0.382 B2**	NA
CB-09	N of 1964 basin and settling pond	1964 Basin	Background	07/10/2018	**5.0**	<50	6.5	0.33	<25	<1	NA	<5	<1	97	35	<1	<0.2	<0.3	NA
CB-09BR	N of 1964 basin and settling pond	1964 Basin	Background	02/05/2018	**6.1**	<50	6.3	1.2	120	<1	0.18	<1	<1	<10	26	<1	<0.2	<0.3	2.538
CB-09BR CCR	N of 1964 basin and settling pond	1964 Basin	Background	02/05/2018	**6.1**	<50	6.8	1.1	100	<1	NA	<1	<1	NA	NA	<1	<0.2	NA	4.636
CB-09BR	N of 1964 basin and settling pond	1964 Basin	Background	04/18/2018	**6.0**	<50	6.9	1.1	50	<1	0.18	<1	<1	3.949 j	32	<1	<0.2	0.177 j	4.528
CB-09BR CCR	N of 1964 basin and settling pond	1964 Basin	Background	04/18/2018	**6.0**	<50	6.5	1.1	49	<1	NA	<1	<1	NA	NA	<1	<0.2	NA	2.263
CB-09BR	N of 1964 basin and settling pond	1964 Basin	Background	07/09/2018	**5.4**	<50	7.1	1.1	63	<1	0.14 M1	0.473 j	<1	7.035 j	34	<1	<0.2	**0.327**	1.205
CB-09SL	N of 1964 basin and settling pond	1964 Basin	Background	02/05/2018	**5.7**	<50	6.5	0.26	67	<1	0.29	<1	<1	<10	<5	<1	<0.2	<0.3	0.7492
CB-09SL CCR	N of 1964 basin and settling pond	1964 Basin	Background	02/05/2018	**5.7**	<50	6.9	0.24	77	<1	NA	<1	<1	NA	NA	<1	<0.2	NA	1.16
CB-09SL	N of 1964 basin and settling pond	1964 Basin	Background	04/18/2018	**5.6**	<50	7	0.26	35	<1	6.4	0.366 j	<1	8.268 j	2.793 j	<1	<0.2	0.17 j	0.2137
CB-09SL CCR	N of 1964 basin and settling pond	1964 Basin	Background	04/18/2018	**5.6**	<50	6.7	0.26	31	<1	NA	0.503 j	<1	NA	NA	<1	<0.2	NA	0.1893
CB-09SL	N of 1964 basin and settling pond	1964 Basin	Background	07/09/2018	**5.0**	<50	7.2	0.24	41	<1	0.3	0.654 j	<1	4.988 j	2.081 j	<1	<0.2	**0.343**	0.106
CCR-100BR	---	---	Background	11/07/2018	6.7	<50	9.1	2	81	0.865 j	NA	1.38	0.529 j	NA	NA	<1	0.091 j	NA	2.025
CCR-100BRL	---	---	Background	11/07/2018	7.3	<50	33	110	480	**1.49**	NA	3.25	**1.9**	NA	NA	<1	<0.2	NA	0.945
CCR-100SL	---	---	Background	11/07/2018	7.3	<50	8.5	0.33	99	**1.36**	NA	2.66	**2.31**	NA	NA	<1	<0.2	NA	1.121
CCR-101BR IMP	S of stilling pond, N of 1964 basin	1964 Basin	Sidegradient	02/05/2018	**5.6**	**3440**	150	130	**780**	<1	0.15	<1	<1	<10	**791**	18.2	<0.2	<0.3	**6.279**
CCR-101BR	S of stilling pond, N of 1964 basin	1964 Basin	Sidegradient	02/05/2018	**5.6**	**3450**	170	140	**760**	<1	NA	<1	<1	NA	NA	19.8	<0.2	NA	2.833
CCR-101BR IMP	S of stilling pond, N of 1964 basin	1964 Basin	Sidegradient	04/17/2018	**5.4**	**1880**	81	82	310	<1	0.12	<1	0.535 j	4.746 j	**429**	12.2	<0.2	0.198 j	2.056
CCR-101BR	S of stilling pond, N of 1964 basin	1964 Basin	Sidegradient	04/17/2018	**5.4**	**1940**	81	89	280	<1	NA	<1	0.544 j	NA	NA	11	<0.2	NA	2.45
CCR-101BR IMP	S of stilling pond, N of 1964 basin	1964 Basin	Sidegradient	07/09/2018	**5.3**	**1080**	52	71	290	<1	0.098 P4,M1	0.381 j	<1	4.698 j	**268**	7.26	0.162 j	0.218 j	1.564
CCR-102D IMP	On dam W of 1964 basin	1964 Basin	Downgradient	02/05/2018	**6.4**	**6340**	**280**	220	**1400**	<1	0.026	<1	**2.5**	171	**729**	<1	<0.2	**0.436**	2.1826
CCR-102D	On dam W of 1964 basin	1964 Basin	Downgradient	02/05/2018	**6.4**	**6330**	**320**	**270**	**1500**	<1	NA	<1	**2.38**	NA	NA	<1	<0.2	NA	1.407
CCR-102D IMP	On dam W of 1964 basin	1964 Basin	Downgradient	04/18/2018	**6.3**	**5700**	**270**	220	**1000**	<1	0.034	<1	**2.22**	17	**685**	<1	0.093 j	0.248 j	4.123
CCR-102D	On dam W of 1964 basin	1964 Basin	Downgradient	04/18/2018	**6.3**	**6000**	**260**	220	**1200**	<1	NA	<1	**2.2**	NA	NA	<1	0.095 j	NA	1.998
CCR-102D IMP	On dam W of 1964 basin	1964 Basin	Downgradient	07/10/2018	**6.2**	**5410**	230	200	**810**	<1	0.048	<1	**2.12**	37	**644**	<1	0.154 j	0.283 j	2.57
CCR-102S IMP	On dam W of 1964 basin	1964 Basin	Downgradient	02/05/2018	**6.4**	**7020**	**310**	230	**1500**	<1	0.074	**12.8**	<1	287	**638**	<1	<0.2	**0.502**	0.2069
CCR-102S	On dam W of 1964 basin	1964 Basin	Downgradient	02/05/2018	**6.4**	**7200**	**370**	**280**	**1500**	<1	NA	**10.8**	<1	NA	NA	<1	<0.2	NA	1.1012
CCR-102S IMP	On dam W of 1964 basin	1964 Basin	Downgradient	04/18/2018	**6.2**	**6620**	**300**	230	**1100**	<1	0.083	1.35	0.555 j	164	**529**	<1	0.12 j	**0.423**	3.8717
CCR-102S	On dam W of 1964 basin	1964 Basin	Downgradient	04/18/2018	**6.2**	**6880**	**290**	230	**1200**	<1	NA	1.88	0.563 j	NA	NA	<1	<0.2	NA	3.385
CCR-102S IMP	On dam W of 1964 basin	1964 Basin	Downgradient	07/10/2018	**6.2**	**6680**	**270**	220	**960**	<1	0.11	2.06	0.417 j	31	**499**	<1	0.139 j	0.292 j	1.765
CCR-103BR IMP	Toe of dam, W of 1964 basin	1964 Basin	Downgradient	02/05/2018	**5.9**	**815**	25	130	310	<1	<0.025	<1	**1.08**	115	**5340**	<1	<0.2	<0.3	**5.93**
CCR-103BR	Toe of dam, W of 1964 basin	1964 Basin	Downgradient	02/05/2018	**5.9**	**844**	26	140	320	<1	NA	<1	**1.13**	NA	NA	<1	<0.2 B3	NA	2.46
CCR-103BR IMP	Toe of dam, W of 1964 basin	1964 Basin	Downgradient	04/18/2018	**6.2**	**832**	26	130	270	<1	0.032	<1	0.999 j	141	**5370**	<1	0.106 j	0.186 j	3.71
CCR-103BR	Toe of dam, W of 1964 basin	1964 Basin	Downgradient	04/18/2018	**6.2**	**838**	25	130	270	<1	NA	<1	0.965 j	NA	NA	<1	<0.2	NA	3.66
CCR-103BR IMP	Toe of dam, W of 1964 basin	1964 Basin	Downgradient	07/10/2018	**6.0**	**826**	24	140	260	<1	<0.025	<1	1	234	**5970**	<1	0.086 j	0.2 j	NA
CCR-103D IMP	Toe of dam, W of 1964 basin	1964 Basin	Downgradient	02/05/2018	**5.7**	**891**	24	110	270	<1	0.026	<1	**1.99**	<10	**6870**	<1	**0.228**	<0.3	2.833
CCR-103D	Toe of dam, W of 1964 basin	1964 Basin	Downgradient	02/05/2018	**5.7**	**891**	25	130	290	<1	NA	<1	**2.08**	NA	NA	<1	**0.232**	NA	0.762
CCR-103D IMP	Toe of dam, W of 1964 basin	1964 Basin	Downgradient	04/18/2018	**5.7**	**873**	24	120	220	<1	0.069 M1,R1	<1	**2.08**	8.717999 j	**6770**	<1	**0.263**	0.239 j	0.562
CCR-103D	Toe of dam, W of 1964 basin	1964 Basin	Downgradient	04/18/2018	**5.7**	**907**	24	120	230	<1	NA	<1	**1.98**	NA	NA	<1	**0.22**	NA	1.308
CCR-103D IMP	Toe of dam, W of 1964 basin	1964 Basin	Downgradient	07/10/2018	**5.7**	**856**	22	130	220	<1	0.061	<1	**2.02**	32	**7100**	<1	**0.302**	0.249 j	NA
CCR-104D IMP	SW of 1964 basin	1964 Basin	Downgradient	02/05/2018	**6.1**	**2740**	94	**410**	**950**	<1	<0.025	<1	**20.2**	13	**9210**	<1	**0.214**	<0.3	3.313
CCR-104D	SW of 1964 basin	1964 Basin	Downgradient	02/05/2018	**6.1**	**2790**	99	**590**	**940**	<1	NA	<1	**20**	NA	NA	<1	**0.219**	NA	2.026
CCR-104D IMP	SW of 1964 basin	1964 Basin	Downgradient	04/18/2018	**5.8**	**2790**	100	**420**	**870**	<1	<0.025	<1	**20.6**	4.984 j	**8810**	<1	0.2	0.221 j	NA
CCR-104D	SW of 1964 basin	1964 Basin	Downgradient	04/18/2018	**5.8**	**2940**	100	**410**	**880**	<1	NA	<1	**19.9**	NA	NA	<1	0.171 j	NA	2.711
CCR-104D IMP	SW of 1964 basin	1964 Basin	Downgradient	07/11/2018	**6.1**	**2850**	100	**390**	**850**	<1	<0.025	<1	**20.3**	16	**8710**	<1	**0.256**	0.252 j	1.678
CCR-105BR IMP	Toe of dam, W of 1982 basin	1982 Basin	Downgradient	02/05/2018	7.2	193	11	140	350	<1	<0.025	<1	<1	**1250**	9	<1	<0.2	**0.701**	NA
CCR-105BR	Toe of dam, W of 1982 basin	1982 Basin	Downgradient	02/05/2018	7.2	175	11	150	310	<1	NA	<1	<1	NA	NA	<1	<0.2 B3	NA	2.38767
CCR-105BR IMP	Toe of dam, W of 1982 basin	1982 Basin	Downgradient	04/18/2018	6.9	192	11	140	270	<1	<0.025	0.998 j	<1	**956**	7	0.947 j	<0.2	**0.761**	NA
CCR-105BR	Toe of dam, W of 1982 basin	1982 Basin	Downgradient	04/18/2018	6.9	203	11	140	280	<1	NA	1.7	<1	NA	NA	0.686 j	<0.2	NA	0.4167

I/A

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TODD PLATING

	PARAM	ED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)									IONUCLI
Reporting Units	S.U.	ug/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L
15A NCAC 02L Standard	6.5-8.5	700	250	250	500	1*	10	10	1*	300	50	20	0.2*	0.3*	5^
Provisional Background (Alluvial Unit)	4.6-5.1	50	15	4.6	56	1	0.42	5	4.29	598	363	1	0.2	0.3	4.17
Provisional Background (Saprolite Unit)	4.3-5.8	50	14	50	104.9	1	1.313	5	6.9	941	725	1.88	0.2	0.625	6.832
Provisional Background (Transition Unit)	3.9-7.0	50	6.7	5.467	72.77	1	0.261	1.32	4.608	779	380	1	0.2	0.41	6.61
Provisional Background (Bedrock Unit)	4.1-8.1	50	6.5	5.6	131.5	1	0.423	1.3	1	1246	93	1	0.2	0.632	5.8

					PARAM	ED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)									IONUCLI
Sample ID	Location Description	Associated Unit	Location with Respect to Groundwater Flow Direction	Sample Collection Date	pH	Boron	Chloride	Sulfate	Total Dissolved Solids	Antimony	Chromium (VI)	Chromium	Cobalt	Iron	Manganese	Selenium	Thallium	Vanadium	Total Radium
CCR-105BR IMP	Toe of dam, W of 1982 basin	1982 Basin	Downgradient	07/10/2018	7.0	212	11	150	290	<1	0.1	1.81	<1	**1150**	9	1.11	0.118 j	**1.16 B2**	NA
CCR-105BR IMP	Toe of dam, W of 1982 basin	1982 Basin	Downgradient	11/07/2018	7.0	234	11	150	290	<1	0.44	1.31	<1	**391**	8	1.36	<0.2	**0.858**	NA
CCR-105BR	Toe of dam, W of 1982 basin	1982 Basin	Downgradient	11/07/2018	7.0	243	12	160	270	<1	NA	1.11	<1	NA	NA	1.43	<0.2	NA	1.811
CCR-105D IMP	Toe of dam, W of 1982 basin	1982 Basin	Downgradient	02/05/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CCR-105D	Toe of dam, W of 1982 basin	1982 Basin	Downgradient	02/05/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CCR-105D IMP	Toe of dam, W of 1982 basin	1982 Basin	Downgradient	07/09/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EXT-01	Pump Test Sample Location	1964 Basin	Downgradient	02/07/2018	**6.2**	**12000**	**660**	**450**	**1600**	<1	<0.025	<1	**4.75**	**428 S1**	**3660**	<1	<0.2	**0.677**	NA
EXT-01	Pump Test Sample Location	1964 Basin	Downgradient	04/18/2018	8.2	**6330**	**320**	230	**1100**	<1	0.032	<1	**9.11**	181	**2160**	1.73	0.122 j	0.146 j	NA
EXT-02	Pump Test Sample Location	1964 Basin	Downgradient	02/07/2018	**6.2**	**1270**	86	87	350	<1	<0.025	<1	<1	47	**404**	<1	<0.2	<0.3	NA
EXT-02	Pump Test Sample Location	1964 Basin	Downgradient	04/18/2018	**6.3**	**1190**	83	79	370	<1	<0.025	<1	0.453 j	28	**375**	<1	0.086 j	0.205 j	NA
EXT-02	Pump Test Sample Location	1964 Basin	Downgradient	07/10/2018	**6.3**	**1090**	76	76	360	<1	<0.025	<1	0.525 j	<10	**318**	<1	<0.2	0.189 j	NA
EXT-A	Pump Test Sample Location	1964 Basin	Downgradient	02/08/2018	**5.5**	**3740**	160	150	**560**	<1	<0.025	2.08	**7.46**	**1200**	**1440**	**20.5**	<0.2	**0.357**	NA
EXT-A	Pump Test Sample Location	1964 Basin	Downgradient	04/17/2018	**5.4**	**4390**	190	150	**680**	<1	<0.025	3.29	**5.72**	**695**	**1210**	**25.2**	0.163 j	**0.587**	NA
EXT-A	Pump Test Sample Location	1964 Basin	Downgradient	07/09/2018	**5.4**	**4180**	180	160	**730**	0.336 j	0.025	7.04	**5.51**	**1560**	**1020**	**25.5**	0.173 j	**1.54**	NA
EXT-A	Pump Test Sample Location	1964 Basin	Downgradient	11/14/2018	**5.6**	**3870**	170	140	**620**	<1	<0.025 M1,R1	2.07	**6.26**	**402**	**1030**	**23.1**	0.121 j	**0.538**	NA
GW-01	Between the 1982 basin and Lake Julian	1982 Basin	Background	02/06/2018	**4.9**	<50	8.6	34	91	<1	1.1	1.12	**5.18**	34	**642**	1.15	<0.2	<0.3	NA
GW-01 IMP	Between the 1982 basin and Lake Julian	1982 Basin	Background	04/18/2018	**4.8**	21.583 j	8.6	39	77	<1	1.3	1.39	**5.64**	40	**709**	1.62	0.102 j	0.177 j	NA
GW-01	Between the 1982 basin and Lake Julian	1982 Basin	Background	04/18/2018	**4.8**	<50	8.8	44	70	<1	NA	<5	**5.26**	<10	**711**	1.61	<0.2	<0.3	NA
GW-01 IMP	Between the 1982 basin and Lake Julian	1982 Basin	Background	07/10/2018	**4.8**	<50	8.9	56	98	<1	1.4	1.55	**5.8**	8.481 j	**775**	2.17	<0.2	**0.342 B2**	2.0418
GW-01	Between the 1982 basin and Lake Julian	1982 Basin	Background	07/10/2018	**4.8**	<50	8.6	56	91	<1	NA	<5	**6.01**	16	**791**	2.27	<0.2	<0.3	NA
GW-01BR	Between the 1982 basin and Lake Julian	1982 Basin	Background	02/06/2018	7.1	<50	1.5	5.2	99	<1	<0.025	<1	<1	224	30	<1	<0.2	**0.307**	NA
GW-01BR	Between the 1982 basin and Lake Julian	1982 Basin	Background	04/18/2018	7.5	<50	1.6	4.3	72	0.401 j	0.036	<1	<1	**993**	**65**	<1	0.138 j	**0.565**	NA
GW-01BR	Between the 1982 basin and Lake Julian	1982 Basin	Background	07/10/2018	7.6	<50	2	5.4	82	0.652 j	<0.025	0.769 j	<1	**824**	**78**	<1	<0.2	**0.923 B2**	NA
GW-01D	Between the 1982 basin and Lake Julian	1982 Basin	Background	02/06/2018	**5.2**	<50	3.7	1	33	<1	0.17	<1	<1	12	**69**	<1	<0.2	<0.3	NA
GW-01D	Between the 1982 basin and Lake Julian	1982 Basin	Background	04/18/2018	**5.1**	<50	4.5	1.2	<25	<1	0.13	<1	**1.08**	9.6 j	**96**	<1	0.143 j	0.172 j	NA
GW-01D	Between the 1982 basin and Lake Julian	1982 Basin	Background	07/10/2018	**4.7**	<50	5.3	1.7	<25	<1	0.13	0.34 j	**1.14**	24	**110**	<1	0.089 j	**0.447 B2**	NA
GW-02	SW of 1964 basin, NE of I-26	1964 Basin	Downgradient	02/07/2018	**5.6**	**2260**	200	130	**570**	<1	0.12	<1	**6.5**	28	**1380**	<1	<0.2	<0.3	0.35768
GW-02	SW of 1964 basin, NE of I-26	1964 Basin	Downgradient	04/18/2018	**5.7**	**2160**	170	110	**610**	<1	1.8	1.65	**6.36**	**460**	**1220**	0.412 j	0.132 j	**0.716**	2.168
GW-02	SW of 1964 basin, NE of I-26	1964 Basin	Downgradient	07/10/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GW-03	SW of 1964 basin, NE of I-26	1964 Basin	Downgradient	02/05/2018	**6.0**	**1580**	57	250	**580**	<1	1.5	1.91	**1.34**	**1010**	**670**	<1	<0.2	**1.01**	1.402
GW-03 CCR	SW of 1964 basin, NE of I-26	1964 Basin	Downgradient	02/05/2018	**6.0**	**1810**	72	**310**	**630**	<1	NA	1.39	**1.26**	NA	NA	<1	<0.2	NA	0.8421
GW-03	SW of 1964 basin, NE of I-26	1964 Basin	Downgradient	04/18/2018	**5.6**	**1470**	60	240	**520**	<1	1.4	1.67	0.376 j	**323**	**179**	1.02	<0.2	**0.376**	3.089
GW-03 CCR	SW of 1964 basin, NE of I-26	1964 Basin	Downgradient	04/18/2018	**5.6**	**1520**	53	220	460	<1	NA	1.74	0.4 j	NA	NA	0.716 j	<0.2	NA	1.103
GW-03	SW of 1964 basin, NE of I-26	1964 Basin	Downgradient	07/18/2018	**5.2**	**2020**	72	**300**	**720**	<1	1.7	1.88	**1.24**	**357**	**817**	0.966 j	0.099 j	**0.418**	2.772
GW-04	SW of 1964 basin, NE of I-26	1982 Basin	Downgradient	02/05/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GW-04	SW of 1964 basin, NE of I-26	1982 Basin	Downgradient	04/18/2018	**5.2**	**812**	4.8	130	200	<1	2.6	5.26	**1.62**	**3580**	**112**	0.54 j	0.151 j	**3.23**	**5.42**
GW-04	SW of 1964 basin, NE of I-26	1982 Basin	Downgradient	07/11/2018	**5.5**	609	5.3	110	190	<1	2	2.27	<1	**489**	**77**	0.82 j	0.123 j	**0.371**	4.546
GW-04	SW of 1964 basin, NE of I-26	1982 Basin	Downgradient	11/07/2018	**5.6**	**768**	7.4	110	170	<1	3.2 M6	3.54	<1	119	**69**	0.813 j	0.106 j	0.25 j	0.861
GW-05	Between Arden Dr and 1982 basin	1982 Basin	Downgradient	02/06/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GW-05	Between Arden Dr and 1982 basin	1982 Basin	Downgradient	07/11/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GW-05	Between Arden Dr and 1982 basin	1982 Basin	Downgradient	11/07/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-03BR	Between Arden Dr and 1982 basin	1982 Basin	Downgradient	04/26/2018	7.9	676	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-03D	Between Arden Dr and 1982 basin	1982 Basin	Downgradient	02/05/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-03D	Between Arden Dr and 1982 basin	1982 Basin	Downgradient	07/11/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-05BR	Between Arden Dr and 1982 basin	1982 Basin	Sidegradient	02/06/2018	6.7	371	5	120	250	<1	<0.025	<1	<1	**32400**	**197**	<1	<0.2	<0.3	NA
MW-05BR	Between Arden Dr and 1982 basin	1982 Basin	Sidegradient	04/18/2018	6.7	337	9	120	200	<1	<0.025	<1	<1	**33600**	**215**	<1	<0.2	<0.3	NA
MW-05BR	Between Arden Dr and 1982 basin	1982 Basin	Sidegradient	07/11/2018	**6.3**	327	8.7	110	240	<1	<0.025	<1	<1	**32800**	**202**	<1	0.11 j	<0.3	NA
MW-05BR	Between Arden Dr and 1982 basin	1982 Basin	Sidegradient	11/07/2018	6.8	303	8.7	110	190	<1	<0.025	0.998 j	**1.67**	**34700**	**271**	<1	<0.2	**1.49**	NA
MW-05D	Between Arden Dr and 1982 basin	1982 Basin	Sidegradient	02/06/2018	**4.0**	650	8.8	160	270	<1	0.047	<1	**19.9**	**1760**	**475**	2.95	<0.2	<0.3	NA
MW-05D	Between Arden Dr and 1982 basin	1982 Basin	Sidegradient	04/18/2018	**3.7**	661	8.3	210	240	<1	<0.025	<1	**19.8**	**1020**	**474**	3.48	0.093 j	0.111 j	NA
MW-05D	Between Arden Dr and 1982 basin	1982 Basin	Sidegradient	07/11/2018	**3.6**	672	8.1	210	280	<1	<0.025	<1	**16.1**	**3380**	**446**	2.81	0.126 j	<0.3	NA
MW-05D	Between Arden Dr and 1982 basin	1982 Basin	Sidegradient	11/07/2018	**3.8**	694	7.8	240	230	<1	<0.025	<1	**18.8**	**1230**	**448**	2.16	<0.2	<0.3	NA
MW-06BR	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	02/06/2018	8.4	171	5.7	68	180	<1	0.06	<1	<1	<10	6	<1	<0.2	**0.313**	0.4724
MW-06BR CCR	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	02/06/2018	8.4	171	5.6	68	180	<1	NA	<1	<1	NA	NA	<1	<0.2 B3	NA	-0.107
MW-06BR	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	04/19/2018	8.4	211	6.2	74	150	<1	<0.025	<1	<1	11	6	<1	<0.2	0.139 j	3.233
MW-06BR CCR	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	04/19/2018	8.4	216	6.2	75	180	<1	NA	<1	<1	NA	NA	<1	<0.2	NA	1.207
MW-06BR	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	07/11/2018	8.2	320	7.4	92	240	<1	<0.025	<1	<1	17	24	<1	<0.2	0.11 j	1.4762
MW-06BR	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	11/07/2018	6.8	80	5	170	260	<1	0.084	<1	**25.1**	**417**	**4910**	<1	<0.2	0.121 j	0.3207
MW-06BR CCR	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	11/07/2018	6.8	83	4.9	200	270	<1	NA	<1	**25.3**	NA	NA	<1	<0.2	NA	0.529
MW-06D	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	02/06/2018	**5.7**	**1320**	8.1	140	230	<1	0.028	<1	**4.95**	81	**4640**	<1	**0.248**	<0.3	0.724
MW-06D CCR	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	02/06/2018	**5.7**	**1340**	8	140	230	<1	NA	<1	**5.03**	NA	NA	<1	**0.248**	NA	0.45096
MW-06D	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	04/19/2018	**5.5**	**1320**	8.2	140	210	<1	0.029	<1	**5.42**	15	**5020**	<1	**0.359**	0.101 j	2.879
MW-06D CCR	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	04/19/2018	**5.5**	**1290**	8.4	140	230	<1	NA	<1	**5.22**	NA	NA	<1	**0.236**	NA	1.611
MW-06D	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	07/11/2018	**5.4**	**1200**	8.4	150	260	<1	<0.025	<1	**4.93**	38	**4660**	<1	**0.312**	0.15 j	0.79622
MW-06D	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	11/07/2018	**5.5**	**1110**	8.2	140	210	<1	0.047	<1	**4.84**	9.711 j	**4710**	<1	**0.246**	<0.3	4.103
MW-06D CCR	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	11/07/2018	**5.5**	**1090**	8.1	140	200	<1	NA	<1	**4.77**	NA	NA	<1	**0.242**	NA	3.152
MW-06S	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	02/06/2018	**5.6**	**935**	9	110	250	<1	0.031	<1	**6.94**	38	**7010**	<1	<0.2	<0.3	0.653
MW-06S CCR	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	02/06/2018	**5.6**	**965**	8.8	110	240	<1	NA	<1	**6.99**	NA	NA	<1	<0.2 B3	NA	0.2209
MW-06S	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	04/19/2018	**5.4**	**933**	9.1	120	220	<1	<0.025	<1	**7.67**	83	**6430**	0.367 j	0.19 j	0.229 j	4.645
MW-06S CCR	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	04/19/2018	**5.4**	**906**	9.3	120	250	<1	NA	<1	**6.96**	NA	NA	0.367 j	0.186 j	NA	2.173
MW-06S	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	07/11/2018	**5.3**	**977**	9.9	140	250	<1	<0.025	<1	**6.02**	11	**6700**	<1	0.149 j,B4	0.163 j	1.315
MW-06S	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	11/07/2018	**5.3**	**951**	9.9	130	200	<1	<0.025	0.588 j	**6.21**	**706**	**7190**	<1	0.167 j	**0.645**	0.863

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	PARAM	ED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)									IONUCLI
Reporting Units	S.U.	ug/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L
15A NCAC 02L Standard	6.5-8.5	700	250	250	500	1*	10	10	1*	300	50	20	0.2*	0.3*	5^
Provisional Background (Alluvial Unit)	4.6-5.1	50	15	4.6	56	1	0.42	5	4.29	598	363	1	0.2	0.3	4.17
Provisional Background (Saprolite Unit)	4.3-5.8	50	14	50	104.9	1	1.313	5	6.9	941	725	1.88	0.2	0.625	6.832
Provisional Background (Transition Unit)	3.9-7.0	50	6.7	5.467	72.77	1	0.261	1.32	4.608	779	380	1	0.2	0.41	6.61
Provisional Background (Bedrock Unit)	4.1-8.1	50	6.5	5.6	131.5	1	0.423	1.3	1	1246	93	1	0.2	0.632	5.8

					PARAM	ED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)									IONUCLI
Sample ID	Location Description	Associated Unit	Location with Respect to Groundwater Flow Direction	Sample Collection Date	pH	Boron	Chloride	Sulfate	Total Dissolved Solids	Antimony	Chromium (VI)	Chromium	Cobalt	Iron	Manganese	Selenium	Thallium	Vanadium	Total Radium
MW-06S CCR	SW of 1982 basin at toe of dam	1982 Basin	Downgradient	11/07/2018	5.3	980	10	130	200	<1	NA	0.477 j	6.03	NA	NA	<1	0.158 j	NA	2.754
MW-07BR	SW of 1964 basin	1964 Basin	Downgradient	04/26/2018	11.1	30.758 j	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-08BR	W of 1964 basin	1964 Basin	Downgradient	04/26/2018	9.0	53	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-08S	W of 1964 basin	1964 Basin	Downgradient	02/07/2018	6.1	4610	250	200	800	<1	<0.025	<1	1.82	<10	1840	<1	<0.2	<0.3	0.504
MW-08S	W of 1964 basin	1964 Basin	Downgradient	04/18/2018	6.2	4290	220	170	840	3.45	<0.025	<1	1.69	6.384 j	1780	0.805 j	<0.2	0.236 j	3.298
MW-08S	W of 1964 basin	1964 Basin	Downgradient	07/10/2018	6.1	5210	240	200	910	0.625 j	<0.025	<1	1.97	6.06 j	1960	0.819 j	<0.2	0.202 j	1.086
MW-09BR	Immediately NW of 1964 basin	1964 Basin	Downgradient	02/05/2018	6.5	2740	340	150	1500	<1	<0.025	<1	5.78	44100	1340	<1	<0.2	<0.3	13.5
MW-09BR CCR	Immediately NW of 1964 basin	1964 Basin	Downgradient	02/05/2018	6.5	2820	390	180	1500	<1	NA	<1	5.72	NA	NA	<1	<0.2	NA	14.29
MW-09BR	Immediately NW of 1964 basin	1964 Basin	Downgradient	04/17/2018	6.3	2550	330	150	1000	<1	<0.025	<1	1.74	42700	1270	<1	0.117 j	0.109 j	11.52
MW-09BR CCR	Immediately NW of 1964 basin	1964 Basin	Downgradient	04/17/2018	6.3	2680	340	160	960	<1	NA	<1	2.15	NA	NA	<1	<0.2	NA	7.88
MW-09BR	Immediately NW of 1964 basin	1964 Basin	Downgradient	07/09/2018	6.3	2550	320	160	1200	<1	<0.025	0.392 j	4.82	45300	1250	<1	<0.2	0.192 j	9.32
MW-09D	Immediately NW of 1964 basin	1964 Basin	Downgradient	02/05/2018	5.7	3610	150	150	780	<1	0.09	1.88	2.01	<10	1120	18.8	<0.2	<0.3	2.2846
MW-09D CCR	Immediately NW of 1964 basin	1964 Basin	Downgradient	02/05/2018	5.7	3810	170	160	780	<1	NA	1.98	2.04	NA	NA	19	<0.2	NA	1.3944
MW-09D	Immediately NW of 1964 basin	1964 Basin	Downgradient	04/17/2018	5.6	4020	160	150	570	<1	0.58 M1	1.8	2.77	6.059 j	1520	21.5	<0.2	0.168 j	1.57512
MW-09D CCR	Immediately NW of 1964 basin	1964 Basin	Downgradient	04/17/2018	5.6	4150	160	160	510	<1	NA	1.64	2.39	NA	NA	20.8	<0.2	NA	1.53
MW-09D	Immediately NW of 1964 basin	1964 Basin	Downgradient	07/09/2018	5.5	3660	150	160	650	<1	4.1	5.42	2.04	15	1340	20.6	0.128 j	0.231 j	0.7
MW-09S	Immediately NW of 1964 basin	1964 Basin	Downgradient	02/05/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-09S CCR	Immediately NW of 1964 basin	1964 Basin	Downgradient	02/05/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-09S	Immediately NW of 1964 basin	1964 Basin	Downgradient	07/09/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-10	SE of 1982 basin, S of Lake Julian	1982 Basin	Background	02/06/2018	5.1	<50	14	0.6	48	<1	0.3	<1	2.24	15	148	<1	<0.2	<0.3	0.402
MW-10	SE of 1982 basin, S of Lake Julian	1982 Basin	Background	04/18/2018	5.0	<50	13	0.55	<25	<1	0.3	0.452 j	1.88	20	131	<1	0.172 j	0.155 j	1.655
MW-10	SE of 1982 basin, S of Lake Julian	1982 Basin	Background	07/10/2018	4.5	<50	14	0.7	<25	<1	0.22	0.523 j	1.66	14	123	<1	0.176 j	0.414 B2	3.018
MW-10	SE of 1982 basin, S of Lake Julian	1982 Basin	Background	11/08/2018	4.9	<50	16	0.54	69	<1	0.42	0.816 j	1.52	13	114	<1	0.142 j	<0.3	1.193
MW-11	NW of 1964 basin, S of Powell Creek	1964 Basin	Downgradient	02/06/2018	5.5	<50	58	46	210	<1	2.4	4.08	<1	17 S1	52	<1	<0.2	<0.3	NA
MW-11	NW of 1964 basin, S of Powell Creek	1964 Basin	Downgradient	04/16/2018	5.5	<50	85	41	240	<1	4.3	5.02	<1	17	33	<1	<0.2	0.285 j	NA
MW-11	NW of 1964 basin, S of Powell Creek	1964 Basin	Downgradient	07/09/2018	4.9	<50	110	38	270	<1	3.4	8.26	0.501 j	31	59	<1	<0.2	0.287 j	NA
MW-11	NW of 1964 basin, S of Powell Creek	1964 Basin	Downgradient	11/12/2018	5.8	<50	89	33	250	<1	2	10.1	0.899 j	64	71	<1	<0.2	0.24 j	NA
MW-11D	NW of 1964 basin, S of Powell Creek	1964 Basin	Downgradient	02/06/2018	5.1	<50	170	12	390	<1	0.14 M1	<1	<1	11	182	<1	<0.2	<0.3	NA
MW-11D	NW of 1964 basin, S of Powell Creek	1964 Basin	Downgradient	04/16/2018	4.9	37.322 j	180	13	340	<1	0.18	<1	0.532 j	20	200	0.412 j	0.155 j	0.236 j	NA
MW-11D	NW of 1964 basin, S of Powell Creek	1964 Basin	Downgradient	07/09/2018	4.5	33.844 j	190	14	480	0.348 j	0.18	0.479 j	0.498 j	8.666 j	197	<1	0.088 j	0.344	NA
MW-11D	NW of 1964 basin, S of Powell Creek	1964 Basin	Downgradient	11/12/2018	5.0	34.503 j	190	9	370	<1	0.13	0.459 j	0.446 j	7.069 j	205	0.463 j	0.099 j	0.236 j	NA
MW-13BR	N of railroad tracks and 1964 basin	1964 Basin	Sidegradient	02/08/2018	5.4	<50	4.6	2.1	<25	<1	0.24	<1	<1	120 S1	19	<1	<0.2	<0.3 S1	NA
MW-13BR	N of railroad tracks and 1964 basin	1964 Basin	Sidegradient	04/19/2018	5.7	<50	5	2.2	<25	0.386 j	0.25	1.63	0.591 j	460	29	<1	<0.2	0.495	NA
MW-13BR	N of railroad tracks and 1964 basin	1964 Basin	Sidegradient	07/09/2018	4.7	<50	5.2	2.4	33	<1	0.24	0.63 j	0.453 j	65	18	<1	<0.2	0.358	NA
MW-13BR	N of railroad tracks and 1964 basin	1964 Basin	Sidegradient	11/08/2018	5.4	<50	5.2	2.2	46	<1	0.28	0.392 j	0.449 j	69	16	<1	<0.2	<0.3	NA
MW-13D	N of railroad tracks and 1964 basin	1964 Basin	Sidegradient	02/08/2018	6.6	<50	3.9	0.82	65	<1	<0.12 D3	<1	4.22	1700	489	<1	<0.2	<0.3	NA
MW-13D	N of railroad tracks and 1964 basin	1964 Basin	Sidegradient	04/19/2018	7.0	<50	4.4	0.67	66	<1	<0.025	0.355 j	3.23	2050	618	<1	<0.2	0.173 j	NA
MW-13D	N of railroad tracks and 1964 basin	1964 Basin	Sidegradient	07/09/2018	6.6	<50	4.9	1.5	91	<1	<0.025	0.554 j	2.89	1460	476	<1	<0.2	0.515	NA
MW-13D	N of railroad tracks and 1964 basin	1964 Basin	Sidegradient	11/08/2018	6.9	<50	4.7	0.88	120	<1	<0.025	<1	1.59	1240	514	<1	<0.2	<0.3	NA
MW-14BR	Along access road N of NPDES stilling pond	1964 Basin	Sidegradient	02/06/2018	6.9	113	3.4	110	260	<1	0.082	<1	<1	108	14	6.16	<0.2	0.609	NA
MW-14BR	Along access road N of NPDES stilling pond	1964 Basin	Sidegradient	04/17/2018	6.8	216	4.5	120	260	<1	0.19	<1	<1	29	2.694 j	6.3	<0.2	0.429	NA
MW-14BR	Along access road N of NPDES stilling pond	1964 Basin	Sidegradient	07/09/2018	6.5	185	4.3	120	280	<1	0.22	0.416 j	<1	26	5	6.52	<0.2	0.551	NA
MW-14BR	Along access road N of NPDES stilling pond	1964 Basin	Sidegradient	11/08/2018	6.7	162	4.3	99	270	<1	0.081	<1	<1	58	8	4.44	<0.2	0.377	NA
MW-15A	NW of 1964 basin, S of MW-11	1964 Basin	Downgradient	02/06/2018	5.0	84	58	3.4	110	<1	0.22	<1	<1	43	549	<1	<0.2	<0.3	1.037
MW-15A	NW of 1964 basin, S of MW-11	1964 Basin	Downgradient	04/16/2018	4.8	82	53	4.2	93	<1	<0.025	<1	0.838 j	49	486	<1	<0.2	0.276 j	2.333
MW-15A	NW of 1964 basin, S of MW-11	1964 Basin	Downgradient	07/16/2018	4.7	129	51	3.7	110	<1	<0.025	<1	0.98 j	21	364	<1	0.144 j	0.349	2.288
MW-15A	NW of 1964 basin, S of MW-11	1964 Basin	Downgradient	11/12/2018	5.0	106	65	3.6	120	<1	<0.025	<1	0.885 j	58	431	<1	0.109 j	0.156 j	2.54
MW-15BR	NW of 1964 basin, S of MW-11	1964 Basin	Downgradient	04/26/2018	11.4	<50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-15BRL	NW of 1964 basin, S of MW-11	1964 Basin	Downgradient	01/09/2018	7.4	<50	11	5.4	180	<1	<0.025	<1	<1	54	451	<1	<0.2	0.861	0.53
MW-15BRL	NW of 1964 basin, S of MW-11	1964 Basin	Downgradient	04/16/2018	7.0	26.569 j	10	3.6	140	<1	<0.025	<1	0.715 j	220	318	0.385 j	<0.2	0.67	NA
MW-15BRL	NW of 1964 basin, S of MW-11	1964 Basin	Downgradient	07/16/2018	6.9	21.363 j	11	3.6	140	<1	<0.025	<1	0.482 j	116	155	0.337 j	<0.2	0.796	4.414
MW-15BRL	NW of 1964 basin, S of MW-11	1964 Basin	Downgradient	11/12/2018	7.9	20.085 j	12	3.4	130	0.468 j	<0.025	<1	<1	51	67	0.588 j	<0.2	0.627	0.487
MW-15D	NW of 1964 basin, S of MW-11	1964 Basin	Downgradient	02/06/2018	6.0	<50	8.1	0.32	84	<1	0.2	<1	<1	51	10	<1	<0.2	0.747	0.885
MW-15D	NW of 1964 basin, S of MW-11	1964 Basin	Downgradient	04/16/2018	5.8	<50	12	0.36	60	<1	0.22	0.365 j	<1	56	10	<1	<0.2	0.822	0.8914
MW-15D	NW of 1964 basin, S of MW-11	1964 Basin	Downgradient	07/16/2018	5.6	<50	17	0.33	85	<1	0.19	0.408 j	<1	24	8	<1	<0.2	0.841	4.718
MW-15D	NW of 1964 basin, S of MW-11	1964 Basin	Downgradient	11/12/2018	6.0	<50	16	0.34	83	<1	0.18 M1	0.42 j	<1	25	10	<1	0.134 j	0.59	1.52
MW-16A	W of 1964 basin, S of MW-15A	1964 Basin	Downgradient	02/06/2018	5.0	518	92	53	240	<1	0.089	<1	1.52	79	816	<1	<0.2	<0.3	0.764
MW-16A	W of 1964 basin, S of MW-15A	1964 Basin	Downgradient	04/16/2018	4.8	453	90	55	220	<1	0.045	<1	1.64	152	797	<1	0.111 j	0.182 j	4.337
MW-16A	W of 1964 basin, S of MW-15A	1964 Basin	Downgradient	07/16/2018	4.7	537	92	61	250	<1	0.03	<1	1.49	48	765	<1	<0.2	0.147 j	2.089
MW-16A	W of 1964 basin, S of MW-15A	1964 Basin	Downgradient	11/12/2018	4.8	621	78	46	200	<1	<0.025	<1	1.42	101	646	<1	<0.2	0.167 j	2.53
MW-16BR	W of 1964 basin, S of MW-15A	1964 Basin	Downgradient	02/06/2018	5.9	210	110	40	320	<1	0.053	<1	<1	55000	727	<1	<0.2	<0.3	0.9542
MW-16BR	W of 1964 basin, S of MW-15A	1964 Basin	Downgradient	04/16/2018	5.8	198	120	51	300	<1	<0.025	0.809 j	0.955 j	61400	754	<1	0.122 j	0.154 j	4.19
MW-16BR	W of 1964 basin, S of MW-15A	1964 Basin	Downgradient	07/16/2018	5.5	230	110	52	350	<1	<0.025	0.792 j	1.74	53300	733	<1	0.222	0.484	3.17
MW-16BR	W of 1964 basin, S of MW-15A	1964 Basin	Downgradient	11/12/2018	5.8	250	110	49	330	<1	<0.025	1.22	0.547 j	52500	708	<1	<0.2	<0.3	4.57
MW-16BRL	W of 1964 basin, S of MW-15A	1964 Basin	Downgradient	01/09/2018	5.4	743	120	53	320	<1	<0.025	<1	9.24	38400	868	<1	<0.2	<0.3	1.75
MW-16BRL	W of 1964 basin, S of MW-15A	1964 Basin	Downgradient	04/16/2018	5.1	756	110	69	320	<1	<0.025	<1	7.29	40500	730	0.547 j	<0.2	0.222 j	NA
MW-16BRL	W of 1964 basin, S of MW-15A	1964 Basin	Downgradient	07/16/2018	5.0	603	96	82	310	<1	<0.025	<1	8.13	32500	942	0.451 j	<0.2	0.124 j	3.66
MW-16BRL	W of 1964 basin, S of MW-15A	1964 Basin	Downgradient	11/14/2018	6.6	336	110	70	350	<1	<0.025	<1	4.76	35200	1060	<1	<0.2	0.155 j	1.847
MW-16BRLL	W of 1964 basin, S of MW-15A	1964 Basin	Downgradient	11/12/2018	6.9	345	74	49	310	<1	<0.025	<1	2.65	16700	828	<1	<0.2	<0.3	2.475
MW-16D	W of 1964 basin, S of MW-15A	1964 Basin	Downgradient	01/09/2018	4.7	368	110	56	300	<1	<0.025	<1	3.93	37900	602	<1	<0.2	0.346	3.23
MW-16D	W of 1964 basin, S of MW-15A	1964 Basin	Downgradient	04/16/2018	4.8	408	110	57	270	<1	<0.025	<1	3.67	34200	709	<1	<0.2	0.252 j	NA
MW-16D	W of 1964 basin, S of MW-15A	1964 Basin	Downgradient	07/16/2018	4.4	739	78	98	250	<1	<0.025 M1,R1	<1	2.61	10100	484	2.63	<0.2	0.159 j	NA

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	PARAM	ED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)									IONUCLI
Reporting Units	**S.U.**	**ug/L**	**mg/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**pCi/L**
15A NCAC 02L Standard	**6.5-8.5**	**700**	**250**	**250**	**500**	**1***	**10**	**10**	**1***	**300**	**50**	**20**	**0.2***	**0.3***	**5^**
Provisional Background (Alluvial Unit)	**4.6-5.1**	**50**	**15**	**4.6**	**56**	**1**	**0.42**	**5**	**4.29**	**598**	**363**	**1**	**0.2**	**0.3**	**4.17**
Provisional Background (Saprolite Unit)	**4.3-5.8**	**50**	**14**	**50**	**104.9**	**1**	**1.313**	**5**	**6.9**	**941**	**725**	**1.88**	**0.2**	**0.625**	**6.832**
Provisional Background (Transition Unit)	**3.9-7.0**	**50**	**6.7**	**5.467**	**72.77**	**1**	**0.261**	**1.32**	**4.608**	**779**	**380**	**1**	**0.2**	**0.41**	**6.61**
Provisional Background (Bedrock Unit)	**4.1-8.1**	**50**	**6.5**	**5.6**	**131.5**	**1**	**0.423**	**1.3**	**1**	**1246**	**93**	**1**	**0.2**	**0.632**	**5.8**

					PARAM	ED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)									IONUCLI
Sample ID	**Location Description**	**Associated Unit**	**Location with Respect to Groundwater Flow Direction**	**Sample Collection Date**	**pH**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Manganese**	**Selenium**	**Thallium**	**Vanadium**	**Total Radium**
MW-16D	W of 1964 basin, S of MW-15A	1964 Basin	Downgradient	11/12/2018	**5.4**	601	96	61	280	<1	<0.025	<1	**3.37**	**36200**	**756**	<1	<0.2	<0.3	NA
MW-17A	W of 1964 basin, N of CB-07	1964 Basin	Downgradient	02/06/2018	**4.6**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.582
MW-17A	W of 1964 basin, N of CB-07	1964 Basin	Downgradient	02/07/2018	NM	**3050**	**440**	250	**1200**	<1	<0.025	<1	**5.44**	**27500**	**3090**	<1	<0.2	<0.3	NA
MW-17A	W of 1964 basin, N of CB-07	1964 Basin	Downgradient	04/17/2018	**5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.964
MW-17A	W of 1964 basin, N of CB-07	1964 Basin	Downgradient	04/18/2018	NM	**3000**	**370**	**320 M2**	**1000**	<1	<0.025	1.4	**6.39**	**6760**	**3390**	<1	0.132 j	**2.5**	NA
MW-17A	W of 1964 basin, N of CB-07	1964 Basin	Downgradient	07/16/2018	**5.7**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.944
MW-17A	W of 1964 basin, N of CB-07	1964 Basin	Downgradient	07/17/2018	**5.7**	**3250**	**350**	**280**	NA	<1	<0.025	0.353 j	**5.06**	**18100**	**2900**	<1	0.185 j	**0.649**	NA
MW-17A	W of 1964 basin, N of CB-07	1964 Basin	Downgradient	11/13/2018	**5.2**	**3030**	**290**	240 M2	**920**	<1	<0.025	0.534 j	**4.16**	**5730**	**2420**	<1	0.154 j	0.205 j	1.137
MW-17BRL	W of 1964 basin, N of CB-07	1964 Basin	Downgradient	01/09/2018	6.9	408	46	**730**	**1300**	<1	<0.025	<1	<1	**2880**	**2190**	<1	<0.2	**0.491**	**8.93**
MW-17BRL	W of 1964 basin, N of CB-07	1964 Basin	Downgradient	04/17/2018	7.0	361	26	**820**	**1400**	<1	<0.025	<1	<1	**2510**	**2250**	<1	0.148 j	0.146 j	NA
MW-17BRL	W of 1964 basin, N of CB-07	1964 Basin	Downgradient	07/16/2018	6.8	343	32	**660**	**1200**	<1	<0.025	<1	<1	**1820**	**2100**	<1	<0.2	0.255 j	4.63
MW-17BRL	W of 1964 basin, N of CB-07	1964 Basin	Downgradient	11/13/2018	7.3	302	21	**770**	**1300**	<1	<0.025	<1	<1	**2050**	**2150**	<1	<0.2	0.221 j	**6**
MW-18BR	Approx. 1000 ft NE of CB-06	1964 Basin	Downgradient	02/07/2018	**5.5**	**953**	110	**360**	**670**	<1	<0.025	<1	**1.18**	<10	**233**	<1	<0.2	<0.3	1.072
MW-18BR	Approx. 1000 ft NE of CB-06	1964 Basin	Downgradient	04/16/2018	**5.5**	**950**	92	**330**	**660**	<1	<0.025	<1	**1.45**	4.323 j	**246**	0.912 j	<0.2	0.26 j	1.726
MW-18BR	Approx. 1000 ft NE of CB-06	1964 Basin	Downgradient	07/17/2018	**5.3**	**972**	95	**360**	**720**	<1	0.043	<1	**1.35**	6.782 j	**252**	0.741 j	<0.2	0.208 j	1.968
MW-18BR	Approx. 1000 ft NE of CB-06	1964 Basin	Downgradient	11/13/2018	**5.5**	**915**	96	**340**	**660**	<1	<0.025	<1	**1.3**	24	**234**	0.87 j	<0.2	**0.436**	1.778
MW-18BRL	Approx. 1000 ft NE of CB-06	1964 Basin	Downgradient	02/07/2018	7.4	<50	5.4	**280**	360	<1	0.14	<1	<1	113	**227**	<1	<0.2	<0.3	1.513
MW-18BRL	Approx. 1000 ft NE of CB-06	1964 Basin	Downgradient	04/16/2018	7.6	26.164 j	5.1	200	360	<1	0.13 M1	<1	<1	101	**239**	<1	<0.2	0.27 j	**5.21**
MW-18BRL	Approx. 1000 ft NE of CB-06	1964 Basin	Downgradient	07/17/2018	7.3	22.096 j	4.2	220	400	<1	0.037	<1	<1	73	**281**	<1	<0.2	0.194 j	3.123
MW-18BRL	Approx. 1000 ft NE of CB-06	1964 Basin	Downgradient	11/13/2018	7.8	21.474 j	3.8	220	370	<1	0.067	<1	<1	69	**272**	<1	<0.2	0.277 j	3.31
MW-18D	Approx. 1000 ft NE of CB-06	1964 Basin	Downgradient	02/07/2018	**5.7**	**896**	110	**350**	**640**	<1	<0.025	<1	**2.13**	**448**	**418**	<1	<0.2	<0.3	0.6196
MW-18D	Approx. 1000 ft NE of CB-06	1964 Basin	Downgradient	04/16/2018	**5.6**	**879**	91	**320**	**620**	<1	<0.025	<1	**1.68**	**317**	**328**	0.683 j	<0.2	0.19 j	1.375
MW-18D	Approx. 1000 ft NE of CB-06	1964 Basin	Downgradient	07/17/2018	**5.3**	**927**	94	**370**	**700**	<1	<0.025	<1	**1.61**	130	**344**	0.716 j	<0.2	0.168 j	1.214
MW-18D	Approx. 1000 ft NE of CB-06	1964 Basin	Downgradient	11/13/2018	**5.4**	**936**	93	**320**	**650**	<1	<0.025 M1,R1	<1	**1.66**	194	**264**	0.994 j	0.103 j	**0.372**	1.181
MW-19BR	Approx. 1000 ft NE of CB-05	1964 Basin	Downgradient	04/26/2018	**10.6**	52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-20A	Open wetlands, S of CB-06, N of CB-05	1982 Basin	Downgradient	02/08/2018	**6.3**	572	17	**260**	180	<1	<0.25 D3	<1	**3.55**	**14100**	**5970**	8.86	<0.2	**0.346**	NA
MW-20A	Open wetlands, S of CB-06, N of CB-05	1982 Basin	Downgradient	04/17/2018	**6.4**	615	17	250	430	<1	<0.025	<1	**2.34**	**17900**	**6420**	2.26	<0.2	0.17 j	NA
MW-20A	Open wetlands, S of CB-06, N of CB-05	1982 Basin	Downgradient	07/18/2018	**6.2**	**702**	14	150	400	<1	0.049	<1	**1.48**	**25100**	**8170**	0.555 j	0.136 j	0.258 j	NA
MW-20A	Open wetlands, S of CB-06, N of CB-05	1982 Basin	Downgradient	11/19/2018	**6.3**	264	10	150	270	<1	<0.025	<1	**1.31**	**7380**	**3180**	<1	<0.2	0.127 j	NA
MW-20BR	Open wetlands, S of CB-06, N of CB-05	1982 Basin	Downgradient	01/09/2018	6.9	233	11	**800**	**1300**	<1	<0.025	<1	**4.96**	**87000 B3**	**8560**	<1	<0.2	<0.3	**15.13**
MW-20BR	Open wetlands, S of CB-06, N of CB-05	1982 Basin	Downgradient	03/23/2018	6.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**13.99**
MW-20BR	Open wetlands, S of CB-06, N of CB-05	1982 Basin	Downgradient	04/17/2018	6.9	255	10	**750**	**1100**	<1	<0.025	<1	**5.01**	**73500**	**9150**	<1	<0.2	<0.3	NA
MW-20BR	Open wetlands, S of CB-06, N of CB-05	1982 Basin	Downgradient	07/18/2018	6.8	281	10	**700**	**1100**	<1	<0.025	<1	**7.19**	**69000**	**9620**	<1	<0.2	0.174 j	**13.34**
MW-20BR	Open wetlands, S of CB-06, N of CB-05	1982 Basin	Downgradient	11/19/2018	6.5	309	11	**640**	**1000**	<1	<0.025	<1	**8.28**	**70300**	**10200**	<1	<0.2	<0.3	2.135
MW-21D	SW of 1982 basin, NE of MW-22BR/D	1982 Basin	Downgradient	02/08/2018	**5.2**	81	29	23	76	<1	<0.12 D3	<1	**1.66**	**1720**	**238**	<1	<0.2	<0.3	0.626
MW-21D	SW of 1982 basin, NE of MW-22BR/D	1982 Basin	Downgradient	04/19/2018	**5.1**	77	34	24	86	<1	0.046	0.427 j	**1.26**	**1800**	**235**	<1	0.095 j	0.192 j	2.705
MW-21D	SW of 1982 basin, NE of MW-22BR/D	1982 Basin	Downgradient	07/10/2018	**4.8**	79	33	30	85	<1	0.032 M1,R1	0.479 j	**1.52**	**1570**	**248**	0.443 j	<0.2	0.181 j	4.482
MW-21D	SW of 1982 basin, NE of MW-22BR/D	1982 Basin	Downgradient	11/08/2018	**5.3**	81	32	23	120	<1	<0.025	<1	0.852 j	**1020**	**237**	<1	<0.2	<0.3	1.221
MW-22BR	SW of 1982 basin,in I-26 right-of-way	1982 Basin	Sidegradient	02/08/2018	**5.9**	<50	54	16	150	<1	<0.12 D3	<1	<1	**17000**	**422**	<1	<0.2	<0.3	2.038
MW-22BR	SW of 1982 basin,in I-26 right-of-way	1982 Basin	Sidegradient	04/19/2018	**5.7**	<50	58	17	150	<1	0.045	<1	0.345 j	**15800**	**431**	<1	<0.2	0.12 j	4.09
MW-22BR	SW of 1982 basin,in I-26 right-of-way	1982 Basin	Sidegradient	07/10/2018	**6.3**	<50	54	18	140	<1	<0.025	<1	0.36 j	**17300**	**372**	<1	0.12 j	**0.497 B2**	**5.503**
MW-22BR	SW of 1982 basin,in I-26 right-of-way	1982 Basin	Sidegradient	11/08/2018	**6.0**	<50	60	16	190	<1	<0.025	<1	0.434 j	**15900**	**409**	<1	<0.2	0.208 j	3.91
MW-22D	SW of 1982 basin,in I-26 right-of-way	1982 Basin	Sidegradient	02/08/2018	**5.1**	<50	47	9.4	94	<1	0.6	<1	<1	20	**159**	<1	<0.2	<0.3	0.446
MW-22D	SW of 1982 basin,in I-26 right-of-way	1982 Basin	Sidegradient	04/19/2018	**5.0**	<50	51	8.8	100	<1	0.59	0.744 j	0.394 j	4.2 j	**160**	<1	**0.204**	0.166 j	1.791
MW-22D	SW of 1982 basin,in I-26 right-of-way	1982 Basin	Sidegradient	07/10/2018	**4.8**	<50	52	13	88	<1	0.61	1.11	0.387 j	4.789 j	**144**	<1	0.13 j	0.231 j	1.315
MW-22D	SW of 1982 basin,in I-26 right-of-way	1982 Basin	Sidegradient	11/08/2018	**4.9**	<50	55	9	120	<1	0.59	0.647 j	0.371 j	6.004 j	**168**	<1	0.144 j	0.192 j	1.044
MW-23BR	S of Arden Dr, N of New Rockwood Rd	1982 Basin	Sidegradient	02/08/2018	**9.6**	<50	6.3	23	210	<1	<0.12 D3	**17.9**	<1	**1870**	24	<1	<0.2	**3.78**	NA
MW-23BR	S of Arden Dr, N of New Rockwood Rd	1982 Basin	Sidegradient	04/19/2018	**9.0**	42.096 j	6	46	NA	**2.01**	0.096	2.31	<1	227	8	1.16	<0.2	**3.07**	NA
MW-23BR	S of Arden Dr, N of New Rockwood Rd	1982 Basin	Sidegradient	07/11/2018	8.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-23BR	S of Arden Dr, N of New Rockwood Rd	1982 Basin	Sidegradient	11/07/2018	8.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-23DL	S of Arden Dr, N of New Rockwood Rd	1982 Basin	Sidegradient	02/08/2018	7.1	<50	3.1	16	130	<1	<0.12 D3,M1	<1	<1	**7910**	**71**	<1	<0.2	<0.3	NA
MW-23DL	S of Arden Dr, N of New Rockwood Rd	1982 Basin	Sidegradient	04/19/2018	7.2	34.365 j	3.4	19	120	<1	<0.025	<1	<1	**12900**	**84**	<1	<0.2	<0.3	NA
MW-23DL	S of Arden Dr, N of New Rockwood Rd	1982 Basin	Sidegradient	07/11/2018	7.1	35.339 j	3.6	20	170	<1	<0.025 M1,R1	<1	<1	**10600**	**81**	<1	0.18 j	0.157 j	NA
MW-23DL	S of Arden Dr, N of New Rockwood Rd	1982 Basin	Sidegradient	11/07/2018	6.8	32.562 j	3.4	17	120	<1	<0.025	<1	<1	**10100**	**82**	<1	<0.2	<0.3	NA
MW-23DU	S of Arden Dr, N of New Rockwood Rd	1982 Basin	Sidegradient	02/08/2018	**5.5**	74	8	15	55	<1	0.21	<1	**1.5**	**374**	**99**	<1	<0.2	**0.331**	NA
MW-23DU	S of Arden Dr, N of New Rockwood Rd	1982 Basin	Sidegradient	04/19/2018	**5.7**	72	8.6	15	44	<1	0.2	<1	**1.73**	**506**	**113**	<1	0.11 j	0.269 j	NA
MW-23DU	S of Arden Dr, N of New Rockwood Rd	1982 Basin	Sidegradient	07/11/2018	**5.2**	71	8.7	14	86	<1	0.18	0.341 j	**1.46**	**352**	**93**	<1	0.141 j	0.237 j	NA
MW-23DU	S of Arden Dr, N of New Rockwood Rd	1982 Basin	Sidegradient	11/07/2018	**5.5**	69	8.3	15	43	<1	0.24	0.468 j	**1.19**	174	**106**	<1	<0.2	0.146 j	NA
MW-24BR	E of plant adjacent to Lake Julian	---	Background	04/26/2018	7.9	<50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-24S	E of plant adjacent to Lake Julian	---	Background	02/06/2018	**5.4**	<50	13	0.62	46	<1	0.28	<1	<1	46	**120**	<1	<0.2	<0.3	0.35
MW-24S	E of plant adjacent to Lake Julian	---	Background	04/18/2018	**4.9**	18.275 j	14	0.7	27	<1	0.28	<1	0.792 j	13	**122**	<1	0.123 j	0.162 j	3.248
MW-24S	E of plant adjacent to Lake Julian	---	Background	07/10/2018	**4.6**	<50	14	0.76	41	<1	0.3	0.403 j	0.782 j	5.592 j	**127**	<1	0.091 j	**0.425 B2**	1.576
MW-24S	E of plant adjacent to Lake Julian	---	Background	11/07/2018	**5.1**	<50	14	0.65	<25	<1	0.35	0.594 j	0.75 j	6.521 j	**117**	<1	<0.2	0.151 j	1.309
MW-25BR	E of FBR, SE of MW-17A	1964 Basin	Downgradient	01/09/2018	6.6	**866**	140	160	**580**	<1	<0.025	<1	<1	209	**164**	<1	<0.2	**0.812**	0.759
MW-25BR	E of FBR, SE of MW-17A	1964 Basin	Downgradient	04/16/2018	**6.3**	**885**	120	180	500	<1	<0.025	<1	0.791 j	**852**	**126**	<1	<0.2	**0.415**	NA
MW-25BR	E of FBR, SE of MW-17A	1964 Basin	Downgradient	07/17/2018	**6.2**	**934**	120	180	**620**	<1	0.052	<1	0.385 j	**560**	**95**	<1	<0.2	**0.51**	1.156
MW-25BR	E of FBR, SE of MW-17A	1964 Basin	Downgradient	11/14/2018	**6.5**	**955**	99	180	490	<1	<0.025	0.431 j	0.562 j	**636**	**87**	<1	<0.2	**0.444**	1.517
MW-25BRL	E of FBR, SE of MW-17A	1964 Basin	Downgradient	01/09/2018	6.9	617	89	**470**	**1100**	<1	<0.025	<1	**1.02**	**2840**	**3990**	<1	<0.2	**0.396**	**14.32**
MW-25BRL	E of FBR, SE of MW-17A	1964 Basin	Downgradient	04/16/2018	7.1	692	96	**550**	**1100**	<1	0.036	<1	<1	**1890**	**2480**	<1	<0.2	0.262 j	NA
MW-25BRL	E of FBR, SE of MW-17A	1964 Basin	Downgradient	07/17/2018	6.8	414	48	**670**	**1200**	<1	<0.025	<1	<1	**4210**	**5770**	<1	<0.2	0.188 j	**6.85**
MW-25BRL	E of FBR, SE of MW-17A	1964 Basin	Downgradient	11/14/2018	7.5	320	28	**770**	**1300**	<1	<0.025	<1	<1	**6120**	**6740**	<1	<0.2	**0.483**	**5.45**
MW-25S	E of FBR, SE of MW-17A	1964 Basin	Downgradient	01/09/2018	**5.5**	**1750**	210	140	**690**	<1	<0.025 M1	<1	**7.5**	131	**1870**	<1	<0.2	**0.479**	1.167

I/A

ASHEVILLE
01/24/2019
BRANDON RUSSO
TODD PLATING

	PARAM	ED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)									IONUCLI
Reporting Units	S.U.	ug/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L
15A NCAC 02L Standard	6.5-8.5	700	250	250	500	1*	10	10	1*	300	50	20	0.2*	0.3*	5^
Provisional Background (Alluvial Unit)	4.6-5.1	50	15	4.6	56	1	0.42	5	4.29	598	363	1	0.2	0.3	4.17
Provisional Background (Saprolite Unit)	4.3-5.8	50	14	50	104.9	1	1.313	5	6.9	941	725	1.88	0.2	0.625	6.832
Provisional Background (Transition Unit)	3.9-7.0	50	6.7	5.467	72.77	1	0.261	1.32	4.608	779	380	1	0.2	0.41	6.61
Provisional Background (Bedrock Unit)	4.1-8.1	50	6.5	5.6	131.5	1	0.423	1.3	1	1246	93	1	0.2	0.632	5.8

					PARAM	ED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)									IONUCLI
Sample ID	**Location Description**	**Associated Unit**	**Location with Respect to Groundwater Flow Direction**	**Sample Collection Date**	**pH**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Manganese**	**Selenium**	**Thallium**	**Vanadium**	**Total Radium**
MW-25S	E of FBR, SE of MW-17A	1964 Basin	Downgradient	04/16/2018	**5.3**	**1880**	190	150	**580**	<1	<0.025	<1	**3.54**	130	**1920**	<1	0.114 j	**0.412**	NA
MW-25S	E of FBR, SE of MW-17A	1964 Basin	Downgradient	07/17/2018	**5.0**	**2070**	180	130	**760**	<1	<0.025	<1	**2.59**	88	**1840**	<1	<0.2	**0.328**	NA
MW-25S	E of FBR, SE of MW-17A	1964 Basin	Downgradient	11/14/2018	**5.3**	**2110**	160	150	**580**	<1	0.029	0.336 j	**2.47**	109	**1790**	<1	<0.2	**0.345**	NA
MW-26BR	E of FBR, SE of CB-07	1964 Basin	Downgradient	11/14/2018	7.1	**973**	45	180	**510**	<1	<0.025	<1	0.379 j	**11200**	**1920**	<1	<0.2	0.278 j	4.72
MW-26BRL	E of FBR, SE of CB-07	1964 Basin	Downgradient	01/10/2018	6.8	533	33	150	410	<1	<0.025	<1	**3.77**	**20000**	**1760**	<1	<0.2 B3	**0.554**	4.97
MW-26BRL	E of FBR, SE of CB-07	1964 Basin	Downgradient	04/17/2018	6.8	642	33	150	400	<1	<0.025	<1	**2.65**	**23600**	**2220**	<1	<0.2	**0.394**	NA
MW-26BRL	E of FBR, SE of CB-07	1964 Basin	Downgradient	07/18/2018	**6.0**	**714**	38	180	390	<1	<0.025	<1	**3.18**	**19500**	**1610**	<1	<0.2	0.196 j	**8.79**
MW-26BRL	E of FBR, SE of CB-07	1964 Basin	Downgradient	11/14/2018	**13.1**	43.809 j	33	180	**1700**	**5.89**	1.3	5.66	0.433 j	131	15	1.33	<0.2	**28.1**	4.62
MW-26S	E of FBR, SE of CB-08	1964 Basin	Downgradient	01/10/2018	**5.8**	697	58	**350**	**640**	<1	<0.025	<1	**92.6**	**26300**	**14000**	<1	<0.2 B3	**0.705**	<RL
MW-26S	E of FBR, SE of CB-08	1964 Basin	Downgradient	04/17/2018	**5.8**	575	46	**270**	460	<1	<0.025	<1	**101**	**32300**	**10200**	<1	0.167 j	0.223 j	NA
MW-26S	E of FBR, SE of CB-08	1964 Basin	Downgradient	07/18/2018	**5.6**	662	46	**260**	470	<1	<0.025	<1	**83**	**30900**	**8840**	<1	**0.22**	**0.317**	NA
MW-26S	E of FBR, SE of CB-08	1964 Basin	Downgradient	11/13/2018	**5.7**	**710**	60	240	420	<1	<0.025	<1	**93.2**	**25500**	**9110**	<1	**0.242**	0.162 j	NA
P-103	On dam between 1964 and 1982 basins	1982 Basin	Sidegradient	02/08/2018	**5.4**	418	12	65	120	<1	<0.25 D3	**11.8**	**30.2**	**1940**	**11300**	<1	<0.2	**2.2**	NA
P-103	On dam between 1964 and 1982 basins	1982 Basin	Sidegradient	04/18/2018	**5.2**	477	13	76	140	<1	0.051	**44.4**	**27.4**	**940**	**11900**	<1	0.131 j	**0.67**	NA
P-103	On dam between 1964 and 1982 basins	1982 Basin	Sidegradient	07/10/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
P-103	On dam between 1964 and 1982 basins	1982 Basin	Sidegradient	11/14/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PRW-05	211 Sumner Dr	---	West of French Broad River	02/02/2018	6.6	<50	0.52	0.52	68	<1	0.12	<1	<1	192	<5	<1	<0.2	**1.26**	2.4368
PRW-10	206 Sumner Dr	---	West of French Broad River	02/19/2018	6.6	<50	0.89	1.6	69	<1	0.22	<1	<1	40	<5	<1	<0.2	**0.537**	NA
PZ-16	On dam between SW corners of 1964 and 1982 basins	1964 Basin	Sidegradient	04/26/2018	**6.2**	518	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PZ-17BRL	On dam SW of 1964 basin and W of 1982 basins	1964 Basin	Downgradient	01/10/2018	6.8	660	8.8	120	340	<1	<0.025	**20.2**	**10.3**	**670**	**2550**	8.9	<0.2 B3	**0.507**	1.79
PZ-17BRL	On dam SW of 1964 basin and W of 1982 basins	1964 Basin	Downgradient	04/18/2018	**6.3**	681	6.3	110	290	<1	<0.025	0.513 j	**5.75**	**941**	**2070**	4.03	<0.2	**0.408**	NA
PZ-17BRL	On dam SW of 1964 basin and W of 1982 basins	1964 Basin	Downgradient	07/11/2018	**6.4**	675	6	110	300	0.454 j	<0.025	<1	**2.74**	**477**	**1100**	8.5	0.171 j	**0.484**	2.664
PZ-17BRL	On dam SW of 1964 basin and W of 1982 basins	1964 Basin	Downgradient	11/07/2018	**6.3**	671	5.3	100	240	<1	0.044 M1	1.47	**1.79**	187	**577**	11.5	<0.2	**0.355**	2.032
PZ-17D	On dam SW of 1964 basin and W of 1982 basins	1964 Basin	Downgradient	02/05/2018	**6.0**	**711**	6	100	300	<1	0.037	<1	**1.34**	<10	**67**	15.5	<0.2	<0.3	1.42
PZ-17D CCR	On dam SW of 1964 basin and W of 1982 basins	1964 Basin	Downgradient	02/05/2018	**6.0**	**739**	6.1	120	290	<1	NA	<1	**1.15**	NA	NA	16.7	<0.2	NA	2.45
PZ-17D	On dam SW of 1964 basin and W of 1982 basins	1964 Basin	Downgradient	04/18/2018	**5.8**	**721**	5.5	110	260	<1	0.079	<1	0.475 j	4.737 j	14	19.8	<0.2	0.21 j	**5.09**
PZ-17D CCR	On dam SW of 1964 basin and W of 1982 basins	1964 Basin	Downgradient	04/18/2018	**5.8**	**754**	5.4	110	250	<1	NA	<1	0.438 j	NA	NA	**20.2**	<0.2	NA	0.607
PZ-17D	On dam SW of 1964 basin and W of 1982 basins	1964 Basin	Downgradient	07/10/2018	**6.0**	694	5.6	110	240	<1	0.088 M1,R1	<1	0.406 j	7.7 j	3.151 j	**20.2**	0.134 j	**0.396 B2**	1.987
PZ-17D	On dam SW of 1964 basin and W of 1982 basins	1964 Basin	Downgradient	11/07/2018	**6.0**	680	5.1	99	220	<1	0.11	<1	0.434 j	6.238 j	2.191 j	**20.6**	**0.332**	<0.3	2.025
PZ-17D CCR	On dam SW of 1964 basin and W of 1982 basins	1964 Basin	Downgradient	11/07/2018	**6.0**	698	5	100	220	<1	NA	<1	0.409 j	NA	NA	**21**	<0.2	NA	2.721
PZ-17S	On dam SW of 1964 basin and W of 1982 basins	1964 Basin	Downgradient	02/05/2018	**5.0**	52	2.1	18	59	<1	0.08	<1	**1.08**	164	32	8.92	<0.2	**0.46**	2.651
PZ-17S CCR	On dam SW of 1964 basin and W of 1982 basins	1964 Basin	Downgradient	02/05/2018	**5.0**	53	2.2	18	70	<1	NA	<1	<1	NA	NA	9.17	<0.2	NA	4.61
PZ-17S	On dam SW of 1964 basin and W of 1982 basins	1964 Basin	Downgradient	04/18/2018	**4.8**	48.204 j	2.1	19	28	<1	0.091	<1	0.711 j	20	30	8.96	0.104 j	0.169 j	3.3
PZ-17S CCR	On dam SW of 1964 basin and W of 1982 basins	1964 Basin	Downgradient	04/18/2018	**4.8**	47.292 j	4.1	17	45	<1	NA	0.354 j	0.674 j	NA	NA	8.78	<0.2	NA	2.331
PZ-17S	On dam SW of 1964 basin and W of 1982 basins	1964 Basin	Downgradient	07/10/2018	**5.3**	40.673 j	2.2	19	35	<1	0.067	1.01	0.562 j	28	25	8.27	0.109 j	**0.359 B2**	3.29
PZ-17S	On dam SW of 1964 basin and W of 1982 basins	1964 Basin	Downgradient	11/07/2018	**5.1**	44.616 j	2.2	17	30	<1	0.075	<1	0.992 j	19	32	8.8	0.098 j	0.117 j	3.05
PZ-17S CCR	On dam SW of 1964 basin and W of 1982 basins	1964 Basin	Downgradient	11/07/2018	**5.1**	43.955 j	2.2	16	25	<1	NA	<1	**1.05**	NA	NA	8.74	0.11 j	NA	2.83
PZ-19	W of 1982 basin	1982 Basin	Downgradient	02/05/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PZ-19	W of 1982 basin	1982 Basin	Downgradient	07/10/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PZ-19	W of 1982 basin	1982 Basin	Downgradient	11/07/2018	NM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

COLOR NOTES

Bold highlighted concentration indicates exceedance of the 15A NCAC 02L .0202 Standard or the IMAC. (Effective date for 15A NCAC 02L .0202 Standard and IMAC is April 1, 2013)

Turbidity of Sample ≥ 10 NTUs

Provisional Background Threshold Values reflect the values represented in the NCDEQ letter dated 10/11/2017.

Analytical data review has not been completed for this dataset.

ABBREVIATION NOTES	
BGS - below ground surface	mV - millivolts
BOD - Biologic Oxygen Demand	NA - Not available or Not Applicable
CB - Compliance Boundary	ND - Not detected
COD - Chemical Oxygen Demand	NE - Not established
Deg C - Degrees Celsius	NM - Not measured
DMAs - dimethylarsinic acid	NTUs - Nephelometric Turbidity Units
DUP - Duplicate	pCi/L - picocuries per liter
Eh - Redox Potential	PSRG - Primary Soil Remediation Goals
ft - Feet	RL - Reporting Limit
GPM - gallons per minute	SeCN - selnocynante
IMAC - Interim Maximum Allowable Concentrations. From the 15A NCAC 02L Standard, Appendix 1, April, 1, 2013.	SeMe (IV) - Selenomethionine
meq/100g - millequivalents per 100 grams	SPLP - Synthetic Precipitation Leaching Procedure
MDC - Minimum Detectable Concentration	S.U. - Standard Units
MeSe - Methylseleninic acid	TCLP - Toxicity Characteristic Leaching Procedure
mg/kg - milligrams per kilogram	ug/L - micrograms per liter
mg/L - milligrams per liter	ug/mL - microgram per milliliter
mg-N/L - Milligram nitrogen per liter	umhos/cm - micromhos per centimenter
MMAs - monomethylarsonic acid	Well Locations referenced to NAD83 and elevations referenced to NAVD88

mV - millivolts
NA - Not available or Not Applicable
ND - Not detected
NE - Not established
NM - Not measured
NTUs - Nephelometric Turbidity Units
pCi/L - picocuries per liter
PSRG - Primary Soil Remediation Goals
RL - Reporting Limit
SeCN - selnocynante
SeMe (IV) - Selenomethionine
SPLP - Synthetic Precipitation Leaching Procedure
S.U. - Standard Units
TCLP - Toxicity Characteristic Leaching Procedure
ug/L - micrograms per liter
ug/mL - microgram per milliliter
umhos/cm - micromhos per centimenter
Well Locations referenced to NAD83 and elevations referenced to NAVD88

I/A

Bednarcik Direct AGO Cross Ex. 8
Docket No. E-2, Sub 1219A

Hart Exhibit 52
Docket No. E-2, Sub 1219

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THE ELM CONSULTING GROUP INTERNATIONAL LLC

ENVIRONMENTAL AUDIT IN SUPPORT OF THE COURT APPOINTED MONITOR

Cape Fear Plant
Moncure, North Carolina
USA

October 2019

Final Report Issued To:

Duke Energy and the Court Appointed Monitor

Prepared By:

Advanced GeoServices Corp.
and
The Elm Consulting Group International LLC

TABLE OF CONTENTS

1.0 INTRODUCTION

Advanced GeoServices Corp. (AGC) and The Elm Consulting Group International LLC (Elm) (collectively, the Audit Team) are conducting environmental compliance audits (the Audits) of certain coal combustion residuals (CCR) management locations owned or operated by Duke Energy Business Services LLC, Duke Energy Carolinas, LLC, and Duke Energy Progress, Inc. (collectively, Duke Energy). The Audits are being conducted under the direction of Mr. Benjamin Wilson, the Court Appointed Monitor (CAM), pursuant to an Order issued by the U.S. District Court, Eastern District of North Carolina, in case numbers 5:15-CR-62-H, 5:15-CR-67-H, and 5:15-CR-68-H.

The scope of the Audits is set forth in the plea agreements entered into by Duke Energy and the United States in the above cases, the Court's judgments in these cases, and a written Audit scoping document agreed to by Duke Energy and the United States.

1.1 BACKGROUND INFORMATION

The subject of this report is the Audit completed at Duke Energy's Cape Fear Plant located in Moncure, Chatham County, North Carolina. The Audit was conducted on August 14 and 15, 2019, for a total of two days on-site. The Audit Team members were:

• Mr. Christopher Reitman, P.E. AGC	Project Director, Audit Team Leader, Sr. Subject Matter Expert (on-site)
• Mr. Joseph Cotier, CPEA, Elm	Sr. Environmental Auditor (on-site)
• Mr. Bernie Beegle, P.G., AGC	Sr. Subject Matter Expert (off-site)

The facility was represented by:

- Mr. Sharat Gollamudi , CCP System Owner, CCP Engineering
- Ms. Gretchen Schroeder, CCP Engineering
- Ms. Asha Sree, CCP Engineering
- Mr. Bobby Barnes, Manager, CCP Engineering
- Mr. Danny Wimberly, CCP Projects
- Mr. Issa Zarzar, General Manager, CCP Project Management
- Mr. Jon Stamas, EHS CCP Environmental Field Support
- Mr. Phil Orlowski, EHS CCP Health and Safety Field Support
- Ms. Joyce Dishmon, EHS CCP Permitting and Compliance
- Mr. Andrew Shull, EHS CCP Waste and Groundwater
- Mr. Randy Hart, Regulatory Affairs
- Mr. Shane Johnson, Environmental Rover, EHS CCP Compliance
- Mr. Steve Struble, Director, EHS CCP Compliance
- Mr. Keith Higgins, EHS CCP Compliance

1.2 FACILITY OVERVIEW

The Cape Fear Plant (the Cape Fear Facility) is located at 500 C P & L Road, in Moncure, Chatham County, North Carolina. Duke Energy personnel stated the Cape Fear Facility is a decommissioned coal-fired electric generating plant that contained six (6) units that produced a total of 400 megawatts of power. In addition to the six (6) coal-fired units, there were four (4) 15-megawatt gas turbine units added to make the steam for the 1 & 2 steam turbines. The generation of electrical power at the facility ended in 2012. Demolition of the remaining remnants of the power plant structures was completed over the last three (3) years.

1.2.1 Ash Management Activities

The following information regarding the five on-site ash basins was provided by Duke Energy or was contained in the Operations and Maintenance Manual for the Cape Fear Facility.

- 1956 Ash Basin – The 1956 Ash Basin has an area of approximately 12 acres and was formed by the 1956 Ash Basin Dam (NCDEQ ID No. CHATH-075). The 1956 Ash Basin Dam is an approximately 20-foot high earthen embankment and has a length of approximately 3,200 feet. The 1956 Ash Basin contains about 420,000 tons of CCR (which would be about 350,000 cubic yards at a 1.2 tons/cubic yard conversion factor utilized by Duke Energy). The 1956 Ash Basin is covered predominantly with hardwood and pine trees along with some grass. Normally, there is no standing water within the 1956 Ash Basin, and the Audit Team noted the basin was dry during the Audit.

- 1963 Ash Basin – The 1963 Ash Basin has an area of approximately 21 acres and was formed by the 1963 Ash Basin Dam (NCDEQ ID No. CHATH-076). The 1963 Ash Basin Dam is an approximately 22-foot high earthen embankment and has a length of approximately 4,000 feet. The 1963 Ash Basin contains about 860,000 tons of CCR. The 1963 Ash Basin is covered predominantly with hardwood and pine trees along with some grass. The 1963 Ash Basin during the Audit was dry during the Audit.

- 1970 Ash Basin – The 1970 Ash Basin has an area of approximately 30 acres and is formed by the 1970 Ash Basin Dam (NCDEQ ID No. CHATH-077). The 1970 Ash Basin Dam is an approximately 27-foot high earthen embankment and has a length of approximately 4,600 feet. The 1970 Ash Basin contains about 830,000 tons of CCR. There is a small area of standing water normally observed at the southeast corner of the basin near an outlet discharge structure. The 1970 Ash

Basin is covered predominantly with hardwood and pine trees along with some grass. At the time of the Audit, a small area of the 1970 Ash Basin had water with an estimated depth of three to four feet.

- 1978 Ash Basin – The 1978 Ash Basin, sometimes referred to as the West Ash Basin, has an area of approximately 35 acres and is formed by the 1978 Ash Basin Dam (NCDEQ ID No. CHATH-078). The 1978 Ash Basin Dam has an approximately 27-foot high earthen embankment. The 1978 Ash Basin contains about 900,000 tons of CCR. A portion at the southern end of the 1978 Ash Basin retains water near the discharge outlet structure. The 1978 Ash Basin is partially covered with trees and shrubs along with grass. The lower portion of the downstream slope of the dam parallel to the Drainage Canal is armored with riprap, and a small area (< 1 acre) within the 1978 Ash Basin was observed to have water in it during the Audit.

- 1985 Ash Basin – The 1985 Ash Basin, sometimes referred to as the East Ash Basin, has an area of approximately 60 acres and is formed by the 1985 Ash Basin Dam (NCDEQ ID No. CHATH-079). The 1985 Ash Basin Dam is an approximately 28-foot high earthen embankment. The 1985 Ash Basin contains about 2,820,000 tons of CCR. The southwest corner of the 1985 Ash Basin retains water near the discharge outlet structure. An interior Ash Stack is present within the 1985 Ash Basin and has a spray-on ash stabilizer (Ecogreen™). The 1985 Ash Basin is predominantly covered with grass. The lower portion of the downstream slope of the 1985 Ash Basin and southern portions of the upstream slope are armored with riprap. Water collecting in the southern end of the 1985 Ash Basin was being decanted at the time of the Audit. This water is generally made up of collected rainwater.

1.2.2 Environmental Permits and Programs

The Cape Fear Facility operates under a number of environmental permits and programs, including:

- **National Pollutant Discharge Elimination System (NPDES) Wastewater Permitting –** North Carolina Department of Environmental Quality (NCDEQ) issued NPDES Permit No. NC0003433 to the Cape Fear Facility with an effective date of September 1, 2011 and an expiration date of July 31, 2016 (the 2011 Permit). A timely permit renewal application package was submitted to NCDEQ on July 31, 2014. As it relates to ash management activities, the 2011 Permit covers:

  - Internal Outfall 001 - West Ash Basin discharge to Outfall 007;
  - Internal Outfall 003 - Once-through cooling water and stormwater with discharge to Outfall 007;
  - Internal Outfall 005 - East Ash Basin discharge to Outfall 007; and
  - Outfall 007 - Combined wastewater streams discharge to the Cape Fear River.

  Several updates to the July 31, 2014 NPDES permit renewal application were submitted to NCDEQ for review including a request for action submitted on February 22, 2016. The permit renewal application included a request for coverage for discharges from the Waste Water Treatment System that were authorized in accordance with a July 20, 2016 decant letter and the addition of outfalls for previously identified seeps. The most recent permit renewal application amendment was submitted to NCDEQ on March 1, 2018 and addressed discussion items from Duke Energy's meeting with NCDEQ on February 20, 2018, including clarifications on: use of the ash beneficiation plant; use of Outfalls 008 and 007 as they pertain to dewatering of the ash basins; potential plans to build an ash landfill at the Cape Fear Facility; and submittal of an updated groundwater compliance boundary map.

Part III.B of the 2011 Permit's "Other Requirements" section provided for implementation of groundwater monitoring if requested by NCDEQ. Under the previous permit the Cape Fear Facility operated a network of 11 compliance wells and 2 background wells for determining compliance with groundwater limits pursuant to 15A NCAC 02L.0200 and which were sampled three times per year. The last sampling event was completed in June 2018.

The renewed NPDES Permit No. NC0003433 was issued by NCDEQ on August 30, 2018 and became effective on October 1, 2018 (the 2018 Permit). The 2018 Permit carries an expiration date of June 30, 2023. As it relates to ash management activities, the 2018 Permit covers:

- Internal Outfall 001 – 1978 Basin emergency discharge of decant water to Outfall 007;
- Internal Outfall 005 – 1985 Basin emergency discharge of decant water to Outfall 007;
- Outfall 007 – Combined wastewater streams discharge to the Cape Fear River;
- Outfall 008 – Combined wastewater streams including decanting/ dewatering during discharge to the Cape Fear River after treatment (Outfall 008 functionally replaces Outfall 007, although Outfall 007 remains a viable outfall under the 2018 Permit.);
- Outfall 008A – 1963/1970 Basin emergency discharge of decant water to the Cape Fear River;

- Outfall 009 – episodic discharge of beneficiation operation waters to the Cape Fear River (At the time of the Audit, this outfall had not yet been constructed.); and
- Internal Outfall S-05 – combined flow from 2 French Drains to the Effluent Canal which discharges to Outfall 007.

Of note is the removal of the groundwater monitoring requirements from the 2018 Permit.

As required by the 2018 Permit, quarterly monitoring for November 2018 included a sample and analysis for chronic toxicity. The sample was collected from Outfall 007 on November 6, 2018. The sample failed (chronic toxicity is a "Pass/Fail" test depending on mortality of the test organisms). This was reported on the Cape Fear Facility electronic Discharge Monitoring Report (eDMR) for November 2018 that was submitted to NCDEQ on December 18, 2018. The comments section of the eDMR included a description of the Fail event. At the time, Duke Energy believed the "Fail" was caused by excessive flood waters from the Cape Fear River backing up into the effluent canal. The flooding was due to Hurricane Michael. Subsequent to this eDMR, NCDEQ issued a Notice of Violation (NOV) NC NOV-2019-TX-0010 to Duke Energy on February 12, 2019. There were no specific action items or civil penalties identified in the NOV for the Cape Fear Facility. Duke Energy responded to the NOV on March 4, 2019. Duke Energy discontinued discharge from Outfall 007 on the date it received the toxicity lab results, November 21, 2018. The 2018 Permit does require two consecutive months of sampling for toxicity if a fail is noted. The DMRs for December 2018 through June 2019 indicated no flow from Outfall 007, and therefore subsequent toxicity samples have not yet been collected. Duke Energy did collect an in-process wastewater sample for toxicity on December 6, 2018. This sample showed "Pass" for toxicity. Duke Energy has reportedly received no further correspondence from NCDEQ on the issue.

Duke Energy personnel anticipate that a Special Order by Consent (SOC) will be issued by the North Carolina Environmental Management Commission during 2019 and will likely include coverage of all non-constructed seeps at the Cape Fear Facility. The draft SOC was not available for review by the Audit Team at the time of the Cape Fear Facility Audit.

- **NPDES Industrial Stormwater Permitting** – NCDEQ issued individual stormwater permit No. NCS000574 to the Cape Fear Facility, which became effective May 27, 2016 and allows stormwater discharges to Shaddox Creek, which flows to the Cape Fear River. The permit has an expiration date of April 30, 2021. It covers outfalls SW-002 and SW-003 located along the railroad tracks and site access road, respectively. A Stormwater Pollution Prevention Plan (SWPPP) was implemented in July 2016.

- **NPDES Construction Stormwater Permitting** – NCDEQ has issued stormwater construction permits for activities related to the ash basins and CCR management at the Cape Fear Facility. These permits were issued by NCDEQ under its Stormwater General Permit for Construction Activities, No. NCG010000, and include the following:

  - CHATH-2017-009 was issued March 28, 2017 for the Groundwater Treatment Trench (seep mitigation);
  - CHATH-2018-008 was issued December 19, 2017 for Tree and Root Ball Removal; and
  - CHATH-2019-001 was issued June 27, 2019 for the CCP 1985 Basin Haul Road. Work on this project had not started at the time of the Audit.

  Erosion and Sediment Control Plans have been implemented for each permit.

- **Title V Permitting –** The Title V Permit No. 010157T29 was rescinded by NCDEQ on November 25, 2013. There is no air permit in place at the Cape Fear facility, and based on Audit Team observations, a permit is not required.

- **Spill Prevention, Control and Countermeasure (SPCC) Plan** – Based on current Cape Fear Facility activities, oil storage quantities, and observations made by the Audit team during the Audit, it appeared that the SPCC regulations were not applicable to the Cape Fear Facility. Total estimated oil storage was 1,052 gallons of diesel fuel for pumps located in the basins.

- **Tier II Reporting –** Hazardous chemicals inventory reporting on Tier II for 2018 was completed and submitted on February 5, 2019.

- **Waste Unit Compliance Boundaries** – NCDEQ issued a letter dated August 25, 2017 to Duke Energy regarding compliance boundaries for North Carolina coal ash facilities. On February 15, 2018, Duke Energy submitted to NCDEQ an updated compliance boundary map for the Cape Fear Facility that eliminated the 1956 Ash Basin, the 1963 Ash Basin, and the 1970 Ash Basin.

- **North Carolina Coal Ash Management Act of 2014 (CAMA) –** CAMA requires identification of drinking water supply wells within one half-mile of the facility, submission of Groundwater Assessment Plans, installation and multiple rounds of sampling from Assessment Wells, submission of Groundwater Assessment Reports summarizing groundwater investigations, submission of an Annual Groundwater Protection and Restoration Report, submission of Discharge Assessment Plans to characterize seeps, submission of a Groundwater Corrective Action Plan, and ash basin closure/removal. The required activities associated with these items have been completed in accordance with the schedule provided under CAMA.

CAMA allows for a modification of the current intermediate risk ranking and provides a potential closure extension of these basins until 2028 if specific dam improvements are completed and approved by NCDEQ and an alternative permanent local water supply is provided to local residents. However, Duke Energy has announced that the ash at the Cape Fear Facility will be beneficially used. The beneficial use will involve burning the ash to create a very low carbon residual material that can be utilized in cement. In accordance with CAMA, this would allow the closure date to be extended to December 31, 2029.

The NCDEQ-approved 2019 Interim Monitoring Plan for the Cape Fear Facility includes 61 monitoring wells sampled semi-annually and three (3) wells sampled quarterly. The CAMA groundwater results are reported on a quarterly basis.

On October 11, 2017, NCDEQ approved provisional background threshold values (PBTVs) for the Cape Fear Facility. Duke Energy submitted to the NCDEQ the Cape Fear Facility’s 2018 Groundwater Protection and Restoration Annual Report on January 25, 2019 and its 2018 Surface Water Protection and Restoration Annual Report on January 21, 2019. Duke Energy submitted to NCDEQ the 2018 Cape Fear CAMA Annual Report on July, 31, 2019

- **Federal Coal Combustion Residuals Rule (CCR Rule)** – Information provided by Duke Energy indicates that electricity has not been generated at the Cape Fear Facility since October 19, 2015 and that no CCR has been placed in any of the basins since that date. Therefore, the CCR Rule (40 CFR Part 257) does not apply to the Cape Fear Facility.

1.2.3 Dam and Other Structural Permits and Approvals

The 1956 Ash Basin Dam (CHATH-075), 1963 Ash Basin Dam (CHATH-076), 1970 Ash Basin Dam (CHATH-077), 1978 Ash Basin Dam (CHATH-078), and the 1985 Ash Basin Dam (CHATH-079) at the Cape Fear Facility are all associated with ash management operations. All five (5) dams referenced above have a high hazard classification under the North Carolina Dam Safety system. These dams were grandfathered under North Carolina's Session Law 2009-390 (Senate Bill 1004, effective January 1, 2010). Under this grandfathering, the original design of the dams is not subject to the current design standards for new construction, although modifications after the effective date may be subject to these standards.

NCDEQ Dam Safety personnel walked the 1956 Ash Basin on March 6, 2019 and noted in their March 19, 2019 Notice of Deficiency that a few areas of the slope eroded, leaving less than a two horizontal to one vertical (2H:1V) slope. NCDEQ also noted many large trees remain on the slope which should be removed to reduce erosion. On October 25, 2018, NDEQ approved a one-year extension on the requirements to remove trees on the slope. Duke Energy submitted a response to the NCDEQ letter on May 7, 2019 and identified their plan to monitor tree growth on basin slopes and to retain an engineer to develop plans to address the steep slope area.

Duke Energy submitted plans to NCDEQ to address slope erosion issues on July 23, 2019. Duke Energy personnel stated that their documentation shows that the observed conditions have not changed over the last four years. The Audit Team did not review the historical documentation or records referenced by Duke Energy.

NCDEQ identified similar vegetation and tree removal issues on the 1963 and 1970 Ash Basin Dams during their March 6, 2019 Site visit. Notices of Deficiencies were issued on March 19, 2019, and Duke Energy provided a similar response to NCDEQ on May 7, 2019, which stated their intention to continue to monitor the situation.

NCDEQ also completed inspections on the 1978 and the 1985 Ash Basins on March 6, 2019, and no deficiencies were noted.

On February 1, 2019, Chapter 15A Section 02K.0224 of the North Carolina Administrative Code (15A NCAC 02K.0224) was published in the North Carolina Register. These regulations created new standards for the CCR impoundments during specific flood events. Duke Energy met with NCDEQ to discuss these regulations on March 13, 2019 and completed analysis and submitted the results of the analysis to NCDEQ on July 10, 2019. The analysis showed the Cape Fear 1956, 1963, and 1970 Ash Basins, which are scheduled to be excavated, did not meet the new basin spillway requirements. Duke Energy is scheduled to meet with NCDEQ on August 21, 2019 to determine the applicability of these new regulations to the basins to be excavated. NCDEQ has previously noted these regulations were not applicable to portions of the basins being excavated at Dan River and did not note deficiencies associated with these new regulations during the March 6, 2019 inspection of the ash basins at the Cape Fear Facility.

1.2.4 CCR Management Projects and Other Facility Activities

Planning and installation of infrastructure is continuing regarding the operational and logistical details of beneficiation of the CCR ash material within the Cape Fear Facility basins. Commercial beneficiation is expected to start in late 2020. Beneficiation will be done using thermal treatment to remove carbon from the ash and make it more suitable for use in cement. Duke Energy is awaiting permits for haul roads to facilitate movement of ash across the site to the area designated for beneficiation.

Over the last year, the 1978 Ash Basin was decanted, a new outfall for discharge (Outfall 8) was installed, and decanting of the 1985 Ash Basin started. The Emergency Action Plan (EAP) was also activated for a Level 3 event (a slowly developing abnormal event), on February 6 and 7, 2019. The event was due to unusual historical animal burrows on the 1985 Ash Basin.

2.0 AUDIT SCOPE AND SUBJECT MATTER

The Audit was completed in accordance with the court documents and the Audit scoping document agreed to by Duke Energy and the United States. A description of the scope is provided as Attachment A. The Audit included ash management activities, including aspects of generation that affect the nature of the waste streams from the point of generation into surface impoundments or ash management basins, landfills, and/or storage piles. The Audit focused on the activities at the facility since the date of the last Audit which was August 15-16, 2018.

3.0 AUDIT FINDINGS

The following Findings at the Cape Fear Facility were identified by the Audit Team.

3.1 SEEPAGE UNDER THE CLEAN WATER ACT

Requirement – The Clean Water Act (CWA) prohibits the discharge from a point source of any pollutant into the waters of the United States except in compliance with a permit issued pursuant to the CWA under the National Pollutant Discharge Elimination System (NPDES) by the United States Environmental Protection Agency (EPA) or a state with an approved program. 33 U.S.C. §§ 1311(a) & 1342. NCDEQ implements an approved NPDES program in North Carolina under 15A NCAC 02H.0100 *et seq*. Additionally, under N.C.G.S.A. § 143-215.1(a), unauthorized discharges of a pollutant to waters of the State are a violation of North Carolina law.

Finding – The Audit Team reviewed documentation about observed seeps at the Cape Fear Facility that contain pollutants and that discharge from point sources through discrete conveyances to waters of the United States. While Duke Energy had requested these seeps be included in the new NPDES permit, these seeps were not authorized by the new NPDES permit and therefore constitute violations of the CWA, the NCDEQ NPDES permitting program, and N.C.G.S.A. § 143-215.1(a). Duke Energy expects these seeps to be covered under the new SOC described in the NPDES Wastewater Permitting discussion in Section 1.2.2 of this Audit Report. The seep conditions remain substantially the same as last year.

Point source discharges to surface waters were identified at Area of Wetness (AOW) sampling locations S-15 and S-16 in and around the 1963 Ash Basin present at the Cape Fear Facility. The locations of these discharges are shown on the figure provided in Attachment B. The discharges from S-15 and S-16, identified here as seeps, discharge directly to the Cape Fear River. S-16 includes the discharge from S-18. Sampling conducted during 2018 and 2019 showed these discharges contained pollutants including pH, boron, arsenic, nickel, sulfate, total dissolved solids

(TDS), and elevated hardness levels. A summary of the sampling results is provided on the table in Attachment B. Flow or dampness was located at other AOWs, but the flow rates were very low and the discharge could not be sampled accurately.

Duke Energy modified the discharge outlet point from S-16 during Spring/Summer 2017. This modification passively captures and treats the discharge to raise the pH to within the anticipated range of the expected NPDES permit. Duke anticipates that this modification will position S-16 to be in compliance at the time the new permit is issued.

However, at this time, the discharges from seeps S-15 and S-16 flow into the Cape Fear River, which is a water of both the State and the United States. The seeps contain pollutants, and the discharges are not authorized by the Cape Fear Facility's currently effective NPDES permit. Duke Energy reports that it and NCDEQ are developing a Special Order by Consent (SOC), which will cover non-constructed seeps (i.e., seeps that are not on or within the dam structure or that do not convey wastewater via a pipe or constructed channel directly to a receiving stream) at the facility. According to Duke Energy, the SOC will, among other things, commit Duke Energy to initiate and complete dewatering of the basins on a specified timeline, which is expected to eliminate or substantially reduce the seeps from the basin.

A new NPDES permit was issued and became effective on October 1, 2018. Seeps S-15 and S-16 were not covered by the NPDES permit. Duke Energy expects the seeps to be covered by a new SOC for the facility to be issued sometime over the next year.

3.2 EXCEEDANCES OF THE STATE GROUNDWATER QUALITY STANDARDS

Requirement – The State groundwater rules establish maximum contaminant levels for groundwater at or beyond the compliance boundaries for the ash basins. *See* 15A NCAC 02L.0202. 15A NCAC 02L.0103(d) provides that "[n]o person shall conduct or cause to be conducted, any activity which causes the concentration of any substance to exceed that specified" under the Class GA standards or the interim maximum acceptable concentrations (IMACs) established for groundwater quality pursuant to 15A NCAC 02L.0202. Further, under N.C.G.S.A. § 143-215.1(i), "[a]ny person … who is required to obtain an individual permit … for a disposal system under the authority of N.C.G.S.A. § 143-215.1 [water pollution control] … shall have a compliance boundary … beyond which groundwater quality standards may not be exceeded." *See also* 15A NCAC 02L.0102(3) (defining "compliance boundary" as "a boundary around a disposal system at and beyond which groundwater quality standards may not be exceeded").

In addition, under N.C.G.S.A. § 143-215.6A(a)(1), civil penalties may be assessed against any person who violates any standard established by the NCDEQ under the authority of N.C.G.S.A. § 143-214.1, which covers groundwater standards.

Finding – Constituents exceeding the standards for Class GA waters, established in 15A NCAC 02L.0202, were documented in monitoring wells located at or beyond the compliance boundaries for the 1978 Ash Basin and 1985 Ash Basin. Based on a review of the 2018 and 2019 CAMA groundwater monitoring analyses, pH, antimony, arsenic, boron, cobalt, iron, sulfate, TDS, vanadium, and manganese were observed to exceed the 02L or IMAC groundwater standards or the NCDEQ-approved PBTVs, if the PBTV was greater than the 02L or IMAC groundwater standards, one or more times at or beyond the compliance boundaries of the 1978 Ash Basin and the 1985 Ash Basin. A summary of the 2018 and 2019 CAMA groundwater monitoring results is presented in Attachment C to this report.

Duke Energy has stated its opinion that, pursuant to a September 2015 Settlement Agreement with the NCDEQ, "Duke Energy is not subject to any further financial penalties for exceedances of groundwater standards" and "Duke Energy is not subject to any further enforcement action based on exceedances of groundwater standards as long as it remains in substantial compliance with CAMA groundwater requirements."

The CAM has advised the Audit Team that the Audit scope does not include an evaluation of compliance with the September 2015 Settlement Agreement, and therefore the Audit Team does not take a position on Duke Energy’s opinion.

4.0 OPEN LINES OF INQUIRY

Open Lines of Inquiry are items identified by the Audit Team while on-site that, due to limited available information or the need for additional research, could not be determined as being in compliance or out of compliance. There were no Open Lines of Inquiry identified during the Audit.

5.0 AUDIT APPROACH

5.1 ON-SITE ACTIVITIES

During its time on-site, the Audit Team conducted an opening conference with facility personnel to discuss the scope of work and the plan for accomplishing necessary tasks while at the facility. A site tour of the coal ash management and program support areas was subsequently completed. Following the tour, the Audit Team conducted a review of pertinent files, interviews with facility representatives, and verification of facility activities related to the Environment Compliance Plans (ECPs), written programs, and permits. A debrief was conducted each Audit day to advise the facility representatives of Audit progress, open lines of inquiry, possible Audit findings, and needs for the next day. At the completion of the Audit, the Audit Team led a verbal discussion of draft Audit findings with facility representatives.

5.2 STANDARDS OF PRACTICE

The fieldwork portion of the Audit was conducted on August 14-15, 2019 with compliance reporting commencing May 14, 2015, the date of the court's judgments. The Audit focused on the activities at the facility since the date of the last Audit, which was August 15-16, 2018. The Audit was based on:

- Physical inspections of the facility;
- Examination of selected administrative and operating records made available by facility staff at the Audit Team's request;
- Interviews and discussions with key facility management and staff; and
- Verification procedures designed to assess the facility's application of, and adherence to, terms of the probation, environment laws and regulations, and site policies and procedures. In addition, the Audit Team reviewed the facility's adherence to good management practices.

The Audit followed established audit protocols and procedures. It should be understood that the Audit consisted of evaluating a sample of practices and was conducted over a short period of time. Efforts were made toward sampling major facets of environmental performance during the period under review. This method is intended to uncover major system deficiencies and the Audit may not have identified all potential problems.

To support the overall independence of the Audit process, the Audit included an auditing professional certified by the Board of Environmental, Health and Safety Auditor Certifications (BEAC). BEAC is an accredited professional certification board that issues the Certified Professional Environmental Auditor (CPEA) designation to qualified auditors. Under BEAC, auditor independence is a key criterion for the implementation of an effective third-party audit program. The Audit was implemented in accordance with the standards related to auditor independence.

The process by which the Audit was conducted was consistent with the general state of the art of environment auditing and the best professional judgment of the Audit Team. To conduct the Audit, the team implemented a formal approach, drawing on process guidance from both BEAC and the Auditing Roundtable (AR) guidance documents. Guidance documents included:

- *Standards for the Professional Practice of Environmental, Health and Safety Auditing*. Prepared by the Board of Environmental, Health and Safety Auditor Certifications, 2008.

- ISO 19011:2002 – Guidelines for Quality and/or Environmental Management Systems Auditing. Prepared by the International Organization for Standardization, 2002.

- Standard for the Design and Implementation of an Environmental, Health and Safety Audit Program. Prepared by The Auditing Roundtable, Inc., 1995.

- Minimum Criteria for the Conduct of Environmental, Health and Safety Audits, Prepared by The Auditing Roundtable, Inc.

5.3 REPRESENTATIVE SAMPLING

When confronted with a large population of data to review or equipment to inspect, the Audit Team employed representative sampling techniques to evaluate records over the Audit period requested, and as necessary, for physical inspection of some types of common equipment. The sample size for records reviews or equipment inspections required professional judgment.

The Audit Team's judgement considered the following:

- The outcome of the evaluation of the records sampled. If problems are found in the representative sample, more records may need to be examined to evaluate compliance status.
- Potential for or severity of non-compliance.
- The general appearance and observed practices of certain operating areas.
- Information obtained during an interview that indicates a potential problem.
- Other specific information or guidance from the CAM.
- Time available during the Audit.

The Audit Team also employed the following types of sampling techniques, depending upon the characteristics of a specific population:

- Random sampling – every item has an equal chance of being selected.
- Interval sampling – select every nth item, (e.g., every third manifest in chronological order as contained in facility files).
- Block sampling – auditor uses his/her judgment to select a specific block of items, (e.g., petroleum storage tank inspections from April to October).
- Stratified sampling – population is divided into groups, which are then sampled through random or judgmental techniques.

I/A

ATTACHMENT A

ATTACHMENT A
AUDIT SCOPE

A-1 GENERAL AUDIT SCOPE ITEMS

The general Audit scope items included:

- Review and evaluation of documentation for maintenance and repair of structures and equipment used for coal ash disposal,

- Review and evaluation of documentation of modifications, failures, leaks, damage, disrepair and other problems at the coal ash management units,

- Review and evaluation of documentation of efforts to correct failures, leaks, damage, disrepair and other problems where they determine that employee/contractor actions were likely a primary or contributing cause to a compliance finding,

- Review and evaluation of documentation of communication of the items above within the organization,

- Review and evaluation of documentation associated with the specific environmental compliance items described below and laws, regulations, and policies associated these items and

- Review of compliance with administrative aspects and regulatory submissions related to coal ash management-specific regulations, including:

–	Coal Combustion Residuals	40 CFR Part 257 Subpart D
–	NC Coal Ash Management Act of 2014	NC General Statutes Chapter 130A, Article 9

More specific items which were addressed in the Audits to comply with the General Audit Scope are described below.

A-2 SPECIFIC COMPLIANCE WITH THE ECP-NC

The following items related to specific ECP-NC compliance were reviewed as part of the Audit:

1. Verify maintenance and sufficient funding of corporate compliance organizations (ABSAT, CCP organization, National Ash Management Advisory Board). Where a root cause of a compliance finding appears in an auditor's judgment to result from inadequate funding, the AGC/ELM Audit Team will identify this in the Audit finding.

2. Verify timely production of satisfactory Compliance Officer (CO) reports to the CAM relating to the development, implementation, and enforcement of the ECP-NC. No auditing work is associated with this work at this time.

3. Evaluate existence and efficacy of toll-free hotline/e-mail inbox for violation reporting, including the appropriateness of the follow-up investigation and disposition of each reported matter. This requirement will be evaluated for the first year of audits and then reassessed.

4. Evaluate completion and efficacy of periodic notices (via Internet, Intranet, email, notices in employee work areas, and publication in community outlets) to employees and the public of the availability of the toll-free hotline and electronic mail inbox.

5. Evaluate training materials and curricula utilized in the mandated training program, particularly those tailored to employee's specific job descriptions, to determine whether it advances the goal of "ensuring that every domestic employee of Duke Energy Corporation and its wholly-owned or operated affiliates understands applicable compliance policies and is able to integrate the compliance objectives in the performance of his/her job." Ensure that the subjects specifically named in the plea agreements are covered by the training (namely, notice and reporting requirements in the event of a release or discharge and the safe and proper handling of pollutants, hazardous substances and/or wastes.)

6. Evaluate whether Defendants are using "Best Efforts" to comply with the obligations under the ECP-NC. Where the Audit Team makes compliance findings, the Audit Team will, upon request, provide their opinion on whether this best efforts standard applies, and if so, whether best efforts have been used.

7. Verify compliance at each facility with the specific procedures and protocols set forth in the ECP-NC.

A-3 SPECIFIC COMPLIANCE WITH OTHER PROVISIONS OF THE PLEA AGREEMENT

The following items related to specific items in the Plea Agreement were reviewed as part of the Audit:

1. Determine whether Defendants have opened, expanded, or reopened any coal ash or coal ash wastewater impoundment and, if so, verify that they are lined and do not allow unpermitted discharges of coal ash or coal ash wastewater to waters of the United States.

2. Verify that Defendants have determined the volume of wastewater and coal ash in each wet-storage coal ash impoundment in North Carolina as described in the plea agreements and that written or electronic records of this information is maintained in a location available to facility staff and employees responsible for making environmental or emergency reports.

3. Review citations/notices of violation/notices of deficiency related to violations of federal, state, or local law to assure that they have been properly relayed to the Court and, as appropriate under the plea agreements, determine their materiality.

4. Evaluate Defendants' efforts to close coal ash impoundments at Dan River, Riverbend, Asheville, and Sutton for legal compliance.

5. Note any observations made during the Audit that cause concern regarding the assets and/or security available to the Defendants to meet the obligations imposed by the Judgment in this case.

A-4 GENERAL ENVIRONMENTAL COMPLIANCE SUBJECT AREAS

The following items related to General Environmental Compliance were reviewed as part of the Audit:

1. Assess all waste streams from Duke Energy facilities with coal ash impoundments. Review Duke Energy's processes, procedures, and practices, as well as compliance with those processes, procedures, and practices, for:

    a. identifying waste streams (especially, but not limited to, waste streams with discharge points into bodies of water),
    b. identifying and communicating any modifications or changes, or potential modifications or changes, to waste streams,
    c. ensuring proper handling/disposal of waste streams,
    d. identifying, preventing, and mitigating any risks or hazards that could affect waste streams and/or the disposal of waste streams, and
    e. ensuring proper permitting for waste streams.

For Item 1.d., the Audit Team evaluated such risk/hazard issues where there were compliance findings associated with waste streams.

2. Review and evaluate documentation of:

    a. Maintenance and repair of structures and equipment related to coal ash disposal,
    b. Modification of the coal ash impoundments and related pollution prevention equipment and structures,
    c. Failures, leaks, damage, disrepair, and other problems,
    d. Communication of the information described in a-c within the organization, and

e. Efforts to correct failures, leaks, damage, disrepair, and other problems.

3. Assess the employees responsible for inspection, maintenance, and repair of coal ash basins and related structures and equipment. The assessment included an assessment of the workloads of such employees to assure that Duke Energy's facilities are adequately staffed. These assessments were made where the Audit Team determines that employee/contractor actions were likely a primary or contributing cause to a compliance finding.

4. Review the results and recommendations of any other Audits (internal or external/state mandated) and assess Duke Energy's implementation of those recommendations.

5. Review and assess Duke Energy's processes, procedures, and practices for identifying, communicating, and addressing problems and potential problems at its coal ash basins (leaks, unpermitted discharges, etc.).

6. Review and assess Duke Energy's policies, procedures, practices, and equipment for handling emergency releases from its coal ash basins and evaluate the personnel with duties in such situations.

7. Verify that Duke Energy is complying with its NPDES wastewater and stormwater permits, as well as other relevant environmental permits. This should include verifying Duke Energy's timely submission of permit applications, permit renewal applications, and responses to requests for additional information from the relevant regulatory authority.

8. Review and assess any actions or measures Duke Energy has undertaken to assure accountability and prevent recurrences when problems and/or failures occur (i.e. disciplinary actions, re-training, revision to policies and procedures, etc.). This

review will be completed where the Audit Team determines that employee/contractor actions were likely a primary or contributing cause to a compliance finding.

9. Review and assess compliance with the following environmental regulations, as applicable to the management of coal ash:

a.	Wastewater Discharges	40 CFR 122; 15A NCAC 2H.0100 *et seq.*
b.	Stormwater Discharges	40 CFR 122.26; 15A NCAC 2H.1000 *et seq.;* NC General Permit (Construction) No. NCG010000
c.	NC Groundwater Standards	15A NCAC 02L.0202(h)
d.	Hazardous Waste Management	15A NCAC 13A.0100 to 13A.0107
e.	Oil Pollution Prevention	40 CFR Part 112
f.	Air Pollution (Title V)	15A NCAC 2Q, and
g.	Hazardous Chemicals (Tier II)	40 CFR Part 370.

Reviews also included an analysis of overall compliance and the status and security of the asset. Subsequent reviews of individual facilities will evaluate the movement towards compliance. The Audit did not include an evaluation of compliance with the September 2015 Settlement Agreement with NCDEQ.

A–5 LIST OF PERMITS AND PROGRAMS DEEMED TO BE EITHER DIRECTLY OR INDIRECTLY IN SUPPORT OF ASH MANAGEMENT

During the Audit, the Audit Team reviewed a variety of written programs developed and implemented by Duke Energy and facility staff. State-issued permits and supporting documentation relative to environmental programs and geotechnical aspects of ash basin management were also requested and reviewed.

Requested documents, pertinent to management of ash in basins, landfills, ponds, etc. were outlined in the pre-audit questionnaire for each facility and included, but were not limited to:

1. The Compliance Register developed for ETrac for the Site.

2. The Duke Energy Operations Manual for the facility.

3. A site plan, site map, or aerial photo which shows the entire facility and key features, of the facility including NPDES outfalls associated environmental monitoring locations, storage tanks, etc.

4. Most recent 2 years of maintenance, monitoring, and inspection records for each coal ash/CCR basin (just the physical inspections, not the groundwater records).

5. A “Phase 1 and Phase 2” summary of ash basin conditions prepared by an outside consultant.

6. Duke Energy’s permitting plans for addressing ash impoundments and landfills at this facility.

7. Applicable pages from the Duke Energy basin-by-basin coal ash/CCR project tracking document for this facility.

8. Original basin/landfill/coal ash management unit construction records.

9. Documentation of changes to these units.

10. Coal ash unit construction permit application and approval.

11. State-issued permits and application materials for permits associated with coal ash/CCR management (including, e.g., dam permits).

12. Any currently effective state order, consent order, or similar state direction that addresses coal ash/CCR management at the site.

13. Records required to be maintained in the site's operating record under the federal CCR regulation and/or any state CCR regulatory program.

14. Records of off-site ash shipments from May 2015 forward.

15. Stormwater permit application and approval for all outfalls.

16. Industrial wastewater (NPDES/POTW) permit application and approval for all outfalls/discharges.

17. Industrial and stormwater sampling and monitoring records, and any corrective action plans (last 2 years).

18. Stormwater pollution prevention plan.

19. Landfill operating permit with maintenance and monitoring requirements.

20. Landfill leak detection and groundwater monitoring records from the last 2 years along with any workplans that describes the rationale for the monitoring system at the Site.

21. Landfill operating permit with maintenance and monitoring requirements.

22. Copies of any air permits and applications for coal ash units and ancillary operations.

23. Any testing and monitoring records completed to comply with the air permits.

24. Any notices of violation~~s~~ associated with the coal ash/CCR management activities received over the last 2 years.

25. Copy of SPCC Plan.

26. Community Right-to-Know

    a. Copies of lists of hazardous chemicals or MSDSs submitted;
    b. Copies of Tier I or II reports; and
    c. Copies of Form R (toxic release inventory) reports.

27. Copies of communications with employees and the public regarding availability of toll-free hotline and electronic mail inbox for reporting suspected environmental violations.

28. Management Systems:

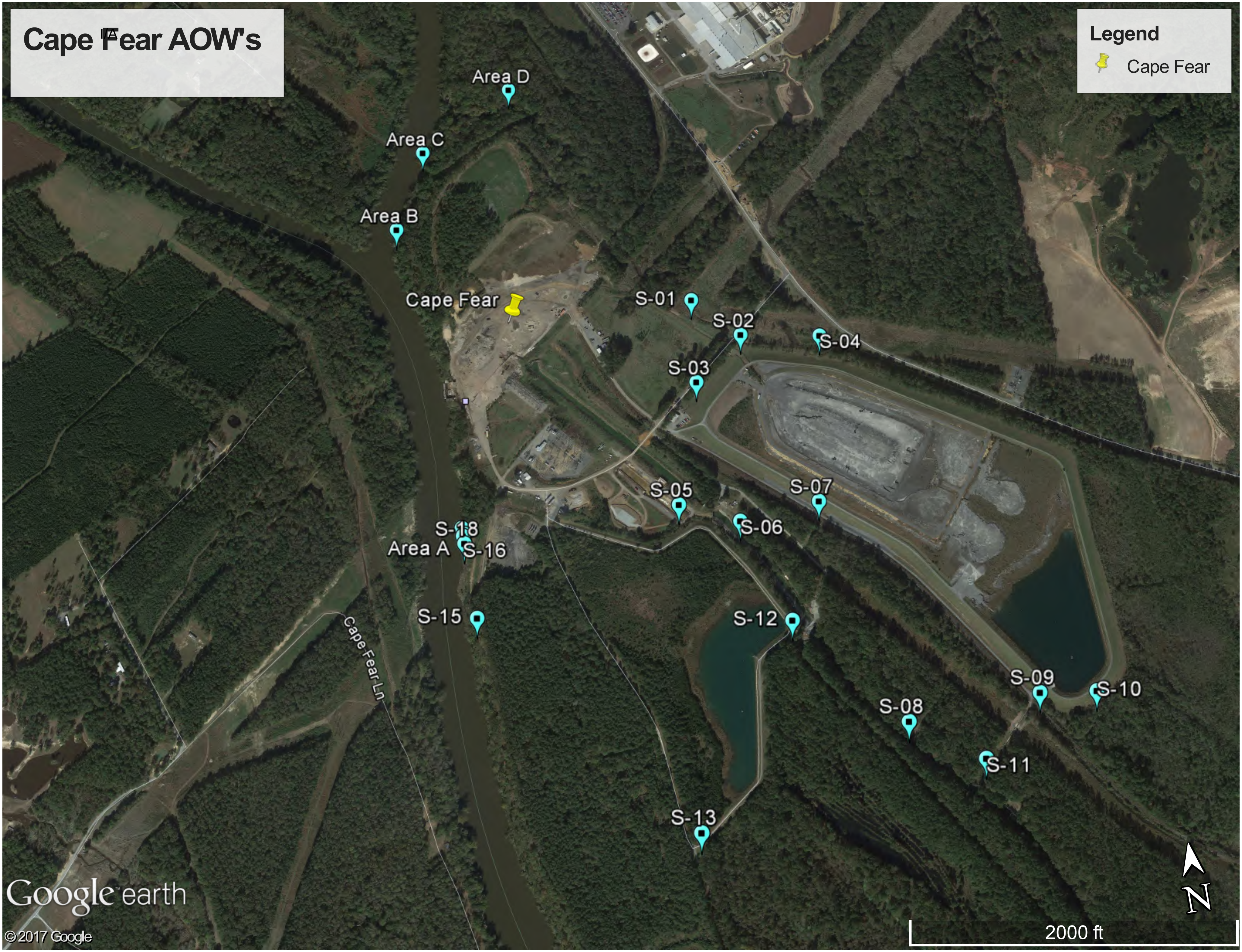
    a. List of responsible party for each environmental activity.
    b. All environmental-related training records.
    c. All environmental policies and procedures.
    d. Organization chart.
    e. Site diagram identifying storage areas, tanks, etc.

29. Employee training records related to environmental programs and ash management policies.

ATTACHMENT B

AOW Locations and 2018 and 2019 Sampling Results

Cape Fear AOW's



I/A

	FIELD PARAMETERS			CFR257 APPENDIX III CONSTIT			METERS (TOTAL C		
Reporting Units	S.U.	mg/L	NTUs	ug/L	mg/L	mg/L	ug/L	ug/L	mg/L
15A NCAC 02B (Class C)	6.0-9.0	4	25	NE	250	500	10	25	100

		FIELD PARAMETERS			CFR257 APPENDIX III CONSTIT			METERS (TOTAL ŒR PARAMET		
Sample ID	Sample Collection Date	pH	Dissolved Oxygen	Turbidity	Boron	Sulfate	Total Dissolved Solids	Arsenic	Nickel	Hardness
S-05	05/16/2019	4.7	4.84	1.7	415	540	570	<1	17	232
S-07	10/23/2018	6.6	5.08	10.0	6560	240	440	<1	4.52	269
S-07	05/16/2019	6.7	4.20	3.0	6790	240	470	<1	4.42	269
S-08	10/23/2018	6.7	8.07	16.0	3380	150	300	<1	7.1	157
S-08	05/16/2019	7.1	8.15	12.6	3750	140	340	<1	6.32	193
S-15	10/23/2018	6.7	5.69	26.1	1500	170	560	92.2	6.82	335
S-15	05/16/2019	7.3	7.61	14.7	1320	170	590	36.2	4.09	337
S-16	10/23/2018	6.4	0.73	3.9	867	1500	2300	6.43	217	1230
S-16	05/16/2019	6.4	1.33	3.9	815	1500	2100	15.5	138	1220

COLOR NOTES

Bold highlighted concentration indicates exceedance of the current respective standard or criteria [15A NCAC 02B(Class C), NPDES permit value]. All hardness-dependent dissolved metal standards in this table assume ≤ 25 mg/L in-stream hardness.

Provisional Background Threshold Values reflect the values represented in the NCDEQ letter dated 10/11/2017.

Analytical data review has not been completed for this dataset.

ABBREVIATION NOTES

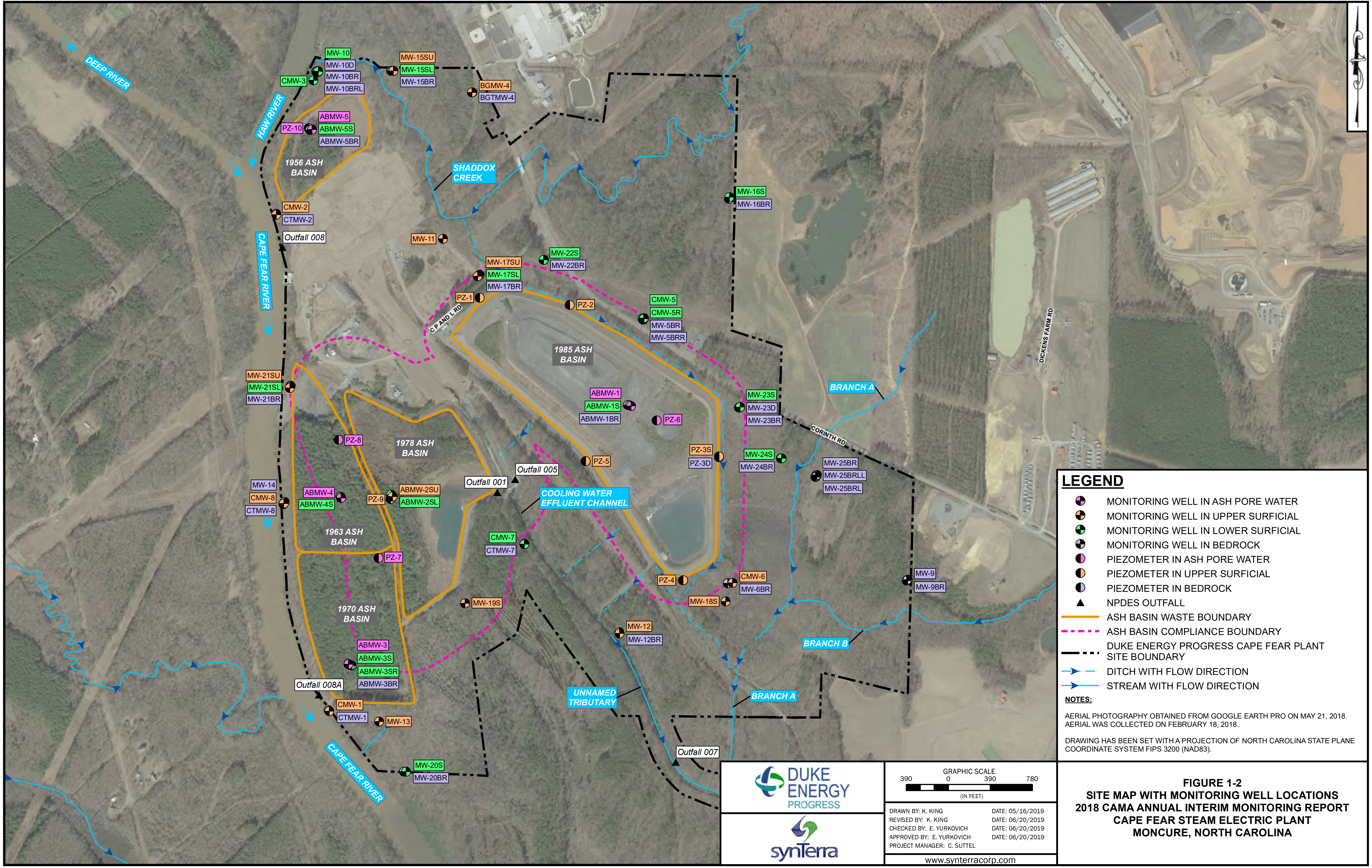
BGS - below ground surface
BOD - Biologic Oxygen Demand
CB - Compliance Boundary
COD - Chemical Oxygen Demand
Deg C - Degrees Celsius
DMAs - dimethylarsinic acid
DUP - Duplicate
Eh - Redox Potential
ft - Feet
GPM - gallons per minute
IMAC - Interim Maximum Allowable Concentrations. From the 15A NCAC 02L Standard, Appendix 1, April, 1, 2013.
MDC - Minimum Detectable Concentration
MeSe - Methylseleninic acid
mg/kg - milligrams per kilogram
mg/L - milligrams per liter
mg-N/L - Milligram nitrogen per liter
MMAs - monomethylarsonic acid
mV - millivolts

NA - Not available or Not Applicable
NE - Not established
NF - No Flow
NM - Not measured
NTUs - Nephelometric Turbidity Units
pCi/L - picocuries per liter
PSRG - Primary Soil Remediation Goals
RL - Reporting Limit
SeCN - selnocynante
SeMe (IV) - Selenomethionine
SPLP - Synthetic Precipitation Leaching Procedure
S.U. - Standard Units
TCLP - Toxicity Characteristic Leaching Procedure
ug/L - micrograms per liter
ug/mL - microgram per milliliter
umhos/cm - micromhos per centimenter
Well Locations referenced to NAD83 and elevations referenced to NAVD88
umhos/cm - micromhos per centimenter

ATTACHMENT C

2018 and 2019 Summary of CAMA Groundwater Data and Well Location Map

I/A



LEGEND

- MONITORING WELL IN ASH PORE WATER
- MONITORING WELL IN UPPER SURFICIAL
- MONITORING WELL IN LOWER SURFICIAL
- MONITORING WELL IN BEDROCK
- PIEZOMETER IN ASH PORE WATER
- PIEZOMETER IN UPPER SURFICIAL
- PIEZOMETER IN BEDROCK
- ▲ NPDES OUTFALL
- ASH BASIN WASTE BOUNDARY
- ASH BASIN COMPLIANCE BOUNDARY
- DUKE ENERGY PROGRESS CAPE FEAR PLANT SITE BOUNDARY
- DITCH WITH FLOW DIRECTION
- STREAM WITH FLOW DIRECTION

NOTES:

AERIAL PHOTOGRAPHY OBTAINED FROM GOOGLE EARTH PRO ON MAY 21, 2018. AERIAL WAS COLLECTED ON FEBRUARY 18, 2018.

DRAWING HAS BEEN SET WITH A PROJECTION OF NORTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3200 (NAD83).

DUKE ENERGY PROGRESS

synTerra

GRAPHIC SCALE
390 0 390 780
(IN FEET)

DRAWN BY: K. KING DATE: 05/16/2019
REVISED BY: K. KING DATE: 06/20/2019
CHECKED BY: E. YURKOVICH DATE: 06/20/2019
APPROVED BY: E. YURKOVICH DATE: 06/20/2019
PROJECT MANAGER: C. SUTTEL

www.synterracorp.com

FIGURE 1-2
SITE MAP WITH MONITORING WELL LOCATIONS
2018 CAMA ANNUAL INTERIM MONITORING REPORT
CAPE FEAR STEAM ELECTRIC PLANT
MONCURE, NORTH CAROLINA

I/A

		PARAM	D 40CFR257 APPENDIX III CONSTITUENT				INORGANIC PARAMETERS (TOTAL CONCENTRATION)															ADIONUCLID	R PARAME
CAPE FEAR	Reporting Units	S.U.	ug/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/mL	mg/L
07/16/2019	15A NCAC 02L Standard	6.5-8.5	700	250	250	500	1*	10	700	4*	2	10	1*	300	15	50	100	20	0.2*	0.3*	1000	0.03^	2
BRANDON RUSSO	Provisional Background (Surficial Aquifer)	5.8-6.4	177	250	510	1200	1	3	183	1	1	1	89	37500	1	9170	48	1	0.2	1.268	62	0.0167	NE
EVAN YURKOVICH	Provisional Background (Bedrock Unit)	5.5-8.2	50	220	96	675	1	6	471	1	1	1	1.15	750	1	901	2	1.98	0.2	2.37	5	0.00196	NE

								PARAM	D 40CFR257 APPENDIX III CONSTITUENT				INORGANIC PARAMETERS (TOTAL CONCENTRATION)															ADIONUCLID	R PARAME
Sample ID	Location Description	Associated Unit	Location With Respect to Groundwater Flow Direction	Well Screen Location	Sample Location Aquifer Name	Sample Collection Date	pH	Boron	Chloride	Sulfate	Total Dissolved Solids	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Iron	Lead	Manganese	Nickel	Selenium	Thallium	Vanadium	Zinc	Total Uranium	Fluoride
ABMW-01	In 1985 WB	1985 Basin	Source Area	Ash Pore Water	Ash Pore Water	06/13/2018	7.5	**3650**	10	110	440	<1	**811**	136	<1	<1	<1	<1	**2560**	<1	**169**	1.22	<1	<0.2	**0.567**	<5	**0.0407**	**2.3**
ABMW-01	In 1985 WB	1985 Basin	Source Area	Ash Pore Water	Ash Pore Water	08/29/2018	7.5	**3540**	11	110	420	<1	**757**	125	<1	<1	<1	<1	**2330**	<1	**156**	1.93	<1	0.088 j	**0.505**	1.873 j	**0.0383**	2
ABMW-01	In 1985 WB	1985 Basin	Source Area	Ash Pore Water	Ash Pore Water	12/06/2018	7.5	**3520**	9.7	110	420	<1	**948**	135	<1	<1	<1	<1	**2680 B2**	<1	**169**	2.41	<1	0.148 j	**0.546**	2.714 j,B	**0.0502**	**2.4**
ABMW-01	In 1985 WB	1985 Basin	Source Area	Ash Pore Water	Ash Pore Water	02/06/2019	7.2	**3590**	9	100	460	<1	**946**	149	<1	NA	0.495 j	0.431 j	**2930**	NA	**178**	3	<1	<0.2	**2.11**	<5	NA	NA
ABMW-01BR	In 1985 WB	1985 Basin	Source Area	Bedrock	Bedrock	06/13/2018	8.1	**1530**	17	120	430	<1	**10.2**	195	<1	<1	0.386 j	<1	143	<1	**720**	1.57	<1	0.189 j	0.287 j	<5	0.000209	0.1376 j
ABMW-01BR	In 1985 WB	1985 Basin	Source Area	Bedrock	Bedrock	08/29/2018	7.7	**1620**	22	160	440	<1	**10.2**	191	<1	<1	0.478 j	<1	238	<1	**840**	2.57	<1	0.125 j	**0.376**	6	0.000208	0.132 j
ABMW-01BR	In 1985 WB	1985 Basin	Source Area	Bedrock	Bedrock	12/06/2018	7.6	**1380**	23	160	410	<1	**10.2**	183	<1	<1	0.402 j	<1	161 B2	<1	**814**	2.42	<1	<0.2	0.194 j	<5	0.000211	<0.5
ABMW-01BR	In 1985 WB	1985 Basin	Source Area	Bedrock	Bedrock	02/07/2019	7.2	**1480**	22	150	420	<1	**10.5**	193	<1	NA	1.4	0.856 j	**2140**	NA	**910**	3.35	<1	0.196 j	**2.13**	6	NA	NA
ABMW-01S	In 1985 WB	1985 Basin	Source Area	Surficial Lower	Surficial	06/13/2018	6.9	**2610**	15	120	370	<1	3.53	54	<1	<1	2.14	**2.01**	**1210**	<1	**1010**	3.85	<1	0.12 j	**0.834**	<5	0.000411	0.95
ABMW-01S	In 1985 WB	1985 Basin	Source Area	Surficial Lower	Surficial	08/29/2018	6.9	**2640**	15	120	360	<1	2.08	54	<1	<1	1.92	**1.31**	**1380**	<1	**928**	3.98	<1	<0.2	**1.22**	<5	0.000497	0.96
ABMW-01S	In 1985 WB	1985 Basin	Source Area	Surficial Lower	Surficial	12/06/2018	6.8	**2620**	14	130	350	<1	2.7	59	<1	<1	0.984 j	**2.44**	**1180 B2**	<1	**1100**	3.93	<1	<0.2	**1.44**	<5	0.000543	1.1
ABMW-01S	In 1985 WB	1985 Basin	Source Area	Surficial Lower	Surficial	02/06/2019	6.6	**2780**	13	120	350	<1	2.3	65	<1	NA	1.01	**2.53**	**1660**	NA	**983**	3.97	<1	<0.2	**3.24**	<5	NA	NA
ABMW-02SL	In 1978 WB	1978 Basin	Source Area	Surficial Lower	Surficial	06/13/2018	**6.0**	<50	7	3.1	54	<1	2.22	10	<1	<1	<1	**2.25**	**6250**	<1	**417**	4.83	<1	<0.2	0.158 j	5	NA	0.084 j
ABMW-02SL	In 1978 WB	1978 Basin	Source Area	Surficial Lower	Surficial	08/28/2018	**6.0**	44.453 j	6.4	3.1	78	<1	2.72	31	<1	<1	<1	0.72 j	**13000**	<1	**790**	1.38	<1	<0.2	<0.3	3.2 j	NA	0.1
ABMW-02SL	In 1978 WB	1978 Basin	Source Area	Surficial Lower	Surficial	12/05/2018	**6.1**	<50	6	4.1	60	<1	2.51	24	<1	<1	<1	**1.24**	**7300**	<1	**453**	3.33	<1	<0.2	<0.3	7	NA	0.0573 j
ABMW-02SL	In 1978 WB	1978 Basin	Source Area	Surficial Lower	Surficial	02/05/2019	**5.9**	<50	6	3.8	55	<1	1.54	16	<1	NA	<1	**1.8**	**4660**	NA	**395**	5.22	<1	<0.2	<0.3	6	NA	NA
ABMW-02SU	In 1978 WB	1978 Basin	Source Area	Surficial Upper	Surficial	06/13/2018	**4.1**	177	42	**360 M2**	470	<1	0.81 j	20	0.388 j	0.366 j	0.345 j	**21.3**	296	3.71	**1620**	19.7	8.25	0.2	0.2 j	51	NA	0.551 j
ABMW-02SU	In 1978 WB	1978 Basin	Source Area	Surficial Upper	Surficial	08/28/2018	**4.3**	182	44	**380**	**560**	<1	0.503 j	22	<1	<1	0.4 j	**28.4**	**480**	3.23	**2230**	17	13.7	0.181 j	<0.3	28	NA	0.512 j
ABMW-02SU	In 1978 WB	1978 Basin	Source Area	Surficial Upper	Surficial	12/05/2018	6.7	283	5.9	110	380	<1	**12.3**	47	<1	<1	<1	**3.04**	**597**	<1	**723**	2.99	1.54	<0.2	0.148 j	2.341 j	NA	0.309 j
ABMW-02SU	In 1978 WB	1978 Basin	Source Area	Surficial Upper	Surficial	02/05/2019	**6.2**	265	8.7	150	400	<1	6.24	46	<1	NA	<1	**3.77**	**394 S1**	NA	**608**	3.13	1.79	<0.2	<0.3	<5	NA	NA
ABMW-03	In 1970 WB	1970 Basin	Source Area	Ash Pore Water	Ash Pore Water	06/13/2018	7.7	**6220**	8.7	**410**	**810**	**4.82**	**281**	156	<1	<1	<1	<1	18	<1	**148**	4.99	0.954 j	**0.954**	**50.5**	<5	**0.0626**	0.653 j
ABMW-03	In 1970 WB	1970 Basin	Source Area	Ash Pore Water	Ash Pore Water	08/28/2018	7.9	**5970**	9.6	**410**	**870**	**5.08**	**281**	162	<1	<1	<1	0.442 j	20	<1	**166**	5.91	0.874 j	**1.05**	**52.2**	<5	**0.074**	0.585 j
ABMW-03	In 1970 WB	1970 Basin	Source Area	Ash Pore Water	Ash Pore Water	12/05/2018	8.1	**6250**	8.6	**420**	**810**	**5.14**	**281**	149	<1	<1	<1	<1	49	<1	**150**	5.85	0.781 j	**0.82**	**39.3**	3.492 j	**0.074**	0.337 j
ABMW-03	In 1970 WB	1970 Basin	Source Area	Ash Pore Water	Ash Pore Water	02/05/2019	7.8	**6470**	8.3	**420**	**830**	**5.27**	**265**	173	<1	NA	<1	<1	71 S1	NA	**195 S1**	6.23	0.705 j	**1.1**	**42.8**	28	NA	NA
ABMW-03BR	In 1970 WB	1970 Basin	Source Area	Bedrock	Bedrock	06/13/2018	6.9	196	36	160	**560**	<1	1.68	111	<1	<1	<1	<1	**1550**	<1	**1630**	<1	<1	0.089 j	<0.3	<5	NA	0.2835 j
ABMW-03BR	In 1970 WB	1970 Basin	Source Area	Bedrock	Bedrock	08/28/2018	7.1	197	36	160	**570**	<1	1.61	108	<1	<1	<1	<1	**1630**	<1	**1680**	0.451 j	<1	<0.2	<0.3	3.577 j	NA	0.27 j
ABMW-03BR	In 1970 WB	1970 Basin	Source Area	Bedrock	Bedrock	12/05/2018	7.0	198	34	160	**550**	<1	1.42	107	<1	<1	<1	<1	**1610**	<1	**1720**	<1	<1	<0.2	0.134 j	2.083 j	NA	0.107 j
ABMW-03BR	In 1970 WB	1970 Basin	Source Area	Bedrock	Bedrock	02/05/2019	6.9	214	33	160	**560**	<1	1.79	107	<1	NA	0.338 j	<1	**1620**	NA	**1670**	0.573 j	<1	0.148 j	0.127 j	<5	NA	NA
ABMW-03SR	In 1970 WB	1970 Basin	Source Area	Surficial Lower	Surficial	06/13/2018	**6.2**	**5870**	17	**340**	**620**	**1.85**	**59.2**	81	<1	<1	<1	**6.22**	**339**	<1	**5110**	4.42	<1	<0.2	**3.59**	<5	0.00355	0.527 j
ABMW-03SR	In 1970 WB	1970 Basin	Source Area	Surficial Lower	Surficial	08/28/2018	**6.4**	**5440**	17	**360**	**630**	**1.69**	**49.7**	76	<1	<1	<1	**6.46**	294	<1	**5110**	4.95	<1	<0.2	**3.83**	3.242 j	0.00377	<1
ABMW-03SR	In 1970 WB	1970 Basin	Source Area	Surficial Lower	Surficial	12/05/2018	**6.5**	**6020**	16	**380**	**620**	**1.56**	**57.9**	77	<1	<1	<1	**6.53**	287	<1	**4980**	4.93	0.458 j	<0.2	**2.56**	3.614 j	0.00568	<1
ABMW-03SR	In 1970 WB	1970 Basin	Source Area	Surficial Lower	Surficial	02/05/2019	**6.2**	**5480**	15	**340**	**610**	**1.34**	**48.2**	74	<1	NA	<1	**7.21**	**333 S1**	NA	**5520**	5.23	0.463 j	0.121 j	**2.51**	<5	NA	NA
ABMW-04	In 1963 WB	1963 Basin	Source Area	Ash Pore Water	Ash Pore Water	06/13/2018	6.6	**1300**	44	87	500	<1	**353**	366	<1	<1	<1	<1	**351**	<1	**478**	2.66	<1	<0.2	**0.726**	<5	0.000259	0.24
ABMW-04	In 1963 WB	1963 Basin	Source Area	Ash Pore Water	Ash Pore Water	08/27/2018	6.6	**1310**	44	80	**510**	<1	**242**	377	<1	<1	<1	<1	271	<1	**471**	2.09	<1	<0.2	**0.58**	13	0.000234	0.21
ABMW-04	In 1963 WB	1963 Basin	Source Area	Ash Pore Water	Ash Pore Water	12/05/2018	6.9	**1380**	41	71	**510**	<1	**404**	428	<1	<1	<1	<1	**383**	<1	**579**	2.44	<1	<0.2	**0.563**	2.073 j	0.000288	0.1786 j
ABMW-04	In 1963 WB	1963 Basin	Source Area	Ash Pore Water	Ash Pore Water	02/04/2019	6.8	**1370**	40	64	**520**	<1	**314**	406	<1	NA	<1	<1	**332**	NA	**529**	2.47	<1	<0.2	**0.482**	<5	NA	NA
ABMW-04S	In 1963 WB	1963 Basin	Source Area	Surficial Lower	Surficial	06/13/2018	**6.1**	<50	26	7.3	200	<1	3.66	91	<1	<1	<1	0.492 j	**24700**	<1	**1110**	<1	<1	<0.2	0.287 j	<5	<0.0002	0.11
ABMW-04S	In 1963 WB	1963 Basin	Source Area	Surficial Lower	Surficial	08/27/2018	**6.1**	<50	26	8.6	220	<1	3.65	94	<1	<1	<1	0.501 j	**26400**	<1	**1150**	<1	<1	<0.2	0.129 j	16	<0.0002	0.12
ABMW-04S	In 1963 WB	1963 Basin	Source Area	Surficial Lower	Surficial	12/05/2018	**6.1**	25.935 j	26	11	220	<1	3.54	92	<1	<1	<1	0.887 j	**23000**	<1	**1130**	<1	<1	<0.2	0.152 j	3.725 j	<0.0002	0.091 j
ABMW-04S	In 1963 WB	1963 Basin	Source Area	Surficial Lower	Surficial	02/04/2019	**6.0**	<50	26	10	220	<1	3.46	90	<1	NA	<1	0.464 j	**23600**	NA	**1060**	<1	<1	<0.2	0.139 j	1.7 j	NA	NA
ABMW-05BR	In 1956 WB	1956 Basin	Source Area	Bedrock	Bedrock	06/13/2018	7.6	60	4.2	3.6	150	<1	1.22	343	<1	<1	<1	<1	90	<1	**55**	<1	<1	<0.2	0.149 j	<5	NA	0.26
ABMW-05BR	In 1956 WB	1956 Basin	Source Area	Bedrock	Bedrock	08/28/2018	7.6	68	4.4	4.2	160	<1	1.21	350	<1	<1	<1	<1	92	<1	**54**	<1	<1	0.134 j	<0.3	2.317 j	NA	0.26
ABMW-05BR	In 1956 WB	1956 Basin	Source Area	Bedrock	Bedrock	12/04/2018	8.0	61	3.8	3.6	160	<1	1.2	345	<1	<1	<1	<1	69	<1	43	<1	<1	<0.2	<0.3	13	NA	0.28
ABMW-05BR	In 1956 WB	1956 Basin	Source Area	Bedrock	Bedrock	02/04/2019	7.9	62	3.6	3.6	150	<1	1.07	351	<1	NA	<1	<1	77	NA	46	<1	<1	<0.2	<0.3	<5	NA	NA
ABMW-05S	In 1956 WB	1956 Basin	Source Area	Surficial Lower	Surficial	06/13/2018	**5.4**	194	37	**870**	**1200**	<1	0.454 j	22	<1	<1	0.408 j	**292**	**84500**	<1	**24200**	**134**	<1	0.169 j	**0.41**	293	NA	<1
ABMW-05S	In 1956 WB	1956 Basin	Source Area	Surficial Lower	Surficial	08/28/2018	**5.8**	196	38	**900**	**1300**	<1	0.449 j	20	<1	<1	0.488 j	**258**	**90800**	<1	**25000**	**126**	<1	0.135 j	0.297 j	293	NA	<1
ABMW-05S	In 1956 WB	1956 Basin	Source Area	Surficial Lower	Surficial	12/04/2018	**6.0**	215	38	**780**	**1200**	<1	0.459 j	27	<1	<1	0.72 j	**242**	**88900**	<1	**21700**	**111**	<1	0.085 j	**0.525**	245	NA	<2
ABMW-05S	In 1956 WB	1956 Basin	Source Area	Surficial Lower	Surficial	02/04/2019	**5.4**	195	34	**840**	**1200**	<1	0.341 j	17	<1	NA	0.405 j	**270**	**88600**	NA	**23600**	**129**	<1	0.103 j	**0.365**	315	NA	NA
BGMW-04 IMP	East of 1956 WB, outside of CB	Background	Background	Surficial Upper	Surficial	06/11/2018	**5.5**	<50	7.7	24	110	<1	<1	31	<1	<1	1.5	<1	147	<1	6	0.56 j	<1	<0.2	**0.741**	1.781 j	<0.0002	0.0566 j
BGMW-04	East of 1956 WB, outside of CB	Background	Background	Surficial Upper	Surficial	06/11/2018	**5.5**	<50	7.3	25	130	<1	<1	31	<1	<1	1.71 j	<1	163	<1	6	<5	<1	<0.2	**0.89**	<5	NA	NA
BGMW-04	East of 1956 WB, outside of CB	Background	Background	Surficial Upper	Surficial	08/22/2018	**5.1**	17.5 j	6.7	23	140	<1	<1	26	<1	<1	1.32	<1	32	<1	7	0.875 j	<1	<0.2	**0.456**	4.5 j	<0.0002	0.0542 j
BGMW-04	East of 1956 WB, outside of CB	Background	Background	Surficial Upper	Surficial	12/05/2018	**5.7**	<50	7.5	38	140	<1	<1	28	<1	<1	1.67	<1	126	<1	39	0.596 j	<1	<0.2	**0.934**	2.495 j	<0.0002	0.0397 j
BGMW-04	East of 1956 WB, outside of CB	Background	Background	Surficial Upper	Surficial	02/04/2019	**5.8**	<50	9.4	140	280	<1	<1	35	<1	NA	0.985 j	<1	61	NA	47	3.12	<1	<0.2	**0.562**	20	NA	NA
BGTMW-04 IMP	East of 1956 WB, outside of CB	Background	Background	Bedrock	Bedrock	06/11/2018	7.7	24.151 j	18	5.5	160	<1	1.37	138	<1	<1	<1	<1	97	<1	**114**	<1	<1	<0.2	0.227 j	<5	<0.0002	0.13
BGTMW-04	East of 1956 WB, outside of CB	Background	Background	Bedrock	Bedrock	06/11/2018	7.7	21.494 j	18	5.4	180	<1	1.4	135	<1	<1	<5	<1	75	<1	**100**	<5	<1	<0.2	**0.347**	<5	NA	NA
BGTMW-04	East of 1956 WB, outside of CB	Background	Background	Bedrock	Bedrock	08/22/2018	7.6	28.7 j	18	5.1	180	<1	1.23	134	<1	<1	<1	<1	115	<1	**104**	<1	<1	0.124 j	<0.3	2.2 j	<0.0002	0.13
BGTMW-04	East of 1956 WB, outside of CB	Background	Background	Bedrock	Bedrock	12/05/2018	7.5	23.34 j	19	5	180	<1	1.01	126	<1	<1	<1	<1	187	<1	**168**	<1	<1	<0.2	<0.3	3.049 j	<0.0002	0.1
BGTMW-04	East of 1956 WB, outside of CB	Background	Background	Bedrock	Bedrock	02/04/2019	7.8	21.499 j	19	4.4	170	<1	1.05	128	<1	NA	<1	<1	87	NA	**142**	<1	<1	<0.2	<0.3	<5	NA	NA
CMW-01 IMP	Southwest of 1970 WB, outside CB	1970 Basin	Downgradient	Surficial Upper	Surficial	06/11/2018	**6.1**	**1970**	18	<0.1	220	<1	<1	200	<1	<1	0.557 j	0.478 j	**38300**	<1	**1220**	1.6	<1	0.081 j	**1.58**	<5	<0.0002	0.0654 j
CMW-01	Southwest of 1970 WB, outside CB	1970 Basin	Downgradient	Surficial Upper	Surficial	06/11/2018	**6.1**	**2000**	17	<0.1	240	<1	<1	196	<1	<1	<5	0.45 j	**37200**	<1	**1220**	0.502 j	<1	<0.2	**1.5**	<5	NA	NA
CMW-01	Southwest of 1970 WB, outside CB	1970 Basin	Downgradient	Surficial Upper	Surficial	08/28/2018	**6.3**	**2130**	19	1.2	220	<1	<1	170	<1	<1	0.774 j	0.433 j	**28000**	<1	**987**	2.07	<1	<0.2	**2.35**	2.002 j	<0.0002	0.0782 j
CMW-01	Southwest of 1970 WB, outside CB	1970 Basin	Downgradient	Surficial Upper	Surficial	12/05/2018	**6.3**	**1590**	17	0.3	180	<1	<1	190	<1	<1	2.75	0.525 j	**37000**	<1	**1460**	2.6	<1	<0.2	**2.04**	3.001 j	<0.0002	0.0356 j
CMW-01	Southwest of 1970 WB, outside CB	1970 Basin	Downgradient	Surficial Upper	Surficial	02/05/2019	**6.0**	**1110**	47	41	280	<1	0.553 j	185	<1	NA	0.589 j	**8.86**	**28500**	NA	**2940**	1.64	<1	<0.2	**1.67**	<5	NA	NA
CMW-02 IMP	Southwest of 1956 WB, outside CB	1956 Basin	Downgradient	Surficial Upper	Surficial	06/12/2018	**5.2**	67	9.1	250	410	<1	<1	20	<1	<1	<1	**6.17**	**1350**	<1	**4170**	41.4	<1	0.098 j	**0.522**	11	NA	<0.5
CMW-02	Southwest of 1956 WB, outside CB	1956 Basin	Downgradient	Surficial Upper	Surficial	06/12/2018	**5.2**	61	9.3	250	440	<1	<1	20	<1	<1	0.489 j	**6.3**	**1380**	<1	**3990**	43	<1	<0.2	**0.733**	14 B2	NA	NA
CMW-02	Southwest of 1956 WB, outside CB	1956 Basin	Downgradient	Surficial Upper	Surficial	08/28/2018	**5.3**	84	9.8	240	430	<1	<1	22	<1	0.34 j	<1	**8.6**	**917**	<1	**5380**	44.5	<1	<0.2	**0.532**	22	NA	<0.5
CMW-02	Southwest of 1956 WB, outside CB	1956 Basin	Downgradient	Surficial Upper	Surficial	12/04/2018	**5.4**	91	12	**290**	480	<1	<1	31	<1	<1	<1	**13.7**	**684**	<1	**5460**	42.9	<1	<0.2	**0.608**	17 B2	NA	<0.5
CMW-02	Southwest of 1956 WB, outside CB	1956 Basin	Downgradient	Surficial Upper	Surficial	02/06/2019	**5.2**	74	25	**310**	**530**	<1	<1	30	<1	NA	<1	**21.1**	**1690**	NA	**7170**	57	<1	<0.2	**0.465**	14 B2	NA	NA
CMW-03 IMP	North of 1956 WB, outside CB	1956 Basin	Downgradient	Surficial Lower	Surficial	06/12/2018	**5.9**	**899**	29	**260**	480	<1	<1	54	<1	<1	<1	**3.98**	292	<1	**1850**	1.72	5.38	<0.2	**0.375**	1.942 j	<0.0002	<0.5
CMW-03	North of 1956 WB, outside CB	1956 Basin	Downgradient	Surficial Lower	Surficial	06/12/2018	**5.9**	**862**	29	250	500	<1	<1	52	<1	<1	0.602 j	**3.82**	**314**	<1	**1820**	1.508 j	5.72	0.087 j	**0.618**	2.958 j,B2	NA	NA
CMW-03	North of 1956 WB, outside CB	1956 Basin	Downgradient	Surficial Lower	Surficial	08/28/2018	**6.0**	**994**	29	**270**	**540**	<1	<1	50	<1	<1	<1	**2.83**	230	<1	**2090**	1.15	8.07	<0.2	**0.333**	1.964 j	<0.0002	<0.5
CMW-03	North of 1956 WB, outside CB	1956 Basin	Downgradient	Surficial Lower	Surficial	12/04/2018	**5.5**	186	4.2	48	120	<1	<1	57	<1	<1	0.564 j	0.527 j	17	<1	**83**	1.39	4.32	<0.2	**0.34**	3.748 j,B2	<0.0002	<0.5
CMW-03	North of 1956 WB, outside CB	1956 Basin	Downgradient	Surficial Lower	Surficial	02/07/2019	**5.8**	379	13	110	250	<1	<1	97	<1	NA	0.655 j	0.59 j	5.684 j	NA	**552**	1.11	3.81	<0.2	**0.402**	<5	NA	NA
CMW-05R IMP	North of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Lower	Surficial	06/11/2018	**5.7**	459	6.5	24	110	<1	<1	41	<1	<1	<1	<1	5.931 j	<1	42	1.42	<1	<0.2	**0.816**	<5	NA	0.0582 j
CMW-05R	North of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Lower	Surficial	06/11/2018	**5.7**	435	6.1	24	120	<1	<1	39	<1	<1	<5	<1	14	<1	41	1.321 j	<1	<0.2	**0.865**	<5	NA	NA
CMW-05R	North of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Lower	Surficial	08/22/2018	**5.6**	382	6	19	130	<1	<1	34	<1	<1	<1	<1	<10	<1	14	1.49	<1	<0.2	**0.569**	1.7 j	NA	0.0601 j
CMW-05R	North of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Lower	Surficial	12/05/2018	**6.0**	354	5.9	17	100	<1	<1	38	<1	<1	<1	<1	23	<1	15	1.1	<1	<0.2	**0.859**	3.513 j	NA	<0.1

I/A

CAPE FEAR
07/16/2019
BRANDON RUSSO
EVAN YURKOVICH

	PARAM	D 40CFR257 APPENDIX III CONSTITUENT				INORGANIC PARAMETERS (TOTAL CONCENTRATION)															ADIONUCLID	R PARAME
Reporting Units	S.U.	ug/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/mL	mg/L
15A NCAC 02L Standard	6.5-8.5	700	250	250	500	1*	10	700	4*	2	10	1*	300	15	50	100	20	0.2*	0.3*	1000	0.03^	2
Provisional Background (Surficial Aquifer)	5.8-6.4	177	250	510	1200	1	3	183	1	1	1	89	37500	1	9170	48	1	0.2	1.268	62	0.0167	NE
Provisional Background (Bedrock Unit)	5.5-8.2	50	220	96	675	1	6	471	1	1	1	1.15	750	1	901	2	1.98	0.2	2.37	5	0.00196	NE

							PARAM	D 40CFR257 APPENDIX III CONSTITUENT				INORGANIC PARAMETERS (TOTAL CONCENTRATION)															ADIONUCLID	R PARAME
Sample ID	Location Description	Associated Unit	Location With Respect to Groundwater Flow Direction	Well Screen Location	Sample Location Aquifer Name	Sample Collection Date	pH	Boron	Chloride	Sulfate	Total Dissolved Solids	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Iron	Lead	Manganese	Nickel	Selenium	Thallium	Vanadium	Zinc	Total Uranium	Fluoride
CMW-05R	North of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Lower	Surficial	02/05/2019	**5.8**	357	5.7	16	110	<1	<1	36	<1	NA	<1	<1	<10	NA	8 S1	1.28	<1	0.081 j	**0.776**	<5	NA	NA
CMW-06 IMP	South of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	06/12/2018	**5.3**	**757**	62	130	340	<1	0.561 j	39	<1	<1	0.79 j	**9.6**	**2760**	<1	**2100**	3.89	<1	<0.2	**3.05**	3.211 j	<0.0002	0.1198 j
CMW-06	South of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	06/12/2018	**5.3**	**734**	62	130	350	<1	0.663 j	36	<1	<1	0.983 j	**8.75**	**2860**	<1	**1970**	3.955 j	<1	<0.2	**3.39**	8 B2	NA	NA
CMW-06	South of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	08/23/2018	**5.4**	643	26	98	400	<1	0.762 j	45	0.392 j	<1	5.19	**2.5**	**6010**	2.78	**418**	4.88	0.359 j	<0.2	**14.7**	21	0.000821	0.145 j
CMW-06	South of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	12/06/2018	**6.0**	349	27	83	260	<1	0.449 j	39	<1	<1	2.78	**5.17**	**3860**	0.675 j	**1520**	3.56	<1	<0.2	**7.07**	15 B2	0.000104 j	0.046 j
CMW-06	South of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	02/05/2019	**5.9**	280	21	71	240	<1	0.35 j	33	<1	NA	1.51	**5.11**	**2150**	NA	**1300**	2.45	<1	0.193 j	**3.85**	2.414 j	NA	NA
CMW-07	Southeast of 1978 WB, outside CB	1978 Basin	Downgradient	Surficial Lower	Surficial	06/12/2018	**5.8**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CMW-07	Southeast of 1978 WB, outside CB	1978 Basin	Downgradient	Surficial Lower	Surficial	08/29/2018	**4.9**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CMW-07	Southeast of 1978 WB, outside CB	1978 Basin	Downgradient	Surficial Lower	Surficial	02/05/2019	**5.4**	<50	2.3	7.7	63	<1	1.18	70	<1	NA	0.759 j	**8.39**	**3670**	NA	**1130**	2.87	<1	<0.2	**2.14**	9	NA	NA
CMW-08 IMP	West of 1963 WB, outside CB	1963 Basin	Downgradient	Surficial Upper	Surficial	06/11/2018	**6.2**	**1490**	16	140	420	<1	<1	259	<1	<1	<1	**1.58**	**54900**	<1	**14500**	3.03	<1	<0.2	**0.306**	3.515 j	<0.0002	0.1332 j
CMW-08	West of 1963 WB, outside CB	1963 Basin	Downgradient	Surficial Upper	Surficial	06/11/2018	**6.2**	**1400**	17	150	480	<1	0.454 j	255	<1	<1	<5	**1.54**	**58200**	<1	**14400**	3.535 j	<1	<0.2	**0.614**	<5	NA	NA
CMW-08	West of 1963 WB, outside CB	1963 Basin	Downgradient	Surficial Upper	Surficial	08/27/2018	**6.2**	**1430**	17	150	460	<1	<1	209	<1	<1	<1	**2.08**	**42300**	<1	**11800**	2.82	<1	<0.2	0.171 j	1.723 j	<0.0002	0.1206 j
CMW-08	West of 1963 WB, outside CB	1963 Basin	Downgradient	Surficial Upper	Surficial	12/06/2018	**6.4**	**1460**	17	140	420	<1	<1	245	<1	<1	3.48	**1.08**	**58400 B2**	<1	**13800**	4.56	<1	<0.2	0.274 j	<5	<0.0002	<0.5
CMW-08	West of 1963 WB, outside CB	1963 Basin	Downgradient	Surficial Upper	Surficial	02/06/2019	**6.4**	**1360**	17	140	420	<1	0.402 j	260	<1	NA	<1	**1.14**	**63500**	NA	**14200**	3.07	<1	0.087 j	0.245 j	<5	NA	NA
CTMW-01 IMP	Southwest of 1970 WB, outside CB	1970 Basin	Downgradient	Bedrock	Bedrock	06/11/2018	6.8	432	28	140	460	<1	<1	135	<1	<1	<1	<1	**1310**	<1	**1680**	0.849 j	<1	<0.2	0.161 j	3.17 j	<0.0002	0.1462 j
CTMW-01	Southwest of 1970 WB, outside CB	1970 Basin	Downgradient	Bedrock	Bedrock	06/11/2018	6.8	423	28	140	490	<1	<1	132	<1	<1	<5	<1	**1080**	<1	**1720**	1.019 j	<1	0.157 j	0.3	<5	NA	NA
CTMW-01	Southwest of 1970 WB, outside CB	1970 Basin	Downgradient	Bedrock	Bedrock	08/28/2018	7.0	423	28	140	480	<1	<1	134	<1	<1	<1	<1	**1440**	<1	**1740**	0.711 j	<1	<0.2	<0.3	2.471 j	<0.0002	0.1606 j
CTMW-01	Southwest of 1970 WB, outside CB	1970 Basin	Downgradient	Bedrock	Bedrock	12/05/2018	6.9	453	27	140	490	<1	<1	134	<1	<1	<1	<1	**1280**	<1	**1800**	0.543 j	<1	0.092 j	<0.3	2.172 j	<0.0002	0.0856 j
CTMW-01	Southwest of 1970 WB, outside CB	1970 Basin	Downgradient	Bedrock	Bedrock	02/05/2019	6.9	444	27	140	480	<1	<1	130	<1	NA	<1	<1	**1360**	NA	**1720**	0.745 j	<1	<0.2	<0.3	<5	NA	NA
CTMW-02	Southwest of 1956 WB, outside CB	1956 Basin	Downgradient	Bedrock	Bedrock	06/11/2018	7.8	45.632 j	3.5	8.3	170	<1	8	261	<1	<1	<5	<1	35	<1	3.334 j	<5	<1	<0.2	**1.44**	2.683 j	NA	NA
CTMW-02 IMP	Southwest of 1956 WB, outside CB	1956 Basin	Downgradient	Bedrock	Bedrock	06/12/2018	7.8	41.135 j	3.6	8.1	150	<1	7.51	253	<1	<1	<1	<1	41	<1	2.812 j	0.588 j	<1	<0.2	**1.26**	<5	NA	0.12
CTMW-02	Southwest of 1956 WB, outside CB	1956 Basin	Downgradient	Bedrock	Bedrock	08/28/2018	7.7	42.266 j	3.6	7.5	180	<1	7.96	254	<1	<1	<1	<1	29	<1	3.299 j	<1	<1	<0.2	**1.24**	3.25 j	NA	0.13
CTMW-02	Southwest of 1956 WB, outside CB	1956 Basin	Downgradient	Bedrock	Bedrock	12/04/2018	8.1	41.971 j	3.6	6.4	180	<1	7	250	<1	<1	<1	<1	42	<1	3.043 j	<1	<1	<0.2	**1.26**	4.111 j,B2	NA	0.092 j
CTMW-02	Southwest of 1956 WB, outside CB	1956 Basin	Downgradient	Bedrock	Bedrock	02/05/2019	7.8	39.316 j	3.5	5.6	170	<1	7.65	263	<1	NA	0.41 j	<1	295 S1	NA	22 S1	0.692 j	<1	<0.2	**1.41**	2.804 j	NA	NA
CTMW-07 IMP	Southeast of 1978 WB, outside CB	1978 Basin	Downgradient	Bedrock	Bedrock	06/12/2018	7.3	51	32	88	330	<1	1.22	38	<1	<1	<1	<1	17	<1	**92**	0.582 j	<1	<0.2	**1.4**	<5	NA	0.131 j
CTMW-07	Southeast of 1978 WB, outside CB	1978 Basin	Downgradient	Bedrock	Bedrock	06/12/2018	7.3	45.696 j	33	89	350	<1	2.05	64	<1	<1	0.337 j	<1	24	<1	**127**	0.653 j	<1	<0.2	**1.69**	2.507 j,B2	NA	NA
CTMW-07	Southeast of 1978 WB, outside CB	1978 Basin	Downgradient	Bedrock	Bedrock	08/29/2018	7.1	64	33	92	370	<1	1.65	58	<1	<1	<1	<1	63	<1	**251**	1.01	<1	<0.2	**1.21**	2.232 j	NA	0.1454 j
CTMW-07	Southeast of 1978 WB, outside CB	1978 Basin	Downgradient	Bedrock	Bedrock	12/17/2018	7.5	65	33	93	360	<1	2.77	112	<1	<1	<1	<1	176	<1	**149**	0.581 j	<1	<0.2	**1.56**	2.394 j	NA	0.1172 j
CTMW-07	Southeast of 1978 WB, outside CB	1978 Basin	Downgradient	Bedrock	Bedrock	02/05/2019	7.4	60	31	89	380	<1	2.94	123	<1	NA	0.349 j	<1	163 S1	NA	**317**	1.61	<1	<0.2	**1.68**	2.147 j	NA	NA
CTMW-08 IMP	West of 1963 WB, outside CB	1963 Basin	Downgradient	Bedrock	Bedrock	06/11/2018	7.0	**1480**	17	110	410	<1	<1	259	<1	<1	<1	**1.68**	**55200**	<1	**14600**	3.15	<1	0.123 j	**0.334**	<5	<0.0002	0.1282 j
CTMW-08	West of 1963 WB, outside CB	1963 Basin	Downgradient	Bedrock	Bedrock	06/11/2018	7.0	478	17	110	430	<1	4.91	139	<1	<1	<5	<1	**7650**	<1	**1360**	2.367 j	<1	<0.2	0.175 j	<5	NA	NA
CTMW-08	West of 1963 WB, outside CB	1963 Basin	Downgradient	Bedrock	Bedrock	08/27/2018	7.0	494	17	110	450	<1	4.2	142	<1	<1	<1	<1	**4520**	<1	**1290**	1.76	<1	<0.2	0.104 j	4.136 j	<0.0002	0.1496 j
CTMW-08	West of 1963 WB, outside CB	1963 Basin	Downgradient	Bedrock	Bedrock	12/06/2018	7.1	498	14	110	380	<1	**16.8**	177	<1	<1	<1	**1.69**	**3440 B2**	<1	**1580**	3.61	<1	<0.2	**0.486**	4.068 j,B	0.00033	<0.2
CTMW-08	West of 1963 WB, outside CB	1963 Basin	Downgradient	Bedrock	Bedrock	02/06/2019	6.6	524	15	110	400	<1	**17.8**	180	<1	NA	0.357 j	0.668 j	**6050**	NA	**1440**	3.21	<1	0.152 j	0.157 j	5	NA	NA
MW-05BRR	North of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	06/11/2018	7.2	50	24	15	230	<1	0.856 j	**773**	<1	<1	<1	<1	188	<1	**726**	0.334 j	<1	<0.2	<0.3	<5	NA	0.0885 j
MW-05BRR	North of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	08/22/2018	7.2	59	24	15	250	<1	0.949 j	**801**	<1	<1	<1	<1	133	<1	**677**	0.504 j	<1	<0.2	<0.3	<5	NA	0.0778 j
MW-05BRR	North of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	12/05/2018	7.3	46.925 j	25	15	220	<1	0.957 j	**782**	<1	<1	<1	<1	137	<1	**664**	0.591 j	<1	<0.2	<0.3	<5	NA	0.0724 j
MW-06BR	South of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	06/12/2018	6.9	21.392 j	170	69	**570**	<1	<1	236	<1	<1	<1	<1	64	<1	**551**	0.457 j	<1	0.087 j	**0.623**	<5	0.00155	0.317 j
MW-06BR	South of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	08/23/2018	7.1	25.585 j	170	69	**590**	<1	<1	220	<1	<1	<1	<1	88	<1	**506**	<1	0.362 j	<0.2	**0.649**	13	0.00149	0.2485 j
MW-06BR	South of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	12/06/2018	7.3	25.684 j	180	73	**570**	<1	0.401 j	217	<1	<1	0.38 j	<1	54	<1	**522**	<1	<1	<0.2	**0.799**	2.011 j,B2	0.0014	<0.5
MW-06BR	South of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	02/05/2019	7.1	25.257 j	180	67	**580**	<1	<1	234	<1	NA	<1	<1	56 S1	NA	**511**	0.344 j	<1	<0.2	**0.565**	<5	NA	NA
MW-09	East of 1985 WB, outside CB	Background	Background	Bedrock	Bedrock	06/14/2018	**5.6**	<50	160	38	470	<1	<1	86	<1	<1	<1	0.66 j	293	<1	**539**	2.03	<1	<0.2	0.252 j	6	0.000362	0.1886 j
MW-09	East of 1985 WB, outside CB	Background	Background	Bedrock	Bedrock	08/22/2018	**5.6**	<50	150	29	480	<1	<1	99	<1	<1	<1	0.805 j	**428**	<1	**692**	1.75	<1	<0.2	0.249 j	9	0.000467	0.282 j
MW-09	East of 1985 WB, outside CB	Background	Background	Bedrock	Bedrock	12/05/2018	**6.1**	<50	150	27	430	<1	<1	118	<1	<1	<1	0.931 j	**725**	<1	**682**	1.18	<1	<0.2	0.132 j	4.439 j	0.000636	<0.5
MW-09	East of 1985 WB, outside CB	Background	Background	Bedrock	Bedrock	02/06/2019	**5.7**	<50	180	51	440	<1	<1	38	<1	NA	<1	<1	6.055 j	NA	**71**	1.34	<1	<0.2	0.133 j	2.175 j	NA	NA
MW-09BR	East of 1985 WB, outside CB	Background	Background	Bedrock	Bedrock	06/14/2018	7.3	<50	120	8	420	<1	<1	462	<1	<1	<1	<1	77	<1	**221**	<1	<1	<0.2	**0.483**	<5	<0.0002	0.1968 j
MW-09BR	East of 1985 WB, outside CB	Background	Background	Bedrock	Bedrock	08/22/2018	7.3	23.8 j	120	8	450	<1	NA	488	<1	<1	<1	<1	146	<1	**717**	<1	<1	<0.2	0.286 j	11	<0.0002	0.1596 j
MW-09BR	East of 1985 WB, outside CB	Background	Background	Bedrock	Bedrock	12/05/2018	7.4	<50	110	7	390	<1	<1	447	<1	<1	<1	<1	267	<1	**1020**	<1	<1	0.149 j	0.142 j	1.847 j	<0.0002	<0.2
MW-09BR	East of 1985 WB, outside CB	Background	Background	Bedrock	Bedrock	02/06/2019	7.3	<50	110	6.7	350	<1	<1	450	<1	NA	<1	<1	**370**	NA	**874**	<1	<1	0.089 j	<0.3	<5	NA	NA
MW-10	North of 1956 WB, outside CB	1956 Basin	Downgradient	Surficial Lower	Surficial	06/12/2018	**5.9**	**881**	32	**600**	**980**	<1	<1	27	<1	<1	<1	**19.4**	**754**	<1	**12700**	4.63	<1	<0.2	**0.488**	2.193 j	0.0000976 j	<1
MW-10	North of 1956 WB, outside CB	1956 Basin	Downgradient	Surficial Lower	Surficial	08/28/2018	**5.9**	**878**	31	**550**	**970**	<1	<1	26	<1	<1	<1	**18.2**	**776**	<1	**12500**	2.75	<1	<0.2	**0.529**	6	0.000077 j	<1
MW-10	North of 1956 WB, outside CB	1956 Basin	Downgradient	Surficial Lower	Surficial	12/04/2018	**6.2**	**820**	23	**520**	**670**	<1	<1	29	<1	0.384 j	0.771 j	**4.64**	**587**	<1	**6900**	2.64	<1	0.081 j	**1.57**	8 B2	0.00013 j	<1
MW-10	North of 1956 WB, outside CB	1956 Basin	Downgradient	Surficial Lower	Surficial	02/07/2019	**6.0**	**829**	22	**400**	**740**	<1	<1	26	<1	NA	<1	**7.84**	**408**	NA	**8850**	2.26	<1	0.092 j	**0.476**	2.667 j	NA	NA
MW-10BR	North of 1956 WB, outside CB	1956 Basin	Downgradient	Bedrock	Bedrock	06/12/2018	7.9	97	21	**360**	**710**	<1	1.94	116	<1	<1	<1	<1	77	<1	**457**	<1	<1	0.114 j	0.156 j	<5	0.0013	0.279 j
MW-10BR	North of 1956 WB, outside CB	1956 Basin	Downgradient	Bedrock	Bedrock	08/28/2018	7.9	118	22	**380**	**770**	<1	1.7	108	<1	<1	<1	<1	90	<1	**502**	<1	<1	<0.2	0.238 j	<5	0.00138	0.2775 j
MW-10BR	North of 1956 WB, outside CB	1956 Basin	Downgradient	Bedrock	Bedrock	12/04/2018	7.9	103	22	**410**	**790**	<1	1.58	96	<1	<1	<1	<1	116	<1	**598**	0.347 j	<1	<0.2	<0.3	1.724 j	0.00191	<0.5
MW-10BR	North of 1956 WB, outside CB	1956 Basin	Downgradient	Bedrock	Bedrock	02/06/2019	7.7	105	21	**370**	**730**	<1	1.92	98	<1	NA	<1	<1	85	NA	**525**	<1	<1	<0.2	<0.3	<5	NA	NA
MW-10BRL	North of 1956 WB, outside CB	1956 Basin	Downgradient	Bedrock	Bedrock	06/12/2018	8.1	123	5	47	180	<1	4.14	66	<1	<1	<1	<1	101	<1	43	<1	<1	<0.2	**0.315**	<5	NA	1.5
MW-10BRL	North of 1956 WB, outside CB	1956 Basin	Downgradient	Bedrock	Bedrock	08/28/2018	8.2	133	5.1	41	220	<1	3.37	69	<1	<1	<1	<1	116	<1	46	<1	<1	<0.2	**0.367**	5	NA	1.4
MW-10BRL	North of 1956 WB, outside CB	1956 Basin	Downgradient	Bedrock	Bedrock	12/04/2018	**9.6**	121	4.9	41	220	<1	1.89	43	<1	<1	0.54 j	<1	69	<1	15	<1	<1	<0.2	**1.77**	4.939 j,B2	NA	1.8
MW-10BRL	North of 1956 WB, outside CB	1956 Basin	Downgradient	Bedrock	Bedrock	02/07/2019	**9.0**	124	4.9	38	200	<1	1.57	50	<1	NA	0.539 j	<1	12	NA	5	<1	<1	<0.2	**1.13**	<5	NA	NA
MW-10D	North of 1956 WB, outside CB	1956 Basin	Downgradient	Bedrock	Bedrock	06/12/2018	**6.2**	546	33	**790**	**1300**	<1	0.924 j	28	<1	<1	<1	0.446 j	**346**	<1	**1560**	3.24	<1	<0.2	**0.424**	<5	NA	<2
MW-10D	North of 1956 WB, outside CB	1956 Basin	Downgradient	Bedrock	Bedrock	08/28/2018	**6.3**	537	34	**790**	**1400**	<1	1.11	28	<1	<1	<1	0.511 j	**542**	<1	**1670**	2.41	<1	<0.2	**0.344**	5	NA	<1
MW-10D	North of 1956 WB, outside CB	1956 Basin	Downgradient	Bedrock	Bedrock	12/04/2018	6.6	470	34	**970**	**1300**	<1	0.659 j	27	<1	<1	<1	0.455 j	208	<1	**1650**	2.47	<1	<0.2	0.245 j	4.886 j,B2	NA	<1
MW-10D	North of 1956 WB, outside CB	1956 Basin	Downgradient	Bedrock	Bedrock	02/06/2019	**6.2**	444	30	**710**	**1300**	<1	0.6 j	27	<1	NA	<1	0.414 j	277	NA	**1600**	2.12	<1	<0.2	0.269 j	<5	NA	NA
MW-11	North of 1985 WB, outside CB	1985 Basin	Downgradient	Surficial Upper	Surficial	06/13/2018	**6.4**	22.036 j	29	150	**550**	<1	0.966 j	77	<1	<1	<1	**1.19**	**5410**	<1	**1900**	2.29	0.445 j	0.113 j	**1.51**	<5	0.000126 j	0.52
MW-11	North of 1985 WB, outside CB	1985 Basin	Downgradient	Surficial Upper	Surficial	08/23/2018	**6.2**	31.098 j	20	180	500	<1	0.46 j	56	<1	<1	<1	0.67 j	**2260**	<1	**795**	3.23	<1	0.112 j	**0.622**	1.673 j	<0.0002	0.4115 j
MW-11	North of 1985 WB, outside CB	1985 Basin	Downgradient	Surficial Upper	Surficial	12/05/2018	**6.2**	27.689 j	24	170	480	<1	1.24	72	<1	<1	<1	0.764 j	**5850**	<1	**1330**	2.75	<1	<0.2	**0.792**	2.096 j	0.0000949 j	0.386 j
MW-11	North of 1985 WB, outside CB	1985 Basin	Downgradient	Surficial Upper	Surficial	02/05/2019	**6.0**	25.746 j	18	190	470	<1	0.379 j	57	<1	NA	<1	0.452 j	**1400**	NA	**668**	3.29	<1	<0.2	**0.44**	<5	NA	NA
MW-12	Southwest of 1985 WB, outside CB	1985 Basin	Downgradient	Surficial Upper	Surficial	06/12/2018	6.7	**760**	47	220	**570**	<1	<1	51	<1	<1	<1	**1.1**	77	<1	**666**	1.47	<1	<0.2	**0.603**	<5	0.000471	0.55
MW-12	Southwest of 1985 WB, outside CB	1985 Basin	Downgradient	Surficial Upper	Surficial	08/23/2018	6.6	413	55	230	**690**	<1	<1	48	<1	<1	<1	0.948 j	53	<1	**524**	0.878 j	<1	<0.2	**0.624**	1.701 j	0.000669	0.58
MW-12	Southwest of 1985 WB, outside CB	1985 Basin	Downgradient	Surficial Upper	Surficial	12/06/2018	6.9	641	52	250	**580**	<1	<1	50	<1	<1	<1	0.72 j	48	<1	**481**	0.906 j	<1	<0.2	**0.954**	2.435 j,B2	0.000356	0.405 j
MW-12	Southwest of 1985 WB, outside CB	1985 Basin	Downgradient	Surficial Upper	Surficial	02/04/2019	6.8	166	66	230	**690**	<1	<1	57	<1	NA	<1	0.957 j	42	NA	**560**	1.03	<1	<0.2	**1.06**	<5	NA	NA
MW-12BR	Southwest of 1985 WB, outside CB	1985 Basin	Downgradient	Bedrock	Bedrock	06/12/2018	7.3	<50	63	37	350	<1	1.24	**779**	<1	<1	0.375 j	<1	184	<1	**731**	<1	<1	<0.2	0.293 j	<5	NA	0.0977 j
MW-12BR	Southwest of 1985 WB, outside CB	1985 Basin	Downgradient	Bedrock	Bedrock	08/23/2018	7.2	17.996 j	63	37	360	<1	1.08	**786**	<1	<1	<1	<1	66	<1	**735**	<1	<1	<0.2	0.202 j	<5	NA	0.1
MW-12BR	Southwest of 1985 WB, outside CB	1985 Basin	Downgradient	Bedrock	Bedrock	12/06/2018	7.5	<50	61	38	340	<1	1.1	**774**	<1	<1	<1	<1	109	<1	**736**	<1	<1	<0.2	0.238 j	2.307 j,B2	NA	0.065 j
MW-12BR	Southwest of 1985 WB, outside CB	1985 Basin	Downgradient	Bedrock	Bedrock	02/04/2019	7.5	<50	61	37	350	<1	1.19	**800**	<1	NA	0.374 j	<1	16	NA	**743**	<1	<1	<0.2	0.18 j	<5	NA	NA
MW-13	South of 1970 WB, outside CB	1970 Basin	Downgradient	Surficial Upper	Surficial	06/13/2018	**5.6**	211	25	78	220	<1	<1	91	<1	<1	<1	0.878 j	39	<1	**615**	4.09	<1	<0.2	**0.943**	4.651 j	NA	0.0992 j

I/A

CAPE FEAR
07/16/2019
BRANDON RUSSO
EVAN YURKOVICH

	PARAM	D 40CFR257 APPENDIX III CONSTITUENT				INORGANIC PARAMETERS (TOTAL CONCENTRATION)															ADIONUCLID	R PARAME
Reporting Units	S.U.	ug/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/mL	mg/L
15A NCAC 02L Standard	6.5-8.5	700	250	250	500	1*	10	700	4*	2	10	1*	300	15	50	100	20	0.2*	0.3*	1000	0.03^	2
Provisional Background (Surficial Aquifer)	5.8-6.4	177	250	510	1200	1	3	183	1	1	1	89	37500	1	9170	48	1	0.2	1.268	62	0.0167	NE
Provisional Background (Bedrock Unit)	5.5-8.2	50	220	96	675	1	6	471	1	1	1	1.15	750	1	901	2	1.98	0.2	2.37	5	0.00196	NE

							PARAM	D 40CFR257 APPENDIX III CONSTITUENT				INORGANIC PARAMETERS (TOTAL CONCENTRATION)															ADIONUCLID	R PARAME
Sample ID	**Location Description**	**Associated Unit**	**Location With Respect to Groundwater Flow Direction**	**Well Screen Location**	**Sample Location Aquifer Name**	**Sample Collection Date**	**pH**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Cobalt**	**Iron**	**Lead**	**Manganese**	**Nickel**	**Selenium**	**Thallium**	**Vanadium**	**Zinc**	**Total Uranium**	**Fluoride**
MW-13	South of 1970 WB, outside CB	1970 Basin	Downgradient	Surficial Upper	Surficial	08/28/2018	**5.8**	281	28	90	270	<1	<1	97	<1	<1	<1	**1.71**	95	<1	**757**	3.39	<1	<0.2	**0.586**	5	NA	0.1182 j
MW-13	South of 1970 WB, outside CB	1970 Basin	Downgradient	Surficial Upper	Surficial	12/05/2018	**5.4**	<50	12	32	120	<1	<1	55	<1	<1	0.53 j	<1	186	<1	**180**	2.97	<1	<0.2	**0.827**	5	NA	<0.2
MW-15BR	Northeast of 1956 WB, outside CB	Background	Background	Bedrock	Bedrock	06/13/2018	7.3	28.977 j	13	38	220	<1	4.46	294	<1	<1	0.351 j	<1	44	<1	20	<1	1.4	0.147 j	**2.37**	<5	0.00079	0.12
MW-15BR	Northeast of 1956 WB, outside CB	Background	Background	Bedrock	Bedrock	08/22/2018	7.7	42.5 j	13	36	260	<1	4.46	330	<1	<1	<1	<1	70	<1	39	<1	2.2	0.178 j	**2.5**	3.7 j	0.000809	0.11
MW-15BR	Northeast of 1956 WB, outside CB	Background	Background	Bedrock	Bedrock	12/05/2018	7.8	26.38 j	13	31	240	<1	4.8	341	<1	<1	<1	<1	6.159 j	<1	**64**	<1	2.18	<0.2	**2.77**	3.536 j	0.000831	<0.1
MW-15BR	Northeast of 1956 WB, outside CB	Background	Background	Bedrock	Bedrock	02/05/2019	7.9	30.514 j	13	34	230	<1	4.59	350	<1	NA	<1	<1	3.382 j,S1	NA	**51 S1**	<1	2.03	<0.2	**2.75**	<5	NA	NA
MW-15SL	Northeast of 1956 WB, outside CB	Background	Background	Surficial Lower	Surficial	06/13/2018	**6.0**	<50	5.7	58	160	<1	3.22	87	<1	<1	<1	**23.6**	**46400**	<1	**2680**	1.68	<1	<0.2	**0.523**	<5	<0.0002	<0.1
MW-15SL	Northeast of 1956 WB, outside CB	Background	Background	Surficial Lower	Surficial	08/22/2018	**5.9**	<50	5.7	54	170	<1	4.49	84	<1	<1	<1	**19.9**	**47100**	<1	**2350**	1.76	<1	<0.2	**0.554**	4 j	<0.0002	<0.1
MW-15SL	Northeast of 1956 WB, outside CB	Background	Background	Surficial Lower	Surficial	12/05/2018	**6.0**	<50	5.6	43	140	<1	2.6	61	<1	<1	<1	**18**	**29800**	<1	**1870**	1.4	<1	<0.2	0.264 j	1.719 j	<0.0002	<0.1
MW-15SL	Northeast of 1956 WB, outside CB	Background	Background	Surficial Lower	Surficial	02/06/2019	**6.1**	<50	5.3	56	130	<1	1.93	66	<1	NA	0.419 j	**19.1**	**32000**	NA	**2180**	1.77	<1	<0.2	0.28 j	<5	NA	NA
MW-15SU	Northeast of 1956 WB, outside CB	Background	Background	Surficial Upper	Surficial	06/13/2018	**6.3**	76	3.1	230	**510**	<1	0.338 j	22	<1	<1	0.381 j	**6.43**	233	<1	**1830**	12.5	0.477 j	<0.2	**0.802**	18	0.0102	0.584 j
MW-15SU	Northeast of 1956 WB, outside CB	Background	Background	Surficial Upper	Surficial	08/22/2018	**6.1**	116	3.1	210	**600**	<1	<1	32	<1	<1	<1	**1.54**	50	<1	**514**	3.5	0.975 j	<0.2	**0.525**	6	0.0162	0.559 j
MW-15SU	Northeast of 1956 WB, outside CB	Background	Background	Surficial Upper	Surficial	12/05/2018	**6.3**	68	2.5	240	**570**	<1	<1	34	<1	<1	<1	**1.27**	21	<1	**795**	4.45	0.617 j	<0.2	**0.341**	4.874 j	0.016	<0.5
MW-15SU	Northeast of 1956 WB, outside CB	Background	Background	Surficial Upper	Surficial	02/06/2019	**6.3**	48.101 j	2.6	200	430	<1	<1	32	<1	NA	0.755 j	**5.42**	223	NA	**2080**	6.48	0.379 j	<0.2	**0.557**	9	NA	NA
MW-16BR	Northeast of 1985 WB, outside CB	Background	Background	Bedrock	Bedrock	06/13/2018	7.5	40.573 j	39	83	380	<1	0.611 j	428	<1	<1	<1	<1	**343**	<1	**280**	<1	<1	<0.2	<0.3	<5	0.000195 j	0.1944 j
MW-16BR	Northeast of 1985 WB, outside CB	Background	Background	Bedrock	Bedrock	08/29/2018	7.7	45.893 j	41	92	400	<1	0.51 j	387	<1	<1	<1	<1	**303**	<1	**289**	<1	<1	<0.2	0.114 j	2.546 j	0.00018 j	0.2
MW-16BR	Northeast of 1985 WB, outside CB	Background	Background	Bedrock	Bedrock	12/04/2018	7.8	43.236 j	36	47	310	<1	**11.9**	320	<1	<1	0.454 j	<1	208	<1	**151**	0.461 j	<1	<0.2	**1.35**	2.372 j	0.000995	0.082 j
MW-16BR	Northeast of 1985 WB, outside CB	Background	Background	Bedrock	Bedrock	02/05/2019	7.5	44.073 j	37	51	340	<1	8.3	398	<1	NA	<1	<1	198 S1	NA	**229 S1**	0.458 j	<1	<0.2	0.14 j	<5	NA	NA
MW-16S	Northeast of 1985 WB, outside CB	Background	Background	Surficial Lower	Surficial	06/13/2018	**6.3**	62	240	22	**620**	<1	<1	172	<1	<1	<1	0.621 j	132	<1	28	1.89	<1	<0.2	**1.18**	2.605 j	0.000546	0.244 j
MW-16S	Northeast of 1985 WB, outside CB	Background	Background	Surficial Lower	Surficial	08/29/2018	**6.3**	49.658 j	230	15	**580**	<1	<1	170	<1	<1	<1	0.995 j	164	<1	25	1.8	<1	<0.2	**1.42**	2.411 j	0.000429	0.2595 j
MW-16S	Northeast of 1985 WB, outside CB	Background	Background	Surficial Lower	Surficial	12/04/2018	**6.3**	73	**270**	21	**600**	<1	<1	176	<1	<1	<1	**2.04**	**435**	<1	**113**	2.92	<1	<0.2	**0.687**	3.42 j	0.000376	<0.5
MW-16S	Northeast of 1985 WB, outside CB	Background	Background	Surficial Lower	Surficial	02/05/2019	**6.2**	94	250	24	**620**	<1	<1	187	<1	NA	<1	**1.83**	184 S1	NA	**79 S1**	2.78	<1	<0.2	**0.601**	<5	NA	NA
MW-17BR	Northwest of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	06/12/2018	7.7	38.888 j	28	34	290	<1	0.347 j	624	<1	<1	<1	<1	204	<1	**79**	<1	<1	<0.2	0.19 j	<5	NA	0.22
MW-17BR	Northwest of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	08/22/2018	7.5	37.6 j	28	19	300	<1	<1	599	<1	<1	<1	<1	122	<1	**67**	<1	<1	<0.2	<0.3	<5	NA	0.2
MW-17BR	Northwest of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	12/05/2018	7.6	40.777 j	27	23	270	<1	<1	592	<1	<1	<1	<1	181	<1	**62**	0.355 j	<1	0.105 j	0.198 j	2.611 j	NA	0.2
MW-17BR	Northwest of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	02/04/2019	7.8	47.639 j	24	17	240	<1	<1	571	<1	NA	<1	<1	113	NA	**51**	<1	<1	<0.2	0.123 j	<5	NA	NA
MW-17SL	Northwest of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Lower	Surficial	06/12/2018	**5.6**	<50	16	**420**	**710**	<1	<1	51	<1	<1	<1	<1	**101000**	<1	**7860**	<1	<1	<0.2	**0.35**	<5	0.0000735 j	<0.5
MW-17SL	Northwest of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Lower	Surficial	08/22/2018	**5.4**	<50	19	**320**	**630**	<1	<1	46	<1	<1	<1	1	**76300**	<1	**6950**	<1	<1	<0.2	0.149 j	2.1 j	<0.0002	<0.5
MW-17SL	Northwest of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Lower	Surficial	12/05/2018	**5.5**	<50	18	**390**	**610**	<1	<1	57	<1	<1	0.341 j	0.358 j	**87200**	<1	**7160**	<1	<1	<0.2	**0.328**	2.644 j	<0.0002	<0.5
MW-17SL	Northwest of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Lower	Surficial	02/04/2019	**5.7**	<50	17	**390**	**690**	<1	<1	61	<1	NA	0.442 j	<1	**95700**	NA	**7080**	<1	<1	<0.2	0.259 j	<5	NA	NA
MW-17SU	Northwest of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	06/12/2018	**4.8**	<50	35	**690**	**910**	<1	0.638 j	19	0.955 j	<1	<1	**270**	**4610**	<1	**46900 M4**	58.4	<1	0.162 j	**0.846**	177	<0.0002	<1
MW-17SU	Northwest of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	08/22/2018	**4.4**	<50	36	**740**	**940**	<1	0.647 j	18	1.39	0.54 j	<1	**255**	**2070**	<1	**45400**	61.4	<1	0.146 j	**0.962**	197	<0.0002	<1
MW-17SU	Northwest of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	12/05/2018	**4.9**	<50	28	**470**	**750**	<1	0.357 j	21	0.674 j	0.428 j	<1	**187**	**5670**	<1	**37400**	43.2	<1	0.083 j	**0.814**	123	<0.0002	<1
MW-17SU	Northwest of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	02/04/2019	**5.0**	<50	28	**470**	**650**	<1	<1	19	0.526 j	NA	<1	**128**	**6590**	NA	**30900**	29.1	<1	<0.2	**0.421**	74	NA	NA
MW-18S	South of 1985 WB, outside CB	1985 Basin	Downgradient	Surficial Upper	Surficial	06/12/2018	**5.6**	485	86	220	**520**	<1	0.552 j	28	<1	<1	<1	**3.66**	**1520**	<1	**1550**	5.17	<1	<0.2	**1.42**	14	<0.0002	0.214 j
MW-18S	South of 1985 WB, outside CB	1985 Basin	Downgradient	Surficial Upper	Surficial	08/23/2018	**5.7**	554	67	210	**510**	<1	0.446 j	32	<1	<1	0.35 j	**2.04**	**640**	<1	**1470**	3.48	<1	0.095 j	**1.37**	10	<0.0002	0.193 j
MW-18S	South of 1985 WB, outside CB	1985 Basin	Downgradient	Surficial Upper	Surficial	12/06/2018	**6.1**	260	43	160	390	<1	0.759 j	40	<1	<1	0.881 j	**10.1**	**5360**	0.406 j	**6060**	5.17	<1	<0.2	**4.01**	2.635 j,B2	<0.0002	<0.5
MW-19S	South of 1978 WB, in CB	1978 Basin	Downgradient	Surficial Upper	Surficial	12/17/2018	**5.0**	<50	13	1.8	41	<1	<1	31	<1	<1	0.462 j	0.482 j	185	<1	17	0.591 j	<1	<0.2	**0.508**	2.461 j	NA	<0.1
MW-20BR	South of 1970 WB, outside CB	1970 Basin	Sidegradient	Bedrock	Bedrock	06/13/2018	7.9	28.476 j	10	15	180	<1	0.827 j	138	<1	<1	<1	<1	106	<1	**123**	<1	<1	<0.2	**0.326**	<5	NA	0.21
MW-20BR	South of 1970 WB, outside CB	1970 Basin	Sidegradient	Bedrock	Bedrock	08/28/2018	7.5	36.083 j	10	14	200	<1	0.759 j	143	<1	<1	0.723 j	<1	169	<1	**130**	<1	<1	<0.2	0.242 j	2.02 j	NA	0.21
MW-20BR	South of 1970 WB, outside CB	1970 Basin	Sidegradient	Bedrock	Bedrock	12/05/2018	8.0	32.433 j	10	12	190	<1	0.835 j	136	<1	<1	<1	<1	107	<1	**117**	<1	<1	<0.2	<0.3	4.126 j	NA	0.16
MW-20S	South of 1970 WB, outside CB	1970 Basin	Sidegradient	Surficial Lower	Surficial	06/13/2018	**6.3**	17.855 j	36	85	340	<1	<1	191	<1	<1	0.368 j	<1	**6710**	<1	**1360**	<1	<1	<0.2	**1.06**	<5	NA	0.17
MW-20S	South of 1970 WB, outside CB	1970 Basin	Sidegradient	Surficial Lower	Surficial	08/28/2018	**6.2**	28.733 j	35	86	390	<1	<1	187	<1	<1	<1	<1	**5890**	<1	**1340**	<1	<1	<0.2	**0.644**	2.119 j	NA	0.23
MW-20S	South of 1970 WB, outside CB	1970 Basin	Sidegradient	Surficial Lower	Surficial	12/05/2018	**6.3**	<50	37	85	350	<1	<1	188	<1	<1	<1	0.359 j	**5100**	<1	**1380**	0.397 j	<1	<0.2	**0.737**	3.018 j	NA	<0.2
MW-21BR	West of 1963 WB, in CB	1963 Basin	Downgradient	Bedrock	Bedrock	06/13/2018	8.5	152	46	9.2	180	<1	2.05	116	<1	<1	<1	<1	33	<1	<5	<1	<1	<0.2	**0.868**	<5	NA	**9.1**
MW-21BR	West of 1963 WB, in CB	1963 Basin	Downgradient	Bedrock	Bedrock	08/27/2018	**8.6**	151	48	9.9	190	<1	2.86	110	<1	<1	<1	<1	16	<1	6	<1	<1	<0.2	0.279 j	1.947 j	NA	**9**
MW-21BR	West of 1963 WB, in CB	1963 Basin	Downgradient	Bedrock	Bedrock	12/05/2018	**8.9**	147	52	8.5	190	<1	2.88	116	<1	<1	<1	<1	19	<1	7	<1	<1	<0.2	0.266 j	1.973 j	NA	**9.6**
MW-21BR	West of 1963 WB, in CB	1963 Basin	Downgradient	Bedrock	Bedrock	02/04/2019	**8.7**	151	47	10	200	<1	1.89	119	<1	NA	<1	<1	<10	NA	4.512 j	<1	<1	<0.2	**0.391**	<5	NA	NA
MW-21SL	West of 1963 WB, in CB	1963 Basin	Downgradient	Surficial Lower	Surficial	06/13/2018	**5.5**	53	21	**840**	**1200**	<1	<1	18	<1	<1	<1	**12.8**	238	<1	**1740**	8.55	<1	<0.2	**0.398**	10	<0.0002	<2
MW-21SL	West of 1963 WB, in CB	1963 Basin	Downgradient	Surficial Lower	Surficial	08/27/2018	**5.7**	68	20	**780**	**1200**	<1	<1	19	<1	<1	<1	**11.8**	131	<1	**1820**	8.12	<1	<0.2	**0.417**	13	<0.0002	<2
MW-21SL	West of 1963 WB, in CB	1963 Basin	Downgradient	Surficial Lower	Surficial	12/06/2018	**5.7**	66	22	**870**	**1300**	<1	<1	16	<1	<1	<1	**12.7**	166 B2	<1	**1940**	8.64	<1	0.116 j	**0.352**	31 B	<0.0002	<1
MW-21SL	West of 1963 WB, in CB	1963 Basin	Downgradient	Surficial Lower	Surficial	02/04/2019	**5.6**	45.603 j	21	**790**	**1200**	<1	<1	17	<1	NA	<1	**12.4**	140	NA	**1910**	8.11	<1	<0.2	0.27 j	11	NA	NA
MW-21SU	West of 1963 WB, in CB	1963 Basin	Downgradient	Surficial Upper	Surficial	06/13/2018	**3.8**	39.4 j	4.5	250	340	<1	2.99	21	**10.1**	0.692 j	0.581 j	**150**	40	0.955 j	**7330**	48.7	0.828 j	<0.2	0.217 j	175	0.000544	0.56
MW-21SU	West of 1963 WB, in CB	1963 Basin	Downgradient	Surficial Upper	Surficial	08/27/2018	**3.8**	55	4.8	**300**	340	<1	2.01	24	**10.3**	0.645 j	0.537 j	**139**	35	0.86 j	**7220**	45.7	0.519 j	<0.2	0.27 j	174	0.000574	0.56
MW-21SU	West of 1963 WB, in CB	1963 Basin	Downgradient	Surficial Upper	Surficial	12/05/2018	**3.9**	52	4.3	**280**	320	<1	1.76	25	**9.14**	0.66 j	0.577 j	**134**	54	0.657 j	**7420**	43.1	0.588 j	<0.2	**0.374**	172	0.000514	0.452 j
MW-21SU	West of 1963 WB, in CB	1963 Basin	Downgradient	Surficial Upper	Surficial	02/04/2019	**4.0**	37.229 j	3.9	**290**	320	<1	1.68	21	**8.61**	NA	0.373 j	**138**	16	NA	**7390**	43.7	0.544 j	<0.2	<0.3	167	NA	NA
MW-22BR	North of 1985 WB, outside CB	1985 Basin	Downgradient	Bedrock	Bedrock	06/12/2018	7.6	44.19 j	26	25	310	<1	0.956 j	**938**	<1	<1	<1	<1	**509**	<1	**238**	<1	<1	0.177 j	0.208 j	<5	NA	0.31
MW-22BR	North of 1985 WB, outside CB	1985 Basin	Downgradient	Bedrock	Bedrock	08/22/2018	7.4	59	18	34	380	<1	0.637 j	**1190**	<1	<1	<1	<1	**612**	<1	**256**	<1	<1	<0.2	<0.3	3.1 j	NA	0.28
MW-22BR	North of 1985 WB, outside CB	1985 Basin	Downgradient	Bedrock	Bedrock	12/05/2018	7.5	46.255 j	18	41	350	<1	1.3	**1220**	<1	<1	<1	<1	**794**	<1	**285**	<1	<1	<0.2	**0.481**	2.353 j	NA	0.26
MW-22BR	North of 1985 WB, outside CB	1985 Basin	Downgradient	Bedrock	Bedrock	02/06/2019	7.5	42.54 j	17	42	340	<1	0.988 j	**1250**	<1	NA	<1	<1	**702**	NA	**285**	<1	<1	<0.2	0.22 j	<5	NA	NA
MW-22S	North of 1985 WB, outside CB	1985 Basin	Downgradient	Surficial Lower	Surficial	06/12/2018	**6.3**	359	21	170	**620**	<1	0.473 j	103	<1	<1	<1	**1.18**	**72400**	<1	**3810**	0.407 j	<1	<0.2	**0.494**	<5	NA	0.136 j
MW-22S	North of 1985 WB, outside CB	1985 Basin	Downgradient	Surficial Lower	Surficial	08/22/2018	**6.0**	328	22	**380**	**680**	0.339 j	0.468 j	100	<1	<1	<1	0.93 j	**90600**	<1	**3760**	0.408 j	<1	<0.2	**0.422**	2.7 j	NA	0.1206 j
MW-22S	North of 1985 WB, outside CB	1985 Basin	Downgradient	Surficial Lower	Surficial	12/05/2018	**6.1**	262	23	**440**	**680**	<1	1.99	183	<1	<1	0.351 j	**3.06**	**97200**	<1	**4360**	0.672 j	<1	<0.2	**1.1**	4.114 j	NA	<1
MW-22S	North of 1985 WB, outside CB	1985 Basin	Downgradient	Surficial Lower	Surficial	02/06/2019	**6.3**	320	20	**260**	**530**	<1	2.1	149	<1	NA	0.53 j	**1.33**	**59900**	NA	**3140**	0.742 j	<1	<0.2	**1.13**	<5	NA	NA
MW-23BR	East of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	06/14/2018	7.5	21.756 j	92	49	340	<1	3.71	247	<1	<1	0.435 j	<1	35	<1	**105**	<1	<1	0.153 j	**2.65**	2.551 j	NA	0.24
MW-23BR	East of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	08/22/2018	7.6	24.8 j	100	45	440	<1	1.89	370	<1	<1	<1	<1	118	<1	**188**	<1	<1	<0.2	**0.479**	<5	NA	0.151 j
MW-23BR	East of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	12/05/2018	7.6	20.301 j	100	42	400	<1	1.72	385	<1	<1	<1	<1	134	<1	**177**	<1	<1	<0.2	0.163 j	<5	NA	0.0966 j
MW-23BR	East of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	02/06/2019	7.6	21.599 j	99	41	380	<1	1.72	398	<1	NA	<1	<1	157	NA	**185**	<1	<1	0.199 j	<0.3	<5	NA	NA
MW-23D	East of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	06/14/2018	7.5	<50	100	45	410	<1	2.49	246	<1	<1	<1	<1	298	<1	**156**	<1	<1	<0.2	**1.89**	4.376 j	0.00262	0.1514 j
MW-23D	East of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	08/22/2018	7.6	24.5 j	100	43	430	<1	2.49	259	<1	<1	<1	<1	**400**	<1	**146**	<1	<1	0.124 j	**0.845**	<5	0.00326	0.127 j
MW-23D	East of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	12/05/2018	7.5	17.007 j	100	41	390	<1	2.53	234	<1	<1	<1	<1	284	<1	**137**	<1	<1	<0.2	**0.599**	1.683 j	0.00301	0.0822 j
MW-23D	East of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	02/06/2019	7.6	17.182 j	99	40	360	<1	2.85	232	<1	NA	<1	<1	**312**	NA	**122**	<1	<1	<0.2	**0.421**	<5	NA	NA
MW-23S	East of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Lower	Surficial	06/14/2018	6.5	**3420**	21	170	340	<1	<1	48	<1	<1	<1	**3.15**	**463**	<1	**549**	3.21	<1	<0.2	**0.356**	<5	<0.0002	0.1536 j
MW-23S	East of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Lower	Surficial	08/22/2018	**6.4**	**3530**	20	160	380	<1	0.36 j	47	<1	<1	<1	**4.46**	**550**	<1	**1020**	4.38	<1	<0.2	0.273 j	2.1 j	<0.0002	0.228 j
MW-23S	East of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Lower	Surficial	12/05/2018	6.5	**3360**	21	160	340	<1	0.387 j	50	<1	<1	<1	**7.28**	**436**	<1	**1490**	4	<1	<0.2	**0.385**	2.757 j	<0.0002	0.105 j
MW-23S	East of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Lower	Surficial	02/06/2019	**6.4**	**3460**	20	160	330	<1	<1	44	<1	NA	<1	**3.2**	186	NA	**558**	3.41	<1	<0.2	**0.444**	<5	NA	NA
MW-24BR	East of 1985 WB, outside CB	1985 Basin	Downgradient	Bedrock	Bedrock	06/14/2018	6.6	**1410**	67	140	430	<1	0.935 j	81	<1	<1	<1	<1	143	<1	**929**	0.529 j	<1	<0.2	**0.349**	<5	0.000128 j	0.24
MW-24BR	East of 1985 WB, outside CB	1985 Basin	Downgradient	Bedrock	Bedrock	08/22/2018	6.6	**1350**	77	130	480	<1	0.418 j	76	<1	<1	<1	<1	93	<1	**897**	0.713 j	<1	<0.2	0.163 j	2.1 j	0.000177 j	0.307 j

I/A

CAPE FEAR
07/16/2019
BRANDON RUSSO
EVAN YURKOVICH

	PARAM	D 40CFR257 APPENDIX III CONSTITUENT				INORGANIC PARAMETERS (TOTAL CONCENTRATION)															ADIONUCLID	R PARAME
Reporting Units	**S.U.**	**ug/L**	**mg/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/mL**	**mg/L**
15A NCAC 02L Standard	**6.5-8.5**	**700**	**250**	**250**	**500**	**1***	**10**	**700**	**4***	**2**	**10**	**1***	**300**	**15**	**50**	**100**	**20**	**0.2***	**0.3***	**1000**	**0.03^**	**2**
Provisional Background (Surficial Aquifer)	**5.8-6.4**	**177**	**250**	**510**	**1200**	**1**	**3**	**183**	**1**	**1**	**1**	**89**	**37500**	**1**	**9170**	**48**	**1**	**0.2**	**1.268**	**62**	**0.0167**	**NE**
Provisional Background (Bedrock Unit)	**5.5-8.2**	**50**	**220**	**96**	**675**	**1**	**6**	**471**	**1**	**1**	**1**	**1.15**	**750**	**1**	**901**	**2**	**1.98**	**0.2**	**2.37**	**5**	**0.00196**	**NE**

							PARAM	D 40CFR257 APPENDIX III CONSTITUENT				INORGANIC PARAMETERS (TOTAL CONCENTRATION)															ADIONUCLID	R PARAME
Sample ID	**Location Description**	**Associated Unit**	**Location With Respect to Groundwater Flow Direction**	**Well Screen Location**	**Sample Location Aquifer Name**	**Sample Collection Date**	**pH**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Cobalt**	**Iron**	**Lead**	**Manganese**	**Nickel**	**Selenium**	**Thallium**	**Vanadium**	**Zinc**	**Total Uranium**	**Fluoride**
MW-24BR	East of 1985 WB, outside CB	1985 Basin	Downgradient	Bedrock	Bedrock	12/06/2018	6.8	**1110**	77	130	410	<1	1.24	86	<1	<1	<1	<1	50 B2	<1	**1140**	0.512 j	<1	<0.2	**0.331**	<5	0.000173 j	0.05 j
MW-24BR	East of 1985 WB, outside CB	1985 Basin	Downgradient	Bedrock	Bedrock	02/06/2019	6.7	**1050**	79	110	400	<1	1.31	86	<1	NA	<1	<1	46	NA	**1190**	0.513 j	<1	<0.2	**0.39**	<5	NA	NA
MW-24S	East of 1985 WB, outside CB	1985 Basin	Downgradient	Surficial Lower	Surficial	06/14/2018	**6.4**	**3500**	20	170	370	<1	0.371 j	68	<1	<1	<1	**8.31**	**334**	<1	**986**	5.52	<1	<0.2	**0.418**	<5	<0.0002	0.28
MW-24S	East of 1985 WB, outside CB	1985 Basin	Downgradient	Surficial Lower	Surficial	08/22/2018	**6.4**	**3420**	19	160	380	<1	0.335 j	57	<1	<1	<1	**3.6**	**373**	<1	**598**	4.7	<1	<0.2	0.221 j	5	<0.0002	0.346 j
MW-24S	East of 1985 WB, outside CB	1985 Basin	Downgradient	Surficial Lower	Surficial	12/06/2018	**6.4**	**3420**	20	170	360	<1	<1	61	<1	<1	<1	**1.93**	80 B2	<1	**414**	5.32	<1	<0.2	**1.32**	2.086 j,B	<0.0002	0.115 j
MW-24S	East of 1985 WB, outside CB	1985 Basin	Downgradient	Surficial Lower	Surficial	02/06/2019	**6.3**	**3350**	19	160	360	<1	<1	56	<1	NA	<1	**1.06**	23 S1	NA	**348**	5.49	<1	<0.2	**0.574**	<5	NA	NA
MW-25BR	of 1985 WB, outside CB, East of Bra	1985 Basin	Downgradient	Bedrock	Bedrock	12/17/2018	7.4	17.246 j	27	29	370	<1	0.975 j	148	<1	<1	0.512 j	<1	**361**	<1	**305**	<1	<1	<0.2	**2.53**	<5	0.00312	0.23
MW-25BR	of 1985 WB, outside CB, East of Bra	1985 Basin	Downgradient	Bedrock	Bedrock	02/04/2019	7.3	<50	31	17	400	<1	1.18	163	<1	NA	<1	<1	**560**	NA	**672**	<1	<1	<0.2	**1.1**	<5	NA	NA
MW-25BR	of 1985 WB, outside CB, East of Bra	1985 Basin	Downgradient	Bedrock	Bedrock	05/06/2019	7.3	18.326 j	36	9.8	420	<1	2.43	175	<1	NA	<1	<1	**1180**	NA	**491**	<1	<1	<0.2	**0.668**	<5	NA	NA
MW-25BRL	of 1985 WB, outside CB, East of Bra	1985 Basin	Downgradient	Bedrock	Bedrock	12/17/2018	7.4	19.052 j	120	10	400	<1	0.622 j	583	<1	<1	<1	<1	230	<1	**275**	<1	<1	<0.2	**1.16**	7	0.000776	0.1332 j
MW-25BRL	of 1985 WB, outside CB, East of Bra	1985 Basin	Downgradient	Bedrock	Bedrock	02/04/2019	7.5	<50	110	4.4	400	<1	1.08	589	<1	NA	<1	<1	**368**	NA	**318**	<1	<1	<0.2	**0.358**	<5	NA	NA
MW-25BRL	of 1985 WB, outside CB, East of Bra	1985 Basin	Downgradient	Bedrock	Bedrock	05/06/2019	7.6	20.01 j	120	3.9	410	<1	0.918 j	525	<1	NA	<1	<1	151	NA	**84**	<1	<1	<0.2	0.267 j	<5	NA	NA
PZ-01	Northwest of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	06/12/2018	**6.2**	**744**	20	220	**530**	<1	0.338 j	37	<1	<1	<1	**3.76**	**16200**	<1	**3820**	3.79	<1	<0.2	**0.384**	<5	NA	0.1388 j
PZ-01	Northwest of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	08/23/2018	**5.9**	472	25	**290**	**690**	<1	0.611 j	46	<1	<1	0.384 j	**13.3**	**20900**	<1	**15200**	5.82	<1	<0.2	**0.458**	4.636 j	NA	0.21 j
PZ-01	Northwest of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	12/05/2018	**6.0**	**722**	22	**270**	**550**	<1	<1	62	<1	<1	<1	**2.75**	**14900**	<1	**3900**	3.46	<1	<0.2	**0.665**	6	NA	<0.5
PZ-01	Northwest of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	02/04/2019	**6.0**	**748**	20	210	**540**	<1	<1	59	<1	NA	<1	**3.28**	**16400**	NA	**3670**	3.22	<1	<0.2	**0.311**	3.362 j	NA	NA
PZ-02	North of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	06/12/2018	**6.4**	**4060**	21	200	420	<1	<1	59	<1	<1	<1	**6.85**	**540**	<1	**2540**	3.68	<1	<0.2	**1.31**	<5	NA	0.16
PZ-02	North of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	08/23/2018	**6.4**	428	14	43	280	<1	0.825 j	56	<1	<1	<1	**2.87**	**388**	<1	**360**	1.31	2.08	<0.2	**3.57**	3.437 j	NA	0.2855 j
PZ-02	North of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	12/06/2018	**6.4**	**1690**	17	99	280	<1	<1	39	<1	<1	<1	0.692 j	252	<1	**530**	1.52	1.21	<0.2	**2.35**	2.257 j,B2	NA	<0.5
PZ-02	North of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	02/05/2019	**6.2**	**3840**	19	200	410	<1	<1	58	<1	NA	<1	**1.36**	32 S1	NA	**2580**	3.54	<1	0.121 j	**2.72**	<5	NA	NA
PZ-03D	East of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	06/12/2018	7.6	58	59	73	350	<1	4.06	171	<1	<1	0.376 j	<1	217	<1	**278**	0.908 j	<1	<0.2	**1**	<5	NA	0.2
PZ-03D	East of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	08/23/2018	7.7	62	59	72	370	<1	4.67	184	<1	<1	<1	<1	100	<1	**601**	0.724 j	<1	0.114 j	**0.367**	1.968 j	NA	0.18
PZ-03D	East of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	12/06/2018	7.5	63	58	72	350	<1	4.74	138	<1	<1	<1	<1	9.489 j,B2	<1	**497**	0.75 j	<1	0.095 j	0.151 j	<5	NA	0.17
PZ-03D	East of 1985 WB, in CB	1985 Basin	Downgradient	Bedrock	Bedrock	02/05/2019	7.5	89	58	70	360	<1	6.1	141	0.365 j	NA	0.482 j	0.95 j	11 S1	NA	**532**	1.53	0.576 j	**0.681**	**0.834**	<5	NA	NA
PZ-03S	East of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	06/12/2018	6.9	**1830**	**280**	**380**	**1300**	<1	0.586 j	53	<1	<1	0.339 j	**5.04**	**2480**	<1	**7300**	2.3	<1	<0.2	**5.11**	2.665 j	NA	0.972 j
PZ-03S	East of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	08/23/2018	**6.5**	**1720**	120	200	**760**	<1	<1	29	<1	<1	0.778 j	**1.39**	**827**	0.338 j	**1510**	1.83	<1	<0.2	**14.5**	3.614 j	NA	0.861 j
PZ-03S	East of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	12/06/2018	7.0	**1850**	230	**290**	**940**	<1	<1	33	<1	<1	0.868 j	**2.35**	272	<1	**3560**	1.41	<1	<0.2	**10.5**	9 B2	NA	0.68 j
PZ-03S	East of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	02/05/2019	6.8	**1500**	**270**	**280**	**1100**	<1	<1	42	<1	NA	<1	**2.53**	**564**	NA	**5260**	0.991 j	<1	<0.2	**3.51**	<5	NA	NA
PZ-04	South of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	06/12/2018	**5.4**	548	120	**330**	**740**	<1	0.652 j	52	<1	<1	0.971 j	**73.4**	**12800**	<1	**7450**	15.9	<1	<0.2	**4.14**	5	NA	0.1202 j
PZ-04	South of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	08/23/2018	**4.9**	333	67	180	480	<1	2.01	48	0.346 j	0.627 j	0.696 j	**50**	**3490**	1.19	**4800**	13.4	<1	<0.2	**7**	74	NA	0.2015 j
PZ-04	South of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	12/06/2018	**5.6**	220	34	130	310	<1	1.05	52	<1	<1	4.19	**30.5**	**9470**	0.464 j	**3910**	9.44	<1	<0.2	**4.9**	13 B2	NA	<0.5
PZ-04	South of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	02/07/2019	**5.4**	131	27	120	290	<1	0.693 j	42	<1	NA	0.873 j	**38.3**	**15000**	NA	**5230**	8.03	<1	<0.2	**3.7**	3.427 j	NA	NA
PZ-05	West of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	06/12/2018	**5.7**	**4440**	26	**260**	440	<1	<1	25	<1	0.535 j	<1	**8.05**	140	<1	**2820**	7.15	<1	<0.2	**0.427**	3.521 j	<0.0002	0.396 j
PZ-05	West of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	08/22/2018	**5.7**	**4970**	26	240	450	<1	<1	26	<1	0.403 j	<1	**9.76**	271	<1	**3010**	7.28	<1	0.094 j	**0.37**	7	<0.0002	0.368 j
PZ-05	West of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	12/06/2018	**5.7**	**4460**	23	**300**	470	<1	<1	28	<1	0.673 j	<1	**17.5**	151 B2	<1	**3440**	9.58	<1	<0.2	**0.578**	15 B	<0.0002	0.11 j
PZ-05	West of 1985 WB, in CB	1985 Basin	Downgradient	Surficial Upper	Surficial	02/05/2019	**5.6**	**3750**	22	**350**	**590**	<1	0.577 j	20	<1	NA	<1	**28.4**	**12200**	NA	**4580**	12.8	<1	<0.2	0.221 j	20	NA	NA
PZ-06	In 1985 WB	1985 Basin	Source Area	Ash Pore Water	Ash Pore Water	06/13/2018	7.0	**5950**	18	230	**780**	**1.7**	**731**	352	<1	<1	<1	**20.1**	**7590**	<1	**1270**	31.6	<1	**0.313**	**7.22**	<5	NA	1.5
PZ-06	In 1985 WB	1985 Basin	Source Area	Ash Pore Water	Ash Pore Water	08/29/2018	7.4	**5700**	19	230	**800**	**1.68**	**702**	346	<1	<1	0.661 j	**16.5**	**6180**	0.805 j	**1150**	25.6	0.495 j	**0.284**	**8.52**	4.763 j	NA	1.3
PZ-06	In 1985 WB	1985 Basin	Source Area	Ash Pore Water	Ash Pore Water	12/06/2018	7.3	**6000**	19	**260**	**850**	**1.55**	**679**	349	<1	<1	0.411 j	**16.4**	**6340 B2**	<1	**1230**	26.1	<1	**0.215**	**7.11**	2.942 j,B	NA	1.4
PZ-06	In 1985 WB	1985 Basin	Source Area	Ash Pore Water	Ash Pore Water	02/07/2019	7.3	**5650**	18	230	**840**	**1.5**	**670 M4**	350	<1	NA	0.338 j	**16.4**	**6040**	NA	**1230**	26.2	<1	**0.214**	**7.31**	2.477 j	NA	NA
PZ-07	In 1970 WB	1970 Basin	Source Area	Ash Pore Water	Ash Pore Water	06/13/2018	**3.7**	**1420**	32	**13000**	**15000**	<10	**190**	47.799 j	**507**	**7.445 j**	**221**	**1580**	**1910000**	12.4	**24400**	**3210**	13.3	**18.7**	**2400**	**7100**	NA	**11.62 j**
PZ-07	In 1970 WB	1970 Basin	Source Area	Ash Pore Water	Ash Pore Water	08/27/2018	**4.0**	**1470**	38	**28000**	**14000**	<1	**157**	45.316 j	**422**	**10.4**	**197**	**1560**	**1810000**	**15.2**	**21900**	**3220**	7.18	**16.9**	**2300**	**7130**	NA	**8.96 j**
PZ-07	In 1970 WB	1970 Basin	Source Area	Ash Pore Water	Ash Pore Water	12/06/2018	**3.8**	**1840**	10 j	**11000**	**15000**	<1	**137**	48.93 j	**418**	**7.96**	**263**	**1430**	**1770000 B2**	**17.8**	**18900**	**3130**	6.989 j	**16.3**	**2050**	**5090**	NA	<50
PZ-08	In 1963 WB	1963 Basin	Source Area	Ash Pore Water	Ash Pore Water	06/13/2018	6.5	295	39	210	**550**	**2.78**	**249**	72	<1	0.498 j	<1	**36.3**	**5760**	<1	**1860**	36.8	<1	**2.47**	**6.2**	12	NA	<1
PZ-08	In 1963 WB	1963 Basin	Source Area	Ash Pore Water	Ash Pore Water	08/27/2018	**6.3**	283	38	220	**540**	**2.55**	**179**	66	<1	0.462 j	0.498 j	**37.8**	**5160**	<1	**2080**	38.5	1.14	**2.77**	**3.12**	18	NA	0.2995 j
PZ-08	In 1963 WB	1963 Basin	Source Area	Ash Pore Water	Ash Pore Water	12/05/2018	**6.2**	454	25	**270**	**580**	**1.96**	**106**	58	<1	0.587 j	0.403 j	**28.4**	**3130**	<1	**1570**	50.5	8.04	**2.98**	**3.9**	20	NA	0.1235 j
PZ-08	In 1963 WB	1963 Basin	Source Area	Ash Pore Water	Ash Pore Water	02/04/2019	**5.8**	**975**	15	**300**	**590**	**2.16**	**25.9**	66	<1	NA	0.464 j	**8.01**	**364**	NA	**1240**	**277**	**49.8**	**7.38**	**10.1**	136	NA	NA

COLOR NOTES

Bold highlighted concentration indicates exceedance of the 15A NCAC 02L .0202 Standard or the IMAC. (Effective date for 15A NCAC 02L .0202 Standard and IMAC is April 1, 2013)

Turbidity of Sample ≥ 10 NTUs

Provisional Background Threshold Values reflect the values represented in the NCDEQ letter dated 10/11/2017.

Analytical data review has not been completed for this dataset.

ABBREVIATION NOTES

BGS - below ground surface
BOD - Biologic Oxygen Demand
CB - Compliance Boundary
COD - Chemical Oxygen Demand
Deg C - Degrees Celsius
DMAs - dimethylarsinic acid
DUP - Duplicate
Eh - Redox Potential
ft - Feet
GPM - gallons per minute
IMAC - Interim Maximum Allowable Concentrations. From the 15A NCAC 02L Standard, Appendix 1, April, 1, 2013.
MDC - Minimum Detectable Concentration
MeSe - Methylseleninic acid
mg/kg - milligrams per kilogram
mg/L - milligrams per liter
mg-N/L - Milligram nitrogen per liter
MMAs - monomethylarsonic acid
mV - millivolts

mV - millivolts
NA - Not available or Not Applicable
NE - Not established
NF - No Flow
NM - Not measured
NTUs - Nephelometric Turbidity Units
pCi/L - picocuries per liter
PSRG - Primary Soil Remediation Goals
RL - Reporting Limit
SeCN - selnocynante
SeMe (IV) - Selenomethionine
SPLP - Synthetic Precipitation Leaching Procedure
S.U. - Standard Units
TCLP - Toxicity Characteristic Leaching Procedure
ug/L - micrograms per liter
ug/mL - microgram per milliliter
umhos/cm - micromhos per centimenter
Well Locations referenced to NAD83 and elevations referenced to NAVD88

Hart Exhibit 53
Docket No. E-2, Sub 1219

Bednarcik Direct AGO Cross Ex. 9
Docket No. E-2, Sub 1219A

I/A

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Oct 02 2020

ENVIRONMENTAL AUDIT IN SUPPORT OF THE COURT APPOINTED MONITOR

H.F. Lee Plant
Goldsboro, North Carolina
USA

October 2019

Final Report Issued To:

Duke Energy and the Court Appointed Monitor

Prepared By:

Advanced GeoServices Corp.
and
The Elm Consulting Group International LLC

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PAGE NO.:

1.0 INTRODUCTION

Advanced GeoServices Corp. (AGC) and The Elm Consulting Group International LLC (Elm) (collectively, the Audit Team) are conducting environmental compliance audits (the Audits) of certain coal combustion residual (CCR) management locations owned or operated by Duke Energy Business Services LLC, Duke Energy Carolinas, LLC, and Duke Energy Progress, Inc. (collectively, Duke Energy). The Audits are being conducted under the direction of Mr. Benjamin Wilson, the Court Appointed Monitor (CAM), pursuant to an Order issued by the U.S. District Court, Eastern District of North Carolina, in case numbers 5:15-CR-62-H, 5:15-CR-67-H, and 5:15-CR-68-H.

The scope of the Audits is set forth in the plea agreements entered into by Duke Energy and the United States in the above cases, the Court's judgments in these cases, and a written Audit scoping document agreed to by Duke Energy and the United States.

1.1 BACKGROUND INFORMATION

The subject of this report is the Audit completed at Duke Energy's H.F. Lee Plant located in Goldsboro, North Carolina. The Audit was conducted on August 12 and 13, 2019, for a total of two days on-site. The Audit Team members were:

• Mr. Christopher Reitman, P.E. AGC	Project Director, Audit Team Leader, Sr. Subject Matter Expert (on-site)
• Mr. Joseph Cotier, CPEA, Elm	Sr. Environmental Auditor (on-site)
• Mr. Bernie Beegle, P.G., AGC	Sr. Subject Matter Expert (off-site)

The facility was represented by:

- Mr. Jeff Hines, Station General Manager
- Mr. Sharat Gollamudi, CCP System Owner, CCP Engineering
- Ms. Asha Sree, CCP Engineering
- Mr. Austin Mack, CCP Engineering
- Mr. Bobby Barnes, Manager, CCP Engineering
- Mr. Issa Zarzar, General Manager, CCP Project Management
- Mr. Steve Cahoon, EHS CCP Permitting and Compliance
- Ms. Cynthia Winston, Manager, EHS CCP Permitting and Compliance
- Mr. Andrew Shull, EHS CCP Waste & Groundwater
- Ms. Tammy Jett, EHS CCP Waste & Groundwater (by phone)
- Mr. Randy Hart, Regulatory Affairs
- Ms. Keeley McCormick, Environmental Rover, EHS CCP Compliance
- Mr. Steve Struble, Managing Director, EHS CCP Compliance
- Mr. Ricky Stroupe, EHS CCP Environmental Field Support
- Mr. Mike Graham, Station Environmental Field Support
- Mr. James Hailey, EHS CCP Health and Safety Field Support
- Mr. Keith Higgins, EHS CCP Compliance

1.2 FACILITY OVERVIEW

The H.F. Lee Plant (the H.F. Lee Facility) is located at 1677 Old Smithfield Road in Goldsboro, Wayne County, North Carolina. According to Duke Energy personnel, the H.F. Lee Facility is a decommissioned coal-fired electric generating plant that contained three (3) coal-fired units and four (4) oil-fired units. All seven of these units were retired in 2012 and subsequently demolished. In late 2012, a new natural gas-fired, combined-cycle plant went online at the H.F. Lee Facility.

1.2.1 Ash Management Activities

The following information regarding the onsite CCR management facilities was provided by Duke Energy personnel or was found in the Operations and Maintenance Manual for the H.F. Lee Facility. The H.F. Lee Facility includes four ash basins and a "Lay of Land Area." These features are described below:

- Active Ash Basin – The Active Ash Basin, also identified in Duke Energy project documentation as the 1982 Ash Basin, the Retired 1982 Ash Basin, the Retired Ash Basin, or the 1980 Ash Basin, has an area of approximately 62 acres and is formed by a 20-foot high earthen embankment (North Carolina Department of Environmental Quality (NCDEQ) ID No. WAYNE-022). The Active Ash Basin contains about 4,520,000 tons of ash. Process water flows into the Active Ash Basin associated with power generation were discontinued in 2012. The remaining flows into the basin were water pumped from the triangular basin, pumping of seepage discharges, and precipitation. An Ash Stack is present within the Active Ash Basin and is covered with vegetation. Although the Active Ash Basin no longer receives ash, this ash basin is often referred to by the historical names identified above. At the time of the Audit, the water in the Active Ash Basin had been decanted and a shallow area of ponded water (< 1 acre) remained in a small area within the basin. Duke Energy ceased placing CCR and non-CCR waste in the Active Ash Basin on April 4, 2019 and initiated the CCR closure process. Duke Energy plans on beneficiating the ash within the basin in an on-site unit.

- Ash Basins 1 and 2 – Ash Basins 1 and 2 are west of the H.F. Lee Facility across the Neuse River and were closed in 1962. Halfmile Branch, a creek, borders Ash Basins 1 and 2 to the south and west. The ash basins are formed by a 5 to 15-foot high earthen embankment and are heavily wooded. NCDEQ identifies the dams associated with Ash Basins 1 and 2 as WAYNE-031 and WAYNE-032, respectively. The combined surface area and total quantity of ash within Ash Basins 1 and 2 are 76 acres and 800,000 tons, respectively.

- Ash Basin 3 – Ash Basin 3 is located to the south of Ash Basins 1 and 2 and was closed in 1982. Ash Basin 3 is formed by an 8 to 10-foot high earthen embankment and is heavily wooded. NCDEQ identifies the dam associated with Ash Basin 3 as WAYNE-033. The surface area and total quantity of ash within Ash Basin 3 are 87 acres and 910,000 tons, respectively. Ash Basin 3 is separated from Ash Basins 1 and 2 by Halfmile Branch.

- Lay of Land Area – The Lay of Land Area (LOLA) or Ash Fill Area is an ash disposal area located between the Neuse River and the Cooling Pond of the H.F. Lee Facility and is about 9 acres in size. The Lay of Land Area is heavily wooded and contains about 72,000 cubic yards of ash.

Although the dams associated with Ash Basins 1, 2, and 3 are listed on the NCDEQ Dam Safety register, at the time of the Audit they were classified as non-jurisdictional. In 2015, NCDEQ requested characterization of Ash Basins 1, 2 and 3 from Duke Energy to revisit the classification of each of these basins. Duke Energy reported to the Audit Team that there has been no formal reclassification of Ash Basins 1, 2, and 3 by NCDEQ based on the information submitted.

Three historical ash fills have been identified at the H.F. Lee Facility. One fill area is located adjacent to the bypass canal; one is located along an area that was being evaluated for a CCR haul road, northeast of the three inactive basins; and the most recently identified area is located northwest of the railroad bridge located north of the decommissioned coal plant. The area near the bypass canal and northeast of the three inactive basins was previously delineated, and Duke Energy is planning additional investigations to characterize the amount of ash found near the railroad bridge over the next couple of months.

A 545-acre Cooling Pond sometimes referred to as the Cooling Lake exists to the east of the main power plant at the H.F. Lee Facility. The Cooling Pond is not considered part of the CCR facilities for purposes of this Audit because it is not related to any CCR management activities.

1.2.2 Environmental Permits and Programs

The H.F. Lee Facility operates under a number of environmental permits and programs, including:

- **National Pollutant Discharge Elimination System (NPDES) Wastewater Permitting** – NCDEQ issued NPDES Permit No. NC0003417 to the H.F. Lee Facility with an effective date of September 1, 2010 and an expiration date of May 31, 2013 (the 2010 Permit). A timely permit renewal application package was submitted to NCDEQ on November 19, 2012.

  As it relates to ash management activities, the permit covers:

  - Outfall 001: This outfall is permitted to discharge water from the ash pond treatment system (Active Ash Basin), which includes ash transport water, Rotamix System precipitator water, air pre-heater wash water, combustion turbine wash water, filter plant blowdown, and stormwater from the ash line trench. Discharges flow through a polishing pond and then to the Neuse River. Note that under the current operating configuration, there are no process waters being directed to the H.F. Lee Facility ash basins.

  Discharges from Outfall 001 recommenced in November 2017 after final decanting approval was received from NCDEQ on October 6, 2017. Duke Energy provided its notice of decanting to NCDEQ on November 17, 2017.

Part III.B of the permit's "Other Requirements" section requires groundwater monitoring if required by NCDEQ. The H.F. Lee Facility operates a network of 8 compliance wells at the Active Ash Basin (including 2 background wells) and 5 compliance wells at Ash Basins 1, 2, and 3 (including 1 background well), for assessing compliance with groundwater limits pursuant to 15A NCAC 02L.0200. These wells were sampled three times a year. Pursuant to the new NPDES Permit that became effect on July 1, 2019, the last NPDES groundwater sampling event occurred in June 2019.

NCDEQ issued NPDES permit renewal to Duke Energy with an effective date of July 1, 2019 and an expiration date of March 31, 2024 (the 2019 Permit). The primary outfall remains Outfall 001, which discharges from the Active Ash Basin to the Neuse River.

During August 2018, there was no flow at Outfall 001 from August 18 to 25, 2018, therefore no weekly samples were collected. This occurred as the Neuse River level was high enough to completely submerge the Outfall 001 discharge pipe. The Audit Team noted that "no flow" was recorded on the electronic Discharge Monitoring Report (eDMR) for the following dates: August 4, August 5, August 9 to 13, August 18, August 19, August 21, August 30, and August 31. The eDMR for August 2018, submitted to NCDEQ on September 24, 2018, included this information in the comments section. On April 12, 2019, NCDEQ issued a Notice of Deficiency (NOD), #NOD-2019-MV-0029, citing no weekly sample having been collected for pH, nitrite, TKN, and total nitrogen. On April 15, 2019, Duke Energy responded to the NOD in an email to NCDEQ explaining the high river level circumstances that led to the inability to collect the weekly sample. On July 10, 2019, NCDEQ issued a letter to Duke Energy indicating that no further action was due on the part of Duke Energy.

The 2010 Permit requires a quarterly chronic toxicity sample to be collected for Outfall 001. Duke Energy's schedule for collecting this sample at the H.F. Lee Facility was typically the 3rd month of the quarter (i.e., March, June, September and December) as there are no specific dates listed in the 2010 Permit. During 2018, Duke Energy ceased discharge from Outfall 001 on November 2 (completion of decanting) and did not recommence discharge until July 16, 2019 (initiation of dewatering), and therefore no quarterly toxicity sample was collected during the 4th quarter of 2018. Duke Energy submitted a letter to NCDEQ on January 29, 2019 explaining the reason for having no chronic toxicity result for the 4th quarter of 2018. On February 12, 2019, NCDEQ issued a Notice of Violation (NOV), #NOV-2019-TX-0008, to Duke Energy for failure to collect the required chronic toxicity sample. Duke Energy responded on March 7, 2019 and reiterated the reasons for having not collected the quarterly chronic toxicity sample at Outfall 001. Duke Energy has received no additional correspondence from NCDEQ on the matter.

On January 10, 2019, the North Carolina Environmental Management Commission Special Order by Consent No. EMC SOC WQ S18-006 (SOC) issued to Duke Energy became effective. The SOC has an expiration date of "no later than February 28, 2023." The SOC covers discharges from the following 46 seeps: LOLA S-01, LOLA S-01A, LOLA S-01B, S-01, S-02, S-03, S-03A, S-04, S-05, S-06, S-07, S-08, S-09, S-18, S-19, S-20, S-21, S-22, S-23, S-24, S-25, S-26, S-27, S-28, S-29, CPS-01, CPS-02, CPS-03, CPS-04, CPS-05, CPS-06, CPS-07, CPS-08, CPS-09, CPS-10, CPS-11, CPS-12, CPS-13, CPS-14, CPS-15, CPS-16, CPS-17, CPS-18, CPS-19, CPS-20, and CPS-21, all considered non-constructed seeps. Non-constructed seeps are not on or within a dam structure and do not convey wastewater via a pipe or constructed channel directly to a receiving stream.

The following Areas of Wetness (AOWs) have been dispositioned due to either lack of flow, lack of CCR constituents in flow, or the representation of the discharge by another seepage location: S-05, S-19, S-20, and S-21. Monitoring is required at S-03A, S-09, and instream locations both up and downstream in the Neuse River and up and downstream in Half Mile Branch. The SOC considers these monitoring locations sufficient to represent the 46 seeps in the SOC. S-03A and S-09 include interim action levels for arsenic, hardness, and total dissolved solids. The up and downstream locations in Half Mile Branch include interim action levels for mercury and selenium. The up and downstream locations in the Neuse River must cover NCDEQ's 2B standards. Quarterly monitoring is required for parameters specified in the SOC. At the time of the Audit, two rounds of sampling had been conducted. No exceedances of Interim Action Levels were noted. Additional requirements of the SOC included:

- Payment of an upfront civil penalty of $72,000 within 30 days of SOC issuance. This penalty was paid January 18, 2019.
- Completion of decanting of the Active Ash Basin by March 31, 2019. Decanting was completed November 2, 2018, with a notification letter sent to NCDEQ on March 26, 2019.
- Initiation of dewatering of the Active Ash Basin by July 31, 2019. Dewatering commenced on July 16, 2019, with a notification sent to NCDEQ on July 16, 2019.
- Annual completion of a comprehensive survey of existing and potential new seeps. New non-constructed seeps identified and reported to NCDEQ in the Annual Seep Report are deemed covered by the SOC. The Annual Seep Survey was conducted on March 29, 2019. No new seeps were identified during the 2018 annual seep survey.

  - Posting of a copy of the H.F. Lee Facility NPDES Permit, SOC, and related reports on Duke Energy's external website. All required documents have been posted.

- **NPDES Industrial Stormwater Permitting –** Duke Energy submitted an application for an individual stormwater permit under the NCDEQ stormwater program on February 2, 2016. NCDEQ responded on February 21, 2017 indicating that, based on the permit application submitted, an industrial stormwater permit was not required for the H.F. Lee Facility.

- **NPDES Construction Stormwater Permitting –** NCDEQ has issued stormwater construction permits for activities related to the ash basins and ash management at the H.F. Lee Facility. These permits were issued by NCDEQ under its General Permit for Construction Activities, No. NCG010000, and include three active permits and two permits that were issued for construction that has not yet commenced. The active permits related to ash management include:

  - WAYNE-2016-010 was issued September 28, 2015 for Ponds 1 & 2 Vegetation Removal;
  - WAYNE-2016-011 was issued October 1, 2015 for Inactive Basin 3 Restabilization; and
  - WAYNE-2019-011 was issued October 10, 2018 for Triangular Pond Dike Decommissioning.

Erosion and sedimentation control plans were in place for these projects.

The permits for which work has not yet commenced include:

- WAYNE-2017-022 was issued April 19, 2017 for Active Basin Seepage Collection System; and
- WAYNE-2019-032 was issued June 20, 2019 for the Haul Road from the 82 Basin.

Since this work had not started, these permits were not reviewed as part of the Audit scope of work.

- **Title V Permitting** – Title V Permit No. 01812T44, effective September 8, 2016 and with an expiration date of June 30, 2020, has been issued to the H.F. Lee Facility for all facility activities, including ash basin management. An April 11, 2019 modification was issued that included a new 200 kW diesel-fired generator to be used as back-up power for the electric pumps in the Active Ash Basin. The generator is listed as Insignificant Activity I-ASH-1. Fugitive dust from the ash basins (I-20), wet ash transfer systems (I-F-2, I-F-3, I-F-4), ash handling (I-F-5) and the haul roads (I-F-6) are also listed as Insignificant Activities. The Ash Basin is listed as source F-4 for fugitive dust and toxics emissions. Fugitive dust control was included in Section 3.MM of the permit.

- **Spill Prevention, Control and Countermeasure (SPCC) Plan** – The H.F. Lee Facility SPCC Plan, Amendment 19, developed and implemented by Duke Energy, covers all site activities including management of the Active Ash Basin and was last revised July 2017.

- **Tier II Reporting** – Hazardous chemicals inventory reporting on Tier II for 2018 has been completed and was submitted on February 5, 2019.

- **Waste Unit Compliance Boundaries** – NCDEQ issued a letter dated August 25, 2017 to Duke Energy regarding compliance boundaries for North Carolina coal ash facilities. On February 15, 2018, Duke Energy submitted to NCDEQ an updated compliance boundary map for the H.F. Lee Facility that eliminated Ash Basins 1, 2, and 3. On March 7, 2018, Duke Energy submitted to NCDEQ an updated compliance boundary map for the H.F. Lee Facility that eliminated the Triangle Basin.

- **North Carolina Coal Ash Management Act of 2014 (CAMA) –** CAMA requires identification of drinking water supply wells within one half mile of the facility, submission of Groundwater Assessment Plans, installation and multiple rounds of sampling from Assessment Wells, submission of Groundwater Assessment Reports summarizing groundwater investigations, submission of an Annual Groundwater Protection and Restoration Report, submission of Discharge Assessment Plans to characterize seeps, submission of a Groundwater Corrective Action Plan, and ash basin closure/removal. The required activities associated with these items have been completed in accordance with the schedule provided under CAMA.

  CAMA allows for a modification of the current intermediate risk ranking and provides a potential closure extension of these basins until 2028 if specific dam improvements are completed and approved by NCDEQ and an alternative permanent local water supply is provided to local residents. However, Duke Energy has announced that the ash at the H.F. Lee Facility will be beneficially used. The beneficial use will involve burning the ash and creating a very low carbon residual material which can be utilized in cement. In accordance with CAMA, this would allow the closure date to be extended to December 31, 2029.

NCDEQ approved the 2019 Interim Monitoring Plan for the H.F. Lee Facility. The Plan includes 50 monitoring wells sampled semi-annually and 12 wells sampled quarterly. The CAMA groundwater results are reported on a quarterly basis.

On October 11, 2017, NCDEQ approved provisional background threshold values (PBTVs) for the H.F. Lee Facility. In addition, Duke Energy submitted to NCDEQ the H.F. Lee Facility's 2018 Groundwater Protection and Restoration Annual Report on January 25, 2019, and its 2018 Surface Water Protection and Restoration Annual Report on January 21, 2019.

On July 31, 2019, Duke Energy submitted to NCDEQ the 2018 H.F. Lee Facility CAMA Annual Report.

- **Federal Coal Combustion Residuals Rule (CCR Rule)** – The CCR Rule (40 CFR, part 257, Subpart D) identifies standards for the disposal of CCR in landfills and surface impoundments. Ash Basins 1, 2, and 3 and the LOLA are exempt from the CCR Rule regulations because they were retired in 2012, prior to the CCR Rule's effective date, and they no longer impound water. The Active Ash Basin is subject to the CCR Rule because it does impound water and the H.F. Lee Facility continues to be used for power generation. Table 1 summarizes the reports and plans posted by Duke Energy to its publicly available website in accordance with the CCR Rule.

  The Active Ash Basin's CCR monitoring well network consists of 34 monitoring wells. On March 14, 2018, Duke Energy provided notice on Duke Energy's public website that the Active Ash Basin is now in the CCR assessment monitoring program due to statistically significant increases over the background values of the Appendix III parameters.

On November 7, 2018, Duke Energy posted on Duke Energy's public website the required location restrictions for the H.F. Lee Facility's impoundments, which stated the Active Ash Basin did not meet the surface impoundment standard for placement above the uppermost aquifer (40 CFR § 257.60(a)) and did not meet the surface impoundment standard for wetlands (40 CFR § 257.61(a)). Failure to meet the wetlands restriction requires Duke Energy to cease placing CCR and non-CCR waste streams into the Active Ash Basin and begin closure by April 12, 2019.

On December 14, 2018, Duke Energy provided notice on Duke Energy's public website that the following CCR Rule Appendix IV constituents were detected at levels above the applicable Groundwater Protection Standards.

Active Ash Basin

- Arsenic
- Cobalt
- Lithium

On May 7, 2019, Duke Energy provided notice on Duke Energy's public website of CCR Assessment of Corrective Measures Reports for the Active Ash Basin.

On April 24, 2019, Duke Energy posted on its public website the Notice of Intent to Close the Active Ash Basin and noted that flows to Active Ash Basin ceased on April 4, 2019.

1.2.3 Dam and Other Structural Permits and Approvals

The Active Ash Basin (WAYNE-022), Ash Basin 1 (WAYNE-031), Ash Basin 2 (WAYNE-032), and Ash Basin 3 (WAYNE-033) at the H.F. Lee Facility were associated with the ash management operations and were grandfathered under North Carolina's Session Law 2009-390 (Senate Bill

1004, effective January 1, 2010). Under this grandfathering, the original designs of the dams were not subject to the current design standards for new construction, although modifications after the effective date may be subject to these standards. On October 9, 2018, Duke Energy was provided a one-year extension on the requirement to remove vegetation on the inactive ash basin embankments. On July 2, 2019, Duke Energy submitted plans to remove pipes on the eastern side of the Active Ash Basin and make improvements to the haul road.

The Active Ash Basin dam referenced above has a high hazard classification under the North Carolina Dam Safety system. The dams at Ash Basins 1, 2, and 3 are currently classified as low hazard and are non-jurisdictional dams.

On February 1, 2019, Chapter 15A Section 02K.0224 of the North Carolina Administrative Code (15A NCAC 02K.0224) was published in the North Carolina Register. These regulations created new standards for the CCR impoundments during specific flood events. Duke Energy met with NCDEQ to discuss these regulations on March 13, 2019 and completed analysis and submitted the results of the analysis to NCDEQ on July 10, 2019. The analysis showed that Ash Basins 1, 2, and 3, which are scheduled to be excavated, would be flooded during a design storm event and did not meet the new basin spillway requirements. Duke Energy is scheduled to meet with NCDEQ on August 21, 2019 to determine the applicability of these new regulations to the inactive ash basins. NCDEQ has previously noted these regulations were not applicable to portions of the basins being excavated at Dan River and did not note deficiencies associated with these new regulations during their March 6, 2019 inspection of the ash basins at Duke Energy's Cape Fear Facility.

1.2.4 CCR Management Projects and Other Facility Activities

During the Audit, Duke Energy was installing upgrades to facility infrastructure, including haul roads to support the planned beneficial use of the excavated ash at the H.F. Lee Facility and development of the planned areas for beneficial use. The planned beneficial use involves heating the ash to remove organic carbon to make the ash more suitable for use in cement. Current plans call for system operation to start in late 2019 and the earliest ash deliveries to start in the first quarter of 2020.

During September 2018, following the Hurricane Florence, Ash Basins 1, 2, and 3 were inundated. The flooding events displaced a small amount of ash at the berm of Ash Basin 3 where ash reportedly sloughed from Ash Basin 3 and was deposited at the boundary of the Ash Basin 3 dam. Concentrated pockets of cenospheres, a residual CCR material which floats on water, were also seen within the footprint of the inactive Ash Basins 1, 2, and 3 in several locations. Testing of the adjacent Neuse River water was reportedly completed by both Duke Energy and NCDEQ, and results reportedly met state water quality standards.

2.0 AUDIT SCOPE AND SUBJECT MATTER

The Audit was completed in accordance with the court documents and the Audit scoping document agreed to by Duke Energy and the United States. A description of the scope is provided as Attachment A. The Audit included ash management activities, including aspects of generation that affect the nature of the waste streams from the point of generation into surface impoundments or ash management basins, landfills, and/or storage piles. The Audit focused on the activities at the facility since the date of the last Audit, which was August 12-13, 2018.

3.0 AUDIT FINDINGS

The following Findings at the H.F. Lee Facility were identified by the Audit Team.

3.1 EXCEEDANCES OF THE STATE GROUNDWATER QUALITY STANDARDS

Requirement – The State groundwater rules establish maximum contaminant levels for groundwater at or beyond the compliance boundary for the ash basins. *See* 15A NCAC 02L.0202. 15A NCAC 02L.0103(d) provides that "[n]o person shall conduct or cause to be conducted, any activity which causes the concentration of any substance to exceed that specified" under the Class GA standards or the interim maximum acceptable concentrations (IMACs) established for groundwater quality in 15A NCAC 02L.0202. Further, under N.C.G.S.A. § 143-215.1(i), "[a]ny person … who is required to obtain an individual permit … for a disposal system under the authority of G.S. 143-215.1 [water pollution control] … shall have a compliance boundary … beyond which groundwater quality standards may not be exceeded." *See also* 15A NCAC 02L.0102(3) (defining "compliance boundary" as "a boundary around a disposal system at and beyond which groundwater quality standards may not be exceeded").

In addition, under N.C.G.S.A. § 143-215.6A(a)(1), civil penalties may be assessed against any person who violates any standard established by NCDEQ under the authority of N.C.G.S.A. § 143-214.1, which covers groundwater standards.

Finding – Constituents exceeding the standards for Class GA waters, established in 15A NCAC 02L.0202, were documented in monitoring wells located at or beyond the compliance boundary for the Active Ash Basin. Based on a review of the 2018 and 2019 CAMA groundwater monitoring analyses and the NPDES groundwater monitoring analyses, arsenic, boron, cobalt, iron, manganese, total dissolved solids, and vanadium were observed to exceed the 02L or IMAC groundwater standards or the NCDEQ-approved PBTVs, if the PBTV was greater than the 02L or IMAC groundwater standards, one or more times at or beyond the compliance boundary of the Active Ash Basin. A summary of the 2018 and 2019 CAMA groundwater monitoring results is presented in Attachment B to this report. Attachment C provides the NPDES Groundwater Results.

Duke Energy has stated its opinion that pursuant to a September 2015 Settlement Agreement with NCDEQ, “Duke Energy is not subject to any further financial penalties for exceedances of groundwater standards” and “Duke Energy is not subject to any further enforcement action based on exceedances of groundwater standards as long as it remains in substantial compliance with CAMA groundwater requirements.”

The CAM has advised the Audit Team that the Audit scope does not include an evaluation of compliance with the September 2015 Settlement Agreement, and therefore the Audit Team does not take a position on Duke Energy’s opinion.

4.0 OPEN LINES OF INQUIRY

Open Lines of Inquiry are items identified by the Audit Team while on-site that, due to limited available information or the need for additional research, could not be determined as being in compliance or out of compliance. There were no Open Lines of Inquiry identified during the Audit.

5.0 AUDIT APPROACH

5.1 ON-SITE ACTIVITIES

During its time on-site, the Audit Team conducted an opening conference with facility personnel to discuss the scope of work and the plan for accomplishing necessary tasks while at the facilities. A site tour of the coal ash management and program support areas was subsequently completed. Following the tour, the Audit Team conducted a review of pertinent files, interviews with facility representatives, and verification of facility activities related to the ECPs, written programs, and permits. A debrief was conducted each Audit day to advise the facility representatives of Audit progress, open lines of inquiry, possible Audit findings, and needs for the next day. At the completion of the Audit, the Audit Team led a verbal discussion of draft Audit findings with facility representatives.

5.2 STANDARDS OF PRACTICE

The fieldwork portion of the Audit was conducted on August 12-13, 2019 with compliance reporting commencing May 14, 2015, the date of the court's judgments. The Audit focused on the activities at the facility since the date of the last Audit, which was August 13-14, 2018. The Audit was based on:

- Physical inspections of the facility;
- Examination of selected administrative and operating records made available by facility staff at the Audit Team's request;
- Interviews and discussions with key facility management and staff; and
- Verification procedures designed to assess the facility's application of, and adherence to, terms of the probation, environment laws and regulations, and site policies and procedures. In addition, the Audit Team reviewed the facility's adherence to good management practices.

The Audit followed established audit protocols and procedures. It should be understood that the Audit consisted of evaluating a sample of practices and was conducted over a short period of time. Efforts were made toward sampling major facets of environmental performance during the period under review. This method is intended to uncover major system deficiencies and the Audit may not have identified all potential problems.

To support the overall independence of the Audit process, the Audit included an auditing professional certified by the Board of Environmental, Health and Safety Auditor Certifications (BEAC). BEAC is an accredited professional certification board that issues the Certified Professional Environmental Auditor (CPEA) designation to qualified auditors. Under BEAC, auditor independence is a key criterion for the implementation of an effective third-party audit program. The Audit was implemented in accordance with the standards related to auditor independence.

The process by which the Audit was conducted was consistent with the general state of the art of environment auditing and the best professional judgment of the Audit Team. To conduct the Audit, the team implemented a formal approach, drawing on process guidance from both BEAC and the Auditing Roundtable (AR) guidance documents. Guidance documents included:

- *Standards for the Professional Practice of Environmental, Health and Safety Auditing*. Prepared by the Board of Environmental, Health and Safety Auditor Certifications, 2008.

- ISO 19011:2002 – Guidelines for Quality and/or Environmental Management Systems Auditing. Prepared by the International Organization for Standardization, 2002.

- Standard for the Design and Implementation of an Environmental, Health and Safety Audit Program. Prepared by The Auditing Roundtable, Inc., 1995.

- Minimum Criteria for the Conduct of Environmental, Health and Safety Audits, Prepared by The Auditing Roundtable, Inc.

5.3 REPRESENTATIVE SAMPLING

When confronted with a large population of data to review or equipment to inspect, the Audit Team employed representative sampling techniques to evaluate records over the Audit period requested, and as necessary, for physical inspection of some types of common equipment. The sample size for records reviews or equipment inspections required professional judgment.

The Audit Team’s judgement considered the following:

- The outcome of the evaluation of the records sampled. If problems are found in the representative sample, more records may need to be examined to evaluate compliance status.
- Potential for or severity of non-compliance.
- The general appearance and observed practices of certain operating areas.
- Information obtained during an interview that indicates a potential problem.
- Other specific information or guidance from the CAM.
- Time available during the Audit.

The Audit Team also employed the following types of sampling techniques, depending upon the characteristics of a specific population:

- Random sampling – every item has an equal chance of being selected.
- Interval sampling – select every nth item, (e.g., every third manifest in chronological order as contained in facility files).
- Block sampling – auditor uses his/her judgment to select a specific block of items, (e.g., petroleum storage tank inspections from April to October).
- Stratified sampling – population is divided into groups, which are then sampled through random or judgmental techniques.

TABLE 1

TABLE 1
Active Ash Basin - Plans and Reports Posted by Duke Energy under the CCR Rule

Document Name	Category	Release Date
Closure Plan	Closure and Post Closure Care	08/01/2019
CCR Annual Surface Impoundment Inspection Report 2019	Operating Criteria	08/01/2019
Annual Meeting with Local Emergency Responders 2019	Design Criteria	06/18/2019
CCR Assessment of Corrective Measures Report	Groundwater Monitoring and Corrective Action	05/07/2019
Notice of Intent to Close	Closure and Post Closure Care	04/24/2019
CCR Annual Groundwater Monitoring and Corrective Action Report 2018	Groundwater Monitoring and Corrective Action	03/01/2019
Notice of Initiation of Assessment of Corrective Measures	Groundwater Monitoring and Corrective Action	02/19/2019
Notice of Groundwater Protection Standard Exceedance 2018	Groundwater Monitoring and Corrective Action	12/14/2018
Annual Fugitive Dust Control Report 2018	Operating Criteria	12/05/2018
Wetlands	Location Restriction	11/07/2018
Unstable Areas	Location Restriction	11/07/2018
Seismic Impact Zones	Location Restriction	11/07/2018
Fault Areas	Location Restriction	11/07/2018
Placement Above Uppermost Aquifer	Location Restriction	11/07/2018
Emergency Action Plan for HF Lee Active Ash Pond	Design Criteria	10/01/2018
CCR Annual Surface Impoundment Inspection Report 2018	Operating Criteria	07/31/2018
Annual Meeting with Local Emergency Responders 2018	Design Criteria	06/28/2018

TABLE 1
(Continued)
Active Ash Basin - Plans and Reports Posted by Duke Energy under the CCR Rule

Document Name	Category	Release Date
Notice of Establishment of an Assessment Monitoring Program - HF Lee Active Ash Basin	Groundwater Monitoring and Corrective Action	03/14/2018
CCR Annual Groundwater Monitoring and Corrective Action Report	Groundwater Monitoring and Corrective Action	02/06/2018
Emergency Action Plan for HF Lee Active Ash Pond Revision 006A	Design Criteria	01/25/2018
HF Lee Inundation Maps	Design Criteria	01/25/2018
2017 Annual CCR Fugitive Dust Control Report-HF Lee	Operating Criteria	11/29/2017
Groundwater Sampling and Analysis Program Selection of Statistical Method Certification-HF Lee Active Ash Basin	Groundwater Monitoring and Corrective Action	11/06/2017
Groundwater Monitoring System Certification-HF Lee Active Ash Basin	Groundwater Monitoring and Corrective Action	11/06/2017
HF Lee Fugitive Dust Control Plan Revision 1	Operating Criteria	08/17/2017
CCR Annual Surface Impoundment Inspection Report 2017	Operating Criteria	08/02/2017
Annual Meeting with Local Emergency Responders 2017	Design Criteria	06/29/2017
Annual Fugitive Dust Control Report 2016	Operating Criteria	12/05/2016
Initial Structural Stability Assessment	Design Criteria	11/16/2016
Initial Factor of Safety Assessment	Design Criteria	11/15/2016
Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016
Inflow Design Flood Control System	Operating Criteria	11/03/2016
History of Construction	Design Criteria	10/25/2016
Initial Hazard Classification Assessment Certification	Design Criteria	10/12/2016

TABLE 1
(Continued)
Active Ash Basin - Plans and Reports Posted by Duke Energy under the CCR Rule

Document Name	**Category**	**Release Date**
Existing Liner Design Criteria	Design Criteria	10/11/2016
Annual Surface Impoundment Report 2016	Operating Criteria	08/11/2016
Annual Surface Impoundment Report (Initial)	Operating Criteria	02/16/2016
Annual Surface Impoundment Report (Initial) Revision 1	Operating Criteria	02/19/2016

*This summary of reports was downloaded on August 10, 2019

ATTACHMENT

ATTACHMENT A
AUDIT SCOPE

A-1 GENERAL AUDIT SCOPE ITEMS

The general Audit scope items included:

- Review and evaluation of documentation for maintenance and repair of structures and equipment used for coal ash disposal,

- Review and evaluation of documentation of modifications, failures, leaks, damage, disrepair and other problems at the coal ash management units,

- Review and evaluation of documentation of efforts to correct failures, leaks, damage, disrepair and other problems where they determine that employee/contractor actions were likely a primary or contributing cause to a compliance finding,

- Review and evaluation of documentation of communication of the items above within the organization,

- Review and evaluation of documentation associated with the specific environmental compliance items described below and laws, regulations, and policies associated with these items, and

- Review of compliance with administrative aspects and regulatory submissions related to coal ash management-specific regulations, including:

–	Coal Combustion Residuals	40 CFR Part 257 Subpart D
–	NC Coal Ash Management Act of 2014	NC General Statutes Chapter 130A, Article 9

More specific items which were addressed in the Audits to comply with the General Audit Scope are described below.

A-2 SPECIFIC COMPLIANCE WITH THE ECP-NC

The following items related to specific ECP-NC compliance were reviewed as part of the Audit:

1. Verify maintenance and sufficient funding of corporate compliance organizations (ABSAT, CCP organization, National Ash Management Advisory Board). Where a root cause of a compliance finding appears in an auditor's judgment to result from inadequate funding, the AGC/ELM Audit Team will identify this in the Audit finding.

2. Verify timely production of satisfactory Compliance Officer (CO) reports to the CAM relating to the development, implementation, and enforcement of the ECP-NC. No auditing work is associated with this work at this time.

3. Evaluate existence and efficacy of toll-free hotline/e-mail inbox for violation reporting, including the appropriateness of the follow-up investigation and disposition of each reported matter. This requirement will be evaluated for the first year of audits and then reassessed.

4. Evaluate completion and efficacy of periodic notices (via Internet, Intranet, email, notices in employee work areas, and publication in community outlets) to employees and the public of the availability of the toll-free hotline and electronic mail inbox.

5. Evaluate training materials and curricula utilized in the mandated training program, particularly those tailored to employee's specific job descriptions, to determine whether it advances the goal of "ensuring that every domestic employee of Duke Energy Corporation and its wholly-owned or operated affiliates understands applicable compliance policies and is able to integrate the compliance objectives in the performance of his/her job." Ensure that the subjects specifically named in the plea agreements are covered by the training (namely, notice and reporting requirements in the event of a release or discharge and the safe and proper handling of pollutants, hazardous substances and/or wastes).

6. Evaluate whether Defendants are using "Best Efforts" to comply with the obligations under the ECP-NC. Where the Audit Team makes compliance findings, the Audit Team will, upon request, provide their opinion on whether this best efforts standard applies, and if so, whether best efforts have been used.

7. Verify compliance at each facility with the specific procedures and protocols set forth in the ECP-NC.

A-3 SPECIFIC COMPLIANCE WITH OTHER PROVISIONS OF THE PLEA AGREEMENT

The following items related to specific items in the Plea Agreement were reviewed as part of the Audit:

1. Determine whether Defendants have opened, expanded, or reopened any coal ash or coal ash wastewater impoundment and, if so, verify that they are lined and do not allow unpermitted discharges of coal ash or coal ash wastewater to waters of the United States.

2. Verify that Defendants have determined the volume of wastewater and coal ash in each wet-storage coal ash impoundment in North Carolina as described in the plea agreements and that written or electronic records of this information are maintained in a location available to facility staff and employees responsible for making environmental or emergency reports.

3. Review citations/notices of violations/notices of deficiency related to violations of federal, state, or local law to assure that they have been properly relayed to the Court and, as appropriate under the plea agreements, determine their materiality.

4. Evaluate Defendants' efforts to close coal ash impoundments at Dan River, Riverbend, Asheville, and Sutton for legal compliance.

5. Note any observations made during the Audit that cause concern regarding the assets and/or security available to the Defendants to meet the obligations imposed by the Judgment in this case.

A-4 GENERAL ENVIRONMENTAL COMPLIANCE SUBJECT AREAS

The following items related to General Environmental Compliance were reviewed as part of the Audit:

1. Assess all waste streams from Duke Energy facilities with coal ash impoundments. Review Duke Energy's processes, procedures, and practices, as well as compliance with those processes, procedures, and practices, for:

    a. identifying waste streams (especially, but not limited to, waste streams with discharge points into bodies of water),
    b. identifying and communicating any modifications or changes, or potential modifications or changes, to waste streams,
    c. ensuring proper handling/disposal of waste streams,
    d. identifying, preventing, and mitigating any risks or hazards that could affect waste streams and/or the disposal of waste streams, and
    e. ensuring proper permitting for waste streams.

For Item 1.d., the Audit Team evaluated such risk/hazard issues where there were compliance findings associated with waste streams.

2. Review and evaluate documentation of:

    a. Maintenance and repair of structures and equipment related to coal ash disposal,
    b. Modification of the coal ash impoundments and related pollution prevention equipment and structures,
    c. Failures, leaks, damage, disrepair, and other problems,
    d. Communication of the information described in a-c within the organization, and
    e. Efforts to correct failures, leaks, damage, disrepair, and other problems.

3. Assess the employees responsible for inspection, maintenance, and repair of coal ash basins and related structures and equipment. The assessment included an assessment of the workloads of such employees to assure that Duke Energy's

facilities are adequately staffed. These assessments were made where the Audit Team determines that employee/contractor actions were likely a primary or contributing cause to a compliance finding.

4. Review the results and recommendations of any other Audits (internal or external/state mandated) and assess Duke Energy's implementation of those recommendations.

5. Review and assess Duke Energy's processes, procedures, and practices for identifying, communicating, and addressing problems and potential problems at its coal ash basins (leaks, unpermitted discharges, etc.).

6. Review and assess Duke Energy's policies, procedures, practices, and equipment for handling emergency releases from its coal ash basins and evaluate the personnel with duties in such situations.

7. Verify that Duke Energy is complying with its NPDES wastewater and stormwater permits, as well as other relevant environmental permits. This should include verifying Duke Energy's timely submission of permit applications, permit renewal applications, and responses to requests for additional information from the relevant regulatory authority.

8. Review and assess any actions or measures Duke Energy has undertaken to assure accountability and prevent recurrences when problems and/or failures occur (i.e. disciplinary actions, re-training, revision to policies and procedures, etc.). This review will be completed where the Audit Team determines that employee/contractor actions were likely a primary or contributing cause to a compliance finding.

9. Review and assess compliance with the following environmental regulations, as applicable to the management of coal ash:

a.	Wastewater Discharges	40 CFR 122; 15A NCAC 2H.0100 *et seq*
b.	Stormwater Discharges	40 CFR 122.26; 15A NCAC 2H.1000 *et seq.;* NC General Permit (Construction) No. NCG010000
c.	NC Groundwater Standards	15A NCAC 02L.0202(h)
d.	Hazardous Waste Management	15A NCAC 13A.0100 to 13A.0107
e.	Oil Pollution Prevention	40 CFR Part 112
f.	Air Pollution (Title V)	15A NCAC 2Q, and
g.	Hazardous Chemicals (Tier II)	40 CFR Part 370.

Reviews also included an analysis of overall compliance and the status and security of the asset. Subsequent reviews of individual facilities will evaluate the movement towards compliance. The Audit did not include an evaluation of compliance with the September 2015 Settlement Agreement with NCDEQ.

A–5 LIST OF PERMITS AND PROGRAMS DEEMED TO BE EITHER DIRECTLY OR INDIRECTLY IN SUPPORT OF ASH MANAGEMENT

During the Audit, the Audit Team reviewed a variety of written programs developed and implemented by Duke Energy and facility staff. State-issued permits and supporting documentation relative to environmental programs and geotechnical aspects of ash basin management were also requested and reviewed.

Requested documents, pertinent to management of ash in basins, landfills, ponds, etc. were outlined in the pre-audit questionnaire for each facility and included, but were not limited to:

1. The Compliance Register developed for ETrac for the Site.

2. The Duke Energy Operations Manual for the facility.

3. A site plan, site map, or aerial photo which shows the entire facility and key features of the facility including NPDES outfalls associated environmental monitoring locations, storage tanks, etc.

4. Most recent 2 years of maintenance, monitoring, and inspection records for each coal ash/CCR basin (just the physical inspections, not the groundwater records).

5. A “Phase 1 and Phase 2” summary of ash basin conditions prepared by an outside consultant.

6. Duke Energy’s permitting plans for addressing ash impoundments and landfills at this facility.

7. Applicable pages from the Duke Energy basin-by-basin coal ash/CCR project tracking document for this facility.

8. Original basin/landfill/coal ash management unit construction records.

9. Documentation of changes to these units.

10. Coal ash unit construction permit application and approval.

11. State-issued permits and application materials for permits associated with coal ash/CCR management (e.g., dam permits).

12. Any currently effective state order, consent order, or similar state direction that addresses coal ash/CCR management at the site.

13. Records required to be maintained in the site's operating record under the federal CCR regulation and/or any state CCR regulatory program.

14. Records of off-site ash shipments from May 2015 forward.

15. Stormwater permit application and approval for all outfalls.

16. Industrial wastewater (NPDES/POTW) permit application and approval for all outfalls/discharges.

17. Industrial and stormwater sampling and monitoring records, and any corrective action plans (last 2 years).

18. Stormwater pollution prevention plan.

19. Landfill operating permit with maintenance and monitoring requirements.

20. Landfill leak detection and groundwater monitoring records from the last 2 years along with any workplans that describes the rationale for the monitoring system at the Site.

21. Landfill operating permit with maintenance and monitoring requirements.

22. Copies of any air permits and applications for coal ash units and ancillary operations.

23. Any testing and monitoring records completed to comply with the air permits.

24. Any notices of violation~~s~~ associated with the coal ash/CCR management activities received over the last 2 years.

25. Copy of SPCC Plan.

26. Community Right-to-Know
    a. Copies of lists of hazardous chemicals or MSDSs submitted;
    b. Copies of Tier I or II reports; and
    c. Copies of Form R (toxic release inventory) reports.

27. Copies of communications with employees and the public regarding availability of toll-free hotline and electronic mail inbox for reporting suspected environmental violations.

28. Management Systems:

    a. List of responsible party for each environmental activity.
    b. All environmental-related training records.
    c. All environmental policies and procedures.
    d. Organization chart.
    e. Site diagram identifying storage areas, tanks, etc.

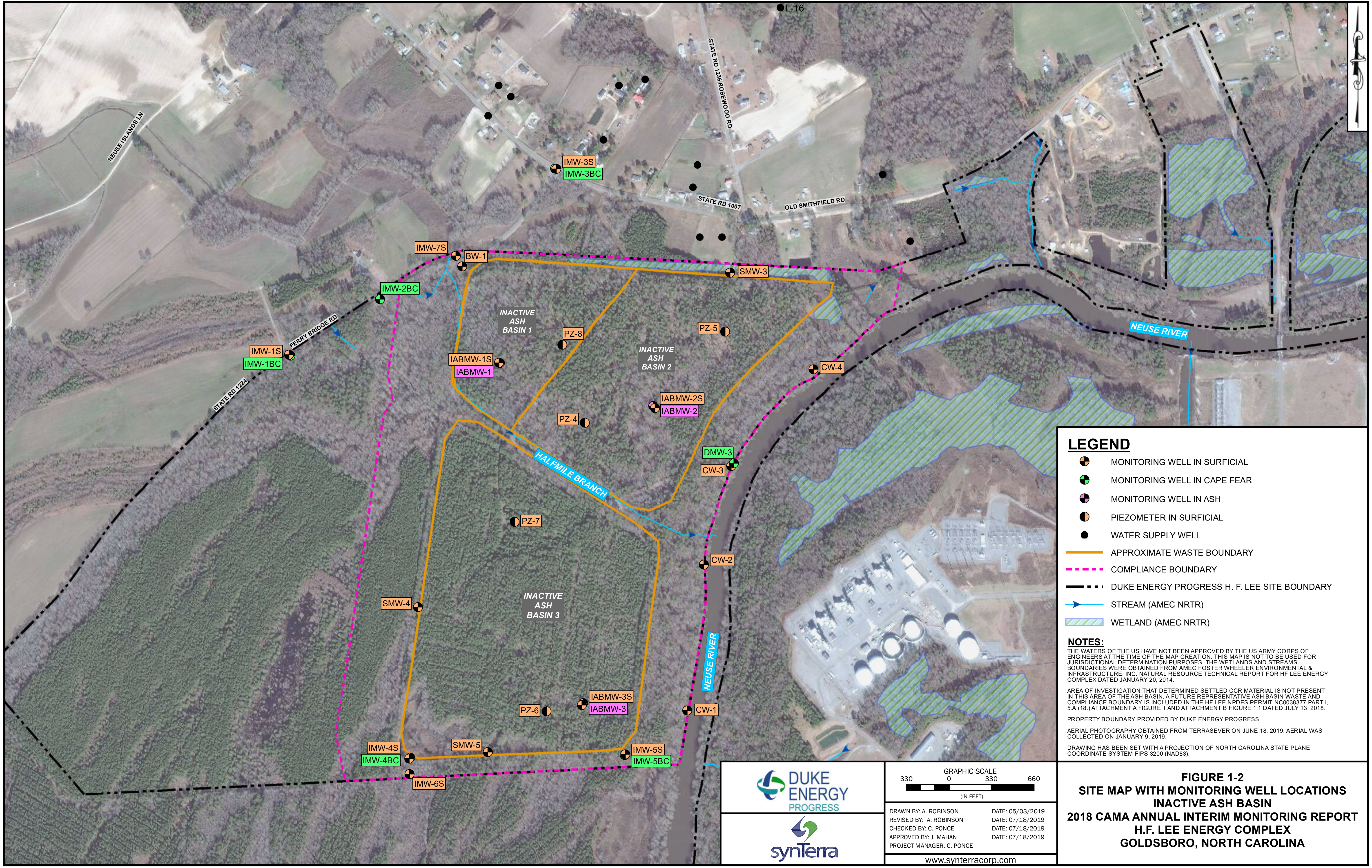
29. Employee training records related to environmental programs and ash management policies.

I/A

ATTACHMENT B

2018 AND 2019 CAMA GROUNDWATER DATA SUMMARY AND WELL LOCATION MAP

I/A



NOTES:

THE WATERS OF THE US HAVE NOT BEEN APPROVED BY THE US ARMY CORPS OF ENGINEERS AT THE TIME OF THE MAP CREATION. THIS MAP IS NOT TO BE USED FOR JURISDICTIONAL DETERMINATION PURPOSES. THE WETLANDS AND STREAMS BOUNDARIES WERE OBTAINED FROM AMEC FOSTER WHEELER ENVIRONMENTAL & INFRASTRUCTURE, INC. NATURAL RESOURCE TECHNICAL REPORT FOR HF LEE ENERGY COMPLEX DATED JANUARY 20, 2014.

AREA OF INVESTIGATION THAT DETERMINED SETTLED CCR MATERIAL IS NOT PRESENT IN THIS AREA OF THE ASH BASIN. A FUTURE REPRESENTATIVE ASH BASIN WASTE AND COMPLIANCE BOUNDARY IS INCLUDED IN THE HF LEE NPDES PERMIT NC0038377 PART I, 5.A.(18.) ATTACHMENT A FIGURE 1 AND ATTACHMENT B FIGURE 1.1 DATED JULY 13, 2018.

PROPERTY BOUNDARY PROVIDED BY DUKE ENERGY PROGRESS.

AERIAL PHOTOGRAPHY OBTAINED FROM TERRASEVER ON JUNE 18, 2019. AERIAL WAS COLLECTED ON JANUARY 9, 2019.

DRAWING HAS BEEN SET WITH A PROJECTION OF NORTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3200 (NAD83).

DUKE ENERGY PROGRESS

synTerra

DRAWN BY: A. ROBINSON	DATE: 05/03/2019
REVISED BY: A. ROBINSON	DATE: 07/18/2019
CHECKED BY: C. PONCE	DATE: 07/18/2019
APPROVED BY: J. MAHAN	DATE: 07/18/2019
PROJECT MANAGER: C. PONCE	

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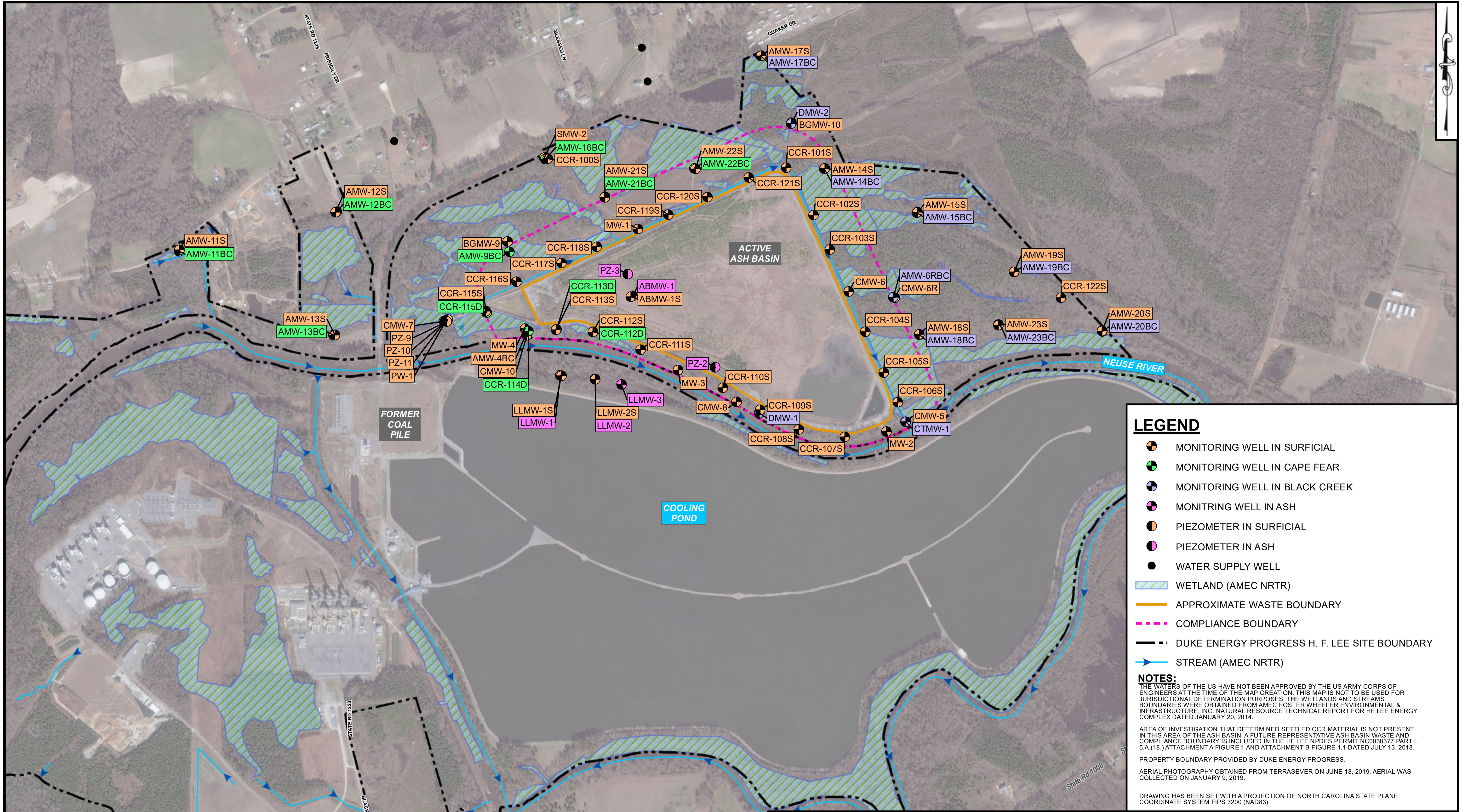
FIGURE 1-2
SITE MAP WITH MONITORING WELL LOCATIONS
INACTIVE ASH BASIN
2018 CAMA ANNUAL INTERIM MONITORING REPORT
H.F. LEE ENERGY COMPLEX
GOLDSBORO, NORTH CAROLINA

I/A



LEGEND

- ● MONITORING WELL IN SURFICIAL
- ● MONITORING WELL IN CAPE FEAR
- ● MONITORING WELL IN BLACK CREEK
- ● MONITRING WELL IN ASH
- ◐ PIEZOMETER IN SURFICIAL
- ◐ PIEZOMETER IN ASH
- ● WATER SUPPLY WELL
- ▨ WETLAND (AMEC NRTR)
- ━ APPROXIMATE WASTE BOUNDARY
- ‐ ‐ ‐ COMPLIANCE BOUNDARY
- ━ ‐ · DUKE ENERGY PROGRESS H. F. LEE SITE BOUNDARY
- ➤ STREAM (AMEC NRTR)

NOTES:

THE WATERS OF THE US HAVE NOT BEEN APPROVED BY THE US ARMY CORPS OF ENGINEERS AT THE TIME OF THE MAP CREATION. THIS MAP IS NOT TO BE USED FOR JURISDICTIONAL DETERMINATION PURPOSES. THE WETLANDS AND STREAMS BOUNDARIES WERE OBTAINED FROM AMEC FOSTER WHEELER ENVIRONMENTAL & INFRASTRUCTURE, INC. NATURAL RESOURCE TECHNICAL REPORT FOR HF LEE ENERGY COMPLEX DATED JANUARY 20, 2014.

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PROPERTY BOUNDARY PROVIDED BY DUKE ENERGY PROGRESS.

AERIAL PHOTOGRAPHY OBTAINED FROM TERRASEVER ON JUNE 18, 2019. AERIAL WAS COLLECTED ON JANUARY 9, 2019.

DRAWING HAS BEEN SET WITH A PROJECTION OF NORTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3200 (NAD83).

DUKE ENERGY
PROGRESS

synTerra

GRAPHIC SCALE
500 0 500 1,000
(IN FEET)

DRAWN BY: A. ROBINSON DATE: 05/03/2019
REVISED BY: A. ROBINSON DATE: 07/09/2019
CHECKED BY: C. PONCE DATE: 07/09/2019
APPROVED BY: J. MAHAN DATE: 07/09/2019
PROJECT MANAGER: C. PONCE

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FIGURE 1-3
SITE MAP WITH MONITORING WELL LOCATIONS ACTIVE ASH BASIN
2018 CAMA ANNUAL INTERIM MONITORING REPORT
H.F. LEE ENERGY COMPLEX
GOLDSBORO, NORTH CAROLINA

I/A

	PARAME	40CFR257 APPENDIX III CONSTITUE			INORGANIC PARAMETERS (TOTAL CONCENTRATION)									IONUCLI
FACILITY NAME: Reporting Units	S.U.	ug/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L
DATE UPDATED: CAC 02L Standard	**6.5-8.5**	**700**	**250**	**500**	**1***	**10**	**700**	**2**	**1***	**300**	**50**	**0.2***	**0.3***	**5^**
SPREADSHEET UPDATED BY: nd (Surficial Unit)	**3.4-6.8**	**50**	**54.7**	**163**	**1**	**1**	**641**	**1**	**13.7**	**413.8**	**838**	**0.2**	**0.471**	**23.4**
SPREADSHEET CHECKED BY: l (Cape Fear Unit)	**5.3-8.3**	**256**	**23**	**385**	**1**	**1**	**342**	**1**	**1**	**11600**	**1560**	**0.2**	**0.3**	**3.01**
Provisional Background (Black Creek Unit)	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**

		PARAME	40CFR257 APPENDIX III CONSTITUE			INORGANIC PARAMETERS (TOTAL CONCENTRATION)									IONUCLI
Sample ID	Sample Collection Date	pH	Boron	Sulfate	Total Dissolved Solids	Antimony	Arsenic	Barium	Cadmium	Cobalt	Iron	Manganese	Thallium	Vanadium	Total Radium
ABMW-01	02/25/2019	**6.4**	**4540**	**560**	**1500**	**2.68**	9.44	113	NA	**42**	**558**	**6400**	**1.69**	**51.7**	NA
ABMW-01S	08/16/2018	6.6	**3120**	12	**560**	<1	**987**	**778**	<1	**7**	**45900**	**1660**	<0.2	0.168 j	3.43
ABMW-01S	02/25/2019	**6.5**	**2910**	14	**570**	<1	**987**	**805**	NA	**6.93**	**42700**	**1580**	<0.2	0.104 j	NA
ABMW-01S	05/14/2019	6.68	**2810**	20	**550**	<1	**893**	**788**	NA	**5.74**	**38100**	**1480**	<0.2	0.135 j	NA
AMW-04BC CCR	10/24/2018	6.8	118	27	220	<1	0.585 j	204	<1	<1	NA	NA	<0.2	NA	1.519
AMW-04BC CCR	03/26/2019	6.8	125	36	300	<1	0.467 j	225	<1	<1	NA	NA	<0.2	NA	2.598
AMW-06RBC	08/20/2018	6.6	188	17	110	<1	<1	63	<1	<1	**5180**	**210**	<0.2	<0.3	NA
AMW-06RBC	02/25/2019	6.8	185	14	120	<1	<1	66	NA	<1	**5310**	**228**	<0.2	<0.3	NA
AMW-09BC	08/21/2018	7.0	80	1.3	130	<1	0.505 j	336	<1	<1	**1220**	**168**	<0.2	0.119 j	NA
AMW-11BC	08/16/2018	7.1	<50	<0.1	63	<1	<1	8	<1	0.42 j	**9270**	**1390**	<0.2	<0.3	NA
AMW-11BC	02/13/2019	6.5	<50	0.35	40	<1	<1	10	NA	**1.71**	**6780**	**1100**	<0.2	<0.3	NA
AMW-11S	08/16/2018	**4.5**	<50	6.2	<25	<1	<1	101	<1	**4.21**	12	33	<0.2	<0.3	0.908
AMW-11S	02/13/2019	**4.5**	<50	6.5	<25	<1	<1	115	NA	**4.14**	18	27	<0.2	<0.3	NA
AMW-12BC	08/16/2018	**5.7**	17.782 j	7.1	66	<1	1.19	49	<1	0.964 j	**4600**	**145**	<0.2	**0.844**	NA
AMW-12BC CCR	10/24/2018	**5.9**	23.392 j	7.3	52	<1	0.938 j	61	<1	**1.34**	NA	NA	<0.2	NA	1.3745
AMW-12BC	02/14/2019	**5.8**	<50	7.7	62	<1	0.944 j	52	NA	**1.18**	**5880**	**147**	<0.2	**1.6**	NA
AMW-12BC CCR	02/14/2019	**5.8**	19.774 j	7.2	75	<1	0.952 j	51	<1	**1.08**	NA	NA	<0.2	NA	1.326
AMW-12S	08/16/2018	**4.4**	<50	4.1 M2	<25	<1	<1	57	<1	0.986 j	87	9	<0.2	<0.3	NA
AMW-12S CCR	10/24/2018	**4.5**	<50	3.9	<25	<1	<1	55	<1	**1.04**	NA	NA	<0.2	NA	**8.46**
AMW-12S	02/14/2019	**4.5**	<50	5.4	35	<1	<1	62	NA	**1.07**	73	11	<0.2	0.184 j	NA
AMW-12S CCR	02/14/2019	**4.5**	<50	1.1	40	<1	<1	60	<1	**1.17**	NA	NA	<0.2	NA	**8.01**
AMW-13BC	08/16/2018	**6.5**	67	6.7	140	<1	1.03	361	<1	0.636 j	**12700**	**103**	<0.2	**0.401**	NA
AMW-13BC	02/13/2019	6.7	57	6.5	140	<1	0.908 j	356	NA	0.66 j	**11300**	**100**	<0.2	0.143 j	NA
AMW-13BC CCR	02/13/2019	6.7	74	6.8	140	<1	0.799 j	361	<1	0.594 j	NA	NA	<0.2	NA	1.541
AMW-13S	08/16/2018	**5.3**	<50	17	140	<1	<1	90	<1	0.681 j	80	**80**	<0.2	0.219 j	NA
AMW-13S	02/13/2019	**5.4**	<50	16	140	<1	<1	125	NA	<1	18	6	<0.2	<0.3	NA
AMW-14BC	08/20/2018	6.8	251	20	130	<1	<1	47	<1	<1	**2520**	**110**	<0.2	<0.3	NA
AMW-14BC	02/26/2019	6.9	239	21	120	<1	<1	53	NA	<1	**2820**	**126**	<0.2	<0.3	NA
AMW-14S	08/20/2018	**5.5**	53	24	87	<1	3.4	64	<1	**4.02**	**7120**	50	<0.2	**0.333**	NA
AMW-14S	02/26/2019	**5.7**	34.789 j	20	45	<1	1.98	51	NA	**2.54**	**3920**	33	<0.2	**0.303**	NA
AMW-15BC	08/20/2018	6.9	197	16	110	<1	<1	46	<1	<1	**1420**	**80**	<0.2	0.158 j	NA
AMW-15BC	02/26/2019	7.0	191	15	84	<1	<1	48	NA	<1	**1310**	**84**	<0.2	0.157 j	NA
AMW-15S	08/20/2018	**5.1**	94	25	93	<1	0.635 j	74	<1	**1.06**	**1320**	45	<0.2	**2.68**	NA
AMW-15S	02/26/2019	**5.3**	80	27	79	<1	<1	68	NA	**1.35**	**699**	44	0.097 j	**1.29**	NA
AMW-15S CCR	02/26/2019	**5.3**	78	26	65	<1	0.36 j	69	<1	**1.31**	NA	NA	<0.2	NA	0.79
AMW-15S	05/14/2019	**5.23**	89	23	83	<1	0.547 j	67	NA	**1.25**	**1170**	47	0.12 j	**1.9**	NA
AMW-16BC	08/21/2018	**5.6**	27.2 j	3.8	<25	<1	<1	18	<1	**11.4**	**306**	33	<0.2	**2.05**	NA
AMW-16BC CCR	10/23/2018	**5.9**	<50	4	<25	<1	<1	18	<1	**12.6**	NA	NA	<0.2	NA	0.6374
AMW-16BC	02/13/2019	**5.5**	17.556 j	2.9	<25	<1	<1	17	NA	**12.7**	23	26	<0.2	**2.11**	NA
AMW-16BC CCR	02/13/2019	**5.5**	<50	2.9	38	<1	<1	17	<1	**12.8**	NA	NA	<0.2	NA	1.369
AMW-17BC	08/21/2018	6.9	280	67	200	<1	1.58	45	<1	0.983 j	**898**	**68**	<0.2	0.24 j	NA
AMW-17BC	02/13/2019	7.1	288	65	210	<1	2.36	49	NA	**2.74**	**2060**	**130**	<0.2	<0.3	NA
AMW-17S	08/21/2018	**4.5**	75	26	30	<1	<1	86	<1	0.612 j	18	**70**	<0.2	0.197 j	NA
AMW-17S CCR	10/23/2018	**3.9**	61	21	45	<1	<1	86	<1	**1.34**	NA	NA	0.131 j	NA	2.744
AMW-17S	02/13/2019	**4.7**	62	25	47	<1	<1	97	NA	**1.08**	131	37	<0.2	**0.325**	NA
AMW-17S CCR	02/13/2019	**4.7**	64	21	66	<1	<1	95	<1	**1.08**	NA	NA	<0.2	NA	3.009
AMW-18S	08/20/2018	**5.9**	**2100**	59	220	<1	**16.5**	113	<1	**6.51**	**13400**	**316**	<0.2	**0.688**	2.66
AMW-18S	02/26/2019	**6.1**	**1580**	45	160	<1	**12.5**	92	NA	**5.22**	**11400**	**265**	<0.2	**0.687**	NA
AMW-18S CCR	02/26/2019	**6.1**	**1650**	49	170	<1	**11.3**	94	<1	**5.34**	NA	NA	<0.2	NA	1.858
AMW-19BC	08/17/2018	**6.2**	70	4.6	64	<1	<1	34	<1	<1	**2240**	**56**	<0.2	0.239 j	NA
AMW-19BC	02/25/2019	**6.3**	73	7.1	78	<1	<1	32	NA	<1	**2240**	**59**	<0.2	0.106 j	NA
AMW-19S	08/17/2018	**4.6**	46.632 j	15	52	<1	0.341 j	62	<1	**2.08**	**2390**	37	<0.2	**2.22**	NA
AMW-19S	02/25/2019	**5.1**	34.342 j	17	72	<1	<1	60	NA	**1.92**	**2410**	39	<0.2	**2.01**	NA
AMW-20BC	08/17/2018	**5.0**	24.295 j	14	55	<1	1.2	38	<1	**3.38**	**2850**	43	<0.2	**3.12**	NA
AMW-20BC	02/25/2019	**5.4**	23.366 j	14	88	<1	0.989 j	42	NA	**2.99**	**3010**	**53**	<0.2	**2.68**	NA
AMW-20S	08/17/2018	**4.7**	24.746 j	14	66	<1	1.86	33	<1	**4.49**	**3730**	42	<0.2	**3.02**	NA
AMW-20S	02/25/2019	**5.2**	22.392 j	17	77	<1	1.79	35	NA	**4.5**	**3670**	47	<0.2	**2.8**	NA
AMW-21BC	08/20/2018	**11.4**	48.1 j	0.59	390	<1	2.33	332	<1	0.568 j	**1380**	14	<0.2	**0.656**	NA
AMW-21S	08/20/2018	**5.3**	40.8 j	11	75	<1	0.441 j	39	<1	0.665 j	**1820**	36	<0.2	**2.4**	NA
AMW-22BC	08/20/2018	7.4	291	18	190	<1	2.17	65	<1	<1	**709**	**90**	<0.2	0.118 j	NA
AMW-22BC	02/27/2019	7.5	283	24	200	<1	2.04	64	NA	<1	**723**	**92**	<0.2	<0.3	NA
AMW-22S	08/20/2018	**4.6**	52	25	82	<1	0.427 j	200	0.436 j	**1.06**	**994**	46	0.147 j	**1.12**	NA
AMW-22S	02/27/2019	**4.7**	39.117 j	21	83	<1	0.369 j	126	NA	0.985 j	**466**	25	<0.2	**0.645**	NA
AMW-23BC	08/17/2018	**6.1**	97	19	79	<1	<1	40	<1	<1	**2090**	**71**	<0.2	**0.317**	NA
AMW-23BC	02/25/2019	**6.1**	96	21	110	<1	<1	42	NA	<1	**2180**	**77**	<0.2	**0.329**	NA
AMW-23S	08/17/2018	**5.5**	236	14	65	<1	<1	53	<1	**1.97**	**3720**	50	<0.2	**2.63**	NA
AMW-23S	02/25/2019	**5.3**	235	16	82	<1	<1	55	NA	**1.48**	**4720**	**54**	<0.2	**2.39**	NA
AMW-23S CCR	03/06/2019	**5.6**	222	14	80	<1	<1	52	<1	**1.57**	NA	NA	<0.2	NA	0.579
BGMW-09	08/21/2018	**5.5**	49.9 j	83	**570**	<1	0.54 j	203	0.543 j	**5.38**	**720**	**314**	<0.2	**2.92**	NA
BGMW-09	10/23/2018	**5.8**	<50	19	190	<1	<1	110	<1	**3.52**	**3180**	**120**	<0.2	**2.68**	NA
BGMW-09	02/27/2019	**5.8**	25.194 j	24	200	<1	0.402 j	133	NA	**2.42**	**2070**	**84**	<0.2	**1.74**	NA
BGMW-09 CCR	02/27/2019	**5.8**	23.307 j	23	220	<1	0.474 j	130	<1	**2.79**	NA	NA	0.136 j	NA	0.543
BGMW-09	03/06/2019	**6.0**	<50	22	210	<1	<1	136	<1	<1	**1190**	35	<0.2	**0.926**	NA
BGMW-09	05/14/2019	**5.73**	31.907 j	17	170	<1	0.612 j	138	NA	**6.4**	**4790**	**215**	<0.2	**1.69**	NA
BGMW-09	06/18/2019	**5.58**	<50	38	330	<1	<1	162	<1	**3.39**	**1100**	**123**	<0.2	**3.24**	NA
BGMW-10	08/16/2018	**5.4**	36.915 j	24	59	<1	<1	129	<1	**1.74**	**2580**	**82**	<0.2	0.14 j	NA
BGMW-10	10/23/2018	**4.7**	<50	27 M2	65	<1	<1	105	<1	**1.72**	**1420**	**94**	<0.2	**0.394**	NA
BGMW-10	03/06/2019	**4.7**	<50	31	90	<1	<1	147	<1	**3.52**	**3350**	**88**	<0.2	<0.3	NA
BGMW-10	06/17/2019	**4.94**	<50	23	80	<1	<1	110	<1	**2.14**	**3070**	**90**	<0.2	<0.3	NA
BW-01	08/15/2018	**6.0**	**772**	69	250	<1	<1	46	<1	**3.09**	**5430**	**513**	0.092 j	<0.3	NA
BW-01	10/22/2018	**6.0**	**764**	50	280	<1	<1	50	<1	**1.52**	**7350**	**560**	<0.2	<0.3	NA
BW-01	11/28/2018	**6.0**	**750**	48	270	<1	<1	54	<1	**1.94**	**4260**	**659**	0.092 j	<0.3	NA
BW-01	02/11/2019	**6.0**	538	41	220	<1	<1	35	NA	0.971 j	**2390**	**542**	0.088 j	<0.3	NA
BW-01	03/06/2019	**6.2**	590	47	220	<1	<1	35	<1	<1	**1610**	**333**	<0.2	<0.3	NA
BW-01	06/17/2019	**6.06**	448	23	160	<1	<1	32	<1	<1	**3850**	**630**	<0.2	<0.3	NA
CCR-100S IMP	08/20/2018	**4.5**	24.5 j	6.7 M2	110	<1	<1	518	<1	**4.78**	29	**100**	0.089 j	0.169 j	3.41
CCR-100S	10/23/2018	**4.3**	<50	4.9	83	<1	<1	554	<1	**5.05**	NA	NA	0.105 j	NA	3.99
CCR-100S IMP	02/13/2019	**4.4**	<50	12	81	<1	<1	574	NA	**5.16**	23	**110**	0.129 j	0.224 j	NA
CCR-100S	02/13/2019	**4.4**	<50	4.5	74	<1	<1	579	<1	**5.16**	NA	NA	0.166 j	NA	4.24
CCR-101S	10/23/2018	NM	30.502 j	4.2	39	<1	<1	80	<1	0.693 j	NA	NA	<0.2	NA	0.84
CCR-101S	10/24/2018	**5.4**	32.165 j	5	42	<1	<1	80	<1	0.686 j	NA	NA	<0.2	NA	0.799
CCR-101S	02/25/2019	**5.1**	31.479 j	0.64	42	<1	<1	76	<1	0.638 j	NA	NA	<0.2	NA	0.893
CCR-102S	10/23/2018	**6.0**	**1380**	16	150	<1	**44.7**	151	<1	<1	NA	NA	<0.2	NA	1.95
CCR-102S	02/26/2019	**5.9**	659	9.3	100	<1	**27.9**	82	<1	<1	NA	NA	<0.2	NA	1.614
CCR-103S	10/23/2018	**5.6**	399	83	180	<1	1.28	126	<1	0.466 j	NA	NA	<0.2	NA	1.821
CCR-103S	02/26/2019	**5.6**	457	85	200	<1	0.56 j	123	<1	0.355 j	NA	NA	<0.2	NA	1.95
CCR-104S	10/23/2018	6.5	**2740**	58	320	<1	**93.4**	218	<1	**4.68**	NA	NA	<0.2	NA	0.413
CCR-104S	02/26/2019	**6.2**	**2560**	61	300	<1	**70.9**	190	<1	**4.08**	NA	NA	0.081 j	NA	0.558
CCR-105S	10/23/2018	**5.8**	**825**	5.6	180	<1	0.563 j	133	<1	**5.81**	NA	NA	<0.2	NA	1.247
CCR-105S	03/26/2019	**5.8**	**891**	2.2	210	<1	0.584 j	133	<1	**5.44**	NA	NA	<0.2	NA	1.486
CCR-106S	10/23/2018	**5.8**	**1000**	48	160	<1	0.818 j	116	<1	**4.6**	NA	NA	<0.2	NA	0.655
CCR-106S	03/26/2019	**5.5**	**1100**	58	200	<1	<1	128	<1	**2.7**	NA	NA	<0.2	NA	0.463
CCR-107S	10/24/2018	**5.0**	147	12	65	<1	<1	109	<1	**5.42**	NA	NA	<0.2	NA	0.58
CCR-107S	02/13/2019	**4.8**	106	12	46	<1	<1	105	<1	**4.5**	NA	NA	<0.2	NA	1.134

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		) PARAME	40CFR257 APPENDIX III CONSTITUE			INORGANIC PARAMETERS (TOTAL CONCENTRATION)									)IONUCLI
FACILITY NAME:	Reporting Units	S.U.	ug/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L
DATE UPDATED:	CAC 02L Standard	**6.5-8.5**	**700**	**250**	**500**	**1***	**10**	**700**	**2**	**1***	**300**	**50**	**0.2***	**0.3***	**5^**
SPREADSHEET UPDATED BY:	nd (Surficial Unit)	**3.4-6.8**	**50**	**54.7**	**163**	**1**	**1**	**641**	**1**	**13.7**	**413.8**	**838**	**0.2**	**0.471**	**23.4**
SPREADSHEET CHECKED BY:	l (Cape Fear Unit)	**5.3-8.3**	**256**	**23**	**385**	**1**	**1**	**342**	**1**	**1**	**11600**	**1560**	**0.2**	**0.3**	**3.01**
	Provisional Background (Black Creek Unit)	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**

		) PARAME	40CFR257 APPENDIX III CONSTITUE			INORGANIC PARAMETERS (TOTAL CONCENTRATION)									)IONUCLI
Sample ID	**Sample Collection Date**	**pH**	**Boron**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Cadmium**	**Cobalt**	**Iron**	**Manganese**	**Thallium**	**Vanadium**	**Total Radium**
CCR-108S	10/24/2018	6.7	**865**	20	160	<1	5.35	124	<1	**2.12**	NA	NA	<0.2	NA	1.17
CCR-108S	02/13/2019	6.9	**956**	20	150	<1	4.52	124	<1	**2.22**	NA	NA	<0.2	NA	0.85
CCR-109S	10/24/2018	**6.3**	**997**	29	170	<1	0.756 j	95	<1	**5.1**	NA	NA	<0.2	NA	0.696
CCR-109S	02/13/2019	**6.3**	**877**	26	140	<1	0.515 j	80	<1	**4.56**	NA	NA	<0.2	NA	0.795
CCR-110S	10/24/2018	**6.2**	**2680**	37	340	<1	<1	90	<1	**22.4**	NA	NA	0.101 j	NA	0.656
CCR-110S	02/14/2019	**6.3**	**2280**	32	320	<1	<1	81	<1	**18.7**	NA	NA	<0.2	NA	0.49
CCR-111S	10/24/2018	6.6	**1710**	83	440	<1	6.34	114	<1	**15.2**	NA	NA	<0.2	NA	1.984
CCR-111S	02/14/2019	6.6	**1750**	73	460	<1	4.85	103	<1	**11.4**	NA	NA	<0.2	NA	2.042
CCR-112D	10/24/2018	**8.9**	121	10	100	<1	2.87	51	<1	<1	NA	NA	<0.2	NA	0.6159
CCR-112D	02/14/2019	8.1	148	14	170	<1	3.9	79	<1	<1	NA	NA	<0.2	NA	1.816
CCR-112S	10/24/2018	6.5	**2690**	96	390	<1	1.58	175	<1	**3.95**	NA	NA	<0.2	NA	1.165
CCR-112S	02/14/2019	**6.4**	**2550**	94	410	<1	1.25	168	<1	**4.11**	NA	NA	<0.2	NA	1.446
CCR-113D	10/24/2018	7.2	173	14	130	<1	5.33	188	<1	<1	NA	NA	<0.2	NA	1.559
CCR-113D	03/25/2019	7.5	175	14	150	<1	6.71	193	<1	<1	NA	NA	<0.2	NA	2.008
CCR-113S	10/24/2018	**6.2**	251	26	400	<1	<1	115	<1	<1	NA	NA	<0.2	NA	1.388
CCR-113S	03/26/2019	**6.3**	218	30	**510**	<1	<1	122	<1	0.453 j	NA	NA	0.111 j	NA	0.833
CCR-114D	10/24/2018	6.8	62	33	160	<1	3.22	40	<1	0.825 j	NA	NA	<0.2	NA	1.141
CCR-114D	03/26/2019	7.2	106	70	350	<1	2.08	51	<1	<1	NA	NA	<0.2	NA	0.85
CCR-115D	10/23/2018	6.7	29.785 j	1.7	220	<1	0.671 j	**735**	<1	**1.22**	NA	NA	<0.2	NA	0.196
CCR-115D	03/26/2019	6.8	29.605 j	1.3	260	<1	0.992 j	**867**	<1	**1.5**	NA	NA	<0.2	NA	1.029
CCR-115S	10/23/2018	**5.6**	236	29	160	<1	0.616 j	87	<1	**2.84**	NA	NA	<0.2	NA	0.614
CCR-115S	03/26/2019	**5.7**	214	31	190	<1	0.406 j	85	<1	**2.84**	NA	NA	<0.2	NA	0.523
CCR-116S	10/24/2018	**5.8**	29.636 j	2	33	<1	<1	4.286 j	<1	0.461 j	NA	NA	<0.2	NA	0.3717
CCR-116S	02/27/2019	**5.5**	28.036 j	1.6	52	<1	<1	2.51 j	<1	<1	NA	NA	<0.2	NA	0.626
CCR-117S	10/24/2018	**6.3**	422	16	150	<1	**72.9**	169	<1	**1.9**	NA	NA	<0.2	NA	1.519
CCR-117S	02/26/2019	6.8	**871**	30	180	<1	**124**	198	<1	**4.19**	NA	NA	<0.2	NA	1.499
CCR-118S	10/24/2018	**6.4**	78	7.1	71	<1	5.04	84	<1	<1	NA	NA	<0.2	NA	0.863
CCR-118S	02/26/2019	**5.6**	104	16	40	<1	1.41	74	<1	<1	NA	NA	<0.2	NA	2.652
CCR-119S	10/23/2018	**5.3**	78	22	89	<1	0.756 j	204	<1	0.604 j	NA	NA	0.09 j	NA	1.736
CCR-119S	02/25/2019	**5.3**	60	22	97	<1	0.586 j	164	<1	0.348 j	NA	NA	0.126 j	NA	2.193
CCR-120S	10/23/2018	**5.5**	70	24	74	<1	6.1	67	<1	**3.13**	NA	NA	<0.2	NA	0.948
CCR-120S	02/25/2019	**6.2**	75	21	66	<1	3.64	59	<1	0.644 j	NA	NA	<0.2	NA	1.002
CCR-121S	10/23/2018	**5.4**	661	52	98	<1	0.548 j	81	<1	0.949 j	NA	NA	<0.2	NA	1.081
CCR-121S	02/25/2019	**5.3**	545	46	95	<1	0.435 j	95	<1	**1.19**	NA	NA	<0.2	NA	1.575
CCR-122S	02/25/2019	**5.2**	31.7 j	13	74	<1	<1	49	<1	**1.54**	NA	NA	<0.2	NA	0.967
CMW-05	08/20/2018	**6.4**	**1680**	30	260	<1	0.705 j	113	<1	<1	198	30	<0.2	**12.6**	NA
CMW-05	10/23/2018	**6.1**	**940**	25	140	<1	1.21	84	<1	<1	**402**	**195**	<0.2	**2.08**	NA
CMW-05	02/13/2019	**6.2**	698	22	170	<1	0.393 j	105	NA	0.581 j	88	**239**	<0.2	**1.52**	NA
CMW-05	03/25/2019	**6.5**	**1420**	24	220	<1	1.11	100	<1	<1	**471**	**229**	<0.2	**1.47**	NA
CMW-05	05/14/2019	**6.11**	**1000**	26	180	<1	0.43 j	98	NA	<1	120	**97**	<0.2	**2.8**	NA
CMW-05	06/17/2019	**6.14**	**1640**	34	230	<1	<1	133	<1	<1	125	42	<0.2	**1.54**	NA
CMW-06 CCR	10/23/2018	6.6	**3440**	18	490	<1	**194**	525	<1	<1	NA	NA	<0.2	NA	2.555
CMW-06 CCR	02/26/2019	6.8	**3360**	7.9	490	<1	**162**	544	<1	<1	NA	NA	<0.2	NA	2.73
CMW-06R	08/20/2018	**5.7**	**1430**	47	170	<1	**12.9**	108	<1	**2.01**	**7880**	**175**	<0.2	**2.52**	NA
CMW-06R	10/23/2018	**6.3**	**2330**	60	260	<1	**41.5**	153	<1	**2.39**	**9310**	**344**	<0.2	**1.84**	NA
CMW-06R	02/25/2019	**5.4**	425	33	130	<1	1.77	65	NA	**3.28**	**5850**	**106**	<0.2	**1.81**	NA
CMW-06R CCR	02/25/2019	**5.4**	419	33	110	<1	1.93	65	<1	**3.33**	NA	NA	<0.2	NA	0.903
CMW-06R	03/06/2019	**5.6**	424	36	140	<1	1.94	66	<1	**3.54**	**5930**	**105**	<0.2	**1.87**	NA
CMW-06R	06/18/2019	**6.06**	**2230**	60	280	<1	**29**	150	<1	**2.42**	**9490**	**316**	<0.2	**1.64**	NA
CMW-07	08/21/2018	**5.7**	45.8 j	0.89	200	<1	1.18	158	<1	**6.88**	**9840**	**281**	<0.2	**0.666**	NA
CMW-07	10/23/2018	**5.7**	<50	1.9	240	<1	<1	172	<1	**9.22**	**10500**	**277**	<0.2	**0.867**	NA
CMW-07	03/06/2019	**6.0**	<50	1.4	180	<1	<1	304	**4**	**4.36**	**4220**	**230**	<0.2	**0.53**	NA
CMW-07	06/17/2019	**5.77**	<50	1.4	220	<1	<1	208	<1	**7.71**	**8050**	**289**	<0.2	**0.52**	NA
CMW-08	08/21/2018	**4.9**	233	14	37	<1	<1	35	<1	0.669 j	12	34	<0.2	0.256 j	NA
CMW-08	10/23/2018	**5.0**	78	14	54	<1	<1	36	<1	<1	**390**	19	<0.2	**0.675**	NA
CMW-08	03/25/2019	**5.0**	73	13	52	<1	<1	36	<1	<1	99	23	<0.2	<0.3	NA
CMW-08	06/18/2019	**4.90**	83	13	85	<1	<1	34	<1	<1	122	16	<0.2	**0.356**	NA
CMW-10	08/21/2018	6.6	120	47	**670**	<1	2.81	190	<1	**6.13**	**21200**	**271**	0.097 j	**32.2**	NA
CMW-10	10/23/2018	**6.1**	69	58	330	<1	<1	74	<1	**2.25**	**2500**	**116**	<0.2	**2.48**	NA
CMW-10	03/25/2019	**5.6**	<50	41	170	<1	<1	43	<1	<1	**382**	26	<0.2	**0.439**	NA
CMW-10	06/17/2019	**6.14**	80	57	300	<1	<1	88	<1	**4.66**	**1870**	**202**	<0.2	**0.756**	NA
CTMW-01	08/20/2018	**6.3**	172	36	120	<1	0.621 j	46	<1	**4**	**3700**	**133**	<0.2	**0.548**	NA
CTMW-01	10/23/2018	**6.2**	53	8.1	73	<1	3.27	27	<1	**5.16**	**2270**	**85**	<0.2	**5.93**	NA
CTMW-01	02/13/2019	**6.3**	115	32	120	<1	1.01	48	NA	**4.65**	**3800**	**134**	<0.2	**1.21**	NA
CTMW-01	03/25/2019	**6.2**	131	35	140	<1	<1	45	<1	**2.41**	**2610**	**115**	<0.2	**0.621**	NA
CTMW-01	06/17/2019	**6.17**	133	37	140	<1	<1	45	<1	**1.7**	**3240**	**128**	<0.2	**0.719**	NA
CW-01	08/15/2018	**5.9**	21.747 j	9.5	200	<1	2.5	168	<1	**11.8**	**32300**	**411**	**0.211**	**46.3**	NA
CW-01	10/22/2018	**5.9**	<50	20	200	<1	<1	50	<1	**2.8**	**1180**	**202**	<0.2	**1.48**	NA
CW-01	11/27/2018	**5.8**	<50	21	230	<1	<1	46	<1	**3.18**	**1130**	**177**	<0.2	**2.96**	NA
CW-01	02/12/2019	**5.6**	<50	23	280	<1	<1	56	NA	<1	114	**81**	0.114 j	0.101 j	NA
CW-01	03/25/2019	**5.9**	<50	26	270	<1	<1	57	<1	**1.45**	278	**87**	<0.2	<0.3	NA
CW-01	06/17/2019	**5.87**	<50	18	250	<1	<1	66	<1	**7.78**	**7360**	**607**	<0.2	<0.3	NA
CW-02	08/15/2018	**5.9**	<50	4.5	380	<1	1.17	68	<1	**8.39**	**18300**	**230**	0.133 j	**19.2**	NA
CW-02	10/22/2018	**6.5**	<50	3.6	120	<1	2.48	50	<1	**6.04**	**17500**	**359**	<0.2	**9.6**	NA
CW-02	11/27/2018	**5.8**	<50	5.5	180	<1	0.732 j	53	<1	**4.57**	**9220**	**84**	0.141 j	**14.9**	NA
CW-02	03/25/2019	**6.3**	<50	4.1	140	<1	<1	40	<1	**6.15**	**10500**	**254**	<0.2	**2.38**	NA
CW-02	06/17/2019	**6.18**	<50	5	140	<1	1.03	40	<1	**6.74**	**14900**	**292**	<0.2	**1.34**	NA
CW-03	08/16/2018	**5.7**	431	63	200	<1	<1	52	<1	0.542 j	**462**	40	<0.2	**0.937**	NA
CW-03	10/22/2018	**6.1**	**718**	95	320	<1	<1	68	<1	<1	132	24	<0.2	**0.528**	NA
CW-03	11/28/2018	**6.0**	574	74	260	<1	<1	61	<1	<1	133	36	<0.2	**0.362**	NA
CW-03	02/12/2019	**6.0**	297	26	140	<1	<1	35	NA	<1	69	31	<0.2	<0.3	NA
CW-03	03/25/2019	**5.9**	279	25	130	<1	<1	34	<1	<1	86	34	<0.2	<0.3	NA
CW-03	06/17/2019	**5.79**	218	17	110	<1	<1	31	<1	<1	**350**	42	<0.2	**0.5**	NA
CW-04	08/16/2018	**5.9**	21.083 j	20	170	<1	<1	90	<1	**9.07**	**8830**	**1240**	<0.2	<0.3	NA
CW-04	10/22/2018	**6.2**	<50	18	160	<1	<1	86	<1	**10.3**	**8880**	**1240**	<0.2	<0.3	NA
CW-04	11/28/2018	**5.4**	17.964 j	24	110	<1	<1	68	<1	**5.2**	**1590**	**515**	<0.2	0.122 j	NA
CW-04	02/12/2019	**5.2**	18.75 j	23	120	<1	<1	65	NA	**5.05**	**933**	**417**	<0.2	<0.3	NA
CW-04	03/25/2019	**5.3**	<50	23	120	<1	<1	67	<1	**6.44**	**1710**	**536**	<0.2	<0.3	NA
CW-04	06/17/2019	**5.90**	<50	11	160	<1	<1	94	<1	**12.9**	**9780**	**1510**	<0.2	<0.3	NA
DMW-01	08/21/2018	**5.9**	75	8.4	32	<1	<1	13	<1	<1	**2050**	**68**	0.173 j	0.119 j	NA
DMW-02	08/16/2018	**11.1**	260	24	160	<1	<1	323	<1	<1	48	1.815 j	<0.2	<0.3	NA
DMW-02	02/14/2019	**10.8**	259	22	120	<1	<1	208	NA	<1	11	<5	<0.2	**0.331**	NA
DMW-02	05/14/2019	**10.59**	270	26	120	<1	<1	200	NA	<1	6.885 j	<5	<0.2	0.113 j	NA
DMW-03	08/16/2018	**5.6**	293	55	180	<1	0.454 j	79	<1	**42.5**	**42300**	**3360**	<0.2	<0.3	NA
DMW-03	11/28/2018	**5.8**	316	59	170	<1	0.465 j	80	<1	**44.9**	**41200**	**3190**	<0.2	<0.3	NA
DMW-03	02/12/2019	**5.9**	303	58	200	<1	0.473 j	81	NA	**45.4**	**36400**	**3240**	<0.2	<0.3	NA
DMW-03	05/13/2019	**5.77**	343	58	180	<1	0.416 j	83	NA	**45.4**	**40400**	**3360**	0.098 j	<0.3	NA
IABMW-01	08/16/2018	6.5	**972**	29	**730**	**1.08**	**12.1**	476	<1	**3.81**	**3660**	**625**	**0.301**	**10.3**	NA
IABMW-01	11/28/2018	6.8	**959**	30	**700**	0.769 j	9.52	418	<1	**2.52**	**1190**	**461**	**0.391**	**13.5**	NA
IABMW-01	02/12/2019	6.7	**967**	30	**710**	0.606 j	7.8	406	NA	**2.34**	**925**	**410**	**0.316**	**9.4**	NA
IABMW-01S	08/16/2018	**6.0**	210	4.8	340	<1	1.38	184	<1	**35.7**	**42000**	**5230**	<0.2	<0.3	1.828
IABMW-01S	11/28/2018	**6.2**	212	4.9	330	<1	1.28	199	<1	**37.5**	**40700**	**5260**	<0.2	<0.3	1.47
IABMW-01S	02/12/2019	**6.1**	182	5	360	<1	0.843 j	179	NA	**36.3**	**28200**	**5200**	0.096 j	<0.3	NA
IABMW-02S	08/15/2018	**6.2**	**1280**	81	440	<1	1.01	206	<1	**61.8**	**24300**	**4060**	<0.2	<0.3	NA

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	PARAME	40CFR257 APPENDIX III CONSTITUE			INORGANIC PARAMETERS (TOTAL CONCENTRATION)									IONUCLI
FACILITY NAME: Reporting Units	S.U.	ug/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L
DATE UPDATED: CAC 02L Standard	**6.5-8.5**	**700**	**250**	**500**	**1***	**10**	**700**	**2**	**1***	**300**	**50**	**0.2***	**0.3***	**5^**
SPREADSHEET UPDATED BY: nd (Surficial Unit)	**3.4-6.8**	**50**	**54.7**	**163**	**1**	**1**	**641**	**1**	**13.7**	**413.8**	**838**	**0.2**	**0.471**	**23.4**
SPREADSHEET CHECKED BY: l (Cape Fear Unit)	**5.3-8.3**	**256**	**23**	**385**	**1**	**1**	**342**	**1**	**1**	**11600**	**1560**	**0.2**	**0.3**	**3.01**
Provisional Background (Black Creek Unit)	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**

		PARAME	40CFR257 APPENDIX III CONSTITUE			INORGANIC PARAMETERS (TOTAL CONCENTRATION)									IONUCLI
Sample ID	**Sample Collection Date**	**pH**	**Boron**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Cadmium**	**Cobalt**	**Iron**	**Manganese**	**Thallium**	**Vanadium**	**Total Radium**
IABMW-02S	11/28/2018	**6.3**	**1190**	78	410	<1	1.29	171	<1	**42.6**	**17200**	**2830**	0.111 j	<0.3	NA
IABMW-02S	02/12/2019	**6.1**	**1220**	76	410	<1	0.657 j	175	NA	**59.3**	**12500**	**3230**	0.142 j	<0.3	NA
IABMW-03	11/27/2018	**6.0**	634	35	230	0.6 j	5.78	172	<1	**3.39**	57	**52**	**3.21**	**7.68**	NA
IABMW-03	02/12/2019	**5.8**	**738**	44	240	<1	4.06	188	NA	**6.52**	85	**112**	**2.64**	**2.56**	NA
IABMW-03S	08/16/2018	**6.0**	635	100	280	<1	1.78	240	<1	**1.61**	**70300**	**1480**	<0.2	**1.95**	NA
IABMW-03S	11/27/2018	**6.2**	**837**	56	300	<1	7.28	404	<1	**1.73**	**59600**	**1170**	<0.2	**0.787**	1.584
IABMW-03S	02/12/2019	**6.1**	621	110	340	<1	2.15	256	NA	**1.61**	**72300**	**1470**	<0.2	**0.405**	NA
IABMW-03S	05/13/2019	**5.99**	**716**	130	350	<1	2.15	280	NA	**1.68**	**80900**	**1640**	<0.2	**0.623**	NA
IMW-01BC	08/15/2018	6.7	152	19	200	<1	<1	121	<1	0.481 j	**1280**	**91**	<0.2	<0.3	NA
IMW-01BC	11/27/2018	6.7	156	18	250	<1	<1	131	<1	0.626 j	**4230**	**97**	<0.2	<0.3	NA
IMW-01BC	02/12/2019	6.9	155	18	230	<1	<1	120	NA	<1	**2150**	37	<0.2	<0.3	NA
IMW-01S	08/15/2018	**4.6**	<50	24	83	<1	<1	169	<1	**4.68**	98	**76**	<0.2	0.183 j	1.408
IMW-01S	11/27/2018	**4.9**	<50	23	110	<1	<1	162	<1	**7**	42	**115**	0.128 j	0.121 j	1.095
IMW-01S	02/12/2019	**4.9**	<50	23	100	<1	<1	162	NA	**3.42**	8.868999 j	**86**	0.091 j	<0.3	NA
IMW-02BC	08/15/2018	7.9	274	10	290	<1	1.19	42	<1	<1	246	28	<0.2	<0.3	NA
IMW-02BC	11/27/2018	7.7	274	11	310	<1	1.29	50	<1	<1	234	31	<0.2	0.105 j	NA
IMW-02BC	02/12/2019	7.9	283	13	310	<1	1.36	49	NA	<1	194	33	<0.2	<0.3	NA
IMW-03BC	08/15/2018	**6.4**	44.001 j	4.9	99	<1	<1	311	<1	**1.69**	**6430**	**178**	<0.2	<0.3	NA
IMW-03BC	11/27/2018	**6.4**	49.294 j	5.1	130	<1	<1	293	<1	0.859 j	**5940**	**94**	<0.2	<0.3	NA
IMW-03BC	02/12/2019	6.6	38.461 j	4.2	110	<1	<1	216	NA	<1	**1800**	24	<0.2	<0.3	NA
IMW-03S	08/15/2018	**6.4**	<50	0.19	92	<1	0.407 j	283	<1	**14**	**33100**	**577**	<0.2	<0.3	0.828
IMW-03S	11/27/2018	**6.1**	21.516 j	0.37	100	<1	<1	264	<1	**14.2**	**15700**	**554**	0.12 j	<0.3	0.831
IMW-03S	02/13/2019	**6.2**	<50	0.66	74	<1	<1	217	NA	**9.69**	**24000**	**480**	<0.2	**1.76**	NA
IMW-04BC	08/15/2018	**6.3**	18.463 j	3.4	51	<1	<1	38	<1	0.429 j	**23000**	**594**	0.134 j	0.251 j	NA
IMW-04BC	11/27/2018	**6.3**	18.725 j	3.1	89	<1	<1	39	<1	<1	**20900**	**598**	<0.2	0.196 j	NA
IMW-04BC	02/12/2019	**6.3**	<50	2.7	70	<1	<1	38	NA	<1	**20300**	**591**	<0.2	<0.3	NA
IMW-04S	08/15/2018	**6.2**	58	0.45	67	<1	**34**	108	<1	**1.72**	**16500**	**299**	<0.2	**6.74**	0.589
IMW-04S	11/27/2018	**6.3**	32.455 j	2.1	99	<1	**20.7**	62	<1	**1.35**	**12800**	**303**	<0.2	**5.75**	1.207
IMW-04S	02/12/2019	**6.2**	<50	2.9	70	<1	9.9	45	NA	**1.46**	**11500**	**364**	<0.2	**3.52**	NA
IMW-04S	05/13/2019	**6.13**	34.95 j	2.3	61	<1	**11.1**	70	NA	**1.58**	**15300**	**379**	0.174 j	**3.46**	NA
IMW-05BC	08/15/2018	**6.2**	56	29	140	<1	0.427 j	39	<1	0.515 j	**46100**	**566**	<0.2	**0.395**	NA
IMW-05BC	11/27/2018	6.9	59	26	210	<1	0.36 j	103	<1	<1	**37200**	**523**	<0.2	0.224 j	NA
IMW-05BC	02/12/2019	**6.5**	20.282 j	29	200	<1	0.393 j	71	NA	<1	**37700**	**539**	<0.2	<0.3	NA
IMW-05S	08/15/2018	**6.2**	164	16	90	<1	2.28	69	<1	**24**	**31700**	**847**	<0.2	<0.3	0.845
IMW-05S	11/27/2018	**6.4**	295	19	160	<1	2.53	101	<1	**30.5**	**41600**	**915**	<0.2	<0.3	0.755
IMW-05S	02/12/2019	**6.3**	287	24	160	<1	2.15	116	NA	**27.4**	**38000**	**796**	<0.2	<0.3	NA
IMW-06S	11/27/2018	**6.3**	72	1.2	110	<1	**20.1**	62	<1	**7.88**	**13800**	**1020**	<0.2	**2.29**	NA
IMW-06S	02/12/2019	**6.3**	45.772 j	1.4	79	<1	**17.6**	47	NA	**8.55**	**13300**	**1180**	<0.2	**1.1**	NA
IMW-06S	05/13/2019	**6.16**	49.511 j	0.32	83	<1	**20.7**	34	<1	**5.25**	**10300**	**669**	0.113 j	**2.29**	0.2951
IMW-07S	11/28/2018	**3.5**	110	81	68	<1	<1	75	<1	**11.5**	**12700**	**163**	0.16 j	**0.63**	NA
IMW-07S	02/12/2019	**3.5**	77	180	91	<1	<1	70	NA	**10.8**	**9900**	**177**	0.09 j	0.287 j	NA
IMW-07S	05/13/2019	**4.10**	182	54	100	<1	<1	66	<1	**10**	**14200**	**135**	0.105 j	**0.759**	1.059
LLMW-01	08/21/2018	**6.2**	137	5.1	270	**2.07**	**30.5**	**1160**	<1	0.713 j	**1080**	**602**	**1.95**	**12.3**	NA
LLMW-01	03/26/2019	6.7	90	4.6	260	**1.09**	**18.5**	**854**	NA	0.805 j	**657**	**406**	**0.611**	**5.38**	NA
LLMW-01S	08/21/2018	6.8	68	1	96	<1	0.405 j	63	<1	**7.88**	**745**	**1840**	0.174 j	<0.3	NA
LLMW-01S	03/26/2019	6.8	62	1	130	<1	0.486 j	64	NA	**8.02**	**826**	**1850**	0.113 j	0.118 j	NA
MW-01	08/20/2018	**5.3**	60	17	96	<1	3.23	93	<1	**4.94**	**442**	49	0.104 j	**7.03**	NA
MW-01 CCR	10/23/2018	**5.3**	54	16	92	<1	4.42	94	<1	**4.23**	NA	NA	0.122 j	NA	0.67
MW-01	02/13/2019	**5.4**	46.071 j	18	95	<1	2.53	91	NA	**4.93**	**421**	**57**	0.094 j	**5.57**	NA
MW-01 CCR	02/13/2019	**5.4**	51	17	68	<1	2.5	95	<1	**4.92**	NA	NA	0.109 j	NA	1.055
MW-01	05/14/2019	**5.26**	52	19	81	<1	2.04	96	NA	**3.47**	**354**	**55**	0.115 j	**3.39**	NA
MW-02	08/21/2018	**5.9**	**711**	18	110	<1	<1	86	<1	**1.18**	**2650**	**1390**	<0.2	**0.756**	NA
MW-02 CCR	10/24/2018	**5.4**	569	19	120	<1	<1	101	<1	<1	NA	NA	<0.2	NA	0.4805
MW-02	02/13/2019	**5.6**	351	15	87	<1	<1	68	NA	0.42 j	66	**407**	<0.2	**0.348**	NA
MW-02 CCR	02/13/2019	**5.6**	347	16	65	<1	<1	65	<1	0.431 j	NA	NA	<0.2	NA	0.977
MW-03	08/21/2018	7.1	**2070**	20	**510**	<1	**595 M4**	576	<1	**4.29**	**47900**	**2750**	<0.2	0.207 j	4.45
MW-03 CCR	10/24/2018	6.9	**2730**	32	490	<1	**588**	507	<1	**7.09**	NA	NA	<0.2	NA	1.814
MW-03	02/13/2019	7.0	**2560**	68	**520**	<1	**598**	477	NA	**6.63**	**49600**	**2610**	<0.2	0.231 j	NA
MW-03 CCR	02/13/2019	7.0	**2710**	74	**550**	<1	**610**	493	<1	**6.59**	NA	NA	<0.2	NA	2.82
MW-03	05/14/2019	6.80	**2500**	72	**540**	<1	**633**	531	NA	**9.5**	**55500**	**2650**	<0.2	<0.3	NA
SMW-03	08/15/2018	**5.4**	64	20	130	<1	0.499 j	61	<1	**82.9**	**6610**	**3470**	<0.2	**0.321**	NA
SMW-03	11/28/2018	**5.6**	71	23	120	<1	0.474 j	60	<1	**75.6**	**3340**	**2580**	<0.2	0.177 j	NA
SMW-03	02/12/2019	**5.4**	52	21	170	<1	<1	63	NA	**84.6**	**1200**	**3510**	<0.2	<0.3	NA
SMW-04	08/15/2018	**5.8**	405	11	140	<1	**13.1**	116	<1	0.585 j	**19000**	**215**	<0.2	**3.52**	NA
SMW-04	11/27/2018	**6.2**	556	19	250	<1	**44**	227	<1	**1.81**	**38300**	**392**	<0.2	**1.35**	NA
SMW-04	02/12/2019	**6.0**	432	17	210	<1	**40.7**	182	NA	**1.83**	**33800**	**358**	<0.2	**1.03**	NA
SMW-05	08/16/2018	**6.3**	200	35	150	<1	1.78	159	<1	**10.9**	**59900**	**1130**	<0.2	**0.319**	NA
SMW-05	11/27/2018	**6.3**	149	34	190	<1	2.88	170	<1	**1.96**	**46200**	**526**	<0.2	**0.697**	NA

COLOR NOTES
Bold highlighted concentration indicates exceedance of the 15A NCAC 02L .0202 Standard or the IMAC. (Effective date for 15A NCAC 02L .0202 Standard and IMAC is April 1, 2013)
Bold highlighted concentration indicates exceedance of the Inactive Hazardous Sites Branch PSRG Table (May 2019) for Industrial Health
Turbidity of Sample ≥ 10 NTUs
Provisional Background Threshold Values reflect the values represented in the NCDEQ letter dated 10/11/2017.
Analytical data review has not been completed for this dataset.

ABBREVIATION NOTES	
BGS - below ground surface	ND - Not detected
BOD - Biologic Oxygen Demand	NE - Not established
CB - Compliance Boundary	NF - No Flow
COD - Chemical Oxygen Demand	NM - Not measured
Deg C - Degrees Celsius	NTUs - Nephelometric Turbidity Units
DMAs - dimethylarsinic acid	pCi/L - picocuries per liter
DUP - Duplicate	PSRG - Primary Soil Remediation Goals
Eh - Redox Potential	RL - Reporting Limit
ft - Feet	SeCN - selnocynante
GPM - gallons per minute	SeMe (IV) - Selenomethionine
IMAC - Interim Maximum Allowable Concentrations. From the 15A NCAC 02L Standard, Appendix 1, April 1	SPLP - Synthetic Precipitation Leaching Procedure
MDC - Minimum Detectable Concentration	S.U. - Standard Units
MeSe - Methylseleninic acid	TCLP - Toxicity Characteristic Leaching Procedure
mg/kg - milligrams per kilogram	ug/L - micrograms per liter
mg/L - milligrams per liter	ug/mL - microgram per milliliter
mg-N/L - Milligram nitrogen per liter	umhos/cm - micromhos per centimenter
MMAs - monomethylarsonic acid	Well Locations referenced to NAD83 and elevations referenced to NAVD88
mV - millivolts	
NA - Not available or Not Applicable	

ATTACHMENT C

2018 AND 2019 NPDES GROUNDWATER DATA

1017268000006208523 7/24/19

I/A

DUKE ENERGY

H.F. Lee Energy Complex
Duke Energy Progress
1199 Black Jack Church Road
Goldsboro, N.C. 27530

July 22, 2019

State of North Carolina
Department of Environmental Quality
Division of Water Quality
Information Processing Unit
1617 Mail Service Center
Raleigh, North Carolina 27699-1617

Subject: Duke Energy Progress LLC – H.F. Lee Energy Complex
June 2019 Groundwater Monitoring Sampling and Analysis Results

Dear Sir or Madam:

Duke Energy Progress, LLC (DEP) sampled the 13 compliance wells around the active ash basin and the inactive ash basins at the H.F. Lee Energy Complex (NPDES Permit #NC0003417) on June 17-18, 2019. Please find attached two copies of the results on the DEQ approved electronic version of the Groundwater Compliance Report Form (GW-59CCR).

All values reported on the attached reports are dependent on the accuracy of approved analytical methods used to measure parameters.

Should you have questions regarding this report, please contact Andrew Shull at (919) 546-2104.

> *I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.*

Sincerely,

Jeffery D. Hines

Jeffery D. Hines
Station Manager
H.F. Lee Energy Complex

I/A

70172680000068308516

Cc: Mr. Michael Wagner
Public Utilities Director
City of Goldsboro
P.O. Drawer A
Goldsboro, NC 27533-9701

Duke eCc: Mr. Ed Sullivan – EC13K
Mr. John Toepfer – NC15
Mr. Ryan Czop – EC13K
Mr. Steve Cahoon – NC15
Mr. Matt Hanchey – NC20
Mr. Andrew Shull – NC15

Attachments

I/A

GROUNDWATER QUALITY MONITORING COMPLIANCE REPORT FORM

Mail original and 1 copy to:
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY - INFORMATION PROCESSING UNIT
1617 MAIL SERVICE CENTER, RALEIGH, NC 27699-1617 Phone: (919) 733-3221

FACILITY INFORMATION Please Print Clearly or Type

Facility Name: Lee Steam Electric Plant
Permit Name (if different): Duke Energy Progress, LLC
Facility Address: 1677 Old Smithfield Road (Street)
Goldsboro (City) NC (State) 27530 (Zip) County Wayne

Permit Type: NPDES
PERMIT Number: NC0003417
Expiration Date: 05/31/2013
TYPE OF PERMITTED OPERATION BEING MONITORED: Ash Impoundment Groundwater

Contact Person: Andrew Shull
Telephone# (919) 546-2104
Well Location/Site Name: Lee Ash Pond Wells
No. of wells to be sampled: 13 (from Permit)

Monitoring Well Construction Information

	Units	CTMW-1	CMW-5	CMW-6R	CMW-7	CMW-8	CMW-10	BGMW-9	BGMW-10	CW-1	CW-2	CW-3	CW-4	BW-1	MW-	MW-	MW-	MW-	MW-
Well Depth [ft below land surface]	ft	37.00	15.00	15.00	25.00	20.00	17.00	12.00	15.00	20.50	20.60	20.30	26.00	13.00					
Measuring Point (toc) [ft above land surface]	ft	3.52	3.52	2.21	-0.04	3.33	3.09	3.17	2.07	2.86	2.77	2.90	2.24	2.77					
Well Diameter	in	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
Screen Top [ft below land surface]	ft	32.00	5.00	5.00	15.00	10.00	7.00	2.00	5.00	5.50	5.60	5.30	11.00	3.00					
Screen Bottom [ft below land surface]	ft	37.00	15.00	15.00	25.00	20.00	17.00	12.00	15.00	20.50	20.60	20.30	26.00	13.00					
Relative Measuring Point Elevation	ft	69 70	69.78	75.37	78.78	77.43	73.29	76.17	78.46	72.83	73.90	74.83	76.03	77.64					

(Well ID Number (From Permit))

Sampling Information and Field Analysis

CHECK IF DRY WELL AT TIME OF SAMPLING	15A-2L	Units	CTMW-1	CMW-5	CMW-6R	CMW-7	CMW-8	CMW-10	BGMW-9	BGMW-10	CW-1	CW-2	CW-3	CW-4	BW-1	MW-	MW-	MW-	MW-	MW-
			☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY
Sample Date			06/17/2019	06/17/2019	06/18/2019	06/17/2019	06/18/2019	06/17/2019	06/18/2019	06/17/2019	06/17/2019	06/17/2019	06/17/2019	06/17/2019	06/17/2019					
Volume of Water pumped/bailed		gal	2.11	0.86	0 89	1.51	1.13	1.69	1.53	0.89	0.61	5.53	1.75	0.28	0.55					
Temperature (00010)		deg. C	21	22	18	21	19	21	20	21	21	19	20	20	21					
Odor (00085)			None	None	None	None	None	None	None	None	None	None	None	None	None					
Appearance			Clear	Clear	Clear	Clear	Clear/Floc	Clear	Clear/Floc	Clear	Clear	Clear/Fines	Clear	Clear	Clear					
Turbidity (82078)		NTU	9.7	1.2	2 4	8.8	5.7	9.6	2.9	2.9	1.7	9.7	9.6	7.8	7.4					
Dissolved Oxygen (00300)		mg/L	0.19	0.33	0.23	0.29	1.6	0.68	0.18	0.18	0.22	0.24	0.16	0.18	0.19					
Oxidation Reduction Potential (00090)		mV	128	350	141	246	460	242	308	392	221	180	340	242	232					
Specific Cond - field (00094)		umhos/cm	220	391	453	408	59	535	532	112	470	257	181	290	300					
Water Level [ft below measuring pt.] (82546)		ft	3 07	8.88	5.91	16.00	17.38	11.53	4.5	4.27	9.95	11.2	7.92	12.7	5.6					
pH - field (00400)	6.5 - 8.5	SU	**6.2**	**6.1**	**6.1**	**5.8**	**4.9**	**6.1**	**5.6**	**4.9**	**5.9**	**6.2**	**5.8**	**5.9**	**6.1**					

Laboratory Information

Laboratory Name: Duke Energy Analytical Laboratory[2]
Sample Analysis Date: June 18 - July 1, 2019
Certification #: NC DENR # 248
Samples for metals were collected unfiltered: ☑ Yes ☐ No
and field acidified: ☑ Yes ☐ No

	IMAC[1]	15A-2L	Units	CTMW-1	CMW-5	CMW-6R	CMW-7	CMW-8	CMW-10	BGMW-9	BGMW-10	CW-1	CW-2	CW-3	CW-4	BW-1	MW-	MW-	MW-	MW-	MW-
TDS - Total Diss. Solids (70300)	---	500	mg/l	140	230	280	220	85	300	330	80	250	140	110	160	160					
Cl - Chloride (00940)	---	250	mg/l	14	10	28	37	4	79	110	11	90	33	7.4	17	5.9					
As - Arsenic (01002)	---	10	ug/l	<1	<1	**29**	<1	<1	<1	<1	<1	<1	1.03	<1	<1	<1					
SO4 - Sulfate (00945)	---	250	mg/l	37	34	60	1.4	13	57	38	23	18	5.0	17	11	23					
Nitrate (NO3) as N (00620)	---	10	mg/l	<0.023	0.95	<0.023	<0.023	0.18	<0.023	<0.023	0.06	<0.046	<0.023	0.08	<0.023	0.07					
Cd - Cadmium (01027)	---	2	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1					
Cr - Chromium (01034)	---	10	ug/l	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5					
Cu - Copper (01042)	---	1	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0 005	0 01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005					
Fe - Iron (01045)	---	300	ug/l	**3240**	125	**9490**	**8050**	122	**1870**	**1100**	**3070**	**7360**	**14900**	**350**	**9780**	**3850**					
Hg - Mercury (71900)	---	1	ug/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0 05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05					
Mn - Manganese (01055)	---	50	ug/l	**128**	42	**316**	**289**	16	**202**	**123**	**90**	**607**	**292**	42	**1510**	**630**					
Ni - Nickel (01067)	---	100	ug/l	<5	<5	<5	6	<5	<5	<5	<5	8	<5	<5	12	<5					
Pb - Lead (01051)	---	15	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1					
Zn - Zinc (01092)	---	1	mg/l	<0.005	<0.005	<0.005	0.043	<0.005	<0 005	0 014	<0.005	0.006	<0.005	<0.005	0.005	<0.005					
Ba - Barium (01007)	---	700	ug/l	45	133	150	208	34	88	162	110	66	40	31	94	32					
B - Boron (01022)	---	700	ug/l	133	**1640**	**2230**	<50	83	80	<50	<50	<50	<50	218	<50	448					
Tl - Thallium (01059)	0.2	NE	ug/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0 2	<0.2	<0 2	<0.2	<0.2	<0 2					
Sb - Antimony (01097)	1	NE	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1					
Se - Selenium (01147)	---	20	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	10.1	<1	<1					
Alkalinity - (00410)	---	NE	mg/l	41 9	143	122	145	5.59	72.7	42.6	7.58	77	57	61.2	89.7	109					
Al - Aluminum (01105)	---	NE	ug/l	187	52	80	27	136	324	108	96	59	73	333	20	64					
Be - Beryllium (01012)	4	NE	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1					
HCO3 - Bicarbonate (00440)	---	NE	mg/l	41.9	143	122	145	5.59	72.7	42.6	7.58	77	57	61.2	89.7	109					
Ca - Calcium (00916)	---	NE	mg/l	13.5	44.1	41.6	16.3	1.44	22.3	25.2	4.24	18.4	5.78	17.9	28.1	38.1					
CO3 - Carbonate (00445)	---	NE	mg/l	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5					
Co - Cobalt (01037)	1	NE	ug/l	1.7	<1	2 42	7.71	<1	4.66	3 39	2.14	7.78	6.74	<1	12.9	<1					
Mg - Magnesium (00927)	---	NE	mg/l	4.8	9.86	10.5	12.5	1.9	10.1	8 39	2.4	11	4.36	7.24	5.38	5.71					
Mo - Molybdenum (01062)	---	NE	ug/l	<1	10.6	34.2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1					
K - Potassium (00937)	---	NE	mg/l	4.6	6.97	6.26	0.574	0.458	2.19	0 677	4.84	1.04	0.977	2.3	0.384	4.12					
Na - Sodium (82035)	---	NE	mg/l	14.7	15.4	25.8	43.3	5.46	62.4	59.9	6.3	52.3	29.3	6.62	14	5.42					
TSS - Total Susp. Solids (70031)	---	NE	mg/l	<5	<5	<5	<5	<5	16	<5	<5	8	11	7	<5	<5					
V - Vanadium (01087)	0.3	NE	ug/l	0.719	1.54	1.64	0.52	0.356	0.756	3.24	<0.3	<0.3	1.34	0.50	<0.3	<0.3					
Sr - Strontium (01082)	---	NE	mg/l	0.099	1.27	0.953	0.116	0.028	0.154	0 16	0.064	0.098	0.049	0.302	0.101	0.886					

Notes
NE = Not Established
NS Not Sampled (insufficient volume)
urbidity is field analyzed for information use only

BOLD values equal or exceed the corresponding 2L standard

Qualifiers:

I certify that, to the best of my knowledge and belief, the information submitted in this report is true, accurate, and complete, and that the laboratory analytical data was produced using approved methods of analysis by a DWQ-certified laboratory. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Jeffery D. Hines
Permittee (or Authorized Agent) Name and Title Please print or type

Jeffery D. Hines
Signature of Permittee (or Authorized Agent)

7/22/2019
Date

GW-59CCR 09/2015

1 -The IMACs were issued in 2010, 2011, and 2012; however NCDEQ has not established a 2L for these constituents as described in 15A NCAD 02L.0202 (c). For this reason, IMAC's noted on the report are for reference only.

2 -Alkalinity, Bicarbonate, and Carbonate were subcontracted by Duke Energy Analytical Laboratory to Pace Analytical Services, LLC in Huntersville, NC.

I/A

DUKE ENERGY

H.F. Lee Energy Complex
Duke Energy Progress
1199 Black Jack Church Road
Goldsboro, N.C. 27530

April 17, 2019

State of North Carolina
Department of Environmental Quality
Division of Water Quality
Information Processing Unit
1617 Mail Service Center
Raleigh, North Carolina 27699-1617

Subject: Duke Energy Progress LLC – H.F. Lee Energy Complex
March 2019 Groundwater Monitoring Sampling and Analysis Results

Dear Sir or Madam:

Duke Energy Progress, LLC (DEP) sampled the 13 compliance wells around the active ash basin and the inactive ash basins at the H.F. Lee Energy Complex (NPDES Permit #NC0003417) on March 6 and March 25, 2019. Please find attached two copies of the results on the DEQ approved electronic version of the Groundwater Compliance Report Form (GW-59CCR).

All values reported on the attached reports are dependent on the accuracy of approved analytical methods used to measure parameters.

Should you have questions regarding this report, please contact Andrew Shull at (919) 546-2104.

> *I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.*

Sincerely,

Jeffery D. Hines
Station Manager
H.F. Lee Energy Complex

I/A

Cc: Mr. Michael Wagner
Public Utilities Director
City of Goldsboro
P.O. Drawer A
Goldsboro, NC 27533-9701

Duke eCc: Mr. Ed Sullivan – EC13K
Mr. John Toepfer – NC15
Mr. Ryan Czop – EC13K
Mr. Steve Cahoon – NC15
Mr. Matt Hanchey – NC20
Mr. Andrew Shull – NC15

Attachments: GW59-CCR report

I/A

GROUNDWATER QUALITY MONITORING COMPLIANCE REPORT FORM

Mail original and 1 copy to:

DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY - INFORMATION PROCESSING UNIT
1617 MAIL SERVICE CENTER, RALEIGH, NC 27699-1617 Phone: (919) 733-3221

FACILITY INFORMATION Please Print Clearly or Type

Facility Name: Lee Steam Electric Plant

Permit Name (if different): Duke Energy Progress, LLC

Facility Address: 1677 Old Smithfield Road (Street)

Goldsboro (City) NC (State) 27530 (Zip) **County** Wayne

Contact Person: Andrew Shull **Telephone#** (919) 546-2104

Well Location/Site Name: Lee Ash Pond Wells **No. of wells to be sampled:** 13 (from Permit)

Permit Type: NPDES **Expiration Date:** 05/31/2013

PERMIT Number: NC0003417

TYPE OF PERMITTED OPERATION BEING MONITORED Ash Impoundment Groundwater

Monitoring Well Construction Information

Well ID Number (From Permit)

		Units	CTMW-1	CMW-5	CMW-6R	CMW-7	CMW-8	CMW-10	BGMW-9	BGMW-10	CW-1	CW-2	CW-3	CW-4	BW-1	MW-	MW-	MW-	MW-	MW-
Well Depth [ft below land surface]		ft	37.00	15.00	15.00	25.00	20.00	17.00	12.00	15.00	20.50	20.60	20.30	26.00	13.00					
Measuring Point (toc) [ft above land surface]		ft	3.52	3.52	2.21	-0.04	3.33	3.09	3.17	2.07	2.86	2.77	2.90	2.24	2.77					
Well Diameter		in	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
Screen Top [ft below land surface]		ft	32.00	5.00	5.00	15.00	10.00	7.00	2.00	5.00	5.50	5.60	5.30	11.00	3.00					
Screen Bottom [ft below land surface]		ft	37.00	15.00	15.00	25.00	20.00	17.00	12.00	15.00	20.50	20.60	20.30	26.00	13.00					
Relative Measuring Point Elevation		ft	69.70	69.78	75.37	78.78	77.43	73.29	76.17	78.46	72.83	73.90	74.83	76.03	77.64					

Sampling Information and Field Analysis

CHECK IF DRY WELL AT TIME OF SAMPLING			☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY
	15A-2L	Units	CTMW-1	CMW-5	CMW-6R	CMW-7	CMW-8	CMW-10	BGMW-9	BGMW-10	CW-1	CW-2	CW-3	CW-4	BW-1	MW-	MW-	MW-	MW-	MW-
Sample Date			03/25/2019	03/25/2019	03/06/2019	03/06/2019	03/25/2019	03/25/2019	03/06/2019	03/06/2019	03/25/2019	03/25/2019	03/25/2019	03/25/2019	03/06/2019					
Volume of Water pumped/bailed		gal	2.38	0.97	0.78	2.72	0.81	1.07	0.45	0.83	1.17	5.02	1.48	1.18	1.32					
Temperature (00010)		deg. C	19	16	13	17	17	16	12	13	18	18	16	16	13					
Odor (00085)			Musty	None	None	Not Noted	None	None	None	None	None	None	None	None	None					
Appearance			Clear/Floc	Clear	Clear	Not Noted	Clear/Floc	Clear	Clear/Floc	Clear	Clear/Fines	Clear/Fines	Clear	Clr/Fines/Floc	Clear/Fines					
Turbidity (82078)		NTU	7.3	1.1	3.2	6.0	1.9	4.9	6.4	5.2	3.6	8.9	2.2	6.7	5.1					
Dissolved Oxygen (00300)		mg/L	0.23	0.27	0.24	0.32	3.33	1.33	1.11	0.13	1.67	0.23	0.10	0.32	1.50					
Oxidation Reduction Potential (00090)		mV	104	259	148	270	433	379	325	473	429	206	469	418	277					
Specific Cond - field (00094)		umhos/cm	214	371	167	334	62	219	368	144	477	207	220	164	377					
Water Level [ft below measuring pt.] (82546)		ft	1.19	6.14	4.18	8.40	12.75	8.00	3.47	3.36	6.64	9.42	3.80	9.53	4.18					
pH - field (00400)	6.5 - 8.5	SU	**6.2**	**6.5**	**5.6**	**6.0**	**5.0**	**5.6**	**6.0**	**4.7**	**5.9**	**6.3**	**5.9**	**5.3**	**6.2**					

Laboratory Information

Laboratory Name Duke Energy Analytical Laboratory[2]

Sample Analysis Date March 7 - 29, 2019

Certification # NC DENR # 248

Samples for metals were collected unfiltered: ☑ Yes ☐ No

and field acidified: ☑ Yes ☐ No

	IMAC[1]	15A-2L	Units	CTMW-1	CMW-5	CMW-6R	CMW-7	CMW-8	CMW-10	BGMW-9	BGMW-10	CW-1	CW-2	CW-3	CW-4	BW-1	MW-	MW-	MW-	MW-	MW-
TDS - Total Diss. Solids (70300)	---	500	mg/l	140	220	140	180	52	170	210	90	270	140	130	120	220					
Cl - Chloride (00940)	---	250	mg/l	13	10	14	21	4.5	22	52	18	100	23	6.7	18	6.8					
As - Arsenic (01002)	---	10	ug/l	<1	1.11	1.94	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1					
SO4 - Sulfate (00945)	---	250	mg/l	35	24	36	1.4	13	41	22	31	26	4.1	25	23	47					
Nitrate (NO3) as N (00620)	---	10	mg/l	<0.023	<0.023	<0.023	<0.023	0.25	<0.023	0.03	<0.023	0.03	0.05	0.04	<0.023	<0.023					
Cd - Cadmium (01027)	---	2	ug/l	<1	<1	<1	4	<1	<1	<1	<1	<1	<1	<1	<1	<1					
Cr - Chromium (01034)	---	10	ug/l	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5					
Cu - Copper (01042)	---	1	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005					
Fe - Iron (01045)	---	300	ug/l	**2610**	**471**	**5930**	**4220**	99	**382**	**1190**	**3350**	278	**10500**	86	**1710**	**1610**					
Hg - Mercury (71900)	---	1	ug/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05					
Mn - Manganese (01055)	---	50	ug/l	**115**	**229**	**105**	**230**	23	26	35	**88**	**87**	**254**	34	**536**	**333**					
Ni - Nickel (01067)	---	100	ug/l	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	7	<5					
Pb - Lead (01051)	---	15	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1					
Zn - Zinc (01092)	---	1	mg/l	<0.005	<0.005	<0.005	0.135	<0.005	<0.005	0.016	<0.005	<0.005	<0.005	<0.005	0.008	<0.005					
Ba - Barium (01007)	---	700	ug/l	45	100	66	304	36	43	136	147	57	40	34	67	35					
B - Boron (01022)	---	700	ug/l	131	**1420**	424	<50	73	<50	<50	<50	<50	<50	279	<50	590					
Tl - Thallium (01059)	0.2	NE	ug/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2					
Sb - Antimony (01097)	1	NE	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1					
Se - Selenium (01147)	---	20	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	13.9	<1	<1					
Alkalinity - (00410)	---	NE	mg/l	37.2	139	11	125	<5	21.3	62	<5	47.9	50.5	72	25.9	122					
Al - Aluminum (01105)	---	NE	ug/l	177	9	389	17	75	535	70	220	93	260	53	32	8					
Be - Beryllium (01012)	4	NE	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1					
HCO3 - Bicarbonate (00440)	---	NE	mg/l	37.2	139	11	125	<5	21.3	62	<5	47.9	50.5	72	25.9	122					
Ca - Calcium (00916)	---	NE	mg/l	13.3	40.9	8.69	23.1	1.56	7.16	22.8	4.52	15.1	6.54	22.2	8.07	51.9					
CO3 - Carbonate (00445)	---	NE	mg/l	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5					
Co - Cobalt (01037)	1	NE	ug/l	2.41	<1	3.54	4.36	<1	<1	<1	3.52	1.45	6.15	<1	6.44	<1					
Mg - Magnesium (00927)	---	NE	mg/l	4.77	9.46	2.94	11	2.01	3.46	7.54	2.66	10.1	4.33	9.54	3.5	8.82					
Mo - Molybdenum (01062)	---	NE	ug/l	<1	25.9	1.07	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1					
K - Potassium (00937)	---	NE	mg/l	4.63	5.9	1.49	0.762	0.541	0.818	0.693	3.86	0.885	1.19	2.33	0.205	3.85					
Na - Sodium (82035)	---	NE	mg/l	14.9 (B2)	14.9 (B2)	11.8	26.7	5.33 (B2)	30.2 (B2)	36.1	10.6	63.6 (B2, M4)	23.8 (B2)	6.14 (B2)	18.1 (B2)	8.71					
TSS - Total Susp. Solids (70031)	---	NE	mg/l	9	<5	6	<5	<5	6	<5	<5	<5	6	<5	<5	<5					
V - Vanadium (01087)	0.3	NE	ug/l	0.621	1.47	1.87	0.53	<0.3	0.439	0.926	<0.3	<0.3	2.38	<0.3	<0.3	<0.3					
Sr - Strontium (01082)	---	NE	mg/l	0.098	1.17	0.163	0.113	0.03	0.052	0.135	0.084	0.087	0.054	0.396	0.063	1.08					

Notes:
NE = Not Established
NS = Not Sampled (insufficient volume)
Turbidity is field analyzed for information use only.

BOLD values equal or exceed the corresponding 2L standard

Qualifiers: B2 - Target analyte was detected in Method/Prep Blank(s) at a concentration greater than 1/2 the reporting limit but less than the reporting limit. Analyte concentration in sample is valid and may be used for compliance. M4 - The spike recovery value was unusable since the analyte concentration in the sample was disproportionate to the spike level. The associated Laboratory Control Spike was acceptable.

I certify that, to the best of my knowledge and belief, the information submitted in this report is true, accurate, and complete, and that the laboratory analytical data was produced using approved methods of analysis by a DWQ-certified laboratory. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Jeffery D. Hines
Permittee (or Authorized Agent) Name and Title - Please print or type

Jeffery D. Hines
Signature of Permittee (or Authorized Agent)

4/17/2019
Date

GW-59CCR 09/2015

1 -The IMACs were issued in 2010, 2011, and 2012; however NCDEQ has not established a 2L for these constituents as described in 15A NCAD 02L.0202 (c). For this reason, IMAC's noted on the report are for reference only.

2 -Alkalinity, Bicarbonate, and Carbonate were subcontracted by Duke Energy Analytical Laboratory to Pace Analytical Services, LLC in Huntersville, NC.

I/A

DUKE ENERGY

H.F. Lee Energy Complex
Duke Energy Progress
1199 Black Jack Church Road
Goldsboro, N.C. 27530

November 20, 2018

State of North Carolina
Department of Environmental Quality
Division of Water Quality
Information Processing Unit
1617 Mail Service Center
Raleigh, North Carolina 27699-1617

Subject: Duke Energy Progress LLC – H.F. Lee Energy Complex
October 2018 Groundwater Monitoring Sampling and Analysis Results

Dear Sir or Madam:

Duke Energy Progress, LLC (DEP) sampled the 13 compliance wells around the active ash basin and the inactive ash basins at the H.F. Lee Energy Complex (NPDES Permit #NC0003417) on October 22 - 23, 2018. Please find attached two copies of the results on the DEQ approved electronic version of the Groundwater Compliance Report Form (GW-59CCR).

All values reported on the attached reports are dependent on the accuracy of approved analytical methods used to measure parameters.

Should you have questions regarding this report, please contact Ryan Czop at (980) 373-2779.

> *I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.*

Sincerely, Gary M Davis Ops. Supt
For

Jeffery D. Hines
Station Manager
H.F. Lee Energy Complex

I/A

Cc: Mr. Michael Wagner
Public Utilities Director
City of Goldsboro
P.O. Drawer A
Goldsboro, NC 27533-9701

Duke eCc: Mr. Ed Sullivan – EC13K
Mr. John Toepfer – NC14
Mr. Ryan Czop – EC13K
Mr. Steve Cahoon – NC14
Mr. Matt Hanchey – NC20
Mr. Andrew Shull – NC14

Attachments: GW-59CCR

GROUNDWATER QUALITY MONITORING COMPLIANCE REPORT FORM

Mail original and 1 copy to: **DEPARTMENT OF ENVIRONMENTAL QUALITY**
DIVISION OF WATER QUALITY - INFORMATION PROCESSING UNIT
1617 MAIL SERVICE CENTER, RALEIGH, NC 27699-1617 Phone: (919) 733-3221

FACILITY INFORMATION

Please Print Clearly or Type

Facility Name: Lee Steam Electric Plant
Permit Name (if different): Duke Energy Progress, LLC
Facility Address: 1677 Old Smithfield Road (Street)
Goldsboro (City) NC (State) 27530 (Zip) County Wayne

Permit Type: NPDES **Expiration Date:** 05/31/2013
PERMIT Number: NC0003417

TYPE OF PERMITTED OPERATION BEING MONITORED Ash Impoundment Groundwater

Contact Person: Ryan Czop **Telephone#** (980) 373-2779
Well Location/Site Name: Lee Ash Pond Wells **No. of wells to be sampled:** 13 (from Permit)

Monitoring Well Construction Information

	Units	Well ID Number (From Permit)																
		CTMW-1	CMW-5	CMW-6R	CMW-7	CMW-8	CMW-10	BGMW-9	BGMW-10	CW-1	CW-2	CW-3	CW-4	BW-1	MW-	MW-	MW-	MW-
Well Depth [ft below land surface]	ft	37.00	15.00	15.00	25.00	20.00	17.00	12.00	15.00	20.50	20.60	20.30	26.00	13.00				
Measuring Point (toc) [ft above land surface]	ft	3.52	3.52	2.21	-0.04	3.33	3.09	3.17	2.07	2.86	2.77	2.90	2.24	2.77				
Well Diameter	in	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Screen Top [ft below land surface]	ft	32.00	5.00	5.00	15.00	10.00	7.00	2.00	5.00	5.50	5.60	5.30	11.00	3.00				
Screen Bottom [ft below land surface]	ft	37.00	15.00	15.00	25.00	20.00	17.00	12.00	15.00	20.50	20.60	20.30	26.00	13.00				
Relative Measuring Point Elevation	ft	69.70	69.78	75.37	78.78	77.43	73.29	76.17	78.46	72.83	73.90	74.83	76.03	77.64				

Sampling Information and Field Analysis

CHECK IF DRY WELL AT TIME OF SAMPLING			☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ ☐DRY	☐ DRY	☐ DRY
	15A-2L	Units	CTMW-1	CMW-5	CMW-6R	CMW-7	CMW-8	CMW-10	BGMW-9	BGMW-10	CW-1	CW-2	CW-3	CW-4	BW-1	MW-	MW-	MW-	MW-
Sample Date			10/23/2018	10/23/2018	10/23/2018	10/23/2018	10/23/2018	10/23/2018	10/23/2018	10/23/2018	10/22/2018	10/22/2018	10/22/2018	10/22/2018	10/22/2018				
Volume of Water pumped/bailed		gal	3.88	0.56	0.57	0.75	0.46	3.37	1.45	0.85	1.03	4.56	1.51	0.52	1.75				
Temperature (00010)		deg. C	19	22	18	17	20	21	19	19	19	18	19	19	21				
Odor (00085)			Minor Earthy	None	Minor Earthy	None	None	None	None	None	None	None	None	None	None				
Appearance			Clear	Clear	Clear	Clear	Clear	Cloudy/Turbid	Clear	Clear	Clear	Red/Iron w/ Fines; Surface Film	Clear	Clear	Clear				
Turbidity (82078)		NTU	9.8	2.1	1.6	8.8	8.2	26.2	3.9	9.3	9.1	21.4	6.6	4.6	4.3				
Dissolved Oxygen (00300)		mg/L	0.24	0.28	0.28	0.30	5.22	0.51	0.25	0.43	0.37	0.10	0.22	0.39	0.26				
Oxidation Reduction Potential (00090)		mV	207	280	166	289	374	260	275	412	289	164	300	204	242				
Specific Cond - field (00094)		umhos/cm	77	262	487	410	63	461	344	114	397	179	572	307	518				
Water Level [ft below measuring pt.] (82546)		ft	1.75	7.20	5.55	13.38	14.50	9.22	4.14	3.95	7.55	8.46	1.72	10.35	4.74				
pH - field (00400)	6.5 - 8.5	SU	**6.17**	**6.05**	**6.31**	**5.65**	**4.95**	**6.06**	**5.84**	**4.74**	**5.88**	**6.48**	**6.08**	**6.15**	**6.04**				

Laboratory Information

Laboratory Name Duke Energy Analytical Laboratory[2]
Sample Analysis Date October 23 - November 5, 2018

Certification # NC DENR # 248

Samples for metals were collected unfiltered: ☑ Yes ☐ No
and field acidified: ☑ Yes ☐ No

	IMAC[1]	15A-2L	Units	CTMW-1	CMW-5	CMW-6R	CMW-7	CMW-8	CMW-10	BGMW-9	BGMW-10	CW-1	CW-2	CW-3	CW-4	BW-1	MW-	MW-	MW-	MW-
TDS - Total Diss. Solids (70300)	---	500	mg/l	73	140	260	240	54	330	190	65	200	120	320	160	280				
Cl - Chloride (00940)	---	250	mg/l	4.5	9.4	28	49	4.8	66	48	9.3	70	12	8.5	16	7.4				
As - Arsenic (01002)	---	10	ug/l	3.27	1.21	**41.5**	<1	<1	<1	<1	<1	<1	2.48	<1	<1	<1				
SO4 - Sulfate (00945)	---	250	mg/l	8.1	25	60	1.9	14	58	19	27 (M2)	20	3.6	95	18	50				
Nitrate (NO3) as N (00620)	---	10	mg/l	<0.023	0.14	<0.023	<0.023	0.18	<0.023	<0.046	0.06	<0.046	<0.023	0.11	<0.023	<0.023				
Cd - Cadmium (01027)	---	2	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1				
Cr - Chromium (01034)	---	10	ug/l	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5				
Cu - Copper (01042)	---	1	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.008	<0.005	<0.005	<0.005				
Fe - Iron (01045)	---	300	ug/l	**2270**	**402**	**9310**	**10500**	**390**	**2500**	**3180**	**1420**	**1180**	**17500**	132	**8880**	**7350**				
Hg - Mercury (71900)	---	1	ug/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	<0.05	<0.05				
Mn - Manganese (01055)	---	50	ug/l	**85**	**195**	**344**	**277**	19	**116**	**120**	**94**	**202**	**359**	24	**1240**	**560**				
Ni - Nickel (01067)	---	100	ug/l	<5	<5	<5	7	<5	<5	<5	<5	5	<5	<5	9	<5				
Pb - Lead (01051)	---	15	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.02	<1	<1	<1				
Zn - Zinc (01092)	---	1	mg/l	0.006	0.007	<0.005	0.012	<0.005	0.006	0.022	<0.005	0.011	0.009	<0.005	0.009	<0.005				
Ba - Barium (01007)	---	700	ug/l	27	84	153	172	36	74	110	105	50	50	68	86	50				
B - Boron (01022)	---	700	ug/l	53	**940**	**2330**	<50	78	69	<50	<50	<50	<50	**718**	<50	**764**				
Tl - Thallium (01059)	0.2	NE	ug/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2				
Sb - Antimony (01097)	1	NE	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1				
Se - Selenium (01147)	---	20	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	9.69	<1	<1				
Alkalinity - (00410)	---	NE	mg/l	15.2	96.7	133	130	<5	57.3	58.9	<5	45	43	188	97	197				
Al - Aluminum (01105)	---	NE	ug/l	1160	67	188	69	247	3580	141	243	1110	2030	172	68	38				
Be - Beryllium (01012)	4	NE	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1				
HCO3 - Bicarbonate (00440)	---	NE	mg/l	15.2	96.7	133	130	<5	57.3	58.9	<5	45	43	188	97	197				
Ca - Calcium (00916)	---	NE	mg/l	4.54 (B2)	27.0 (B2)	41.9 (B2)	10.8 (B2)	1.47 (B2)	16.4 (B2)	19.0 (B2)	4.04 (B2)	12.0	6.36	59.9	29.3	67.5				
CO3 - Carbonate (00445)	---	NE	mg/l	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5				
Co - Cobalt (01037)	1	NE	ug/l	5.16	<1	2.39	9.22	<1	2.25	3.52	1.72	2.80	6.04	<1	10.3	1.52				
Mg - Magnesium (00927)	---	NE	mg/l	1.86	6.72	10.4	12.0	1.87	7.69	6.04	2.42	7.70	3.21	28.7	4.63	10.2				
Mo - Molybdenum (01062)	---	NE	ug/l	<1	12.2	47.4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1				
K - Potassium (00937)	---	NE	mg/l	3.94	4.97	7.12	0.528	0.633	1.82	0.792	5.18	1.30	2.14	2.87	0.503	5.27				
Na - Sodium (82035)	---	NE	mg/l	4.10	11.4	26.3	51.8	5.44	58.6	32.4	6.63	47.5	14.6	11.2	12.7	9.86				
TSS - Total Susp. Solids (70031)	---	NE	mg/l	9	<5	<5	<5	<5	120	<5	<5	7	20	<5	<5	<5				
V - Vanadium (01087)	0.3	NE	ug/l	5.93	2.08	1.84	0.867	0.675	2.48	2.68	0.394	1.48	9.60	0.528	<0.3	<0.3				
Sr - Strontium (01082)	---	NE	mg/l	0.033	0.754	1.13	0.107	0.029	0.116	0.116	0.061	0.070	0.053	1.03	0.086	1.43				

Notes:
NE = Not Established
Turbidity is field analyzed for information use only.

BOLD values equal or exceed the corresponding 2L standard

Qualifiers: (B2): Target analyte was detected in Method/Prep Blank(s) at a concentration greater than ½ the reporting limit but less than the reporting limit. Analyte concentration in sample is valid and may be used for compliance purposes.
(M2): Matrix Spike and/or Matrix Spike Duplicate recovery was Low: the associated Laboratory Control Spike (LCS) was acceptable

I certify that, to the best of my knowledge and belief, the information submitted in this report is true, accurate, and complete, and that the laboratory analytical data was produced using approved methods of analysis by a DWQ-certified laboratory. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Gary M Davis Ops Supt.
Permittee (or Authorized Agent) Name and Title - Please print or type

Gary M Davis
Signature of Permittee (or Authorized Agent)

11/20/18
Date

GW-59CCR 09/2015

1 -The IMACs were issued in 2010, 2011, and 2012; however NCDEQ has not established a 2L for these constituents as described in 15A NCAD 02L.0202 (c). For this reason, IMAC's noted on the report are for reference only.
2 -Alkalinity, Bicarbonate, and Carbonate were subcontracted by Duke Energy Analytical Laboratory to Pace Analytical Services, LLC in Huntersville, NC.

I/A

I/A

Bednarcik Direct AGO Cross Ex. 10
Docket No. E-2, Sub 1219A

Hart Exhibit 54
Docket No. E-2, Sub 1219

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THE ELM CONSULTING GROUP INTERNATIONAL LLC

ENVIRONMENTAL AUDIT IN SUPPORT OF THE COURT APPOINTED MONITOR

Mayo Steam Electric Plant
Roxboro, North Carolina
USA

October 2019

Final Report Issued To:

Duke Energy and the Court Appointed Monitor

Prepared By:

Advanced GeoServices Corp.
and
The Elm Consulting Group International LLC

TABLE OF CONTENTS

1.0 INTRODUCTION

Advanced GeoServices Corp. (AGC) and The Elm Consulting Group International LLC (Elm) (collectively, the Audit Team) are conducting environmental compliance audits (the Audits) of certain coal combustion residuals (CCR) management locations owned or operated by Duke Energy Business Services LLC, Duke Energy Carolinas, LLC, and Duke Energy Progress, Inc. (collectively, Duke Energy). The Audits are being conducted under the direction of Mr. Benjamin Wilson, the Court Appointed Monitor (CAM), pursuant to an Order issued by the U.S. District Court, Eastern District of North Carolina, in case numbers 5:15-CR-62-H, 5:15-CR-67-H, and 5:15-CR-68-H.

The scope of the Audits is set forth in the plea agreements entered into by Duke Energy and the United States in the above cases, the Court's judgments in these cases, and a written Audit scoping document agreed to by Duke Energy and the United States.

1.1 BACKGROUND INFORMATION

The subject of this report is the Audit completed at Duke Energy's Mayo Steam Electric Plant located in Roxboro, North Carolina. The Audit was conducted on July 24-25, 2019, for a total of two days on-site. The Audit Team members were:

• Mr. Christopher Reitman, P.E. AGC	Project Director, Audit Team Leader, Sr. Subject Matter Expert (on-site)
• Mr. Joseph Cotier, CPEA, Elm	Sr. Environmental Auditor (on-site)
• Mr. Bernie Beegle, P.G., AGC	Sr. Subject Matter Expert (off-site)

The facility was represented by:

- Mr. Tom Copolo, Station General Manager
- Mr. Cedric Fairbanks, CCP System Owner

- Mr. Mike Lazar, CCP Engineering & Closure Engineering
- Mr. Tim Hill, General Manager, Regional CCP Operations and Maintenance
- Mr. Bobby Barnes, Manager, Engineering & Closure Engineering
- Mr. Dan Kinateder, Duncan Brewer, CCP Projects
- Ms. Lori Tollie, EHS CCP Permitting and Compliance
- Ms. Kim Witt, EHS CCP Waste & Groundwater
- Mr. Randy Hart, Regulatory Affairs
- Ms. Keeley McCormick, Environmental Rover, EHS CCP Compliance
- Mr. Mike Phillips, Manager, EHS CCP Compliance
- Ms. Brian Fowler, EHS CCP Environmental Field Support
- Ms. Leanne Wilson, Station Environmental Field Support
- Mr. Tim Winters, Station Health and Safety Field Support
- Mr. Keith Higgins, EHS CCP Compliance

1.2 FACILITY OVERVIEW

The Mayo Steam Electric Plant (the Mayo Facility) is located at 10660 Boston Road in Roxboro, Person County, North Carolina. The Mayo Facility is a single unit coal-fired electric generating plant that began operation in 1983.

1.2.1 Ash Management Activities

The following information regarding the on-site CCR management facilities was provided by Duke Energy personnel, the Operations and Maintenance Manual, or the 2017 Annual CCR Inspection Report for the Mayo Facility:

- Active Ash Basin – The Active Ash Basin covers approximately 140 acres with a storage capacity of 1,921 acre-feet and includes the Ash Basin Dam. For regulatory purposes, the Ash Basin Dam has been identified as PERSO-035 by the North

Carolina Department of Environmental Quality (NCDEQ). The Active Ash Basin consists of two areas that are separated by an earthen dike: the Active Ash Basin Pond and the Release Forebay Basin. Historically, several waste streams were discharged/placed into the southern portion of the Active Ash Basin Pond via drainage conveyances and piping. These waste streams included coal pile runoff water, various stormwater flows, sewage treatment plant discharges, and cooling tower blowdown, as well as various low volume wastes including boiler blowdown, air pre-heater wash water, boiler wash water, precipitator wash, oily waste treatment, wastes/backwash water from water treatment processes, plant area washdown water, and the equipment heat exchanger water. The Active Ash Basin Pond flows to the Release Forebay Basin, which discharges into the Mayo Reservoir. According to the 2019 Annual Surface Impoundment Inspection Report, the Active Ash Basin impounds approximately 5.6 million tons of impounded CCR and 475 million gallons of water as of March 19, 2019. Discharges to the Active Ash Basin were terminated on June 27, 2019.

- CCP Monofill – The CCP Monofill is an operational solid waste facility. The CCP Monofill has 11 planned phases with a total area of 103.8 acres. The current Phase 1 has an area of 31 acres. The liner of the CCP Monofill consists of the following: a 60 mil HDPE bonded with a bentonite layer; a secondary 60 mil HDPE leak collection layer; a geocomposite leak detection layer; a primary HDPE liner; 24 inches of No. 57 coarse aggregate drainage/protective cover layer; and a 12-inch bottom ash filter. The CCP Monofill has been designed to provide separation of water that contacts waste surfaces (contact water) from non-contact water. Contact water is managed as leachate while non-contact water is managed as stormwater. Leachate had historically been collected and piped to either a one million-gallon tank system (on-site) or the FGD Settling Pond. The leachate conveyance piping currently directs leachate to the new FGD Settling Basin.

- Flue Gas Desulfurization (FGD) Ponds – There are two FGD Ponds at the Mayo Facility that were formed by two dams that share abutment features. These two ponds are the FGD Settling Pond (identified as PERSO-036 by NCDEQ) and the FGD Forward Flush Pond (identified as PERSO-037 by NCDEQ). The total length of the exterior dam is 2,145 feet. The FGD Settling Pond is active and receives the FGD blowdown water as well as leachate water from the CCP Monofill. Water is pumped out of the FGD Settling Pond to the Thermal Evaporator System. The FGD Settling Pond has an emergency spillway that will direct flow into the Active Ash Basin should the pond's freeboard be exceeded. The FGD Forward Flush Pond was originally used in the bioreactor treatment process. The bioreactor has been decommissioned, and the FGD Forward Flush Pond is inactive and no longer receives the back-flush of the bioreactor. Duke Energy is currently preparing plans to decommission the FGD Ponds starting in late 2019.

- New FGD Settling Basin (Wastewater Treatment) – The New FGD Settling Basin, became operational during the second quarter of 2019 and is utilized to manage leachate from the landfill, FGD blowdown water, and discharges from the thermal evaporator system sumps. The CCR groundwater monitoring system for the Mayo FGD Settling Basin (Wastewater Treatment) consists of 20 groundwater monitoring wells, which were installed in June 2017 through October 2018.

- Thermal Evaporator System – The Thermal Evaporator System is a process whereby the FGD wastewater is pumped to the system for evaporation and condensate recovery. The condensed water can be routed to the cooling tower or used as absorber make-up water. The collected distillate (brine) is used to condition, by wetting, the fly ash for transport and disposal.

- Gypsum Pad – A conveyor transports gypsum from the FGD Building to the Gypsum Pad. The Operations and Maintenance Manual states the Gypsum Pad includes a radial conveyor to deliver the conveyed gypsum to the pad, a truck wash, and truck scales. Most stockpiled gypsum is trucked to Duke Energy's Roxboro Facility. The material is sent via conveyor from the Roxboro Facility to the adjacent Certain-Teed Facility for use in wallboard. Off-spec gypsum at the Mayo Facility is disposed in the CCP Monofill.

Dry handling of fly and bottom ash is the primary management method used at the Mayo Facility. Dry fly ash is disposed of on-site in the CCP Monofill. Bottom ash is sold for beneficial reuse in cement or disposed in the CCP Monofill. Mayo can no longer sluice fly ash or bottom ash to the Active Ash Basin.

1.2.2 Environmental Permits and Programs

The Mayo Facility operates under a number of environmental permits and programs, including:

- **National Pollutant Discharge Elimination System (NPDES) Wastewater Permitting** – NCDEQ issued NPDES Permit No. NC0038377 with an effective date of November 1, 2009 and an expiration date of March 31, 2012. A timely permit renewal application package was submitted to NCDEQ on September 27, 2011. As it relates to CCR and ash management activities, the 2009 NPDES permit covers:
    - Outfall 002: This outfall discharges wastewaters from the Active Ash Basin and treatment system to Mayo Reservoir.
    - Internal outfall 008: This outfall discharges the cooling tower blowdown to the Active Ash Basin Pond and then to the Mayo Reservoir via outfall 002.
    - Internal outfall 009: This outfall discharges the FGD treatment system's wastewaters to the discharge channel upstream of outfall 002 but downstream of the Active Ash Basin, and then to Mayo Reservoir.
    - Eight stormwater outfalls including outfall 010, which discharges the drainage from the haul road for coal ash, limestone, gypsum, and gaseous anhydrous ammonia. All of the stormwater outfalls discharge to Mayo Reservoir.

The 2009 NPDES permit includes provisions for groundwater monitoring if required by NCDEQ. The facility operates a network of 10 compliance wells which are sampled three times a year to determine compliance with groundwater limits pursuant to 15A NCAC 02L.0200. The last groundwater sampling event under the 2009 NPDES permit was conducted in Aril 2018.

On July 13, 2018, NCDEQ issued the renewal of NPDES Permit No. NC0038377 with an effective date of August 1, 2018 and an expiration date of July 31, 2023 (the 2018 NPDES Permit).

As it relates to CCR and ash management activities, the 2018 NPDES permit covers:

- Outfall 002: This outfall discharges wastewaters from the Active Ash Basin and treatment system to Mayo Reservoir. There are a set of limits for normal operations/decanting and a set of limitations for dewatering from this Outfall.
- Outfall 002A: This outfall is for the newly constructed Lined Retention Basin (LRB) and discharges to Mayo Reservoir. Flows of Mayo Facility wastewaters that went to the Ash Basin and then Outfall 002 will be rerouted to the LRB and Outfall 002A and then Outfall 002.
- Internal Outfall 009: This outfall discharges the FGD treatment system's wastewaters to the discharge channel upstream of outfall 002 but downstream of the Active Ash Basin, and then to Mayo Reservoir.
- Outfalls 004, 005, 006c, 006d, 006e: These are stormwater outfalls that were formerly in the Mayo Facility Individual Stormwater permit. Outfalls 006c, 006d, and 006e have been grouted and permanently closed. The original locations for Outfalls 004 and 005 have been permanently closed with the new outfalls directed to Mayo Reservoir via the Effluent Canal and Outfall 002.

The 2018 NPDES Permit eliminated the previous groundwater monitoring requirements.

The constructed seeps are covered by the new NPDES permit. Constructed seeps are constructed features on or within dam structures, such as toe drains or filter blankets conveyed via a constructed channel directly to a receiving water.

- **Special Orders by Consent** – The Mayo Facility operated under a Special Order by Consent (SOC) dated June 25, 2012 (the 2012 SOC) that required installation of a "zero liquid discharge" facility (thermal evaporator) in place of the current FGD bioreactor as part of the wastewater treatment operations. The 2012 SOC included additional monitoring requirements for metals, including mercury, selenium, boron, manganese, and thallium. The 2012 SOC expired on September 1, 2017 with NCDEQ issuing its Final Written Account (closure letter) to Duke Energy on September 22, 2017.

  On August 15, 2018, the North Carolina Environmental Management Commission Special Order by Consent No. EMC SOC WQ S18-005 (SOC) issued to Duke Energy and became effective (the 2018 SOC). The 2018 SOC has an expiration date of "no later than June 30, 2022." The 2018 SOC covers discharges from the following non-constructed seeps: S-01, S-02, S-01A, S-02A, S-02B, S-03, S-04, S-05, S-06, S-07, S-08, S-09, and S-10. Non-constructed seeps are not on or within a dam structure and do not convey wastewater via a pipe or constructed channel directly to a receiving stream.

  The following seeps have been dispositioned due to lack of flow, lack of CCR related compounds, or the fact that their discharge is represented by other seeps: S-03, S-04, S-05, S-06, S-07, and S-09. S-01 and S-02 do not carry monitoring requirements. Seeps S-03, S-04, and S-05 are sampling locations and not seeps.

Seep S-06 is a seep flow to a small channel that originates southeast of the power plant and flows to Mayo Lake. Seeps S-07 and S-09 have no CCR impacts.

For monitoring purposes, the remaining seeps (S-01A, S-02A, S-02B, S-08, and S-10) are represented by instream monitoring in Crutchfield Branch, downstream of all seep contributions. Quarterly monitoring is required for parameters specified in the 2018 SOC. At the time of the Audit, four rounds of sampling had been conducted. No exceedances of Interim Action Levels were noted.

Additional requirements of the 2018 SOC included:

- Payment of an upfront civil penalty within 30 days of SOC issuance. This penalty was paid September 13, 2018.
- Initiation of decanting of the Ash Basin by June 30, 2019. In a letter to NCDEQ dated July 8, 2019, Duke Energy reported commencement of decanting had taken place on June 27, 2019.
- Annual completion of a comprehensive survey of existing and potential new seeps. New non-constructed seeps identified and reported to NCDEQ in the Annual Seep Report are deemed covered by the 2018 SOC. The Annual Seep Survey was conducted on October 16, 2018 with a subsequent report submitted to NCDEQ on April 24, 2019. The 2018 SOC requires the Annual Seep Survey to be submitted by April 30 each year. One new seep, S-11, was identified but determined to be along the same discharge path as S-10 and was subsequently dispositioned by Duke's seep survey contractor, SynTerra.
- Posting of a copy of the Mayo Facility NPDES Permit, the 2018 SOC, and related reports on Duke Energy's external website. All required documents have been posted.

- **NPDES Industrial Stormwater Permitting** – NCDEQ issued Individual Stormwater Permit No. NCS000580, effective January 27, 2017 with an expiration date of December 31, 2021. The permit includes stormwater outfalls 06a and 010, which drain to Mayo Reservoir. Former Outfalls 004, 005, 006c, 006d, and 006e are now covered under the Mayo Facility NPDES permit. Note that Outfalls 006c, 006d, and 006e have been grouted and permanently closed. A Stormwater Pollution Prevention Plan (SWPPP) dated May 2016 associated with the Industrial Stormwater Permit has been developed and implemented.

- **NPDES Construction Stormwater Permitting** – NCDEQ has issued 11 stormwater construction permits that govern activities related to CCR management at the Mayo Facility. These permits were issued by NCDEQ under its General Permit for Construction Activities, No. NCG010000.
  - PERSO-2017-003 was issued October 14, 2016 for Process Water Redirection;
  - PERSO-2018-018 was issued July 2, 2018 for an additional 6.2 acres related to the water redirect project;
  - PERSO-2018-019 was reissued January 22, 2019 for stormwater redirect project;
  - PERSO-2018-016 was issued May 2, 2018 for the Monofill stock pile;
  - PERSO-2018-015 was issued May 1, 2018 for the FGD Pond Decommissioning (work has not yet commenced);
  - PERSO-2018-011 was reissued August 4, 2018 and PERSO-2018-021 was issued July 17, 2018 for the stormwater redirect and LRB stockpiles;
  - PERSO-2018-006 was issued February 1, 2018 for Installation of FGD Monitoring Wells for the water redirect project.
  - PERSO-2013-006 was issued March 5, 2013 for Addendum 2 to Mayo Monofill Phase I;

- PERSO-2019-005 was issued November 26, 2018 for Water Treatment System Pad and Infrastructure; and
- PERSO-2019-007 was issued December 5, 2018 for Seep Collection System.

Erosion and sedimentation control plans were in place for these projects.

In the 2018 Audit, it was noted that Duke Energy self-reported unauthorized wetland and stream impacts in the area of the Lined Retention Basin on February 2, 2018. The area of the self-reported impacts was being implemented under permit Perso-2017-003. The impacts were associated with 227.39 linear feet of stream impact, approximately 1 acre of jurisdictional impacts, and 0.14 acres of permanent impacts in the area of Lined Retention Basin. The Audit Team understands the wetlands were not shown on the original project erosion and sediment control drawings and, as a result, were not incorporated into the project planning for the development of these areas. NCDEQ determined these unauthorized impacts represent violations of North Carolina Administrative codes associated with Wetland Standards (Title 15A NCAC 02B.0231(b)), Stream Standards – Removal of Use (Title 15A NCAC 02B.211(2)), and Failure to Secure a 401 Certification Title (15A NCAC 02H.501), and issued a Notice of Violation (NOV-2018-PC-0152) on June 18, 2018. Duke Energy is pursuing an after-the-fact U.S. Army Corps of Engineers (ACOE) permit for addressing the impacts to this area and submitted an application for a permit modification to ACOE following the 2018 Audit, on July 31, 2018. Duke reports that although it has had no further communications with ACOE on its efforts to permit the previously unpermitted impacts to wetlands and streams, Duke Energy did receive an ACOE individual Water Quality Certification 401 for the previously unpermitted impacts to wetlands and streams for the construction of the Lined Retention Basin, and Duke Energy is still waiting to receive the ACOE 404 Permit. The ACOE 401 Water Quality Certification was received on January 31, 2019.

- **NCDEQ Industrial Stormwater General Permit** – Coverage under NCDEQ's Industrial Stormwater General Permit No. NCG120000 (Landfills) was issued to Duke Energy for industrial stormwater associated with the facility's CCP Monofill. The Certificate of Coverage, No. NCG120101, was issued January 6, 2014 and renewed on November 6, 2018. The Permit includes requirements for outfall monitoring at Outfalls SW01, SW02, and SW03, storage of chemicals on secondary containment, and development of a Sedimentation and Erosion Control Plan. Historical sampling at the Monofill outfalls has shown elevated levels of fecal coliform, likely due to impacts of wildlife in the area. On February 20, 2018, NCDEQ granted Duke Energy regulatory relief for any fecal coliform results in excess of the general permit benchmark of 1,000 colonies per 100 mL. This relief continues through the term of Duke Energy's coverage.

  Duke Energy is continuing discussions with NCDEQ to discontinue stormwater coverage under the Landfills general permit and include Outfalls SW01, SW02, and SW03 in the Mayo Facility NPDES permit.

- **Title V Permitting** – Title V Permit No. 03478T47 was last revised by NCDEQ on September 15, 2017 and has an expiration date of November 30, 2021. The permit for the Mayo Facility covers all site activities including ash and ash basin management. Ash management activities, including fly and bottom ash handling, operation of the Monofill, gypsum handling, and truck transport of ash and gypsum, were listed as sources. Fugitive dust control was included in Section 3.MM of the permit.

- **Spill Prevention, Control, and Countermeasure (SPCC) Plan** – A Tier I Qualified Plan was prepared by Charah, Inc., a contractor to Duke Energy, for water redirect project work, including construction of the LRB. The Tier I SPCC Plan was dated March 20, 2018. The project work was largely completed and Charah had commenced demobilization of equipment and fuel storage tanks at the time of the Audit.

  Charah has also implemented a SPCC Plan that covers activities at the Monofill. This SPCC Plan was dated March 7, 2017.

- **Tier II Reporting** – Hazardous chemicals inventory reporting on Tier II for 2018 has been completed and was submitted on February 13, 2019.

- **CCP Monofill** – The CCP Monofill operates under Solid Waste Permit No. 7305-INDUS-2012 and began accepting brine-conditioned fly ash from the Mayo Facility in 2014. The permit requires semi-annual groundwater monitoring of five (5) monitoring wells and three (3) surface water locations, semi-annual sampling of untreated leachate, a record of the amount of waste received (compiled on a monthly basis), and submittal of an annual report.

  It was reported in the 2018 Audit that Duke Energy identified two integrity issues associated with the leachate force main used to transfer CCP monofill leachate to the FGD ponds in late March and early April 2018. These issues were reported to NCDEQ Division of Waste Management on March 29, 2018. During 2019, there were two additional leachate force main issues that led to releases on January 25, 2019 and June 12, 2019. As a result of these releases, NCDEQ issued a Notice of Violation and a Notice of Intent to enforce on July 22, 2019. NCDEQ stated Duke Energy has violated the following regulation:

"1. 15A NCAC 13B .0505(7)(c) which states in part "leachate shall be contained on site or *properly treated prior to discharge.*"

NCDEQ stated their concern that the issues at Mayo "may be indicative of future problems across the fleet..." NCDEQ requested Duke Energy have a 3rd party engineer review and evaluate the system and identify recommendations for future operations. As a result of these issues the leachate force main was not in service at the time of the 2019 Audit.

- **Waste Unit Compliance Boundaries** – NCDEQ issued a letter dated August 25, 2017 to Duke Energy regarding compliance boundaries for North Carolina coal ash facilities. On February 14, 2018, Duke Energy submitted to NCDEQ an updated compliance boundary map for the Mayo Facility that eliminated the area surrounding the 1981 demolition landfill. On April 19, 2018, Duke Energy submitted to NCDEQ a future compliance boundary for the Mayo Facility that will eliminate the small finger area of the southwest portion of the Ash Basin.

- **North Carolina Coal Ash Management Act of 2014 (CAMA)** – CAMA requires the identification of drinking water supply wells within one-half mile of the facility, submission of Groundwater Assessment Plans, installation and multiple rounds of sampling from Assessment Wells, submission of Groundwater Assessment Reports summarizing groundwater investigations, submission of an Annual Groundwater Protection and Restoration Report, submission of Discharge Assessment Plans to characterize seeps, submission of a Groundwater Corrective Action Plan, and ash basin closure/removal. These activities have been completed in accordance with the schedule required under CAMA.

NCDEQ has assigned the Active Ash Basin at the Mayo Facility an "intermediate risk" classification under CAMA. An intermediate risk classification requires excavation, removal, and safe storage of the facility's coal ash by December 31, 2024. Duke Energy completed improvements to the Active Ash Basin Dam structure and the water supply system of nearby residents, and as a result of these improvements, NCDEQ assigned a "low risk" classification for the Active Ash Basin on November 14, 2018. The low risk classification allows in-place closure activities at the Active Ash Basin and provides an extension of the closure deadline to June 2030. However, on April 1, 2019, NCDEQ issued a closure determination directing Duke Energy to excavate all of the CAMA-related coal ash from the Mayo Facility and properly dispose of it. On April 26, 2019, Duke Energy filed an administrative petition challenging NCDEQ's determination.

The current Interim Monitoring Plan (IMP) for groundwater monitoring at the Mayo Facility includes sampling 8 wells quarterly, 29 wells semi-annually, and 8 surface water locations. Duke Energy submitted the 2018 CAMA Interim Monitoring Report dated April 30, 2019 to NCDEQ.

Duke Energy submitted to NCDEQ the Mayo Facility's 2018 Groundwater Protection and Restoration Annual Report on January 25, 2019 and its 2018 Surface Water Protection and Restoration Annual Report on January 21, 2019.

- **Federal Coal Combustion Residuals Rule (CCR Rule)** – The CCR Rule (40 CFR, part 257, Subpart D) identifies standards for the disposal of CCR in landfills and surface impoundments. The Active Ash Basin, the CCP Monofill, the FGD Forward Flush Pond, the FGD Settling Pond, and the new FGD Settling Basin (Wastewater Treatment) are subject to the CCR Rule because the Mayo Facility continues to use coal for power generation. Tables 1a through 1e summarize the reports and plans posted by Duke Energy to its publicly available website in accordance with the CCR Rule.

The Active Ash Basin, the FGD Forward Flush Pond, and the FGD Settling Pond have a CCR multi-unit monitoring well network consisting of 17 CCR down gradient monitoring wells and three (3) background wells. The CCP Monofill's CCR monitoring network consists of 16 CCR down gradient monitoring wells and four (4) background wells.

On February 27, 2018, Duke Energy provided notice on Duke Energy's public website that the Active Ash Basin, the FGD Forward Flush Pond, and the FGD Settling Pond are now in the CCR assessment monitoring program due to statistically significant increases (SSIs) over the background values of the Appendix III parameters.

Duke Energy conducted an Alternative Source Demonstration (ASD) regarding the CCP Monofill CCR groundwater data that had SSIs over the background values of the Appendix III parameters. The ASD report dated July 2019 concluded the SSIs in Appendix III constituents in groundwater are from sources other than the CCP Monofill; therefore, the CCP Monofill will remain in detection monitoring. The ASD report identifies the truck wash station and leachate transfer station area (ancillary units to the landfill) as sources of the groundwater impact north of the CCP Monofill. As discussed in the 2018 Audit report, elevated boron concentrations were measured in groundwater samples from two CCR wells (CCR-210D and CCR-209BR) located just north of the CCP Monofill. The highest boron concentrations measured were 3,910 µg/l at CCR-209BR and 1,000 µg/l at CCR-210D. Both samples were collected on March 29, 2017.

Based on a review of the October 3, 2019 groundwater monitoring analyses, boron, chloride, cobalt, and total dissolved solids (TDS) were observed to exceed North Carolina's 02L groundwater standards one or more times at wells CCR-209BR and CCR-210D. Wells CCR-209BR and CCR-210D are located hydraulically down gradient of the Truck Wash Station and Leachate Transfer Station Area and within the compliance boundary of the CCP Monofill unit system.

On November 7, 2018, Duke Energy posted on Duke Energy's public website the required location restrictions for the Mayo Facility impoundments. Duke Energy stated that the Active Ash Basin, the FGD Forward Flush Pond, and the FGD Settling Pond did not meet the surface impoundment standard for placement above the uppermost aquifer (40 CFR § 257.60(a)).

On March 1, 2019, Duke Energy posted on its public website the CCR Annual Groundwater Monitoring and Corrective Action Reports, dated January 18, 2019, for the Active Ash Basin, the CCP Monofill, the FGD Forward Flush Pond, the FGD Settling Pond, and the FGD Settling Basin (Wastewater Treatment).

1.2.3 Dam and Other Structural Permits and Approvals

The Ash Basin Dam (PERSO-035) at the Mayo Facility is associated with ash management operations. The Ash Basin Dam was grandfathered under North Carolina's Session Law 2009-390 (Senate Bill 1004, effective January 1, 2010). Under this grandfathering, the original design of the Ash Basin Dam is not subject to the current design standards for new construction, although modifications after the effective date may be subject to these standards. The Ash Basin Dam has a high hazard classification under the North Carolina Dam Safety system.

The FGD Settling Pond (PERSO-036) and the FGD Forward Flush Pond (PERSO-037) are also dams, although they are significantly smaller, with a size of 4.36 acres and 0.56 acres respectively. Each of these dams has a low hazard classification under the North Carolina Dam Safety system. Duke Energy was developing plans for decommissioning these dams in late 2019 or early 2020.

New dams were also constructed and permitted for the new Lined Retention Basin and the new FGD Settling Basin.

1.2.4 Audit Observations and Update of the Mayo Facility's Activities

During the 2019 Audit, the Audit team observed completion of significant construction activities required for the implementation of the water redirection project. As part of these activities, a new FGD Settling Bain (the Wastewater Treatment Basin), a new Lined Retention Basin, and a new Coal Pile Holding Basin were installed along with associated piping infrastructure to connect these improvements. Duke Energy also was implementing improvements to the Truck Wash area at the landfill and improvements to the leachate force main to address identified integrity issues.

2.0 AUDIT SCOPE AND SUBJECT MATTER

The Audit was completed in accordance with the court documents and the Audit scoping document agreed to by Duke Energy and the United States. A description of the scope is provided in Attachment A. The Audit included ash management activities, including aspects of generation that affect the nature of the waste streams from the point of generation into surface impoundments or ash management basins, landfills, and/or storage piles. The Audit focused on the activities at the facility since the date of the last Audit, which was July 25-26, 2018.

3.0 AUDIT FINDINGS

There were no Findings at the Mayo Facility identified by the Audit Team.

4.0 OPEN LINES OF INQUIRY

Open Lines of Inquiry are items identified by the Audit Team while on-site that, due to limited available information or the need for additional research, could not be determined as being in compliance or out of compliance. There were no Open Lines of Inquiry identified during the Audit.

5.0 AUDIT APPROACH

5.1 ON-SITE ACTIVITIES

During its time on-site, the Audit Team conducted an opening conference with facility personnel to discuss the scope of work and the plan for accomplishing necessary tasks while at the facility. A site tour of the coal ash management and program support areas was subsequently completed. Following the tour, the Audit Team conducted a review of pertinent files, interviews with facility representatives, and verification of facility activities related to the ECPs, written programs, and permits. A debrief was conducted each Audit day to advise the facility representatives of Audit progress, open lines of inquiry, possible Audit findings, and needs for the next day. At the completion of the Audit, the Audit Team led a verbal discussion of draft Audit findings with facility representatives.

5.2 STANDARDS OF PRACTICE

The fieldwork portion of the Audit was conducted on July 24-25, 2019, with compliance reporting commencing May 14, 2015, the date of the Court's judgments. The Audit focused on the activities at the facility since the date of the last Audit, which was July 25-26, 2018 and was based on:

- Physical inspections of the facility;
- Examination of selected administrative and operating records made available by facility staff at the Audit Team's request;
- Interviews and discussions with key facility management and staff; and
- Verification procedures designed to assess the facility's application of, and adherence to, terms of the Probation, environment laws and regulations, and site policies and procedures. In addition, the Audit Team reviewed the facility's adherence to good management practices.

The Audit followed established audit protocols and procedures. It should be understood that the Audit consisted of evaluating a sample of practices and was conducted over a short period of time.

Efforts were made to sample major facets of environmental performance during the period under review. This method is intended to uncover major system deficiencies and the Audit may not have identified all potential problems.

To support the overall independence of the Audit process, the Audit included an auditing professional certified by the Board of Environmental, Health and Safety Auditor Certifications (BEAC). BEAC is an accredited professional certification board that issues the Certified Professional Environmental Auditor (CPEA) designation to qualified auditors. Under BEAC, auditor independence is a key criterion for the implementation of an effective third-party audit program. The Audit was implemented in accordance with the standards related to auditor independence.

The process by which the Audit was conducted was consistent with the general state of the art of environment auditing and the best professional judgment of the Audit Team. To conduct the Audit, the team implemented a formal approach, drawing on process guidance from both BEAC and the Auditing Roundtable (AR) guidance documents. Guidance documents included:

- *Standards for the Professional Practice of Environmental, Health and Safety Auditing*. Prepared by the Board of Environmental, Health and Safety Auditor Certifications, 2008.

- ISO 19011:2002 – *Guidelines for Quality and/or Environmental Management Systems Auditing*. Prepared by the International Organization for Standardization, 2002.

- *Standard for the Design and Implementation of an Environmental, Health and Safety Audit Program*. Prepared by The Auditing Roundtable, Inc., 1995.
- *Minimum Criteria for the Conduct of Environmental, Health and Safety Audits*. Prepared by The Auditing Roundtable, Inc.

5.3 REPRESENTATIVE SAMPLING

When confronted with a large population of data to review or equipment to inspect, the Audit Team employed representative sampling techniques to evaluate records over the Audit period requested, and as necessary, for physical inspection of some types of common equipment. The sample size for records reviews or equipment inspections required professional judgment.

The Audit Team's judgement considered the following:

- The outcome of the evaluation of the records sampled. If problems are found in the representative sample, more records may need to be examined to evaluate compliance status.
- Potential for or severity of non-compliance.
- The general appearance and observed practices of certain operating areas.
- Information obtained during an interview that indicates a potential problem.
- Other specific information or guidance from the CAM.
- Time available during the Audit.

The Audit Team also employed the following types of sampling techniques, depending upon the characteristics of a specific population:

- Random sampling – every item has an equal chance of being selected.

- Interval sampling – select every nth item, (e.g., every third manifest in chronological order as contained in facility files).
- Block sampling – auditor uses his/her judgment to select a specific block of items, (e.g., petroleum storage tank inspections from April to October).
- Stratified sampling – population is divided into groups, which are then sampled through random or judgmental techniques.

TABLES

TABLE 1A
Active Ash Basin - Plans and Reports Posted by Duke Energy Under the CCR Rule

Document Name	Category	Release Date
Emergency Action Plan Active Ash Basin and FGD Settling Basin	Design Criteria	08/28/2019
Notice of Intent to Close	Closure and Post Closure Care	08/01/2019
CCR Annual Surface Impoundment Inspection Report 2019	Operating Criteria	05/29/2019
Annual Meeting with Local Emergency Responders 2019	Design Criteria	04/24/2019
Emergency Action Plan	Design Criteria	04/04/2019
Fugitive Dust Control Plan	Operating Criteria	03/26/2019
CCR Annual Groundwater Monitoring and Corrective Action Report 2018	Groundwater Monitoring and Corrective Action	03/01/2019
Annual Fugitive Dust Control Report 2018	Operating Criteria	12/05/2018
Wetlands	Location Restriction	11/07/2018
Unstable Areas	Location Restriction	11/07/2018
CCR Annual Surface Impoundment Inspection Report 2018	Operating Criteria	06/06/2018
Annual Meeting with Local Emergency Responders 2018	Design Criteria	05/01/2018
Notice of Establishment of an Assessment Monitoring Program Mayo Ash Basin	Groundwater Monitoring and Corrective Action	02/27/2018
CCR Annual Groundwater Monitoring and Corrective Action Report	Groundwater Monitoring and Corrective Action	02/06/2018
Mayo Inundation Maps	Design Criteria	01/25/2018
2017 Annual CCR Fugitive Dust Control Report-Mayo	Operating Criteria	11/29/2017
Fugitive Dust Control Plan	Operating Criteria	11/29/2017
Groundwater Sampling and Analysis Program Selection of Statistical Method Certification-Mayo Ash Basin	Groundwater Monitoring and Corrective Action	10/25/2017
Groundwater Monitoring System Certification-Mayo Ash Basin	Groundwater Monitoring and Corrective Action	10/25/2017
CCR Annual Surface Impoundment Inspection Report 2017 - Mayo	Operating Criteria	06/06/2017

TABLE 1A
(Continued)

Document Name	**Category**	**Release Date**
Annual Meeting with Local Emergency Responders 2017	Design Criteria	05/24/2017
Annual Fugitive Dust Control Report 2016	Operating Criteria	12/05/2016
Initial Structural Stability Assessment	Design Criteria	11/16/2016
Initial Factor of Safety Assessment	Design Criteria	11/15/2016
Post Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016
Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016
Inflow Design Flood Control System	Operating Criteria	11/03/2016
History of Construction	Design Criteria	10/25/2016
Initial Hazard Classification Assessment Certification	Design Criteria	10/12/2016
Existing Liner Design Criteria	Design Criteria	10/11/2016
Annual Surface Impoundment Inspection Report 2016	Operating Criteria	06/15/2016
Annual Surface Impoundment Report (Initial)	Operating Criteria	02/16/2016
Annual Surface Impoundment Report (Initial) Revision 1	Operating Criteria	02/19/2016

*This summary of reports was downloaded on October 10, 2019

TABLE 1B

FGD Forward Flush Pond - Plans and Reports Posted by Duke Energy Under the CCR Rule

Document Name	Category	Release Date
CCR Annual Surface Impoundment Inspection Report 2019	Operating Criteria	05/29/2019
Annual Meeting with Local Emergency Responders 2019	Design Criteria	04/24/2019
Emergency Action Plan	Design Criteria	04/04/2019
Fugitive Dust Control Plan	Operating Criteria	03/26/2019
CCR Annual Groundwater Monitoring and Corrective Action Report 2018	Groundwater Monitoring and Corrective Action	03/01/2019
Annual Fugitive Dust Control Report 2018	Operating Criteria	12/05/2018
Wetlands	Location Restriction	11/07/2018
Unstable Areas	Location Restriction	11/07/2018
Seismic Impact Zones	Location Restriction	11/07/2018
Fault Areas	Location Restriction	11/07/2018
Placement Above Uppermost Aquifer	Location Restriction	11/07/2018
CCR Annual Surface Impoundment Inspection Report 2018	Operating Criteria	06/06/2018
Annual Meeting with Local Emergency Responders 2018	Design Criteria	05/01/2018
Notice of Establishment of an Assessment Monitoring Program Mayo FGD Forward Flush Pond	Groundwater Monitoring and Corrective Action	02/27/2018
CCR Annual Groundwater Monitoring and Corrective Action Report	Groundwater Monitoring and Corrective Action	02/06/2018
Mayo Inundation Maps	Design Criteria	01/25/2018
2017 Annual CCR Fugitive Dust Control Report-Mayo	Operating Criteria	11/29/2017
Fugitive Dust Control Plan	Operating Criteria	11/29/2017

TABLE 1B
(Continued)

Document Name	Category	Release Date
Groundwater Sampling and Analysis Program Selection of Statistical Method Certification-Mayo FGD Forward Flush	Groundwater Monitoring and Corrective Action	10/25/2017
Groundwater Monitoring System Certification-Mayo FGD Forward Flush Pond	Groundwater Monitoring and Corrective Action	10/25/2017
CCR Annual Surface Impoundment Inspection Report 2017 - Mayo	Operating Criteria	06/06/2017
Annual Meeting with Local Emergency Responders 2017	Design Criteria	05/24/2017
Structural Stability Assessment for May FGD Forward Flush Pond - Revision 1	Design Criteria	01/12/2017
Annual Fugitive Dust Control Report 2016	Operating Criteria	12/05/2016
Initial Structural Stability Assessment	Design Criteria	11/16/2016
Initial Factor of Safety Assessment	Design Criteria	11/15/2016
Post Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016
Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016
Inflow Design Flood Control System	Operating Criteria	11/03/2016
History of Construction	Design Criteria	10/25/2016
Initial Hazard Classification Assessment Certification	Design Criteria	10/12/2016
Existing Liner Design Criteria	Design Criteria	10/11/2016
Annual Surface Impoundment Inspection Report 2016	Operating Criteria	06/15/2016
Annual Surface Impoundment Report (Initial)	Operating Criteria	02/16/2016
Annual Surface Impoundment Report (Initial) Revision 1	Operating Criteria	02/19/2016

*This summary of reports was downloaded on October 10, 2019

TABLE 1C
FGD Settling Pond - Plans and Reports Posted by Duke Energy Under the CCR Rule

Document Name	Category	Release Date
Emergency Action Plan Active Ash Basin and FGD Settling Basin	Design Criteria	08/28/2019
CCR Annual Surface Impoundment Inspection Report 2019	Operating Criteria	05/29/2019
Annual Meeting with Local Emergency Responders 2019	Design Criteria	04/24/2019
Emergency Action Plan	Design Criteria	04/04/2019
Fugitive Dust Control Plan	Operating Criteria	03/26/2019
CCR Annual Groundwater Monitoring and Corrective Action Report 2018	Groundwater Monitoring and Corrective Action	03/01/2019
Annual Fugitive Dust Control Report 2018	Operating Criteria	12/05/2018
Wetlands	Location Restriction	11/07/2018
Unstable Areas	Location Restriction	11/07/2018
Seismic Impact Zones	Location Restriction	11/07/2018
Fault Areas	Location Restriction	11/07/2018
Placement Above Uppermost Aquifer	Location Restriction	11/07/2018
CCR Annual Surface Impoundment Inspection Report 2018	Operating Criteria	06/06/2018
Annual Meeting with Local Emergency Responders 2018	Design Criteria	05/01/2018
Notice of Establishment of an Assessment Monitoring Program Mayo FGD Settling Pond	Groundwater Monitoring and Corrective Action	02/27/2018
CCR Annual Groundwater Monitoring and Corrective Action Report	Groundwater Monitoring and Corrective Action	02/06/2018
Mayo Inundation Maps	Design Criteria	01/25/2018
2017 Annual CCR Fugitive Dust Control Report-Mayo	Operating Criteria	11/29/2017
Fugitive Dust Control Plan	Operating Criteria	11/29/2017

TABLE 1C
(Continued)

Document Name	**Category**	**Release Date**
Groundwater Sampling and Analysis Program Selection of Statistical Method Certification-Mayo FGD Settling Pond	Groundwater Monitoring and Corrective Action	10/25/2017
Groundwater Monitoring System Certification-Mayo FGD Settling Pond	Groundwater Monitoring and Corrective Action	10/25/2017
Notice of Corrective Measure to Address Structural Stability Deficiency-Mayo FGD Settling Pond	Operating Criteria	10/19/2017
CCR Annual Surface Impoundment Inspection Report 2017 - Mayo	Operating Criteria	06/06/2017
Annual Meeting with Local Emergency Responders 2017	Design Criteria	05/24/2017
Annual Fugitive Dust Control Report 2016	Operating Criteria	12/05/2016
Initial Structural Stability Assessment	Design Criteria	11/16/2016
Initial Factor of Safety Assessment	Design Criteria	11/15/2016
Post Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016
Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016
Inflow Design Flood Control System	Operating Criteria	11/03/2016
History of Construction	Design Criteria	10/25/2016
Initial Hazard Classification Assessment Certification	Design Criteria	10/12/2016
Existing Liner Design Criteria	Design Criteria	10/11/2016
Annual Surface Impoundment Inspection Report 2016	Operating Criteria	06/15/2016
Annual Surface Impoundment Report (Initial)	Operating Criteria	02/16/2016
Annual Surface Impoundment Report (Initial) Revision 1	Operating Criteria	02/19/2016

*This summary of reports was downloaded on October 10, 2019

TABLE 1D
CCP Monofill - Plans and Reports Posted by Duke Energy Under the CCR Rule

Document Name	Category	Release Date
Fugitive Dust Control Plan	Operating Criteria	03/26/2019
CCR Annual Groundwater Monitoring and Corrective Action Report 2018	Groundwater Monitoring and Corrective Action	03/01/2019
Run On and Run Off Control System Plan	Operating Criteria	02/19/2019
Annual Fugitive Dust Control Report 2018	Operating Criteria	12/05/2018
CCR Annual Landfill Inspection Report 2018	Operating Criteria	11/19/2018
Unstable Areas	Location Restriction	11/07/2018
CCR Annual Groundwater Monitoring and Corrective Action Report	Groundwater Monitoring and Corrective Action	02/06/2018
2017 Annual CCR Fugitive Dust Control Report-Mayo	Operating Criteria	11/29/2017
Fugitive Dust Control Plan	Operating Criteria	11/29/2017
CCR Annual Landfill Report 2017-Mayo CCP Monofill	Operating Criteria	11/29/2017
Groundwater Sampling and Analysis Program Selection of Statistical Method Certification-Mayo CCP Monofill	Groundwater Monitoring and Corrective Action	10/25/2017
Groundwater Monitoring System Certification-Mayo CCP Monofill	Groundwater Monitoring and Corrective Action	10/25/2017
Annual Fugitive Dust Control Report 2016	Operating Criteria	12/05/2016
CCR Annual Landfill Inspection Report 2016	Operating Criteria	11/22/2016
Post Closure Plan for CCP Monofill	Closure and Post Closure Care	11/11/2016
Closure Plan for CCP Monofill	Closure and Post Closure Care	11/11/2016
Run-on and Run-off Control System Plan	Operating Criteria	11/03/2016
Annual Landfill Report (Initial)	Operating Criteria	02/03/2016

*This summary of reports was downloaded on October 10, 2019

TABLE 1E
FGD Settling Basin (Wastewater Treatment) Plans and Reports Posted by Duke Energy under the CCR Rule

Document Name	Category	Release Date
Emergency Action Plan Active Ash Basin and FGD Settling Basin	Design Criteria	08/28/2019
Groundwater Sampling and Analysis Program Selection of Statistical Method Certification	Groundwater Monitoring and Corrective Action	04/24/2019
Groundwater Monitoring System Certification	Groundwater Monitoring and Corrective Action	04/24/2019
Annual Meeting with Local Emergency Responders 2018	Design Criteria	04/24/2019
Emergency Action Plan	Design Criteria	04/04/2019
Fugitive Dust Control Plan	Operating Criteria	03/26/2019
Inflow Design Flood Control System	Operating Criteria	03/26/2019
Wetlands	Location Restriction	03/26/2019
Unstable Areas	Location Restriction	03/26/2019
Initial Structural Stability Assessment	Design Criteria	03/26/2019
Seismic Impact Zones	Location Restriction	03/26/2019
Initial Factor of Safety Assessment	Design Criteria	03/26/2019
Initial Design Criteria Liner	Design Criteria	03/26/2019
Initial Hazard Potential Classification	Design Criteria	03/26/2019
Fault Areas	Location Restriction	03/26/2019
Design and Construction Criteria	Design Criteria	03/26/2019
Closure Plan	Closure and Post Closure Care	03/26/2019
Placement Above the Uppermost Aquifer FGD Settling Basin – (Wastewater	Location	03/26/2019

TABLE 1E
(Continued)

Document Name	Category	Release Date
Treatment)	Restriction	
CCR Annual Groundwater Monitoring and Corrective Action Report 2018	Groundwater Monitoring and Corrective Action	03/01/2019
Liner Design Criteria	Design Criteria	06/19/2018

*This summary of reports was downloaded on October 10, 2019

ATTACHMENTS

ATTACHMENT A

ATTACHMENT A

AUDIT SCOPE

A-1 GENERAL AUDIT SCOPE ITEMS

The general Audit scope items included:

- Review and evaluation of documentation for maintenance and repair of structures and equipment used for coal ash disposal,
- Review and evaluation of documentation of modifications, failures, leaks, damage, disrepair and other problems at the coal ash management units,
- Review and evaluation of documentation of efforts to correct failures, leaks, damage, disrepair and other problems where they determine that employee/contractor actions were likely a primary or contributing cause to a compliance finding,
- Review and evaluation of documentation of communication of the items above within the organization,
- Review and evaluation of documentation associated with the specific environmental compliance items described below and laws, regulations, and policies associated these items and

- Review of compliance with administrative aspects and regulatory submissions related to coal ash management-specific regulations, including:

–	Coal Combustion Residuals	40 CFR Part 257 Subpart D
–	NC Coal Ash Management Act of 2014	NC General Statutes Chapter 130A, Article 9

More specific items which were addressed in the audits to comply with the General Audit Scope are described below.

A-2 SPECIFIC COMPLIANCE WITH THE ECP-NC

The following items related to specific ECP-NC compliance were reviewed as part of the audit:

1. Verify maintenance and sufficient funding of corporate compliance organizations (ABSAT, CCP organization, National Ash Management Advisory Board). Where a root cause of a compliance finding appears in an auditor's judgment to result from inadequate funding, the AGC/ELM Audit Team will identify this in the Audit finding.

2. Verify timely production of satisfactory Compliance Officer (CO) reports to the CAM relating to the development, implementation, and enforcement of the ECP-NC. No auditing work is associated with this work at this time.

3. Evaluate existence and efficacy of toll-free hotline/e-mail inbox for violation reporting, including the appropriateness of the follow-up investigation and disposition of each reported matter. This requirement will be evaluated for the first year of audits and then reassessed.

4. Evaluate completion and efficacy of periodic notices (via Internet, Intranet, email, notices in employee work areas, and publication in community outlets) to employees and the public of the availability of the toll-free hotline and electronic mail inbox.

5. Evaluate training materials and curricula utilized in the mandated training program, particularly those tailored to employee's specific job descriptions, to determine whether it advances the goal of "ensuring that every domestic employee of Duke Energy Corporation and its wholly-owned or operated affiliates understands applicable compliance policies and is able to integrate the compliance objectives in the performance of his/her job." Ensure that the subjects specifically named in the plea agreements are covered by the training (namely, notice and reporting requirements in the event of a release or discharge and the safe and proper handling of pollutants, hazardous substances and/or wastes.)

6. Evaluate whether Defendants are using "Best Efforts" to comply with the obligations under the ECP-NC. Where the Audit Team makes compliance findings, the Audit Team will, upon request, provide their opinion on whether this best efforts standard applies, and if so, whether best efforts have been used.

7. Verify compliance at each facility with the specific procedures and protocols set forth in the ECP-NC.

A-3 SPECIFIC COMPLIANCE WITH OTHER PROVISIONS OF THE PLEA AGREEMENT

The following items related to specific items in the Plea Agreement were reviewed as part of the Audit:

1. Determine whether Defendants have opened, expanded, or reopened any coal ash or coal ash wastewater impoundment and, if so, verify that they are lined and do not allow unpermitted discharges of coal ash or coal ash wastewater to waters of the United States.

2. Verify that Defendants have determined the volume of wastewater and coal ash in each wet-storage coal ash impoundment in North Carolina as described in the plea agreements and that written or electronic records of this information is maintained in a location available to facility staff and employees responsible for making environmental or emergency reports.

3. Review citations/notices of violation/notices of deficiency related to violations of federal, state, or local law to assure that they have been properly relayed to the Court and, as appropriate under the plea agreements, determine their materiality.

4. Evaluate Defendants' efforts to close coal ash impoundments at Dan River, Riverbend, Asheville, and Sutton for legal compliance.

5. Note any observations made during the Audit that cause concern regarding the assets and/or security available to the Defendants to meet the obligations imposed by the Judgment in this case.

A-4 GENERAL ENVIRONMENTAL COMPLIANCE SUBJECT AREAS

The following items related to General Environmental Compliance were reviewed as part of the Audit:

1. Assess all waste streams from Duke Energy facilities with coal ash impoundments. Review Duke Energy's processes, procedures, and practices, as well as compliance with those processes, procedures, and practices, for:

    a. identifying waste streams (especially, but not limited to, waste streams with discharge points into bodies of water),
    b. identifying and communicating any modifications or changes, or potential modifications or changes, to waste streams,
    c. ensuring proper handling/disposal of waste streams,
    d. identifying, preventing, and mitigating any risks or hazards that could affect waste streams and/or the disposal of waste streams, and
    e. ensuring proper permitting for waste streams.

For Item 1.d., the Audit Team evaluated such risk/hazard issues where there were compliance findings associated with waste streams.

2. Review and evaluate documentation of:

    a. Maintenance and repair of structures and equipment related to coal ash disposal,
    b. Modification of the coal ash impoundments and related pollution prevention equipment and structures,
    c. Failures, leaks, damage, disrepair, and other problems,
    d. Communication of the information described in a-c within the organization, and

e. Efforts to correct failures, leaks, damage, disrepair, and other problems.

3. Assess the employees responsible for inspection, maintenance, and repair of coal ash basins and related structures and equipment. The assessment included an assessment of the workloads of such employees to assure that Duke Energy's facilities are adequately staffed. These assessments were made where the Audit Team determine that employee/contractor actions were likely a primary or contributing cause to a compliance finding.

4. Review the results and recommendations of any other audits (internal or external/state mandated) and assess Duke Energy's implementation of those recommendations.

5. Review and assess Duke Energy's processes, procedures, and practices for identifying, communicating, and addressing problems and potential problems at its coal ash basins (leaks, unpermitted discharges, etc.).

6. Review and assess Duke Energy's policies, procedures, practices, and equipment for handling emergency releases from its coal ash basins and evaluate the personnel with duties in such situations.

7. Verify that Duke Energy is complying with its NPDES wastewater and stormwater permits, as well as other relevant environmental permits. This should include verifying Duke Energy's timely submission of permit applications, permit renewal applications, and responses to requests for additional information from the relevant regulatory authority.

8. Review and assess any actions or measures Duke Energy has undertaken to assure accountability and prevent recurrences when problems and/or failures occur (i.e. disciplinary actions, re-training, revision to policies and procedures, etc.). This

review will be completed where the Audit Team determines that employee/contractor actions were likely a primary or contributing cause to a compliance finding.

9. Review and assess compliance with the following environmental regulations, as applicable to the management of coal ash:

a.	Wastewater Discharges	40 CFR 122; 15A NCAC 2H.0100 *et seq*
b.	Stormwater Discharges	40 CFR 122.26; 15A NCAC 2H.1000 *et seq;* NC General Permit (Construction) No. NCG010000
c.	NC Groundwater Standards	15A NCAC 02L.0202(h)
d.	Hazardous Waste Management	15A NCAC 13A.0100 to 13A.0107
e.	Oil Pollution Prevention	40 CFR Part 112
f.	Air Pollution (Title V)	15A NCAC 2Q, and
g.	Hazardous Chemicals (Tier II)	40 CFR Part 370.

Reviews also included an analysis of overall compliance and the status and security of the asset. Subsequent reviews of individual facilities will evaluate the movement towards compliance. The Audit did not include an evaluation of compliance with the September 2015 Settlement Agreement with NCDEQ.

A–5 LIST OF PERMITS AND PROGRAMS DEEMED TO BE EITHER DIRECTLY OR INDIRECTLY IN SUPPORT OF ASH MANAGEMENT

During the Audit, the Audit Team reviewed a variety of written programs developed and implemented by Duke Energy and facility staff. State-issued permits and supporting documentation relative to environmental programs and geotechnical aspects of ash basin management were also requested and reviewed.

Requested documents, pertinent to management of ash in basins, landfills, ponds, etc. were outlined in the pre-audit questionnaire for each facility and included, but were not limited to:

1. The Compliance Register developed for ETrac for the Site.

2. The Duke Energy Operations Manual for the facility.

3. A site plan, site map, or aerial photo which shows the entire facility and key features, of the facility including NPDES outfalls associated environmental monitoring locations, storage tanks, etc.

4. Most recent 2 years of maintenance, monitoring, and inspection records for each coal ash/CCR basin (just the physical inspections, not the groundwater records).
5. A “Phase 1 and Phase 2” summary of ash basin conditions prepared by an outside consultant.

6. Duke Energy’s permitting plans for addressing ash impoundments and landfills at this facility.

7. Applicable pages from the Duke Energy basin-by-basin coal ash/CCR project tracking document for this facility.

8. Original basin/landfill/coal ash management unit construction records.

9. Documentation of changes to these units.

10. Coal ash unit construction permit application and approval.

11. State-issued permits and application materials for permits associated with coal ash/CCR management (including, e.g., dam permits).

12. Any currently effective state order, consent order, or similar state direction that addresses coal ash/CCR management at the site.

13. Records required to be maintained in the site's operating record under the federal CCR regulation and/or any state CCR regulatory program.
14. Records of off-site ash shipments from May 2015 forward.

15. Stormwater permit application and approval for all outfalls.

16. Industrial wastewater (NPDES/POTW) permit application and approval for all outfalls/discharges.

17. Industrial and stormwater sampling and monitoring records, and any corrective action plans (last 2 years).

18. Stormwater pollution prevention plan.

19. Landfill operating permit with maintenance and monitoring requirements.

20. Landfill leak detection and groundwater monitoring records from the last 2 years along with any workplans that describes the rationale for the monitoring system at the Site.

21. Landfill operating permit with maintenance and monitoring requirements.

22. Copies of any air permits and applications for coal ash units and ancillary operations.

23. Any testing and monitoring records completed to comply with the air permits.

24. Any notices of violation~~s~~ associated with the coal ash/CCR management activities received over the last 2 years.

25. Copy of SPCC Plan.

26. Community Right-to-Know
    a. Copies of lists of hazardous chemicals or MSDSs submitted;
    b. Copies of Tier I or II reports; and
    c. Copies of Form R (toxic release inventory) reports.

27. Copies of communications with employees and the public regarding availability of toll-free hotline and electronic mail inbox for reporting suspected environmental violations.

28. Management Systems:

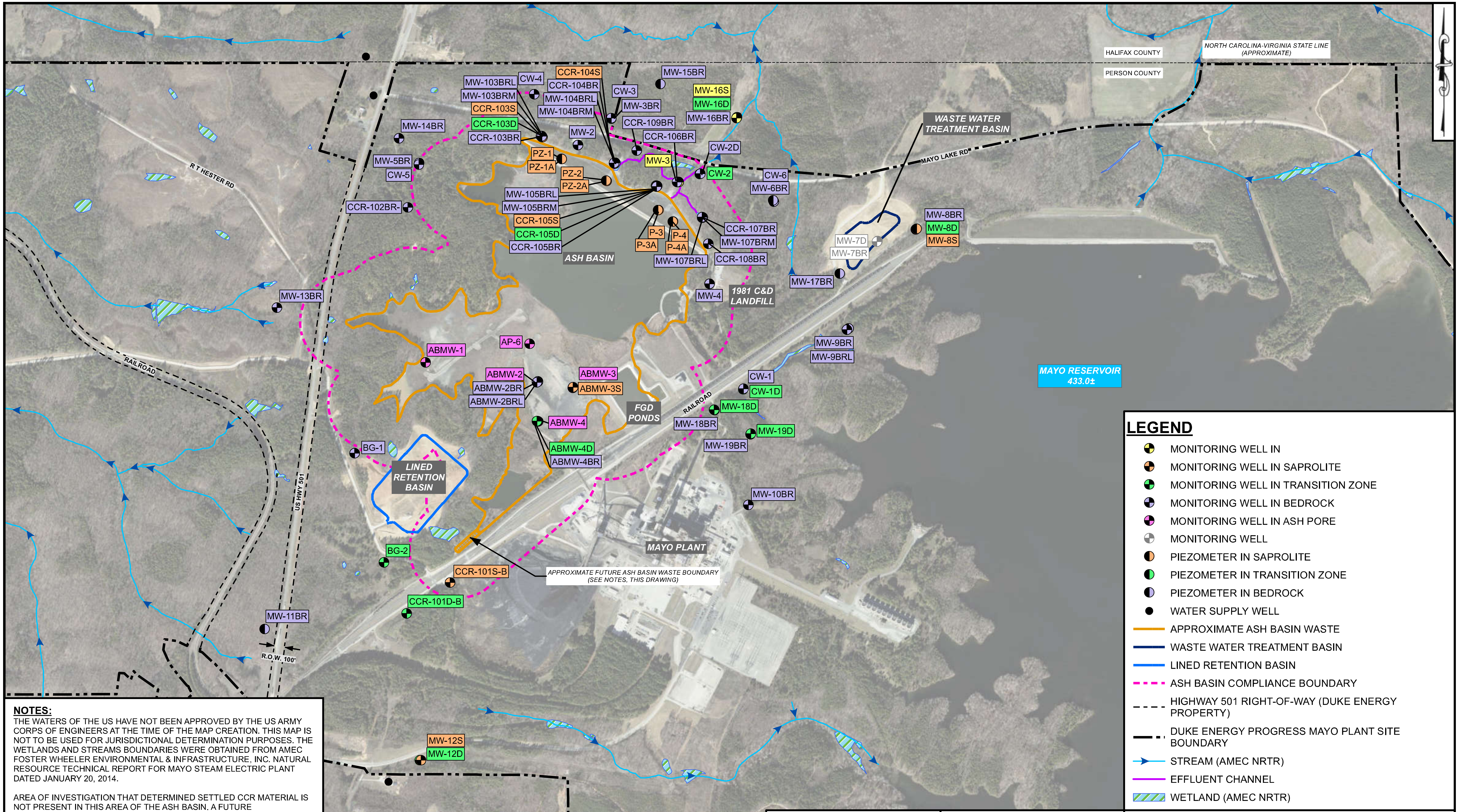
    a. List of responsible party for each environmental activity.
    b. All environmental-related training records.
    c. All environmental policies and procedures.
    d. Organization chart.
    e. Site diagram identifying storage areas, tanks, etc.

29. Employee training records related to environmental programs and ash management policies.

ATTACHMENT B

2018 and 2019 CAMA GROUNDWATER DATA SUMMARY AND WELL LOCATION MAP

I/A



LEGEND

●	MONITORING WELL IN
●	MONITORING WELL IN SAPROLITE
●	MONITORING WELL IN TRANSITION ZONE
●	MONITORING WELL IN BEDROCK
●	MONITORING WELL IN ASH PORE
●	MONITORING WELL
◐	PIEZOMETER IN SAPROLITE
◐	PIEZOMETER IN TRANSITION ZONE
◐	PIEZOMETER IN BEDROCK
●	WATER SUPPLY WELL
━	APPROXIMATE ASH BASIN WASTE
━	WASTE WATER TREATMENT BASIN
━	LINED RETENTION BASIN
- -	ASH BASIN COMPLIANCE BOUNDARY
- -	HIGHWAY 501 RIGHT-OF-WAY (DUKE ENERGY PROPERTY)
━ ·	DUKE ENERGY PROGRESS MAYO PLANT SITE BOUNDARY
→	STREAM (AMEC NRTR)
━	EFFLUENT CHANNEL
▨	WETLAND (AMEC NRTR)

NOTES:

THE WATERS OF THE US HAVE NOT BEEN APPROVED BY THE US ARMY CORPS OF ENGINEERS AT THE TIME OF THE MAP CREATION. THIS MAP IS NOT TO BE USED FOR JURISDICTIONAL DETERMINATION PURPOSES. THE WETLANDS AND STREAMS BOUNDARIES WERE OBTAINED FROM AMEC FOSTER WHEELER ENVIRONMENTAL & INFRASTRUCTURE, INC. NATURAL RESOURCE TECHNICAL REPORT FOR MAYO STEAM ELECTRIC PLANT DATED JANUARY 20, 2014.

AREA OF INVESTIGATION THAT DETERMINED SETTLED CCR MATERIAL IS NOT PRESENT IN THIS AREA OF THE ASH BASIN. A FUTURE REPRESENTATIVE ASH BASIN WASTE AND COMPLIANCE BOUNDARY IS INCLUDED IN THE MAYO NPDES PERMIT NC0038377 PART I, 5.A.(18.) ATTACHMENT A FIGURE 1 AND ATTACHMENT B FIGURE 1.1 DATED JULY 13, 2018.

AERIAL PHOTOGRAPHY OBTAINED FROM GOOGLE EARTH PRO ON SEPTEMBER 27, 2017. AERIAL WAS COLLECTED ON JUNE 13, 2016.

DRAWING HAS BEEN SET WITH A PROJECTION OF NORTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3200 (NAD83/2011).

400 200 0 400 800 1,200

GRAPHIC SCALE IN FEET

148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
PHONE 864-421-9999
www.synterracorp.com

DRAWN BY: A. ROBINSON
PROJECT MANAGER: J. WYLIE
CHECKED BY: E. KINSEY
DATE: 04/30/2019

FIGURE 1-2
SITE MAP WITH MONITORING WELL LOCATIONS
2018 CAMA ANNUAL INTERIM MONITORING REPORT
MAYO STEAM ELECTRIC PLANT
DUKE ENERGY PROGRESS, LLC
ROXBORO, NORTH CAROLINA

I/A

FACILITY NAME: **MAYO**
DATE UPDATED: **06/24/2019**
PREADSHEET UPDATED BY: **BRANDON RUSSO**
PREADSHEET CHECKED BY: **JERRY WYLIE**

	D 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)																RADIONUCLIDES		R PARAME
Reporting Units	ug/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/mL	mg/L
CAC 02L Standard	700	250	250	500	1*	10	700	4*	2	10	10	1*	300	15	50	100	20	0.2*	0.3*	1000	5^	0.03^	2
Provisional Background Threshold Values (Surficial Unit)	50	3.3	1.6	85	1	1	19	1	1	0.088	3.23	1.02	385	1	253	3.03	1	0.2	0.974	227	4	0.000367	NE
Provisional Background Threshold Values (Transition Zone Unit)	50	33.3	7.5	430	1	1	78.3	1	1	1.26	6	1	1319	1	298	5	1	0.2	5.88	12	9	0.001	NE
Provisional Background Threshold Values (Bedrock Unit)	50	43	18	340	1	1	97	1	1	0.4	7	1.19	2550	1	544	5	1	0.2	5.52	37.9	7.6	0.00203	NE

						D 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)																RADIONUCLIDES		R PARAME
Sample ID	Location Description	Associated Unit	Location With Respect to Groundwater Flow Direction	Sample Location Aquifer Name	Sample Collection Date	Boron	Chloride	Sulfate	Total Dissolved Solids	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium (VI)	Chromium	Cobalt	Iron	Lead	Manganese	Nickel	Selenium	Thallium	Vanadium	Zinc	Total Radium	Total Uranium	Fluoride
ABMW-01	In AB, west-side, west of ABMW-2	Ash Basin	Source Area	Ash Pore Water	07/19/2018	**4080**	16	11	500	**10.3**	**368**	**1010**	<1	<1	<0.025	0.371 j	**11.1**	**5600**	<1	**1870**	11.8	<1	**0.55**	**52.5**	7	0.722	**0.0762**	0.14
ABMW-01	In AB, west-side, west of ABMW-2	Ash Basin	Source Area	Ash Pore Water	11/08/2018	**5090**	15	23	340	**7.67**	**373**	546	<1	<1	<0.025	0.393 j	**1.78**	**1940**	<1	**627**	1.55	<1	<0.2	**27.4**	6	0.495	**0.0733**	0.21
ABMW-02	In AB, south-side	Ash Basin	Source Area	Ash Pore Water	07/19/2018	**8270**	14	36	410	<1	**896**	64	<1	<1	<0.025	<1	<1	33	<1	**152**	2.96	<1	<0.2	**0.852**	<5	NA	NA	1.1
ABMW-02	In AB, south-side	Ash Basin	Source Area	Ash Pore Water	11/07/2018	**8600**	15	35	340	**1.07**	**920**	53	<1	<1	0.027	<1	<1	12	<1	47	<1	<1	<0.2	**0.655**	<5	NA	NA	0.88
ABMW-02	In AB, south-side	Ash Basin	Source Area	Ash Pore Water	04/02/2019	**8670**	15	36	430	NA	**1050**	112	NA	NA	<0.025	<1	<1	113	NA	**483**	NA	NA	NA	**0.667**	NA	NA	NA	NA
ABMW-02BR	In AB, south-side	Ash Basin	Source Area	Bedrock	07/19/2018	<50	27	12	360	<1	3	104	<1	<1	<0.025 P4,R0	<1	<1	**1250**	<1	**228**	<1	<1	0.083 j	**0.335**	3.287 j	NA	NA	1.1
ABMW-02BR	In AB, south-side	Ash Basin	Source Area	Bedrock	11/07/2018	19.895 j	28	13	320	<1	3.11	110	<1	<1	<0.025	<1	<1	**1280**	<1	**227**	<1	<1	<0.2	0.161 j	<5	NA	NA	1.1
ABMW-02BR	In AB, south-side	Ash Basin	Source Area	Bedrock	04/02/2019	<50	27	10	330	NA	2.54	121	NA	NA	<0.025	0.764 j	<1	**977**	NA	**205**	NA	NA	NA	0.112 j	NA	NA	NA	NA
ABMW-02BRL	In AB, with ABMW-02	Ash Basin	Source Area	Bedrock	07/19/2018	<50	20	0.26	310	0.373 j	2.86	72	<1	<1	<0.025	<1	<1	**1860**	<1	**339**	<1	<1	<0.2	**0.375**	2.526 j	NA	NA	0.84
ABMW-02BRL	In AB, with ABMW-02	Ash Basin	Source Area	Bedrock	11/07/2018	<50	22	0.38	270	<1	2.23	72	<1	<1	<0.025	<1	<1	**1630**	<1	**328**	<1	<1	<0.2	<0.3	<5	NA	NA	0.77
ABMW-02BRL	In AB, with ABMW-02	Ash Basin	Source Area	Bedrock	04/02/2019	<50	21	0.39	320	NA	2.75	77	NA	NA	<0.025 M1,R1	<1	<1	**1740**	NA	**345**	NA	NA	NA	<0.3	NA	NA	NA	NA
ABMW-03	In AB, south-side, near FGD ponds	Ash Basin	Source Area	Ash Pore Water	07/18/2018	**1940**	64	23	320	<1	**67.2**	242	<1	<1	<0.025	0.383 j	<1	**6170**	<1	**785**	<1	<1	<0.2	**0.345**	2.173 j,B2	NA	NA	0.43
ABMW-03	In AB, south-side, near FGD ponds	Ash Basin	Source Area	Ash Pore Water	11/08/2018	**1960**	70	41	310	<1	**288**	203	<1	<1	<0.025	0.359 j	<1	**8160**	<1	**504**	<1	<1	0.1 j	**0.335**	2.029 j	NA	NA	0.43
ABMW-03S	In AB, south-side, near FGD ponds	Ash Basin	Source Area	Saprolite	07/18/2018	**1340**	12	0.39	94	<1	0.732 j	28	0.452 j	<1	<0.025	<1	**1.59**	**1100**	<1	**294**	<1	<1	<0.2	**0.39**	7 B2	NA	NA	<0.1
ABMW-03S	In AB, south-side, near FGD ponds	Ash Basin	Source Area	Saprolite	11/08/2018	**1340**	13	0.35	97	<1	0.862 j	30	0.473 j	<1	<0.025	<1	**1.45**	**1340**	<1	**285**	<1	<1	<0.2	**0.642**	4 j	NA	NA	0.0547 j
ABMW-04BR	In AB, south-side, south of ABMW-2	Ash Basin	Source Area	Bedrock	07/18/2018	<50	5.4	46	310	<1	2.02	109	<1	<1	<0.025	0.347 j	<1	**790**	<1	**483**	0.362 j	<1	<0.2	**0.349**	<5	NA	NA	1.1
ABMW-04BR	In AB, south-side, south of ABMW-2	Ash Basin	Source Area	Bedrock	11/08/2018	38.274 j	5.7	37	320	<1	1.97	118	<1	<1	<0.025	0.521 j	<1	**589**	<1	**435**	<1	<1	<0.2	0.189 j	<5	NA	NA	1.1
ABMW-04BR	In AB, south-side, south of ABMW-2	Ash Basin	Source Area	Bedrock	04/02/2019	25.329 j	5.7	43	340	NA	2.71	122	NA	NA	<0.025	<1	<1	**973**	NA	**507**	NA	NA	NA	<0.3	NA	NA	NA	NA
ABMW-04D	In AB, south-side, south of ABMW-2	Ash Basin	Source Area	Transition Zone	07/18/2018	**3430**	14	1.6	**530**	<1	**23.1**	**907**	<1	<1	<0.025 P4,R0	0.759 j	**5.34**	**54500**	<1	**6360**	0.893 j	<1	0.106 j	**8.52**	6 B2	NA	NA	0.14
ABMW-04D	In AB, south-side, south of ABMW-2	Ash Basin	Source Area	Transition Zone	11/08/2018	**3040**	13	2.3	500	<1	**21.4**	**901**	<1	<1	<0.025	0.795 j	**6.3**	**53600**	<1	**6590**	0.947 j	<1	<0.2	**9.75**	<5	NA	NA	0.11
ABMW-04D	In AB, south-side, south of ABMW-2	Ash Basin	Source Area	Transition Zone	04/02/2019	**3240**	15	1.2	**520**	NA	**15.5**	**870**	NA	NA	<0.025	0.78 j	**6.36**	**46800**	NA	**6960**	NA	NA	NA	**7.99**	NA	NA	NA	NA
ABMW-04X	In AB, south-side, south of ABMW-2	Ash Basin	Source Area	Ash Pore Water	11/08/2018	**5290**	12	43	430	<1	**63**	443	<1	<1	<0.025	0.692 j	0.444 j	**3570**	<1	**1390**	<1	0.508 j	<0.2	**2.81**	<5	1.494	0.000272	0.33
ABMW-04X	In AB, south-side, south of ABMW-2	Ash Basin	Source Area	Ash Pore Water	04/02/2019	**5580**	12	98	470	NA	**173**	452	NA	NA	<0.025	0.343 j	0.623 j	**7980**	NA	**1440**	NA	NA	NA	**1.6**	NA	NA	NA	NA
BG-01 IMP	SW of AB, outside compliance boundary	Background	Background	Bedrock	07/16/2018	<50	10	0.24	98	<1	<1	88	<1	<1	0.42	0.687 j	<1	91	<1	8	1.36	<1	<0.2	**3.94**	4.785 j	2.706	<0.0002	0.0658 j
BG-01	SW of AB, outside compliance boundary	Background	Background	Bedrock	07/16/2018	<50	10	0.25	100	<1	<1	90	<1	<1	NA	<5	<1	94	<1	8	<5	<1	<0.2	**3.77**	<5	NA	NA	NA
BG-01	SW of AB, outside compliance boundary	Background	Background	Bedrock	11/06/2018	<50	8.9	0.25	110	<1	<1	86	<1	<1	0.47	0.839 j	<1	286	<1	14	1.04	<1	<0.2	**4.58**	5	1.7433	<0.0002	0.0793 j
BG-01 CCR	SW of AB, outside compliance boundary	Background	Background	Bedrock	01/09/2019	<50	9.9	0.22	120	<1	<1	83	<1	<1	NA	0.627 j	<1	NA	<1	NA	NA	<1	<0.2	NA	NA	1.439	NA	<0.1
BG-01	SW of AB, outside compliance boundary	Background	Background	Bedrock	04/08/2019	<50	9.7	0.1942 j	110	NA	<1	80	NA	NA	0.34	0.752 j	<1	124	NA	9	NA	NA	NA	**3.83**	NA	-0.1365	<0.0002	NA
BG-02 IMP	SW of AB, outside compliance boundary	Background	Background	Transition Zone	07/17/2018	<50	42	5.5	340	<1	<1	38	<1	<1	<0.025 M1	<1	<1	94	<1	**62**	0.508 j	<1	<0.2	**4.72**	1.975 j	2.3047	0.00061	0.28
BG-02	SW of AB, outside compliance boundary	Background	Background	Transition Zone	07/17/2018	<50	42	5.4	280	<1	<1	38	<1	<1	NA	<5	<1	100	<1	**62**	<5	<1	<0.2	**5.03**	<5	NA	NA	NA
BG-02	SW of AB, outside compliance boundary	Background	Background	Transition Zone	11/06/2018	<50	39	5.2	290	<1	<1	42	<1	<1	<0.025	<1	<1	122	<1	**105**	0.355 j	<1	<0.2	**4.61**	<5	1.705	0.000639	0.26
BG-02	SW of AB, outside compliance boundary	Background	Background	Transition Zone	04/08/2019	<50	40	5.5	320	NA	<1	49	NA	NA	<0.025	<1	0.475 j	236	NA	**185**	NA	NA	NA	**3.78**	NA	0.2471	0.000818	NA
CCR-102BR-BG	West of AB, outside compliance boundary	Background	Background	Bedrock	10/02/2018	<50	12	110	470	0.354 j	0.595 j	20	<1	<1	NA	<1	0.768 j	NA	<1	NA	NA	0.773 j	<0.2	NA	NA	0.848	NA	0.28
CCR-102BR-BG IMP	West of AB, outside compliance boundary	Background	Background	Bedrock	04/11/2019	<50	11	65	380	NA	0.388 j	19	NA	NA	0.25	0.65 j	0.361 j	26	NA	**218**	NA	NA	NA	**0.842**	NA	2.35	0.00233	NA
CCR-103BR	Below Dam, North of Ash Basin	Ash Basin	Downgradient	Bedrock	01/07/2019	**2700**	59	200	420	<1	<1	113	<1	<1	NA	<1	<1	NA	<1	NA	NA	<1	<0.2	NA	NA	4.065	NA	<0.5
CCR-103D	Below Dam, North of Ash Basin	Ash Basin	Downgradient	Transition Zone	01/07/2019	**1580**	66	120	310	<1	<1	98	<1	<1	NA	0.672 j	<1	NA	<1	NA	NA	<1	<0.2	NA	NA	2.651	NA	<0.2
CCR-103S	Below Dam, North of Ash Basin	Ash Basin	Downgradient	Saprolite	01/07/2019	495	43	67	210	<1	<1	116	<1	<1	NA	<1	0.499 j	NA	<1	NA	NA	<1	<0.2	NA	NA	1.481	NA	0.0599 j
CCR-104BR	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	10/02/2018	<50	70	130	**600**	<1	0.4 j	23	<1	<1	NA	0.503 j	<1	NA	<1	NA	NA	<1	<0.2	NA	NA	**6.84**	NA	1.4
CCR-104BR	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	01/09/2019	<50	56	150	490	<1	0.49 j	25	<1	<1	NA	<1	<1	NA	<1	NA	NA	<1	<0.2	NA	NA	**11.31**	NA	1
CCR-104S	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Saprolite	10/02/2018	338	23	32	190	<1	<1	32	<1	<1	NA	0.93 j	**1.23**	NA	<1	NA	NA	<1	<0.2	NA	NA	0.424	NA	0.13
CCR-104S	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Saprolite	01/08/2019	192	15	23	160	<1	0.416 j	37	<1	<1	NA	2.87	**4.09**	NA	0.649 j	NA	NA	<1	<0.2	NA	NA	0.977	NA	0.05 j
CCR-105BR	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	10/02/2018	**854**	30	15	340	<1	<1	7	<1	<1	NA	0.355 j	<1	NA	<1	NA	NA	<1	<0.2	NA	NA	0.6723	NA	0.087 j
CCR-105BR	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	01/08/2019	**853**	32	15	340	<1	<1	5	<1	<1	NA	0.621 j	<1	NA	<1	NA	NA	<1	<0.2	NA	NA	1.3177	NA	0.063 j
CCR-105D	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Transition Zone	10/02/2018	**831**	39	17	250	<1	<1	28	<1	<1	NA	<1	**1.03**	NA	<1	NA	NA	<1	<0.2	NA	NA	0.697	NA	0.14
CCR-105D	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Transition Zone	01/08/2019	**789**	41	17	250	<1	<1	30	<1	<1	NA	<1	**1.2**	NA	<1	NA	NA	<1	<0.2	NA	NA	2.5629	NA	0.1
CCR-105S	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Saprolite	10/02/2018	282	22	28	180	<1	<1	50	<1	<1	NA	0.486 j	0.707 j	NA	<1	NA	NA	<1	<0.2	NA	NA	0.62222	NA	0.037 j
CCR-105S	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Saprolite	01/08/2019	353	25	19	160	<1	<1	62	<1	<1	NA	<1	**1.08**	NA	<1	NA	NA	<1	<0.2	NA	NA	1.466	NA	<0.1
CCR-106BR	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	10/02/2018	55	17	200	490	<1	<1	23	<1	<1	NA	<1	<1	NA	<1	NA	NA	<1	<0.2	NA	NA	1.298	NA	0.43 j
CCR-106BR	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	01/08/2019	88	20	210	490	<1	<1	24	<1	<1	NA	3.16	0.359 j	NA	<1	NA	NA	<1	<0.2	NA	NA	**5.7542**	NA	0.21 j
CCR-107BR	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	10/02/2018	**1060**	54	51	270	<1	<1	45	<1	<1	NA	<1	0.336 j	NA	<1	NA	NA	<1	<0.2	NA	NA	1.193	NA	0.11
CCR-107BR	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	01/08/2019	**1060**	52	50	240	<1	<1	45	<1	<1	NA	1.72	**1.28**	NA	<1	NA	NA	<1	<0.2	NA	NA	1.225	NA	0.081 j
CCR-108BR	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	10/02/2018	<50	48	22	340	<1	0.35 j	26	<1	<1	NA	0.489 j	<1	NA	<1	NA	NA	<1	<0.2	NA	NA	0.826	NA	0.08 j
CCR-108BR	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	01/09/2019	<50	46	21	270	<1	<1	18	<1	<1	NA	<1	<1	NA	<1	NA	NA	0.662 j	<0.2	NA	NA	1.5702	NA	0.036 j
CCR-109BR	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	10/02/2018	<50	27	**260**	**650**	<1	0.493 j	42	<1	<1	NA	<1	<1	NA	0.706 j	NA	NA	<1	<0.2	NA	NA	3.051	NA	1.1
CCR-109BR	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	01/09/2019	<50	30	**320**	**650**	<1	1.53	44	<1	<1	NA	<1	0.886 j	NA	0.475 j	NA	NA	<1	0.177 j	NA	NA	**5.25**	NA	1
CPA-01BR	N of coal pile	Coal Pile Area	---	Bedrock	04/03/2019	40.976 j	210	**890**	**1700**	<1	<1	140	<1	<1	<0.025	0.467 j	**43.9**	**2020**	<1	**13500**	22.6	**26.3**	0.118 j	0.128 j	13	3.29	0.000581	<1
CPA-01D	N of coal pile	Coal Pile Area	---	Transition Zone	04/03/2019	69	**300**	**1400**	**2500**	<1	0.76 j	31	0.426 j	0.614 j	<0.025	0.431 j	**254**	**18800**	<1	**66000**	**154**	0.545 j	<0.2	**0.448**	67	0.876	0.00071	<1
CPA-02BR	W of coal pile	Coal Pile Area	---	Bedrock	04/03/2019	<50	18	13	350	<1	<1	85	<1	<1	0.13	<1	0.553 j	144	<1	**791**	0.982 j	<1	<0.2	**0.632**	<5	**5.18**	0.00711	0.47
CPA-03BR	Near coal pile retention basin	Coal Pile Area	---	Bedrock	04/03/2019	<50	6.4	8.6	200	<1	0.403 j	13	<1	<1	0.077	0.837 j	0.379 j	117	<1	**397**	0.546 j	<1	<0.2	**0.742**	<5	**7.1**	0.00542	0.056 j
CPA-03D	Near coal pile retention basin	Coal Pile Area	---	Transition Zone	04/03/2019	48.296 j	34	190	480	<1	<1	55	<1	<1	0.12	<1	0.966 j	88	<1	**1170**	18.7	<1	<0.2	**0.604**	5	1.477	0.000754	<1
CPA-07D	N of coal pile	Coal Pile Area	---	Transition Zone	04/08/2019	559	**470**	**5000**	**5200**	<1	**104**	35	**31.5**	**31.5**	<0.025 P4,R0	1.36	**904**	**14200**	**27.4**	**187000**	**686**	**29.1**	**0.296**	<0.3	**1880**	1.275	0.0237	**4.46 j**
CW-01 IMP	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Transition Zone	07/16/2018	<50	16	9.1	110	<1	<1	<5	<1	<1	0.11	<1	<1	23	<1	4.043 j	0.649 j	<1	<0.2	**0.502**	9	NA	NA	0.0817 j
CW-01	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Transition Zone	07/16/2018	<50	16	8.8	140	<1	<1	<5	<1	<1	NA	<5	<1	26	<1	<5	<5	<1	<0.2	**0.651**	11	NA	NA	NA
CW-01	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Transition Zone	11/06/2018	<50	16	9.4	110	<1	<1	<5	<1	<1	0.15	0.425 j	<1	22	<1	3.707 j	0.376 j	<1	<0.2	**0.561**	11	NA	NA	0.0964 j
CW-01	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Transition Zone	04/03/2019	<50	17	12	130	NA	<1	3.487 j	NA	NA	0.14	0.913 j	<1	258	NA	14	NA	NA	NA	**0.797**	NA	NA	NA	NA
CW-01D IMP	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Bedrock	07/17/2018	<50	9.4	2.8	220	<1	<1	1.742 j	<1	<1	0.12	0.805 j	<1	21	<1	8	<1	<1	<0.2	**1.27**	2.447 j	NA	NA	0.15
CW-01D	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Bedrock	07/17/2018	<50	9	2.6	190	<1	<1	<5	<1	<1	NA	<5	<1	41	<1	14	<5	<1	<0.2	**1.34**	<5	NA	NA	NA
CW-01D	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Bedrock	11/06/2018	<50	8.3	2.4	180	<1	<1	2.008 j	<1	<1	0.063	0.646 j	<1	26	<1	17	<1	<1	<0.2	**1.37**	2.793 j	NA	NA	0.13

I/A

FACILITY NAME: MAYO
DATE UPDATED: 06/24/2019
PREADSHEET UPDATED BY: BRANDON RUSSO
PREADSHEET CHECKED BY: JERRY WYLIE

	ED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)																RADIONUCLIDES		ER PARAME
Reporting Units	**ug/L**	**mg/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**pCi/L**	**ug/mL**	**mg/L**
CAC 02L Standard	**700**	**250**	**250**	**500**	**1***	**10**	**700**	**4***	**2**	**10**	**10**	**1***	**300**	**15**	**50**	**100**	**20**	**0.2***	**0.3***	**1000**	**5^**	**0.03^**	**2**
Provisional Background Threshold Values (Surficial Unit)	**50**	**3.3**	**1.6**	**85**	**1**	**1**	**19**	**1**	**1**	**0.088**	**3.23**	**1.02**	**385**	**1**	**253**	**3.03**	**1**	**0.2**	**0.974**	**227**	**4**	**0.000367**	**NE**
Provisional Background Threshold Values (Transition Zone Unit)	**50**	**33.3**	**7.5**	**430**	**1**	**1**	**78.3**	**1**	**1**	**1.26**	**6**	**1**	**1319**	**1**	**298**	**5**	**1**	**0.2**	**5.88**	**12**	**9**	**0.001**	**NE**
Provisional Background Threshold Values (Bedrock Unit)	**50**	**43**	**18**	**340**	**1**	**1**	**97**	**1**	**1**	**0.4**	**7**	**1.19**	**2550**	**1**	**544**	**5**	**1**	**0.2**	**5.52**	**37.9**	**7.6**	**0.00203**	**NE**

						ED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)																RADIONUCLIDES		ER PARAME
Sample ID	**Location Description**	**Associated Unit**	**Location With Respect to Groundwater Flow Direction**	**Sample Location Aquifer Name**	**Sample Collection Date**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Lead**	**Manganese**	**Nickel**	**Selenium**	**Thallium**	**Vanadium**	**Zinc**	**Total Radium**	**Total Uranium**	**Fluoride**
CW-01D	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Bedrock	04/03/2019	<50	13	3.7	200	NA	<1	1.776 j	NA	NA	0.03	<1	<1	<10	NA	<5	NA	NA	NA	**1.1**	NA	NA	NA	NA
CW-02 IMP	Below AB dam, S of Mayo Lake Road, inside CB	Ash Basin	Downgradient	Transition Zone	07/16/2018	**970**	43	42	140	<1	<1	109	<1	<1	0.095	<1	<1	3.724 j	<1	**313**	1.87	<1	<0.2	0.222 j	3.404 j	0.308	<0.0002	<0.1
CW-02	Below AB dam, S of Mayo Lake Road, inside CB	Ash Basin	Downgradient	Transition Zone	07/16/2018	**952**	44	42	150	<1	<1	107	<1	<1	NA	<5	<1	<10	<1	**311**	<5	<1	<0.2	<0.3	6	NA	NA	NA
CW-02	Below AB dam, S of Mayo Lake Road, inside CB	Ash Basin	Downgradient	Transition Zone	11/07/2018	661	26	33	100	<1	<1	78	<1	<1	0.1	<1	<1	92	<1	**107**	0.997 j	<1	<0.2	**0.441**	6	2.945	<0.0002	<0.1
CW-02	Below AB dam, S of Mayo Lake Road, inside CB	Ash Basin	Downgradient	Transition Zone	01/08/2019	407	20	29	110	NA	<1	58	NA	NA	0.035	<1	<1	39	NA	35	NA	NA	NA	**0.414**	NA	1.967	<0.0002	NA
CW-02	Below AB dam, S of Mayo Lake Road, inside CB	Ash Basin	Downgradient	Transition Zone	04/02/2019	421	22	33	120	NA	<1	60	NA	NA	0.041	<1	<1	16	NA	49	NA	NA	NA	0.156 j	NA	0.427	<0.0002	NA
CW-02D IMP	Below AB dam, S of Mayo Lake Road, inside CB	Ash Basin	Downgradient	Bedrock	07/16/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.796	0.00189	NA
CW-02D	Below AB dam, S of Mayo Lake Road, inside CB	Ash Basin	Downgradient	Bedrock	07/16/2018	271	37	72	310	<1	<1	26	<1	<1	NA	**34**	<1	**405**	<1	**109**	15	<1	<0.2	**1.17**	9	NA	NA	NA
CW-02D IMP	Below AB dam, S of Mayo Lake Road, inside CB	Ash Basin	Downgradient	Bedrock	07/17/2018	263	36	80	360	0.553 j	0.405 j	26	<1	<1	0.45	5.28	<1	208	<1	**201**	2.74	<1	<0.2	**1.45**	10	NA	NA	0.16
CW-02D	Below AB dam, S of Mayo Lake Road, inside CB	Ash Basin	Downgradient	Bedrock	11/07/2018	211	35	76	310	0.399 j	0.427 j	19	<1	<1	0.25	1.07	<1	45	<1	31	1.23	<1	<0.2	**1.19**	20	0.616	0.00252	0.12
CW-02D	Below AB dam, S of Mayo Lake Road, inside CB	Ash Basin	Downgradient	Bedrock	04/02/2019	244	35	75	360	NA	0.481 j	20	NA	NA	0.46	0.657 j	<1	7.763 j	NA	8	NA	NA	NA	**0.749**	NA	0.5	0.00245	NA
CW-03 IMP	Below AB dam, N of Mayo Lake Road, inside CB	Ash Basin	Downgradient	Transition Zone	07/17/2018	<50	88	16	370	<1	<1	17	<1	<1	0.053	0.583 j	<1	238	<1	15	0.495 j	<1	<0.2	**1.93**	4.662 j	NA	NA	0.16
CW-03	Below AB dam, N of Mayo Lake Road, inside CB	Ash Basin	Downgradient	Transition Zone	07/17/2018	<50	89	16	340	<1	<1	17	<1	<1	NA	<5	<1	**389**	<1	19	<5	<1	<0.2	**2.26**	5	NA	NA	NA
CW-03	Below AB dam, N of Mayo Lake Road, inside CB	Ash Basin	Downgradient	Transition Zone	11/08/2018	<50	88	17	350	<1	<1	14	<1	<1	0.065	0.381 j	<1	133	<1	9	<1	<1	<0.2	**1.81**	<5	NA	NA	0.1876 j
CW-03	Below AB dam, N of Mayo Lake Road, inside CB	Ash Basin	Downgradient	Transition Zone	04/10/2019	<50	83	17	360	NA	<1	17	NA	NA	0.057	<1	<1	9.419 j	NA	6	NA	NA	NA	**1.35**	NA	NA	NA	NA
CW-04 IMP	North of AB and Mayo Lake Road, inside CB	Ash Basin	Downgradient	Bedrock	07/17/2018	<50	8.8	26	180	<1	<1	29	<1	<1	0.22	<1	<1	12	<1	2.954 j	0.642 j	0.336 j	<0.2	**0.978**	1.786 j	NA	NA	0.11
CW-04	North of AB and Mayo Lake Road, inside CB	Ash Basin	Downgradient	Bedrock	07/17/2018	<50	8.4	25	140	<1	<1	29	<1	<1	NA	<5	<1	32	<1	<5	<5	<1	<0.2	**1.1**	<5	NA	NA	NA
CW-04	North of AB and Mayo Lake Road, inside CB	Ash Basin	Downgradient	Bedrock	11/08/2018	<50	6.1	17	140	<1	<1	24	<1	<1	0.053	<1	<1	84	<1	<5	<1	0.335 j	<0.2	**1.22**	4.048 j	NA	NA	0.13
CW-04	North of AB and Mayo Lake Road, inside CB	Ash Basin	Downgradient	Bedrock	04/10/2019	<50	7.5	26	160	NA	<1	29	NA	NA	0.3	0.418 j	<1	85	NA	2.1 j	NA	NA	NA	**0.906**	NA	NA	NA	NA
CW-05 IMP	West of AB, East of Boston Rd, inside CB	Ash Basin	Upgradient	Bedrock	07/17/2018	<50	35	6.8	290	<1	<1	52	<1	<1	<0.025	0.443 j	**1.08**	**413**	<1	**803**	0.711 j	<1	<0.2	0.244 j	5	NA	NA	0.26
CW-05	West of AB, East of Boston Rd, inside CB	Ash Basin	Upgradient	Bedrock	07/17/2018	<50	35	6.7	250	<1	<1	52	<1	<1	NA	<5	**1.06**	**398**	<1	**785**	<5	<1	<0.2	**0.301**	<5	NA	NA	NA
CW-05	West of AB, East of Boston Rd, inside CB	Ash Basin	Upgradient	Bedrock	11/06/2018	<50	33	6.6	260	<1	<1	55	<1	<1	<0.025	0.629 j	0.964 j	**810**	<1	**787**	0.343 j	<1	<0.2	0.149 j	2.451 j	NA	NA	0.24
CW-05	West of AB, East of Boston Rd, inside CB	Ash Basin	Upgradient	Bedrock	04/08/2019	<50	42	6.2	280	NA	<1	50	NA	NA	<0.025	<1	0.571 j	**329**	NA	**630**	NA	NA	NA	<0.3	NA	NA	NA	NA
CW-06 IMP	NE of AB, S of Mayo Lake Road, inside CB	Ash Basin	Downgradient	Bedrock	07/16/2018	<50	92	36	480	<1	<1	43	<1	<1	<0.025	<1	0.741 j	**1600**	<1	**1330**	1.31	<1	<0.2	0.166 j	7	**27.89**	0.000179 j	0.29
CW-06	NE of AB, S of Mayo Lake Road, inside CB	Ash Basin	Downgradient	Bedrock	07/16/2018	<50	95	37	480	<1	<1	42	<1	<1	NA	<5	<1	**1550**	<1	**1370**	<5	<1	<0.2	<0.3	<5	NA	NA	NA
CW-06	NE of AB, S of Mayo Lake Road, inside CB	Ash Basin	Downgradient	Bedrock	11/07/2018	<50	94	37	480	<1	<1	42	<1	<1	<0.025	<1	0.628 j	**1670**	<1	**1460**	0.863 j	<1	<0.2	0.248 j	<5	**118.76**	0.000216	0.26
CW-06	NE of AB, S of Mayo Lake Road, inside CB	Ash Basin	Downgradient	Bedrock	04/11/2019	<50	88	37	**510**	NA	<1	41	NA	NA	<0.025	<1	0.715 j	**1510**	NA	**1310**	NA	NA	NA	<0.3	NA	**32.25**	0.000164 j	NA
MW-02	Below AB dam, NW side, b/w dam and Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	07/18/2018	<50	18	18	200	<1	0.343 j	74	<1	<1	<0.025	<1	**4.79**	**1240**	<1	**1310**	3.2	<1	<0.2	**0.76**	2.73 j,B2	NA	NA	0.23
MW-02 CCR	Below AB dam, NW side, b/w dam and Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	10/02/2018	<50	24	17	210	**2.6**	0.39 j	72	<1	<1	NA	0.464 j	**5.32**	NA	<1	NA	NA	<1	<0.2	NA	NA	0.73	NA	0.2
MW-02	Below AB dam, NW side, b/w dam and Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	11/06/2018	<50	14	18	180	**3.05**	<1	54	<1	<1	<0.025	0.575 j	**1.76**	**848**	<1	**537**	3.54	<1	<0.2	**1.27**	7	NA	NA	0.24
MW-02 CCR	Below AB dam, NW side, b/w dam and Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	01/09/2019	<50	13	19	190	<1	<1	43	<1	<1	NA	0.765 j	**1.09**	NA	<1	NA	NA	<1	<0.2	NA	NA	1.126	NA	0.25
MW-02	Below AB dam, NW side, b/w dam and Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	04/10/2019	<50	11	19	240	NA	<1	40	NA	NA	<0.025	0.516 j	0.855 j	**356**	NA	**270**	NA	NA	NA	**2.07**	NA	NA	NA	NA
MW-03	Below AB dam, along Crutchfield Branch, by SB-7	Ash Basin	Downgradient	Saprolite	07/18/2018	**1230**	47	25	200	<1	<1	56	<1	<1	0.2	<1	<1	4.883 j	<1	**1040**	2.12	<1	<0.2	**0.319**	<5	**6.485**	<0.0002	0.15
MW-03 CCR	Below AB dam, along Crutchfield Branch, by SB-7	Ash Basin	Downgradient	Saprolite	10/02/2018	**1080**	39	22	200	<1	<1	53	<1	<1	NA	<1	<1	NA	<1	NA	NA	<1	<0.2	NA	NA	0.368	NA	0.1
MW-03	Below AB dam, along Crutchfield Branch, by SB-7	Ash Basin	Downgradient	Saprolite	11/08/2018	**1090**	40	23	190	<1	<1	55	<1	<1	0.19	0.495 j	<1	12	<1	**1320**	2.19	<1	0.145 j	**0.335**	8	0.976	<0.0002	0.12
MW-03 CCR	Below AB dam, along Crutchfield Branch, by SB-7	Ash Basin	Downgradient	Saprolite	01/09/2019	**899**	39	21	190	<1	<1	50	<1	<1	NA	0.421 j	<1	NA	<1	NA	NA	<1	<0.2	NA	NA	1.488	NA	<0.1
MW-03	Below AB dam, along Crutchfield Branch, by SB-7	Ash Basin	Downgradient	Saprolite	04/10/2019	**982**	38	21	210	NA	<1	52	NA	NA	0.16	<1	<1	24	NA	**1070**	NA	NA	NA	0.104 j	NA	0.5774	<0.0002	NA
MW-03BR	North of Mayo Lake Rd, adjacent to CW-3	Ash Basin	Downgradient	Bedrock	07/17/2018	<50	150	11	**690**	<1	<1	40	<1	<1	<0.025	<1	<1	**331**	<1	**564**	<1	<1	<0.2	0.249 j	<5	NA	NA	0.24
MW-03BR	North of Mayo Lake Rd, adjacent to CW-3	Ash Basin	Downgradient	Bedrock	11/08/2018	<50	150	11	**610**	<1	<1	42	<1	<1	<0.025	0.505 j	<1	**361**	<1	**574**	<1	<1	<0.2	0.134 j	<5	NA	NA	0.28 j
MW-03BR	North of Mayo Lake Rd, adjacent to CW-3	Ash Basin	Downgradient	Bedrock	04/10/2019	<50	140	11	**640**	NA	<1	41	NA	NA	<0.025	<1	<1	266	NA	**540**	NA	NA	NA	<0.3	NA	NA	NA	NA
MW-04	Southeast of AB, northeast of forebay	Ash Basin	Sidegradient	Bedrock	07/18/2018	<50	8.7	38	210	<1	<1	6	<1	<1	0.028	<1	<1	25	<1	**53**	0.606 j	<1	<0.2	**0.6**	19 B2	NA	NA	0.21
MW-04	Southeast of AB, northeast of forebay	Ash Basin	Sidegradient	Bedrock	11/06/2018	<50	8.1	35	220	<1	<1	7	<1	<1	0.14	<1	<1	6.703 j	<1	**511**	1.27	<1	<0.2	**0.655**	37	NA	NA	0.19
MW-05BR	NW of AB, on compliance boundary, next to CW-5	Ash Basin	Upgradient	Bedrock	07/17/2018	<50	68	2.4	460	<1	0.698 j	35	<1	<1	<0.025	<1	<1	**5430**	<1	**1750**	<1	<1	<0.2	0.207 j	2.098 j	NA	NA	0.19
MW-05BR	NW of AB, on compliance boundary, next to CW-5	Ash Basin	Upgradient	Bedrock	11/06/2018	<50	64	2.6	380	<1	1	34	<1	<1	<0.025	1.76	<1	**5950**	<1	**1780**	<1	<1	<0.2	0.119 j	1.948 j	NA	NA	0.18
MW-05BR	NW of AB, on compliance boundary, next to CW-5	Ash Basin	Upgradient	Bedrock	04/08/2019	<50	64	1.8	390	NA	1.16	36	NA	NA	<0.025	<1	**1.2**	**8770**	NA	**1770**	NA	NA	NA	<0.3	NA	NA	NA	NA
MW-08BR	Northeast of AB, on 1500 ft offset	Reference Location	Reference Location	Bedrock	07/18/2018	<50	120	40	480	0.81 j	0.5 j	15	0.498 j	0.389 j	0.03	0.494 j	0.821 j	53	0.726 j	**188**	2.5	0.552 j	**0.608**	**1.52**	4.843 j,B2	NA	NA	0.1566 j
MW-08BR	Northeast of AB, on 1500 ft offset	Reference Location	Reference Location	Bedrock	11/06/2018	<50	110	36	400	<1	<1	14	<1	<1	<0.025	0.734 j	0.343 j	104	<1	**156**	1.73	<1	<0.2	**0.995**	6	NA	NA	0.1314 j
MW-09BRL	East of AB, southeast of railroad	Reference Location	Reference Location	Bedrock	07/19/2018	<50	46	9.5	220	0.681 j	0.574 j	16	<1	<1	<0.025	1.48	<1	**573**	<1	**493**	2.98	<1	<0.2	**1.97**	4.067 j	NA	NA	0.13
MW-09BRL	East of AB, southeast of railroad	Reference Location	Reference Location	Bedrock	11/06/2018	<50	19	8.8	220	<1	0.559 j	18	<1	<1	0.028	5.78	<1	**4620**	0.695 j	**223**	2.84	<1	0.136 j	**6.63**	9	NA	NA	0.15
MW-09BRL	East of AB, southeast of railroad	Reference Location	Reference Location	Bedrock	04/03/2019	<50	5	7.9	380	NA	0.648 j	21	NA	NA	0.088	**13**	0.541 j	**12000**	NA	**194**	NA	NA	NA	**14.4**	NA	NA	NA	NA
MW-103BRL	Below Dam, North of Ash Basin	Ash Basin	Downgradient	Bedrock	02/12/2019	<50	5	4.6	**2000**	<1	0.35 j	**1070**	<1	<1	**21.8**	**14.8**	<1	41	0.416 j	<5	1	0.431 j	**0.205**	**3.32**	5	**13.49**	<0.0002	0.3
MW-103BRL	Below Dam, North of Ash Basin	Ash Basin	Downgradient	Bedrock	04/22/2019	<50	5	1.2	**2200**	<1	<1	**1200**	<1	<1	**14.7**	**15.9 B2**	<1	42	0.571 j	<5	1.45	0.534 j	0.198 j	**2.52**	4.2 j,B1	4.2303	<0.0002	0.19
MW-103BRM	Below Dam, North of Ash Basin	Ash Basin	Downgradient	Bedrock	02/12/2019	<50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-103BRM	Below Dam, North of Ash Basin	Ash Basin	Downgradient	Bedrock	04/23/2019	<50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-104BRL	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	11/29/2018	<50	55	55	390	<1	<1	29	<1	<1	<0.025	<1	<1	224	<1	**80**	<1	<1	<0.2	<0.3	2.349 j	3.7	0.00124	0.78
MW-104BRL	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	02/11/2019	<50	53	54	420	<1	0.367 j	29	<1	<1	0.04	<1	<1	239	<1	**87**	<1	<1	<0.2	<0.3	<5	**5.56**	0.00122	0.79
MW-104BRL	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	04/23/2019	<50	55	56	440	<1	<1	30	<1	<1	<0.025	0.411 j	<1	**397**	<1	**92**	<1	<1	<0.2	0.286 j	1.954 j	4.71	0.00108	1
MW-104BRM	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	11/29/2018	<50	13	37	290	0.469 j	0.871 j	19	<1	<1	0.53	9.04	<1	158	<1	17	5.87	<1	<0.2	**3.63**	22	3.089	0.00306	1.3
MW-104BRM	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	02/12/2019	<50	12	38	310	0.704 j	0.812 j	18	<1	<1	0.25	0.85 j	<1	3.512 j	<1	10	<1	<1	<0.2	**2.42**	3.367 j	0.953	0.00376	1.4
MW-104BRM	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	04/23/2019	<50	19	39	320	<1	0.9 j	19	<1	<1	0.027	<1	<1	74	<1	**57**	<1	<1	<0.2	**0.637**	<5	0.654	0.00282	1.8
MW-105BRL	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	02/12/2019	<50	16	19	330	**3.26**	2.66	43	<1	<1	0.22 M1	2.28	<1	**369**	0.579 j	26	1.12	<1	<0.2	**1.91**	14	1.116	0.00444	0.92
MW-105BRL	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	04/23/2019	<50	15	15	400	**2.36**	4.01	52	<1	<1	0.081	2.7	<1	142	0.351 j	12	0.504 j	<1	<0.2	**1.52**	6	0.745	0.000802	1.5
MW-105BRM	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	11/29/2018	<50	26	29	350	**4.27**	<1	32	<1	<1	0.036	2.1	<1	**337**	<1	**347**	3.23	<1	<0.2	**1.2**	10	0.781	0.00133	0.25
MW-105BRM	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	02/11/2019	<50	26	32	370	<1	1.28	27	<1	<1	0.041 M1	0.433 j	<1	**788**	<1	**415**	0.984 j	<1	<0.2	0.224 j	1.837 j	0.223	0.00141	0.25
MW-105BRM	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	04/23/2019	<50	26	27	360	0.458 j	2.71	32	<1	<1	<0.025	<1	<1	**1150**	<1	**426**	<1	<1	<0.2	0.166 j	<5	0.4587	0.00161	0.31
MW-107BRL	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	02/11/2019	64	9.3	31	**1100**	**1.7**	1.23	313	<1	<1	8.2	6.49	<1	87	<1	11	0.535 j	0.362 j	0.098 j	**10**	5	4.37	0.000444	**2.9**
MW-107BRL	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	04/22/2019	68	9.5	32	**1200**	**1.45**	1.15	309	<1	<1	5.8	7.57 B2	<1	91	0.366 j	6	0.855 j	0.449 j	0.111 j	**9.82**	4.229 j,B1	3.7	0.00016 j	**2.7**
MW-107BRM	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	02/12/2019	44.891 j	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-107BRM	Below Dam, S of Mayo Lake Rd	Ash Basin	Downgradient	Bedrock	04/22/2019	83	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-10BR	E side of Plant, along 1500 ft offset, next to SB-	Upgradient	Upgradient	Bedrock	07/18/2018	<50	21	87	290	<1	<1	4.689 j	<1	<1	0.16	<1	<1	7.238 j	<1	40	1.79	<1	0.152 j	**1.93**	27 B2	**6.017**	0.0000671 j	0.37

I/A

FACILITY NAME: MAYO
DATE UPDATED: 06/24/2019
PREADSHEET UPDATED BY: BRANDON RUSSO
PREADSHEET CHECKED BY: JERRY WYLIE

	ED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)																RADIONUCLIDES		ER PARAME
Reporting Units	ug/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/mL	mg/L
CAC 02L Standard	**700**	**250**	**250**	**500**	**1***	**10**	**700**	**4***	**2**	**10**	**10**	**1***	**300**	**15**	**50**	**100**	**20**	**0.2***	**0.3***	**1000**	**5^**	**0.03^**	**2**
Provisional Background Threshold Values (Surficial Unit)	50	3.3	1.6	85	1	1	19	1	1	0.088	3.23	1.02	385	1	253	3.03	1	0.2	0.974	227	4	0.000367	NE
Provisional Background Threshold Values (Transition Zone Unit)	50	33.3	7.5	430	1	1	78.3	1	1	1.26	6	1	1319	1	298	5	1	0.2	5.88	12	9	0.001	NE
Provisional Background Threshold Values (Bedrock Unit)	50	43	18	340	1	1	97	1	1	0.4	7	1.19	2550	1	544	5	1	0.2	5.52	37.9	7.6	0.00203	NE

						ED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)																RADIONUCLIDES		ER PARAME
Sample ID	**Location Description**	**Associated Unit**	**Location With Respect to Groundwater Flow Direction**	**Sample Location Aquifer Name**	**Sample Collection Date**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Lead**	**Manganese**	**Nickel**	**Selenium**	**Thallium**	**Vanadium**	**Zinc**	**Total Radium**	**Total Uranium**	**Fluoride**
MW-10BR	E side of Plant, along 1500 ft offset, next to SB-	Upgradient	Upgradient	Bedrock	11/06/2018	<50	19	85	290	<1	<1	4.263 j	<1	<1	0.14	0.404 j	<1	27	<1	34	1.44	<1	0.171 j	**2.05**	17	1.5201	<0.0002	0.35
MW-12D	South edge of property, southwest of Plant	Background	Background	Transition Zone	07/18/2018	<50	4.3	1.1	110	<1	<1	16	<1	<1	0.96	0.791 j	<1	48	<1	18	0.794 j	<1	<0.2	**0.747**	1.962 j,B2	**15.945**	0.0000928 j	0.0788 j
MW-12D CCR	South edge of property, southwest of Plant	Background	Background	Transition Zone	10/02/2018	<50	4.4	1.1	120	<1	<1	15	<1	<1	NA	0.949 j	<1	NA	<1	NA	NA	<1	<0.2	NA	NA	2.783	NA	<0.1
MW-12D	South edge of property, southwest of Plant	Background	Background	Transition Zone	11/07/2018	<50	4.4	1.1	86	<1	<1	15	<1	<1	0.82	1.02	<1	149	<1	28	0.371 j	<1	0.083 j	**0.68**	14	3.855	0.000107 j	<0.1
MW-12D CCR	South edge of property, southwest of Plant	Background	Background	Transition Zone	01/07/2019	<50	4.6	1.2	81	<1	<1	18	<1	<1	NA	1.13	<1	NA	<1	NA	NA	<1	<0.2	NA	NA	3.118	NA	0.0694 j
MW-12D	South edge of property, southwest of Plant	Background	Background	Transition Zone	04/10/2019	<50	4.6	1.1	98	NA	<1	17	NA	NA	0.72	1.14	<1	147	NA	27	NA	NA	NA	**0.664**	NA	1.36	0.000115 j	NA
MW-12S	South edge of property, southwest of Plant	Background	Background	Saprolite	07/18/2018	<50	2.5	1.6	52	<1	0.52 j	17	<1	<1	0.045	0.851 j	0.667 j	**510**	0.383 j	**101**	1.4	<1	<0.2	**1.5**	126 B2	0.3319	<0.0002	0.0703 j
MW-12S CCR	South edge of property, southwest of Plant	Background	Background	Saprolite	10/02/2018	<50	1.6	2.2	110	<1	1.53	15	<1	<1	NA	1.78	**2.14**	NA	1.96	NA	NA	<1	<0.2	NA	NA	0.5118	NA	0.041 j
MW-12S	South edge of property, southwest of Plant	Background	Background	Saprolite	11/07/2018	<50	2.4	1.3	<25	<1	0.53 j	16	<1	<1	0.063	0.996 j	0.948 j	**776**	0.597 j	**153**	0.837 j	<1	<0.2	**2.09**	94	0.76	0.0000899 j	0.0493 j
MW-12S CCR	South edge of property, southwest of Plant	Background	Background	Saprolite	01/07/2019	<50	2.1	1.8	<25	<1	0.334 j	12	<1	<1	NA	0.872 j	0.366 j	NA	<1	NA	NA	<1	<0.2	NA	NA	0.649	NA	0.051 j
MW-12S	South edge of property, southwest of Plant	Background	Background	Saprolite	04/10/2019	<50	2.5	1.2	<25	NA	<1	14	NA	NA	0.09	0.569 j	<1	178	NA	41	NA	NA	NA	**0.982**	NA	0.677	<0.0002	NA
MW-13BR	West of AB, west of US HWY 501	Background	Background	Bedrock	07/18/2018	<50	29	16	310	0.37 j	<1	40	<1	<1	<0.025	3.48	**5.99**	**2080**	1.27	**303**	1.87	<1	<0.2	**1.97**	9 B2	NA	NA	0.11
MW-13BR	West of AB, west of US HWY 501	Background	Background	Bedrock	11/08/2018	<50	28	16	280	<1	<1	18	<1	<1	0.045	0.727 j	**4.67**	**675**	<1	**260**	<1	<1	<0.2	0.282 j	<5	NA	NA	0.0772 j
MW-13BR	West of AB, west of US HWY 501	Background	Background	Bedrock	04/08/2019	<50	27	16	290	NA	<1	15	NA	NA	<0.025	<1	**4.83**	**503**	NA	**233**	NA	NA	NA	<0.3	NA	0.821	0.000399	NA
MW-14BR	Northwest of AB, outside compliance boundary	Background	Background	Bedrock	07/18/2018	<50	14	9.2	190	<1	0.538 j	17	<1	<1	<0.025 M1	<1	0.581 j	104	<1	**119**	0.42 j	<1	<0.2	**2.55**	3.146 j,B2	NA	NA	0.3
MW-14BR	Northwest of AB, outside compliance boundary	Background	Background	Bedrock	11/07/2018	<50	13	9.5	160	<1	0.582 j	16	<1	<1	0.028	<1	**1.53**	178	<1	**114**	<1	<1	<0.2	**2.74**	2.656 j	NA	NA	0.25
MW-16BR	Off Duke property, N of AB, near state boundary	Ash Basin	Downgradient	Bedrock	07/18/2018	25.78 j	8.6	0.75	180	<1	0.428 j	15	<1	<1	<0.025	<1	<1	**1950**	<1	**306**	<1	<1	<0.2	0.222 j	2.042 j,B2	0.1778	0.000114 j	0.4
MW-16BR	Off Duke property, N of AB, near state boundary	Ash Basin	Downgradient	Bedrock	11/06/2018	22.397 j	8.2	1.4	160	<1	<1	14	<1	<1	0.025	<1	<1	**2400**	<1	**319**	<1	<1	<0.2	0.103 j	3.136 j	0.1352	0.000151 j	0.32
MW-16BR	Off Duke property, N of AB, near state boundary	Ash Basin	Downgradient	Bedrock	01/08/2019	20.709 j	8.7	1.8	180	NA	<1	14	NA	NA	<0.025	<1	<1	**1270**	NA	**356**	NA	NA	NA	**0.384**	NA	1.158	0.000259	NA
MW-16BR	Off Duke property, N of AB, near state boundary	Ash Basin	Downgradient	Bedrock	04/02/2019	17.218 j	8.6	2.3	180	NA	<1	13	NA	NA	<0.025	<1	<1	**421**	NA	**327**	NA	NA	NA	<0.3	NA	NA	NA	NA
MW-16BR	Off Duke property, N of AB, near state boundary	Ash Basin	Downgradient	Bedrock	04/03/2019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.532	0.000408	NA
MW-16D	Off Duke property, N of AB, near state boundary	Ash Basin	Downgradient	Transition Zone	07/18/2018	<50	11	7.7	140	<1	<1	4.956 j	<1	<1	0.14	0.37 j	<1	195	<1	**128**	<1	0.49 j	<0.2	**0.823**	<5	1.26	0.000276	0.22
MW-16D	Off Duke property, N of AB, near state boundary	Ash Basin	Downgradient	Transition Zone	11/06/2018	<50	11	7.3	130	<1	<1	4.907 j	<1	<1	0.15	0.447 j	<1	156	<1	**173**	0.404 j	<1	<0.2	**0.761**	7	3.64	0.000289	0.2
MW-16D	Off Duke property, N of AB, near state boundary	Ash Basin	Downgradient	Transition Zone	01/08/2019	<50	11	7.1	150	NA	<1	3.277 j	NA	NA	0.13	<1	<1	15	NA	26	NA	NA	NA	**0.866**	NA	1.2389	0.000259	NA
MW-16D	Off Duke property, N of AB, near state boundary	Ash Basin	Downgradient	Transition Zone	04/02/2019	<50	9.9	6.2	150	NA	<1	3.38 j	NA	NA	0.079	<1	<1	60	NA	**52**	NA	NA	NA	**0.589**	NA	NA	NA	NA
MW-16D	Off Duke property, N of AB, near state boundary	Ash Basin	Downgradient	Transition Zone	04/03/2019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0726	0.000275	NA
MW-16S	Off Duke property, N of AB, near state boundary	Ash Basin	Downgradient	Saprolite	07/18/2018	164	9.7	8.7	80	0.364 j	<1	75	<1	<1	<0.025	<1	<1	**657**	<1	23	1.51	<1	<0.2	0.3	7 B2	NA	NA	0.0594 j
MW-16S	Off Duke property, N of AB, near state boundary	Ash Basin	Downgradient	Saprolite	11/06/2018	98	4.1	9.6	51	<1	<1	71	<1	<1	0.044	<1	<1	50	<1	10	0.599 j	<1	<0.2	0.144 j	4.052 j	NA	NA	<0.5
MW-16S	Off Duke property, N of AB, near state boundary	Ash Basin	Downgradient	Saprolite	01/08/2019	49.518 j	3.6	9.9	66	NA	<1	58	NA	NA	<0.025	<1	<1	45	NA	3.508 j	NA	NA	NA	0.147 j	NA	1.505	<0.0002	NA
MW-16S	Off Duke property, N of AB, near state boundary	Ash Basin	Downgradient	Saprolite	04/02/2019	100	8.6	9	58	NA	<1	63	NA	NA	<0.025	<1	<1	47	NA	25	NA	NA	NA	<0.3	NA	NA	NA	NA
MW-18BR	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Bedrock	07/18/2018	<50	69	21	420	<1	2.51	90	<1	<1	<0.025	<1	<1	**690**	<1	**1300**	<1	<1	<0.2	**0.398**	<5	NA	NA	0.19
MW-18BR	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Bedrock	09/12/2018	<50	65	17	410	<1	2.01	91	<1	<1	<0.025	<1	<1	**632**	<1	**1320**	<1	<1	<0.2	0.25 j	<5	0.646	0.00601	0.18
MW-18BR	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Bedrock	11/06/2018	<50	66	18	380	<1	1.96	92	<1	<1	<0.025	<1	<1	**625**	<1	**1380**	<1	<1	<0.2	0.284 j	2.331 j	NA	NA	0.16
MW-18BR	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Bedrock	12/05/2018	<50	67	17	390	<1	1.29	91	<1	<1	<0.025	<1	<1	**491**	<1	**1360**	<1	<1	<0.2	<0.3	2.298 j,B2	2.377	0.00485	0.14
MW-18BR	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Bedrock	04/11/2019	28.714 j	67	31	460	NA	4.72	85	NA	NA	<0.025	<1	<1	**791**	NA	**1250**	NA	NA	NA	<0.3	NA	NA	NA	NA
MW-18D	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Transition Zone	07/18/2018	<50	25	37	270	<1	<1	3.536 j	<1	0.385 j	0.034	<1	<1	28	<1	3.055 j	0.752 j	0.336 j	0.114 j	**1.5**	18 B2	NA	NA	0.16
MW-18D	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Transition Zone	09/12/2018	<50	23	36	260	<1	<1	3.691 j	<1	<1	<0.025	<1	<1	7.779 j	<1	2.249 j	0.57 j	0.401 j	<0.2	**1.29**	21	1.512	0.000224	0.16
MW-18D	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Transition Zone	11/06/2018	<50	22	36	260	<1	<1	6	<1	<1	<0.025	0.594 j	<1	**385**	<1	26	0.55 j	<1	<0.2	**1.9**	12	NA	NA	0.15
MW-18D	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Transition Zone	12/05/2018	<50	23	37	250	<1	<1	4.775 j	<1	<1	0.058	0.528 j	<1	144	<1	4.426 j	0.634 j	<1	<0.2	**1.36**	15 B2	2.8283	0.000204	0.11
MW-18D	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Transition Zone	04/11/2019	<50	23	37	260	NA	<1	4.593 j	NA	NA	<0.025	<1	<1	5.432 j	NA	22	NA	NA	NA	**1.1**	NA	NA	NA	NA
MW-19BR	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Bedrock	07/18/2018	<50	150	60	**670**	<1	0.415 j	58	<1	<1	<0.025	<1	0.387 j	**1360**	<1	**1340**	0.413 j	<1	<0.2	0.214 j	4.007 j,B2	NA	NA	0.1894 j
MW-19BR	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Bedrock	11/06/2018	<50	130	56	**560**	<1	0.442 j	58	<1	<1	<0.025	<1	0.41 j	**1330**	<1	**1360**	<1	<1	<0.2	0.19 j	<5	NA	NA	0.236 j
MW-19BR	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Bedrock	04/03/2019	<50	130	55	**600**	NA	0.534 j	59	NA	NA	<0.025	<1	0.4 j	**1380**	NA	**1380**	NA	NA	NA	<0.3	NA	NA	NA	NA
MW-19D	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Transition Zone	07/18/2018	<50	130	62	**580**	<1	<1	58	<1	<1	<0.025	<1	0.757 j	**1470**	0.478 j	**981**	0.589 j	<1	0.084 j	0.184 j	2.234 j,B2	NA	NA	0.1886 j
MW-19D	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Transition Zone	11/06/2018	<50	120	59	470	<1	0.39 j	61	<1	<1	<0.025	0.354 j	0.77 j	**2470**	5.98	**1190**	0.455 j	<1	<0.2	0.281 j	3.13 j	NA	NA	0.1626 j
MW-19D	SE of AB, outside compliance boundary	Ash Basin	Sidegradient	Transition Zone	04/03/2019	<50	120	63	490	NA	<1	55	NA	NA	<0.025 M1	<1	0.703 j	**1120**	NA	**896**	NA	NA	NA	<0.3	NA	NA	NA	NA

COLOR NOTES

Bold highlighted concentration indicates exceedance of the 15A NCAC 02L .0202 Standard or the IMAC. (Effective date for 15A NCAC 02L .0202 Standard and IMAC is April 1, 2013)

Turbidity of Sample ≥ 10 NTUs

Provisional Background Threshold Values updated with Background Results through October 2017.

Analytical data review has not been completed for this dataset.

ABBREVIATION NOTES

BGS - below ground surface
BOD - Biologic Oxygen Demand
CB - Compliance Boundary
COD - Chemical Oxygen Demand
Deg C - Degrees Celsius
DMAs - dimethylarsinic acid
DUP - Duplicate
Eh - Redox Potential
ft - Feet
GPM - gallons per minute
IMAC - Interim Maximum Allowable Concentrations. From the 15A NCAC 02L Standard, Appendix 1, April, 1, 2013.
MDC - Minimum Detectable Concentration
MeSe - Methylseleninic acid
mg/kg - milligrams per kilogram
mg/L - milligrams per liter
mg-N/L - Milligram nitrogen per liter

mV - millivolts
NA - Not available or Not Applicable
NE - Not established
NM - Not measured
NTUs - Nephelometric Turbidity Units
pCi/L - picocuries per liter
PSRG - Primary Soil Remediation Goals
RL - Reporting Limit
SeCN - selnocynante
SeMe (IV) - Selenomethionine
SPLP - Synthetic Precipitation Leaching Procedure
S.U. - Standard Units
TCLP - Toxicity Characteristic Leaching Procedure
ug/L - micrograms per liter
ug/mL - microgram per milliliter
umhos/cm - micromhos per centimeter

I/A

FACILITY NAME: MAYO
DATE UPDATED: 06/24/2019
PREADSHEET UPDATED BY: BRANDON RUSSO
PREADSHEET CHECKED BY: JERRY WYLIE

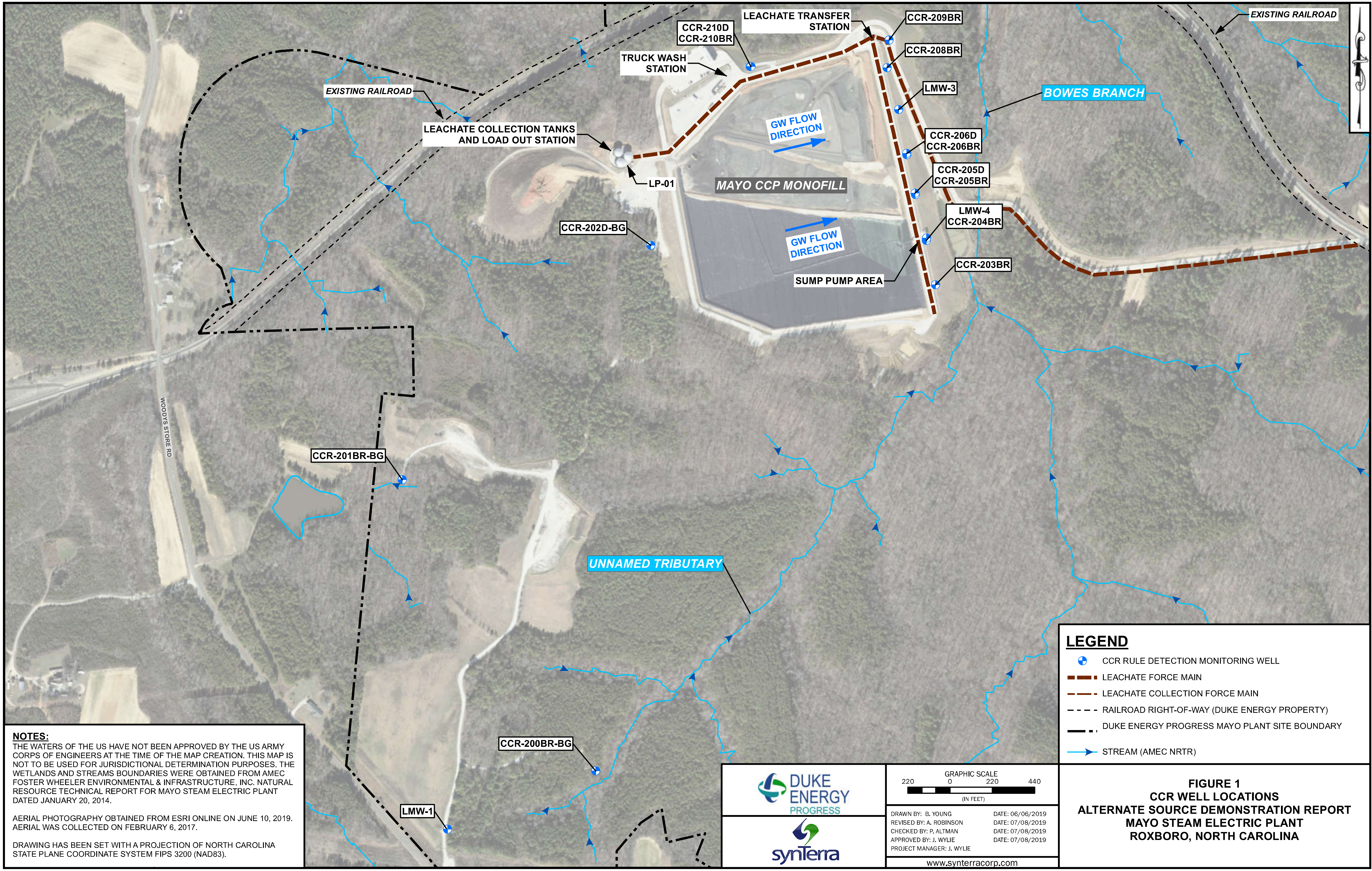
	D 40CFR257 APPENDIX III CONSTITUENT				INORGANIC PARAMETERS (TOTAL CONCENTRATION)																RADIONUCLIDES		R PARAME
Reporting Units	ug/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/mL	mg/L
CAC 02L Standard	700	250	250	500	1*	10	700	4*	2	10	10	1*	300	15	50	100	20	0.2*	0.3*	1000	5^	0.03^	2
Provisional Background Threshold Values (Surficial Unit)	50	3.3	1.6	85	1	1	19	1	1	0.088	3.23	1.02	385	1	253	3.03	1	0.2	0.974	227	4	0.000367	NE
Provisional Background Threshold Values (Transition Zone Unit)	50	33.3	7.5	430	1	1	78.3	1	1	1.26	6	1	1319	1	298	5	1	0.2	5.88	12	9	0.001	NE
Provisional Background Threshold Values (Bedrock Unit)	50	43	18	340	1	1	97	1	1	0.4	7	1.19	2550	1	544	5	1	0.2	5.52	37.9	7.6	0.00203	NE

						D 40CFR257 APPENDIX III CONSTITUENT				INORGANIC PARAMETERS (TOTAL CONCENTRATION)																RADIONUCLIDES		R PARAME
Sample ID	**Location Description**	**Associated Unit**	**Location With Respect to Groundwater Flow Direction**	**Sample Location Aquifer Name**	**Sample Collection Date**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Lead**	**Manganese**	**Nickel**	**Selenium**	**Thallium**	**Vanadium**	**Zinc**	**Total Radium**	**Total Uranium**	**Fluoride**
		MMAs - monomethylarsonic acid					Well Locations referenced to NAD83 and elevations referenced to NAVD88																					

ATTACHMENT C

CCP MONOFILL CCR GROUNDWATER DATA SUMMARY AND WELL LOCATION MAP

I/A



NOTES:

THE WATERS OF THE US HAVE NOT BEEN APPROVED BY THE US ARMY CORPS OF ENGINEERS AT THE TIME OF THE MAP CREATION. THIS MAP IS NOT TO BE USED FOR JURISDICTIONAL DETERMINATION PURPOSES. THE WETLANDS AND STREAMS BOUNDARIES WERE OBTAINED FROM AMEC FOSTER WHEELER ENVIRONMENTAL & INFRASTRUCTURE, INC. NATURAL RESOURCE TECHNICAL REPORT FOR MAYO STEAM ELECTRIC PLANT DATED JANUARY 20, 2014.

AERIAL PHOTOGRAPHY OBTAINED FROM ESRI ONLINE ON JUNE 10, 2019. AERIAL WAS COLLECTED ON FEBRUARY 6, 2017.

DRAWING HAS BEEN SET WITH A PROJECTION OF NORTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3200 (NAD83).

LEGEND

●	CCR RULE DETECTION MONITORING WELL
▬ ▬	LEACHATE FORCE MAIN
— —	LEACHATE COLLECTION FORCE MAIN
- - -	RAILROAD RIGHT-OF-WAY (DUKE ENERGY PROPERTY)
— · —	DUKE ENERGY PROGRESS MAYO PLANT SITE BOUNDARY
→	STREAM (AMEC NRTR)

DUKE ENERGY PROGRESS

synTerra

DRAWN BY: B. YOUNG DATE: 06/06/2019
REVISED BY: A. ROBINSON DATE: 07/08/2019
CHECKED BY: P. ALTMAN DATE: 07/08/2019
APPROVED BY: J. WYLIE DATE: 07/08/2019
PROJECT MANAGER: J. WYLIE

www.synterracorp.com

FIGURE 1
CCR WELL LOCATIONS
ALTERNATE SOURCE DEMONSTRATION REPORT
MAYO STEAM ELECTRIC PLANT
ROXBORO, NORTH CAROLINA

P:\Duke Energy Progress.1026\00 GIS BASE DATA\Mayo\Map_Docs\CCR_Draft\Mayo_Monofill_Surveyed_CCR_Locations_20190708.mxd

I/A

Analytical Laboratory

13339 Hagers Ferry Road
Huntersville, NC 28078-7929
McGuire Nuclear Complex - MG03A2
Phone: 980-875-5245   Fax: 980-875-4349

Order Summary Report

Order Number:	**J18100179**
Project Name:	MAYO STEAM - MAYO MONOFILL CCR
Customer Name(s):	Kim Witt, Bryan Moeller, Ryan Czop, Fred Holt, K Webb, J Wylie, B Russo, M M
Customer Address:	Mayo Steam Plant 10660 Boston Road Roxboro,North Carolina 27574
Lab Contact:	Peggy Kendall Phone: 980-875-5848

Report Authorized By:
(Signature)
Peggy F Kendall
Peggy Kendall

Date: 10/29/2018

Program Comments:

Please contact the Program Manager (Peggy Kendall) with any questions regarding this report.

Data Flags & Calculations:

Any analytical tests or individual analytes within a test flagged with a Qualifier indicate a deviation from the method quality system or quality control requirement. The qualifier description is found at the end of the Certificate of Analysis (sample results) under the qualifiers heading. All results are reported on a dry weight basis unless otherwise noted. Subcontracted data included on the Duke Certificate of Analysis is to be used as information only. Certified vendor results can be found in the subcontracted lab final report. Duke Energy Analytical Laboratory subcontracts analyses to other vendor laboratories that have been qualified by Duke Energy to perform these analyses except where noted.

Data Package:

This data package includes analytical results that are applicable only to the samples described in this narrative. An estimation of the uncertainty of measurement for the results in the report is available upon request. This report shall not be reproduced, except in full, without the written consent of the Analytical Laboratory. Please contact the Analytical laboratory with any questions. The order of individual sections within this report is as follows:

Job Summary Report, Sample Identification, Technical Validation of Data Package, Analytical Laboratory Certificate of Analysis, Analytical Laboratory QC Reports, Sub-contracted Laboratory Results, Customer Specific Data Sheets, Reports & Documentation, Customer Database Entries, Test Case Narratives, Chain of Custody (COC)

Certification:

The Analytical Laboratory holds the following State Certifications : North Carolina (DENR) Certificate #248, South Carolina (DHEC) Laboratory ID # 99005. Contact the Analytical Laboratory for definitive information about the certification status of specific methods.

I/A

Sample ID's & Descriptions:

Sample ID	Plant/Station	Collection Date and	Time	Collected By	Sample Description
2018031599	MAYO STEAM	03-Oct-18	9:10 AM	Greg Darnell	CCR-209BR
2018031600	MAYO STEAM	03-Oct-18	9:12 AM	Greg Darnell	CCR-210D
2018031601	MAYO STEAM	03-Oct-18	9:58 AM	Greg Darnell	CCR-210BR
2018031602	MAYO STEAM	03-Oct-18	10:10 AM	Greg Darnell	CCR-208BR
2018031603	MAYO STEAM	03-Oct-18	10:56 AM	Greg Darnell	CCR-203BR
2018031604	MAYO STEAM	03-Oct-18	10:56 AM	Greg Darnell	LMW-4
2018031605	MAYO STEAM	03-Oct-18	11:04 AM	Greg Darnell	LMW-3
2018031606	MAYO STEAM	03-Oct-18	11:34 AM	Greg Darnell	CCR-206D
2018031607	MAYO STEAM	03-Oct-18	11:45 AM	Greg Darnell	CCR-204BR
2018031608	MAYO STEAM	03-Oct-18	11:55 AM	Greg Darnell	CCR-206BR
2018031609	MAYO STEAM	03-Oct-18	12:02 PM	Greg Darnell	CCR-205D
2018031610	MAYO STEAM	03-Oct-18	12:50 PM	Greg Darnell	CCR-205BR
2018031611	MAYO STEAM	03-Oct-18	12:02 PM	Greg Darnell	CCR-205D Duplicate
2018031612	MAYO STEAM	03-Oct-18	11:58 AM	Greg Darnell	FIELD BLANK

14 Total Samples

Technical Validation Review

Checklist:

COC and .pdf report are in agreement with sample totals and analyses (compliance programs and procedures).	☑ Yes	☐ No
All Results are less than the laboratory reporting limits.	☐ Yes	☑ No
All laboratory QA/QC requirements are acceptable.	☑ Yes	☐ No

Report Sections Included:

- ☑ Job Summary Report
- ☑ Sample Identification
- ☑ Technical Validation of Data Package
- ☑ Analytical Laboratory Certificate of Analysis
- ☐ Analytical Laboratory QC Report
- ☑ Sub-contracted Laboratory Results
- ☐ Customer Specific Data Sheets, Reports, & Documentation
- ☐ Customer Database Entries
- ☑ Chain of Custody
- ☑ Electronic Data Deliverable (EDD) Sent Separately

Reviewed By: Peggy Kendall

Date: 10/29/2018

Certificate of Laboratory Analysis

This report shall not be reproduced, except in full.

Order # J18100179

Site: CCR-209BR

Collection Date: 10/03/2018 09:10 AM

Sample #: 2018031599

Matrix: GW_RCRA

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
ALKALINITY (FIXED END POINT 4.5) - (Analysis Performed by Pace Laboratories)								
Vendor Parameter	**Complete**					Vendor Method		V_PACE
INORGANIC IONS BY IC - Q18100417								
Chloride	**1200**	mg/L		50	500	EPA 9056A	10/15/2018 18:31	BGN9034
Fluoride	**< 5**	mg/L		5	50	EPA 9056A	10/15/2018 18:31	BGN9034
Sulfate	**81**	mg/L		5	50	EPA 9056A	10/15/2018 18:31	BGN9034
MERCURY (COLD VAPOR) IN WATER - Q18100425								
Mercury (Hg)	**0.06**	ug/L		0.05	1	EPA 7470A	10/15/2018 14:23	DMFRANC
TOTAL RECOVERABLE METALS BY ICP - Q18100370								
Barium (Ba)	**0.248**	mg/L		0.005	1	SW 6010D	10/15/2018 16:47	MHALL3
Boron (B)	**8.85**	mg/L		0.05	1	SW 6010D	10/15/2018 16:47	MHALL3
Calcium (Ca)	**442**	mg/L		0.2	20	SW 6010D	10/15/2018 16:47	MHALL3
Lithium (Li)	**0.585**	mg/L		0.005	1	SW 6010D	10/15/2018 16:47	MHALL3
Magnesium (Mg)	**132**	mg/L		0.1	20	SW 6010D	10/15/2018 16:47	MHALL3
Potassium (K)	**14.3**	mg/L		0.1	1	SW 6010D	10/15/2018 16:47	MHALL3
Sodium (Na)	**171**	mg/L		1	20	SW 6010D	10/15/2018 16:47	MHALL3
TOTAL RECOVERABLE METALS BY ICP-MS - Q18100371								
Antimony (Sb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 15:38	CWSPEN3
Arsenic (As)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 15:38	CWSPEN3
Beryllium (Be)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 15:38	CWSPEN3
Cadmium (Cd)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 15:38	CWSPEN3
Chromium (Cr)	**1.18**	ug/L		1	1	SW 6020B	10/15/2018 15:38	CWSPEN3
Cobalt (Co)	**44.8**	ug/L		1	1	SW 6020B	10/15/2018 15:38	CWSPEN3
Lead (Pb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 15:38	CWSPEN3
Molybdenum (Mo)	**2.03**	ug/L		1	1	SW 6020B	10/15/2018 15:38	CWSPEN3
Selenium (Se)	**5.55**	ug/L		1	1	SW 6020B	10/15/2018 15:38	CWSPEN3
Thallium (Tl) Low Level	**< 0.2**	ug/L		0.2	1	SW 6020B	10/15/2018 15:38	CWSPEN3
RADIOLOGICAL - (Analysis Performed by GEL)								
Vendor Parameter	**Complete**					Vendor Method		v_GEL
TOTAL DISSOLVED SOLIDS - Q18100228								
TDS	**3100**	mg/L		500	1	SM2540C	10/08/2018 15:00	Mgigant

Certificate of Laboratory Analysis

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Order # J18100179

Site: CCR-210D

Collection Date: 10/03/2018 09:12 AM

Sample #: 2018031600

Matrix: GW_RCRA

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
ALKALINITY (FIXED END POINT 4.5) - (Analysis Performed by Pace Laboratories)								
Vendor Parameter	**Complete**					Vendor Method		V_PACE
INORGANIC IONS BY IC - Q18100417								
Chloride	**850**	mg/L		10	100	EPA 9056A	10/15/2018 18:49	BGN9034
Fluoride	**< 1**	mg/L		1	10	EPA 9056A	10/15/2018 18:49	BGN9034
Sulfate	**190**	mg/L		10	100	EPA 9056A	10/15/2018 18:49	BGN9034
MERCURY (COLD VAPOR) IN WATER - Q18100425								
Mercury (Hg)	**0.56**	ug/L		0.05	1	EPA 7470A	10/15/2018 14:25	DMFRANC
TOTAL RECOVERABLE METALS BY ICP - Q18100370								
Barium (Ba)	**0.203**	mg/L		0.005	1	SW 6010D	10/15/2018 16:52	MHALL3
Boron (B)	**5.73**	mg/L		0.05	1	SW 6010D	10/15/2018 16:52	MHALL3
Calcium (Ca)	**317**	mg/L		0.2	20	SW 6010D	10/15/2018 16:52	MHALL3
Lithium (Li)	**0.091**	mg/L		0.005	1	SW 6010D	10/15/2018 16:52	MHALL3
Magnesium (Mg)	**102**	mg/L		0.1	20	SW 6010D	10/15/2018 16:52	MHALL3
Potassium (K)	**7.40**	mg/L		0.1	1	SW 6010D	10/15/2018 16:52	MHALL3
Sodium (Na)	**104**	mg/L		1	20	SW 6010D	10/15/2018 16:52	MHALL3
TOTAL RECOVERABLE METALS BY ICP-MS - Q18100371								
Antimony (Sb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 15:47	CWSPEN3
Arsenic (As)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 15:47	CWSPEN3
Beryllium (Be)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 15:47	CWSPEN3
Cadmium (Cd)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 15:47	CWSPEN3
Chromium (Cr)	**16.6**	ug/L		1	1	SW 6020B	10/15/2018 15:47	CWSPEN3
Cobalt (Co)	**1.45**	ug/L		1	1	SW 6020B	10/15/2018 15:47	CWSPEN3
Lead (Pb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 15:47	CWSPEN3
Molybdenum (Mo)	**2.23**	ug/L		1	1	SW 6020B	10/15/2018 15:47	CWSPEN3
Selenium (Se)	**5.36**	ug/L		1	1	SW 6020B	10/15/2018 15:47	CWSPEN3
Thallium (Tl) Low Level	**< 0.2**	ug/L		0.2	1	SW 6020B	10/15/2018 15:47	CWSPEN3
RADIOLOGICAL - (Analysis Performed by GEL)								
Vendor Parameter	**Complete**					Vendor Method		v_GEL
TOTAL DISSOLVED SOLIDS - Q18100228								
TDS	**2200**	mg/L		500	1	SM2540C	10/08/2018 15:00	Mgigant

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Order # J18100179

Site: CCR-210BR

Collection Date: 10/03/2018 09:58 AM

Sample #: **2018031601**

Matrix: GW_RCRA

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
ALKALINITY (FIXED END POINT 4.5) - (Analysis Performed by Pace Laboratories)								
Vendor Parameter	**Complete**					Vendor Method		V_PACE
INORGANIC IONS BY IC - Q18100417								
Chloride	**55**	mg/L		1	10	EPA 9056A	10/15/2018 19:06	BGN9034
Fluoride	**0.19**	mg/L		0.1	1	EPA 9056A	10/15/2018 19:06	BGN9034
Sulfate	**85**	mg/L		1	10	EPA 9056A	10/15/2018 19:06	BGN9034
MERCURY (COLD VAPOR) IN WATER - Q18100425								
Mercury (Hg)	**< 0.05**	ug/L		0.05	1	EPA 7470A	10/15/2018 14:28	DMFRANC
TOTAL RECOVERABLE METALS BY ICP - Q18100370								
Barium (Ba)	**0.027**	mg/L		0.005	1	SW 6010D	10/15/2018 16:56	MHALL3
Boron (B)	**< 0.05**	mg/L		0.05	1	SW 6010D	10/15/2018 16:56	MHALL3
Calcium (Ca)	**111**	mg/L		0.2	20	SW 6010D	10/15/2018 16:56	MHALL3
Lithium (Li)	**0.005**	mg/L		0.005	1	SW 6010D	10/15/2018 16:56	MHALL3
Magnesium (Mg)	**18.7**	mg/L		0.005	1	SW 6010D	10/15/2018 16:56	MHALL3
Potassium (K)	**4.81**	mg/L		0.1	1	SW 6010D	10/15/2018 16:56	MHALL3
Sodium (Na)	**25.9**	mg/L		0.05	1	SW 6010D	10/15/2018 16:56	MHALL3
TOTAL RECOVERABLE METALS BY ICP-MS - Q18100371								
Antimony (Sb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 15:55	CWSPEN3
Arsenic (As)	**1.03**	ug/L		1	1	SW 6020B	10/15/2018 15:55	CWSPEN3
Beryllium (Be)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 15:55	CWSPEN3
Cadmium (Cd)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 15:55	CWSPEN3
Chromium (Cr)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 15:55	CWSPEN3
Cobalt (Co)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 15:55	CWSPEN3
Lead (Pb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 15:55	CWSPEN3
Molybdenum (Mo)	**12.6**	ug/L		1	1	SW 6020B	10/15/2018 15:55	CWSPEN3
Selenium (Se)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 15:55	CWSPEN3
Thallium (Tl) Low Level	**< 0.2**	ug/L		0.2	1	SW 6020B	10/15/2018 15:55	CWSPEN3
RADIOLOGICAL - (Analysis Performed by GEL)								
Vendor Parameter	**Complete**					Vendor Method		v_GEL
TOTAL DISSOLVED SOLIDS - Q18100228								
TDS	**500**	mg/L		25	1	SM2540C	10/08/2018 15:00	Mgigant

Certificate of Laboratory Analysis

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Order # J18100179

Site: CCR-208BR

Collection Date: 10/03/2018 10:10 AM

Sample #: 2018031602

Matrix: GW_RCRA

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
ALKALINITY (FIXED END POINT 4.5) - (Analysis Performed by Pace Laboratories)								
Vendor Parameter	**Complete**					Vendor Method		V_PACE
INORGANIC IONS BY IC - Q18100417								
Chloride	**75**	mg/L		1	10	EPA 9056A	10/15/2018 19:24	BGN9034
Fluoride	**0.23**	mg/L		0.1	1	EPA 9056A	10/15/2018 19:24	BGN9034
Sulfate	**19**	mg/L		1	10	EPA 9056A	10/15/2018 19:24	BGN9034
MERCURY (COLD VAPOR) IN WATER - Q18100646								
Mercury (Hg)	**< 0.05**	ug/L		0.05	1	EPA 7470A	10/24/2018 12:22	DMFRANC
TOTAL RECOVERABLE METALS BY ICP - Q18100370								
Barium (Ba)	**0.077**	mg/L		0.005	1	SW 6010D	10/15/2018 17:01	MHALL3
Boron (B)	**< 0.05**	mg/L		0.05	1	SW 6010D	10/15/2018 17:01	MHALL3
Calcium (Ca)	**59.4**	mg/L		0.01	1	SW 6010D	10/15/2018 17:01	MHALL3
Lithium (Li)	**< 0.005**	mg/L		0.005	1	SW 6010D	10/15/2018 17:01	MHALL3
Magnesium (Mg)	**40.9**	mg/L		0.1	20	SW 6010D	10/15/2018 17:01	MHALL3
Potassium (K)	**6.01**	mg/L		0.1	1	SW 6010D	10/15/2018 17:01	MHALL3
Sodium (Na)	**23.6**	mg/L		0.05	1	SW 6010D	10/15/2018 17:01	MHALL3
TOTAL RECOVERABLE METALS BY ICP-MS - Q18100371								
Antimony (Sb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:03	CWSPEN3
Arsenic (As)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:03	CWSPEN3
Beryllium (Be)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:03	CWSPEN3
Cadmium (Cd)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:03	CWSPEN3
Chromium (Cr)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:03	CWSPEN3
Cobalt (Co)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:03	CWSPEN3
Lead (Pb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:03	CWSPEN3
Molybdenum (Mo)	**4.30**	ug/L		1	1	SW 6020B	10/15/2018 16:03	CWSPEN3
Selenium (Se)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:03	CWSPEN3
Thallium (Tl) Low Level	**< 0.2**	ug/L		0.2	1	SW 6020B	10/15/2018 16:03	CWSPEN3
RADIOLOGICAL - (Analysis Performed by GEL)								
Vendor Parameter	**Complete**					Vendor Method		v_GEL
TOTAL DISSOLVED SOLIDS - Q18100228								
TDS	**430**	mg/L		25	1	SM2540C	10/08/2018 15:00	Mgigant

Certificate of Laboratory Analysis

This report shall not be reproduced, except in full.

Order # J18100179

Site: CCR-203BR

Collection Date: 10/03/2018 10:56 AM

Sample #: 2018031603

Matrix: GW_RCRA

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
ALKALINITY (FIXED END POINT 4.5) - (Analysis Performed by Pace Laboratories)								
Vendor Parameter	**Complete**					Vendor Method		V_PACE
INORGANIC IONS BY IC - Q18100417								
Chloride	**7.6**	mg/L		0.5	5	EPA 9056A	10/15/2018 19:42	BGN9034
Fluoride	**0.24**	mg/L		0.1	1	EPA 9056A	10/15/2018 19:42	BGN9034
Sulfate	**12**	mg/L		0.5	5	EPA 9056A	10/15/2018 19:42	BGN9034
MERCURY (COLD VAPOR) IN WATER - Q18100646								
Mercury (Hg)	**< 0.05**	ug/L		0.05	1	EPA 7470A	10/24/2018 12:24	DMFRANC
TOTAL RECOVERABLE METALS BY ICP - Q18100370								
Barium (Ba)	**0.115**	mg/L		0.005	1	SW 6010D	10/15/2018 17:06	MHALL3
Boron (B)	**< 0.05**	mg/L		0.05	1	SW 6010D	10/15/2018 17:06	MHALL3
Calcium (Ca)	**50.5**	mg/L		0.01	1	SW 6010D	10/15/2018 17:06	MHALL3
Lithium (Li)	**< 0.005**	mg/L		0.005	1	SW 6010D	10/15/2018 17:06	MHALL3
Magnesium (Mg)	**29.4**	mg/L		0.1	20	SW 6010D	10/15/2018 17:06	MHALL3
Potassium (K)	**5.20**	mg/L		0.1	1	SW 6010D	10/15/2018 17:06	MHALL3
Sodium (Na)	**16.1**	mg/L		0.05	1	SW 6010D	10/15/2018 17:06	MHALL3
TOTAL RECOVERABLE METALS BY ICP-MS - Q18100371								
Antimony (Sb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:12	CWSPEN3
Arsenic (As)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:12	CWSPEN3
Beryllium (Be)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:12	CWSPEN3
Cadmium (Cd)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:12	CWSPEN3
Chromium (Cr)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:12	CWSPEN3
Cobalt (Co)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:12	CWSPEN3
Lead (Pb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:12	CWSPEN3
Molybdenum (Mo)	**1.93**	ug/L		1	1	SW 6020B	10/15/2018 16:12	CWSPEN3
Selenium (Se)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:12	CWSPEN3
Thallium (Tl) Low Level	**< 0.2**	ug/L		0.2	1	SW 6020B	10/15/2018 16:12	CWSPEN3
RADIOLOGICAL - (Analysis Performed by GEL)								
Vendor Parameter	**Complete**					Vendor Method		v_GEL
TOTAL DISSOLVED SOLIDS - Q18100228								
TDS	**310**	mg/L		25	1	SM2540C	10/08/2018 15:00	Mgigant

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Order # J18100179

Site: LMW-4 **Sample #: 2018031604**

Collection Date: 10/03/2018 10:56 AM Matrix: GW_RCRA

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
ALKALINITY (FIXED END POINT 4.5) - (Analysis Performed by Pace Laboratories)								
Vendor Parameter	**Complete**					Vendor Method		V_PACE
INORGANIC IONS BY IC - Q18100417								
Chloride	**180**	mg/L		2.5	25	EPA 9056A	10/15/2018 23:53	BGN9034
Fluoride	**< 0.5**	mg/L		0.5	5	EPA 9056A	10/15/2018 23:53	BGN9034
Sulfate	**47**	mg/L		2.5	25	EPA 9056A	10/15/2018 23:53	BGN9034
MERCURY (COLD VAPOR) IN WATER - Q18100646								
Mercury (Hg)	**< 0.05**	ug/L		0.05	1	EPA 7470A	10/24/2018 12:39	DMFRANC
TOTAL RECOVERABLE METALS BY ICP - Q18100370								
Barium (Ba)	**0.331**	mg/L		0.005	1	SW 6010D	10/15/2018 17:10	MHALL3
Boron (B)	**< 0.05**	mg/L		0.05	1	SW 6010D	10/15/2018 17:10	MHALL3
Calcium (Ca)	**85.2**	mg/L		0.01	1	SW 6010D	10/15/2018 17:10	MHALL3
Lithium (Li)	**< 0.005**	mg/L		0.005	1	SW 6010D	10/15/2018 17:10	MHALL3
Magnesium (Mg)	**72.3**	mg/L		0.1	20	SW 6010D	10/15/2018 17:10	MHALL3
Potassium (K)	**3.72**	mg/L		0.1	1	SW 6010D	10/15/2018 17:10	MHALL3
Sodium (Na)	**57.9**	mg/L		0.05	1	SW 6010D	10/15/2018 17:10	MHALL3
TOTAL RECOVERABLE METALS BY ICP-MS - Q18100371								
Antimony (Sb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:45	CWSPEN3
Arsenic (As)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:45	CWSPEN3
Beryllium (Be)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:45	CWSPEN3
Cadmium (Cd)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:45	CWSPEN3
Chromium (Cr)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:45	CWSPEN3
Cobalt (Co)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:45	CWSPEN3
Lead (Pb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:45	CWSPEN3
Molybdenum (Mo)	**1.29**	ug/L		1	1	SW 6020B	10/15/2018 16:45	CWSPEN3
Selenium (Se)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:45	CWSPEN3
Thallium (Tl) Low Level	**< 0.2**	ug/L		0.2	1	SW 6020B	10/15/2018 16:45	CWSPEN3
RADIOLOGICAL - (Analysis Performed by GEL)								
Vendor Parameter	**Complete**					Vendor Method		v_GEL
TOTAL DISSOLVED SOLIDS - Q18100228								
TDS	**720**	mg/L		25	1	SM2540C	10/08/2018 15:00	Mgigant

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Order # J18100179

Site: LMW-3

Collection Date: 10/03/2018 11:04 AM

Sample #: 2018031605

Matrix: GW_RCRA

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
ALKALINITY (FIXED END POINT 4.5) - (Analysis Performed by Pace Laboratories)								
Vendor Parameter	**Complete**					Vendor Method		V_PACE
INORGANIC IONS BY IC - Q18100417								
Chloride	**77**	mg/L		1	10	EPA 9056A	10/16/2018 00:11	BGN9034
Fluoride	**0.29**	mg/L		0.1	1	EPA 9056A	10/16/2018 00:11	BGN9034
Sulfate	**17**	mg/L		1	10	EPA 9056A	10/16/2018 00:11	BGN9034
MERCURY (COLD VAPOR) IN WATER - Q18100646								
Mercury (Hg)	**< 0.05**	ug/L		0.05	1	EPA 7470A	10/24/2018 12:41	DMFRANC
TOTAL RECOVERABLE METALS BY ICP - Q18100370								
Barium (Ba)	**0.142**	mg/L		0.005	1	SW 6010D	10/15/2018 17:15	MHALL3
Boron (B)	**< 0.05**	mg/L		0.05	1	SW 6010D	10/15/2018 17:15	MHALL3
Calcium (Ca)	**60.7**	mg/L		0.01	1	SW 6010D	10/15/2018 17:15	MHALL3
Lithium (Li)	**< 0.005**	mg/L		0.005	1	SW 6010D	10/15/2018 17:15	MHALL3
Magnesium (Mg)	**35.7**	mg/L		0.1	20	SW 6010D	10/15/2018 17:15	MHALL3
Potassium (K)	**6.08**	mg/L		0.1	1	SW 6010D	10/15/2018 17:15	MHALL3
Sodium (Na)	**24.3**	mg/L		0.05	1	SW 6010D	10/15/2018 17:15	MHALL3
TOTAL RECOVERABLE METALS BY ICP-MS - Q18100371								
Antimony (Sb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:54	CWSPEN3
Arsenic (As)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:54	CWSPEN3
Beryllium (Be)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:54	CWSPEN3
Cadmium (Cd)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:54	CWSPEN3
Chromium (Cr)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:54	CWSPEN3
Cobalt (Co)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:54	CWSPEN3
Lead (Pb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:54	CWSPEN3
Molybdenum (Mo)	**2.71**	ug/L		1	1	SW 6020B	10/15/2018 16:54	CWSPEN3
Selenium (Se)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 16:54	CWSPEN3
Thallium (Tl) Low Level	**< 0.2**	ug/L		0.2	1	SW 6020B	10/15/2018 16:54	CWSPEN3
RADIOLOGICAL - (Analysis Performed by GEL)								
Vendor Parameter	**Complete**					Vendor Method		v_GEL
TOTAL DISSOLVED SOLIDS - Q18100228								
TDS	**430**	mg/L		25	1	SM2540C	10/08/2018 15:00	Mgigant

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Order # J18100179

Site: CCR-206D | **Sample #: 2018031606**

Collection Date: 10/03/2018 11:34 AM | Matrix: GW_RCRA

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
ALKALINITY (FIXED END POINT 4.5) - (Analysis Performed by Pace Laboratories)								
Vendor Parameter	**Complete**					Vendor Method		V_PACE
INORGANIC IONS BY IC - Q18100417								
Chloride	**14**	mg/L		0.5	5	EPA 9056A	10/16/2018 00:29	BGN9034
Fluoride	**0.16**	mg/L		0.1	1	EPA 9056A	10/16/2018 00:29	BGN9034
Sulfate	**5.9**	mg/L		0.1	1	EPA 9056A	10/16/2018 00:29	BGN9034
MERCURY (COLD VAPOR) IN WATER - Q18100646								
Mercury (Hg)	**< 0.05**	ug/L		0.05	1	EPA 7470A	10/24/2018 12:44	DMFRANC
TOTAL RECOVERABLE METALS BY ICP - Q18100370								
Barium (Ba)	**0.073**	mg/L		0.005	1	SW 6010D	10/15/2018 12:50	MHALL3
Boron (B)	**< 0.05**	mg/L		0.05	1	SW 6010D	10/15/2018 12:50	MHALL3
Calcium (Ca)	**24.3**	mg/L		0.01	1	SW 6010D	10/15/2018 12:50	MHALL3
Lithium (Li)	**< 0.005**	mg/L		0.005	1	SW 6010D	10/15/2018 12:50	MHALL3
Magnesium (Mg)	**14.9**	mg/L		0.005	1	SW 6010D	10/15/2018 12:50	MHALL3
Potassium (K)	**2.19**	mg/L		0.1	1	SW 6010D	10/15/2018 12:50	MHALL3
Sodium (Na)	**13.3**	mg/L		0.05	1	SW 6010D	10/15/2018 12:50	MHALL3
TOTAL RECOVERABLE METALS BY ICP-MS - Q18100371								
Antimony (Sb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:02	CWSPEN3
Arsenic (As)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:02	CWSPEN3
Beryllium (Be)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:02	CWSPEN3
Cadmium (Cd)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:02	CWSPEN3
Chromium (Cr)	**1.79**	ug/L		1	1	SW 6020B	10/15/2018 17:02	CWSPEN3
Cobalt (Co)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:02	CWSPEN3
Lead (Pb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:02	CWSPEN3
Molybdenum (Mo)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:02	CWSPEN3
Selenium (Se)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:02	CWSPEN3
Thallium (Tl) Low Level	**< 0.2**	ug/L		0.2	1	SW 6020B	10/15/2018 17:02	CWSPEN3
RADIOLOGICAL - (Analysis Performed by GEL)								
Vendor Parameter	**Complete**					Vendor Method		v_GEL
TOTAL DISSOLVED SOLIDS - Q18100228								
TDS	**210**	mg/L		25	1	SM2540C	10/08/2018 15:00	Mgigant

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Order # J18100179

Site: CCR-204BR

Collection Date: 10/03/2018 11:45 AM

Sample #: **2018031607**

Matrix: GW_RCRA

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
ALKALINITY (FIXED END POINT 4.5) - (Analysis Performed by Pace Laboratories)								
Vendor Parameter	**Complete**					Vendor Method		V_PACE
INORGANIC IONS BY IC - Q18100417								
Chloride	**8.5**	mg/L		0.5	5	EPA 9056A	10/16/2018 00:47	BGN9034
Fluoride	**1.7**	mg/L		0.5	5	EPA 9056A	10/16/2018 00:47	BGN9034
Sulfate	**190**	mg/L		5	50	EPA 9056A	10/16/2018 00:47	BGN9034
MERCURY (COLD VAPOR) IN WATER - Q18100646								
Mercury (Hg)	**< 0.05**	ug/L		0.05	1	EPA 7470A	10/24/2018 12:46	DMFRANC
TOTAL RECOVERABLE METALS BY ICP - Q18100370								
Barium (Ba)	**0.038**	mg/L		0.005	1	SW 6010D	10/15/2018 12:55	MHALL3
Boron (B)	**0.095**	mg/L		0.05	1	SW 6010D	10/15/2018 12:55	MHALL3
Calcium (Ca)	**52.8**	mg/L		0.01	1	SW 6010D	10/15/2018 12:55	MHALL3
Lithium (Li)	**< 0.005**	mg/L		0.005	1	SW 6010D	10/15/2018 12:55	MHALL3
Magnesium (Mg)	**10.6**	mg/L		0.005	1	SW 6010D	10/15/2018 12:55	MHALL3
Potassium (K)	**2.39**	mg/L		0.1	1	SW 6010D	10/15/2018 12:55	MHALL3
Sodium (Na)	**76.2**	mg/L		0.05	1	SW 6010D	10/15/2018 12:55	MHALL3
TOTAL RECOVERABLE METALS BY ICP-MS - Q18100371								
Antimony (Sb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:10	CWSPEN3
Arsenic (As)	**10.7**	ug/L		1	1	SW 6020B	10/15/2018 17:10	CWSPEN3
Beryllium (Be)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:10	CWSPEN3
Cadmium (Cd)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:10	CWSPEN3
Chromium (Cr)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:10	CWSPEN3
Cobalt (Co)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:10	CWSPEN3
Lead (Pb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:10	CWSPEN3
Molybdenum (Mo)	**29.6**	ug/L		1	1	SW 6020B	10/15/2018 17:10	CWSPEN3
Selenium (Se)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:10	CWSPEN3
Thallium (Tl) Low Level	**< 0.2**	ug/L		0.2	1	SW 6020B	10/15/2018 17:10	CWSPEN3
RADIOLOGICAL - (Analysis Performed by GEL)								
Vendor Parameter	**Complete**					Vendor Method		v_GEL
TOTAL DISSOLVED SOLIDS - Q18100228								
TDS	**460**	mg/L		25	1	SM2540C	10/08/2018 15:00	Mgigant

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Order # J18100179

Site: CCR-206BR

Collection Date: 10/03/2018 11:55 AM

Sample #: 2018031608

Matrix: GW_RCRA

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
ALKALINITY (FIXED END POINT 4.5) - (Analysis Performed by Pace Laboratories)								
Vendor Parameter	**Complete**					Vendor Method		V_PACE
INORGANIC IONS BY IC - Q18100417								
Chloride	**19**	mg/L		0.5	5	EPA 9056A	10/16/2018 01:05	BGN9034
Fluoride	**0.14**	mg/L		0.1	1	EPA 9056A	10/16/2018 01:05	BGN9034
Sulfate	**5.8**	mg/L		0.1	1	EPA 9056A	10/16/2018 01:05	BGN9034
MERCURY (COLD VAPOR) IN WATER - Q18100646								
Mercury (Hg)	**< 0.05**	ug/L		0.05	1	EPA 7470A	10/24/2018 12:49	DMFRANC
TOTAL RECOVERABLE METALS BY ICP - Q18100370								
Barium (Ba)	**0.073**	mg/L		0.005	1	SW 6010D	10/15/2018 12:59	MHALL3
Boron (B)	**< 0.05**	mg/L		0.05	1	SW 6010D	10/15/2018 12:59	MHALL3
Calcium (Ca)	**25.9**	mg/L		0.01	1	SW 6010D	10/15/2018 12:59	MHALL3
Lithium (Li)	**< 0.005**	mg/L		0.005	1	SW 6010D	10/15/2018 12:59	MHALL3
Magnesium (Mg)	**17.7**	mg/L		0.005	1	SW 6010D	10/15/2018 12:59	MHALL3
Potassium (K)	**3.52**	mg/L		0.1	1	SW 6010D	10/15/2018 12:59	MHALL3
Sodium (Na)	**12.6**	mg/L		0.05	1	SW 6010D	10/15/2018 12:59	MHALL3
TOTAL RECOVERABLE METALS BY ICP-MS - Q18100371								
Antimony (Sb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:19	CWSPEN3
Arsenic (As)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:19	CWSPEN3
Beryllium (Be)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:19	CWSPEN3
Cadmium (Cd)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:19	CWSPEN3
Chromium (Cr)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:19	CWSPEN3
Cobalt (Co)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:19	CWSPEN3
Lead (Pb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:19	CWSPEN3
Molybdenum (Mo)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:19	CWSPEN3
Selenium (Se)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:19	CWSPEN3
Thallium (Tl) Low Level	**< 0.2**	ug/L		0.2	1	SW 6020B	10/15/2018 17:19	CWSPEN3
RADIOLOGICAL - (Analysis Performed by GEL)								
Vendor Parameter	**Complete**					Vendor Method		v_GEL
TOTAL DISSOLVED SOLIDS - Q18100228								
TDS	**210**	mg/L		25	1	SM2540C	10/08/2018 15:00	Mgigant

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Order # J18100179

Site: CCR-205D

Sample #: 2018031609

Collection Date: 10/03/2018 12:02 PM

Matrix: GW_RCRA

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
ALKALINITY (FIXED END POINT 4.5) - (Analysis Performed by Pace Laboratories)								
Vendor Parameter	**Complete**					Vendor Method		V_PACE
INORGANIC IONS BY IC - Q18100417								
Chloride	**15**	mg/L		0.5	5	EPA 9056A	10/16/2018 01:23	BGN9034
Fluoride	**0.33**	mg/L		0.1	1	EPA 9056A	10/16/2018 01:23	BGN9034
Sulfate	**13**	mg/L		0.5	5	EPA 9056A	10/16/2018 01:23	BGN9034
MERCURY (COLD VAPOR) IN WATER - Q18100646								
Mercury (Hg)	**< 0.05**	ug/L		0.05	1	EPA 7470A	10/24/2018 12:51	DMFRANC
TOTAL RECOVERABLE METALS BY ICP - Q18100370								
Barium (Ba)	**0.117**	mg/L		0.005	1	SW 6010D	10/15/2018 17:19	MHALL3
Boron (B)	**< 0.05**	mg/L		0.05	1	SW 6010D	10/15/2018 17:19	MHALL3
Calcium (Ca)	**39.9**	mg/L		0.01	1	SW 6010D	10/15/2018 17:19	MHALL3
Lithium (Li)	**< 0.005**	mg/L		0.005	1	SW 6010D	10/15/2018 17:19	MHALL3
Magnesium (Mg)	**30.9**	mg/L		0.1	20	SW 6010D	10/15/2018 17:19	MHALL3
Potassium (K)	**4.27**	mg/L		0.1	1	SW 6010D	10/15/2018 17:19	MHALL3
Sodium (Na)	**22.6**	mg/L		0.05	1	SW 6010D	10/15/2018 17:19	MHALL3
TOTAL RECOVERABLE METALS BY ICP-MS - Q18100371								
Antimony (Sb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:27	CWSPEN3
Arsenic (As)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:27	CWSPEN3
Beryllium (Be)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:27	CWSPEN3
Cadmium (Cd)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:27	CWSPEN3
Chromium (Cr)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:27	CWSPEN3
Cobalt (Co)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:27	CWSPEN3
Lead (Pb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:27	CWSPEN3
Molybdenum (Mo)	**2.34**	ug/L		1	1	SW 6020B	10/15/2018 17:27	CWSPEN3
Selenium (Se)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:27	CWSPEN3
Thallium (Tl) Low Level	**< 0.2**	ug/L		0.2	1	SW 6020B	10/15/2018 17:27	CWSPEN3
RADIOLOGICAL - (Analysis Performed by GEL)								
Vendor Parameter	**Complete**					Vendor Method		v_GEL
TOTAL DISSOLVED SOLIDS - Q18100228								
TDS	**300**	mg/L		25	1	SM2540C	10/08/2018 15:00	Mgigant

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Order # J18100179

Site: CCR-205BR

Collection Date: 10/03/2018 12:50 PM

Sample #: 2018031610

Matrix: GW_RCRA

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
ALKALINITY (FIXED END POINT 4.5) - (Analysis Performed by Pace Laboratories)								
Vendor Parameter	**Complete**					Vendor Method		V_PACE
INORGANIC IONS BY IC - Q18100417								
Chloride	**22**	mg/L		0.5	5	EPA 9056A	10/16/2018 01:40	BGN9034
Fluoride	**0.34**	mg/L		0.1	1	EPA 9056A	10/16/2018 01:40	BGN9034
Sulfate	**12**	mg/L		0.5	5	EPA 9056A	10/16/2018 01:40	BGN9034
MERCURY (COLD VAPOR) IN WATER - Q18100646								
Mercury (Hg)	**< 0.05**	ug/L		0.05	1	EPA 7470A	10/24/2018 12:32	DMFRANC
TOTAL RECOVERABLE METALS BY ICP - Q18100370								
Barium (Ba)	**0.029**	mg/L		0.005	1	SW 6010D	10/15/2018 17:24	MHALL3
Boron (B)	**< 0.05**	mg/L		0.05	1	SW 6010D	10/15/2018 17:24	MHALL3
Calcium (Ca)	**58.9**	mg/L		0.01	1	SW 6010D	10/15/2018 17:24	MHALL3
Lithium (Li)	**< 0.005**	mg/L		0.005	1	SW 6010D	10/15/2018 17:24	MHALL3
Magnesium (Mg)	**27.1**	mg/L		0.1	20	SW 6010D	10/15/2018 17:24	MHALL3
Potassium (K)	**4.36**	mg/L		0.1	1	SW 6010D	10/15/2018 17:24	MHALL3
Sodium (Na)	**17.5**	mg/L		0.05	1	SW 6010D	10/15/2018 17:24	MHALL3
TOTAL RECOVERABLE METALS BY ICP-MS - Q18100371								
Antimony (Sb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:35	CWSPEN3
Arsenic (As)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:35	CWSPEN3
Beryllium (Be)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:35	CWSPEN3
Cadmium (Cd)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:35	CWSPEN3
Chromium (Cr)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:35	CWSPEN3
Cobalt (Co)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:35	CWSPEN3
Lead (Pb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:35	CWSPEN3
Molybdenum (Mo)	**4.68**	ug/L		1	1	SW 6020B	10/15/2018 17:35	CWSPEN3
Selenium (Se)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:35	CWSPEN3
Thallium (Tl) Low Level	**< 0.2**	ug/L		0.2	1	SW 6020B	10/15/2018 17:35	CWSPEN3
RADIOLOGICAL - (Analysis Performed by GEL)								
Vendor Parameter	**Complete**					Vendor Method		v_GEL
TOTAL DISSOLVED SOLIDS - Q18100228								
TDS	**320**	mg/L		25	1	SM2540C	10/08/2018 15:00	Mgigant

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Order # J18100179

Site:	CCR-205D Duplicate	**Sample #:**	**2018031611**
Collection Date:	10/03/2018 12:02 PM	Matrix:	GW_RCRA

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
ALKALINITY (FIXED END POINT 4.5) - (Analysis Performed by Pace Laboratories)								
Vendor Parameter	**Complete**					Vendor Method		V_PACE
INORGANIC IONS BY IC - Q18100417								
Chloride	**15**	mg/L		0.5	5	EPA 9056A	10/16/2018 01:58	BGN9034
Fluoride	**0.33**	mg/L		0.1	1	EPA 9056A	10/16/2018 01:58	BGN9034
Sulfate	**13**	mg/L		0.5	5	EPA 9056A	10/16/2018 01:58	BGN9034
MERCURY (COLD VAPOR) IN WATER - Q18100646								
Mercury (Hg)	**< 0.05**	ug/L		0.05	1	EPA 7470A	10/24/2018 12:54	DMFRANC
TOTAL RECOVERABLE METALS BY ICP - Q18100370								
Barium (Ba)	**0.114**	mg/L		0.005	1	SW 6010D	10/15/2018 17:28	MHALL3
Boron (B)	**< 0.05**	mg/L		0.05	1	SW 6010D	10/15/2018 17:28	MHALL3
Calcium (Ca)	**38.8**	mg/L		0.01	1	SW 6010D	10/15/2018 17:28	MHALL3
Lithium (Li)	**< 0.005**	mg/L		0.005	1	SW 6010D	10/15/2018 17:28	MHALL3
Magnesium (Mg)	**29.9**	mg/L		0.1	20	SW 6010D	10/15/2018 17:28	MHALL3
Potassium (K)	**4.15**	mg/L		0.1	1	SW 6010D	10/15/2018 17:28	MHALL3
Sodium (Na)	**22.1**	mg/L		0.05	1	SW 6010D	10/15/2018 17:28	MHALL3
TOTAL RECOVERABLE METALS BY ICP-MS - Q18100371								
Antimony (Sb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:44	CWSPEN3
Arsenic (As)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:44	CWSPEN3
Beryllium (Be)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:44	CWSPEN3
Cadmium (Cd)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:44	CWSPEN3
Chromium (Cr)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:44	CWSPEN3
Cobalt (Co)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:44	CWSPEN3
Lead (Pb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:44	CWSPEN3
Molybdenum (Mo)	**2.22**	ug/L		1	1	SW 6020B	10/15/2018 17:44	CWSPEN3
Selenium (Se)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:44	CWSPEN3
Thallium (Tl) Low Level	**< 0.2**	ug/L		0.2	1	SW 6020B	10/15/2018 17:44	CWSPEN3
RADIOLOGICAL - (Analysis Performed by GEL)								
Vendor Parameter	**Complete**					Vendor Method		v_GEL
TOTAL DISSOLVED SOLIDS - Q18100228								
TDS	**300**	mg/L		25	1	SM2540C	10/08/2018 15:00	Mgigant

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Order # J18100179

Site: FIELD BLANK

Collection Date: 10/03/2018 11:58 AM

Sample #: 2018031612

Matrix: GW_RCRA

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
ALKALINITY (FIXED END POINT 4.5) - (Analysis Performed by Pace Laboratories)								
Vendor Parameter	**Complete**					Vendor Method		V_PACE
INORGANIC IONS BY IC - Q18100417								
Chloride	**< 0.1**	mg/L		0.1	1	EPA 9056A	10/15/2018 23:17	BGN9034
Fluoride	**< 0.1**	mg/L		0.1	1	EPA 9056A	10/15/2018 23:17	BGN9034
Sulfate	**< 0.1**	mg/L		0.1	1	EPA 9056A	10/15/2018 23:17	BGN9034
MERCURY (COLD VAPOR) IN WATER - Q18100646								
Mercury (Hg)	**< 0.05**	ug/L		0.05	1	EPA 7470A	10/24/2018 12:56	DMFRANC
TOTAL RECOVERABLE METALS BY ICP - Q18100370								
Barium (Ba)	**< 0.005**	mg/L		0.005	1	SW 6010D	10/15/2018 13:18	MHALL3
Boron (B)	**< 0.05**	mg/L		0.05	1	SW 6010D	10/15/2018 13:18	MHALL3
Calcium (Ca)	**< 0.01**	mg/L		0.01	1	SW 6010D	10/15/2018 13:18	MHALL3
Lithium (Li)	**< 0.005**	mg/L		0.005	1	SW 6010D	10/15/2018 13:18	MHALL3
Magnesium (Mg)	**< 0.005**	mg/L		0.005	1	SW 6010D	10/15/2018 13:18	MHALL3
Potassium (K)	**< 0.1**	mg/L		0.1	1	SW 6010D	10/15/2018 13:18	MHALL3
Sodium (Na)	**< 0.05**	mg/L		0.05	1	SW 6010D	10/15/2018 13:18	MHALL3
TOTAL RECOVERABLE METALS BY ICP-MS - Q18100371								
Antimony (Sb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:52	CWSPEN3
Arsenic (As)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:52	CWSPEN3
Beryllium (Be)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:52	CWSPEN3
Cadmium (Cd)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:52	CWSPEN3
Chromium (Cr)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:52	CWSPEN3
Cobalt (Co)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:52	CWSPEN3
Lead (Pb)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:52	CWSPEN3
Molybdenum (Mo)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:52	CWSPEN3
Selenium (Se)	**< 1**	ug/L		1	1	SW 6020B	10/15/2018 17:52	CWSPEN3
Thallium (Tl) Low Level	**< 0.2**	ug/L		0.2	1	SW 6020B	10/15/2018 17:52	CWSPEN3

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Order # J18100179

Level II QC Summary

Q18100417 Dionex INORGANIC IONS BY IC

Blank # 1

Parameter	Measured	Final	Units:	Dil	RDL	Relative Concentration	Qualifier
Chloride	0.0211	0.0211	mg/L	1	0.1	< 1/2 RDL	-
Fluoride	0	0	mg/L	1	0.1	< 1/2 RDL	-
Sulfate	0	0	mg/L	1	0.1	< 1/2 RDL	-

LCS # 1

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Chloride	4.95	4.95	mg/L	1	5	98.9	90	110	-
Fluoride	5.05	5.05	mg/L	1	5	101	90	110	-
Sulfate	5.01	5.01	mg/L	1	5	100	90	110	-

MS # 1

Parent Sample: J18100132 -- 2018031471

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Chloride	3	15	mg/L	5	10	98.6	80	120	-
Fluoride	2.14	2.14	mg/L	1	2	93.2	80	120	-
Sulfate	9.83	49.1	mg/L	5	10	100	80	120	-

MSD # 1

Parent Sample: J18100132 -- 2018031471

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	RPD	Qualifier
Chloride	3.01	15	mg/L	5	10	98.9	80	120	0.273	-
Fluoride	2.15	2.15	mg/L	1	2	93.5	80	120	0.332	-
Sulfate	9.82	49.1	mg/L	5	10	99.8	80	120	0.225	-

Level II QC Summary

Q18100425 HG 7470 MERCURY (COLD VAPOR) IN WATER

Blank # 1

Parameter	Measured	Final	Units:	Dil	RDL	Relative Concentration	Qualifier
Mercury (Hg)	0.021	0.021	ug/L	1	0.05	< 1/2 RDL	-

Blank # 2

Parameter	Measured	Final	Units:	Dil	RDL	Relative Concentration	Qualifier
Mercury (Hg)	0.005	0.005	ug/L	1	0.05	< 1/2 RDL	-

Blank # 3

Parameter	Measured	Final	Units:	Dil	RDL	Relative Concentration	Qualifier
Mercury (Hg)	0.004	0.004	ug/L	1	0.05	< 1/2 RDL	-

Blank # 4

Parameter	Measured	Final	Units:	Dil	RDL	Relative Concentration	Qualifier
Mercury (Hg)	0.006	0.006	ug/L	1	0.05	< 1/2 RDL	-

LCS # 1

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Mercury (Hg)	2.02	2.02	ug/L	1	2	101	85	115	-

LCS # 2

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Mercury (Hg)	1.99	1.99	ug/L	1	2	99.6	85	115	-

MS # 1

Parent Sample: J18100057 -- 2018031135

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Mercury (Hg)	0.632	0.632	ug/L	1	1	63.4	75	125	M2

MSD # 1

Parent Sample: J18100057 -- 2018031135

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	RPD	Qualifier
Mercury (Hg)	0.624	0.624	ug/L	1	1	62.6	75	125	1.27	M2

Qualifiers:

M2 Matrix Spike and/or Matrix Spike Duplicate recovery was Low: the associated Laboratory Control Spike (LCS) was acceptable.

Level II QC Summary

Q18100646 HG 7470 MERCURY (COLD VAPOR) IN WATER

Blank # 1

Parameter	Measured	Final	Units:	Dil	RDL	Relative Concentration	Qualifier
Mercury (Hg)	0.016	0.016	ug/L	1	0.05	< 1/2 RDL	-

Blank # 2

Parameter	Measured	Final	Units:	Dil	RDL	Relative Concentration	Qualifier
Mercury (Hg)	0.018	0.018	ug/L	1	0.05	< 1/2 RDL	-

Blank # 3

Parameter	Measured	Final	Units:	Dil	RDL	Relative Concentration	Qualifier
Mercury (Hg)	0.02	0.02	ug/L	1	0.05	< 1/2 RDL	-

Blank # 4

Parameter	Measured	Final	Units:	Dil	RDL	Relative Concentration	Qualifier
Mercury (Hg)	0.022	0.022	ug/L	1	0.05	< 1/2 RDL	-

LCS # 1

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Mercury (Hg)	2	2	ug/L	1	2	100	85	115	-

LCS # 2

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Mercury (Hg)	1.96	1.96	ug/L	1	2	98.2	85	115	-

MS # 1

Parent Sample: J18090577 -- 2018030169

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Mercury (Hg)	1.03	1.03	ug/L	1	1	102	75	125	-

MSD # 1

Parent Sample: J18090577 -- 2018030169

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	RPD	Qualifier
Mercury (Hg)	1.06	1.06	ug/L	1	1	104	75	125	2.43	-

MS # 2

Parent Sample: J18100179 -- 2018031610

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Mercury (Hg)	1.02	1.02	ug/L	1	1	99.9	75	125	-

MSD # 2

Parent Sample: J18100179 -- 2018031610

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	RPD	Qualifier
Mercury (Hg)	1.02	1.02	ug/L	1	1	101	75	125	0.599	-

Level II QC Summary

Q18100370 ICP_TRM TOTAL RECOVERABLE METALS BY ICP

Blank # 1

Parameter	Measured	Final	Units:	Dil	RDL	Relative Concentration	Qualifier
Barium (Ba)	-0.000047	-0.000047	mg/L	1	0.005	< 1/2 RDL	-
Boron (B)	-0.000654	-0.000654	mg/L	1	0.05	< 1/2 RDL	-
Calcium (Ca)	0.00342	0.00342	mg/L	1	0.01	< 1/2 RDL	-
Lithium (Li)	-0.000403	-0.000403	mg/L	1	0.005	< 1/2 RDL	-
Magnesium (Mg)	0.000049	0.000049	mg/L	1	0.005	< 1/2 RDL	-
Potassium (K)	-0.004	-0.004	mg/L	1	0.1	< 1/2 RDL	-
Sodium (Na)	0.00314	0.00314	mg/L	1	0.05	< 1/2 RDL	-

LCS # 1

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Barium (Ba)	5.04	5.04	mg/L	1	5	101	80	120	-
Boron (B)	4.83	4.83	mg/L	1	5	96.6	80	120	-
Calcium (Ca)	4.8	4.8	mg/L	1	5	96.1	80	120	-
Lithium (Li)	4.75	4.75	mg/L	1	5	95.1	80	120	-
Magnesium (Mg)	5.11	5.11	mg/L	1	5	102	80	120	-
Potassium (K)	4.95	4.95	mg/L	1	5	99.1	80	120	-
Sodium (Na)	4.93	4.93	mg/L	1	5	98.6	80	120	-

MS # 1

Parent Sample: J18100132 -- 2018031471

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Barium (Ba)	5.13	5.13	mg/L	1	5	102	75	125	-
Boron (B)	5.03	5.03	mg/L	1	5	100	75	125	-
Calcium (Ca)	54	54	mg/L	1	5	93.8	75	125	-
Lithium (Li)	4.83	4.83	mg/L	1	5	96.5	75	125	-
Magnesium (Mg)	15.6	15.6	mg/L	1	5	91.2	75	125	-
Potassium (K)	7.63	7.63	mg/L	1	5	100	75	125	-
Sodium (Na)	15.2	15.2	mg/L	1	5	102	75	125	-

MSD # 1

Parent Sample: J18100132 -- 2018031471

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	RPD	Qualifier
Barium (Ba)	5.13	5.13	mg/L	1	5	102	75	125	0.078	-
Boron (B)	5	5	mg/L	1	5	99.8	75	125	0.479	-
Calcium (Ca)	53.6	53.6	mg/L	1	5	84.7	75	125	0.844	-
Lithium (Li)	4.84	4.84	mg/L	1	5	96.8	75	125	0.248	-
Magnesium (Mg)	15.6	15.6	mg/L	1	5	90.8	75	125	0.141	-
Potassium (K)	7.62	7.62	mg/L	1	5	99.8	75	125	0.157	-
Sodium (Na)	15.1	15.1	mg/L	1	5	99.5	75	125	0.692	-

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Order # J18100179

Level II QC Summary

Q18100371 IMS_TRM TOTAL RECOVERABLE METALS BY ICP-MS

Blank # 1

Parameter	Measured	Final	Units:	Dil	RDL	Relative Concentration	Qualifier
Antimony (Sb)	0.017	0.017	ug/L	1	1	< 1/2 RDL	-
Arsenic (As)	0.012	0.012	ug/L	1	1	< 1/2 RDL	-
Beryllium (Be)	-0.046	-0.046	ug/L	1	1	< 1/2 RDL	-
Cadmium (Cd)	0.001	0.001	ug/L	1	1	< 1/2 RDL	-
Chromium (Cr)	0.056	0.056	ug/L	1	1	< 1/2 RDL	-
Cobalt (Co)	0	0	ug/L	1	1	< 1/2 RDL	-
Lead (Pb)	-0.004	-0.004	ug/L	1	1	< 1/2 RDL	-
Molybdenum (Mo)	0.022	0.022	ug/L	1	1	< 1/2 RDL	-
Selenium (Se)	-0.003	-0.003	ug/L	1	1	< 1/2 RDL	-
Thallium (Tl) Low Level	-0.01	-0.01	ug/L	1	0.2	< 1/2 RDL	-

LCS # 1

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Antimony (Sb)	48.1	48.1	ug/L	1	50	96.3	80	120	-
Arsenic (As)	49.2	49.2	ug/L	1	50	98.4	80	120	-
Beryllium (Be)	48.1	48.1	ug/L	1	50	96.1	80	120	-
Cadmium (Cd)	49.6	49.6	ug/L	1	50	99.2	80	120	-
Chromium (Cr)	49.1	49.1	ug/L	1	50	98.2	80	120	-
Cobalt (Co)	49.3	49.3	ug/L	1	50	98.5	80	120	-
Lead (Pb)	49.7	49.7	ug/L	1	50	99.5	80	120	-
Molybdenum (Mo)	48.7	48.7	ug/L	1	50	97.5	80	120	-
Selenium (Se)	48.3	48.3	ug/L	1	50	96.6	80	120	-
Thallium (Tl) Low Level	48.8	48.8	ug/L	1	50	97.7	80	120	-

MS # 1

Parent Sample: J18100132 -- 2018031473

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Antimony (Sb)	50.7	50.7	ug/L	1	50	101	75	125	-
Arsenic (As)	51	51	ug/L	1	50	101	75	125	-
Beryllium (Be)	52.3	52.3	ug/L	1	50	105	75	125	-
Cadmium (Cd)	50.6	50.6	ug/L	1	50	101	75	125	-
Chromium (Cr)	50.5	50.5	ug/L	1	50	100	75	125	-
Cobalt (Co)	50.1	50.1	ug/L	1	50	100	75	125	-
Lead (Pb)	51	51	ug/L	1	50	102	75	125	-
Molybdenum (Mo)	51	51	ug/L	1	50	101	75	125	-
Selenium (Se)	49.7	49.7	ug/L	1	50	99.4	75	125	-
Thallium (Tl) Low Level	50.3	50.3	ug/L	1	50	100	75	125	-

MSD # 1

Parent Sample: J18100132 -- 2018031473

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	RPD	Qualifier
Antimony (Sb)	51	51	ug/L	1	50	102	75	125	0.583	-

Level II QC Summary

Q18100371 IMS_TRM TOTAL RECOVERABLE METALS BY ICP-MS

MSD # 1

Parent Sample: J18100132 -- 2018031473

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	RPD	Qualifier
Arsenic (As)	51.3	51.3	ug/L	1	50	102	75	125	0.604	-
Beryllium (Be)	50.3	50.3	ug/L	1	50	101	75	125	3.88	-
Cadmium (Cd)	51	51	ug/L	1	50	102	75	125	0.748	-
Chromium (Cr)	50.3	50.3	ug/L	1	50	99.9	75	125	0.557	-
Cobalt (Co)	50.1	50.1	ug/L	1	50	100	75	125	0.038	-
Lead (Pb)	51.3	51.3	ug/L	1	50	103	75	125	0.666	-
Molybdenum (Mo)	51.3	51.3	ug/L	1	50	102	75	125	0.515	-
Selenium (Se)	49.8	49.8	ug/L	1	50	99.5	75	125	0.0945	-
Thallium (Tl) Low Level	50.2	50.2	ug/L	1	50	100	75	125	0.0936	-

Level II QC Summary

Q18100228 TDS TOTAL DISSOLVED SOLIDS

Blank # 1

Parameter	Measured	Final	Units:	Dil	RDL	Relative Concentration	Qualifier
TDS	0	0	mg/L	1	25	< 1/2 RDL	-

Blank # 2

Parameter	Measured	Final	Units:	Dil	RDL	Relative Concentration	Qualifier
TDS	0	0	mg/L	1	25	< 1/2 RDL	-

Duplicate # 1

Parent Sample: J18100179 -- 2018031599

Parameter	Measured	Final	Units:	Dil	RPD	Qualifier
TDS	3120	3120	mg/L	1	1.94	-

Duplicate # 2

Parent Sample: J18100179 -- 2018031600

Parameter	Measured	Final	Units:	Dil	RPD	Qualifier
TDS	2160	2160	mg/L	1	0.922	-

Duplicate # 3

Parent Sample: J18100179 -- 2018031601

Parameter	Measured	Final	Units:	Dil	RPD	Qualifier
TDS	501	501	mg/L	1	0.4	-

LCS # 1

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
TDS	103	103	mg/L	1	100	103	90	110	-

Pace Analytical www.pacelabs.com

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

October 10, 2018

Program Manager
Duke Energy
13339 Hagers Ferry Road
Bldg. 7405 MG30A2
Huntersville, NC 28078

RE: Project: J18100179
Pace Project No.: 92402167

Dear Program Manager:

Enclosed are the analytical results for sample(s) received by the laboratory on October 04, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kevin Herring
kevin.herring@pacelabs.com
1(704)875-9092
HORIZON Database Administrator

Enclosures

cc: Program Manager, Duke Energy

CERTIFICATIONS

Project: J18100179
Pace Project No.: 92402167

Asheville Certification IDs

2225 Riverside Drive, Asheville, NC 28804
Florida/NELAP Certification #: E87648
Massachusetts Certification #: M-NC030
North Carolina Drinking Water Certification #: 37712
North Carolina Wastewater Certification #: 40
South Carolina Certification #: 99030001
Virginia/VELAP Certification #: 460222

Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

SAMPLE SUMMARY

Project: J18100179
Pace Project No.: 92402167

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92402167001	**2018031599**	Water	10/03/18 09:10	10/04/18 14:00
92402167002	**2018031600**	Water	10/03/18 09:12	10/04/18 14:00
92402167003	**2018031601**	Water	10/03/18 09:58	10/04/18 14:00
92402167004	**2018031602**	Water	10/03/18 10:10	10/04/18 14:00
92402167005	**2018031603**	Water	10/03/18 10:56	10/04/18 14:00
92402167006	**2018031604**	Water	10/03/18 10:56	10/04/18 14:00
92402167007	**2018031605**	Water	10/03/18 11:04	10/04/18 14:00
92402167008	**2018031606**	Water	10/03/18 11:34	10/04/18 14:00
92402167009	**2018031607**	Water	10/03/18 11:45	10/04/18 14:00
92402167010	**2018031608**	Water	10/03/18 11:55	10/04/18 14:00
92402167011	**2018031609**	Water	10/03/18 12:02	10/04/18 14:00
92402167012	**2018031610**	Water	10/03/18 12:50	10/04/18 14:00
92402167013	**2018031611**	Water	10/03/18 12:02	10/04/18 14:00
92402167014	**2018031612**	Water	10/03/18 11:58	10/04/18 14:00

SAMPLE ANALYTE COUNT

Project:	J18100179
Pace Project No.:	92402167

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92402167001	**2018031599**	SM 2320B-2011	ECH	1	PASI-A
92402167002	**2018031600**	SM 2320B-2011	ECH	1	PASI-A
92402167003	**2018031601**	SM 2320B-2011	ECH	1	PASI-A
92402167004	**2018031602**	SM 2320B-2011	ECH	1	PASI-A
92402167005	**2018031603**	SM 2320B-2011	ECH	1	PASI-A
92402167006	**2018031604**	SM 2320B-2011	ECH	1	PASI-A
92402167007	**2018031605**	SM 2320B-2011	ECH	1	PASI-A
92402167008	**2018031606**	SM 2320B-2011	ECH	1	PASI-A
92402167009	**2018031607**	SM 2320B-2011	ECH	1	PASI-A
92402167010	**2018031608**	SM 2320B-2011	ECH	1	PASI-A
92402167011	**2018031609**	SM 2320B-2011	ECH	1	PASI-A
92402167012	**2018031610**	SM 2320B-2011	ECH	1	PASI-A
92402167013	**2018031611**	SM 2320B-2011	ECH	1	PASI-A
92402167014	**2018031612**	SM 2320B-2011	ECH	1	PASI-A

SUMMARY OF DETECTION

Project: J18100179
Pace Project No.: 92402167

Lab Sample ID Method	Client Sample ID Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92402167001	**2018031599**					
SM 2320B-2011	Alkalinity, Total as CaCO3	202	mg/L	5.0	10/06/18 01:31	
92402167002	**2018031600**					
SM 2320B-2011	Alkalinity, Total as CaCO3	29.6	mg/L	5.0	10/08/18 15:43	
92402167003	**2018031601**					
SM 2320B-2011	Alkalinity, Total as CaCO3	259	mg/L	5.0	10/09/18 02:27	
92402167004	**2018031602**					
SM 2320B-2011	Alkalinity, Total as CaCO3	254	mg/L	5.0	10/09/18 02:35	
92402167005	**2018031603**					
SM 2320B-2011	Alkalinity, Total as CaCO3	274	mg/L	5.0	10/09/18 02:44	
92402167006	**2018031604**					
SM 2320B-2011	Alkalinity, Total as CaCO3	327	mg/L	5.0	10/09/18 02:52	
92402167007	**2018031605**					
SM 2320B-2011	Alkalinity, Total as CaCO3	246	mg/L	5.0	10/09/18 03:03	
92402167008	**2018031606**					
SM 2320B-2011	Alkalinity, Total as CaCO3	139	mg/L	5.0	10/08/18 16:59	
92402167009	**2018031607**					
SM 2320B-2011	Alkalinity, Total as CaCO3	149	mg/L	5.0	10/08/18 17:15	
92402167010	**2018031608**					
SM 2320B-2011	Alkalinity, Total as CaCO3	148	mg/L	5.0	10/08/18 17:32	
92402167011	**2018031609**					
SM 2320B-2011	Alkalinity, Total as CaCO3	260	mg/L	5.0	10/09/18 13:13	
92402167012	**2018031610**					
SM 2320B-2011	Alkalinity, Total as CaCO3	275	mg/L	5.0	10/09/18 13:25	
92402167014	**2018031612**					
SM 2320B-2011	Alkalinity, Total as CaCO3	256	mg/L	5.0	10/09/18 13:34	

PROJECT NARRATIVE

Project:	J18100179
Pace Project No.:	92402167

Method: **SM 2320B-2011**
Description: 2320B Alkalinity
Client: Duke Energy
Date: October 10, 2018

General Information:
14 samples were analyzed for SM 2320B-2011. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 434646

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 92401210003,92401919002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2394686)
  - Alkalinity, Total as CaCO3
- MS (Lab ID: 2394688)
  - Alkalinity, Total as CaCO3
- MSD (Lab ID: 2394687)
  - Alkalinity, Total as CaCO3
- MSD (Lab ID: 2394689)
  - Alkalinity, Total as CaCO3

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

ANALYTICAL RESULTS

Project: J18100179
Pace Project No.: 92402167

Sample: 2018031599 **Lab ID: 92402167001** Collected: 10/03/18 09:10 Received: 10/04/18 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B-2011							
Alkalinity, Total as CaCO3	**202**	mg/L	5.0	1		10/06/18 01:31		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: J18100179
Pace Project No.: 92402167

Sample: 2018031600 **Lab ID: 92402167002** Collected: 10/03/18 09:12 Received: 10/04/18 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B-2011							
Alkalinity, Total as CaCO3	**29.6**	mg/L	5.0	1		10/08/18 15:43		

ANALYTICAL RESULTS

Project: J18100179
Pace Project No.: 92402167

Sample: 2018031601 **Lab ID: 92402167003** Collected: 10/03/18 09:58 Received: 10/04/18 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B-2011							
Alkalinity, Total as CaCO3	**259**	mg/L	5.0	1		10/09/18 02:27		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: J18100179
Pace Project No.: 92402167

Sample: 2018031602 **Lab ID: 92402167004** Collected: 10/03/18 10:10 Received: 10/04/18 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B-2011							
Alkalinity, Total as CaCO3	**254**	mg/L	5.0	1		10/09/18 02:35		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: J18100179
Pace Project No.: 92402167

Sample: 2018031603 **Lab ID: 92402167005** Collected: 10/03/18 10:56 Received: 10/04/18 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B-2011							
Alkalinity, Total as CaCO3	**274**	mg/L	5.0	1		10/09/18 02:44		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project:	J18100179
Pace Project No.:	92402167

Sample: 2018031604 **Lab ID: 92402167006** Collected: 10/03/18 10:56 Received: 10/04/18 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B-2011							
Alkalinity, Total as CaCO3	**327**	mg/L	5.0	1		10/09/18 02:52		

REPORT OF LABORATORY ANALYSIS

ANALYTICAL RESULTS

Project: J18100179
Pace Project No.: 92402167

Sample: 2018031605 **Lab ID: 92402167007** Collected: 10/03/18 11:04 Received: 10/04/18 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B-2011							
Alkalinity, Total as CaCO3	**246**	mg/L	5.0	1		10/09/18 03:03		

ANALYTICAL RESULTS

Project: J18100179
Pace Project No.: 92402167

Sample: 2018031606 **Lab ID: 92402167008** Collected: 10/03/18 11:34 Received: 10/04/18 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B-2011							
Alkalinity, Total as CaCO3	**139**	mg/L	5.0	1		10/08/18 16:59		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: J18100179
Pace Project No.: 92402167

Sample: 2018031607 **Lab ID: 92402167009** Collected: 10/03/18 11:45 Received: 10/04/18 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B-2011							
Alkalinity, Total as CaCO3	**149**	mg/L	5.0	1		10/08/18 17:15		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: J18100179
Pace Project No.: 92402167

Sample: 2018031608 **Lab ID: 92402167010** Collected: 10/03/18 11:55 Received: 10/04/18 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B-2011							
Alkalinity, Total as CaCO3	**148**	mg/L	5.0	1		10/08/18 17:32		

REPORT OF LABORATORY ANALYSIS

ANALYTICAL RESULTS

Project: J18100179
Pace Project No.: 92402167

Sample: 2018031609 **Lab ID: 92402167011** Collected: 10/03/18 12:02 Received: 10/04/18 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B-2011							
Alkalinity, Total as CaCO3	**260**	mg/L	5.0	1		10/09/18 13:13		

REPORT OF LABORATORY ANALYSIS

ANALYTICAL RESULTS

Project: J18100179
Pace Project No.: 92402167

Sample: 2018031610 **Lab ID: 92402167012** Collected: 10/03/18 12:50 Received: 10/04/18 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B-2011							
Alkalinity, Total as CaCO3	**275**	mg/L	5.0	1		10/09/18 13:25		

ANALYTICAL RESULTS

Project: J18100179
Pace Project No.: 92402167

Sample: 2018031611 **Lab ID: 92402167013** Collected: 10/03/18 12:02 Received: 10/04/18 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B-2011							
Alkalinity, Total as CaCO3	ND	mg/L	5.0	1		10/08/18 19:13		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: J18100179
Pace Project No.: 92402167

Sample: 2018031612 **Lab ID: 92402167014** Collected: 10/03/18 11:58 Received: 10/04/18 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
2320B Alkalinity	Analytical Method: SM 2320B-2011							
Alkalinity, Total as CaCO3	**256**	mg/L	5.0	1		10/09/18 13:34		

REPORT OF LABORATORY ANALYSIS

QUALITY CONTROL DATA

Project: J18100179
Pace Project No.: 92402167

QC Batch: 434644
QC Batch Method: SM 2320B-2011
Associated Lab Samples: 92402167001

Analysis Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity

METHOD BLANK: 2393320
Matrix: Water
Associated Lab Samples: 92402167001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	10/05/18 20:09	

LABORATORY CONTROL SAMPLE: 2393321

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	50.1	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2393324 2393325

Parameter	Units	92402206002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	82.9	50	50	131	128	95	90	80-120	2	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2393327 2393328

Parameter	Units	92402203001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	ND	50	50	52.8	53.4	98	99	80-120	1	25	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALITY CONTROL DATA

Project: J18100179
Pace Project No.: 92402167

QC Batch: 434646
Analysis Method: SM 2320B-2011
QC Batch Method: SM 2320B-2011
Analysis Description: 2320B Alkalinity
Associated Lab Samples: 92402167002, 92402167003, 92402167004, 92402167005, 92402167006, 92402167007, 92402167008, 92402167009, 92402167010, 92402167011, 92402167012, 92402167013, 92402167014

METHOD BLANK: 2393329
Matrix: Water
Associated Lab Samples: 92402167002, 92402167003, 92402167004, 92402167005, 92402167006, 92402167007, 92402167008, 92402167009, 92402167010, 92402167011, 92402167012, 92402167013, 92402167014

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	5.0	10/08/18 13:24	

LABORATORY CONTROL SAMPLE: 2393330

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	50	52.2	104	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2394686 2394687

Parameter	Units	92401210003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	390	50	50	423	429	66	78	80-120	1	25	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2394688 2394689

Parameter	Units	92401919002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	311	50	50	380	382	139	143	80-120	1	25	M1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

QUALIFIERS

Project:	J18100179
Pace Project No.:	92402167

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-A	Pace Analytical Services - Asheville

ANALYTE QUALIFIERS

M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

REPORT OF LABORATORY ANALYSIS

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: J18100179
Pace Project No.: 92402167

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92402167001	**2018031599**	SM 2320B-2011	434644		
92402167002	**2018031600**	SM 2320B-2011	434646		
92402167003	**2018031601**	SM 2320B-2011	434646		
92402167004	**2018031602**	SM 2320B-2011	434646		
92402167005	**2018031603**	SM 2320B-2011	434646		
92402167006	**2018031604**	SM 2320B-2011	434646		
92402167007	**2018031605**	SM 2320B-2011	434646		
92402167008	**2018031606**	SM 2320B-2011	434646		
92402167009	**2018031607**	SM 2320B-2011	434646		
92402167010	**2018031608**	SM 2320B-2011	434646		
92402167011	**2018031609**	SM 2320B-2011	434646		
92402167012	**2018031610**	SM 2320B-2011	434646		
92402167013	**2018031611**	SM 2320B-2011	434646		
92402167014	**2018031612**	SM 2320B-2011	434646		

Pace Analytical®	Document Name: Sample Condition Upon Receipt(SCUR)	Document Revised: February 7, 2018 Page 1 of 2
	Document No.: F-CAR-CS-033-Rev.06	Issuing Authority: Pace Carolinas Quality Office

Laboratory receiving samples:

Asheville ☐ Eden ☐ Greenwood ☐ Huntersville ☑ Raleigh ☐ Mechanicsville ☐

Sample Condition Upon Receipt

Client Name: Duke

Project #: WO# : 92402167

92402167

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace ☐ Other:_____

Custody Seal Present? ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☑ No

Date/Initials Person Examining Contents: EH 10-4-18

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other

Biological Tissue Frozen? ☐ Yes ☐ No ☑ N/A

Thermometer: ☑ IR Gun ID: 92T045

Type of Ice: ☑ Wet ☐ Blue ☐ None

Cooler Temp (°C): 2.6 **Correction Factor:** Add/Subtract (°C) -0.1

Cooler Temp Corrected (°C): 2.5

Temp should be above freezing to 6°C

☐ Samples out of temp criteria. Samples on ice, cooling process has begun

USDA Regulated Soil (☑ N/A, water sample)

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? ☐ Yes ☑ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☑ No

		Comments/Discrepancy:
Chain of Custody Present?	☑ Yes ☐ No ☐ N/A	1.
Samples Arrived within Hold Time?	☑ Yes ☐ No ☐ N/A	2.
Short Hold Time Analysis (<72 hr.)?	☐ Yes ☑ No ☐ N/A	3.
Rush Turn Around Time Requested?	☐ Yes ☑ No ☐ N/A	4.
Sufficient Volume?	☑ Yes ☐ No ☐ N/A	5.
Correct Containers Used? -Pace Containers Used?	☑ Yes ☐ No ☐ N/A ☐ Yes ☑ No ☐ N/A	6.
Containers Intact?	☑ Yes ☐ No ☐ N/A	7.
Dissolved analysis: Samples Field Filtered?	☐ Yes ☐ No ☑ N/A	8.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes ☐ No ☐ N/A	9.
Headspace in VOA Vials (>5-6mm)?	☐ Yes ☐ No ☑ N/A	10.
Trip Blank Present?	☐ Yes ☐ No ☑ N/A	11.
Trip Blank Custody Seals Present?	☐ Yes ☐ No ☑ N/A	

COMMENTS/SAMPLE DISCREPANCY

Field Data Required? ☐ Yes ☐ No

Lot ID of split containers:

CLIENT NOTIFICATION/RESOLUTION

Person contacted: _______________ Date/Time: _______________

Project Manager SCURF Review: _______________ **Date:** _______________

Project Manager SRF Review: _______________ **Date:** _______________

Pace Analytical	Document Name: **Sample Condition Upon Receipt(SCUR)**	Document Revised: February 7, 2018 Page 1 of 2
	Document No.: **F-CAR-CS-033-Rev.06**	Issuing Authority: Pace Carolinas Quality Office

***Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.**

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

****Bottom half of box is to list number of bottle**

Project #

WO#:92402167
PM: KLH1 Due Date: 10/11/18
CLIENT: 92-Duke Ener

Pg 1

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic ZN Acetate & NaOH (>9)	BP4C-125 mL Plastic NaOH (pH > 12) (Cl-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)		BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)
1		1																										
2		1																										
3		1																										
4		1																										
5		1																										
6		1																										
7		1																										
8		1																										
9		1																										
10		1																										
11		1																										
12		1																										

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers.

Pace Analytical	Document Name: **Sample Condition Upon Receipt(SCUR)**	Document Revised: February 7, 2018 Page 1 of 2
	Document No.: **F-CAR-CS-033-Rev.06**	Issuing Authority: Pace Carolinas Quality Office

***Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.**

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

****Bottom half of box is to list number of bottle**

Project # WO# : 92402167

PM: KLH1 Due Date: 10/11/18

CLIENT: 92–Duke Ener

Pg 2

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic ZN Acetate & NaOH (>9)	BP4C-125 mL Plastic NaOH (pH > 12) (Cl-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)		BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)
1		1																										
2		1																										
3																												
4																												
5																												
6																												
7																												
8																												
9																												
10																												
11																												
12																												

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers.

I/A

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Duke Energy
Analytical Laboratory
Chain of Custody &
Sample Log

Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-5038

Analytical Laboratory Use Only

Order # J18100179
Matrix GW_RCRA
Samples Originating From NC_X_ SC___
Logged By Q
Date & Time 10/4/18 1038
2.1 Cooler Temp (C)

SAMPLE PROGRAM
Ground Water _X_ NPDES ___
Drinking Water ___ UST ___
RCRA Waste ___

Page _1_ of _1_
DISTRIBUTION
ORIGINAL to LAB, COPY to CLIENT

COC REV DATE 2/13/2018

PACE
PO 5666396

GEL
PO 5616867

Project Name CCR Assessment Wells- WATER
Phone
Client CCR DEP
Fax No
Business Unit:
Process:
Resp.
Project ID:
Activity ID:
Mail Code:
Waterbody:
Station Mayo Monit

92402167

Customer to complete all appropriate non-shaded areas.

tration (0.45 um)	⇩		Unfiltered						⇩					
eservative	Ice	Ice	HNO3	HNO3										
lume (mL)	1000	500	500	4L										
iner Type	PET	PET	HDPE	HDPE										

	Sample Description or ID	Sample Location	Date	Time	Signature	Comp.	Grab	TDS	F, Cl, Sulfate, Alkalinity	Metals (see below)	Total Radium (228 and 226) V_GEL										Total # Containers	
218031599		CCR-209BR	10-3-18	0910			x	1	1	1	1										4	001
1600		CCR-210D		0912			X	1	1	1	1										4	002
1601		CCR-210BR		0958			X	1	1	1	1										4	003
1602		CCR-208BR		1010			X	1	1	1	1										4	004
1603		CCR-203BR		1056			X	1	1	1	1										4	005
1604		LMW-4		1056			X	1	1	1	1										4	006
1605		LMW-3		1104			X	1	1	1	1										4	007
1606		CCR-206D		1134			X	1	1	1	1										4	008
1607		CCR-204BR		1145			X	1	1	1	1										4	009
1608		CCR-206BR		1155			X	1	1	1	1										4	010
1609		CCR-205D		1202			X	1	1	1	1										4	011
1610		CCR-205BR		1250			X	1	1	1	1										4	012
																					0	
																					0	
																					0	
																					0	
1611	CCR-205D	Duplicate		1202			X	1	1	1	1										4	013
1612		Field Blank		1158			X		1	1											2	014
					TOTAL			2	3	3	2	0	0	0	0	0	0	0	0	0	10	

Customer to sign & date below

Relinquished By Matt Craig	Date/Time 10/3/18	Accepted By: J. Watts	Date/Time 10/3/18 / 1832
Relinquished By ShipTeam	Date/Time	Accepted By:	Date/Time 10/4/18 720
Relinquished By	Date/Time 10/4/18 1400	Accepted By: Chad Fox PACE	Date/Time 10/4. 1400
Seal/Locked By Chad Fox Pace	Date/Time 10/4 1425	Sealed/Lock Opened By	Date/Time

Comments

ELEMENTS by ICP_MS (TRM): As, Be, Cd, Cr, Co, Mo, Pb, Se, Sb, Tl(LL)
ELEMENTS by ICP (TRM): Ba, Ca, B, Li, Na, K, Mg Hg by 7470

Customer, important: please indicate desired turnaround

Requested Turnaround
14 Days 10/17/18
*7 Days ______
* 48 Hr ______
*Other ______
* Add. Cost Will Apply

Total ~~10~~ 54

Erick Hanna/Pace 10-4-18 1425

GEL Laboratories LLC
a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171
F 843.766.1178

gel.com

October 22, 2018

Peggy Kendall
Duke Energy Central Lab
13339 Hagers Ferry Road
Huntersville, North Carolina 28078

Re: CCR Assessment Wells
Work Order: 461113
SDG: J18100179

Dear Peggy Kendall:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on October 05, 2018. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4705.

Sincerely,

Katherine Cates

Katherine Cates
Project Manager

Purchase Order: 5616867
Enclosures

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 − (843) 556−8171 − www.gel.com

Certificate of Analysis Report
for

DUPO006 Duke Energy Carolinas, LLC (PO 5616867)

Client SDG: J18100179 GEL Work Order: 461113

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a Tracer compound

** Analyte is a surrogate compound

U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the ’U’ qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Katherine Cates.

Katherine Cates

Reviewed by ______________________________

Certificate of Analysis

Report Date: October 22, 2018

Company : Duke Energy Central Lab
Address : 13339 Hagers Ferry Road

Huntersville, North Carolina 28078
Contact: Peggy Kendall
Project: CCR Assessment Wells

Client Sample ID: 2018031599
Sample ID: 461113001
Matrix: Water
Collect Date: 03-OCT-18 09:10
Receive Date: 05-OCT-18
Collector: Client

Project: DUKE00601
Client ID: DUPO006

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting													
GFPC, Ra228, Liquid "As Received"													
Radium-228		2.12	+/-0.512	0.597	1.00	pCi/L			JXC9	10/16/18	0953	1810346	1
Rad Radium-226													
Lucas Cell, Ra226, liquid "As Received"													
Radium-226		1.81	+/-0.454	0.327	1.00	pCi/L			PCW	10/15/18	0940	1809846	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			83	(15%-125%)

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

Certificate of Analysis

Report Date: October 22, 2018

Company : Duke Energy Central Lab
Address : 13339 Hagers Ferry Road

Huntersville, North Carolina 28078
Contact: Peggy Kendall
Project: CCR Assessment Wells

Client Sample ID: 2018031600
Sample ID: 461113002
Matrix: Water
Collect Date: 03-OCT-18 09:12
Receive Date: 05-OCT-18
Collector: Client

Project: DUKE00601
Client ID: DUPO006

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting													
GFPC, Ra228, Liquid "As Received"													
Radium-228		0.799	+/-0.390	0.559	1.00	pCi/L			JXC9	10/16/18	0953	1810346	1
Rad Radium-226													
Lucas Cell, Ra226, liquid "As Received"													
Radium-226		1.39	+/-0.446	0.388	1.00	pCi/L			PCW	10/15/18	0940	1809846	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			79.8	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Lc/LC: Critical Level
PF: Prep Factor
RL: Reporting Limit
SQL: Sample Quantitation Limit

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: October 22, 2018

Company : Duke Energy Central Lab
Address : 13339 Hagers Ferry Road

Huntersville, North Carolina 28078
Contact: Peggy Kendall
Project: CCR Assessment Wells

Client Sample ID:	2018031601	Project:	DUKE00601
Sample ID:	461113003	Client ID:	DUPO006
Matrix:	Water		
Collect Date:	03-OCT-18 09:58		
Receive Date:	05-OCT-18		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting													
GFPC, Ra228, Liquid "As Received"													
Radium-228		2.43	+/-0.508	0.505	1.00	pCi/L			JXC9	10/16/18	0953	1810346	1
Rad Radium-226													
Lucas Cell, Ra226, liquid "As Received"													
Radium-226		1.87	+/-0.452	0.354	1.00	pCi/L			PCW	10/15/18	1015	1809846	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			83.4	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

Certificate of Analysis

Report Date: October 22, 2018

Company : Duke Energy Central Lab
Address : 13339 Hagers Ferry Road

Huntersville, North Carolina 28078
Contact: Peggy Kendall
Project: CCR Assessment Wells

Client Sample ID: 2018031602
Sample ID: 461113004
Matrix: Water
Collect Date: 03-OCT-18 10:10
Receive Date: 05-OCT-18
Collector: Client

Project: DUKE00601
Client ID: DUPO006

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting													
GFPC, Ra228, Liquid "As Received"													
Radium-228		0.439	+/-0.267	0.397	1.00	pCi/L			JXC9	10/16/18	0954	1810346	1
Rad Radium-226													
Lucas Cell, Ra226, liquid "As Received"													
Radium-226	U	0.229	+/-0.192	0.250	1.00	pCi/L			PCW	10/10/18	0900	1809846	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			92	(15%-125%)

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration

Lc/LC: Critical Level
PF: Prep Factor
RL: Reporting Limit
SQL: Sample Quantitation Limit

Certificate of Analysis

Report Date: October 22, 2018

Company : Duke Energy Central Lab
Address : 13339 Hagers Ferry Road

Huntersville, North Carolina 28078
Contact: Peggy Kendall
Project: CCR Assessment Wells

Client Sample ID: 2018031603
Sample ID: 461113005
Matrix: Water
Collect Date: 03-OCT-18 10:56
Receive Date: 05-OCT-18
Collector: Client

Project: DUKE00601
Client ID: DUPO006

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting													
GFPC, Ra228, Liquid "As Received"													
Radium-228	U	-0.0428	+/-0.380	0.696	1.00	pCi/L			JXC9	10/16/18	0954	1810346	1
Rad Radium-226													
Lucas Cell, Ra226, liquid "As Received"													
Radium-226	U	0.127	+/-0.152	0.242	1.00	pCi/L			PCW	10/10/18	0900	1809846	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			91.2	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

Certificate of Analysis

Report Date: October 22, 2018

Company : Duke Energy Central Lab
Address : 13339 Hagers Ferry Road

Huntersville, North Carolina 28078
Contact: Peggy Kendall
Project: CCR Assessment Wells

Client Sample ID: 2018031604
Sample ID: 461113006
Matrix: Water
Collect Date: 03-OCT-18 10:56
Receive Date: 05-OCT-18
Collector: Client

Project: DUKE00601
Client ID: DUPO006

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting													
GFPC, Ra228, Liquid "As Received"													
Radium-228	U	-0.0746	+/-0.302	0.579	1.00	pCi/L			JXC9	10/16/18	1002	1810346	1
Rad Radium-226													
Lucas Cell, Ra226, liquid "As Received"													
Radium-226		0.456	+/-0.286	0.360	1.00	pCi/L			PCW	10/10/18	0900	1809846	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			88.2	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

Certificate of Analysis

Report Date: October 22, 2018

Company :	Duke Energy Central Lab
Address :	13339 Hagers Ferry Road Huntersville, North Carolina 28078
Contact:	Peggy Kendall
Project:	CCR Assessment Wells

Client Sample ID:	2018031605	Project:	DUKE00601
Sample ID:	461113007	Client ID:	DUPO006
Matrix:	Water		
Collect Date:	03-OCT-18 11:04		
Receive Date:	05-OCT-18		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting													
GFPC, Ra228, Liquid "As Received"													
Radium-228	U	0.229	+/-0.298	0.508	1.00	pCi/L			JXC9	10/16/18	1003	1810346	1
Rad Radium-226													
Lucas Cell, Ra226, liquid "As Received"													
Radium-226		0.540	+/-0.336	0.398	1.00	pCi/L			PCW	10/10/18	0935	1809846	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			89.1	(15%-125%)

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

Certificate of Analysis

Report Date: October 22, 2018

Company : Duke Energy Central Lab
Address : 13339 Hagers Ferry Road

Huntersville, North Carolina 28078
Contact: Peggy Kendall
Project: CCR Assessment Wells

Client Sample ID: 2018031606
Project: DUKE00601
Sample ID: 461113008
Client ID: DUPO006
Matrix: Water
Collect Date: 03-OCT-18 11:34
Receive Date: 05-OCT-18
Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting													
GFPC, Ra228, Liquid "As Received"													
Radium-228	U	-0.0359	+/-0.228	0.447	1.00	pCi/L			JXC9	10/16/18	1003	1810346	1
Rad Radium-226													
Lucas Cell, Ra226, liquid "As Received"													
Radium-226		1.19	+/-0.413	0.355	1.00	pCi/L			PCW	10/10/18	0935	1809846	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			89.4	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Lc/LC: Critical Level
PF: Prep Factor
RL: Reporting Limit
SQL: Sample Quantitation Limit

Certificate of Analysis

Report Date: October 22, 2018

Company : Duke Energy Central Lab
Address : 13339 Hagers Ferry Road

Huntersville, North Carolina 28078
Contact: Peggy Kendall
Project: CCR Assessment Wells

Client Sample ID: 2018031607
Sample ID: 461113009
Matrix: Water
Collect Date: 03-OCT-18 11:45
Receive Date: 05-OCT-18
Collector: Client

Project: DUKE00601
Client ID: DUPO006

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting													
GFPC, Ra228, Liquid "As Received"													
Radium-228	U	0.0886	+/-0.199	0.361	1.00	pCi/L			JXC9	10/16/18	1003	1810346	1
Rad Radium-226													
Lucas Cell, Ra226, liquid "As Received"													
Radium-226		1.35	+/-0.549	0.641	1.00	pCi/L			PCW	10/10/18	0935	1809846	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			87.5	(15%-125%)

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Lc/LC: Critical Level
PF: Prep Factor
RL: Reporting Limit
SQL: Sample Quantitation Limit

Certificate of Analysis

Report Date: October 22, 2018

Company : Duke Energy Central Lab
Address : 13339 Hagers Ferry Road

Huntersville, North Carolina 28078
Contact: Peggy Kendall
Project: CCR Assessment Wells

Client Sample ID:	2018031608	Project:	DUKE00601
Sample ID:	461113010	Client ID:	DUPO006
Matrix:	Water		
Collect Date:	03-OCT-18 11:55		
Receive Date:	05-OCT-18		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting													
GFPC, Ra228, Liquid "As Received"													
Radium-228	U	0.0712	+/-0.205	0.379	1.00	pCi/L			JXC9	10/16/18	1003	1810346	1
Rad Radium-226													
Lucas Cell, Ra226, liquid "As Received"													
Radium-226		0.322	+/-0.236	0.308	1.00	pCi/L			PCW	10/10/18	0935	1809846	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			84.6	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

Certificate of Analysis

Report Date: October 22, 2018

Company :	Duke Energy Central Lab
Address :	13339 Hagers Ferry Road Huntersville, North Carolina 28078
Contact:	Peggy Kendall
Project:	CCR Assessment Wells

Client Sample ID:	2018031609	Project:	DUKE00601
Sample ID:	461113011	Client ID:	DUPO006
Matrix:	Water		
Collect Date:	03-OCT-18 12:02		
Receive Date:	05-OCT-18		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting													
GFPC, Ra228, Liquid "As Received"													
Radium-228	U	0.212	+/-0.252	0.424	1.00	pCi/L			JXC9	10/16/18	1003	1810346	1
Rad Radium-226													
Lucas Cell, Ra226, liquid "As Received"													
Radium-226		0.468	+/-0.323	0.408	1.00	pCi/L			PCW	10/10/18	0935	1809846	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			87.4	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

Certificate of Analysis

Report Date: October 22, 2018

Company :	Duke Energy Central Lab
Address :	13339 Hagers Ferry Road Huntersville, North Carolina 28078
Contact:	Peggy Kendall
Project:	CCR Assessment Wells

Client Sample ID:	2018031610	Project:	DUKE00601
Sample ID:	461113012	Client ID:	DUPO006
Matrix:	Water		
Collect Date:	03-OCT-18 12:50		
Receive Date:	05-OCT-18		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting													
GFPC, Ra228, Liquid "As Received"													
Radium-228	U	0.153	+/-0.224	0.388	1.00	pCi/L			JXC9	10/16/18	1003	1810346	1
Rad Radium-226													
Lucas Cell, Ra226, liquid "As Received"													
Radium-226	U	0.191	+/-0.176	0.243	1.00	pCi/L			PCW	10/10/18	0935	1809846	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			92.5	(15%-125%)

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

Certificate of Analysis

Report Date: October 22, 2018

Company : Duke Energy Central Lab
Address : 13339 Hagers Ferry Road

Huntersville, North Carolina 28078
Contact: Peggy Kendall
Project: CCR Assessment Wells

Client Sample ID:	2018031611	Project:	DUKE00601
Sample ID:	461113013	Client ID:	DUPO006
Matrix:	Water		
Collect Date:	03-OCT-18 12:02		
Receive Date:	05-OCT-18		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting													
GFPC, Ra228, Liquid "As Received"													
Radium-228	U	0.100	+/-0.216	0.387	1.00	pCi/L			JXC9	10/16/18	1003	1810346	1
Rad Radium-226													
Lucas Cell, Ra226, liquid "As Received"													
Radium-226	U	0.269	+/-0.295	0.485	1.00	pCi/L			PCW	10/10/18	0935	1809846	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			90.1	(15%-125%)

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

GEL LABORATORIES LLC
2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: October 22, 2018

Page 1 of 2

Duke Energy Central Lab
13339 Hagers Ferry Road
Huntersville, North Carolina

Contact: **Peggy Kendall**

Workorder: **461113**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gas Flow										
Batch 1810346										
QC1204131248 461113008 DUP										
Radium-228	U	-0.0359	U	0.277	pCi/L	N/A		N/A	JXC9	10/16/18 10:03
	Uncertainty	+/-0.228		+/-0.255						
QC1204131249 LCS										
Radium-228	5.74			5.63	pCi/L		98.2	(75%-125%)		10/16/18 10:04
	Uncertainty			+/-0.660						
QC1204131247 MB										
Radium-228			U	0.019	pCi/L					10/16/18 10:03
	Uncertainty			+/-0.221						
Rad Ra-226										
Batch 1809846										
QC1204130114 461113001 DUP										
Radium-226		1.81		1.27	pCi/L	35*		(0%-20%)	PCW	10/15/18 10:15
	Uncertainty	+/-0.454		+/-0.362						
QC1204130116 LCS										
Radium-226	26.0			20.6	pCi/L		79.1	(75%-125%)		10/15/18 10:15
	Uncertainty			+/-1.50						
QC1204130113 MB										
Radium-226			U	0.00	pCi/L					10/15/18 10:15
	Uncertainty			+/-0.225						
QC1204130115 461113001 MS										
Radium-226	130	1.81		118	pCi/L		89.4	(75%-125%)		10/10/18 10:10
	Uncertainty	+/-0.454		+/-8.40						

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

**	Analyte is a Tracer compound
<	Result is less than value reported
>	Result is greater than value reported
BD	Results are either below the MDC or tracer recovery is low
FA	Failed analysis.
H	Analytical holding time was exceeded

QC Summary

Workorder: **461113**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

J	Value is estimated
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
M	M if above MDC and less than LLD
M	REMP Result > MDC/CL and < RDL
N/A	RPD or %Recovery limits do not apply.
N1	See case narrative
ND	Analyte concentration is not detected above the detection limit
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UI	Gamma Spectroscopy--Uncertain identification
UJ	Gamma Spectroscopy--Uncertain identification
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h	Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

461113

1/A

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Duke Energy Analytical Laboratory
Chain of Custody & Sample Log

Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-5038

Analytical Laboratory Use Only

Order # J18100179
Matrix GW_RCRA
Samples Originating From NC_X_ SC___
Logged By
Date & Time 10/4/18 1038
2.1 Cooler Temp (C)

SAMPLE PROGRAM
Ground Water _X_ NPDES ___
Drinking Water ___ UST ___
RCRA Waste ___

Page _1_ of _1_
DISTRIBUTION
ORIGINAL to LAB, COPY to CLIENT

COC REV DATE 2/13/2018

Project Name CCR Assessment Wells- WATER
Phone
Client CCR DEP
Fax No
Business Unit:
Process:
Resp.
Project ID:
Activity ID:
Mail Code:
Waterbody:
Station: Mayo Monat

PACE
PO 5666396

GEL
PO 5616867

Customer to complete all appropriate non-shaded areas.

tration (0.45 um)	⇩	Unfiltered							⇩					
eservative	Ice	Ice	HNO₃	HNO₃										########
lume (mL)	1000	500	500	4L										
iner Type	PET	PET	HDPE	HDPE										

	Sample Description or ID	Sample Location	Collection Information Date	Time	Signature	Comp.	Grab	TDS	F, Cl, Sulfate, Alkalinity	Metals (see below)	Total Radium (228 and 226) V_GEL										Total # Containers
2018031599		CCR-209BR	10-3-18	0910			X	1	1	1	1										4
1600		CCR-210D		0912			X	1	1	1	1										4
1601		CCR-210BR		0958			X	1	1	1	1										4
1602		CCR-208BR		1010			X	1	1	1	1										4
1603		CCR-203BR		1056			X	1	1	1	1										4
1604		LMW-4		1056			X	1	1	1	1										4
1605		LMW-3		1104			X	1	1	1	1										4
1606		CCR-206D		1134			X	1	1	1	1										4
1607		CCR-204BR		1145			X	1	1	1	1										4
1608		CCR-206BR		1155			X	1	1	1	1										4
1609		CCR-205D		1202			X	1	1	1	1										4
1610		CCR-205BR		1250			X	1	1	1	1										4
																					0
																					0
																					0
																					0
1611	CCR-205D	Duplicate		1202			X	1	1	1	1										4
1612		Field Blank		1158			X		1	1											2
					TOTAL			2	3	3	2	0	0	0	0	0	0	0	0	0	10

Customer to sign & date below

Relinquished By	Date/Time	Accepted By:	Date/Time
Matt Craig	10/3/18		10/3/18 / 1832
ShipTeam			10/4/18 720
	10/4/18 1400		10/4 1400
Seal/Locked By	**Date/Time**	**Sealed/Lock Opened By**	**Date/Time**
	10/4/18		10/5/18 1335

Comments
ELEMENTS by ICP_MS (TRM): As, Be, Cd, Cr, Co, Mo, Pb, Se, Sb, Tl(LL)
ELEMENTS by ICP (TRM): Ba, Ca, B, Li, Na, K, Mg Hg by 7470

Customer, important: please indicate desired turnaround

Requested Turnaround
14 Days 15BD
*7 Days ___
* 48 Hr ___
*Other ___
* Add. Cost Will Apply

Total 54

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: DUKE	**SDG/AR/COC/Work Order:** 461113 / 461114
Received By: ZKW	**Date Received:** 10-5-18
Carrier and Tracking Number	Circle Applicable: FedEx Express FedEx Ground UPS Field Services [✓ Courier] Other

Suspected Hazard Information	**Yes**	**No**	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#:
COC/Samples marked or classified as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 [✓ CPM] mR/Hr **Classified as: Rad 1 Rad 2 Rad 3**
Is package, COC, and/or Samples marked HAZ?		✓	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

	Sample Receipt Criteria	**Yes**	**NA**	**No**	**Comments/Qualifiers (Required for Non-Conforming Items)**
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*		✓		Preservation Method: Wet Ice Ice Packs Dry ice [✓ None] Other: *all temperatures are recorded in Celsius **TEMP:** 2°
4	Daily check performed and passed on IR temperature gun?	✓			**Temperature Device Serial #:** IR3-18 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?	✓			Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?			✓	If Yes, Are Encores or Soil Kits present? Yes___ No___ (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes___ No___ N/A___ (If unknown, select No) VOA vials free of headspace? Yes___ No___ N/A___ Sample ID's and containers affected:
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Sample ID's affected:
11	Number of containers received match number indicated on COC?			✓	Sample ID's affected: received CCR 205D Dup.
12	Are sample containers identifiable as GEL provided?			✓	
13	COC form is properly signed in relinquished/received sections?	✓			

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials AM Date 10/8/18 Page 1 of 1

GL-CHL-SR-001 Rev 5

List of current GEL Certifications as of 22 October 2018

State	Certification
Alaska	17−018
Arkansas	88−0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH−0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−15−00283, P330−15−00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA180011
Maryland	270
Massachusetts	M−SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE−OS−26−13
Nevada	SC000122018−1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R−158
Oklahoma	9904
Pennsylvania NELAP	68−00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235−18−13
Utah NELAP	SC000122018−27
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

Radiochemistry
Technical Case Narrative
Duke Energy Carolinas, LLC (DUPC)
SDG #: J18100179
Work Order #: 461113

Product: **GFPC, Ra228, Liquid**
Analytical Method: EPA 904.0/SW846 9320 Modified
Analytical Procedure: GL-RAD-A-063 REV# 2
Analytical Batch: 1810346

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
461113001	2018031599
461113002	2018031600
461113003	2018031601
461113004	2018031602
461113005	2018031603
461113006	2018031604
461113007	2018031605
461113008	2018031606
461113009	2018031607
461113010	2018031608
461113011	2018031609
461113012	2018031610
461113013	2018031611
1204131247	Method Blank (MB)
1204131248	461113008(2018031606) Sample Duplicate (DUP)
1204131249	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: **Lucas Cell, Ra226, liquid**
Analytical Method: EPA 903.1 Modified
Analytical Procedure: GL-RAD-A-008 REV# 15
Analytical Batch: 1809846

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
461113001	2018031599
461113002	2018031600

461113003	2018031601
461113004	2018031602
461113005	2018031603
461113006	2018031604
461113007	2018031605
461113008	2018031606
461113009	2018031607
461113010	2018031608
461113011	2018031609
461113012	2018031610
461113013	2018031611
1204130113	Method Blank (MB)
1204130114	461113001(2018031599) Sample Duplicate (DUP)
1204130115	461113001(2018031599) Matrix Spike (MS)
1204130116	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Duplication Criteria between QC Sample and Duplicate Sample

The Sample and the Duplicate, (See Below), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with the value listed below.

Sample	Analyte	Value
1204130114 (2018031599DUP)	Radium-226	RPD 35* (0.00%-20.00%) RER 1.56 (0-3)

Technical Information

Recounts

Samples 1204130113 (MB), 1204130114 (2018031599DUP), 1204130116 (LCS), 461113001 (2018031599), 461113002 (2018031600) and 461113003 (2018031601) were recounted to verify sample results. Recounts are reported.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

I/A

Page 75 of 75

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Duke Energy Analytical Laboratory
Chain of Custody & Sample Log

Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-5038

Analytical Laboratory Use Only

Order # J18100179
Matrix GW_RCRA
Logged By Q
Date & Time 10/4/18 1038
Cooler Temp (C) 2.1
Samples Originating From NC_X_ SC__

SAMPLE PROGRAM
Ground Water _X_
Drinking Water ___
NPDES ___
UST ___
RCRA Waste ___

Page _1_ of _1_
DISTRIBUTION
ORIGINAL to LAB, COPY to CLIENT

COC REV DATE 2/13/2018

Customer Must Complete

Project Name: CCR Assessment Wells- WATER
Phone
Client: CCR DEP
Fax No
Business Unit:
Process:
Resp.
Project ID:
Activity ID:
Mail Code:
Waterbody:
Station: Mayo Mon

PACE
PO 5666396

GEL
PO 5616867

Customer to complete all appropriate non-shaded areas.

						Filtration (0.45 um)	⇩		Unfiltered				⇩								
						Preservative	Ice	Ice	HNO3	HNO3											########
						Volume (mL)	1000	500	500	4L											
						Container Type	PET	PET	HDPE	HDPE											
	Sample Description or ID	Collection Information																			
	Sample Location	Date	Time	Signature	Comp.	Grab	TDS	F, Cl, Sulfate, Alkalinity	Metals (see below)	Total Radium (228 and 226) V_GEL											Total # Containers
2018031599	CCR-209BR	10-3-18	0910			x	1	1	1	1											4
1600	CCR-210D	↓	0912	↓		X	1	1	1	1											4
1601	CCR-210BR		0958			X	1	1	1	1											4
1602	CCR-208BR		1010			X	1	1	1	1											4
1603	CCR-203BR		1056			X	1	1	1	1											4
1604	LMW-4		1056			X	1	1	1	1											4
1605	LMW-3		1104			X	1	1	1	1											4
1606	CCR-206D		1134			X	1	1	1	1											4
1607	CCR-204BR		1145			X	1	1	1	1											4
1608	CCR-206BR		1155			X	1	1	1	1											4
1609	CCR-205D		1202			X	1	1	1	1											4
1610	CCR-205BR		1250			X	1	1	1	1											4
																					0
																					0
																					0
																					0
1611	CCR-205D Duplicate		1202			X	1	1	1	1											4
1612	Field Blank	↓	1158	↓		X		1	1												2
				TOTAL			2	3	3	2	0	0	0	0	0	0	0	0	0		10

Customer to sign & date below

Relinquished By Matt Craig	Date/Time 10/3/18/	Accepted By: J Watts	Date/Time 10/3/18 / 1832
Relinquished By ShipTeam	Date/Time	Accepted By:	Date/Time 10/4/18 7:20
Relinquished By	Date/Time 10/4/18 1420	Accepted By: Chad Fort PAK	Date/Time 10/4 1400
Seal/Locked By	Date/Time 10/4/18	Sealed/Lock Opened By	Date/Time

Comments
ELEMENTS by ICP_MS (TRM): As, Be, Cd, Cr, Co, Mo, Pb, Se, Sb, Tl(LL)
ELEMENTS by ICP (TRM): Ba, Ca, B, Li, Na, K, Mg
Hg by 7470

Customer, important: please indicate desired turnaround

Requested Turnaround
14 Days 15BD
*7 Days ___
* 48 Hr ___
*Other ___
* Add. Cost Will Apply

Total ~~10~~ 54

Bednarcik Direct AGO Cross Ex. 11
Docket No. E-2, Sub 1219A

Hart Exhibit 55
Docket No. E-2, Sub 1219

OFFICIAL COPY

Oct 02 2020

I/A ADVANCED GeoServices
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THE ELM CONSULTING GROUP INTERNATIONAL LLC

ENVIRONMENTAL AUDIT IN SUPPORT OF THE COURT APPOINTED MONITOR

H.B. Robinson Facility
Hartsville, South Carolina

March 2019

Final Report Issued To:

Duke Energy and the Court Appointed Monitor

Prepared By:

Advanced GeoServices Corp.
and
The Elm Consulting Group International LLC

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1.0 INTRODUCTION

Advanced GeoServices Corp. (AGC) and The Elm Consulting Group International LLC (Elm) (collectively, the Audit Team) are conducting environmental compliance audits (the Audits) of certain coal combustion residuals (CCR) management locations owned or operated by Duke Energy Business Services LLC, Duke Energy Carolinas, LLC, and Duke Energy Progress, Inc. (collectively, Duke Energy). The Audits are being conducted under the direction of Mr. Benjamin Wilson, the Court Appointed Monitor (CAM), pursuant to an order issued by the U.S. District Court, Eastern District of North Carolina, in case numbers 5:15-CR-62-H, 5:15-CR-67-H, and 5:15-CR-68-H.

The scope of the Audits is set forth in the plea agreements entered into by Duke Energy and the United States in the above-referenced cases, the court's judgments in these cases, and a written Audit scoping document agreed to by Duke Energy and the United States.

1.1 BACKGROUND INFORMATION FOR THE H.B. ROBINSON AUDIT

The subject of this report is the Audit completed at Duke Energy's H.B. Robinson Facility located in Hartsville, Darlington County, South Carolina (Robinson Facility). The on-site portion of the Audit was conducted on January 16-17, 2019 for a total of two days on-site. The on-site Audit Team consisted of two senior auditors, who were supported by a third team member assisting from off-site:

• Mr. Christopher Reitman, AGC	Project Director, Audit Team Leader, Sr. Subject Matter Expert (on-site)
• Mr. Joseph Cotier, CPEA, ELM	Sr. Environmental Auditor (on-site)
• Mr. Bernie Beegle, AGC	Sr. Subject Matter Expert (off-site)

During the on-site audit, the facility was represented by:

- Mr. Dan Zakary, CCP System Owner
- Mr. Tim Hill, General Manager, Carolinas West Region, CCP Operations and Maintenance
- Mr. Kevin Kirkley, CCP Project Management
- Mr. Scott Saunders, CCP Engineering & Closure Engineering
- Ms. Tina Woodward, EHS CCP Permitting and Compliance
- Ms. Bryson Sheetz, EHS CCP Waste & Groundwater
- Ms. Tammy Jett, EHS CCP Waste & Groundwater (by phone)
- Mr. Randy Hart, Regulatory Affairs
- Mr. Michael Phillips, Manager, Environmental Rover, EHS CCP Compliance
- Ms. Danelle Watson, EHS CCP Environmental Field Support
- Mr. William Hamilton, Station Environmental Field Support
- Mr. Ken Bazilio, EHS CCP H&S Field Support
- Mr. Keith Higgins, EHS CCP Compliance

1.2 FACILITY OVERVIEW

The Duke Energy Robinson Facility is located at 3581 West Entrance Road, Hartsville, South Carolina. The Robinson Facility is located along the west side of Lake Robinson and first began power generation in 1960. One coal-fired power plant (Unit 1) was operated from 1960 to 2012 and was demolished in 2016.

According to the Robinson Facility Operations and Maintenance Manual and Duke Energy personnel, coal combustion has not occurred since Unit 1 was shut down in October 2012. Since there is no coal combustion, there was no ash generation while the Audit Team was on-site.

Current power generation at the Robinson Facility is provided by a nuclear reactor. Operations and activities associated with these operations were not reviewed as part of the Audit.

1.2.1 Ash Management Activities

The Robinson Facility Operations and Maintenance Manual and Duke Energy personnel indicated that ash generated by coal combustion was placed in only the following two discrete areas on-site:

- **Ash Basin (approx. 72.0 acres)** – An estimated 2,400,000 cubic yards of ash currently exists within the Ash Basin (HDR, July 15, 2016). Ash is not currently being placed into the Ash Basin and Duke Energy personnel indicated that there are no plans to place additional ash in the Ash Basin. The Ash Basin does intermittently receive water discharged from the adjacent Darlington County combustion turbine facility's oil/water separator. Any combustion turbine water discharged into the Ash Basin would be discharged to Lake Robinson via Outfall 005. However, according to Duke Energy personnel, over the last four years all of the discharged water has infiltrated into the ground and no water has been discharged from the Ash Basin to Outfall 005. The Ash Basin includes an Ash Stack which exists within the basin limits. Duke Energy received South Carolina Department of Health and Environmental Control (DHEC) approval of a Closure Plan for the Ash Basin on May 30, 2017.

- **1960 Fill Area, also referred to as LOLA (25.0 acres) –** The 1960 Fill Area has been inactive for at least 40 years and contains an estimated 276,000 cubic yards of material overlain by 19,600 cubic yards of cover (AMEC, August 21, 2014). Removal and restoration of the 1960 Fill Area is complicated by the presence of overhead electric transmission lines and an underground sewer pipe.

Duke Energy entered a Consent Agreement (15-23-HW) with DHEC dated July 15, 2015 which requires consolidation of materials in the 1960 Fill Area and placement of the materials in the proposed on-site Class 3 Landfill which was under construction at the time of the Audit. Excavation and transport of the ash will commence upon receipt of the Cell 1 certification from DHEC which Duke Energy anticipates receiving during the first quarter of 2020.

Duke Energy also plans on addressing the Ash Basin closure by excavating the ash and disposing it in the proposed on-site Class 3 Landfill. The landfill, to be located to the northwest of the Ash Basin, was under construction at the time of the Audit. Duke Energy received a Class 3 Landfill permit on October 6, 2017 and submitted a Permit Modification Package in December 2018 to reduce the landfill footprint size. Duke Energy stated after the audit that the updated permit was received on February 1, 2019. Duke Energy is anticipating the construction certification for Cell 1 in the first quarter of 2020, at which time Duke will be able to begin placing ash and CCR materials in Cell 1.

1.2.2 Environmental Permits and Programs

The Robinson Facility operates under the following environmental permits and programs:

- **National Pollutant Discharge Elimination System (NPDES) Wastewater Permitting** – DHEC issued NPDES Permit No. SC0002925 on March 8, 2007, with an effective date of May 1, 2007 and an expiration date of April 30, 2011. A timely NPDES permit renewal application was submitted to DHEC on October 28, 2010 and received by DHEC on November 1, 2010. Per the DHEC letter acknowledging the permit renewal application, authorization to discharge under Permit No. SC0002925 continues pursuant to Section 122.6 of SC Regulation 61-9.

As it relates to ash and ash management activities, the permit covers Outfall 001. This is the main outfall from the Robinson Facility discharge canal that leads to Lake Robinson. Several internal discharges flow to Outfall 001, including:

- Outfall 005 - Ash transport waters (this is the outfall from the Robinson Facility ash basin).

A modification to the NPDES permit renewal application was submitted to DHEC on January 11, 2017 requesting permit coverage for seeps S-1, S-2, S-3, and S-4, all of which discharge via Outfall 005. Note that Outfall 005 and S-1 are located in close proximity and the flows are comingled before flowing through Outfall 005 and eventually into Robinson Lake via Outfall 001. Duke Energy received email confirmation from DHEC on January 13, 2017 that all flows east of the Main Dam that drain to the catch basin and Outfall 005 are covered under NPDES Permit. No. SC0002925. This approval covers all four seeps. Duke Energy has not identified any additional seeps since completion of the Audit in January 2018.

On October 3, 2018, DHEC contacted the Robinson Facility to inquire about the Discharge Monitoring Report (DMR) for discharges at the Robinson Facility during June 2018; the June DMR had not been received by DHEC. Duke Energy submitted an email copy to DHEC by email on October 3, 2018 with a hardcopy submitted on October 4, 2018. On November 2, 2018, DHEC issued a Notice of Violation (NOV) to Duke Energy for failing to submit the June 2018 DMR. In Duke Energy’s reply to DHEC, dated November 13, 2018, it was explained that Robinson Facility staff had inadvertently filed the DMR and not sent it to DHEC. According to Duke Energy, there has been no follow-up by DHEC since the submittal of Duke Energy’s response.

The adjacent Darlington County combustion turbine facility operates an oil/water separator which discharges treated water to a drain connected to the Robinson Facility Ash Basin, which ultimately discharges via Outfall 005. However, as previously noted, according to Duke Energy personnel, over the last four years all of the discharged water has infiltrated into the ground and no water has been discharged from the Ash Basin to Outfall 005. A December 16, 2015 email from DHEC to Duke Energy approved the Robinson Facility's request to connect the oil/water separator drain line to the Ash Basin.

The NPDES permit also requires groundwater monitoring for seven compliance wells. Four wells, MW-1, MW-2, MW-3 and MW-4, were included with the issuance of the permit in 2007. In 2014, MW-1, MW-2, MW-3 and MW-4 were replaced and re-established in a deeper monitoring zone due to the lack of water in the original wells. The new deeper wells were renamed MW-1R, MW-2R, MW-3R and MW-4R. An additional three groundwater monitoring wells (MW-5, MW-6 and MW-7) are being monitored in accordance with the permit at the request of DHEC. The water from these wells is analyzed for a select list of field parameters and metals identified in the NPDES permit, as well as sulfate, on a semi-annual basis.

- **NPDES Stormwater Construction Permitting** – DHEC issues coverage for stormwater discharges associated with construction activity under the State Stormwater General Permit for Construction Activities, No. SCR100000. There is no local authority (i.e., County) permit required to be issued for stormwater construction activities in Darlington County. The Robinson Facility has one active stormwater construction permit associated with CCR management. The CCR related project is described below:

  - DHEC Permit No. SCR10BQ32 for Closure Project activities was issued on June 12, 2017 and covers activities related to development of an on-site landfill and excavation and closure of the 1960 Fill Area on 135 acres. The Permit was modified on December 4, 2018 to add 4.9 acres, bringing the total area under control to 139.9 acres. The Audit Team observed that tree removal, ground disturbance activities and excavation and grading associated with landfill construction had commenced and were ongoing during the 2019 Audit.

- **Spill Prevention, Control and Countermeasure (SPCC) Plan** – The SPCC Plan Amendment No. 24 was implemented by Duke Energy in December 2018. The SPCC Plan covers oil storage across the entire Robinson Facility. Based on documentation reviewed and activities observed by the Audit Team, it appeared that the SPCC regulations were not specifically applicable to Ash Basin management activities at the time of the Audit.

- **Title V Permitting** – DHEC issued Title V Permit No. TV-0820-0002 with an effective date of July 1, 2015 and an expiration date of June 30, 2020. Ash Basin management is addressed under the requirement to control emissions of fugitive dust in Section M.4.

- **Tier II Reporting** – Hazardous chemicals inventory reporting on Tier II for 2017 was completed and submitted on February 16, 2018.

- **CCR Rule –** The Ash Basin is subject to the CCR Rule because the Robinson Facility currently produces electricity via a nuclear reactor. A summary of CCR submittals completed by Duke Energy is provided on Table 1.

A CCR groundwater monitoring well network of 14 wells plus nine (9) characterization wells installed during 2018 has been established at the Ash Basin. On February 6, 2018, Duke Energy posted on its public website the CCR Annual Groundwater Monitoring and Corrective Action Report, dated January 10, 2018, for the Ash Basin.

On March 14, 2018, Duke Energy provided notice on Duke Energy's public website that the Ash Basin is now in the CCR assessment monitoring program due to statistically significant increases over the background values of the Appendix III parameters. On December 14, 2018, Duke Energy provided notice on Duke Energy's public website that the following CCR Rule Appendix IV constituents were detected at levels above the applicable Groundwater Protection Standard (GWPS).

- Arsenic
- Lithium
- Radium 226 and 228 combined

Duke Energy was continuing to implement the groundwater assessment process prescribed by the CCR Rule at the time of the Audit.

On November 7, 2018, Duke Energy provided notice on Duke Energy's public website that the Ash Basin did not meet specific location restrictions under the CCR Rule. The Ash Basin did not meet the restrictions for placement above the uppermost aquifer. Failure to meet this restriction requires the Ash Basin Operator to cease placement of CCR in the basin by October 31, 2020. The CCR regulations also require waste flows to be terminated. The final closure plan for the Ash Basin calls for excavation and disposal of the ash in a proposed Class 3 Landfill which is being constructed on Robinson Facility property to the northwest of the Ash Basin.

There are no coal ash regulations covering the management of the 1960 Fill Area and it is not covered by the CCR Rule since it is not an active landfill, ash basin, or CCR pile. However, as previously noted, Duke Energy entered a Consent Agreement (15-23-HW) with DHEC dated July 15, 2015, which requires consolidation of materials in the 1960 Fill Area and placement of the materials in a proposed on-site Class 3 landfill.

1.2.3 Dam Background Information and Other Structural Permits and Approvals

The 72-acre Ash Basin is comprised of a 49-acre basin which contains a 23-acre dry ash storage area near the upstream (western) side of the Ash Basin. The Ash Basin was reportedly formed via the construction of a dam across an unnamed tributary to the nearby Black Creek. The Ash Basin began receiving ash in the mid-1970s and continued to receive ash until coal power generation activities were terminated in October 2012. Based upon available data, ash thickness within the basin ranges from 11 feet along the northern side of the basin to 53 feet in the middle portion of the basin. The calculated ash volume reported in the most recent annual report is 1,500 acre-feet (about 2,400,000 cubic yards), including the dry ash stack on the upslope western side of the basin. During the Audit, no water was observed in the basin and Duke Energy personnel reported that there is generally no water in the basin except for minor temporary ponding during storm events. The State ID for the dam is D3514. The most recent annual inspection of the dam was completed on May 2, 2018 by Duke Energy Coal Combustion Products (CCP) Engineering and an inspection report was issued on July 31, 2018. The report notes that "[n]o conditions were observed during the field inspection nor identified by existing engineering analysis that represent an unsafe structural stability concern requiring immediate action."

The state completed an inspection of the Ash Basin dam on October 31, 2017 and issued their inspection report on January 23, 2018. The report noted the Ash Basin was in fair condition and the status would be updated to satisfactory if seismic studies regarding the Ash Basin conditions were provided to the state. Seismic studies have been completed and Duke Energy noted to the Audit Team they were forwarded to the state and the conclusions of the studies were posted on their public website. However, as of the date of the Audit, the state has not issued a written change in the dam condition.

1.2.4 Audit Update and 2018 Observations

As noted in the 2018 Audit Report, Duke Energy received a Class 3 Landfill Permit on October 6, 2017 from DHEC. Duke Energy started tree clearing for the landfill on October 25, 2017 with completion on December 15, 2017.

Over the last year the landfill construction and ash excavation bid event were completed. Construction of the Cell 1 and the sedimentation ponds associated with landfill construction had commenced and were ongoing during the 2019 Audit. The landfill construction activities are expected to be completed in the fourth quarter of 2019 or first quarter of 2020. Cell 2 construction is planned immediately following completion of Cell 1. It may also be noted that Duke Energy submitted plans to DHEC in December 2018 for modifications to the Landfill Permit associated with reducing the Landfill Permit and capacity. Ash from both the Ash Basin and 1960 Fill Area will be deposited in the landfill.

Excavation of ash in the 1960 Ash Fill Area had also been started at the time of the Audit. The phased approach is being completed to allow coordination with landfill completion activities, construction of a sewer re-route, Duke Energy Transmission requirements, Plant Outages, and Customer power demands between 2019 and 2022. The initial phase includes excavation of a small section of ash on the southeast side of the 1960 Fill Area and stockpiling on the eastern side, until the landfill is prepared and permitted to accept the excavated ash. This initial excavation phase was observed by the Audit Team. A small volume of additional material still required excavation and confirmation sampling in the observed area.

2.0 AUDIT SCOPE AND SUBJECT MATTER

The Audit was completed in accordance with the court documents and the Audit scoping document agreed to by Duke Energy and the United States. A description of the scope is provided as Attachment A. The Audit included a review of ash management activities including aspects of generation that affect the nature of the waste streams from the point of generation into surface impoundments or ash management basins, landfills, and/or storage piles. The Audit focused on the activities at the facility since the date of the last Audit, which was January 17-18, 2018.

3.0 AUDIT FINDINGS

The Audit Finding for the Robinson Facility is described below.

3.1 EXCEEDANCE OF STATE GROUNDWATER STANDARDS

Requirement – The Robinson Facility's NPDES permit requires Duke Energy to monitor seven (7) groundwater monitoring wells and report sampling results to DHEC. The groundwater beneath the Robinson Facility is designated as Class GB (underground source of drinking water) under South Carolina's Water Classification Standards, Regulation 61-68. Regulation 61-68 further provides that "all ground waters of the State shall be protected to a quality consistent with the use associated with the classes described herein. Further, the Department may require the owner or operator of a contaminated site to restore the ground water quality to a level that maintains and supports the existing and classified uses…" The applicable water quality standards for Class GB Ground Waters for inorganic chemicals are the maximum contaminant levels (MCLs) as set forth in Regulation 61-58.5, the State Primary Drinking Water Regulations. The MCL for arsenic is 10 micrograms/liter (µg/L) and the MCL for combined radium 226/228 is 5 picocuries per Liter (pCi/L).

Finding – In September 2014, DHEC issued a Notice of Violation (NOV) to Duke Energy alleging a violation of the state groundwater Class GB standards. The NOV stated that monitoring data from groundwater under the Robinson Facility's Ash Basin detected arsenic in groundwater that is designated as an underground source of drinking water at concentrations above the Class GB groundwater standard of 10 micrograms per liter (µg/L). DHEC determined that the presence of arsenic above the Class GB standard violated the requirement to protect the quality of groundwater to a quality consistent with Class GB groundwater. The NOV stated that DHEC was requiring Duke Energy to investigate and remediate, as appropriate, the groundwater at the facility that exceeds the Class GB standard.

The Audit Team observed that Duke Energy appears to be in substantial compliance with the remedial requirements as stated in the 2014 NOV. In response to the 2014 NOV that Duke Energy received from DHEC, Duke Energy submitted: (1) a Work Plan for groundwater assessment activities in October 2014, (2) an Assessment Report that characterized the extent of groundwater contamination in February 2015, and (3) the Closure Plan, submitted on November 13, 2015 and approved by DHEC on May 30, 2017, which provides Duke Energy's plan to permanently close the Robinson Ash Basin as a remedial action measure. In early February 2018, DHEC approved Duke Energy's Assessment Report and proposed corrective action to close the Robinson Ash Basin.

However, based on the Audit Team's review of the facility's 2018 NPDES groundwater sampling data, water beneath and near the Ash Basin continues to exceed the South Carolina Class GB Water Classification Standard for arsenic. Recent sampling in well MW-7 identified arsenic concentrations of 84.6 µg/L during the January 2018 sampling event and 95.6 µg/L of arsenic during the July 2018 sampling event. These concentrations are above the arsenic MCL of 10 µg/L. The arsenic MCL was also exceeded in CCR wells CCR-02S, CCR-02D, CCR-03S, and CCR-04S based on groundwater data from May 2018 at the Ash Basin. Note that the Audit Team included a similar finding in the 2016 and the 2017 Audit Reports related to exceedances of the South Carolina groundwater standard for arsenic based on the 2016 and the 2017 groundwater data that the Audit Team reviewed.

Sampling results also indicate that there is a combined radium exceedance of the groundwater protection standard in the wells identified as part of the CCR Rule monitoring program. The MCL for combined radium 226/228 of 5 pCi/L was exceeded during the May 2018 event in CCR wells CCR-03S (6.36 pCi/L), CCR-04D (7.86 pCi/L), CCR-05D (7.66 pCi/L), and CCR-06D (15.1 pCi/L) at the Ash Basin. The locations of the NPDES monitoring wells and CCR monitoring wells referenced above are provided on figures in Attachment B, along with the groundwater monitoring data. The statistical analysis of groundwater samples completed by Duke Energy under the CCR Rule, and the lack of radium 226/228 in background wells, indicates that the Ash Basin is the source of the identified radium. Duke Energy stated that they intend to continue CCR groundwater sampling and assessment activities to characterize the nature, extent, and source of the combined radium groundwater plume.

As determined by DHEC, the presence of arsenic and combined radium 226/228 above the Class GB standard violates the requirement to protect the quality of groundwater to a quality consistent with Class GB groundwater; therefore, the Audit Team has included these issues as a Finding.

The Audit Team further notes that per a July 2015 Consent Agreement between Duke Energy and DHEC, Duke Energy is required to "assess and address any release or threat of release of Coal Combustion Residuals or other pollutants from the [Robinson Facility] to the environment." The assessments required by the agreement include an assessment of any groundwater contamination at the facility and an evaluation of the need for groundwater remediation. If remedial actions are necessary, then upon DHEC's approval of a Remedial Plan, Duke Energy must fully implement and complete the remedy. Once the remedy is completed, as confirmed by DHEC, the Department will provide Duke Energy a written approval of completion that includes a covenant not to sue for the remedial actions covered by and completed in accordance with the Consent Agreement.

The CAM has advised the Audit Team that the Audit Scope does not include an evaluation of compliance with the July 2015 Consent Agreement with DHEC.

4.0 OPEN LINES OF INQUIRY

Open Lines of Inquiry are items identified by the Audit Team while on-site that, due to limited available information or the need for additional research, could not be determined as being in compliance or out of compliance. There were no Open Lines of Inquiry for the Robinson Facility Audit.

5.0 AUDIT APPROACH

5.1 ON-SITE ACTIVITIES

During its time on-site, the Audit Team conducted an opening conference with facility personnel to discuss the scope of work and the plan for accomplishing necessary tasks while at the Robinson Facility. A site tour of the coal ash management and program support areas was subsequently completed. Following the tour, the Audit Team conducted a review of pertinent files, interviews with facility representatives, and verification of facility activities related to the Environmental Compliance Plans (ECPs), written programs, and permits. A debrief was conducted each Audit day to advise the facility representatives of Audit progress, Open Lines of Inquiry, possible Audit Findings, and needs for the next day. At the completion of the Audit, the Audit Team led a verbal discussion of draft Audit findings with facility representatives.

5.2 STANDARDS OF PRACTICE

The fieldwork portion of the Audit was conducted on January 16-17, 2019, with compliance reporting commencing May 14, 2015, the date of the court's judgments. The Audit focused on the activities at the facility since the date of the last Audit, which was January 17-18, 2018. The Audit was based on:

- Physical inspections of the facility;
- Examination of selected administrative and operating records made available by facility staff at the Audit Team's request;
- Interviews and discussions with key facility management and staff; and

- Verification procedures designed to assess the facility's application of, and adherence to, terms of the probation, environmental laws and regulations, and site policies and procedures. In addition, the Audit Team reviewed the facility's adherence to good management practices.

The Audit followed established audit protocols and procedures. It should be understood that the Audit consisted of evaluating a sample of practices and was conducted over a short period of time. Efforts were made toward sampling major facets of environmental performance during the period under review. This method is intended to uncover major system deficiencies and the Audit may not have identified all potential problems.

To support the overall independence of the Audit process, the Audit included an auditing professional certified by the Board of Environmental, Health and Safety Auditor Certifications (BEAC). BEAC is an accredited professional certification board that issues the Certified Professional Environmental Auditor (CPEA) designation to qualified auditors. Under BEAC, auditor independence is a key criterion for the implementation of an effective third-party audit program. The Audit was implemented in accordance with the standards related to auditor independence.

The process by which the Audit was conducted was consistent with the general state of the art of environment auditing and the best professional judgment of the Audit Team. To conduct the Audit, the team implemented a formal approach, drawing on process guidance from both BEAC and the Auditing Roundtable (AR) guidance documents. Guidance documents included:

- *Standards for the Professional Practice of Environmental, Health and Safety Auditing*. Prepared by the Board of Environmental, Health and Safety Auditor Certifications, 2008.

- ISO 19011:2002 – Guidelines for Quality and/or Environmental Management Systems Auditing. Prepared by the International Organization for Standardization, 2002.

- Standard for the Design and Implementation of an Environmental, Health and Safety Audit Program. Prepared by The Auditing Roundtable, Inc., 1995.

- Minimum Criteria for the Conduct of Environmental, Health and Safety Audits. Prepared by The Auditing Roundtable, Inc.

5.3 REPRESENTATIVE SAMPLING

When confronted with a large population of data to review or equipment to inspect, the Audit Team employed representative sampling techniques to evaluate records over the Audit period requested, and as necessary, for physical inspection of some types of common equipment. The sample size for record reviews or equipment inspections required professional judgment.

The Audit Team's judgement considered the following:

- The outcome of the evaluation of the records sampled. If problems are found in the representative sample, more records may need to be examined to evaluate compliance status.
- Potential for or severity of non-compliance.
- The general appearance and observed practices of certain operating areas.
- Information obtained during an interview that indicates a potential problem.
- Other specific information or guidance from the CAM.
- Time available during the Audit.

The Audit Team also employed the following types of sampling techniques, depending upon the characteristics of a specific population:

- Random sampling – every item has an equal chance of being selected.
- Interval sampling – select every nth item, (e.g., every third manifest in chronological order as contained in facility files).
- Block sampling – auditor uses his/her judgment to select a specific block of items, (e.g., petroleum storage tank inspections from April to October).
- Stratified sampling – population is divided into groups, which are then sampled through random or judgmental techniques.

TABLE

TABLE 1
Ash Basin - Plans and Reports Posted by Duke Energy Under the CCR Rule

Document Name	Category	Release Date
Notice of Groundwater Protection Standard Exceedance 2018	Groundwater Monitoring and Corrective Action	12/14/2018
Annual Fugitive Dust Control Report 2018	Operating Criteria	12/05/2018
Wetlands	Location Restriction	11/07/2018
Unstable Areas	Location Restriction	11/07/2018
Seismic Impact Zones	Location Restriction	11/07/2018
Fault Areas	Location Restriction	11/07/2018
Placement Above Uppermost Aquifer	Location Restriction	11/07/2018
Emergency Action Plan Robinson Ash Pond	Design Criteria	10/01/2018
CCR Annual Surface Impoundment Inspection Report 2018	Operating Criteria	08/16/2018
Annual Meeting with Local Emergency Responders 2018	Design Criteria	05/23/2018
Notice of Establishment of an Assessment Monitoring Program - Robinson Ash Pond	Groundwater Monitoring and Corrective Action	03/14/2018
CCR Annual Groundwater Monitoring and Corrective Action Report	Groundwater Monitoring and Corrective Action	02/06/2018
Robinson Inundation Maps	Design Criteria	01/25/2018
2017 Annual CCR Fugitive Dust Control Report-Robinson	Operating Criteria	11/29/2017
Groundwater Sampling and Analysis Program Selection of Statistical Method Certification-Robinson Ash Basin	Groundwater Monitoring and Corrective Action	11/06/2017
Groundwater Monitoring System Certification	Groundwater Monitoring and Corrective Action	10/25/2017
CCR Annual Surface Impoundment Inspection Report 2017 Revision 1	Operating Criteria	10/19/2017
CCR Annual Surface Impoundment Inspection Report 2017	Operating Criteria	08/17/2017
Annual Meeting with Local Emergency Responders 2017	Design Criteria	05/24/2017
Annual Fugitive Dust Control Report 2016	Operating Criteria	12/05/2016

TABLE 1
(Continued)

Initial Structural Stability Assessment	Design Criteria	11/16/2016
Initial Factor of Safety Assessment	Design Criteria	11/15/2016
Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016
Inflow Design Flood Control System	Operating Criteria	11/03/2016
History of Construction	Design Criteria	10/25/2016
Initial Hazard Classification Assessment Certification	Design Criteria	10/12/2016
Existing Liner Design Criteria	Design Criteria	10/11/2016
Annual Surface Impoundment Report 2016	Operating Criteria	08/11/2016
Coal Combustion Residual Fugitive Dust Control Plan	Operating Criteria	11/12/2015
Annual Surface Impoundment Report (Initial)	Operating Criteria	02/12/2016

*This summary of reports was downloaded on January 17, 2019

ATTACHMENT A

ATTACHMENT A
AUDIT SCOPE

A-1 GENERAL AUDIT SCOPE ITEMS

The general Audit scope items included:

- Review and evaluation of documentation for maintenance and repair of structures and equipment used for coal ash disposal.
- Review and evaluation of documentation of modifications, failures, leaks, damage, disrepair and other problems at the coal ash management units.
- Review and evaluation of documentation of efforts to correct failures, leaks, damage, disrepair and other problems where they determine that employee/contractor actions were likely a primary or contributing cause to a compliance finding.
- Review and evaluation of documentation of communication of the items above within the organization.
- Review and evaluation of documentation associated with the specific environmental compliance items described below and laws, regulations, and policies associated these items.
- Review of compliance with administrative aspects and regulatory submissions related to coal ash management-specific regulations, including the Coal Combustion Residuals Rule found in 40 CFR Part 257, Subpart D.

More specific items which were addressed in the audits to comply with the general Audit scope are described below.

A-2 SPECIFIC COMPLIANCE WITH OTHER PROVISIONS OF THE PLEA AGREEMENTS

The following items related to specific items in the plea agreements were reviewed as part of the Audit:

1. Determine whether Defendants have opened, expanded, or reopened any coal ash or coal ash wastewater impoundment and, if so, verify that they are lined and do not allow unpermitted discharges of coal ash or coal ash wastewater to waters of the United States.

2. Review citations/notices of violation/notices of deficiency related to violations of federal, state, or local law to assure that they have been properly relayed to the court and, as appropriate under the plea agreements, determine their materiality.

3. Note any observations made during the audit that cause concern regarding the assets and/or security available to the Defendants to meet the obligations imposed by the court's judgment.

A-3 GENERAL ENVIRONMENTAL COMPLIANCE SUBJECT AREAS

The following items related to general environmental compliance were reviewed as part of the Audit:

1. Assess all waste streams from Duke Energy facilities with coal ash impoundments. Review Duke Energy's processes, procedures, and practices, as well as compliance with those processes, procedures, and practices, for:
    a. identifying waste streams (especially, but not limited to, waste streams with discharge points into bodies of water);
    b. identifying and communicating any modifications or changes, or potential modifications or changes, to waste streams;
    c. ensuring proper handling/disposal of waste streams;
    d. identifying, preventing, and mitigating any risks or hazards that could affect waste streams and/or the disposal of waste streams; and,
    e. ensuring proper permitting for waste streams.

For Item 1.d., the Audit Team evaluated such risk/hazard issues where there were compliance findings associated with waste streams.

2. Review and evaluate documentation of:
    a. maintenance and repair of structures and equipment related to coal ash disposal;
    b. modification of the coal ash impoundments and related pollution prevention equipment and structures;
    c. failures, leaks, damage, disrepair, and other problems;
    d. communication of the information described in a-c within the organization; and,
    e. efforts to correct failures, leaks, damage, disrepair, and other problems.

3. Assess the employees responsible for inspection, maintenance, and repair of coal ash basins and related structures and equipment. The assessment included an assessment of the workloads of such employees to assure that Duke Energy's facilities are adequately staffed. These assessments were made where the Audit Team determined that employee/contractor actions were likely a primary or contributing cause to a compliance finding.

4. Review the results and recommendations of any other audits (internal or external/state-mandated) and assess Duke Energy's implementation of those recommendations.

5. Review and assess Duke Energy's processes, procedures, and practices for identifying, communicating, and addressing problems and potential problems at its coal ash basins (leaks, unpermitted discharges, etc.).

6. Review and assess Duke Energy's policies, procedures, practices, and equipment for handling emergency releases from its coal ash basins and evaluate the personnel with duties in such situations.

7. Verify that Duke Energy is complying with its NPDES wastewater and stormwater permits, as well as other relevant environmental permits. This would include verifying Duke Energy's timely submission of permit applications, permit renewal applications, and responses to requests for additional information from the relevant regulatory authority.

8. Review and assess any actions or measures Duke Energy has undertaken to assure accountability and prevent recurrences when problems and/or failures occur (e.g., disciplinary actions, re-training, revision to policies and procedures, etc.). This review was conducted where the Audit Team determined that employee/contractor actions were likely a primary or contributing cause to a compliance finding.

9. Review and assess compliance with the following environmental regulations, as applicable to the management of coal ash:

a.	Wastewater Discharges	40 CFR 122; R61-9.122
b.	Stormwater Discharges	40 CFR 122.26; R61-9.122.26
c.	Groundwater Quality Standards	SC R. 61-58, 61-68, 61-69
d.	Hazardous Waste Management	R61-79.260, R61-79.261
e.	Oil Pollution Prevention	40 CFR Part 112
f.	Dam Safety	Dam & Reservoir Safety 72-1 to72-9
g.	Air Pollution (Title V)	R. 61-62.70
h.	Hazardous Chemical Reporting (Tier II)	40 CFR Part 370.

Reviews also included an analysis of overall compliance and the status and security of the asset. Subsequent reviews of individual facilities will evaluate the movement towards compliance. The Audit did not include an evaluation of compliance with the July 2015 Consent Agreement with DHEC.

A-4 LIST OF PERMITS AND PROGRAMS DEEMED TO BE EITHER DIRECTLY OR INDIRECTLY IN SUPPORT OF ASH MANAGEMENT

During the Audit, the Audit Team reviewed a variety of written programs developed and implemented by Duke Energy and facility staff. State-issued permits and supporting documentation relative to environmental programs and geotechnical aspects of ash basin management were also requested and reviewed.

Requested documents, pertinent to management of ash in basins, landfills, ponds, etc., were outlined in the pre-Audit questionnaire for the facility and included, but were not limited to:

1. The Compliance Register developed for eTRAC for the facility.

2. The Duke Energy Operations Manual for the facility.

3. A site plan, site map, or aerial photo which shows the entire facility and key features of the facility, including NPDES outfalls associated environmental monitoring locations, storage tanks, etc.

4. Most recent two (2) years of maintenance, monitoring, and inspection records for each coal ash/CCR basin (just the physical inspections, not the groundwater records).

5. A “Phase 1 and Phase 2” summary of ash basin conditions prepared by an outside consultant.

6. Duke Energy’s permitting plans for addressing ash impoundments and landfills at the facility.

7. Applicable pages from the Duke Energy basin-by-basin coal ash/CCR project tracking document for the facility.

8. Original basin/landfill/coal ash management unit construction records.

9. Documentation of changes to these units.

10. Coal ash unit construction permit application and approval.

11. State-issued permits and application materials for permits associated with coal ash/CCR management (including, e.g., dam permits).

12. Any currently effective state order, consent order, or similar state directive that addresses coal ash/CCR management at the facility.

13. Records required to be maintained in the facility's operating record under the federal CCR regulation and/or any state CCR regulatory program.

14. Records of off-site ash shipments from May 2015 forward.

15. Stormwater permit application and approval for all outfalls.

16. Industrial wastewater (NPDES/POTW) permit application and approval for all outfalls/discharges.

17. Industrial stormwater permit, sampling and monitoring records, and any corrective action plans (last two (2) years).

18. Stormwater Pollution Prevention Plan(s).

19. Landfill operating permit(s) with maintenance and monitoring requirements.

20. Landfill leak detection and groundwater monitoring records from the last two (2) years along with any workplans that describe the rationale for the monitoring system at the facility.

21. Air permits and applications for coal ash units and ancillary operations.

22. Testing and monitoring records completed to comply with air permits.

23. Any notices of violation associated with the coal ash/CCR management activities received over the last two (2) years.

24. Spill Prevention Control and Countermeasure Plan.

25. Community Right-to-Know:
    a. Lists of hazardous chemicals and/or MSDSs submitted;
    b. Tier I or II reports; and
    c. Form R (toxic release inventory) reports.

26. Copies of communications with employees and the public regarding availability of toll-free hotline and electronic mail inbox for reporting suspected environmental violations.

27. Management Systems:
    a. List of responsible party(ies) for each environmental activity.
    b. All environmental-related training records.
    c. All environmental policies and procedures.
    d. Organization chart.
    e. Site diagram identifying storage areas, tanks, etc.

ATTACHMENT B-1

NPDES MONITORING WELL LOCATIONS AND MONITORING RESULTS

I/A

Robinson Groundwater Programs

Ash Basin Groundwater Monitoring

- NPDES Network
  - 7 Wells (1 background, 5 down gradient, 1 near nuclear plant)
  - Sampled and reported semi-annually (January and July)
  - Sampling since at least 1995
- Parameters:
  - MCLs - Arsenic, Cadmium & Chromium
  - SMCLs - Copper, Sulfate, Zinc, TDS, pH
- 2018 Results (summary of SC R. 61-68 standards exceedances)
  - **pH** (low pH; all wells except MW-6 and MW-7, including background)
  - **Sulfate** (MW-4R)
  - **Arsenic** (MW-7)
    - MW-5: 6.74 ug/L (07/18)
    - MW-7: 84.6 ug/L (01/18), 95.6 ug/L (07/18)
- Arsenic NOV Assessment Report approval received February 2018

WELL ID	NORTHING	EASTING	TOP OF CASING ELEVATION
MW-1R	939582.35	2249216.74	267.99
MW-2R	941299.50	2252877.87	256.62
MW-3R	939418.88	2252615.48	280.25
MW-4R	935207.61	2254495.38	227.92
MW-5	939998.24	2252712.41	265.99
MW-6	940407.92	2252768.03	257.72
MW-7	940805.40	2252844.88	245.61

I/A

7015 1660 0000 4945 2710

Serial #: 18-0005 **Distribution #:** DHEC

Outgoing Correspondence Checklist

Activity	Initials
Prior to Mailing	
Check the headers on additional pages and attachments for consistent letter number and number of pages.	CC
Check the listed attachments against actual attachment titles.	CC
Verify that the Original Letter Date Stamped and Signed?	CC
Check the quality of original. Are the pages clean, numbered, dates and numbers not rolled to next line, attachments in order, and no hand written notes left on the pages.	CC
Check the distribution requirements	CC
Is the original copied? Verify that the copies have the correct page count.	CC
Check the quality of the copies (Two sided if required).	CC
Verify that the outgoing envelopes correctly labeled.	CC
Verify that the outgoing envelopes have correct postage.	CC
After Mailing	
Make the electronic copy.	CC
Send the electronic copy, if applicable.	CC
Post the electronic copy to file (N: Drive).	CC
Send copy to QA vault.	CC
Update the Letter Log	CC
Enter commitments into Action Tracking, if applicable. Note AT # on Signature Traveler.	NA
Place the validation file in the file cabinet.	CC
Create source file folder for submittal in 'Letters' folder.	CC

bc: John Krakuszeski
John Williamson
Greg Hartzer
Gary Sain
William Hamilton
Wellie Gilbert
John Gainey
John Toepfer – Duke Corp Environmental
W. Reid Garrett – Duke Environmental Water Resources
Nathan Craig – Duke Environmental Services
Tina Woodward – Duke Energy NPDES Compliance
State directory
Vault

I/A

DUKE ENERGY

John A. Krakuszeski
H. B. Robinson Steam
Electric Plant Unit 2
Plant Manager

Duke Energy
3581 West Entrance Road
Hartsville, SC 29550

O: 843 951 1201
F: 843 951 1319
John.Krakuszeski@duke-energy.com

FEB 21 2018

Serial: RNP-RA/18-0005

R61-9.122

South Carolina Department of Health and Environmental Control (SCDHEC)
Bureau of Water/Water Monitoring, Assessment, and Protection Division
Groundwater Quality Section
2600 Bull Street
Columbia, South Carolina 29201

H. B. ROBINSON STEAM ELECTRIC PLANT, SITE ID #16-00568
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
PERMIT NUMBER SC0002925

FIRST SEMIANNUAL GROUNDWATER MONITORING REPORT FOR 2018

Ladies and Gentlemen:

In accordance with Part II, Paragraph L.4.a.(2) of NPDES Permit No. SC0002925, effective May 1, 2007, Duke Energy Progress, LLC hereby submits the First Semiannual Groundwater Monitoring Report of 2018 for H. B. Robinson Steam Electric Plant (HBRSEP). The attachment provides this report.

The current SC0002925 NPDES permit for HBRSEP expired on April 30, 2011. On October 28, 2010, Progress Energy Carolinas, Inc. submitted its renewal application for this permit. By letter dated March 2, 2011, SCDHEC acknowledged receipt of this application. This letter authorized continued discharge of effluent to surface waters, pursuant to Section 122.6 of South Carolina Regulation 61-9, and stated this permit will remain fully effective and enforceable pending issuance of a new permit. Please contact William Hamilton, Senior EHS Professional, at (843) 951-1231 with any questions.

Certification

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Sincerely,

John A. Krakuszeski

John A. Krakuszeski
Plant Manager
H. B. Robinson Steam Electric Plant, Unit 2

JAK/cac

Attachment

c: South Carolina Department of Health and Environmental Control

I/A

South Carolina Department of Health and Environmental Control
Attachment to Serial: RNP-RA/18-0005
28 Pages (including this cover page)

H. B. ROBINSON STEAM ELECTRIC PLANT

FIRST SEMIANNUAL GROUNDWATER MONITORING REPORT FOR 2018

I/A

D H E C
PROMOTE PROTECT PROSPER

Groundwater Monitoring Report

SC0002925	
Permit Number	

Facility: H. B. Robinson Steam Electric Plant
Address: 3581 West Entrance Road
City: Hartsville State: South Carolina
County: Darlington Zipcode: 29550
Site I.D. #: 16-00568

Date Sampled				Date Analyzed		
01	03	2018		01	03	2018
Month	Day	Year		Month	Day	Year

Lab Name: Duke Energy Analytical
SC Lab Certification No.: 99005 / 99005001

PARAMETERS		**WELL NUMBERS**						
Name	Units	1R	2R	3R	4R	5	6	7
Depth to Water	FT.	26.71	30.25	50.82	19.69	36.94	29.91	18.94
Water Elevation	FT.	241.28	226.37	229.43	208.23	229.05	227.81	226.67
Water Temperature	C	12.5	16.4	15.1	14.4	11.1	16.8	19.0
Specific Conductivity	uS/cm	24.0	31.0	234.0	519.8	171.2	139.6	121.3
pH	S.U.	4.7	5.6	6.3	3.0	6.4	6.7	6.9
Sulfate - IC	mg/L							
Arsenic, Total	ug/L							
Cadmium, Total - PQL	ug/L							
Chromium, Total	ug/L							
Copper, Total	ug/L							
Zinc, Total	ug/L							
Total Dissolved Solids	mg/L							
Turbidity	NTU	5.3	7.7	9.9	6.7	0.6	4.2	6.0

(Type or Print) Telephone: (843) 951-1201

Authorized Release By: John A. Krakuszeski - H.B. Robinson Plant Manager Date: John A. Krakuszeski

DHEC 2110 (05/1999)

I/A

D H E C

PROMOTE PROTECT PROSPER

Groundwater Monitoring Report

SC0002925

Permit Number

Facility: H. B. Robinson Steam Electric Plant
Address: 3581 West Entrance Road
City: Hartsville State: South Carolina
County: Darlington Zipcode: 29550
Site I.D. #: 16-00568

Date Sampled		
01	03	2018
Month	Day	Year

Date Analyzed		
01	04	2018
Month	Day	Year

Lab Name: Duke Energy Analytical

SC Lab Certification No.: 99005 / 99005001

PARAMETERS		WELL NUMBERS						
Name	Units	1R	2R	3R	4R	5	6	7
Depth to Water	FT.							
Water Elevation	FT.							
Water Temperature	C							
Specific Conductivity	uS/cm							
pH	S.U.							
Sulfate - IC	mg/L	5.3	8.2	94	690	27	45	15
Arsenic, Total	ug/L							
Cadmium, Total - PQL	ug/L							
Chromium, Total	ug/L							
Copper, Total	ug/L							
Zinc, Total	ug/L							
Total Dissolved Solids	mg/L	<25	<25	200	360	150	130	110
Turbidity	NTU							

(Type or Print)

Telephone: (843) 951-1201

Authorized Release By: John A. Krakuszeski - H.B. Robinson Plant Manager Date: John A. Krakuszeski

DHEC 2110 (05/1999)

I/A

DHEC
PROMOTE PROTECT PROSPER

Groundwater Monitoring Report

SC0002925
Permit Number

Facility: H. B. Robinson Steam Electric Plant
Address: 3581 West Entrance Road
City: Hartsville State: South Carolina
County: Darlington Zipcode: 29550
Site I.D. #: 16-00568

Date Sampled		
01	03	2018
Month	Day	Year

Date Analyzed		
01	10	2018
Month	Day	Year

Lab Name: Duke Energy Analytical

SC Lab Certification No.: 99005 / 99005001

PARAMETERS		WELL NUMBERS						
Name	Units	1R	2R	3R	4R	5	6	7
Depth to Water	FT.							
Water Elevation	FT.							
Water Temperature	C							
Specific Conductivity	uS/cm							
pH	S.U.							
Sulfate - IC	mg/L							
Arsenic, Total	ug/L	<1	3.43	<1	2.11	4.97	1.28	84.6
Cadmium, Total - PQL	ug/L	<1	<1	<1	<1	<1	<1	<1
Chromium, Total	ug/L	<1	<1	<1	7.63	<1	<1	<1
Copper, Total	ug/L	<1	<1	<1	102	<1	<1	<1
Zinc, Total	ug/L	<5	<5	<5	197	<5	<5	<5
Total Dissolved Solids	mg/L							
Turbidity	NTU							

(Type or Print)

Telephone: (843) 951-1201

Authorized Release By: John A. Krakuszeski - H.B. Robinson Plant Manager Date: John A. Krakuszeski

DHEC 2110 (05/1999)

I/A

DUKE ENERGY

Analytical Laboratory

13339 Hagers Ferry Road
Huntersville, NC 28078-7929
McGuire Nuclear Complex - MG03A2
Phone: 980-875-5245 Fax: 980-875-4349

Order Summary Report

Order Number: **J17120441**

Project Name: ROBINSON - GW ASH BASIN

Customer Name(s): j. Toepfer, B Moeller, C Campbell, J Gainey, W Ham

Customer Address:

Lab Contact: Peggy Kendall Phone: 980-875-5848

Report Authorized By:
(Signature)
Peggy J Kendall
Peggy Kendall

Date: 1/19/2018

Program Comments:

Please contact the Program Manager (Peggy Kendall) with any questions regarding this report.

Data Flags & Calculations:

Any analytical tests or individual analytes within a test flagged with a Qualifier indicate a deviation from the method quality system or quality control requirement. The qualifier description is found at the end of the Certificate of Analysis (sample results) under the qualifiers heading. All results are reported on a dry weight basis unless otherwise noted. Subcontracted data included on the Duke Certificate of Analysis is to be used as information only. Certified vendor results can be found in the subcontracted lab final report. Duke Energy Analytical Laboratory subcontracts analyses to other vendor laboratories that have been qualified by Duke Energy to perform these analyses except where noted.

Data Package:

This data package includes analytical results that are applicable only to the samples described in this narrative. An estimation of the uncertainty of measurement for the results in the report is available upon request. This report shall not be reproduced, except in full, without the written consent of the Analytical Laboratory. Please contact the Analytical laboratory with any questions. The order of individual sections within this report is as follows:

Job Summary Report, Sample Identification, Technical Validation of Data Package, Analytical Laboratory Certificate of Analysis, Analytical Laboratory QC Reports, Sub-contracted Laboratory Results, Customer Specific Data Sheets, Reports & Documentation, Customer Database Entries, Test Case Narratives, Chain of Custody (COC)

Certification:

The Analytical Laboratory holds the following State Certifications : North Carolina (DENR) Certificate #248, South Carolina (DHEC) Laboratory ID # 99005. Contact the Analytical Laboratory for definitive information about the certification status of specific methods.

I/A

Sample ID's & Descriptions:

Sample ID	Plant/Station	Collection Date and Time	Collected By	Sample Description
2017042155	ROBINSON	03-Jan-18 12:35 PM	Pace	MW-1R NPDES (ASH)
2017042156	ROBINSON	03-Jan-18 1:30 PM	Pace	MW-2R NPDES (ASH)
2017042157	ROBINSON	03-Jan-18 5:00 PM	Pace	MW-3R NPDES (ASH)
2017042158	ROBINSON	03-Jan-18 10:55 AM	Pace	MW-4R NPDES (ASH)
2017042159	ROBINSON	03-Jan-18 3:30 PM	Pace	MW-5 NPDES (ASH)
2017042160	ROBINSON	03-Jan-18 2:40 PM	Pace	MW-6 NPDES (ASH)
2017042161	ROBINSON	03-Jan-18 2:05 PM	Pace	MW-7 NPDES (ASH)
2017042162	ROBINSON	03-Jan-18 11:10 AM	Pace	FIELD BLANK

8 Total Samples

Technical Validation Review

Checklist:

COC and .pdf report are in agreement with sample totals and analyses (compliance programs and procedures). ☑ Yes ☐ No

All Results are less than the laboratory reporting limits. ☐ Yes ☑ No

All laboratory QA/QC requirements are acceptable. ☑ Yes ☐ No

Report Sections Included:

- ☑ Job Summary Report
- ☑ Sample Identification
- ☑ Technical Validation of Data Package
- ☑ Analytical Laboratory Certificate of Analysis
- ☐ Analytical Laboratory QC Report
- ☐ Sub-contracted Laboratory Results
- ☐ Customer Specific Data Sheets, Reports, & Documentation
- ☐ Customer Database Entries
- ☑ Chain of Custody
- ☑ Electronic Data Deliverable (EDD) Sent Separatel

Reviewed By: Peggy Kendall

Date: 1/19/2018

I/A

Certificate of Laboratory Analysis

This report shall not be reproduced, except in full.

Order # J17120441

Site: MW-1R NPDES (ASH)
Collection Date: 01/03/2018 12:35 PM

Sample #: 2017042155
Matrix: GW_WW

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
INORGANIC IONS BY IC								
Sulfate	5.3	mg/L	M2	0.5	5	EPA 300.0	01/04/2018 10:25	BGN9034
TOTAL RECOVERABLE METALS BY ICP-MS								
Arsenic (As)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 20:04	CWSPEN3
Cadmium (Cd)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 20:04	CWSPEN3
Chromium (Cr)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 20:04	CWSPEN3
Copper (Cu)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 20:04	CWSPEN3
Zinc (Zn)	< 5	ug/L		5	1	EPA 200.8	01/10/2018 20:04	CWSPEN3
TOTAL DISSOLVED SOLIDS								
TDS	< 25	mg/L		25	1	SM2540C	01/04/2018 14:00	Mgigant

I/A

Certificate of Laboratory Analysis

This report shall not be reproduced, except in full.

Order # J17120441

Site: MW-2R NPDES (ASH)
Collection Date: 01/03/2018 01:30 PM

Sample #: **2017042156**
Matrix: GW_WW

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
INORGANIC IONS BY IC								
Sulfate	8.2	mg/L		0.5	5	EPA 300.0	01/04/2018 11:15	BGN9034
TOTAL RECOVERABLE METALS BY ICP-MS								
Arsenic (As)	3.43	ug/L		1	1	EPA 200.8	01/10/2018 20:29	CWSPEN3
Cadmium (Cd)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 20:29	CWSPEN3
Chromium (Cr)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 20:29	CWSPEN3
Copper (Cu)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 20:29	CWSPEN3
Zinc (Zn)	< 5	ug/L		5	1	EPA 200.8	01/10/2018 20:29	CWSPEN3
TOTAL DISSOLVED SOLIDS								
TDS	< 25	mg/L		25	1	SM2540C	01/04/2018 14:00	Mgigant

I/A

Certificate of Laboratory Analysis

This report shall not be reproduced, except in full.

Order # J17120441

Site: MW-3R NPDES (ASH)
Collection Date: 01/03/2018 05:00 PM

Sample #: **2017042157**
Matrix: GW_WW

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
INORGANIC IONS BY IC								
Sulfate	**94**	mg/L		1	10	EPA 300.0	01/04/2018 11:32	BGN9034
TOTAL RECOVERABLE METALS BY ICP-MS								
Arsenic (As)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 20:38	CWSPEN3
Cadmium (Cd)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 20:38	CWSPEN3
Chromium (Cr)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 20:38	CWSPEN3
Copper (Cu)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 20:38	CWSPEN3
Zinc (Zn)	< 5	ug/L		5	1	EPA 200.8	01/10/2018 20:38	CWSPEN3
TOTAL DISSOLVED SOLIDS								
TDS	**200**	mg/L		25	1	SM2540C	01/04/2018 14:00	Mgigant

I/A

Certificate of Laboratory Analysis

This report shall not be reproduced, except in full.

Order # J17120441

Site: MW-4R NPDES (ASH)

Collection Date: 01/03/2018 10:55 AM

Sample #: 2017042158

Matrix: GW_WW

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
INORGANIC IONS BY IC								
Sulfate	690	mg/L		10	100	EPA 300.0	01/04/2018 11:49	BGN9034
TOTAL RECOVERABLE METALS BY ICP-MS								
Arsenic (As)	2.11	ug/L		1	1	EPA 200.8	01/10/2018 20:46	CWSPEN3
Cadmium (Cd)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 20:46	CWSPEN3
Chromium (Cr)	7.63	ug/L		1	1	EPA 200.8	01/10/2018 20:46	CWSPEN3
Copper (Cu)	102	ug/L		1	1	EPA 200.8	01/10/2018 20:46	CWSPEN3
Zinc (Zn)	197	ug/L		5	1	EPA 200.8	01/10/2018 20:46	CWSPEN3
TOTAL DISSOLVED SOLIDS								
TDS	360	mg/L		25	1	SM2540C	01/04/2018 14:00	Mgigant

I/A

Certificate of Laboratory Analysis

This report shall not be reproduced, except in full.

Order # J17120441

Site: MW-5 NPDES (ASH)

Collection Date: 01/03/2018 03:30 PM

Sample #: 2017042159

Matrix: GW_WW

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
INORGANIC IONS BY IC								
Sulfate	27	mg/L		0.5	5	EPA 300.0	01/04/2018 12:06	BGN9034
TOTAL RECOVERABLE METALS BY ICP-MS								
Arsenic (As)	4.97	ug/L		1	1	EPA 200.8	01/10/2018 21:02	CWSPEN3
Cadmium (Cd)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 21:02	CWSPEN3
Chromium (Cr)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 21:02	CWSPEN3
Copper (Cu)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 21:02	CWSPEN3
Zinc (Zn)	< 5	ug/L		5	1	EPA 200.8	01/10/2018 21:02	CWSPEN3
TOTAL DISSOLVED SOLIDS								
TDS	150	mg/L		25	1	SM2540C	01/04/2018 14:00	Mgigant

I/A

Certificate of Laboratory Analysis

This report shall not be reproduced, except in full.

Order # J17120441

Site: MW-6 NPDES (ASH)
Collection Date: 01/03/2018 02:40 PM

Sample #: 2017042160
Matrix: GW_WW

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
INORGANIC IONS BY IC								
Sulfate	45	mg/L		1	10	EPA 300.0	01/04/2018 12:22	BGN9034
TOTAL RECOVERABLE METALS BY ICP-MS								
Arsenic (As)	1.28	ug/L		1	1	EPA 200.8	01/10/2018 21:11	CWSPEN3
Cadmium (Cd)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 21:11	CWSPEN3
Chromium (Cr)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 21:11	CWSPEN3
Copper (Cu)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 21:11	CWSPEN3
Zinc (Zn)	< 5	ug/L		5	1	EPA 200.8	01/10/2018 21:11	CWSPEN3
TOTAL DISSOLVED SOLIDS								
TDS	130	mg/L		25	1	SM2540C	01/04/2018 14:00	Mgigant

I/A

Certificate of Laboratory Analysis

This report shall not be reproduced, except in full.

Order # J17120441

Site: MW-7 NPDES (ASH)
Collection Date: 01/03/2018 02:05 PM

Sample #: 2017042161
Matrix: GW_WW

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
INORGANIC IONS BY IC								
Sulfate	15	mg/L		0.5	5	EPA 300.0	01/04/2018 12:39	BGN9034
TOTAL RECOVERABLE METALS BY ICP-MS								
Arsenic (As)	84.6	ug/L		1	1	EPA 200.8	01/10/2018 21:19	CWSPEN3
Cadmium (Cd)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 21:19	CWSPEN3
Chromium (Cr)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 21:19	CWSPEN3
Copper (Cu)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 21:19	CWSPEN3
Zinc (Zn)	< 5	ug/L		5	1	EPA 200.8	01/10/2018 21:19	CWSPEN3
TOTAL DISSOLVED SOLIDS								
TDS	110	mg/L		25	1	SM2540C	01/04/2018 14:00	Mgigant

I/A

Certificate of Laboratory Analysis

This report shall not be reproduced, except in full.

Order # J17120441

Site: FIELD BLANK

Collection Date: 01/03/2018 11:10 AM

Sample #: 2017042162

Matrix: GW_WW

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
INORGANIC IONS BY IC								
Sulfate	< 0.1	mg/L		0.1	1	EPA 300.0	01/04/2018 12:56	BGN9034
TOTAL RECOVERABLE METALS BY ICP-MS								
Arsenic (As)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 21:52	CWSPEN3
Cadmium (Cd)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 21:52	CWSPEN3
Chromium (Cr)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 21:52	CWSPEN3
Copper (Cu)	< 1	ug/L		1	1	EPA 200.8	01/10/2018 21:52	CWSPEN3
Zinc (Zn)	< 5	ug/L		5	1	EPA 200.8	01/10/2018 21:52	CWSPEN3

Qualifiers:

M2 Matrix Spike and/or Matrix Spike Duplicate recovery was Low; the associated Laboratory Control Spike (LCS) was acceptable.

Level II QC Summary

Q18010086 Dionex INORGANIC IONS BY IC

Blank # 1

Parameter	Measured	Final	Units:	Dil	RDL	Relative Concentration	Qualifier
Sulfate	-0.0144	-0.0144	mg/L	1	0.1	< 1/2 RDL	-

LCS # 1

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Sulfate	4.96	4.96	mg/L	1	5	99.3	90	110	-

MS # 1

Parent Sample: J17120441 -- 2017042155

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Sulfate	3.24	16.2	mg/L	5	15	72.4	80	120	M2

MSD # 1

Parent Sample: J17120441 -- 2017042155

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	RPD	Qualifier
Sulfate	3.21	16.1	mg/L	5	15	71.4	80	120	1.37	M2

Qualifiers:

M2 Matrix Spike and/or Matrix Spike Duplicate recovery was Low; the associated Laboratory Control Spike (LCS) was acceptable.

I/A

Level II QC Summary

Q18010225 IMS_TRM TOTAL RECOVERABLE METALS BY ICP-MS

Blank # 1

Parameter	Measured	Final	Units:	Dil	RDL	Relative Concentration	Qualifier
Arsenic (As)	0.011	0.011	ug/L	1	1	< 1/2 RDL	-
Cadmium (Cd)	-0.001	-0.001	ug/L	1	1	< 1/2 RDL	-
Chromium (Cr)	0.103	0.103	ug/L	1	1	< 1/2 RDL	-
Copper (Cu)	0	0	ug/L	1	1	< 1/2 RDL	-
Zinc (Zn)	-0.014	-0.014	ug/L	1	5	< 1/2 RDL	-

LCS # 1

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Arsenic (As)	47.3	47.3	ug/L	1	50	94.7	85	115	-
Cadmium (Cd)	48.7	48.7	ug/L	1	50	97.5	85	115	-
Chromium (Cr)	49.1	49.1	ug/L	1	50	98.3	85	115	-
Copper (Cu)	47.6	47.6	ug/L	1	50	95.3	85	115	-
Zinc (Zn)	47.4	47.4	ug/L	1	50	94.7	85	115	-

MS # 1

Parent Sample: J17120441 -- 2017042155

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Arsenic (As)	45.2	45.2	ug/L	1	50	90.1	70	130	-
Cadmium (Cd)	47.1	47.1	ug/L	1	50	94	70	130	-
Chromium (Cr)	47.3	47.3	ug/L	1	50	93.9	70	130	-
Copper (Cu)	45.9	45.9	ug/L	1	50	90.9	70	130	-
Zinc (Zn)	46.3	46.3	ug/L	1	50	90.5	70	130	-

MSD # 1

Parent Sample: J17120441 -- 2017042155

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	RPD	Qualifier
Arsenic (As)	45.3	45.3	ug/L	1	50	90.4	70	130	0.41	-
Cadmium (Cd)	46.8	46.8	ug/L	1	50	93.4	70	130	0.653	-
Chromium (Cr)	47	47	ug/L	1	50	93.4	70	130	0.476	-
Copper (Cu)	45.7	45.7	ug/L	1	50	90.6	70	130	0.333	-
Zinc (Zn)	46.3	46.3	ug/L	1	50	90.4	70	130	0.102	-

I/A

Level II QC Summary

Q18010090 TDS TOTAL DISSOLVED SOLIDS

Blank # 1

Parameter	Measured	Final	Units:	Dil	RDL	Relative Concentration	Qualifier
TDS	0	0	mg/L	1	25	< 1/2 RDL	-

Duplicate # 1

Parent Sample: J17120441 -- 2017042155

Parameter	Measured	Final	Units:	Dil	RPD	Qualifier
TDS	3	3	mg/L	1	0	-

Duplicate # 2

Parent Sample: J17120441 -- 2017042156

Parameter	Measured	Final	Units:	Dil	RPD	Qualifier
TDS	17	17	mg/L	1	0	-

LCS # 1

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
TDS	103	103	mg/L	1	100	103	90	110	-

I/A

DUKE ENERGY.

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Duke Energy Analytical Laboratories
Mail Code MG03A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(980) 875-6371
Fax: (980) 875-5559

Page 15 of 15

[10]Page 1 of 1
DISTRIBUTION
ORIGINAL to LAB,
COPY to CLIENT

Revised 12/8/2017

Analytical Laboratory Use Only

LIMS # J17120441	Sample Class: GROUNDWATER	Samples Originating From	NC SC ✓
Logged By: TDC	Date & Time: 1/4/18 0750	SAMPLE PROGRAM Ground Water ___ NPDES _X_ Drinking Water ___ UST ___ RCRA Waste ___	
Vendor	Cooler Temp (C): 0.6		
PO #	[15]Preserv.: 1=HCL 2=H_2SO_4 3=HNO_3 4=Ice 5=None		
MR #	Volume		

Customer must Complete

1)Project Name: Robinson NPDES Groundwater Monitoring Program NPDES #SC0002925		2)Phone No: 980-875-5257
3)Client John Toepfer, Bryan Moeller, Chuck Campbell, John Gainey, Will Hamilton, Dee O'Brian		4)Fax No:
5)Business Unit: 50125	6)Process: BENVWT	7)Resp. To: RS01
8)Task ID:	9)Activity ID:	10)Mail Code: MG03A3

Customer to complete all appropriate NON-SHADED areas.

Customer to complete appropriate columns to right

LAB USE ONLY [11]Lab ID	[13]Sample Description or ID	[14]Collection Information Date	Time	Signature	TESTS	[18]Analyses Required [19]Grab	Metals IMS/TRM (EPA 200.8) As, Cd, Cr, Cu, Zn 3 500 ML	SULFATES 4 500 ML	TDS 4 500 ML	[22]Total # of Containers
2017042155	MW-1R - NPDES (ASH)	1/3/18	1235			X	1	1	1	3
2017042156	MW-2R - NPDES (ASH)	1/3/18	1330			X	1	1	1	3
2017042157	MW-3R - NPDES (ASH)	1/3/18	1700			X	1	1	1	3
2017042158	MW-4R - NPDES (ASH)	1/3/18	1035			X	1	1	1	3
2017042159	MW-5 - NPDES (ASH)	1/3/18	1530			X	1	1	1	3
2017042160	MW-6 - NPDES (ASH)	1/3/18	1440			X	1	1	1	3
2017042161	MW-7 - NPDES (ASH)	1/3/18	~~1445~~ 1455			X	1	1	1	3
2017042162	FIELD BLANK	1/3/18	1110			X	1	1		2

Customer to sign & date below

21)Relinquished By: /Pace	Date/Time: 1/3/18 1920	Accepted By:	Date/Time: 1/4/18 0800
21)Relinquished By:	Date/Time	Accepted By:	Date/Time
21)Relinquished By	Date/Time	Accepted By:	Date/Time
23)Seal/Locked By	Date/Time	Sealed/Lock Opened By	Date/Time
24)Comments:			

Customer, important please indicate desired turnaround

[22]Requested Turnaround
14 Days X
*7 Days ___
*48 Hr ___
*Other ___
* Add. Cost Will Apply

I/A

DUKE ENERGY
GROUNDWATER MONITORING DATA SHEET
SAMPLING PROCEDURE NO. 3175.4
FOR LOW FLOW SAMPLING

SITE NAME	ROBINSON STEAM STATION	PERMIT #	SC0002925	SITE ID	16-00568
PROJECT NAME	ASH BASIN GROUNDWATER MONITORING PROGRAM	FIELD CREW	PACE		
SAMPLING DATE(s)	☑ 3-Jan-2018 ☐ ☐ ☐	WELL/LOCATION NAME	MW-1R-(ASH)		

MONITORING WELL INFORMATION

WELL DIAMETER (in)	2.00	TOC ELEV (ft msl)	267.99	MIDDLE OF WETTED SCREEN (ft toc)			33.60
WELL DEPTH (ft TOC)	38.60	GS ELEV (ft msl)	265.32	PUMP INTAKE DEPTH (ft TOC)			38.00
SCREEN LENGTH (ft)	10	ELEV REF	0	SCREEN INTERVAL (ft TOC)	28.60	TO	38.60

EQUIPMENT INFORMATION

LEVEL METER SERIAL#	?	SAMPLING EQUIPMENT	QED T1250	TUBING DIAMETER (in)	3/8 OD

PUMP CONTROLLER SETTINGS

PRESSURE	25	(psi)	RECHARGE	9	(sec)	DISCHARGE	6 (sec)

WELL/SAMPLING INFORMATION

WELL TYPE	WELL INFORMATION	WELL USE	PURGE METHOD
STICK UP WELL	MONITORING WELL	ASH BASIN NPDES	Low Flow

SAMPLING INFORMATION

INITIAL DEPTH TO WATER (ft TOC)	26.71	WATER COLUMN (ft)		11.89
WATER ELEVATION (ft msl)	241.28	WELL VOLUME	(gal)	1.94
DETECTED ODOR	None			
ODOR STRENGTH	None			
APPEARANCE	Normal			

TIME (hh:mm)	WATER LEVEL (ft)	FLOWRATE (ml/min)	☑ TEMP (deg C)	☑ SPECIFIC COND. (umho/cm)	☑ pH (SU)	☑ TURBIDITY (NTU)	☑ ORP (mV-NHE)	☑ DISSOLVED OXYGEN (mg/L)	☐ (gal) WELL VOL (recalculates on current water level)
12:35	26.77	200	12.5	24.0	4.7	5.3	227.3	7.1	N/A

DRAW-DOWN	0.06	(ft)			CHLORINE (mg/l)
INITIAL PURGE VOLUME	0.26	(gal)	SAMPLE COLLECTED BY	DATE / TIME	
TOTAL PURGE VOLUME	1.05	(gal)	PACE	1/3/2018 @ 1235	N/A

QC By:

Sample preservation verified to pH (units): N/A

SAMPLE LIST CHECK IF SAMPLES WERE COLLECTED

☐ GAMMA ☐ H3 ☐ BORON ☐ SR 89/90 ☐ GROSS ALPH/BETA ☐ Fe 55 ☐ Ni 63 ☐ IODINE 131 ☐ SO4,CL ☐ ALPHA SPEC
☐ METALS ☐ F_ALK ☐ CO2 ☐ RSK 175 ☐ VOC's ☐ TPH-DRO
☐ METALS ☐ NO3-N, CL, F, SO4, F_ALK ☐ TDS
☐ METALS ☐ NO3-N, CL, SO4 ☐ F_ALK ☐ TDS/TSS ☐ RADIUM 226/228

WELL CONDITION	
WELL PAD	Good Condition
WELL CAPS	Well cap in good conditon
WELL CASING	Good Condition
ACCESS TO WELLS	Access cleared into well
PROTECTIVE CASING	Casing in good condition
FLUSH MOUNT WELLS	Vault in good condition
WELL TAG	Well tag in good condition
ACCESS AROUND WELL	Access cleared around well
WELL SECURITY	Well found locked
WELL LOCK CONDITION	Lock in good condition

ADDITIONAL WELL CONDITION NOTES	
Well Impacted By Silting:	NO

SAMPLING NOTES

0

I/A

DUKE ENERGY
GROUNDWATER MONITORING DATA SHEET
SAMPLING PROCEDURE NO. 3175.4
FOR LOW FLOW SAMPLING

SITE NAME	ROBINSON STEAM STATION	PERMIT #	SC0002925	SITE ID	16-00568
PROJECT NAME	ASH BASIN GROUNDWATER MONITORING PROGRAM	FIELD CREW	PACE		
SAMPLING DATE(s)	☑ 3-Jan-2018 ☐ ☐ ☐	WELL/LOCATION NAME	MW-2R-(ASH)		

MONITORING WELL INFORMATION

WELL DIAMETER (in)	2.00	TOC ELEV (ft msl)	256.62	MIDDLE OF WETTED SCREEN (ft toc)	40.52
WELL DEPTH (ft TOC)	45.52	GS ELEV (ft msl)	254.62	PUMP INTAKE DEPTH (ft TOC)	44.92
SCREEN LENGTH (ft)	10	ELEV REF	0	SCREEN INTERVAL (ft TOC)	35.52 TO 45.52

EQUIPMENT INFORMATION

LEVEL METER SERIAL#	?		
SAMPLING EQUIPMENT	QED T1250	TUBING DIAMETER (in)	3/8 OD

PUMP CONTROLLER SETTINGS

PRESSURE 20 (psi)	RECHARGE 10 (sec)	DISCHARGE 5 (sec)

WELL/SAMPLING INFORMATION

WELL TYPE	WELL INFORMATION	WELL USE	PURGE METHOD
STICK UP WELL	MONITORING WELL	ASH BASIN NPDES	Low Flow

SAMPLING INFORMATION

INITIAL DEPTH TO WATER (ft TOC)	30.25	WATER COLUMN (ft)	15.27
WATER ELEVATION (ft msl)	226.37	WELL VOLUME (gal)	2.49
DETECTED ODOR	None		
ODOR STRENGTH	None		
APPEARANCE	Normal		

TIME (hh:mm)	WATER LEVEL (ft)	FLOWRATE (ml/min)	☑ TEMP (deg C)	☑ SPECIFIC COND. (umho/cm)	☑ pH (SU)	☑ TURBIDITY (NTU)	☑ ORP (mV-NHE)	☑ DISSOLVED OXYGEN (mg/L)	☐ (gal) WELL VOL (recalculates on current water level)
13:30	30.25	200	16.4	31.0	5.6	7.7	168.4	6.0	N/A

DRAW-DOWN	0.00	(ft)				
INITIAL PURGE VOLUME	0.26	(gal)	SAMPLE COLLECTED BY	DATE	TIME	CHLORINE (mg/l)
TOTAL PURGE VOLUME	1.32	(gal)	PACE	1/3/2018 @	1330	N/A

QC By:

Sample preservation verified to pH (units): N/A

SAMPLE LIST CHECK IF SAMPLES WERE COLLECTED

☐ GAMMA ☐ H3 ☐ BORON ☐ SR 89/90 ☐ GROSS ALPH/BETA ☐ Fe 55 ☐ Ni 63 ☐ IODINE 131 ☐ SO4,CL ☐ ALPHA SPEC
☐ METALS ☐ F_ALK ☐ CO2 ☐ RSK 175 ☐ VOC's ☐ TPH DRO
☐ METALS ☐ NO3-N, CL, F, SO4, F_ALK ☐ TDS
☐ METALS ☐ NO3-N, CL, SO4 ☐ F_ALK ☐ TDS/TSS ☐ RADIUM 226/228

WELL CONDITION

WELL PAD	Good Condition
WELL CAPS	Well cap in good conditon
WELL CASING	Good Condition
ACCESS TO WELLS	Access cleared into well
PROTECTIVE CASING	Casing in good condition
FLUSH MOUNT WELLS	Vault in good condition
WELL TAG	Well tag in good condition
ACCESS AROUND WELL	Access cleared around well
WELL SECURITY	Well found locked
WELL LOCK CONDITION	Lock in good condition

ADDITIONAL WELL CONDITION NOTES

Well Impacted By Silting:	NO

SAMPLING NOTES

0

I/A

DUKE ENERGY

GROUNDWATER MONITORING DATA SHEET

SAMPLING PROCEDURE NO. 3175.4

FOR LOW FLOW SAMPLING

SITE NAME	ROBINSON STEAM STATION	PERMIT #	SC0002925	SITE ID	16-00568
PROJECT NAME	ASH BASIN GROUNDWATER MONITORING PROGRAM	FIELD CREW	PACE		
SAMPLING DATE(s)	☑ 3-Jan-2018 ☐ ☐ ☐	WELL/LOCATION NAME	MW-3R-(ASH)		

MONITORING WELL INFORMATION

WELL DIAMETER (in)	2.00	TOC ELEV (ft msl)	280.25	MIDDLE OF WETTED SCREEN (ft toc)	67.88
WELL DEPTH (ft TOC)	72.88	GS ELEV (ft msl)	277.27	PUMP INTAKE DEPTH (ft TOC)	72.28
SCREEN LENGTH (ft)	10	ELEV REF	0	SCREEN INTERVAL (ft TOC)	62.88 TO 72.88

EQUIPMENT INFORMATION

LEVEL METER SERIAL#	?	SAMPLING EQUIPMENT	QED T1250	TUBING DIAMETER (in)	3/8 OD

PUMP CONTROLLER SETTINGS

PRESSURE	35	(psi)	RECHARGE	5	(sec)	DISCHARGE	10 (sec)

WELL/SAMPLING INFORMATION

WELL TYPE	WELL INFORMATION	WELL USE	PURGE METHOD
STICK UP WELL	MONITORING WELL	ASH BASIN NPDES	Low Flow

SAMPLING INFORMATION

INITIAL DEPTH TO WATER (ft TOC)	50.82	WATER COLUMN (ft)	22.06
WATER ELEVATION (ft msl)	229.43	WELL VOLUME (gal)	3.60
DETECTED ODOR	None		
ODOR STRENGTH	None		
APPEARANCE	Normal		

TIME (hh:mm)	WATER LEVEL (ft)	FLOWRATE (ml/min)	☑ TEMP (deg C)	☑ SPECIFIC COND. (umho/cm)	☑ pH (SU)	☑ TURBIDITY (NTU)	☑ ORP (mV-NHE)	☑ DISSOLVED OXYGEN (mg/L)	☐ (gal) WELL VOL (recalculates on current water level)
17:00	50.96	200	15.1	234.0	6.3	9.9	29.4	0.3	N/A

DRAW-DOWN	0.14	(ft)				CHLORINE (mg/l)
INITIAL PURGE VOLUME	0.26	(gal)	SAMPLE COLLECTED BY	DATE	TIME	
TOTAL PURGE VOLUME	3.17	(gal)	PACE	1/3/2018	@ 1700	N/A

QC By:

Sample preservation verified to pH (units): N/A

SAMPLE LIST CHECK IF SAMPLES WERE COLLECTED

☐ GAMMA ☐ H3 ☐ BORON ☐ SR 89/90 ☐ GROSS ALPH/BETA ☐ Fe 55 ☐ Ni 63 ☐ IODINE 131 ☐ SO4,CL ☐ ALPHA SPEC
☐ METALS ☐ F_ALK ☐ CO2 ☐ RSK 175 ☐ VOC's ☐ TPH-DRO
☐ METALS ☐ NO3-N, CL, F, SO4, F_ALK ☐ TDS
☐ METALS ☐ NO3-N, CL, SO4 ☐ F_ALK ☐ TDS/TSS ☐ RADIUM 226/228

WELL CONDITION

WELL PAD	Good Condition
WELL CAPS	Well cap in good conditon
WELL CASING	Good Condition
ACCESS TO WELLS	Access cleared into well
PROTECTIVE CASING	Casing in good condition
FLUSH MOUNT WELLS	Vault in good condition
WELL TAG	Well tag in good condition
ACCESS AROUND WELL	Access cleared around well
WELL SECURITY	Well found locked
WELL LOCK CONDITION	Lock in good condition

ADDITIONAL WELL CONDITION NOTES

Well Impacted By Silting:	NO

SAMPLING NOTES

0

I/A

DUKE ENERGY
GROUNDWATER MONITORING DATA SHEET
SAMPLING PROCEDURE NO. 3175.4
FOR LOW FLOW SAMPLING

SITE NAME	ROBINSON STEAM STATION	PERMIT #	SC0002925	SITE ID	16-00568
PROJECT NAME	ASH BASIN GROUNDWATER MONITORING PROGRAM	FIELD CREW	PACE		
SAMPLING DATE(s)	☑ 3-Jan-2018 ☐ ☐ ☐	WELL/LOCATION NAME	MW-4R-(ASH)		

MONITORING WELL INFORMATION

WELL DIAMETER (in)	2.00	TOC ELEV (ft msl)	227.92	MIDDLE OF WETTED SCREEN (ft toc)	25.79
WELL DEPTH (ft TOC)	30.79	GS ELEV (ft msl)	225.29	PUMP INTAKE DEPTH (ft TOC)	30.79
SCREEN LENGTH (ft)	10	ELEV REF	0	SCREEN INTERVAL (ft TOC)	20.79 TO 30.79

EQUIPMENT INFORMATION

LEVEL METER SERIAL#	?	SAMPLING EQUIPMENT	QED T1250	TUBING DIAMETER (in)	3/8 OD		
PUMP CONTROLLER SETTINGS		PRESSURE	20 (psi)	RECHARGE	10 (sec)	DISCHARGE	5 (sec)

WELL/SAMPLING INFORMATION

WELL TYPE	WELL INFORMATION	WELL USE	PURGE METHOD
STICK UP WELL	MONITORING WELL	ASH BASIN NPDES	Low Flow

SAMPLING INFORMATION

INITIAL DEPTH TO WATER (ft TOC)	19.69	WATER COLUMN (ft)		11.10
WATER ELEVATION (ft msl)	208.23	WELL VOLUME	(gal)	1.81
DETECTED ODOR	None			
ODOR STRENGTH	None			
APPEARANCE	Normal			

TIME (hh:mm)	WATER LEVEL (ft)	FLOWRATE (ml/min)	☑ TEMP (deg C)	☑ SPECIFIC COND. (umho/cm)	☑ pH (SU)	☑ TURBIDITY (NTU)	☑ ORP (mV-NHE)	☑ DISSOLVED OXYGEN (mg/L)	☐ (gal) WELL VOL (recalculates on current water level)
16:55	19.68	100	14.4	519.8	3.0	6.7	367.3	2.8	N/A

DRAW-DOWN	0.00	(ft)				CHLORINE (mg/l)
INITIAL PURGE VOLUME	0.13	(gal)	SAMPLE COLLECTED BY	DATE	TIME	
TOTAL PURGE VOLUME	1.32	(gal)	PACE	1/3/2018 @	1655	N/A

QC By:

Sample preservation verified to pH (units): N/A

SAMPLE LIST CHECK IF SAMPLES WERE COLLECTED

☐ GAMMA ☐ H3 ☐ BORON ☐ SR 89/90 ☐ GROSS ALPH/BETA ☐ Fe 55 ☐ Ni 63 ☐ IODINE 131 ☐ SO4,CL ☐ ALPHA SPEC
☐ METALS ☐ F_ALK ☐ CO2 ☐ RSK 175 ☐ VOC's ☐ TPH-DRO
☐ METALS ☐ NO3-N, CL, F, SO4, F_ALK ☐ TDS
☐ METALS ☐ NO3-N, CL, SO4 ☐ F_ALK ☐ TDS/TSS ☐ RADIUM 226/228

WELL CONDITION

WELL PAD	Good Condition	
WELL CAPS	Well cap in good conditon	
WELL CASING	Good Condition	
ACCESS TO WELLS	Access cleared into well	
PROTECTIVE CASING	Casing in good condition	
FLUSH MOUNT WELLS	Vault in good condition	
WELL TAG	Well tag in good condition	
ACCESS AROUND WELL	Access cleared around well	
WELL SECURITY	Well found locked	
WELL LOCK CONDITION	Lock in good condition	

ADDITIONAL WELL CONDITION NOTES

Well Impacted By Silting:	NO

SAMPLING NOTES

0

I/A

DUKE ENERGY
GROUNDWATER MONITORING DATA SHEET
SAMPLING PROCEDURE NO. 3175.4
FOR LOW FLOW SAMPLING

SITE NAME	ROBINSON STEAM STATION	PERMIT #	SC0002925	SITE ID	16-00568
PROJECT NAME	ASH BASIN GROUNDWATER MONITORING PROGRAM	FIELD CREW	PACE		
SAMPLING DATE(s)	☑ 3-Jan-2018 ☐ ☐ ☐	WELL/LOCATION NAME	MW-5-(ASH)		

MONITORING WELL INFORMATION

WELL DIAMETER (in)	2.00	TOC ELEV (ft msl)	265.99	MIDDLE OF WETTED SCREEN (ft toc)	39.78
WELL DEPTH (ft TOC)	42.61	GS ELEV (ft msl)	262.81	PUMP INTAKE DEPTH (ft TOC)	42.01
SCREEN LENGTH (ft)	10	ELEV REF	0	SCREEN INTERVAL (ft TOC)	32.61 TO 42.61

EQUIPMENT INFORMATION

LEVEL METER SERIAL#	?	SAMPLING EQUIPMENT	QED T1250	TUBING DIAMETER (in)	3/8 OD

PUMP CONTROLLER SETTINGS

PRESSURE	20 (psi)	RECHARGE	5 (sec)	DISCHARGE	10 (sec)

WELL/SAMPLING INFORMATION

WELL TYPE	WELL INFORMATION	WELL USE	PURGE METHOD
STICK UP WELL	MONITORING WELL	ASH BASIN NPDES	Low Flow

SAMPLING INFORMATION

INITIAL DEPTH TO WATER (ft TOC)	36.94	WATER COLUMN (ft)	5.67
WATER ELEVATION (ft msl)	229.05	WELL VOLUME (gal)	0.92
DETECTED ODOR	None		
ODOR STRENGTH	None		
APPEARANCE	Normal		

TIME (hh:mm)	WATER LEVEL (ft)	FLOWRATE (ml/min)	☑ TEMP (deg C)	☑ SPECIFIC COND. (umho/cm)	☑ pH (SU)	☑ TURBIDITY (NTU)	☑ ORP (mV-NHE)	☑ DISSOLVED OXYGEN (mg/L)	☐ (gal) WELL VOL (recalculates on current water level)
15:30	36.95	120	11.1	171.2	6.4	0.6	24.9	0.6	N/A

DRAW-DOWN	0.01	(ft)				CHLORINE (mg/l)
INITIAL PURGE VOLUME	0.15	(gal)	SAMPLE COLLECTED BY	DATE	TIME	
TOTAL PURGE VOLUME	0.79	(gal)	PACE	1/3/2018 @	1530	N/A

QC By:

Sample preservation verified to pH (units): N/A

SAMPLE LIST CHECK IF SAMPLES WERE COLLECTED

☐ GAMMA ☐ H3 ☐ BORON ☐ SR 89/90 ☐ GROSS ALPH/BETA ☐ Fe 55 ☐ Ni 63 ☐ IODINE 131 ☐ SO4,CL ☐ ALPHA SPEC
☐ METALS ☐ F_ALK ☐ CO2 ☐ RSK 175 ☐ VOC's ☐ TPH-DRO
☐ METALS ☐ NO3-N, CL, F, SO4, F_ALK ☐ TDS
☐ METALS ☐ NO3-N, CL, SO4 ☐ F_ALK ☐ TDS/TSS ☐ RADIUM 226/228

WELL CONDITION

WELL PAD	Good Condition	
WELL CAPS	Well cap in good conditon	
WELL CASING	Good Condition	
ACCESS TO WELLS	Access cleared into well	
PROTECTIVE CASING	Casing in good condition	
FLUSH MOUNT WELLS	Vault in good condition	
WELL TAG	Well tag in good condition	
ACCESS AROUND WELL	Access cleared around well	
WELL SECURITY	Well found locked	
WELL LOCK CONDITION	Lock in good condition	

ADDITIONAL WELL CONDITION NOTES

Well Impacted By Silting: NO

SAMPLING NOTES

0

I/A

DUKE ENERGY
GROUNDWATER MONITORING DATA SHEET
SAMPLING PROCEDURE NO. 3175.4
FOR LOW FLOW SAMPLING

SITE NAME	ROBINSON STEAM STATION	PERMIT #	SC0002925	SITE ID	16-00568
PROJECT NAME	ASH BASIN GROUNDWATER MONITORING PROGRAM	FIELD CREW	PACE		
SAMPLING DATE(s)	☑ 3-Jan-2018 ☐ ☐ ☐	WELL/LOCATION NAME	MW-6-(ASH)		

MONITORING WELL INFORMATION

WELL DIAMETER (in)	2.00	TOC ELEV (ft msl)	257.72	MIDDLE OF WETTED SCREEN (ft toc)	47.97
WELL DEPTH (ft TOC)	52.97	GS ELEV (ft msl)	254.73	PUMP INTAKE DEPTH (ft TOC)	52.37
SCREEN LENGTH (ft)	10	ELEV REF	0	SCREEN INTERVAL (ft TOC)	42.97 TO 52.97

EQUIPMENT INFORMATION

LEVEL METER SERIAL#	?		
SAMPLING EQUIPMENT	QED T1250	TUBING DIAMETER (in)	3/8 OD

PUMP CONTROLLER SETTINGS

PRESSURE	28	(psi)	RECHARGE	5	(sec)	DISCHARGE	10	(sec)

WELL/SAMPLING INFORMATION

WELL TYPE	WELL INFORMATION	WELL USE	PURGE METHOD
STICK UP WELL	MONITORING WELL	ASH BASIN NPDES	Low Flow

SAMPLING INFORMATION

INITIAL DEPTH TO WATER (ft TOC)	29.91	WATER COLUMN (ft)		23.06
WATER ELEVATION (ft msl)	227.81	WELL VOLUME	(gal)	3.76
DETECTED ODOR	None			
ODOR STRENGTH	None			
APPEARANCE	Normal			

TIME (hh:mm)	WATER LEVEL (ft)	FLOWRATE (ml/min)	☑ TEMP (deg C)	☑ SPECIFIC COND. (umho/cm)	☑ pH (SU)	☑ TURBIDITY (NTU)	☑ ORP (mV-NHE)	☑ DISSOLVED OXYGEN (mg/L)	☐ (gal) WELL VOL (recalculates on current water level)
14:40	29.95	100	16.8	139.6	6.7	4.2	2.3	0.2	N/A

DRAW-DOWN	0.04	(ft)				CHLORINE (mg/l)
INITIAL PURGE VOLUME	0.13	(gal)	SAMPLE COLLECTED BY	DATE	TIME	
TOTAL PURGE VOLUME	0.39	(gal)	PACE	1/3/2018 @	1440	N/A

QC By:

Sample preservation verified to pH (units) N/A

SAMPLE LIST CHECK IF SAMPLES WERE COLLECTED

☐ GAMMA ☐ H3 ☐ BORON ☐ SR 89/90 ☐ GROSS ALPH/BETA ☐ Fe 55 ☐ Ni 63 ☐ IODINE 131 ☐ SO4,CL ☐ ALPHA SPEC

☐ METALS ☐ F_ALK ☐ CO2 ☐ RSK 175 ☐ VOC's ☐ TPH-DRO

☐ METALS ☐ NO3-N, CL, F, SO4, F_ALK ☐ TDS

☐ METALS ☐ NO3-N, CL, SO4 ☐ F_ALK ☐ TDS/TSS ☐ RADIUM 226/228

WELL CONDITION

WELL PAD	Good Condition	
WELL CAPS	Well cap in good conditon	
WELL CASING	Good Condition	
ACCESS TO WELLS	Access cleared into well	
PROTECTIVE CASING	Casing in good condition	
FLUSH MOUNT WELLS	Vault in good condition	
WELL TAG	Well tag in good condition	
ACCESS AROUND WELL	Access cleared around well	
WELL SECURITY	Well found locked	
WELL LOCK CONDITION	Lock in good condition	

ADDITIONAL WELL CONDITION NOTES

Well Impacted By Silting:	NO

SAMPLING NOTES

0

I/A

DUKE ENERGY
GROUNDWATER MONITORING DATA SHEET
SAMPLING PROCEDURE NO. 3175.4
FOR LOW FLOW SAMPLING

SITE NAME	ROBINSON STEAM STATION	PERMIT #	SC0002925	SITE ID	16-00568
PROJECT NAME	ASH BASIN GROUNDWATER MONITORING PROGRAM	FIELD CREW	PACE		
SAMPLING DATE(s)	☑ 3-Jan-2018 ☐ ☐ ☐	WELL/LOCATION NAME	MW-7-(ASH)		

MONITORING WELL INFORMATION

WELL DIAMETER (in)	2.00	TOC ELEV (ft msl)	245.61	MIDDLE OF WETTED SCREEN (ft toc)	31.88
WELL DEPTH (ft TOC)	36.88	GS ELEV (ft msl)	243.18	PUMP INTAKE DEPTH (ft TOC)	36.28
SCREEN LENGTH (ft)	10	ELEV REF	0	SCREEN INTERVAL (ft TOC)	26.88 TO 36.88

EQUIPMENT INFORMATION

LEVEL METER SERIAL#	?	SAMPLING EQUIPMENT	QED T1250	TUBING DIAMETER (in)	3/8 OD

PUMP CONTROLLER SETTINGS

PRESSURE	30	(psi)	RECHARGE	10	(sec)	DISCHARGE	5	(sec)

WELL/SAMPLING INFORMATION

WELL TYPE	WELL INFORMATION	WELL USE	PURGE METHOD
STICK UP WELL	MONITORING WELL	ASH BASIN NPDES	Low Flow

SAMPLING INFORMATION

INITIAL DEPTH TO WATER (ft TOC)	18.94	WATER COLUMN (ft)		17.94
WATER ELEVATION (ft msl)	226.67	WELL VOLUME	(gal)	2.93
DETECTED ODOR	None			
ODOR STRENGTH	None			
APPEARANCE	Normal			

TIME (hh:mm)	WATER LEVEL (ft)	FLOWRATE (ml/min)	☑ TEMP (deg C)	☑ SPECIFIC COND. (umho/cm)	☑ pH (SU)	☑ TURBIDITY (NTU)	☑ ORP (mV-NHE)	☑ DISSOLVED OXYGEN (mg/L)	☐ (gal) WELL VOL (recalculates on current water level)
14:05	18.94	200	19.0	121.3	6.9	6.0	-45.1	0.3	N/A

DRAW-DOWN	0.00	(ft)				
INITIAL PURGE VOLUME	0.26	(gal)	SAMPLE COLLECTED BY	DATE	TIME	CHLORINE (mg/l)
TOTAL PURGE VOLUME	1.05	(gal)	PACE	1/3/2018	@ 1405	N/A

QC By:		Sample preservation verified to pH (units)	N/A

SAMPLE LIST CHECK IF SAMPLES WERE COLLECTED

☐ GAMMA ☐ H3 ☐ BORON ☐ SR 89/90 ☐ GROSS ALPH/BETA ☐ Fe 55 ☐ Ni 63 ☐ IODINE 131 ☐ SO4,CL ☐ ALPHA SPEC
☐ METALS ☐ F_ALK ☐ CO2 ☐ RSK 175 ☐ VOC's ☐ TPH-DRO
☐ METALS ☐ NO3-N, CL, F, SO4, F_ALK ☐ TDS
☐ METALS ☐ NO3-N, CL, SO4 ☐ F_ALK ☐ TDS/TSS ☐ RADIUM 226/228

WELL CONDITION			ADDITIONAL WELL CONDITION NOTES	
WELL PAD	Good Condition		Well Impacted By Silting:	NO
WELL CAPS	Well cap in good conditon			
WELL CASING	Good Condition			
ACCESS TO WELLS	Access cleared into well			
PROTECTIVE CASING	Casing in good condition			
FLUSH MOUNT WELLS	Vault in good condition			
WELL TAG	Well tag in good condition			
ACCESS AROUND WELL	Access cleared around well			
WELL SECURITY	Well found locked			
WELL LOCK CONDITION	Lock in good condition			

SAMPLING NOTES

0

I/A

SOUTH CAROLINA GROUNDWATER SAMPLING SITE CHECKLIST

SITE: ROBINSON STEAM STATION
PROJECT: ASH BASIN GROUNDWATER MONITORING PROGRAM
SITE CONTACT John Toepfer, Welke Gilbert, John Gainey
WEATHER 1/3/2018 Cloudy, 34 deg F, wind 5 to 10 mph

SAMPLE DATE January 3, 2018
FIELD CREW PACE

PAGE 1 OF 1

	MW-1R ASH	MW-2R ASH	MW-3R ASH	MW-4R ASH	MW-5 ASH	MW-6 ASH	MW-7 ASH											
ACCESS TO WELLS																		
Access cleared into well	YES	YES	YES	YES	YES	YES	YES											
Access cleared around well	YES	YES	YES	YES	YES	YES	YES											
Tall grass or weeds - needs mowing																		
Road washing out / muddy / needs grading																		
Fallen tree blocking access																		
WELL DEPTH																		
Well impacted by silting	NO	NO	NO	NO	NO	NO	NO											
WELL SECURITY																		
Well found locked	YES	YES	YES	YES	YES	YES	YES											
Well found unlocked																		
WELL LOCK CONDITION																		
Lock in good condition	YES	YES	YES	YES	YES	YES	YES											
Lock rusted, difficult to open / needs replacing																		
Replaced damaged lock																		
WELL CASINGS																		
Casing in good condition	YES	YES	YES	YES	YES	YES	YES											
Damaged casing / still functional																		
Damaged casing / repair required																		
CONCRETE PADS																		
Pad in good condition	YES	YES	YES	YES	YES	YES	YES											
Minor cracks																		
Major cracks / broken / repair required																		
Undermined / washing out																		
Fire ants around concrete pad																		
WELL PROTECTIVE CASINGS																		
Casing in good condition	YES	YES	YES	YES	YES	YES	YES											
Damaged casing / still functional																		
Damaged casing / repair required																		
Broken hinge on protective lid																		
Wasp nest inside protective casing																		
Ants inside protective casing																		
WELL CAPS																		
Well cap in good conditon	YES	YES	YES	YES	YES	YES	YES											
Damaged / needs replacement																		
Replaced damaged well cap																		
FLUSH MOUNT WELLS																		
Vault in good condition	N/A	N/A	N/A	N/A	N/A	N/A	N/A											
Water inside vault																		
Vault bolt holes broken or stripped																		
Bolts stripped																		
Vault lid cracked or broken																		
WELL ID TAGS																		
Well tag in good condition	YES	YES	YES	YES	YES	YES	YES											
Well tag missing																		
Well tag damaged / illegible																		
Lacks required information - Driller Reg #																		
Lacks required information - Completion date																		
Lacks required information - Total well depth																		
Lacks required information - Depth to screen																		
Lacks required info - Casing depth / diam.																		
Lacks required information - Screen interval																		
Lacks required information - Static WL / date																		
Lacks required information - Non potable tag																		

NOTE:

I/A

ROBINSON STEAM STATION
ASH BASIN GROUNDWATER MONITORING PROGRAM
GROUNDWATER MONITORING FIELD DATA
PERMIT # SC0002925

Purge Methods

LF = Low Flow | C = Connventional | EOP = Equip. Only Purge | LO = Level Only | NP = No Purge | LF(M) = Low Flow (Mod.) | * = Applicable to LF & LF(M) Purging Only

DATE	WELL NO	WELL DEPTH (ft - TOC)	DEPTH TO WATER (ft - TOC)	WATER ELEV. (ft)	APPEARANCE	ODOR	PURGE METHOD	PUMP RATE (ml/min)	WELL VOL. (gal)	EVAC VOL. (gal)	EVAC (YES/NO)	TEMP. (deg. C)	SPECIFIC CONDUCTANCE (umho/cm)	pH (units)	TURBIDITY (NTU's)	ORP (mV-NHE)	DO (mg/L)
1/3/2018	MW-1R-(ASH)	38.60	26.71	241.28	Normal	None	LF	200.00	1.94	1.05	N/A	12.5	24.0	4.7	5.3	227.3	7.1
1/3/2018	MW-2R-(ASH)	45.52	30.25	226.37	Normal	None	LF	200.00	2.49	1.32	N/A	16.4	31.0	5.6	7.7	168.4	6.0
1/3/2018	MW-3R-(ASH)	72.88	50.82	229.43	Normal	None	LF	200.00	3.60	3.17	N/A	15.1	234.0	6.3	9.9	29.4	0.3
1/3/2018	MW-4R-(ASH)	30.79	19.69	208.23	Normal	None	LF	100.00	1.81	1.32	N/A	14.4	519.8	3.0	6.7	367.3	2.8
1/3/2018	MW-5-(ASH)	42.61	36.94	229.05	Normal	None	LF	120.00	0.92	0.79	N/A	11.1	171.2	6.4	0.6	24.9	0.6
1/3/2018	MW-6-(ASH)	52.97	29.91	227.81	Normal	None	LF	100.00	3.76	0.39	N/A	16.8	139.6	6.7	4.2	2.3	0.2
1/3/2018	MW-7-(ASH)	36.88	18.94	226.67	Normal	None	LF	200.00	2.93	1.05	N/A	19.0	121.3	6.9	6.0	-45.1	0.3

I/A

DUKE ENERGY.

John A. Krakuszeski
H. B. Robinson Steam
Electric Plant Unit 2
Plant Manager

Duke Energy
3581 West Entrance Road
Hartsville, SC 29550

O: 843 857 1201
F: 843 857 1319
John.Krakuszeski@duke-energy.com

Serial: RNP-RA/18-0051

R61-9.122

AUG 06 2018

South Carolina Department of Health and Environmental Control (SCDHEC)
Bureau of Water/Water Monitoring, Assessment, and Protection Division
Groundwater Quality Section
2600 Bull Street
Columbia, South Carolina 29201

H. B. ROBINSON STEAM ELECTRIC PLANT, SITE ID #16-00568
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
PERMIT NUMBER SC0002925

SECOND SEMIANNUAL GROUNDWATER MONITORING REPORT FOR 2018

Ladies and Gentlemen:

In accordance with Part II, Paragraph L.4.a.(2) of NPDES Permit No. SC0002925, effective May 1, 2007, Duke Energy Progress, LLC hereby submits the Second Semiannual Groundwater Monitoring Report of 2018 for H. B. Robinson Steam Electric Plant (HBRSEP). The attachment provides this report.

The current SC0002925 NPDES permit for HBRSEP expired on April 30, 2011. On October 28, 2010, Progress Energy Carolinas, Inc. submitted its renewal application for this permit. By letter dated March 2, 2011, SCDHEC acknowledged receipt of this application. This letter authorized continued discharge of effluent to surface waters, pursuant to Section 122.6 of South Carolina Regulation 61-9, and stated this permit will remain fully effective and enforceable pending issuance of a new permit. Please contact William Hamilton, Senior EHS Professional, at (843) 951-1231 with any questions.

Certification

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Sincerely,

John A. Krakuszeski

John A. Krakuszeski
Plant Manager
H. B. Robinson Steam Electric Plant, Unit 2

JAK/cac

I/A

Attachment

c: South Carolina Department of Health and Environmental Control

I/A

South Carolina Department of Health and Environmental Control
Attachment to Serial: RNP-RA/18-0051
28 Pages (including this cover page)

H. B. ROBINSON STEAM ELECTRIC PLANT

SECOND SEMIANNUAL GROUNDWATER MONITORING REPORT FOR 2018

I/A

DHEC
PROMOTE PROTECT PROSPER

Groundwater Monitoring Report

SC0002925
Permit Number

Facility: H. B. Robinson Steam Electric Plant
Address: 3581 West Entrance Road
City: Hartsville State: South Carolina
County: Darlington Zipcode: 29550
Site I.D. #: 16-00568

Date Sampled				Date Analyzed		
07	11	2018		07	11	2018
Month	Day	Year		Month	Day	Year

Lab Name: Duke Energy Analytical
SC Lab Certification No.: 99005 / 99005001

PARAMETERS		WELL NUMBERS						
Name	Units	1R	2R	3R	4R	5	6	7
Depth to Water	FT.	27.80	30.57	51.87	19.70	37.78	30.48	19.36
Water Elevation	FT.	240.19	226.05	228.38	208.22	228.21	227.24	226.25
Water Temperature	C	20.0	21.0	23.0	29.0	24.0	22.0	23.0
Specific Conductivity	uS/cm	42.0	42.0	357.0	625.0	247.0	202.0	179.0
pH	S.U.	5.08	5.35	6.05	3.10	6.14	6.50	6.67
Sulfate - IC	mg/L							
Arsenic, Total	ug/L							
Cadmium, Total - PQL	ug/L							
Chromium, Total	ug/L							
Copper, Total	ug/L							
Zinc, Total	ug/L							
Total Dissolved Solids	mg/L							
Turbidity	NTU	5.72	8.30	8.94	9.30	0.9	6.34	6.6

(Type or Print)
Telephone: (843) 951-1201

Authorized Release By: John A. Krakuszeski - H.B. Robinson Plant Manager Date: 8-6-18

DHEC 2110 (05/1999)

I/A

D H E C
PROMOTE PROTECT PROSPER

Groundwater Monitoring Report

SC0002925
Permit Number

Facility: H. B. Robinson Steam Electric Plant
Address: 3581 West Entrance Road
City: Hartsville State: South Carolina
County: Darlington Zipcode: 29550
Site I.D. #: 16-00568

Date Sampled			Date Analyzed		
07	11	2018	07	12	2018
Month	Day	Year	Month	Day	Year

Lab Name: Duke Energy Analytical
SC Lab Certification No.: 99005 / 99005001

PARAMETERS		WELL NUMBERS						
Name	Units	1R	2R	3R	4R	5	6	7
Depth to Water	FT.							
Water Elevation	FT.							
Water Temperature	C							
Specific Conductivity	uS/cm							
pH	S.U.							
Sulfate - IC	mg/L	3.1		87	490	23	38	14
Arsenic, Total	ug/L							
Cadmium, Total - PQL	ug/L							
Chromium, Total	ug/L							
Copper, Total	ug/L							
Zinc, Total	ug/L							
Total Dissolved Solids	mg/L	<25	<25	210	300	150	120	110
Turbidity	NTU							

(Type or Print) John A. Krakuszeski Telephone: (843) 951-1201

Authorized Release By: John A. Krakuszeski - H.B. Robinson Plant Manager Date: 8-6-18

DHEC 2110 (05/1999)

I/A

D H E C

PROMOTE PROTECT PROSPER

Groundwater Monitoring Report

SC0002925
Permit Number

Facility: H. B. Robinson Steam Electric Plant
Address: 3581 West Entrance Road
City: Hartsville State: South Carolina
County: Darlington Zipcode: 29550
Site I.D. #: 16-00568

Date Sampled				Date Analyzed		
07	11	2018		07	13	2018
Month	Day	Year		Month	Day	Year

Lab Name: Duke Energy Analytical

SC Lab Certification No.: 99005 / 99005001

PARAMETERS		WELL NUMBERS						
Name	Units	1R	2R	3R	4R	5	6	7
Depth to Water	FT.							
Water Elevation	FT.							
Water Temperature	C							
Specific Conductivity	uS/cm							
pH	S.U.							
Sulfate - IC	mg/L							
Arsenic, Total	ug/L	<1	3.30	<1	1.22	6.74	2.72	95.6
Cadmium, Total - PQL	ug/L	<1	<1	<1	<1	<1	<1	<1
Chromium, Total	ug/L	<1	<1	<1	4.50	<1	<1	<1
Copper, Total	ug/L	<1	<1	<1	110	<1	<1	<1
Zinc, Total	ug/L	<5	<5	<5	140	<5	<5	<5
Total Dissolved Solids	mg/L							
Turbidity	NTU							

(Type or Print) John A. Krakuszeski

Telephone: (843) 951-1201

Authorized Release By: John A. Krakuszeski - H.B. Robinson Plant Manager Date: 8-6-18

DHEC 2110 (05/1999)

I/A

D H E C
PROMOTE PROTECT PROSPER

Groundwater Monitoring Report

SC0002925
Permit Number

Facility: H. B. Robinson Steam Electric Plant
Address: 3581 West Entrance Road
City: Hartsville State: South Carolina
County: Darlington Zipcode: 29550
Site I.D. #: 16-00568

Date Sampled			Date Analyzed		
07	11	2018	07	16	2018
Month	Day	Year	Month	Day	Year

Lab Name: Duke Energy Analytical
SC Lab Certification No.: 99005 / 99005001

PARAMETERS		**WELL NUMBERS**						
Name	Units	1R	2R	3R	4R	5	6	7
Depth to Water	FT.							
Water Elevation	FT.							
Water Temperature	C							
Specific Conductivity	uS/cm							
pH	S.U.							
Sulfate - IC	mg/L		6.7					
Arsenic, Total	ug/L							
Cadmium, Total - PQL	ug/L							
Chromium, Total	ug/L							
Copper, Total	ug/L							
Zinc, Total	ug/L							
Total Dissolved Solids	mg/L							
Turbidity	NTU							

(Type or Print)

Telephone: (843) 951-1201

Authorized Release By: John A. Krakuszeski - H.B. Robinson Plant Manager Date: 8-6-18

DHEC 2110 (05/1999)

I/A

DUKE ENERGY.

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Duke Energy Analytical Laboratories
Mail Code MG03A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N.C. 28078
(980) 875-5371
Fax: (980) 875-5559

Analytical Laboratory Use Only

LIMS # J18070011

Sample Class: GROUNDWATER

Samples Originating From: NC SC ✓

SAMPLE PROGRAM
Ground Water ___
NPDES X
Drinking Water ___
UST ___
RCRA Waste ___

[19]Page 1 of 1
DISTRIBUTION
ORIGINAL to LAB,
COPY to CLIENT

Logged By:

Date & Time:

Vendor:

Cooler Temp (C):

PO #:

MR #:

1)Project Name:
Robinson NPDES Groundwater Monitoring Program
NPDES #SC0002925

2)Phone No:
980-875-5257

3)Client
John Toepfer, Bryan Moeller, Chuck Campbell,
John Gainey, Will Hamilton, Dee O'Brien

4)Fax No:

5)Business Unit: 50125

6)Process: BENVWT

7)Resp. To: RS01

8)Task ID:

9)Activity ID:

10)Mail Code: MG03A3

Customer must Complete

Customer to complete all appropriate NON-SHADED areas.

[15]Preserv.: 1=HCL 2=H_2SO_4 3=HNO_3 4=Ice 5=None

						Metals IMS/TRM (EPA 200.8) As, Cd, Cr, Cu, Zn	SULFATES	TDS
Preserv.						3	4	4
Volume						500 ML	500 ML	500 ML

LAB USE ONLY [11]Lab ID	[13]Sample Description or ID	[14]Collection Information Date	Time	Signature	[16]Grab	[18]Analyses Required: Metals IMS/TRM (EPA 200.8) As, Cd, Cr, Cu, Zn	SULFATES	TDS
2018020252	MW-1R - NPDES (ASH)	7/11/18	1035	EHS	X	1	1	1
2018020253	MW-2R - NPDES (ASH)	7/11/18	1110	EHS	X	[illegible]	1	1
2018020254	MW-3R - NPDES (ASH)	7/11/18	1158	EHS	X	1	1	1
2018020255	MW-4R - NPDES (ASH)	7/11/18	1045	EHS	X	1	1	1
2018020256	MW-5 - NPDES (ASH)	7/11/18	1256	EHS	X	1	1	1
2018020257	MW-6 - NPDES (ASH)	7/11/18	1245	EHS	X	1	1	1
2018020258	MW-7 - NPDES (ASH)	7/11/18	1150	EHS	X	1	1	1
2018020259	FIELD BLANK	7/11/18	1215	EHS	X	1	1	

Customer to complete appropriate columns to right

COPY

Customer to sign & date below

21)Relinquished By:	Date/Time: 7/12/18 0725	Accepted By:	Date/Time: 7/12/18 725
21)Relinquished By	Date/Time	Accepted By:	Date/Time
21)Relinquished By	Date/Time	Accepted By:	Date/Time
23)Seal/Locked By	Date/Time	Sealed/Lock Opened By	Date/Time

24)Comments:

Customer, important please indicate desired turnaround

[22]Requested Turnaround

14 Days ✓

*7 Days ___

*48 Hr ___

*Other ___

*Add. Cost Will Apply

I/A

☐ CAMA ☐ CCR ☐ Landfill ☑ NPDES ☐ SPECIAL STUDY ________ - GROUNDWATER MONITORING

LOW FLOW SAMPLING LOG

Site: Robinson

DUKE ENERGY

WEATHER: ☑ SUNNY ☐ PARTLY CLOUDY ☐ OVERCAST ☐ RAIN ☐ SNOW

FIELD PERSONNEL: EHS/HPB
TEMPERATURE (APPROX): 90 °F
INSITU SMARTROLL SERIAL #: 563632
2100Q SERIAL #: 3328

STABLIZATION CRITERIA:

• pH	± 0.1 standard unit
• Specific Conductance	± 5% in µS/cm
• DO	± 0.2 mg/L or 10% saturation
• Turbidity	less than 10 NTUs

WELL ID: MW-1R
WELL DIAMETER: 2 (IN)
WELL DEPTH: 38.60 (FT) EHS 7/11/18
DEPTH TO WATER: ~~20.95~~ (FT) 27.80
HEIGHT OF WC: ~~9.80~~ (FT) 10.8 EHS 7/11/18

PUMP/TUBING INTAKE DEPTH: 33.60 (FT)
MULT FACTOR *: 0.163 [*(radius/12)2*3.14*7.48]
CASING VOLUME: 1.76 (GAL)
INITIAL PURGE VOLUME: 1.00 (GAL)
TOTAL VOLUME PURGED: 2.40 (GAL)

START PURGE TIME: 1010
END PURGE TIME: 1038
FINAL READING TIME: 1029
SAMPLE DATE: 7/11/18
COLLECTION TIME: 1035

	Bladder			Peristaltic	12 Volt	Grundfos	Other ( )
TYPE OF PUMP:							
PURGE METHOD:	✓						
SAMPLING METHOD:	✓						
PUMP SETTING:	25 P	9 R	6 D				
	(psi)	(sec)	(sec)				

TIME	WATER LEVEL (FT) (x.xx)	FLOW RATE (mL/min) (x)	VOLUME REMOVED (gallons/ mL) (x.xx)	TEMPERATURE (°C) (x)	DO (mg/L) (x.xx)	SPECIFIC CONDUCTANCE (µS/cm) (x)	pH (su) (x.xx)	ORP (mv) (x)	TURBIDITY (NTU) (x.x)
1017	27.96	380	1.00	20	8.27	45	5.19	359	33.4
1020	27.96	380	1.25	20	8.31	44	5.15	353	17.5
1023	27.96	380	1.60	20	8.32	44	5.11	350	11.7
1026	27.96	380	1.90	20	8.30	42	5.07	350	7.83
1029	27.96	380	2.20	20	8.31	42	5.08	349	5.72

COMMENTS:

PLEASE REFER TO THE BACK OF THIS SHEET IF THE CHART ABOVE IS FULL

IF TURBIDITY >10 NTUS, REDEVELOPMENT NEEDED ☐ YES ☑ NO ALL SAMPLES ON ICE WITHIN 15 MINUTES ☑ YES ☐ NO

FINAL SAMPLE OBSERVATIONS (COLOR/CLARITY/ODOR): Clear/no odor

ADDITIONAL NOTES:

FIELD VEHICLE ACCESSIBLE ☑ YES ☐ NO

WELL TAG			PROTECTIVE CASING			LOCK			CAP			CONCRETE PAD		
GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE
✓			✓			✓			✓			✓		

I/A

☐ CAMA ☐ CCR ☐ Landfill ☑ NPDES ☐ SPECIAL STUDY ____________ - GROUNDWATER MONITORING

LOW FLOW SAMPLING LOG

Site: Robinson

DUKE ENERGY

WEATHER: ☑ SUNNY ☐ PARTLY CLOUDY ☐ OVERCAST ☐ RAIN ☐ SNOW

FIELD PERSONNEL: EHS, HPB
TEMPERATURE (APPROX): 90 °F
INSITU SMARTROLL SERIAL #: 563632
2100Q SERIAL #: 3328

STABLIZATION CRITERIA:

pH	± 0.1 standard unit
Specific Conductance	± 5% in µS/cm
DO	± 0.2 mg/L or 10% saturation
Turbidity	less than 10 NTUs

WELL ID: MW-2R
WELL DIAMETER: 2 (IN)
WELL DEPTH: 45.52 (FT)
DEPTH TO WATER: 30.57 (FT)
HEIGHT OF WC: 14.95 (FT)

PUMP/TUBING INTAKE DEPTH: 40.52 (FT)
MULT FACTOR *: 0.163 [*(radius/12)2*3.14*7.48]
CASING VOLUME: 2.44 (GAL)
INITIAL PURGE VOLUME: 0.50 (GAL)
TOTAL VOLUME PURGED: 1.50 (GAL)

START PURGE TIME: 1050
END PURGE TIME: 1115
FINAL READING TIME: 1109
SAMPLE DATE: 7/11/18
COLLECTION TIME: 1110

TYPE OF PUMP:	Bladder	Peristaltic	12 Volt	Grundfos	Other ( )
PURGE METHOD:	✓				
SAMPLING METHOD:	✓				
PUMP SETTING:	30 P (psi) 10 R (sec) 5 D (sec)				

TIME	WATER LEVEL (FT) (x.xx)	FLOW RATE (mL/min) (x)	VOLUME REMOVED (gallons/ mL) (x.xx)	TEMPERATURE (°C) (x)	DO (mg/L) (x.xx)	SPECIFIC CONDUCTANCE (µS/cm) (x)	pH (su) (x.xx)	ORP (mv) (x)	TURBIDITY (NTU) (x.x)
1057	30.69	440	0.50	21	7.18	43	5.40	344	55.2
1100	30.69	440	0.70	21	7.24	43	5.35	337	40.8
1103	30.69	440	0.90	21	7.30	43	5.34	334	23.4
1106	30.69	440	1.10	21	7.30	43	5.35	332	15.8
1109	30.69	440	1.30	21	7.35	42	5.35	333	8.30

COMMENTS:

PLEASE REFER TO THE BACK OF THIS SHEET IF THE CHART ABOVE IS FULL

IF TURBIDITY >10 NTUS, REDEVELOPMENT NEEDED ☐ YES ☑ NO ALL SAMPLES ON ICE WITHIN 15 MINUTES ☑ YES ☐ NO

FINAL SAMPLE OBSERVATIONS (COLOR/CLARITY/ODOR): Clear/no odor

ADDITIONAL NOTES:

FIELD VEHICLE ACCESSIBLE ☑ YES ☐ NO

WELL TAG			PROTECTIVE CASING			LOCK			CAP			CONCRETE PAD		
GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE
✓			✓			✓			✓			✓		

I/A

☐ CAMA ☐ CCR ☐ Landfill ☒ NPDES ☐ SPECIAL STUDY________________ - GROUNDWATER MONITORING

LOW FLOW SAMPLING LOG

Site: Robinson

DUKE ENERGY

FIELD PERSONNEL: RDP HJS

WEATHER: ☒ SUNNY ☐ PARTLY CLOUDY ☐ OVERCAST ☐ RAIN ☐ SNOW

TEMPERATURE (APPROX): 86°F

INSITU SMARTROLL SERIAL #: 563024

2100Q SERIAL #: 3326

STABLIZATION CRITERIA:

pH	± 0.1 standard unit
Specific Conductance	± 5% in µS/cm
DO	± 0.2 mg/L or 10% saturation
Turbidity	less than 10 NTUs

WELL ID: MW-3BR

WELL DIAMETER: 2 (IN)

WELL DEPTH: 72.88 (FT)

DEPTH TO WATER: 51.87 (FT)

HEIGHT OF WC: 21.01 (FT)

PUMP/TUBING INTAKE DEPTH: 67.00 (FT)

MULT FACTOR *: 0.163 [*(radius/12)2*3.14*7.48]

CASING VOLUME: 3.42 (GAL)

INITIAL PURGE VOLUME: 0.02 (GAL)

TOTAL VOLUME PURGED: 1.06 (GAL)

START PURGE TIME: 1139

END PURGE TIME: 1158

FINAL READING TIME: 1158

SAMPLE DATE: ~~1158~~ 7-11-18 HS

COLLECTION TIME: 1158

	Bladder			Peristaltic	12 Volt	Grundfos	Other ( )
TYPE OF PUMP:							
PURGE METHOD:	✓						
SAMPLING METHOD:	✓						
PUMP SETTING:	35 P	10.5 R	4.5 D				
	(psi)	(sec)	(sec)				

TIME	WATER LEVEL (FT) (x.xx)	FLOW RATE (mL/min) (x)	VOLUME REMOVED (gallons/ mL) (x.xx)	TEMPERATURE (°C) (x)	DO (mg/L) (x.xx)	SPECIFIC CONDUCTANCE (µS/cm) (x)	pH (su) (x.xx)	ORP (mv) (x)	TURBIDITY (NTU) (x.x)
1140	51.90	200	0.02	27	2.59	357	6.10	346	9.25
1143	51.95	200	0.17	25	0.66	358	6.05	345	21.1
1148	51.90	200	0.42	25	0.37	356	6.06	339	11.9
1153	51.90	200	0.67	24	0.35	359	6.04	332	10.4
1158	51.90	200	0.92	23	0.30	357	6.05	318	8.94

PLEASE REFER TO THE BACK OF THIS SHEET IF THE CHART ABOVE IS FULL

COMMENTS:

IF TURBIDITY >10 NTUS, REDEVELOPMENT NEEDED ☐ YES ☒ NO ALL SAMPLES ON ICE WITHIN 15 MINUTES ☒ YES ☐ NO

FINAL SAMPLE OBSERVATIONS (COLOR/CLARITY/ODOR):

ADDITIONAL NOTES:

Clear / no odor

FIELD VEHICLE ACCESSIBLE ☒ YES ☐ NO

WELL TAG			PROTECTIVE CASING			LOCK			CAP			CONCRETE PAD		
GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE
X			X			X			X			X		

I/A

☐CAMA ☐CCR ☐Landfill ☒NPDES ☐SPECIAL STUDY________________ - GROUNDWATER MONITORING

LOW FLOW SAMPLING LOG

Site: Robinson

DUKE ENERGY.

FIELD PERSONNEL: RDP HJS

WEATHER: ☒SUNNY ☐PARTLY CLOUDY ☐OVERCAST ☐RAIN ☐SNOW

TEMPERATURE (APPROX): 83 °F

INSITU SMARTROLL SERIAL #: 563024

2100Q SERIAL #: 3326

STABLIZATION CRITERIA:

• pH	± 0.1 standard unit
• Specific Conductance	± 5% in µS/cm
• DO	± 0.2 mg/L or 10% saturation
• Turbidity	less than 10 NTUs

WELL ID: MW-4R

WELL DIAMETER: 2 (IN)

WELL DEPTH: 30.79 (FT)

DEPTH TO WATER: 19.70 (FT)

HEIGHT OF WC: 11.09 (FT)

PUMP/TUBING INTAKE DEPTH: 25.00 (FT)

MULT FACTOR *: 0.163 [*(radius/12)2*3.14*7.48]

CASING VOLUME: 1.81 (GAL)

INITIAL PURGE VOLUME: 0.01 (GAL)

TOTAL VOLUME PURGED: 2.26 (GAL)

START PURGE TIME: 0929

END PURGE TIME: 1045

FINAL READING TIME: 1045

SAMPLE DATE: 7/11/18

COLLECTION TIME: 1045

TYPE OF PUMP:	Bladder			Peristaltic	12 Volt	Grundfos	Other ( )
PURGE METHOD:	✓						
SAMPLING METHOD:	✓						
PUMP SETTING:	20	13.5 18	1.5 5				
	(psi)	(sec)	(sec)				

TIME	WATER LEVEL (FT) (x.xx)	FLOW RATE (mL/min) (x)	VOLUME REMOVED (gallons/ mL) (x.xx)	TEMPERATURE (°C) (x)	DO (mg/L) (x.xx)	SPECIFIC CONDUCTANCE (µS/cm) (x)	pH (su) (x.xx)	ORP (mv) (x)	TURBIDITY (NTU) (x.x)
0930	19.70	100	0.01	27	5.05	656	3.06	740	46.1
0935	19.70	100	0.16	27	3.79	643	3.07	735	118.0
0945	19.70	100	0.46	27	3.57	641	3.08	741	73.1
0955	19.70	100	0.76	27	3.51	639	3.08	742	54.0
1005	19.70	100	1.06	28	3.49	638	3.09	736	33.0
1015	19.70	100	1.36	28	3.55	633	3.10	733	20.2
1025	19.70	100	1.66	29	3.59	631	3.10	738	16.6
1035	19.70	100	1.96	29	3.53	628	3.10	736	12.7
1040	19.70	100	2.11	29	3.51	629	3.10	734	11.0
1045	19.70	100	2.26	29	3.53	625	3.10	738	~~9.2~~ 9.3 RDP 7/11

PLEASE REFER TO THE BACK OF THIS SHEET IF THE CHART ABOVE IS FULL

COMMENTS:

IF TURBIDITY >10 NTUS, REDEVELOPMENT NEEDED ☐YES ☒NO ALL SAMPLES ON ICE WITHIN 15 MINUTES ☒YES ☐NO

FINAL SAMPLE OBSERVATIONS (COLOR/CLARITY/ODOR): clear/no odor

ADDITIONAL NOTES:

Field blank taken @ 1215
7-11-18

FIELD VEHICLE ACCESSIBLE ☒YES ☐NO

WELL TAG			PROTECTIVE CASING			LOCK			CAP			CONCRETE PAD		
GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE
X			X			X			X			X		

I/A

☐ CAMA ☐ CCR ☐ Landfill ☒ NPDES ☐ SPECIAL STUDY________________ - GROUNDWATER MONITORING

LOW FLOW SAMPLING LOG

Site: Robinson

DUKE ENERGY

FIELD PERSONNEL: HJS RDP

WEATHER: ☐ SUNNY ☒ PARTLY CLOUDY ☐ OVERCAST ☐ RAIN ☐ SNOW

TEMPERATURE (APPROX): 85 °F

INSITU SMARTROLL SERIAL #: 563024

2100Q SERIAL #: 3326

STABLIZATION CRITERIA:

• pH	± 0.1 standard unit
• Specific Conductance	± 5% in µS/cm
• DO	± 0.2 mg/L or 10% saturation
• Turbidity	less than 10 NTUs

WELL ID: MW-5

WELL DIAMETER: 2 (IN)

WELL DEPTH: 42.61 (FT)

DEPTH TO WATER: 37.78 (FT)

HEIGHT OF WC: 4.83 (FT)

PUMP/TUBING INTAKE DEPTH: 42.01 (FT)

MULT FACTOR *: 0.163 [*(radius/12)2*3.14*7.48]

CASING VOLUME: 0.79 (GAL)

INITIAL PURGE VOLUME: 0.01 (GAL)

TOTAL VOLUME PURGED: 0.64 (GAL)

START PURGE TIME: 1234

END PURGE TIME: 1256

FINAL READING TIME: 1256

SAMPLE DATE: 7/11/18

COLLECTION TIME: 1256

TYPE OF PUMP:	Bladder			Peristaltic	12 Volt	Grundfos	Other ( )
PURGE METHOD:	✓						
SAMPLING METHOD:	✓						
PUMP SETTING:	25	11	4				
	(psi)	(sec)	(sec)				

TIME	WATER LEVEL (FT) (x.xx)	FLOW RATE (mL/min) (x)	VOLUME REMOVED (gallons/ mL) (x.xx)	TEMPERATURE (°C) (x)	DO (mg/L) (x.xx)	SPECIFIC CONDUCTANCE (µS/cm) (x)	pH (su) (x.xx)	ORP (mv) (x)	TURBIDITY (NTU) (x.x)
1235	37.90	120	0.01	25	3.52	244	6.13	395	8.9
1238	37.90	120	0.10	24	2.52	248	6.08	384	6.6
1241	37.90	170	0.19	24	1.81	247	609	369	3.1
1244	37.90	120	0.28	24	1.50	246	6.10	361	1.9
1247	37.90	120	0.37	24	1.30	246	6.11	355	1.5
1250	37.90	120	0.46	24	1.14	246	6.12	349	1.6
1253	37.90	120	0.55	24	1.06	246	6.13	345	1.1
1256	37.90	120	0.64	24	1.01	247	6.14	343	0.9

PLEASE REFER TO THE BACK OF THIS SHEET IF THE CHART ABOVE IS FULL

COMMENTS:

IF TURBIDITY >10 NTUS, REDEVELOPMENT NEEDED ☐ YES ☒ NO   ALL SAMPLES ON ICE WITHIN 15 MINUTES ☒ YES ☐ NO

FINAL SAMPLE OBSERVATIONS (COLOR/CLARITY/ODOR):

ADDITIONAL NOTES:

Clear, no odor

FIELD VEHICLE ACCESSIBLE ☒ YES ☐ NO

WELL TAG			PROTECTIVE CASING			LOCK			CAP			CONCRETE PAD		
GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE
X			X			X			X			X		

I/A

☐ CAMA ☐ CCR ☐ Landfill ☑ NPDES ☐ SPECIAL STUDY ______________ - GROUNDWATER MONITORING

LOW FLOW SAMPLING LOG

Site: Robinson

DUKE ENERGY

WEATHER: ☑ SUNNY ☐ PARTLY CLOUDY ☐ OVERCAST ☐ RAIN ☐ SNOW

FIELD PERSONNEL: EHS
TEMPERATURE (APPROX): 90 °F
INSITU SMARTROLL SERIAL #: 563632
2100Q SERIAL #: 3328

STABLIZATION CRITERIA:

pH	± 0.1 standard unit
Specific Conductance	± 5% in µS/cm
DO	± 0.2 mg/L or 10% saturation
Turbidity	less than 10 NTUs

WELL ID: MW-6
WELL DIAMETER: 2 (IN)
WELL DEPTH: 52.97 (FT)
DEPTH TO WATER: 30.48 (FT)
HEIGHT OF WC: 22.49 (FT)

PUMP/TUBING INTAKE DEPTH: 47.97 (FT)
MULT FACTOR *: 0.163 (*(radius/12)2*3 14*7 48)
CASING VOLUME: [illegible] 3.67 (GAL)
INITIAL PURGE VOLUME: 2.80 (GAL)
TOTAL VOLUME PURGED: 3.60 (GAL)

START PURGE TIME: 1208
END PURGE TIME: 1250
FINAL READING TIME: 1239
SAMPLE DATE: 7/11/18
COLLECTION TIME: 1245

	Bladder			Peristaltic	12 Volt	Grundfos	Other ( )
TYPE OF PUMP:	✓						
PURGE METHOD:	✓						
SAMPLING METHOD:	✓						
PUMP SETTING:	28 (psi)	5 (sec)	10 (sec)				

TIME	WATER LEVEL (FT) (x.xx)	FLOW RATE (mL/min) (x)	VOLUME REMOVED (gallons/ mL) (x.xx)	TEMPERATURE (°C) (x)	DO (mg/L) (x.xx)	SPECIFIC CONDUCTANCE (µS/cm) (x)	pH (su) (x.xx)	ORP (mv) (x)	TURBIDITY (NTU) (x.x)
1233	30.62	440	2.80	22	0.10	201	6.50	201	25.9
1236	30.62	440	3.10	22	0.09	201	6.50	200	10.2
1239	30.62	440	3.40	22	0.09	202	6.50	199	6.34

COMMENTS:

PLEASE REFER TO THE BACK OF THIS SHEET IF THE CHART ABOVE IS FULL

IF TURBIDITY >10 NTUS, REDEVELOPMENT NEEDED ☐ YES ☐ NO ALL SAMPLES ON ICE WITHIN 15 MINUTES ☑ YES ☐ NO

FINAL SAMPLE OBSERVATIONS (COLOR/CLARITY/ODOR):

ADDITIONAL NOTES: Started out very turbid, orange particulates and orange chunks
Final reading: Clear/no odor

FIELD VEHICLE ACCESSIBLE ☑ YES ☐ NO

WELL TAG			PROTECTIVE CASING			LOCK			CAP			CONCRETE PAD		
GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE
✓			✓			✓			✓			✓		

I/A

☐ CAMA ☐ CCR ☐ Landfill ☑ NPDES ☐ SPECIAL STUDY ______________ - GROUNDWATER MONITORING

LOW FLOW SAMPLING LOG

Site: Robinson

DUKE ENERGY

WEATHER: ☑ SUNNY ☐ PARTLY CLOUDY ☐ OVERCAST ☐ RAIN ☐ SNOW

FIELD PERSONNEL: EHS, HPB
TEMPERATURE (APPROX): 90 °F
INSITU SMARTROLL SERIAL #: 563632
2100Q SERIAL #: 3328

STABLIZATION CRITERIA:

pH	± 0.1 standard unit
Specific Conductance	± 5% in µS/cm
DO	± 0.2 mg/L or 10% saturation
Turbidity	less than 10 NTUs

WELL ID: MW-7
WELL DIAMETER: 2 (IN)
WELL DEPTH: 36.88 (FT)
DEPTH TO WATER: 19.36 (FT)
HEIGHT OF WC: 17.52 (FT)

PUMP/TUBING INTAKE DEPTH: 31.88 (FT)
MULT FACTOR *: 0.163 [*(radius/12)2*3.14*7.48]
CASING VOLUME: 2.86 (GAL)
INITIAL PURGE VOLUME: 1.00 (GAL)
TOTAL VOLUME PURGED: 2.80 (GAL)

START PURGE TIME: 1125
END PURGE TIME: 1155
FINAL READING TIME: 1147
SAMPLE DATE: 7-11-18
COLLECTION TIME: 1150

	Bladder			Peristaltic	12 Volt	Grundfos	Other ( )
TYPE OF PUMP:							
PURGE METHOD:	✓						
SAMPLING METHOD:	✓						
PUMP SETTING:	30 P (psi)	10 R (sec)	5 D (sec)				

TIME	WATER LEVEL (FT) (x.xx)	FLOW RATE (mL/min) (x)	VOLUME REMOVED (gallons/ mL) (x.xx)	TEMPERATURE (°C) (x)	DO (mg/L) (x.xx)	SPECIFIC CONDUCTANCE (µS/cm) (x)	pH (su) (x.xx)	ORP (mv) (x)	TURBIDITY (NTU) (x.x)
1135	19.49	460	1.00	22	0.10	180	6.53	86	86.2
1138	19.49	460	1.51	22	1.11	179	6.57	91	59.1
1141	19.49	460	1.82	23	0.09	179	6.63	97	38.8
1144	19.49	460	2.25	23	0.09	179	6.65	101	14.0
1147	19.49	460	2.67	23	0.08	179	6.67	102	6.6

COMMENTS: **PLEASE REFER TO THE BACK OF THIS SHEET IF THE CHART ABOVE IS FULL**

IF TURBIDITY >10 NTUS, REDEVELOPMENT NEEDED ☐ YES ☑ NO   ALL SAMPLES ON ICE WITHIN 15 MINUTES ☑ YES ☐ NO

FINAL SAMPLE OBSERVATIONS (COLOR/CLARITY/ODOR):

ADDITIONAL NOTES:

Clear / no odor

FIELD VEHICLE ACCESSIBLE ☑ YES ☐ NO

WELL TAG			PROTECTIVE CASING			LOCK			CAP			CONCRETE PAD		
GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE	GOOD	BAD	NONE
✓			✓			✓			✓			✓		

I/A

DUKE ENERGY.

Analytical Laboratory

13339 Hagers Ferry Road
Huntersville, NC 28078-7929
McGuire Nuclear Complex - MG03A2
Phone: 980-875-5245 Fax: 980-875-4349

Order Summary Report

Order Number:	**J18070011**
Project Name:	ROBINSON - GW ASH BASIN
Customer Name(s):	Toepfer, Moeller, Campbell, Gainey, Hamilton,
Customer Address:	

Lab Contact: Peggy Kendall Phone: 980-875-5848

Report Authorized By:
(Signature)
Peggy F Kendall
Peggy Kendall
Date: 7/25/2018

Program Comments:

Please contact the Program Manager (Peggy Kendall) with any questions regarding this report.

Data Flags & Calculations:

Any analytical tests or individual analytes within a test flagged with a Qualifier indicate a deviation from the method quality system or quality control requirement. The qualifier description is found at the end of the Certificate of Analysis (sample results) under the qualifiers heading. All results are reported on a dry weight basis unless otherwise noted. Subcontracted data included on the Duke Certificate of Analysis is to be used as information only. Certified vendor results can be found in the subcontracted lab final report. Duke Energy Analytical Laboratory subcontracts analyses to other vendor laboratories that have been qualified by Duke Energy to perform these analyses except where noted.

Data Package:

This data package includes analytical results that are applicable only to the samples described in this narrative. An estimation of the uncertainty of measurement for the results in the report is available upon request. This report shall not be reproduced, except in full, without the written consent of the Analytical Laboratory. Please contact the Analytical laboratory with any questions. The order of individual sections within this report is as follows:

Job Summary Report, Sample Identification, Technical Validation of Data Package, Analytical Laboratory Certificate of Analysis, Analytical Laboratory QC Reports, Sub-contracted Laboratory Results, Customer Specific Data Sheets, Reports & Documentation, Customer Database Entries, Test Case Narratives, Chain of Custody (COC)

Certification:

The Analytical Laboratory holds the following State Certifications : North Carolina (DENR) Certificate #248, South Carolina (DHEC) Laboratory ID # 99005. Contact the Analytical Laboratory for definitive information about the certification status of specific methods.

I/A

Sample ID's & Descriptions:

Sample ID	Plant/Station	Collection Date and Time	Collected By	Sample Description
2018020252	ROBINSON	11-Jul-18 10:35 AM	EHS	MW-1R NPDES (ASH)
2018020253	ROBINSON	11-Jul-18 11:10 AM	EHS	MW-2R NPDES (ASH)
2018020254	ROBINSON	11-Jul-18 11:58 AM	EHS	MW-3R NPDES (ASH)
2018020255	ROBINSON	11-Jul-18 10:45 AM	EHS	MW-4R NPDES (ASH)
2018020256	ROBINSON	11-Jul-18 12:56 PM	EHS	MW-5 NPDES (ASH)
2018020257	ROBINSON	11-Jul-18 12:45 PM	EHS	MW-6 NPDES (ASH)
2018020258	ROBINSON	11-Jul-18 11:50 AM	EHS	MW-7 NPDES (ASH)
2018020259	ROBINSON	11-Jul-18 12:15 PM	EHS	FIELD BLANK

8 Total Samples

I/A

Technical Validation Review

Checklist:

COC and .pdf report are in agreement with sample totals and analyses (compliance programs and procedures). ☑ Yes ☐ No

All Results are less than the laboratory reporting limits. ☐ Yes ☑ No

All laboratory QA/QC requirements are acceptable. ☑ Yes ☐ No

Report Sections Included:

- ☑ Job Summary Report
- ☑ Sample Identification
- ☑ Technical Validation of Data Package
- ☑ Analytical Laboratory Certificate of Analysis
- ☐ Analytical Laboratory QC Report
- ☐ Sub-contracted Laboratory Results
- ☐ Customer Specific Data Sheets, Reports, & Documentation
- ☐ Customer Database Entries
- ☑ Chain of Custody
- ☑ Electronic Data Deliverable (EDD) Sent Separatel

Reviewed By: Peggy Kendall Date: 7/25/2018

I/A

Certificate of Laboratory Analysis

This report shall not be reproduced, except in full.

Order # J18070011

Site: MW-1R NPDES (ASH)

Collection Date: 07/11/2018 10:35 AM

Sample #: 2018020252

Matrix: GW_WW

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
INORGANIC IONS BY IC - Q18070271								
Sulfate	3.1	mg/L		0.5	5	EPA 300.0	07/12/2018 17:49	BGN9034
TOTAL RECOVERABLE METALS BY ICP-MS - Q18070297								
Arsenic (As)	< 1	ug/L		1	1	EPA 200.8	07/13/2018 21:08	CWSPEN3
Cadmium (Cd)	< 1	ug/L		1	1	EPA 200.8	07/13/2018 21:08	CWSPEN3
Chromium (Cr)	< 1	ug/L		1	1	EPA 200.8	07/13/2018 21:08	CWSPEN3
Copper (Cu)	< 1	ug/L		1	1	EPA 200.8	07/13/2018 21:08	CWSPEN3
Zinc (Zn)	< 5	ug/L		5	1	EPA 200.8	07/13/2018 21:08	CWSPEN3
TOTAL DISSOLVED SOLIDS - Q18070258								
TDS	< 25	mg/L		25	1	SM2540C	07/12/2018 14:00	Mgigant

I/A

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Order # J18070011

Site: MW-2R NPDES (ASH)

Collection Date: 07/11/2018 11:10 AM

Sample #: **2018020253**

Matrix: GW_WW

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
INORGANIC IONS BY IC - Q18070271								
Sulfate	**6.7**	mg/L		0.1	1	EPA 300.0	07/16/2018 10:28	BGN9034
TOTAL RECOVERABLE METALS BY ICP-MS - Q18070297								
Arsenic (As)	**3.30**	ug/L		1	1	EPA 200.8	07/13/2018 21:41	CWSPEN3
Cadmium (Cd)	**< 1**	ug/L		1	1	EPA 200.8	07/13/2018 21:41	CWSPEN3
Chromium (Cr)	**< 1**	ug/L		1	1	EPA 200.8	07/13/2018 21:41	CWSPEN3
Copper (Cu)	**< 1**	ug/L		1	1	EPA 200.8	07/13/2018 21:41	CWSPEN3
Zinc (Zn)	**< 5**	ug/L		5	1	EPA 200.8	07/13/2018 21:41	CWSPEN3
TOTAL DISSOLVED SOLIDS - Q18070258								
TDS	**< 25**	mg/L		25	1	SM2540C	07/12/2018 14:00	Mgigant

I/A

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Order # J18070011

Site: MW-3R NPDES (ASH)

Collection Date: 07/11/2018 11:58 AM

Sample #: 2018020254

Matrix: GW_WW

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
INORGANIC IONS BY IC - Q18070271								
Sulfate	87	mg/L		1	10	EPA 300.0	07/12/2018 19:03	BGN9034
TOTAL RECOVERABLE METALS BY ICP-MS - Q18070297								
Arsenic (As)	< 1	ug/L		1	1	EPA 200.8	07/13/2018 21:49	CWSPEN3
Cadmium (Cd)	< 1	ug/L		1	1	EPA 200.8	07/13/2018 21:49	CWSPEN3
Chromium (Cr)	< 1	ug/L		1	1	EPA 200.8	07/13/2018 21:49	CWSPEN3
Copper (Cu)	< 1	ug/L		1	1	EPA 200.8	07/13/2018 21:49	CWSPEN3
Zinc (Zn)	< 5	ug/L		5	1	EPA 200.8	07/13/2018 21:49	CWSPEN3
TOTAL DISSOLVED SOLIDS - Q18070258								
TDS	210	mg/L		25	1	SM2540C	07/12/2018 14:00	Mgigant

I/A

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Order # J18070011

Site: MW-4R NPDES (ASH)

Collection Date: 07/11/2018 10:45 AM

Sample #: **2018020255**

Matrix: GW_WW

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
INORGANIC IONS BY IC - Q18070271								
Sulfate	**490**	mg/L		10	100	EPA 300.0	07/12/2018 19:21	BGN9034
TOTAL RECOVERABLE METALS BY ICP-MS - Q18070297								
Arsenic (As)	**1.22**	ug/L		1	1	EPA 200.8	07/13/2018 21:58	CWSPEN3
Cadmium (Cd)	**< 1**	ug/L		1	1	EPA 200.8	07/13/2018 21:58	CWSPEN3
Chromium (Cr)	**4.50**	ug/L		1	1	EPA 200.8	07/13/2018 21:58	CWSPEN3
Copper (Cu)	**110**	ug/L		1	1	EPA 200.8	07/13/2018 21:58	CWSPEN3
Zinc (Zn)	**140**	ug/L		5	1	EPA 200.8	07/13/2018 21:58	CWSPEN3
TOTAL DISSOLVED SOLIDS - Q18070258								
TDS	**300**	mg/L		25	1	SM2540C	07/12/2018 14:00	Mgigant

I/A

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Order # J18070011

Site: MW-5 NPDES (ASH)

Collection Date: 07/11/2018 12:56 PM

Sample #: **2018020256**

Matrix: GW_WW

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
INORGANIC IONS BY IC - Q18070271								
Sulfate	**23**	mg/L		0.5	5	EPA 300.0	07/12/2018 19:40	BGN9034
TOTAL RECOVERABLE METALS BY ICP-MS - Q18070297								
Arsenic (As)	**6.74**	ug/L		1	1	EPA 200.8	07/13/2018 22:06	CWSPEN3
Cadmium (Cd)	**< 1**	ug/L		1	1	EPA 200.8	07/13/2018 22:06	CWSPEN3
Chromium (Cr)	**< 1**	ug/L		1	1	EPA 200.8	07/13/2018 22:06	CWSPEN3
Copper (Cu)	**< 1**	ug/L		1	1	EPA 200.8	07/13/2018 22:06	CWSPEN3
Zinc (Zn)	**< 5**	ug/L		5	1	EPA 200.8	07/13/2018 22:06	CWSPEN3
TOTAL DISSOLVED SOLIDS - Q18070258								
TDS	**150**	mg/L		25	1	SM2540C	07/12/2018 14:00	Mgigant

I/A

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Order # J18070011

Site: MW-6 NPDES (ASH)
Collection Date: 07/11/2018 12:45 PM

Sample #: **2018020257**
Matrix: GW_WW

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
INORGANIC IONS BY IC - Q18070271								
Sulfate	**38**	mg/L		1	10	EPA 300.0	07/12/2018 19:58	BGN9034
TOTAL RECOVERABLE METALS BY ICP-MS - Q18070297								
Arsenic (As)	**2.72**	ug/L		1	1	EPA 200.8	07/13/2018 22:14	CWSPEN3
Cadmium (Cd)	**< 1**	ug/L		1	1	EPA 200.8	07/13/2018 22:14	CWSPEN3
Chromium (Cr)	**< 1**	ug/L		1	1	EPA 200.8	07/13/2018 22:14	CWSPEN3
Copper (Cu)	**< 1**	ug/L		1	1	EPA 200.8	07/13/2018 22:14	CWSPEN3
Zinc (Zn)	**< 5**	ug/L		5	1	EPA 200.8	07/13/2018 22:14	CWSPEN3
TOTAL DISSOLVED SOLIDS - Q18070258								
TDS	**120**	mg/L		25	1	SM2540C	07/12/2018 14:00	Mgigant

I/A

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This report shall not be reproduced, except in full.

Order # J18070011

Site: MW-7 NPDES (ASH)
Collection Date: 07/11/2018 11:50 AM

Sample #: **2018020258**
Matrix: GW_WW

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
INORGANIC IONS BY IC - Q18070271								
Sulfate	**14**	mg/L		0.5	5	EPA 300.0	07/12/2018 20:16	BGN9034
TOTAL RECOVERABLE METALS BY ICP-MS - Q18070297								
Arsenic (As)	**95.6**	ug/L		1	1	EPA 200.8	07/13/2018 22:22	CWSPEN3
Cadmium (Cd)	**< 1**	ug/L		1	1	EPA 200.8	07/13/2018 22:22	CWSPEN3
Chromium (Cr)	**< 1**	ug/L		1	1	EPA 200.8	07/13/2018 22:22	CWSPEN3
Copper (Cu)	**< 1**	ug/L		1	1	EPA 200.8	07/13/2018 22:22	CWSPEN3
Zinc (Zn)	**< 5**	ug/L		5	1	EPA 200.8	07/13/2018 22:22	CWSPEN3
TOTAL DISSOLVED SOLIDS - Q18070258								
TDS	**110**	mg/L		25	1	SM2540C	07/12/2018 14:00	Mgigant

I/A

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Order # J18070011

Site: FIELD BLANK

Collection Date: 07/11/2018 12:15 PM

Sample #: 2018020259

Matrix: GW_WW

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
INORGANIC IONS BY IC - Q18070271								
Sulfate	< 0.1	mg/L		0.1	1	EPA 300.0	07/12/2018 20:35	BGN9034
TOTAL RECOVERABLE METALS BY ICP-MS - Q18070297								
Arsenic (As)	< 1	ug/L		1	1	EPA 200.8	07/13/2018 22:31	CWSPEN3
Cadmium (Cd)	< 1	ug/L		1	1	EPA 200.8	07/13/2018 22:31	CWSPEN3
Chromium (Cr)	< 1	ug/L		1	1	EPA 200.8	07/13/2018 22:31	CWSPEN3
Copper (Cu)	< 1	ug/L		1	1	EPA 200.8	07/13/2018 22:31	CWSPEN3
Zinc (Zn)	< 5	ug/L		5	1	EPA 200.8	07/13/2018 22:31	CWSPEN3

I/A

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Order # J18070011

Level II QC Summary

Q18070271 Dionex INORGANIC IONS BY IC

Blank # 1

Parameter	Measured	Final	Units:	Dil	RDL	Relative Concentration	Qualifier
Sulfate	0	0	mg/L	1	0.1	< 1/2 RDL	-

LCS # 1

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Sulfate	4.91	4.91	mg/L	1	5	98.3	90	110	-

MS # 1

Parent Sample: J18070011 -- 2018020252

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Sulfate	2.49	12.4	mg/L	5	10	93.7	80	120	-

MSD # 1

Parent Sample: J18070011 -- 2018020252

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	RPD	Qualifier
Sulfate	2.49	12.4	mg/L	5	10	93.6	80	120	0.0694	-

I/A

Level II QC Summary

Q18070297 IMS_TRM TOTAL RECOVERABLE METALS BY ICP-MS

Blank #1

Parameter	Measured	Final	Units:	Dil	RDL	Relative Concentration	Qualifier
Arsenic (As)	0.002	0.002	ug/L	1	1	< 1/2 RDL	-
Cadmium (Cd)	0.001	0.001	ug/L	1	1	< 1/2 RDL	-
Chromium (Cr)	0.01	0.01	ug/L	1	1	< 1/2 RDL	-
Copper (Cu)	-0.109	-0.109	ug/L	1	1	< 1/2 RDL	-
Zinc (Zn)	-0.067	-0.067	ug/L	1	5	< 1/2 RDL	-

LCS #1

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Arsenic (As)	49	49	ug/L	1	50	98	85	115	-
Cadmium (Cd)	48.3	48.3	ug/L	1	50	96.5	85	115	-
Chromium (Cr)	47.5	47.5	ug/L	1	50	94.9	85	115	-
Copper (Cu)	48.7	48.7	ug/L	1	50	97.5	85	115	-
Zinc (Zn)	48.6	48.6	ug/L	1	50	97.2	85	115	-

MS #1

Parent Sample: J18070011 -- 2018020252

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
Arsenic (As)	50	50	ug/L	1	50	99.9	70	130	-
Cadmium (Cd)	49.5	49.5	ug/L	1	50	99	70	130	-
Chromium (Cr)	48.9	48.9	ug/L	1	50	97.4	70	130	-
Copper (Cu)	50.5	50.5	ug/L	1	50	100	70	130	-
Zinc (Zn)	50.8	50.8	ug/L	1	50	93.1	70	130	-

MSD #1

Parent Sample: J18070011 -- 2018020252

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	RPD	Qualifier
Arsenic (As)	49.4	49.4	ug/L	1	50	98.7	70	130	1.25	-
Cadmium (Cd)	49.4	49.4	ug/L	1	50	98.6	70	130	0.336	-
Chromium (Cr)	49.2	49.2	ug/L	1	50	97.9	70	130	0.506	-
Copper (Cu)	50.4	50.4	ug/L	1	50	100	70	130	0.307	-
Zinc (Zn)	50	50	ug/L	1	50	91.4	70	130	1.91	-

I/A

Certificate of Laboratory Analysis

This report shall not be reproduced, except in full.

Order # J18070011

Level II QC Summary

Q18070258 TDS TOTAL DISSOLVED SOLIDS

Blank #1

Parameter	Measured	Final	Units:	Dil	RDL	Relative Concentration	Qualifier
TDS	0	0	mg/L	1	25	< 1/2 RDL	-

Duplicate #1

Parent Sample: J18060179 -- 2018016794

Parameter	Measured	Final	Units:	Dil	RPD	Qualifier
TDS	157	157	mg/L	1	1.93	-

Duplicate #2

Parent Sample: J18070011 -- 2018020252

Parameter	Measured	Final	Units:	Dil	RPD	Qualifier
TDS	11	11	mg/L	1	9.52	-

LCS #1

Parameter	Measured	Final	Units:	Dil	Spike	% Recovery	LCL	UCL	Qualifier
TDS	104	104	mg/L	1	100	104	90	110	-

I/A

DUKE ENERGY

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Page 15 of 15

Duke Energy Analytical Laboratories
Mail Code MG03A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(980) 875-5371
Fax: (980) 875-5559

Analytical Laboratory Use Only

LIMS # **J18070011**

Sample Class: GROUNDWATER

Samples Originating From: NC__ SC_√_

[19]Page _1_ of _1_
DISTRIBUTION
ORIGINAL to LAB,
COPY to CLIENT

Logged By: Q

Date & Time: 7/12/18 758

SAMPLE PROGRAM
Ground Water ___
NPDES __X__
Drinking Water ___
UST ___
RCRA Waste ___

Revised 12/8/2017

Vendor:

Cooler Temp (C): 3.8

PO #:

MR #:

[16]Preserv.: 1=HCL 2=H_2SO_4 3=HNO_3 4=Ice 5=None

Customer must Complete

1)Project Name: Robinson NPDES Groundwater Monitoring Program NPDES #SC0002925

2)Phone No: 980-875-5257

3)Client: John Toepfer, Bryan Moeller, Chuck Campbell, John Gainey, Will Hamilton, Des O'Brien

4)Fax No:

5)Business Unit: 50125

6)Process: BENVWT

7)Resp. To: RS01

8)Task ID:

9)Activity ID:

10)Mail Code: MG03A3

Customer to complete all appropriate NON-SHADED areas.

LAB USE ONLY [11]Lab ID	[13]Sample Description or ID	[14]Collection Information Date	Time	Signature	TESTS	[15]Analyses Required [18]Grab		Metals IMS/TRM (EPA 200.8) As, Cd, Cr, Cu, Zn Preserv. 3 Volume 500 ML		SULFATES Preserv. 4 Volume 500 ML		TDS Preserv. 4 Volume 500 ML		[20]Total # of Containers
2018020252	MW-1R - NPDES (ASH)	7/11/18	1035	EHS		X		1		1		1		3
2018020253	MW-2R - NPDES (ASH)	7/11/18	1110	EHS		X		1		1		1		3
2018020254	MW-3R - NPDES (ASH)	7/11/18	1158	EHS		X		1		1		1		3
2018020255	MW-4R - NPDES (ASH)	7/11/18	1045	EHS		X		1		1		1		3
2018020256	MW-5 - NPDES (ASH)	7/11/18	1256	EHS		X		1		1		1		3
2018020257	MW-6 - NPDES (ASH)	7/11/18	1245	EHS		X		1		1		1		3
2018020258	MW-7 - NPDES (ASH)	7/11/18	1150	EHS		X		1		1		1		3
2018020259	FIELD BLANK	7/11/18	1215	EHS		X		1		1				2

Customer to complete appropriate columns to right

Customer to sign & date below

21)Relinquished By:	Date/Time: 7/12/18 0725	Accepted By:	Date/Time: 7/12/18 725
21)Relinquished By	Date/Time	Accepted By:	Date/Time
21)Relinquished By	Date/Time	Accepted By:	Date/Time
23)Seal/Locked By	Date/Time	Sealed/Lock Opened By	Date/Time

24)Comments:

Customer, important please indicate desired turnaround

[22]Requested Turnaround

14 Days ___√___

*7 Days ______

*48 Hr ______

*Other ______

* Add. Cost Will Apply

ATTACHMENT B-2

CCR COMPLIANCE WELL LOCATIONS AND MONITORING RESULTS

I/A

Robinson Groundwater Programs

Ash Basin Groundwater Monitoring

- CCR Network
    - 14 wells plus 9 Characterization wells (installed 2018)
        - 1 Background cluster
        - 6 Downgradient clusters
        - 3 Downgradient characterization clusters
    - 3 Rounds of Assessment Monitoring (including characterization sampling)

DUKE ENERGY®

I/A

TABLE 7A
COMPARISON OF GROUNDWATER PROTECTION STANDARDS
ASH BASIN - SHALLOW FLOW ZONE
H.B. ROBINSON STEAM ELECTRIC PLANT
DUKE ENERGY PROGRESS, LLC, HARTSVILLE, SC

		Appendix III Parameters CCR Rule 257.95 (d)(1)							**Appendix IV Parameters CCR Rule 257.95 (d)(1)**														
	Analytical Parameter	**Boron**	**Calcium**	**Chloride**	**Fluoride**	**pH**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Cobalt**	**Fluoride**	**Lead**	**Lithium**	**Mercury**	**Molybdenum**	**Selenium**	**Thallium**	**Total Radium**
	Reporting Units	**ug/L**	**mg/L**	**mg/L**	**mg/L**	**S.U.**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**pCi/L**
	Comparison Criteria	**49***	**7.3***	**4.1***	**0.1***	**3.8 - 6.2***	**10.8***	**55***	**6**$^{+}$	**10**$^{+}$	**2000**$^{+}$	**4**$^{+}$	**5**$^{+}$	**100**$^{+}$	**6**$^{+}$	**4**$^{+}$	**15**$^{+}$	**40**$^{+}$	**2**$^{+}$	**100**$^{+}$	**50**$^{+}$	**2**$^{+}$	**5**$^{+}$
Sample ID	**Sample Collection Date**	**Analytical Results**							**Analytical Results**														
CCR-01SA	05/24/2018	30.3	3.78	1.3	<0.1	5.4	5.8	35	<0.5	0.13	12.1	<0.1	0.073 j	2.3	0.36	<0.1	0.19	9	<0.2	0.11 j	0.44 j	0.23	1.14 U
CCR-02S	05/24/2018	**473**	**33.5**	2.3	**0.15**	**6.6**	**18.7**	**154**	<0.5	**49**	121	<0.1	<0.08	0.7 B	0.03 j	0.15	<0.1	**48**	<0.2	4.7	<0.5	<0.1	2.22
CCR-03S	05/24/2018	**511**	**49.9**	2.5	**0.37**	**6.5**	**50.1**	**210**	<0.5	**20.7**	111	<0.1	<0.08	0.24 j,B	0.54	0.37	<0.1	**81**	<0.2	54.7	<0.5	<0.1	**6.36**
CCR-04S	05/24/2018	**607**	**41.8**	2.7 M1	**0.25 M1**	**6.7**	**28.7 M1**	**184**	<0.5	**120**	111	<0.1	<0.08	<0.5	0.42	0.25 M1	<0.1	**50**	<0.2	26.7	3.8	0.051 j	3.49
CCR-06S	05/24/2018	**350**	**22.6**	2.1	0.072 j	5.0	**38.2**	**111 D6**	<0.5	0.068 j	30.3	<0.1	<0.08	1.3 B	0.12	0.072 j	<0.1	6	<0.2	0.16 j	8.4	0.38	4.51

Prepared by: HHS Checked by: VTV

Notes:

175	- Bold, blue highlighted value indicates concentration detected at a statistically significant level greater than the comparison criteria for Appendix III constituents.
302	- Bold, orange highlighted value indicates concentration detected at a statistically significant level greater than the comparison criteria for Appendix IV constituents.

^ - Comparison criteria represents values noted in USEPA'S Amendments to the National Minimum Criteria (Phase One, Part One), Disposal of Coal Combustion Residuals from Electric Utilities; effective August 29, 2018.

- Comparison criteria represents background concentration developed in July 2018.

* - Comparison criteria represents background concentration value developed in January 2018.

+ - Comparison criteria represents the USEPA Maximum Contaminant Level (MCL).

< - Concentration not detected at or above the adjusted reporting limit.

B - Target analyte detected in method blank at or above the reporting limit. Target analyte concentration in sample is less than 10X the concentration in the method blank. Analyte concentration in sample could be due to blank contamination.

Background wells include: CCR-BG-1S

CCR-05S was not sampled due to insufficient water in the well.

D6 - The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.

j - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

M1 - Matrix spike recovery was high: the associated Laboratory Control Spike (LCS) was acceptable.

mg/L - milligrams per liter

pCi/L - picocuries per liter

Radium (Total) = the sum of radium-226 + radium-228

S.U. - Standard Unit

U – Analyte was analyzed for, but not detected above the MDC.

ug/L - micrograms per liter

TABLE 7B
COMPARISON OF GROUNDWATER PROTECTION STANDARDS
ASH BASIN - DEEP FLOW ZONE
HB ROBINSON STEAM ELECTRIC PLANT
DUKE ENERGY PROGRESS, LLC, HARTSVILLE, SC

		Appendix III Parameters CCR Rule 257.95 (d)(1)							Appendix IV Parameters CCR Rule 257.95 (d)(1)														
	Analytical Parameter	**Boron**	**Calcium**	**Chloride**	**Fluoride**	**pH**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Cobalt**	**Fluoride**	**Lead**	**Lithium**	**Mercury**	**Molybdenum**	**Selenium**	**Thallium**	**Total Radium**
	Reporting Units	**ug/L**	**mg/L**	**mg/L**	**mg/L**	**S.U.**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**pCi/L**
	Comparison Criteria	**16***	**4.4***	**1.8***	**0.1***	**3.9 - 7.1***	**1***	**31***	**6**$^{+}$	**10**$^{+}$	**2000**$^{+}$	**4**$^{+}$	**5**$^{+}$	**100**$^{+}$	**6**$^{+}$	**4**$^{+}$	**15**$^{+}$	**40**$^{+}$	**2**$^{+}$	**100**$^{+}$	**50**$^{+}$	**2**$^{+}$	**5**$^{+}$
Sample ID	**Sample Collection Date**	**Analytical Results**							**Analytical Results**														
CCR-01D	05/24/2018	**91**	**17**	0.86 j	**0.14**	6.3	**8.9**	**87**	<0.5	0.64	135	<0.1	<0.08	0.62 B	0.13	0.14	<0.1	20	<0.2	4.1	1.3	0.08 j	0.847 U
CCR-02D	05/24/2018	**207**	**12**	**1.9**	**0.14**	6.7	**24.2**	**87**	<0.5	**51.2**	79.9	<0.1	<0.08	0.22 j,B	0.2	0.14	<0.1	31	<0.2	9.1	0.99	<0.1	1.94
CCR-03D	05/24/2018	**262**	**10.9**	**1.9**	0.064 j	6.5	**27.3**	**77**	<0.5	0.56	15.8	<0.1	<0.08	2.7	0.77	0.064 j	<0.1	30	<0.2	<0.5	<0.5	0.021 j	4.44
CCR-04D	05/24/2018	**593**	**39.6**	**2.4**	**0.33**	6.7	**40.7**	**173**	0.12 j	1.8	93.8	<0.1	<0.08	0.34 j,B	0.13	0.33	<0.1	**61**	<0.2	1.2	<0.5	<0.1	**7.86**
CCR-05D	05/24/2018	**1070**	**54.6**	**3.2**	<0.1	6.2	**94.3**	**253**	<0.5	0.13	45.2	<0.1	<0.08	<0.5	0.025 j	<0.1	<0.1	**45**	<0.2	<0.5	<0.5	2	**7.66**
CCR-06D	05/24/2018	**1000**	**39**	**3.2**	<0.1	5.6	**104**	**209**	<0.5	0.37	38.5	<0.1	<0.08	0.32 j,B	0.045 j	<0.1	<0.1	21	<0.2	<0.5	<0.5	0.29	**15.1**

Prepared by: HHS Checked by:VTV

Notes:

175	- Bold, blue highlighted value indicates concentration detected at a statistically significant level greater than the comparison criteria for Appendix III constituents.
302	- Bold, orange highlighed value indicates concentration detected at a statistically significant level greater than the comparison criteria for Appendix IV constituents.

^ - Comparison criteria represents values noted in USEPA'S Amendments to the National Minimum Criteria (Phase One, Part One), Disposal of Coal Combustion Residuals from Electric Utilities; effective August 29, 2018.

+ - Comparison criteria represents the USEPA Maximum Contaminant Level (MCL).

* - Comparison criteria represents background concentration value developed in January 2018.

< - Concentration not detected at or above the adjusted reporting limit.

B - Target analyte detected in method blank at or above the reporting limit. Target analyte concentration in sample is less than 10X the concentration in the method blank. Analyte concentration in sample could be due to blank contamination.

Background wells include: MW-101D

j - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

mg/L - milligrams per liter

pCi/L - picocuries per liter

Radium (Total) = the sum of radium-226 + radium-228

S.U. - Standard Unit

U – Analyte was analyzed for, but not detected above the MDC.

ug/L - micrograms per liter

Hart Exhibit 56
Docket No. E-2, Sub 1219

Bednarcik Direct AGO Cross Ex. 12
Docket No. E-2, Sub 1219A

I/A

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THE ELM CONSULTING GROUP INTERNATIONAL LLC

ENVIRONMENTAL AUDIT IN SUPPORT OF THE COURT APPOINTED MONITOR

Roxboro Steam Plant
Semora, North Carolina
USA

October 2019

Final Report Issued To:

Duke Energy and the Court Appointed Monitor

Prepared By:

Advanced GeoServices Corp.
and
The Elm Consulting Group International LLC

TABLE OF CONTENTS

1.0 INTRODUCTION

Advanced GeoServices Corp. (AGC) and The Elm Consulting Group International LLC (Elm) (collectively, the Audit Team) are conducting environmental compliance audits (the Audits) of certain coal combustion residuals (CCR) management locations owned or operated by Duke Energy Business Services LLC, Duke Energy Carolinas, LLC, and Duke Energy Progress, Inc. (collectively, Duke Energy). The Audits are being conducted under the direction of Mr. Benjamin Wilson, the Court Appointed Monitor (CAM), pursuant to an Order issued by the U.S. District Court, Eastern District of North Carolina, in case numbers 5:15-CR-62-H, 5:15-CR-67-H, and 5:15-CR-68-H.

The scope of the Audits is set forth in the plea agreements entered into by Duke Energy and the United States in the above cases, the Court's judgments in these cases, and a written Audit scoping document agreed to by Duke Energy and the United States.

1.1 BACKGROUND INFORMATION

The subject of this report is the Audit completed at Duke Energy's Roxboro Steam Electric Plant located in Semora, North Carolina. The Audit was conducted on July 22-23, 2019, for a total of two days on-site. The Audit Team members were:

• Mr. Christopher Reitman, P.E. AGC	Project Director, Audit Team Leader, Sr. Subject Matter Expert (on-site)
• Mr. Joseph Cotier, CPEA, Elm	Sr. Environmental Auditor (on-site)
• Mr. Bernie Beegle, P.G., AGC	Sr. Subject Matter Expert (off-site)

The facility was represented by:

- Mr. Tom Copolo, Station General Manager
- Mr. Jake Muessen, CCP System Owner

- Mr. Tim Hill, General Manager, Regional CCP Operations and Maintenance
- Ms. Gretchen Schroeder, CCP Engineering & Closure Engineering
- Mr. Bobby Barnes, Manager, Engineering & Closure Engineering
- Ms. Lori Tollie, EHS CCP Permitting and Compliance
- Ms. Kim Witt, EHS CCP Waste & Groundwater
- Ms. Tammy Jett, EHS CCP Waste & Groundwater (by phone)
- Mr. Randy Hart, Regulatory Affairs
- Ms. Keeley McCormick, Environmental Rover, EHS CCP Compliance
- Mr. Michael Phillips, Manager, EHS CCP Compliance
- Mr. Brian Fowler, EHS CCP Environmental Field Support
- Mr. Robert Howard, Station Environmental Field Support
- Mr. James Hailey, EHS CCP Health & Safety Field Support
- Mr. Keith Higgins, EHS CCP Compliance

1.2 FACILITY OVERVIEW

The Roxboro Steam Electric Plant (the Roxboro Facility) is located at 1700 Dunnaway Road in Semora, Person County, North Carolina. According to Duke Energy personnel, the Roxboro Facility has four coal-fired units, and the plant has a total electric generating capacity of 2,419 Megawatts (MWs) of power. All four coal burning units were operating while the Audit Team was on-site.

1.2.1 Ash Management Activities

The following information regarding the on-site CCR management facilities was provided during the pre-audit conference call or was found in the Operations and Maintenance Manual for the Roxboro Facility. The CCR management facilities include: two ash basins; one active landfill; three flue gas desulfurization (FGD) ponds; one gypsum storage area; and five fly ash silos.

These features are described below:

- West Ash Basin – The West Ash Basin has an area of approximately 240 acres and is made up of the following five dams/dikes: Main Dam (PERSO-038 by the North Carolina Department of Environmental Quality (NCDEQ)); Rock Filter Dam (PERSO-039 by NCDEQ); and three non-jurisdictional saddle dikes. According to the 2019 Annual Surface Impoundment Inspection Report, the West Ash Basin impounds approximately 12,970,000 tons of CCR and 120.8 million gallons of water as of March 12, 2019. The West Ash Basin historically received sluiced bottom ash, boiler slag, pyrites, stormwater, and flows from the East Ash Basin (stormwater and leachate). Duke Energy reported on their publicly available CCR website site that they ceased placing CCR and non-CCR waste in the West Ash Basin on April 10, 2019.

- East Ash Basin – The East Ash Basin was formed through the construction of the East Ash Basin Dam and was historically used as the ash treatment and storage basin for the Roxboro Facility. According to the 2019 Annual Surface Impoundment Inspection Report, this East Ash Basin has an area of approximately 126 acres and contains approximately 7,070,000 tons of CCR and no water (dry) as of March 12, 2019. An east finger of the East Ash Basin was identified by NCDEQ as a separate impoundment in its draft proposed ash basin classification document. Duke Energy subsequently clarified with NCDEQ that the "east finger" was not a separate impoundment but merely a portion of the East Ash Basin that was cut off as a result of construction of the landfill. This area is identified in Roxboro Facility correspondence as the Eastern Extension Impoundment.

  Ash flows to the East Ash Basin were discontinued in 1986; however, East Ash Basin stormwater and leachate from the CCP Landfill, which is located primarily within the East Ash Basin and is discussed below, historically discharged through a culvert system to the West Ash Basin. Duke Energy reported on their CCR publicly available website that they ceased placing CCR and non-CCR waste in the East Ash Basin on April 10, 2019.

- CCP Landfill – In 1988, the construction of the CCP Landfill (identified as the Industrial Landfill on CCR correspondence) was permitted. A significant portion of the CCP Landfill is located within the boundary of the East Ash Basin. The total permitted landfill area is approximately 280 acres, and development is permitted in six phases. Phases 1 through 5 were permitted and constructed with a single liner with leachate collection; Phase 6 has a double liner system with leachate collection and leak detection. Phases 1 through 5 have a temporary cover while Phase 6 is active with ongoing placement of waste. The waste being landfilled includes fly ash, bottom ash, boiler slag, mill rejects, FGD residuals, and gypsum.

- FGD Ponds – There are three FGD Ponds at the Roxboro Facility that are formed by three dams that share abutment features. The total length of the exterior dam is 5,100 feet. These three ponds are the West FGD Settling Pond (identified as PERSO-039 by NCDEQ), the East FGD Settling Pond (identified as PERSO-041 by NCDEQ), and the FGD Forward Flush (FF) Pond (identified as PERSO-042 by NCDEQ). The West and East FGD Settling Ponds receive FGD blowdown. The FGD FF Pond receives inflow from the back-flush of the bioreactor. The inflow is treated and released from the West and East FGD Settling Ponds at NPDES Internal Outfall 010. According to the 2019 Annual Surface Impoundment Inspection Report, the three FGD Ponds at the Roxboro Facility have a total area of approximately 29.5 acres and contain approximately 203,300 tons of CCR as of March 12, 2019. Impounded water in the FGD Ponds varies based upon bioreactor operations.

- Gypsum Storage Area – The Gypsum Storage Area is located north of the East Ash Basin. The Gypsum Storage Area stores gypsum material from the FGD process of the Roxboro Facility and Duke Energy's Mayo Facility. A conveyor at the Roxboro Facility is used to transfer the gypsum to the Gypsum Storage Area. The gypsum is moved from the Gypsum Storage Area to an off-site wallboard manufacturer on the other (far) side of the Intake Canal with another conveyor system. Off-spec gypsum is disposed in the on-site CCP Landfill.

- Fly Ash Silos – The Roxboro Facility contains five dry fly ash silos. Fly ash is transferred pneumatically into the ash silos. At the silos, the fly ash is treated for on-site disposal in the CCP Landfill or separated for beneficial use.

In addition to the above described ash management activities, three legacy ash structural fills exist at the facility. These legacy structural fills are located: 1) under the coal pile; 2) under the gypsum pad; and 3) under the CCP landfill.

1.2.2 Environmental Permits and Programs

The Roxboro Facility operates under a number of current environmental permits and programs, including:

- **National Pollutant Discharge Elimination System (NPDES) Wastewater Permitting and Special Order by Consent Discharges –** NCDEQ issued NPDES Permit No. NC00003425 with an effective date of May 1, 2007 and an expiration date of March 31, 2012. A timely permit renewal application package was submitted to NCDEQ on September 27, 2011. Permit renewal updates were submitted to NCDEQ on July 5, 2016 (inclusion of Areas of Wetness S-18 and S-19) and November 6, 2018 (direct coal pile runoff to the new Lined Retention Basin; include the new Lined Retention Basin discharge as internal outfall 012B;

include Outfall 012B as a discharge to existing Outfall 003 via the Heated Water Discharge Canal; and eliminate Outfall 006). A new permit has not yet been issued by NCDEQ. As it relates to CCR management activities, the currently effective permit covers the following Outfalls:

- Internal Outfall 002 – Ash Basin treatment system waters flow to a discharge canal, then the Heated Water Discharge Canal, and then discharge to Hyco Lake via Outfall 003;
- Outfall 003 – The Heated Water Discharge Canal collects various waters from the plant and discharges to Hyco Lake through this outfall;
- Internal Outfall 005 – Cooling tower blowdown water from Unit 4 discharges to the ash basin system through this outfall;
- Outfall 006 – Coal pile runoff, limestone and gypsum pile runoff, and wheel wash water all flow to a retention pond for neutralization, sedimentation, and equalization and then discharge to Hyco Lake through this outfall;
- Internal Outfall 008 – Domestic wastewater discharges to the ash basin system through this outfall;
- Internal Outfall 009 – Chemical metal wash water discharges to the ash basin system through this outfall; and
- Internal Outfall 010 – FGD treatment system waters flow to the west basin canal, then the Heated Water Discharge Canal, and then discharge to Hyco Lake via Outfall 003.

On March 14, 2019, Duke Energy submitted a letter to NCDEQ advising of the commissioning of the new Lined Retention Basin, which would receive all Roxboro Facility waters. These waters were previously directed to the Ash Basin. NCDEQ approved these changes in its March 26, 2019 letter response to Duke Energy. Wastewater discharges to the Ash Basin were discontinued and redirected to the Lined Retention Basin on April 10, 2019. Discharge from the Lined Retention Basin via Outfall 012B commenced on April 22, 2019. As noted above, Outfall

012B discharges to the Heated Water Discharge Canal and then to Outfall 003, and was included in the Roxboro Facility's NPDES permit renewal updates. However, NCDEQ has not yet issued a new permit.

The Roxboro Facility currently operates a network of eight compliance wells sampled three times per year for determining compliance with groundwater limits pursuant to 15A NCAC 02L.0200.

On August 15, 2018, the North Carolina Environmental Management Commission Special Order by Consent No. EMC SOC WQ S18-005 (SOC) issued to Duke Energy became effective. The SOC has an expiration date of "no later than June 30, 2022." The SOC covers discharges from the following seeps: S-01, S-02, S-03, S-04, S-05, S-06, S-07, S-08, S-09, S-10, S-11, S-12, S-13, S-14, S-18, S-19, S-20, S-21, S-22 and S-23, all considered non-constructed seeps. Non-constructed seeps are not on or within a dam structure and do not convey wastewater via a pipe or constructed channel directly to a receiving stream.

Seeps S-10, S-11, and S-12 have been dispositioned due to lack of flow. These seeps do not carry monitoring requirements. For monitoring purposes, the following seeps are represented by other seeps or monitoring programs: S-01, S-02, S-03, S-04, S-05, S-06, S-07, S-08, S-13, S-14, S-19, S-21, S-22, and S-23. Monitoring is required at S-13, S-18, and S-20. S-18 and S-20 include interim action levels for total hardness, total dissolved solids, and sulfates. Seep S-13 is represented by instream monitoring covering the 2B standards in an unnamed tributary to Hyco Lake. Quarterly monitoring is required for parameters specified in the SOC. At the time of the Audit, four rounds of sampling had been conducted. No exceedances of Interim Action Levels were noted.

Additional requirements of the SOC included:

- Payment of an upfront civil penalty within 30 days of SOC issuance. This penalty was paid September 13, 2018.
- Completion of the dry bottom ash system (submerged flight conveyor or SFC) by May 31, 2019. In a March 21, 2019 letter to NCDEQ, Duke Energy reported commencement of the dry bottom ash handling system.
- Initiation of decanting of the Ash Basin by June 30, 2019. In its first quarterly decanting report to NCDEQ dated July 12, 2019, Duke Energy reported commencement of decanting had taken place on April 10, 2019.
- Annual completion of a comprehensive survey of existing and potentially new seeps. New non-constructed seeps identified and reported to NCDEQ in the Annual Seep Report are deemed covered by the SOC. The Annual Seep Survey was conducted on October 25, 2018 with a subsequent report submitted to NCDEQ on April 24, 2019. The SOC requires the Annual Seep Survey to be submitted by April 30 each year. No new seeps were identified during the 2018 annual seep survey.
- Posting of a copy of the Roxboro Facility NPDES Permit, SOC, and related reports on Duke Energy’s external website. All required documents have been posted.

- **NPDES Industrial Stormwater Permitting** – NCDEQ issued Individual Stormwater Permit No. NCS000581 with an effective date of January 27, 2017 and an expiration date of December 31, 2021. The permit was modified on June 22, 2017 and includes one stormwater outfall, SW-A, which drains an area north of the generation powerhouse and discharges to Hyco Lake. A Stormwater Pollution Prevention Plan (SWPPP) dated June 2017 has been developed and implemented.

- **NPDES Construction Stormwater Permitting** – NCDEQ has issued ten stormwater construction permits to Duke Energy for activities related to the facility's CCR management. These permits were issued by NCDEQ under its Stormwater General Permit for Construction Activities, No. NCG010000.
    - PERSO-2017-004 was issued November 7, 2016 for the Water Redirection Program (submerged flight conveyor);
    - PERSO-2017-011 was issued April 24, 2017 for wastewater treatment, bottom ash, and the retention basin;
    - PERSO-2018-014 was issued April 30, 2018 for the Leachate Transfer Line;
    - PERSO-2018-010 was issued March 16, 2018 for the Lined Retention Basin (LRB) Emergency Spillway;
    - PERSO-2018-005 was issued November 17, 2017 for the Process Water Redirect-Final Phase;
    - PERSO-2018-010 was issued May 11, 2018 for Water Redirection Project-Final Phase;
    - PERSO-2018-003 was issued October 11, 2017 for the Phase 6 Landfill-East Divider berm;
    - PERSO-2014-001 was issued August 16, 2013 for the Monofill Borrow Area;
    - PERSO-2014-004 was issued September 5, 2013 for the Lined Ash Monofill-Phase 6; and
    - PERSO-2017-005 was issued January 13, 2017 for Monofill Berm Vegetation Removal.

At the time of the Audit, erosion and sedimentation control plans were in place for these projects.

- **Title V Permitting** – Title V Permit No. 01001T56, effective November 27, 2018 and with an expiration date of September 30, 2023, has been issued to the Roxboro Facility for all facility activities, including gypsum storage and transfer operations, ash transfer operations, ash silos, and ash basin management. Ash management activities listed as sources included: fly and bottom ash handling; the CCP landfill; the gypsum handling; and the truck transport of ash and gypsum. Fugitive dust control was included in Section 3.MM of the permit.

- **Spill Prevention, Control, and Countermeasure (SPCC) Plan** – A Tier I Qualified Plan was prepared by Charah, Inc., a contractor to Duke Energy, for ash excavation and gypsum management activities. The SPCC Plan was dated July 30, 2018.

- **Tier II Reporting** – Hazardous chemicals inventory reporting on Tier II for 2018 has been completed and was submitted on February 25, 2019.

- **CCP Landfill** – The CCP Landfill began operating under NCDEQ Solid Waste Permit No. 7302 in 1988. The permit requires semi-annual groundwater monitoring, semi-annual sampling of untreated leachate, an annual dam safety progress reporting, a record of the amount of waste received (compiled on a monthly basis), and submission of an annual report. The CCP Landfill groundwater monitoring network consists of five (5) detection wells and one (1) background well, which are sampled semi-annually.

- **Waste Unit Compliance Boundaries** – NCDEQ issued a letter dated August 25, 2017 to Duke Energy regarding compliance boundaries for North Carolina coal ash facilities. On February 15, 2018, Duke Energy submitted to NCDEQ an updated compliance boundary map for the Roxboro Facility Ash Basins that eliminated the Gypsum Storage Area. On June 26, 2018, Duke Energy submitted to NCDEQ a future compliance boundary for the Roxboro Facility that will eliminate the compliance boundary associated with the Eastern Extension Impoundment located on the northwest the East Ash Basin. Duke Energy plans on removing the CCR within this impoundment as part of closure activities.

- **North Carolina Coal Ash Management Act of 2014 (CAMA)** – CAMA requires identification of drinking water supply wells within one-half mile of the facility, submission of Groundwater Assessment Plans, installation and multiple rounds of sampling from Assessment Wells, submission of Groundwater Assessment Reports summarizing groundwater investigations, submission of an Annual Groundwater Protection and Restoration Report, submission of Discharge Assessment Plans to characterize seeps, submission of a Groundwater Corrective Action Plan, and ash basin closure/removal. These activities have been completed in accordance with the schedule required under CAMA.

  NCDEQ initially assigned both the East and West Ash Basins at the Roxboro Facility an "intermediate risk" classification under CAMA. An intermediate risk classification requires excavation, removal, and safe storage of the impounded coal ash by December 31, 2024. Duke Energy completed dam improvements and local installation of an alternative potable drinking water, and as a result, NCDEQ assigned the Roxboro Facility a "low risk" ranking on November 13, 2018. The low risk classification allows in-place closure activities at the East and West Ash Basins and provides an extension of the closure deadline to June 2030. However, on April 1, 2019, NCDEQ issued a closure determination directing Duke Energy to excavate all of the CAMA-related coal ash from the Roxboro Facility and properly dispose of it. On April 26, 2019, Duke Energy filed an administrative petition challenging NCDEQ's determination.

The current Interim Monitoring Plan (IMP) for groundwater monitoring at the Roxboro Facility includes sampling 25 wells quarterly and 75 wells semi-annually. Duke Energy submitted the 2018 CAMA Interim Monitoring Report dated April 30, 2019 to NCDEQ.

Duke Energy submitted to NCDEQ the Roxboro Facility's 2018 Groundwater Protection and Restoration Annual Report on January 25, 2019 and its 2018 Surface Water Protection and Restoration Annual Report on January 21, 2019.

- **Federal Coal Combustion Residuals Rule (CCR Rule)** – The CCR Rule (40 CFR, part 257, Subpart D) identifies standards for the disposal of CCR in landfills and surface impoundments. The West Ash Basin, the East Ash Basin, the CCP Landfill, the West FGD Settling Pond, the East FGD Settling Pond, and the FGD Forward Flush Pond are subject to the CCR Rule because the Roxboro Facility continues to use coal for power generation. Tables 1a through 1f summarize the reports and plans posted by Duke Energy to its publicly available website in accordance with the CCR Rule.

The East Ash Basin and the CCP Landfill's CCR multi-unit monitoring well network (CCR Multi-unit 1) consists of 25 CCR monitoring wells. The West Basin, the West FGD Settling Pond, the East FGD Settling Pond, and the FGD Forward Flush Pond utilize a separate CCR multi-unit monitoring well network (CCR Multi-unit 2) consisting of 34 CCR monitoring wells

On February 27, 2018, Duke Energy provided notice on Duke Energy's public website that the West Ash Basin, the East Ash Basin, the CCP Landfill, the West FGD Settling Pond, the East FGD Settling Pond, and the FGD Forward Flush Pond are now in the CCR assessment monitoring program due to statistically significant increases over the background values of the Appendix III parameters.

On November 7, 2018, Duke Energy posted on Duke Energy's public website the required location restrictions for the Roxboro Facility impoundments, which stated the East Ash Basin and West Ash Basin did not meet the surface impoundment standard for placement above the uppermost aquifer (40 CFR § 257.60(a)). The West Ash Basin did not meet the surface impoundment standard for wetlands (40 CFR § 257.61(a)). Failure to meet the wetlands restriction requires Duke Energy to cease placing CCR and non-CCR waste streams into the West Ash Basin by April 12, 2019 and begin closure.

On December 14, 2018, Duke Energy provided notice on Duke Energy's public website that the following CCR Rule Appendix IV constituents were detected at levels above the applicable Groundwater Protection Standard (GWPS).

East Ash Basin and Industrial Landfill

- Cobalt
- Lithium
- Molybdenum
- Selenium

West Ash Basin, East and West FGD Settling Ponds, and the FGD Forward Flush Pond

- Arsenic
- Cobalt
- Molybdenum

On February 19, 2019, Duke Energy provided notice on Duke Energy's public website that an assessment of corrective measures was initiated for the East Ash

Basin, the Industrial Landfill, the West FGD Settling Pond, the East FGD Settling Pond, and the FGD Forward Flush Pond in accordance with 40 CFR § 257.96(a).

On March 1, 2019, Duke Energy posted on its public website the CCR Annual Groundwater Monitoring and Corrective Action Reports, dated January 18, 2019, for the West Ash Basin, the East Ash Basin, the CCP Landfill, the West FGD Settling Pond, the East FGD Settling Pond, and the FGD Forward Flush Pond.

On May 7, 2019, Duke Energy provided notice on Duke Energy's public website of CCR Assessment of Corrective Measures Reports for the East Ash Basin, the Industrial Landfill, the West FGD Settling Pond, the East FGD Settling Pond, and the FGD Forward Flush Pond.

On May 20, 2019, Duke Energy posted on its public website the Notice of Intent to Close the East Ash Basin and the West Ash Basin and noted that flows to these Basins were ceased on April 10, 2019.

1.2.3 Dam and Other Structural Permits and Approvals

The Main Dam (PERSO-038) and the Rock Filter Dam (PERSO-039) of the West Ash Basin, the East Ash Basin Dam (PERSO-033), the West FGD Pond (PERSO-040), the East FGD Pond (PERSO-041), and FGD FF Pond (PERSO-042) at the Roxboro Facility are associated with the ash management operations. These dams were grandfathered under North Carolina's Session Law 2009-390 (Senate Bill 1004, effective January 1, 2010). Under this grandfathering, the original design of the dams is not subject to the current design standards for new construction, although modifications after the effective date may be subject to these standards. All five (5) dams referenced above have a high hazard classification under the North Carolina Dam Safety system.

Over the last year Duke Energy modified the lower bench of the East Ash Basin Dam to facilitate installation of the Dry Fly Ash Silo Pipeline and repaired two culverts which go under a road in the area of the landfill. Duke Energy has also submitted plans to remove (breach) the West FGD Settling Pond Dam, the East FGD Settling Pond Dam, and the Forward Flush Pond Dam.

A new Lined Retention Basin dam and a new Holding Basin Dam were also constructed and Engineer of Record Certifications were submitted for each on February 13, 2019.

On February 1, 2019, Chapter 15A section 02K.0224 of the North Carolina Administrative Code (15A NCAC 02K.0224) was published in the North Carolina Register. These regulations created new standards for CCR impoundment during flood events. Duke Energy met with NCDEQ to discuss these regulations on March 13, 2019 and completed analysis of the spillways at their facilities on July 10, 2019. The analysis showed the Roxboro East Ash Basin will require modification to meet the new requirements. Duke Energy is scheduled to meet with NCDEQ on August 21, 2019 to discuss their approach and the timing for meeting these new CCR basin standards.

1.2.4 Audit Notes and Observations and an Update of Facility Activities

During the 2019 Audit, the redirection of water flow activities were substantially complete. This project included construction of a new wastewater treatment system that includes the Lined Retention Basin and the Holding Basin and construction of a submerged flight conveyor, which allows dry handling of the bottom ash that historically was sluiced to the West Ash Basin and came on line in December 2018. These new facilities are on the western side of the Roxboro Facility property. The new Lined Retention Basin required construction of a high hazard dam based on its size and the amount of wastewater it may hold.

Significant projects completed or underway on the West Ash Basin included: cleaning a pipe under Dunnaway Road; developing plans for decommissioning of the FGD Basins; and construction of a dewatering pad near the Western Ash Basin Dam.

Significant projects completed or under construction on the East Ash Basin included: installation of an ash pipeline to convey dry fly ash silo discharge and water from the East Ash Basin to the new Lined Retention Basin; repair of two culverts; and closure of a small section of the CCP Landfill which sits above a newly installed landfill leachate collection system.

Final closure plans are being revised and permit level drawings are planned for submission by December 31, 2019 for both the East and the West Ash Basins. Duke Energy anticipates having design approaches for both a cap-in-place closure approach and a CAMA ash-excavation approach available for the December 31, 2019 submission.

2.0 AUDIT SCOPE AND SUBJECT MATTER

The Audit was completed in accordance with the court documents and the Audit scoping document agreed to by Duke Energy and the United States. A description of the scope is provided in Attachment A. The Audit included ash management activities, including aspects of generation that affect the nature of the waste streams from the point of generation into surface impoundments or ash management basins, landfills, and/or storage piles. The Audit focused on the activities at the facility since the date of the last Audit, which was July 23-24, 2018.

3.0 AUDIT FINDINGS

The following Findings at the Roxboro Facility were identified by the Audit Team.

3.1 EXCEEDANCES OF THE STATE GROUNDWATER QUALITY STANDARDS

Requirement – The State groundwater rules establish maximum contaminant levels for groundwater at or beyond the compliance boundaries for the East and West Ash Basins. *See* 15A NCAC 02L.0202. 15A NCAC 02L.0103(d) provides that "[n]o person shall conduct or cause to be conducted, any activity which causes the concentration of any substance to exceed that specified" under the Class GA standards or the interim maximum acceptable concentrations (IMACs) established for groundwater quality pursuant to 15A NCAC 02L.0202. Further, under N.C.G.S.A. § 143-215.1(i), "[a]ny person … who is required to obtain an individual permit … for a disposal system under the authority of N.C.G.S.A. § 143-215.1 [water pollution control] … shall have a compliance boundary … beyond which groundwater quality standards may not be exceeded." *See also* 15A NCAC 02L.0102(3) (defining "compliance boundary" as "a boundary around a disposal system at and beyond which groundwater quality standards may not be exceeded").

In addition, under N.C.G.S.A. § 143-215.6A(a)(1), civil penalties may be assessed against any person who violates any standard established by NCDEQ under the authority of N.C.G.S.A. § 143-214.1, which covers groundwater standards.

Finding – Constituents exceeding the standards for Class GA waters, established in 15A NCAC 02L.0202, were documented in monitoring wells located at or beyond the compliance boundary for the East and/or West Ash Basins. Based on the review of the 2018 and 2019 CAMA groundwater monitoring analyses and the NPDES groundwater monitoring analyses, pH, boron, cobalt, iron, manganese, sulfate, vanadium, and TDS were observed to exceed the 02L or IMAC groundwater standards, or NCDEQ-approved PBTVs if the PBTV was greater than the 02L or IMAC groundwater standards, one or more times at or beyond the compliance boundaries of the East and/or West Ash Basins. The 2018 and 2019 groundwater data summary and a well location map are located in Attachment B to this report. Attachment C provides the 2018 and 2019 NPDES Ash Basin Groundwater Results.

Duke Energy is addressing the groundwater exceedances as required by the state under CAMA, as well as under the CCR rule. Duke Energy has stated its opinion that, pursuant to a September 2015 Settlement Agreement with NCDEQ, “Duke Energy is not subject to any further financial penalties for exceedances of groundwater standards” and “Duke Energy is not subject to any further enforcement action based on exceedances of groundwater standards as long as it remains in substantial compliance with CAMA groundwater requirements.”

The CAM has advised the Audit Team that the Audit scope does not include an evaluation of compliance with the September 2015 Settlement Agreement, and therefore the Audit Team does not take a position on Duke Energy’s opinion.

4.0 OPEN LINES OF INQUIRY

Open Lines of Inquiry are items identified by the Audit Team while on-site that, due to limited available information or the need for additional research, could not be determined as being in compliance or out of compliance. There were no Open Lines of Inquiry identified during the Audit.

5.0 AUDIT APPROACH

5.1 ON-SITE ACTIVITIES

During its time on-site, the Audit Team conducted an opening conference with facility personnel to discuss the scope of work and the plan for accomplishing necessary tasks while at the facility. A site tour of the coal ash management and program support areas was subsequently completed. Following the tour, the Audit Team conducted a review of pertinent files, interviews with facility representatives, and verification of facility activities related to the ECPs, written programs, and permits. A debrief was conducted each Audit day to advise the facility representatives of Audit progress, open lines of inquiry, possible Audit findings, and needs for the next day. At the completion of the Audit, the Audit Team led a verbal discussion of draft Audit findings with facility representatives.

5.2 STANDARDS OF PRACTICE

The fieldwork portion of the Audit was conducted on July 22-23, 2019, with compliance reporting commencing May 14, 2015, the date of the Court's judgments. The Audit focused on the activities at the facility since the date of the last Audit, which was July 23-24, 2018 and was based on:

- Physical inspections of the facility;
- Examination of selected administrative and operating records made available by facility staff at the Audit Team's request;
- Interviews and discussions with key facility management and staff; and
- Verification procedures designed to assess the facility's application of, and adherence to, terms of the Probation, environment laws and regulations, and site policies and procedures. In addition, the Audit Team reviewed the facility's adherence to good management practices.

The Audit followed established audit protocols and procedures. It should be understood that the Audit consisted of evaluating a sample of practices and was conducted over a short period of time.

Efforts were made to sample major facets of environmental performance during the period under review. This method is intended to uncover major system deficiencies, and the Audit may not have identified all potential problems.

To support the overall independence of the Audit process, the Audit included an auditing professional certified by the Board of Environmental, Health and Safety Auditor Certifications (BEAC). BEAC is an accredited professional certification board that issues the Certified Professional Environmental Auditor (CPEA) designation to qualified auditors. Under BEAC, auditor independence is a key criterion for the implementation of an effective third-party audit program. The Audit was implemented in accordance with the standards related to auditor independence.

The process by which the Audit was conducted was consistent with the general state of the art of environment auditing and the best professional judgment of the Audit Team. To conduct the Audit, the team implemented a formal approach, drawing on process guidance from both BEAC and the Auditing Roundtable (AR) guidance documents. Guidance documents included:

- *Standards for the Professional Practice of Environmental, Health and Safety Auditing*. Prepared by the Board of Environmental, Health and Safety Auditor Certifications, 2008.

- ISO 19011:2002 – *Guidelines for Quality and/or Environmental Management Systems Auditing*. Prepared by the International Organization for Standardization, 2002.

- *Standard for the Design and Implementation of an Environmental, Health and Safety Audit Program*. Prepared by The Auditing Roundtable, Inc., 1995.

- *Minimum Criteria for the Conduct of Environmental, Health and Safety Audits*. Prepared by The Auditing Roundtable, Inc.

5.3 REPRESENTATIVE SAMPLING

When confronted with a large population of data to review or equipment to inspect, the Audit Team employed representative sampling techniques to evaluate records over the Audit period requested, and as necessary, for physical inspection of some types of common equipment. The sample size for records reviews or equipment inspections required professional judgment.

The Audit Team’s judgement considered the following:

- The outcome of the evaluation of the records sampled. If problems are found in the representative sample, more records may need to be examined to evaluate compliance status.
- Potential for or severity of non-compliance.
- The general appearance and observed practices of certain operating areas.
- Information obtained during an interview that indicates a potential problem.
- Other specific information or guidance from the CAM.
- Time available during the Audit.

The Audit Team also employed the following types of sampling techniques, depending upon the characteristics of a specific population:

- Random sampling – every item has an equal chance of being selected.
- Interval sampling – select every nth item, (e.g., every third manifest in chronological order as contained in facility files).
- Block sampling – auditor uses his/her judgment to select a specific block of items, (e.g., petroleum storage tank inspections from April to October).
- Stratified sampling – population is divided into groups, which are then sampled through random or judgmental techniques.

TABLES

TABLE 1A
East Ash Basin (East Ash Pond) - Plans and Reports Posted by Duke Energy under the CCR Rule

Document Name	Category	Release Date
Emergency Action Plan East Ash Pond, West Ash Pond, West Settling Pond East Settling Pond and FGD Forward Flush Pond	Design Criteria	08/28/2019
CCR Annual Surface Impoundment Inspection Report 2019	Operating Criteria	05/29/2019
Notice of Intent to Close	Closure and Post Closure Care	05/20/2019
CCR Assessment of Corrective Measures Report	Groundwater Monitoring and Corrective Action	05/07/2019
Annual Meeting with Local Emergency Responders 2019	Design Criteria	04/24/2019
CCR Annual Groundwater Monitoring and Corrective Action Report 2018	Groundwater Monitoring and Corrective Action	03/01/2019
Notice of Initiation of Assessment of Corrective Measures	Groundwater Monitoring and Corrective Action	02/19/2019
Notice of Groundwater Protection Standard Exceedance 2018	Groundwater Monitoring and Corrective Action	12/14/2018
EAP Activation Level 3, 10/31/2018: 6.5" Hole Discovered and Water Coming from Hole	Design Criteria	12/05/2018
Annual Fugitive Dust Control Report 2018	Operating Criteria	12/05/2018
Fugitive Dust Control Plan	Operating Criteria	11/19/2018
Wetlands	Location Restriction	11/07/2018
Unstable Areas	Location Restriction	11/07/2018
Seismic Impact Zones	Location Restriction	11/07/2018
Fault Areas	Location Restriction	11/07/2018
Placement Above Uppermost Aquifer	Location Restriction	11/07/2018

TABLE 1A
(Continued)

Document Name	Category	Release Date
Emergency Action Plan Roxboro East Ash Pond, West Ash Pond and Associated Structures	Design Criteria	10/01/2018
CCR Annual Surface Impoundment Inspection Report 2018	Operating Criteria	06/06/2018
Annual Meeting with Local Emergency Responders 2018	Design Criteria	05/01/2018
Inundation map	Design Criteria	04/09/2018
Notice of Establishment of an Assessment Monitoring Program Roxboro East Ash Pond	Groundwater Monitoring and Corrective Action	02/27/2018
CCR Annual Groundwater Monitoring and Corrective Action Report	Groundwater Monitoring and Corrective Action	02/06/2018
2017 Annual CCR Fugitive Dust Control Report-Roxboro	Operating Criteria	11/29/2017
Groundwater Monitoring System Certification-Roxboro East Ash Pond	Groundwater Monitoring and Corrective Action	11/06/2017
Groundwater Sampling and Analysis Program Selection of Statistical Method Certification-Roxboro East Ash Pond	Groundwater Monitoring and Corrective Action	10/25/2017
Roxboro Inundation Maps	Design Criteria	10/06/2017
Fugitive Dust Control Plan Revision 1	Operating Criteria	08/02/2017
CCR Annual Surface Impoundment Inspection Report 2017 - Roxboro	Operating Criteria	06/06/2017
Annual Meeting with Local Emergency Responders 2017	Design Criteria	05/24/2017
Annual Fugitive Dust Control Report 2016	Operating Criteria	12/05/2016
Initial Structural Stability Assessment	Design Criteria	11/16/2016
Initial Factor of Safety Assessment	Design Criteria	11/15/2016
Post Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016

TABLE 1A
(Continued)

Document Name	Category	Release Date
Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016
Inflow Design Flood Control System	Operating Criteria	11/03/2016
History of Construction	Design Criteria	10/25/2016
Initial Hazard Classification Assessment Certification	Design Criteria	10/12/2016
Existing Liner Design Criteria	Design Criteria	10/11/2016
Annual Surface Impoundment Inspection Report 2016	Operating Criteria	06/15/2016
Annual Surface Impoundment Report (Initial)	Operating Criteria	02/16/2016
Annual Surface Impoundment Report (Initial) Revision 1	Operating Criteria	02/19/2016

*This summary of reports was downloaded on October 10, 2019

TABLE 1B
West Ash Basin (West Ash Pond) - Plans and Reports Posted by Duke Energy under the CCR Rule

Document Name	Category	Release Date
Emergency Action Plan East Ash Pond, West Ash Pond, West Settling Pond East Settling Pond and FGD Forward Flush Pond	Design Criteria	08/28/2019
CCR Annual Surface Impoundment Inspection Report 2019	Operating Criteria	05/29/2019
Notice of Groundwater Protection Standard Exceedance 2019	Groundwater Monitoring and Corrective Action	05/20/2019
Notice of Intent to Close	Closure and Post Closure Care	05/20/2019
CCR Assessment of Corrective Measures Report	Groundwater Monitoring and Corrective Action	05/07/2019
Annual Meeting with Local Emergency Responders 2019	Design Criteria	04/24/2019
CCR Annual Groundwater Monitoring and Corrective Action Report 2018	Groundwater Monitoring and Corrective Action	03/01/2019
Notice of Initiation of Assessment of Corrective Measures	Groundwater Monitoring and Corrective Action	02/19/2019
Notice of Groundwater Protection Standard Exceedance 2018	Groundwater Monitoring and Corrective Action	12/14/2018
Annual Fugitive Dust Control Report 2018	Operating Criteria	12/05/2018
Fugitive Dust Control Plan	Operating Criteria	11/19/2018
Wetlands	Location Restriction	11/07/2018
Unstable Areas	Location Restriction	11/07/2018
Seismic Impact Zones	Location Restriction	11/07/2018
Fault Areas	Location Restriction	11/07/2018

TABLE 1B
(Continued)

Document Name	Category	Release Date
Placement Above Uppermost Aquifer	Location Restriction	11/07/2018
Emergency Action Plan Roxboro East Ash Pond, West Ash Pond and Associated Structures	Design Criteria	10/01/2018
CCR Annual Surface Impoundment Inspection Report 2018	Operating Criteria	06/06/2018
Annual Meeting with Local Emergency Responders 2018	Design Criteria	05/01/2018
Notice of Establishment of an Assessment Monitoring Program Roxboro West Ash Basin	Groundwater Monitoring and Corrective Action	02/27/2018
CCR Annual Groundwater Monitoring and Corrective Action Report	Groundwater Monitoring and Corrective Action	02/06/2018
2017 Annual CCR Fugitive Dust Control Report-Roxboro	Operating Criteria	11/29/2017
Groundwater Monitoring System Certification-Roxboro West Ash Basin	Groundwater Monitoring and Corrective Action	11/06/2017
Groundwater Sampling and Analysis Program Selection of Statistical Method Certification-Roxboro West Ash Basin	Groundwater Monitoring and Corrective Action	10/25/2017
Roxboro Inundation Maps	Design Criteria	10/06/2017
Fugitive Dust Control Plan Revision 1	Operating Criteria	08/02/2017
CCR Annual Surface Impoundment Inspection Report 2017 - Roxboro	Operating Criteria	06/06/2017
Annual Meeting with Local Emergency Responders 2017	Design Criteria	05/24/2017
Annual Fugitive Dust Control Report 2016	Operating Criteria	12/05/2016
Initial Structural Stability Assessment	Design Criteria	11/16/2016
Initial Factor of Safety Assessment	Design Criteria	11/15/2016
Post Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016

TABLE 1B
(Continued)

Document Name	Category	Release Date
Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016
Inflow Design Flood Control System	Operating Criteria	11/03/2016
History of Construction	Design Criteria	10/25/2016
Initial Hazard Classification Assessment Certification	Design Criteria	10/12/2016
Existing Liner Design Criteria	Design Criteria	10/11/2016
Annual Surface Impoundment Inspection Report 2016	Operating Criteria	06/15/2016
Annual Surface Impoundment Report (Initial)	Operating Criteria	02/16/2016
Annual Surface Impoundment Report (Initial) Revision 1	Operating Criteria	02/19/2016

*This summary of reports was downloaded on October 10, 2019

TABLE 1C
West FGD Settling Pond - Plans and Reports Posted by Duke Energy under the CCR Rule

Document Name	Category	Release Date
Emergency Action Plan East Ash Pond, West Ash Pond, West Settling Pond East Settling Pond and FGD Forward Flush Pond	Design Criteria	08/28/2019
CCR Annual Surface Impoundment Inspection Report 2019	Operating Criteria	05/29/2019
Notice of Groundwater Protection Standard Exceedance 2019	Groundwater Monitoring and Corrective Action	05/20/2019
CCR Assessment of Corrective Measures Report	Groundwater Monitoring and Corrective Action	05/07/2019
Annual Meeting with Local Emergency Responders 2019	Design Criteria	04/24/2019
CCR Annual Groundwater Monitoring and Corrective Action Report 2018	Groundwater Monitoring and Corrective Action	03/01/2019
Notice of Initiation of Assessment of Corrective Measures	Groundwater Monitoring and Corrective Action	02/19/2019
Notice of Groundwater Protection Standard Exceedance 2018	Groundwater Monitoring and Corrective Action	12/14/2018
Annual Fugitive Dust Control Report 2018	Operating Criteria	12/05/2018
Fugitive Dust Control Plan	Operating Criteria	11/19/2018
Wetlands	Location Restriction	11/07/2018
Unstable Areas	Location Restriction	11/07/2018
Seismic Impact Zones	Location Restriction	11/07/2018
Fault Areas	Location Restriction	11/07/2018
Placement Above Uppermost Aquifer	Location Restriction	11/07/2018
Emergency Action Plan Roxboro East Ash Pond, West Ash Pond and Associated Structures	Design Criteria	10/01/2018
CCR Annual Surface Impoundment Inspection Report 2018	Operating Criteria	06/06/2018

TABLE 1C
(Continued)

Document Name	Category	Release Date
Annual Meeting with Local Emergency Responders 2018	Design Criteria	05/01/2018
Notice of Establishment of an Assessment Monitoring Program Roxboro West FGD Settling Pond	Groundwater Monitoring and Corrective Action	02/27/2018
CCR Annual Groundwater Monitoring and Corrective Action Report	Groundwater Monitoring and Corrective Action	02/06/2018
2017 Annual CCR Fugitive Dust Control Report-Roxboro	Operating Criteria	11/29/2017
Groundwater Monitoring System Certification-Roxboro West FGD Settling Pond	Groundwater Monitoring and Corrective Action	11/06/2017
Groundwater Sampling and Analysis Program Selection of Statistical Method Certification-Roxboro West FGD Settling Pond	Groundwater Monitoring and Corrective Action	10/25/2017
Roxboro Inundation Maps	Design Criteria	10/06/2017
Fugitive Dust Control Plan Revision 1	Operating Criteria	08/02/2017
CCR Annual Surface Impoundment Inspection Report 2017 - Roxboro	Operating Criteria	06/06/2017
Annual Meeting with Local Emergency Responders 2017	Design Criteria	05/24/2017
Annual Fugitive Dust Control Report 2016	Operating Criteria	12/05/2016
Initial Structural Stability Assessment	Design Criteria	11/16/2016
Initial Factor of Safety Assessment	Design Criteria	11/15/2016
Post Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016
Inflow Design Flood Control System	Operating Criteria	11/03/2016
History of Construction	Design Criteria	10/25/2016
Initial Hazard Classification Assessment Certification	Design Criteria	10/12/2016

TABLE 1C
(Continued)

Document Name	Category	Release Date
Existing Liner Design Criteria	Design Criteria	10/11/2016
Annual Surface Impoundment Inspection Report 2016	Operating Criteria	06/15/2016
Annual Surface Impoundment Report (Initial)	Operating Criteria	02/16/2016
Annual Surface Impoundment Report (Initial) Revision 1	Operating Criteria	02/19/2016
Inflow Design Flood Control System	Operating Criteria	11/03/2016

*This summary of reports was downloaded on October 10, 2019

TABLE 1D
East FGD Settling Pond - Plans and Reports Posted by Duke Energy under the CCR Rule

Document Name	Category	Release Date
Emergency Action Plan East Ash Pond, West Ash Pond, West Settling Pond East Settling Pond and FGD Forward Flush Pond	Design Criteria	08/28/19
CCR Annual Surface Impoundment Inspection Report 2019	Operating Criteria	05/29/2019
Notice of Groundwater Protection Standard Exceedance 2019	Groundwater Monitoring and Corrective Action	05/20/2019
CCR Assessment of Corrective Measures Report	Groundwater Monitoring and Corrective Action	05/07/2019
Annual Meeting with Local Emergency Responders 2019	Design Criteria	04/24/2019
CCR Annual Groundwater Monitoring and Corrective Action Report 2018	Groundwater Monitoring and Corrective Action	03/01/2019
Notice of Initiation of Assessment of Corrective Measures	Groundwater Monitoring and Corrective Action	02/19/2019
Notice of Groundwater Protection Standard Exceedance 2018	Groundwater Monitoring and Corrective Action	12/14/2018
Annual Fugitive Dust Control Report 2018	Operating Criteria	12/05/2018
Fugitive Dust Control Plan	Operating Criteria	11/19/2018
Wetlands	Location Restriction	11/07/2018
Unstable Areas	Location Restriction	11/07/2018
Seismic Impact Zones	Location Restriction	11/07/2018
Fault Areas	Location Restriction	11/07/2018
Placement Above Uppermost Aquifer	Location Restriction	11/07/2018
Emergency Action Plan Roxboro East Ash Pond, West Ash Pond and Associated Structures	Design Criteria	10/01/2018
CCR Annual Surface Impoundment Inspection Report 2018	Operating Criteria	06/06/2018

TABLE 1D
(Continued)

Document Name	Category	Release Date
Annual Meeting with Local Emergency Responders 2018	Design Criteria	05/01/2018
Notice of Establishment of an Assessment Monitoring Program Roxboro East FGD Settling Pond	Groundwater Monitoring and Corrective Action	02/27/2018
CCR Annual Groundwater Monitoring and Corrective Action Report	Groundwater Monitoring and Corrective Action	02/06/2018
2017 Annual CCR Fugitive Dust Control Report-Roxboro	Operating Criteria	11/29/2017
Groundwater Monitoring System Certification-Roxboro East FGD Settling Pond	Groundwater Monitoring and Corrective Action	11/06/2017
Groundwater Sampling and Analysis Program Selection of Statistical Method Certification-Roxboro East FGD Settling Pond	Groundwater Monitoring and Corrective Action	10/25/2017
Roxboro Inundation Maps	Design Criteria	10/06/2017
Fugitive Dust Control Plan Revision 1	Operating Criteria	08/02/2017
CCR Annual Surface Impoundment Inspection Report 2017 - Roxboro	Operating Criteria	06/06/2017
Annual Meeting with Local Emergency Responders 2017	Design Criteria	05/24/2017
Annual Fugitive Dust Control Report 2016	Operating Criteria	12/05/2016
Initial Structural Stability Assessment	Design Criteria	11/16/2016
Initial Factor of Safety Assessment	Design Criteria	11/15/2016
Post Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016
Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016
Inflow Design Flood Control System	Operating Criteria	11/03/2016
History of Construction	Design Criteria	10/25/2016

TABLE 1D
(Continued)

Document Name	Category	Release Date
Initial Hazard Classification Assessment Certification	Design Criteria	10/12/2016
Existing Liner Design Criteria	Design Criteria	10/11/2016
Annual Surface Impoundment Inspection Report 2016	Operating Criteria	06/15/2016
Annual Surface Impoundment Report (Initial)	Operating Criteria	02/16/2016
Annual Surface Impoundment Report (Initial) Revision 1	Operating Criteria	02/19/2016

*This summary of reports was downloaded on October 10, 2019

TABLE 1E
FGD Forward Flush Pond - Plans and Reports Posted by Duke Energy under the CCR Rule

Document Name	Category	Release Date
Emergency Action Plan East Ash Pond, West Ash Pond, West Settling Pond East Settling Pond and FGD Forward Flush Pond	Design Criteria	08/28/2019
CCR Annual Surface Impoundment Inspection Report 2019	Operating Criteria	05/29/2019
Notice of Groundwater Protection Standard Exceedance 2019	Groundwater Monitoring and Corrective Action	05/20/2019
CCR Assessment of Corrective Measures Report	Groundwater Monitoring and Corrective Action	05/07/2019
Annual Meeting with Local Emergency Responders 2019	Design Criteria	04/24/2019
CCR Annual Groundwater Monitoring and Corrective Action Report 2018	Groundwater Monitoring and Corrective Action	03/01/2019
Notice of Initiation of Assessment of Corrective Measures	Groundwater Monitoring and Corrective Action	02/19/2019
Notice of Groundwater Protection Standard Exceedance 2018	Groundwater Monitoring and Corrective Action	12/14/2018
Annual Fugitive Dust Control Report 2018	Operating Criteria	12/05/2018
Fugitive Dust Control Plan	Operating Criteria	11/19/2018
Wetlands	Location Restriction	11/07/2018
Unstable Areas	Location Restriction	11/07/2018
Seismic Impact Zones	Location Restriction	11/07/2018
Fault Areas	Location Restriction	11/07/2018
Placement Above Uppermost Aquifer	Location Restriction	11/07/2018
Emergency Action Plan Roxboro East Ash Pond, West Ash Pond and Associated Structures	Design Criteria	10/01/2018

TABLE 1E
(Continued)

Document Name	Category	Release Date
CCR Annual Surface Impoundment Inspection Report 2018	Operating Criteria	06/06/2018
Annual Meeting with Local Emergency Responders 2018	Design Criteria	05/01/2018
Notice of Establishment of an Assessment Monitoring Program Roxboro FGD Forward Flush Pond	Groundwater Monitoring and Corrective Action	02/27/2018
CCR Annual Groundwater Monitoring and Corrective Action Report	Groundwater Monitoring and Corrective Action	02/06/2018
2017 Annual CCR Fugitive Dust Control Report-Roxboro	Operating Criteria	11/29/2017
Groundwater Monitoring System Certification-Roxboro FGD Forward Flush Pond	Groundwater Monitoring and Corrective Action	11/06/2017
Groundwater Sampling and Analysis Program Selection of Statistical Method Certification-Roxboro FGD Forward Flush Pond	Groundwater Monitoring and Corrective Action	10/25/2017
Roxboro Inundation Maps	Design Criteria	10/06/2017
Fugitive Dust Control Plan Revision 1	Operating Criteria	08/02/2017
CCR Annual Surface Impoundment Inspection Report 2017 - Roxboro	Operating Criteria	06/06/2017
Annual Meeting with Local Emergency Responders 2017	Design Criteria	05/24/2017
Annual Fugitive Dust Control Report 2016	Operating Criteria	12/05/2016
Initial Structural Stability Assessment	Design Criteria	11/16/2016
Initial Factor of Safety Assessment	Design Criteria	11/15/2016
Post Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016
Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016
Inflow Design Flood Control System	Operating Criteria	11/03/2016

TABLE 1E
(Continued)

Document Name	Category	Release Date
History of Construction	Design Criteria	10/25/2016
Initial Hazard Classification Assessment Certification	Design Criteria	10/12/2016
Existing Liner Design Criteria	Design Criteria	10/11/2016
Annual Surface Impoundment Inspection Report 2016	Operating Criteria	06/15/2016
Annual Surface Impoundment Report (Initial)	Operating Criteria	02/16/2016
Annual Surface Impoundment Report (Initial) Revision 1	Operating Criteria	02/19/2016

*This summary of reports was downloaded on October 10, 2019

TABLE 1F
Industrial Landfill - Plans and Reports Posted by Duke Energy under the CCR Rule

Document Name	Category	Release Date
CCR Assessment of Corrective Measures Report	Groundwater Monitoring and Corrective Action	05/07/2019
CCR Annual Groundwater Monitoring and Corrective Action Report 2018	Groundwater Monitoring and Corrective Action	03/01/2019
Notice of Initiation of Assessment of Corrective Measures	Groundwater Monitoring and Corrective Action	02/19/2019
Notice of Groundwater Protection Standard Exceedance 2018	Groundwater Monitoring and Corrective Action	12/14/2018
Annual Fugitive Dust Control Report 2018	Operating Criteria	12/05/2018
Fugitive Dust Control Plan	Operating Criteria	11/19/2018
CCR Annual Landfill Inspection Report 2018	Operating Criteria	11/19/2018
Unstable Areas	Location Restriction	11/07/2018
Notice of Establishment of an Assessment Monitoring Program Roxboro Industrial Landfill	Groundwater Monitoring and Corrective Action	02/27/2018
CCR Annual Groundwater Monitoring and Corrective Action Report	Groundwater Monitoring and Corrective Action	02/06/2018
2017 Annual CCR Fugitive Dust Control Report-Roxboro	Operating Criteria	11/29/2017
CCR Annual Landfill Report 2017-Roxboro Industrial Landfill	Operating Criteria	11/29/2017
Groundwater Monitoring System Certification-Roxboro Industrial Landfill	Groundwater Monitoring and Corrective Action	11/06/2017
Groundwater Sampling and Analysis Program Selection of Statistical Method Certification-Roxboro Industrial Landfill	Groundwater Monitoring and Corrective Action	10/25/2017
Fugitive Dust Control Plan Revision 1	Operating Criteria	08/02/2017

TABLE 1F
(Continued)

Document Name	Category	Release Date
Annual Fugitive Dust Control Report 2016	Operating Criteria	12/05/2016
CCR Annual Landfill Inspection Report 2016	Operating Criteria	11/22/2016
Post Closure Plan for Industrial Landfill	Closure and Post Closure Care	11/11/2016
Closure Plan for Industrial Landfill	Closure and Post Closure Care	11/11/2016
Run-on and Run-off Control System Plan	Operating Criteria	11/03/2016
Annual Landfill Report (Initial)	Operating Criteria	02/03/2016

*This summary of reports was downloaded on October 10, 2019

ATTACHMENT A

Audit Scope

ATTACHMENT A
AUDIT SCOPE

A-1 GENERAL AUDIT SCOPE ITEMS

The general Audit scope items included:

- Review and evaluation of documentation for maintenance and repair of structures and equipment used for coal ash disposal,

- Review and evaluation of documentation of modifications, failures, leaks, damage, disrepair and other problems at the coal ash management units,

- Review and evaluation of documentation of efforts to correct failures, leaks, damage, disrepair and other problems where they determine that employee/contractor actions were likely a primary or contributing cause to a compliance finding,

- Review and evaluation of documentation of communication of the items above within the organization,

- Review and evaluation of documentation associated with the specific environmental compliance items described below and laws, regulations, and policies associated these items and

- Review of compliance with administrative aspects and regulatory submissions related to coal ash management-specific regulations, including:

–	Coal Combustion Residuals	40 CFR Part 257 Subpart D
–	NC Coal Ash Management Act of 2014	NC General Statutes Chapter 130A, Article 9

More specific items which were addressed in the audits to comply with the General Audit Scope are described below.

A-2 SPECIFIC COMPLIANCE WITH THE ECP-NC

The following items related to specific ECP-NC compliance were reviewed as part of the audit:

1. Verify maintenance and sufficient funding of corporate compliance organizations (ABSAT, CCP organization, National Ash Management Advisory Board). Where a root cause of a compliance finding appears in an auditor's judgment to result from inadequate funding, the AGC/ELM Audit Team will identify this in the Audit finding.

2. Verify timely production of satisfactory Compliance Officer (CO) reports to the CAM relating to the development, implementation, and enforcement of the ECP-NC. No auditing work is associated with this work at this time.

3. Evaluate existence and efficacy of toll-free hotline/e-mail inbox for violation reporting, including the appropriateness of the follow-up investigation and disposition of each reported matter. This requirement will be evaluated for the first year of audits and then reassessed.

4. Evaluate completion and efficacy of periodic notices (via Internet, Intranet, email, notices in employee work areas, and publication in community outlets) to employees and the public of the availability of the toll-free hotline and electronic mail inbox.

5. Evaluate training materials and curricula utilized in the mandated training program, particularly those tailored to employee's specific job descriptions, to determine whether it advances the goal of "ensuring that every domestic employee of Duke Energy Corporation and its wholly-owned or operated affiliates understands applicable compliance policies and is able to integrate the compliance objectives in the performance of his/her job." Ensure that the subjects specifically named in the plea agreements are covered by the training (namely, notice and reporting requirements in the event of a release or discharge and the safe and proper handling of pollutants, hazardous substances and/or wastes.)

6. Evaluate whether Defendants are using "Best Efforts" to comply with the obligations under the ECP-NC. Where the Audit Team makes compliance findings, the Audit Team will, upon request, provide their opinion on whether this best efforts standard applies, and if so, whether best efforts have been used.

7. Verify compliance at each facility with the specific procedures and protocols set forth in the ECP-NC.

A-3 SPECIFIC COMPLIANCE WITH OTHER PROVISIONS OF THE PLEA AGREEMENT

The following items related to specific items in the Plea Agreement were reviewed as part of the Audit:

1. Determine whether Defendants have opened, expanded, or reopened any coal ash or coal ash wastewater impoundment and, if so, verify that they are lined and do not allow unpermitted discharges of coal ash or coal ash wastewater to waters of the United States.

2. Verify that Defendants have determined the volume of wastewater and coal ash in each wet-storage coal ash impoundment in North Carolina as described in the plea agreements and that written or electronic records of this information is maintained in a location available to facility staff and employees responsible for making environmental or emergency reports.

3. Review citations/notices of violation/notices of deficiency related to violations of federal, state, or local law to assure that they have been properly relayed to the Court and, as appropriate under the plea agreements, determine their materiality.

4. Evaluate Defendants' efforts to close coal ash impoundments at Dan River, Riverbend, Asheville, and Sutton for legal compliance.

5. Note any observations made during the Audit that cause concern regarding the assets and/or security available to the Defendants to meet the obligations imposed by the Judgment in this case.

A-4 GENERAL ENVIRONMENTAL COMPLIANCE SUBJECT AREAS

The following items related to General Environmental Compliance were reviewed as part of the Audit:

1. Assess all waste streams from Duke Energy facilities with coal ash impoundments. Review Duke Energy's processes, procedures, and practices, as well as compliance with those processes, procedures, and practices, for:

    a. identifying waste streams (especially, but not limited to, waste streams with discharge points into bodies of water),
    b. identifying and communicating any modifications or changes, or potential modifications or changes, to waste streams,
    c. ensuring proper handling/disposal of waste streams,
    d. identifying, preventing, and mitigating any risks or hazards that could affect waste streams and/or the disposal of waste streams, and
    e. ensuring proper permitting for waste streams.

For Item 1.d., the Audit Team evaluated such risk/hazard issues where there were compliance findings associated with waste streams.

2. Review and evaluate documentation of:

    a. Maintenance and repair of structures and equipment related to coal ash disposal,
    b. Modification of the coal ash impoundments and related pollution prevention equipment and structures,
    c. Failures, leaks, damage, disrepair, and other problems,
    d. Communication of the information described in a-c within the organization, and
    e. Efforts to correct failures, leaks, damage, disrepair, and other problems.

3. Assess the employees responsible for inspection, maintenance, and repair of coal ash basins and related structures and equipment. The assessment included an assessment of the workloads of such employees to assure that Duke Energy's facilities are adequately staffed. These assessments were made where the Audit Team determine that employee/contractor actions were likely a primary or contributing cause to a compliance finding.

4. Review the results and recommendations of any other audits (internal or external/state mandated) and assess Duke Energy's implementation of those recommendations.

5. Review and assess Duke Energy's processes, procedures, and practices for identifying, communicating, and addressing problems and potential problems at its coal ash basins (leaks, unpermitted discharges, etc.).

6. Review and assess Duke Energy's policies, procedures, practices, and equipment for handling emergency releases from its coal ash basins and evaluate the personnel with duties in such situations.

7. Verify that Duke Energy is complying with its NPDES wastewater and stormwater permits, as well as other relevant environmental permits. This should include verifying Duke Energy's timely submission of permit applications, permit renewal applications, and responses to requests for additional information from the relevant regulatory authority.

8. Review and assess any actions or measures Duke Energy has undertaken to assure accountability and prevent recurrences when problems and/or failures occur (i.e. disciplinary actions, re-training, revision to policies and procedures, etc.). This review will be completed where the Audit Team determines that employee/contractor actions were likely a primary or contributing cause to a compliance finding.

9. Review and assess compliance with the following environmental regulations, as applicable to the management of coal ash:

a.	Wastewater Discharges	40 CFR 122; 15A NCAC 2H.0100 *et seq*
b.	Stormwater Discharges	40 CFR 122.26; 15A NCAC 2H.1000 *et seq;* NC General Permit (Construction) No. NCG010000
c.	NC Groundwater Standards	15A NCAC 02L.0202(h)
d.	Hazardous Waste Management	15A NCAC 13A.0100 to 13A.0107
e.	Oil Pollution Prevention	40 CFR Part 112
f.	Air Pollution (Title V)	15A NCAC 2Q, and
g.	Hazardous Chemicals (Tier II)	40 CFR Part 370.

Reviews also included an analysis of overall compliance and the status and security of the asset. Subsequent reviews of individual facilities will evaluate the movement towards compliance. The Audit did not include an evaluation of compliance with the September 2015 Settlement Agreement with NCDEQ.

A–5 LIST OF PERMITS AND PROGRAMS DEEMED TO BE EITHER DIRECTLY OR INDIRECTLY IN SUPPORT OF ASH MANAGEMENT

During the Audit, the Audit Team reviewed a variety of written programs developed and implemented by Duke Energy and facility staff. State-issued permits and supporting documentation relative to environmental programs and geotechnical aspects of ash basin management were also requested and reviewed.

Requested documents, pertinent to management of ash in basins, landfills, ponds, etc. were outlined in the pre-audit questionnaire for each facility and included, but were not limited to:

1. The Compliance Register developed for ETrac for the Site.

2. The Duke Energy Operations Manual for the facility.

3. A site plan, site map, or aerial photo which shows the entire facility and key features, of the facility including NPDES outfalls associated environmental monitoring locations, storage tanks, etc.

4. Most recent 2 years of maintenance, monitoring, and inspection records for each coal ash/CCR basin (just the physical inspections, not the groundwater records).
5. A "Phase 1 and Phase 2" summary of ash basin conditions prepared by an outside consultant.

6. Duke Energy's permitting plans for addressing ash impoundments and landfills at this facility.

7. Applicable pages from the Duke Energy basin-by-basin coal ash/CCR project tracking document for this facility.

8. Original basin/landfill/coal ash management unit construction records.

9. Documentation of changes to these units.

10. Coal ash unit construction permit application and approval.

11. State-issued permits and application materials for permits associated with coal ash/CCR management (including, e.g., dam permits).

12. Any currently effective state order, consent order, or similar state direction that addresses coal ash/CCR management at the site.

13. Records required to be maintained in the site's operating record under the federal CCR regulation and/or any state CCR regulatory program.
14. Records of off-site ash shipments from May 2015 forward.

15. Stormwater permit application and approval for all outfalls.

16. Industrial wastewater (NPDES/POTW) permit application and approval for all outfalls/discharges.

17. Industrial and stormwater sampling and monitoring records, and any corrective action plans (last 2 years).

18. Stormwater pollution prevention plan.

19. Landfill operating permit with maintenance and monitoring requirements.

20. Landfill leak detection and groundwater monitoring records from the last 2 years along with any workplans that describes the rationale for the monitoring system at the Site.

21. Landfill operating permit with maintenance and monitoring requirements.

22. Copies of any air permits and applications for coal ash units and ancillary operations.

23. Any testing and monitoring records completed to comply with the air permits.

24. Any notices of violation~~s~~ associated with the coal ash/CCR management activities received over the last 2 years.

25. Copy of SPCC Plan.

26. Community Right-to-Know

    a. Copies of lists of hazardous chemicals or MSDSs submitted;
    b. Copies of Tier I or II reports; and
    c. Copies of Form R (toxic release inventory) reports.

27. Copies of communications with employees and the public regarding availability of toll-free hotline and electronic mail inbox for reporting suspected environmental violations.

28. Management Systems:

    a. List of responsible party for each environmental activity.
    b. All environmental-related training records.
    c. All environmental policies and procedures.
    d. Organization chart.
    e. Site diagram identifying storage areas, tanks, etc.

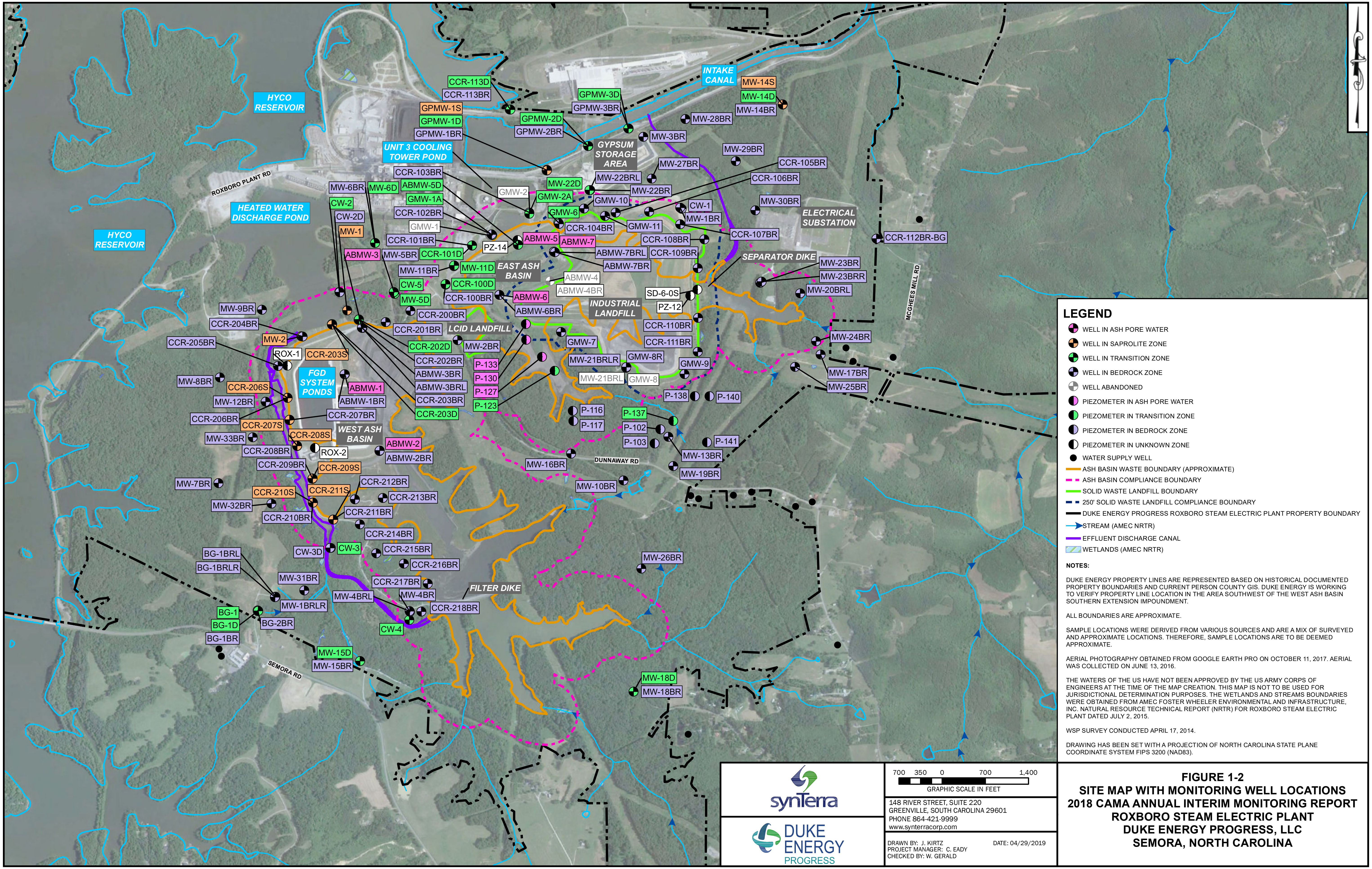
29. Employee training records related to environmental programs and ash management policies.

I/A

ATTACHMENT B

2018 AND 2019 GROUNDWATER DATA SUMMARY AND WELL LOCATION MAP

I/A



LEGEND

- ⊕ WELL IN ASH PORE WATER
- ⊕ WELL IN SAPROLITE ZONE
- ⊕ WELL IN TRANSITION ZONE
- ⊕ WELL IN BEDROCK ZONE
- ⊕ WELL ABANDONED
- ◐ PIEZOMETER IN ASH PORE WATER
- ◐ PIEZOMETER IN TRANSITION ZONE
- ◐ PIEZOMETER IN BEDROCK ZONE
- ◐ PIEZOMETER IN UNKNOWN ZONE
- ● WATER SUPPLY WELL
- ASH BASIN WASTE BOUNDARY (APPROXIMATE)
- ASH BASIN COMPLIANCE BOUNDARY
- SOLID WASTE LANDFILL BOUNDARY
- 250' SOLID WASTE LANDFILL COMPLIANCE BOUNDARY
- DUKE ENERGY PROGRESS ROXBORO STEAM ELECTRIC PLANT PROPERTY BOUNDARY
- STREAM (AMEC NRTR)
- EFFLUENT DISCHARGE CANAL
- ▨ WETLANDS (AMEC NRTR)

NOTES:

DUKE ENERGY PROPERTY LINES ARE REPRESENTED BASED ON HISTORICAL DOCUMENTED PROPERTY BOUNDARIES AND CURRENT PERSON COUNTY GIS. DUKE ENERGY IS WORKING TO VERIFY PROPERTY LINE LOCATION IN THE AREA SOUTHWEST OF THE WEST ASH BASIN SOUTHERN EXTENSION IMPOUNDMENT.

ALL BOUNDARIES ARE APPROXIMATE.

SAMPLE LOCATIONS WERE DERIVED FROM VARIOUS SOURCES AND ARE A MIX OF SURVEYED AND APPROXIMATE LOCATIONS. THEREFORE, SAMPLE LOCATIONS ARE TO BE DEEMED APPROXIMATE.

AERIAL PHOTOGRAPHY OBTAINED FROM GOOGLE EARTH PRO ON OCTOBER 11, 2017. AERIAL WAS COLLECTED ON JUNE 13, 2016.

THE WATERS OF THE US HAVE NOT BEEN APPROVED BY THE US ARMY CORPS OF ENGINEERS AT THE TIME OF THE MAP CREATION. THIS MAP IS NOT TO BE USED FOR JURISDICTIONAL DETERMINATION PURPOSES. THE WETLANDS AND STREAMS BOUNDARIES WERE OBTAINED FROM AMEC FOSTER WHEELER ENVIRONMENTAL AND INFRASTRUCTURE, INC. NATURAL RESOURCE TECHNICAL REPORT (NRTR) FOR ROXBORO STEAM ELECTRIC PLANT DATED JULY 2, 2015.

WSP SURVEY CONDUCTED APRIL 17, 2014.

DRAWING HAS BEEN SET WITH A PROJECTION OF NORTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3200 (NAD83).

700 350 0 700 1,400
GRAPHIC SCALE IN FEET

148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
PHONE 864-421-9999
www.synterracorp.com

DRAWN BY: J. KIRTZ
PROJECT MANAGER: C. EADY
CHECKED BY: W. GERALD
DATE: 04/29/2019

FIGURE 1-2
SITE MAP WITH MONITORING WELL LOCATIONS
2018 CAMA ANNUAL INTERIM MONITORING REPORT
ROXBORO STEAM ELECTRIC PLANT
DUKE ENERGY PROGRESS, LLC
SEMORA, NORTH CAROLINA

I/A

FACILITY NAME:	ROXBORO		D PARAME	TED 40CFR257 APPENDIX III CONSTITUENTS p				INORGANIC PARAMETERS (TOTAL CONCENTRATION)														RADIONUCLIDES		ER PARAME
DATE UPDATED:	06/24/2019	Reporting Units	S.U.	ug/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/mL	mg/L
DSHEET UPDATED BY:	BRANDON RUSSO	15A NCAC 02L Standard	6.5-8.5	700	250	250	500	1*	10	700	4*	10	10	1*	300	50	100	20	0.2*	0.3*	1000	5^	0.03^	2
DSHEET CHECKED BY:	CRAIG EADY	Provisional Background Threshold Values (Transition Zone Unit)	6.3-7.6	50	150	37	540	1	1	91	1	16.1	24.1	1	1173	405	5.22	1.78	0.2	30.2	12	5.45	0.00516	NE
		Provisional Background Threshold Values (Bedrock Unit)	6.8-8.3	50	120	73.5	530	1	1	185	1	0.19	3.61	6.4	4227	1198	2.11	1	0.2	2.49	7	5.21	0.00324	NE

					D PARAME	TED 40CFR257 APPENDIX III CONSTITUENTS p				INORGANIC PARAMETERS (TOTAL CONCENTRATION)														RADIONUCLIDES		ER PARAME
Sample ID	Location Description	Associated Unit	Location With Respect to Groundwater Flow Direction	Sample Collection Date	pH	Boron	Chloride	Sulfate	Total Dissolved Solids	Antimony	Arsenic	Barium	Beryllium	Chromium (VI)	Chromium	Cobalt	Iron	Manganese	Nickel	Selenium	Thallium	Vanadium	Zinc	Total Radium	Total Uranium	Fluoride
ABMW-01	In WB	West Ash Basin	Downgradient	07/26/2018	9.6	12200	11	170	370	3.66	608	154	<1	0.16	<1	<1	24	3.7 j	2.71	5.5	<0.2	2.1	5	0.2315	<0.0002	0.52
ABMW-01	In WB	West Ash Basin	Downgradient	11/15/2018	9.7	12800	10	200	370	3.58	585	147	<1	0.28 M1,R1	<1	<1	6.032 j	3.382 j	2.59	5.66	<0.2	1.37	<5	0.936	<0.0002	0.285 j
ABMW-01	In WB	West Ash Basin	Downgradient	04/23/2019	9.2	12400	9.9	170	390	6.82	537	NA	NA	0.042 M1	<1	<1	3.841 j	3.752 j	NA	4.48	NA	1.64	NA	0.272	<0.0002	NA
ABMW-01BR	In WB	West Ash Basin	Downgradient	07/26/2018	7.3	549	16	20	320	<1	<1	31	<1	<0.025	<1	<1	1560	1000	<1	<1	<0.2	0.25 j	<5	1.6	<0.0002	0.12
ABMW-01BR	In WB	West Ash Basin	Downgradient	11/15/2018	7.1	558	15	19	320	<1	<1	30	<1	<0.025	<1	<1	1570	1010	<1	<1	<0.2	0.131 j	<5	1.2322	<0.0002	0.067 j
ABMW-01BR	In WB	West Ash Basin	Downgradient	04/23/2019	6.5	622	15	19	390	<1	<1	NA	NA	<0.025	<1	<1	1660	1000	NA	<1	NA	0.127 j	NA	1.511	<0.0002	NA
ABMW-02	In WB	West Ash Basin	Downgradient	07/25/2018	8.4	6150	7.6	76	240	0.365 j	631	380	<1	<0.025	<1	<1	718	368	1.08	1.52	<0.2	1.19	1.78 j	0.476	0.000465	1.2
ABMW-02	In WB	West Ash Basin	Downgradient	11/15/2018	7.3	4870	7.2	37	230	<1	567	515	<1	<0.025	0.426 j	0.423 j	4710	1010	<1	0.901 j	<0.2	2.33	3.141 j	1.243	0.00119	1.1
ABMW-02	In WB	West Ash Basin	Downgradient	04/23/2019	6.4	1430	8.1	3.8	220	<1	144	NA	NA	<0.025	1.01	1.79	33800	1580	NA	<1	NA	2.54	NA	0.736	<0.0002	NA
ABMW-02BR	In WB	West Ash Basin	Downgradient	07/25/2018	7.6	<50	26	75	410	<1	0.517 j	138	<1	0.052	<1	0.355 j	666	1180	<1	<1	0.159 j	0.633	<5	0.838	0.000489	0.21
ABMW-02BR	In WB	West Ash Basin	Downgradient	11/15/2018	7.7	<50	29	91	410	<1	0.348 j	162	<1	0.036	<1	<1	630	1030	<1	<1	0.107 j	0.294 j	<5	1.028	0.000825	0.18
ABMW-02BR	In WB	West Ash Basin	Downgradient	04/23/2019	7.0	<50	26	98	450	<1	0.4 j	NA	NA	<0.025	<1	<1	666	1150	NA	<1	NA	0.229 j	NA	1.514	0.000934	NA
ABMW-03	In WB	West Ash Basin	Downgradient	07/26/2018	3.4	223	4.54 j	1700	1200	<1	4.38	21	27.9	<0.025	3.88	95.2	13400	6720	248	1.24	2.65	2.86	496	NA	NA	2.885 j
ABMW-03	In WB	West Ash Basin	Downgradient	11/14/2018	3.4	289	5.7	1500	1000	<1	2.69	22	16.1	<0.025	4.98	97	9320	5860	232	0.617 j	3.16	1.76	406	NA	NA	<5
ABMW-03	In WB	West Ash Basin	Downgradient	04/30/2019	3.7	136	4.265 j	510	720	<1	1.95	NA	NA	<0.025	2.36	44.9	5660	3230	NA	0.349 j	NA	1.3	NA	NA	NA	NA
ABMW-03BR	In WB	West Ash Basin	Downgradient	07/26/2018	5.6	3450	17	2500	4000	<1	<1	19	3.91	<0.025 M1,R1	<1	134	5790	17500	349	<1	<0.2	2.42	127	NA	NA	2.68 j
ABMW-03BR	In WB	West Ash Basin	Downgradient	11/14/2018	5.5	2770	10	2800	3400	<1	0.341 j	20	4.11	<0.025 M1	0.347 j	164	6980	18700	358	<1	0.166 j	2.4	174	NA	NA	<5
ABMW-03BR	In WB	West Ash Basin	Downgradient	04/30/2019	5.5	2820	14	2200	3300	<1	0.374 j	NA	NA	<0.025	0.439 j	141	6510	18300	NA	<1	NA	1.86	NA	NA	NA	NA
ABMW-03BRL	In WB	West Ash Basin	Downgradient	07/26/2018	7.8	<50	10	500	880	<1	<1	29	<1	<0.025	<1	<1	271	19	0.345 j	<1	<0.2	0.267 j	<5	NA	NA	0.642 j
ABMW-03BRL	In WB	West Ash Basin	Downgradient	11/14/2018	7.3	19.744 j	10	490	840	<1	<1	28	<1	<0.025	0.616 j	<1	649	163	<1	<1	<0.2	0.278 j	10	NA	NA	0.497 j
ABMW-03BRL	In WB	West Ash Basin	Downgradient	04/30/2019	7.7	21.464 j	9.8	460	800	<1	<1	NA	NA	<0.025	0.413 j	<1	104	2.551 j	NA	<1	NA	<0.3	NA	NA	NA	NA
ABMW-04	In EB	East Ash Basin	Downgradient	07/26/2018	5.6	45000	90	2200	3800	<1	951	33	<1	<0.025	<1	6.41	71500	12300	4.98	<1	0.125 j	1.63	4.233 j	0.743	0.0241	<5
ABMW-04BR	In EB	East Ash Basin	Downgradient	07/26/2018	6.2	<50	9.9	20	230	<1	<1	95	<1	<0.025	0.711 j	<1	3710	1570	<1	<1	<0.2	0.635	3.985 j	0.2193	0.000117 j	0.17
ABMW-05	In EB	East Ash Basin	Downgradient	07/31/2018	7.2	23500	100	1300	2200	<1	330	46	<1	<0.025	<1	1.71	3400	1550	1.89	<1	<0.2	0.753 B2	<5	0.1865	0.00821	<5
ABMW-05	In EB	East Ash Basin	Downgradient	11/15/2018	7.4	24800	99	1400	2300	<1	339	46	<1	<0.025	<1	1.19	4520	1570	1.46	<1	<0.2	0.677	<5	0.3758	0.00665	<2
ABMW-05D	In EB	East Ash Basin	Downgradient	07/30/2018	6.8	2880	15	9.2	260	<1	2.86	165	<1	<0.025	<1	0.619 j	34600	6380	0.939 j	<1	<0.2	1.14	<5	1.12	<0.0002	0.29
ABMW-05D	In EB	East Ash Basin	Downgradient	11/15/2018	6.8	2980	15	16	240	<1	2.81	175	<1	<0.025	0.345 j	0.63 j	32700	6630	0.917 j	<1	<0.2	0.726	<5	0.558	<0.0002	0.29
ABMW-05D	In EB	East Ash Basin	Downgradient	04/29/2019	7.0	2980	16	26	290	<1	2.47	NA	NA	<0.025	<1	0.695 j	31300	6430	NA	<1	NA	0.519	NA	0.766	<0.0002	NA
ABMW-06	In EB	East Ash Basin	Downgradient	07/25/2018	7.1	2880	7.5	170	740	<1	378	738	<1	<0.025	<1	<1	942	975	0.595 j	0.526 j	<0.2	1.46	1.709 j	NA	NA	0.53
ABMW-06	In EB	East Ash Basin	Downgradient	11/15/2018	7.2	2980	7.2	140	700	<1	269	725	<1	0.052	<1	<1	501	1060	<1	0.473 j	<0.2	1.56	<5	NA	NA	0.55
ABMW-06	In EB	East Ash Basin	Downgradient	04/29/2019	7.0	2310	8.6	96	670	<1	316	NA	NA	<0.025	0.555 j	<1	5810	1460	NA	0.336 j	NA	1.67	NA	NA	NA	NA
ABMW-06BR	In EB	East Ash Basin	Downgradient	07/25/2018	6.4	<50	4.2	64	330	<1	3.57	35	<1	<0.025	<1	0.388 j	77	717	1.95	<1	<0.2	0.419	<5	NA	NA	0.17
ABMW-06BR	In EB	East Ash Basin	Downgradient	11/15/2018	6.8	<50	9.5	60	320	<1	<1	37	<1	<0.025	<1	0.425 j	86	746	2.11	<1	<0.2	0.474	2.537 j	NA	NA	0.12
ABMW-06BR	In EB	East Ash Basin	Downgradient	04/29/2019	6.7	<50	10	62	370	<1	<1	NA	NA	0.038	<1	<1	52	590	NA	<1	NA	0.348	NA	NA	NA	NA
ABMW-07BR	In EB	East Ash Basin	Downgradient	07/25/2018	6.8	1550	13	110	430	<1	<1	15	<1	<0.025	<1	1.12	168	476	0.507 j	<1	0.15 j	0.455	<5	NA	NA	0.1412 j
ABMW-07BR	In EB	East Ash Basin	Downgradient	11/14/2018	6.9	1550	14	110	420	<1	<1	16	<1	<0.025	<1	1.65	211 B2	458	<1	<1	<0.2	0.352	<5	NA	NA	0.1084 j
ABMW-07BR	In EB	East Ash Basin	Downgradient	04/29/2019	6.9	2080	14	120	450	0.903 j	<1	NA	NA	0.05	0.531 j	0.397 j	135	564	NA	<1	NA	0.692	NA	NA	NA	NA
ABMW-07BRL	In EB	East Ash Basin	Downgradient	07/25/2018	7.2	173	14	250	560	<1	0.729 j	14	<1	0.033	<1	<1	272	66	<1	<1	<0.2	0.235 j	<5	NA	NA	0.3025 j
ABMW-07BRL	In EB	East Ash Basin	Downgradient	11/14/2018	7.5	157	14	250	530	<1	0.888 j	15	<1	<0.025	<1	<1	244 B2	67	<1	<1	<0.2	0.19 j	<5	NA	NA	0.2605 j
ABMW-07BRL	In EB	East Ash Basin	Downgradient	04/29/2019	7.6	147	15	230	530	<1	0.885 j	NA	NA	<0.025	<1	<1	216	62	NA	<1	NA	0.154 j	NA	NA	NA	NA
ABMW-07BRLL	In EB	East Ash Basin	Downgradient	04/09/2019	7.8	137	15	90	400	<1	0.852 j	15	<1	<0.025	0.592 j	<1	460	64	<1	<1	<0.2	0.497	<5	0.97	0.00164	0.257 j
BG-01 IMP	Southwest of WB, outside CB	Background	Background	07/25/2018	6.3	<50	19	17	330	<1	<1	88	<1	2.3	2.4	<1	24	1.761 j	1.22	<1	<0.2	16.7	1.757 j	-0.1404	0.000585	0.15
BG-01	Southwest of WB, outside CB	Background	Background	07/25/2018	6.3	<50	18	17	340	<1	<1	87	<1	NA	<5	<1	26	<5	<5	<1	<0.2	17.3	<5	NA	NA	NA
BG-01 IMP	Southwest of WB, outside CB	Background	Background	11/14/2018	6.5	<50	19	18	330	<1	<1	89	<1	2.2	2.09 B2	<1	17 B2	<5	0.689 j	<1	0.177 j	18.1	<5	0.28	0.0006	0.13
BG-01	Southwest of WB, outside CB	Background	Background	11/14/2018	6.5	<50	18	18	310	<1	<1	92	<1	NA	<5	<1	19	<5	<5	<1	<0.2	17.6	<5	NA	NA	NA
BG-01 IMP	Southwest of WB, outside CB	Background	Background	04/24/2019	6.0	<50	20	16	340	<1	<1	NA	NA	2.2 M6	2.93	<1	55	<5	NA	<1	NA	20.1	NA	0.666	0.000488	NA
BG-01	Southwest of WB, outside CB	Background	Background	04/24/2019	6.0	<50	20	16	350	<1	<1	96	<1	NA	<5	<1	58	<5	<5	<1	<0.2	20.4	<5	NA	NA	NA
BG-01BR	Southwest of WB, outside CB	Background	Background	07/31/2018	6.8	<50	14	17	330	0.346 j	0.483 j	31	<1	0.12	<1	0.581 j	28	263	0.892 j	<1	<0.2	2.26 B2	3.138 j	0.123	0.000902	0.11
BG-01BR	Southwest of WB, outside CB	Background	Background	11/13/2018	7.0	<50	13	17	310	<1	0.461 j	31	<1	0.049	<1	0.485 j	40	179	0.86 j	<1	<0.2	2.26	9	0.775	0.000805	0.051 j
BG-01BR	Southwest of WB, outside CB	Background	Background	04/25/2019	6.8	<50	13	18	290	<1	0.342 j	NA	NA	0.14	0.411 j	<1	7.621 j	111	NA	<1	NA	1.36	NA	0.509	0.000651	NA
BG-01BRLR	Southwest of WB, background, outside of CB	Background	Background	07/30/2018	8.4	22.754 j	83	85	500	<1	4.5	48	<1	<0.025	<1	<1	122	240	0.504 j	<1	<0.2	0.792	3.759 j	3.81	0.0184	0.21
BG-01BRLR	Southwest of WB, background, outside of CB	Background	Background	11/14/2018	8.5	22.846 j	79	79	460	<1	6.02	58	<1	<0.025	0.469 j,B2	<1	59 B2	167	<1	<1	<0.2	0.676	<5	2.183	0.0176	0.1872 j
BG-01BRLR	Southwest of WB, background, outside of CB	Background	Background	04/25/2019	8.4	22.94 j	67	66	360	0.365 j	4.49	NA	NA	0.2	0.525 j	<1	25	145	NA	<1	NA	0.665	NA	1.452	0.015	NA
BG-02BR	Southwest of WB outside of CB	Background	Background	07/31/2018	8.3	<50	35	26	330	<1	2.16	14	<1	<0.025	<1	<1	182	129	<1	<1	<0.2	0.241 j,B2	<5	2.76	0.0042	0.17
BG-02BR	Southwest of WB outside of CB	Background	Background	11/13/2018	8.0	<50	28	36	310	<1	2.03	11	<1	0.045	<1	<1	12	<5	0.399 j	<1	<0.2	0.258 j	2.354 j	1.26	0.000587	0.18
BG-02BR	Southwest of WB outside of CB	Background	Background	04/30/2019	8.2	18.771 j	34	42	350	<1	2.14	NA	NA	0.056	0.439 j	<1	51	42	NA	<1	NA	0.243 j	NA	1.601	0.0016	NA
CCR-100BR	Edge of EB	East Ash Basin	Downgradient	10/08/2018	7.0	<50	4.9	27	430	<1	1.89	41	<1	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	NA	1.74	NA	0.21
CCR-100BR	Edge of EB	East Ash Basin	Downgradient	01/24/2019	7.1	<50	5	28	420	<1	1.74	40	<1	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	NA	2.209	NA	0.18
CCR-100D	Edge of EB	East Ash Basin	Downgradient	10/08/2018	6.9	<50	3.5	22	410	<1	<1	130	<1	NA	0.587 j	0.632 j	NA	NA	NA	<1	<0.2	NA	NA	0.671	NA	0.86
CCR-100D	Edge of EB	East Ash Basin	Downgradient	01/24/2019	7.0	18.936 j	3.1	22	430	<1	0.342 j	120	<1	NA	0.368 j	<1	NA	NA	NA	<1	<0.2	NA	NA	0.381	NA	0.83
CCR-101BR	Edge of EB	East Ash Basin	Downgradient	10/08/2018	7.0	<50	15	20	400	<1	0.808 j	13	<1	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	NA	0.374	NA	0.061 j

I/A

FACILITY NAME: ROXBORO
DATE UPDATED: 06/24/2019
SHEET UPDATED BY: BRANDON RUSSO
SHEET CHECKED BY: CRAIG EADY

	PARAME	TED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)													RADIONUCLIDES		R PARAME
Reporting Units	S.U.	ug/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/mL	mg/L
15A NCAC 02L Standard	6.5-8.5	700	250	250	500	1*	10	700	4*	10	10	1*	300	50	100	20	0.2*	0.3*	1000	5^	0.03^	2
Provisional Background Threshold Values (Transition Zone Unit)	6.3-7.6	50	150	37	540	1	1	91	1	16.1	24.1	1	1173	405	5.22	1.78	0.2	30.2	12	5.45	0.00516	NE
Provisional Background Threshold Values (Bedrock Unit)	6.8-8.3	50	120	73.5	530	1	1	185	1	0.19	3.61	6.4	4227	1198	2.11	1	0.2	2.49	7	5.21	0.00324	NE

					PARAME	TED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)														RADIONUCLIDES		R PARAME
Sample ID	**Location Description**	**Associated Unit**	**Location With Respect to Groundwater Flow Direction**	**Sample Collection Date**	**pH**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Manganese**	**Nickel**	**Selenium**	**Thallium**	**Vanadium**	**Zinc**	**Total Radium**	**Total Uranium**	**Fluoride**
CCR-101BR	Edge of EB	East Ash Basin	Downgradient	01/29/2019	7.2	<50	14	19	440	<1	0.883 j	12	<1	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	NA	0.808	NA	0.042 j
CCR-101D	Edge of EB	East Ash Basin	Downgradient	10/08/2018	6.6	<50	15	2.9	320	<1	1.46	**858**	<1	NA	0.396 j	**31**	NA	NA	NA	<1	<0.2	NA	NA	0.842	NA	0.18
CCR-101D	Edge of EB	East Ash Basin	Downgradient	01/29/2019	6.8	<50	16	2.3	350	<1	1.5	**822**	<1	NA	<1	**30**	NA	NA	NA	<1	<0.2	NA	NA	0.65	NA	0.16
CCR-102BR	Edge of EB	East Ash Basin	Downgradient	10/08/2018	**6.4**	<50	15	**390**	**800**	<1	<1	<5	<1	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	NA	1.6137	NA	0.085 j
CCR-102BR	Edge of EB	East Ash Basin	Downgradient	01/29/2019	**6.5**	<50	16	**390**	**830**	<1	<1	<5	<1	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	NA	1	NA	<0.5
CCR-103BR	Edge of EB	East Ash Basin	Downgradient	10/08/2018	7.0	**4090**	29	**680**	**1300**	<1	<1	28	<1	NA	<1	<1	NA	NA	NA	1.98	<0.2	NA	NA	0.669	NA	0.05 j
CCR-103BR	Edge of EB	East Ash Basin	Downgradient	01/30/2019	7.2	**3970**	29	**630**	**1200**	<1	<1	29	<1	NA	<1	<1	NA	NA	NA	0.663 j	<0.2	NA	NA	0.387	NA	<1
CCR-104BR	Edge of EB	East Ash Basin	Downgradient	10/08/2018	**6.4**	**6610**	41	**430**	**1900**	<1	0.604 j	48	<1	NA	1.56 S1	0.382 j	NA	NA	NA	**25.5**	<0.2	NA	NA	4.641	NA	<2
CCR-104BR	Edge of EB	East Ash Basin	Downgradient	01/30/2019	6.8	**7700**	41	**1100**	**1900**	<1	0.428 j	32	<1	NA	0.572 j	<1	NA	NA	NA	15.8	<0.2	NA	NA	0.1343	NA	<2
CCR-105BR	Edge of EB	East Ash Basin	Downgradient	10/08/2018	6.7	570	33	250	**590**	<1	<1	68	<1	NA	0.578 j	<1	NA	NA	NA	12.7	0.121 j	NA	NA	0.7076	NA	0.305 j
CCR-105BR	Edge of EB	East Ash Basin	Downgradient	01/30/2019	6.9	613	33	**290**	**620**	<1	<1	78	<1	NA	0.656 j	<1	NA	NA	NA	12.8	<0.2	NA	NA	0.0248	NA	0.194 j
CCR-106BR	Edge of EB	East Ash Basin	Downgradient	10/09/2018	6.6	**1450**	15	**400**	**930**	<1	<1	75	<1	NA	<1	0.756 j	NA	NA	NA	<1	<0.2	NA	NA	1.6295	NA	0.29 j
CCR-106BR	Edge of EB	East Ash Basin	Downgradient	01/29/2019	6.7	**1700**	15	**450**	**1000**	<1	<1	76	<1	NA	<1	0.804 j	NA	NA	NA	<1	<0.2	NA	NA	1.294	NA	0.181 j
CR-107BR (Geochem M	Edge of EB	East Ash Basin	Downgradient	09/20/2018	**6.3**	**4140**	19	**340**	**690**	<1	<1	73	<1	0.057	<1	<1	3.656 j	3.717 j	1.17	<1	<0.2	**12.5**	1.728 j	0.3063	0.000121 j	0.239 j
CCR-107BR	Edge of EB	East Ash Basin	Downgradient	10/09/2018	**6.1**	**4090**	18	**350**	**680**	<1	<1	70	<1	NA	<1	<1	NA	NA	NA	0.39 j	<0.2	NA	NA	0.977	NA	0.105 j
CCR-107BR	Edge of EB	East Ash Basin	Downgradient	01/30/2019	**6.3**	**2750**	19	**270**	**520**	<1	<1	60	<1	NA	<1	<1	NA	NA	NA	0.46 j	<0.2	NA	NA	0.457	NA	<0.5
CR-108BR (Geochem M	Edge of EB	East Ash Basin	Downgradient	09/20/2018	6.6	**11600**	25	**1200**	**2100**	<1	<1	33	<1	0.086	<1	0.563 j	<10	**74**	5.72	19.2	<0.2	**6.26**	3.1 j	0.46	0.0055	<2
CCR-108BR	Edge of EB	East Ash Basin	Downgradient	10/09/2018	6.5	**12400**	23	**520**	**2100**	<1	<1	32	<1	NA	<1	0.694 j	NA	NA	NA	16.9	<0.2	NA	NA	0.608	NA	0.1 j
CCR-108BR	Edge of EB	East Ash Basin	Downgradient	01/29/2019	6.6	**11000**	23	**1200**	**2000**	<1	<1	30	<1	NA	<1	<1	NA	NA	NA	**41.2**	<0.2	NA	NA	1.4455	NA	<2
CCR-109BR	Edge of EB	East Ash Basin	Downgradient	10/09/2018	6.5	**1470**	140	**490**	**1300**	<1	<1	66	<1	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	NA	0.639	NA	0.12 j
CCR-109BR	Edge of EB	East Ash Basin	Downgradient	01/29/2019	6.6	**1840**	170	**700**	**1300**	<1	<1	67	<1	NA	0.448 j	0.335 j	NA	NA	NA	0.459 j	<0.2	NA	NA	0.5552	NA	<1
CCR-110BR	Edge of EB	East Ash Basin	Downgradient	10/09/2018	**6.2**	**21900**	24	**1300**	**2100**	<1	<1	21	<1	NA	0.395 j	**11.6**	NA	NA	NA	**49.5**	0.084 j	NA	NA	0.845	NA	0.902 j
CCR-110BR	Edge of EB	East Ash Basin	Downgradient	01/29/2019	**6.3**	**16600**	19	**1100**	**1800**	0.49 j	<1	37	<1	NA	0.352 j	**20.5**	NA	NA	NA	**41.3**	0.127 j	NA	NA	0.804	NA	<2
CCR-110BR IMP	Edge of EB	East Ash Basin	Downgradient	05/07/2019	**6.3**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CCR-111BR	Edge of EB	East Ash Basin	Downgradient	10/09/2018	6.5	**4810**	120	**740**	**1600**	<1	<1	60	<1	NA	1.07	<1	NA	NA	NA	**195**	<0.2	NA	NA	1.144	NA	0.389 j
CCR-111BR	Edge of EB	East Ash Basin	Downgradient	01/29/2019	6.6	**6500**	120	**920**	**1800**	<1	<1	50	<1	NA	1.19	<1	NA	NA	NA	**299**	<0.2	NA	NA	0.3508	NA	<1
CCR-111BR IMP	Edge of EB	East Ash Basin	Downgradient	05/07/2019	6.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CCR-112BR-BG	East of EB, outside of CB	Background	Background	10/08/2018	**6.4**	<50	4.9	19	170	<1	<1	17	<1	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	NA	0.851	NA	0.068 j
CCR-112BR-BG	East of EB, outside of CB	Background	Background	01/29/2019	**6.3**	<50	4.8	19	200	<1	0.409 j	16	<1	NA	<1	<1	NA	NA	NA	<1	0.088 j	NA	NA	0.496	NA	0.039 j
CCR-113BR IMP	Downgradient of EB/Gypsum Storage Area	East Ash Basin	Downgradient	07/31/2018	7.0	<50	16	130	480	<1	0.719 j	15	<1	<0.025	<1	0.461 j	235	**69**	0.553 j	<1	<0.2	**1.5**	8	NA	NA	0.683 j
CCR-113BR	Downgradient of EB/Gypsum Storage Area	East Ash Basin	Downgradient	10/09/2018	6.6	<50	12	130	460	<1	1.14	19	<1	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	NA	3.991	NA	0.27
CCR-113BR IMP	Downgradient of EB/Gypsum Storage Area	East Ash Basin	Downgradient	11/15/2018	7.1	<50	12	140	450	<1	1.36	18	<1	<0.025	0.334 j	<1	**432**	44	0.49 j	<1	<0.2	**1.32**	3.805 j	NA	NA	0.166 j
CCR-113BR	Downgradient of EB/Gypsum Storage Area	East Ash Basin	Downgradient	01/30/2019	7.1	<50	11	150	470	<1	0.806 j	17	<1	NA	2.12	<1	NA	NA	NA	0.345 j	<0.2	NA	NA	0.651	NA	0.22
CCR-113BR IMP	Downgradient of EB/Gypsum Storage Area	East Ash Basin	Downgradient	01/30/2019	7.1	<50	12	140	480	<1	0.728 j	16	<1	<0.025	0.965 j	<1	277	25	<1	<1	<0.2	**1.56**	3.992 j	NA	NA	0.1976 j
CCR-113BR IMP	Downgradient of EB/Gypsum Storage Area	East Ash Basin	Downgradient	04/23/2019	7.2	<50	11	160 M4	**520**	<1	0.853 j	NA	NA	<0.025	1.75	<1	**328**	23	NA	<1	NA	**2.04**	NA	NA	NA	NA
CCR-113D IMP	Downgradient of EB/Gypsum Storage Area	East Ash Basin	Downgradient	07/31/2018	6.7	<50	9.7	110	440	<1	<1	32	<1	0.04	0.387 j	0.715 j	244	**97**	2	0.38 j	<0.2	**2.54**	4.074 j	NA	NA	0.7 j
CCR-113D	Downgradient of EB/Gypsum Storage Area	East Ash Basin	Downgradient	10/09/2018	**6.4**	<50	9.6	110	410	<1	<1	28	<1	NA	0.436 j	<1	NA	NA	NA	<1	<0.2	NA	NA	3.7353	NA	0.39
CCR-113D IMP	Downgradient of EB/Gypsum Storage Area	East Ash Basin	Downgradient	11/15/2018	6.7	<50	9.6	120	410	<1	<1	33	<1	0.095	0.364 j	<1	109	20	1.81	0.352 j	<0.2	**3.35**	8	NA	NA	0.29
CCR-113D	Downgradient of EB/Gypsum Storage Area	East Ash Basin	Downgradient	01/30/2019	6.7	<50	9.2	140	440	<1	<1	22	<1	NA	0.839 j	<1	NA	NA	NA	<1	<0.2	NA	NA	0.828	NA	0.32
CCR-113D IMP	Downgradient of EB/Gypsum Storage Area	East Ash Basin	Downgradient	01/30/2019	6.7	<50	9.5	130	440	<1	<1	22	<1	0.1	0.682 j	<1	285	13	0.744 j	<1	<0.2	**3.63**	2.823 j	NA	NA	0.29
CCR-113D IMP	Downgradient of EB/Gypsum Storage Area	East Ash Basin	Downgradient	04/23/2019	6.7	<50	8.5	140	470	<1	<1	NA	NA	0.17	0.862 j	<1	**310**	12	NA	<1	NA	**3.7**	NA	NA	NA	NA
CCR-200BR	Edge of WB	West Ash Basin	Downgradient	10/09/2018	6.8	<50	7.7	43	380	<1	<1	99	<1	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	NA	1.471	NA	0.28
CCR-200BR	Edge of WB	West Ash Basin	Downgradient	01/23/2019	6.9	<50	7.6	45	390	<1	<1	<5	<1	NA	0.444 j	<1	NA	NA	NA	0.346 j	<0.2	NA	NA	2.587	NA	0.25
CCR-201BR	Edge of WB	West Ash Basin	Downgradient	10/09/2018	**6.1**	24.845 j	18	**3700**	**5600**	<1	<1	26	<1	NA	0.586 j	**16.7**	NA	NA	NA	<1	<0.2	NA	NA	2.225	NA	0.1 j
CCR-201BR	Edge of WB	West Ash Basin	Downgradient	01/23/2019	**6.1**	20.841 j	19	**3500**	**5500**	<1	<1	26	<1	NA	<1	**18.1**	NA	NA	NA	<1	<0.2	NA	NA	0.738	NA	<5
CR-202BR (Geochem M	Edge of WB	West Ash Basin	Downgradient	09/20/2018	**6.4**	**2880**	34	**1800**	**2800**	<1	<1	29	<1	<0.025	<1	<1	<10	**93**	12	0.419 j	<0.2	**4.12**	<5	0.6	0.00855	<5
CCR-202BR	Edge of WB	West Ash Basin	Downgradient	10/10/2018	**6.3**	**2750**	38	**4500**	**2800**	<1	<1	28	<1	NA	0.369 j	<1	NA	NA	NA	0.456 j	<0.2	NA	NA	0.975	NA	<5
CCR-202BR	Edge of WB	West Ash Basin	Downgradient	01/23/2019	**6.4**	**2270**	36	**1800**	**2700**	<1	<1	26	<1	NA	<1	0.405 j	NA	NA	NA	0.483 j	<0.2	NA	NA	0.732	NA	<5
CCR-202D (Geochem M	Edge of WB	West Ash Basin	Downgradient	09/20/2018	**6.3**	**2770**	29	**2100**	**3100**	<1	<1	23	<1	<0.025 M1	<1	<1	7.041 j	**634**	20.4	0.52 j	<0.2	**4.8**	3.271 j	0.59	0.00924	<5
CCR-202D	Edge of WB	West Ash Basin	Downgradient	10/10/2018	**6.2**	**2740**	32	**2100**	**3100**	<1	<1	22	<1	NA	<1	<1	NA	NA	NA	0.404 j	<0.2	NA	NA	1.379	NA	<5
CCR-202D	Edge of WB	West Ash Basin	Downgradient	01/23/2019	**6.3**	**2480**	28	**1900**	**3000**	<1	<1	21	<1	NA	<1	0.456 j	NA	NA	NA	0.551 j	<0.2	NA	NA	-0.004	NA	<5
CR-203BR (Geochem M	Edge of WB	West Ash Basin	Downgradient	09/20/2018	6.6	**762**	30	**350**	**920**	<1	<1	71	<1	<0.025	<1	**8.61**	178	**355**	1.46	<1	<0.2	**3.44**	3.342 j	-0.0119	0.0067	<1
CCR-203BR	Edge of WB	West Ash Basin	Downgradient	10/09/2018	6.6	**713**	30	**340**	**910**	<1	<1	70	<1	NA	0.631 j	**9.01**	NA	NA	NA	<1	<0.2	NA	NA	2.28	NA	<1
CCR-203BR	Edge of WB	West Ash Basin	Downgradient	01/30/2019	6.6	**751**	29	**490**	**910**	<1	<1	69	<1	NA	0.761 j	**8.34**	NA	NA	NA	<1	0.092 j	NA	NA	0.999	NA	<1
CCR-203D (Geochem M	Edge of WB	West Ash Basin	Downgradient	09/20/2018	**6.3**	491	32	**300**	**800**	<1	<1	183	<1	<0.025	<1	**5.6**	**1440**	**460**	2.36	<1	<0.2	**1.81**	<5	0.2764	0.00142	0.234 j
CCR-203D	Edge of WB	West Ash Basin	Downgradient	10/09/2018	**6.3**	551	33	**300**	**800**	<1	<1	154	<1	NA	0.335 j	**6.66**	NA	NA	NA	<1	<0.2	NA	NA	1.635	NA	0.218 j
CCR-203D	Edge of WB	West Ash Basin	Downgradient	01/30/2019	**6.5**	505	31	**340**	**790**	<1	<1	174	<1	NA	<1	**4.9**	NA	NA	NA	<1	0.136 j	NA	NA	0.33	NA	<0.5
CCR-203S	Edge of WB	West Ash Basin	Downgradient	10/09/2018	**6.2**	<50	32	8.1	**730**	<1	0.611 j	338	<1	NA	<1	**37.3**	NA	NA	NA	<1	<0.2	NA	NA	1.04	NA	0.26
CCR-203S	Edge of WB	West Ash Basin	Downgradient	01/30/2019	**6.3**	<50	31	7.9	**660**	<1	0.361 j	355	<1	NA	0.335 j	**41.5**	NA	NA	NA	<1	<0.2	NA	NA	0.644	NA	0.04 j
CCR-204BR	Edge of WB	West Ash Basin	Downgradient	10/09/2018	6.8	**6710**	**1100**	**290**	**3200**	<1	<1	85	<1	NA	0.446 j	**1.38**	NA	NA	NA	<1	<0.2	NA	NA	3.258	NA	<2
CCR-204BR	Edge of WB	West Ash Basin	Downgradient	01/23/2019	6.8	**7630**	**1200**	**320**	**3000**	<1	<1	90	<1	NA	<1	**1.69**	NA	NA	NA	<1	<0.2	NA	NA	0.589	NA	<2
CCR-205BR	Edge of WB	West Ash Basin	Downgradient	10/10/2018	**6.2**	**6540**	**1200**	130	**3200**	<1	<1	278	<1	NA	1.2	<1	NA	NA	NA	1.63	<0.2	NA	NA	**5.03**	NA	<2
CCR-205BR	Edge of WB	West Ash Basin	Downgradient	01/24/2019	**6.1**	**7620**	**1200**	150	**2600**	<1	<1	342	<1	NA	0.803 j	<1	NA	NA	NA	2.16	0.115 j	NA	NA	4.28	NA	<2

I/A

FACILITY NAME:	ROXBORO
DATE UPDATED:	06/24/2019
SHEET UPDATED BY:	BRANDON RUSSO
SHEET CHECKED BY:	CRAIG EADY

	PARAME	TED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)														RADIONUCLIDES		R PARAME
Reporting Units	S.U.	ug/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/mL	mg/L
15A NCAC 02L Standard	**6.5-8.5**	**700**	**250**	**250**	**500**	**1***	**10**	**700**	**4***	**10**	**10**	**1***	**300**	**50**	**100**	**20**	**0.2***	**0.3***	**1000**	**5^**	**0.03^**	**2**
Provisional Background Threshold Values (Transition Zone Unit)	**6.3-7.6**	**50**	**150**	**37**	**540**	**1**	**1**	**91**	**1**	**16.1**	**24.1**	**1**	**1173**	**405**	**5.22**	**1.78**	**0.2**	**30.2**	**12**	**5.45**	**0.00516**	**NE**
Provisional Background Threshold Values (Bedrock Unit)	**6.8-8.3**	**50**	**120**	**73.5**	**530**	**1**	**1**	**185**	**1**	**0.19**	**3.61**	**6.4**	**4227**	**1198**	**2.11**	**1**	**0.2**	**2.49**	**7**	**5.21**	**0.00324**	**NE**

					PARAME	TED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)														RADIONUCLIDES		R PARAME
Sample ID	**Location Description**	**Associated Unit**	**Location With Respect to Groundwater Flow Direction**	**Sample Collection Date**	**pH**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Manganese**	**Nickel**	**Selenium**	**Thallium**	**Vanadium**	**Zinc**	**Total Radium**	**Total Uranium**	**Fluoride**
CCR-206BR	Edge of WB	West Ash Basin	Downgradient	10/10/2018	**6.0**	**11500**	**1600**	240	**4300**	<1	<1	240	<1	NA	2.08	**26.8**	NA	NA	NA	<1	0.083 j	NA	NA	1.923	NA	<2
CCR-206BR	Edge of WB	West Ash Basin	Downgradient	01/24/2019	**6.0**	**12100**	**1600**	230	**3200**	0.981 j	<1	233	<1	NA	4.65	**27.8**	NA	NA	NA	<1	<0.2	NA	NA	2.68	NA	<2
CCR-206S	Edge of WB	West Ash Basin	Downgradient	10/10/2018	6.6	**22000**	**470**	**290**	**1700**	<1	0.727 j	56	<1	NA	4.25	**4.95**	NA	NA	NA	<1	0.136 j	NA	NA	0.087	NA	0.045 j
CCR-206S	Edge of WB	West Ash Basin	Downgradient	01/24/2019	6.7	**19500**	**510**	**330**	**1300**	<1	0.779 j	54	<1	NA	0.395 j	**4.42**	NA	NA	NA	<1	<0.2	NA	NA	0.25458	NA	<1
CCR-207BR	Edge of WB	West Ash Basin	Downgradient	10/10/2018	**6.4**	**17700**	**2000**	**350**	**5000**	<1	<1	205	<1	NA	1.26	**24.3**	NA	NA	NA	<1	0.194 j	NA	NA	0.968	NA	<5
CCR-207BR	Edge of WB	West Ash Basin	Downgradient	01/24/2019	**6.3**	**22600**	**2100**	**480**	**4300**	<1	<1	178	<1	NA	0.599 j	**32.4**	NA	NA	NA	<1	<0.2	NA	NA	1.843	NA	<5
CCR-207S	Edge of WB	West Ash Basin	Downgradient	10/09/2018	**6.4**	**14100**	**770**	**280**	**2400**	<1	0.467 j	59	<1	NA	1.85	**1.09**	NA	NA	NA	<1	<0.2	NA	NA	0.505	NA	0.796 j
CCR-207S	Edge of WB	West Ash Basin	Downgradient	01/24/2019	6.8	**8830**	**320**	190	**1000**	<1	0.409 j	54	<1	NA	0.97 j	0.549 j	NA	NA	NA	<1	<0.2	NA	NA	0.336	NA	<2
CR-208BR (Geochem M	Edge of WB	West Ash Basin	Downgradient	09/20/2018	**6.4**	**50800**	**3000**	**1000**	**7500**	<1	0.398 j	125	<1	0.2	0.41 j	**38.2**	5.589 j	**7770**	83.4	<1	<0.2	**11.4**	2.024 j	0.659	0.00859	0.922 j
CCR-208BR	Edge of WB	West Ash Basin	Downgradient	10/09/2018	**5.9**	**49000**	**2900**	**1000**	**8300**	<1	0.463 j	124	<1	NA	**19.1**	**37**	NA	NA	NA	<1	<0.2	NA	NA	1.186	NA	<5
CCR-208BR	Edge of WB	West Ash Basin	Downgradient	01/24/2019	**6.1**	**49800**	**2800**	**1100**	**6100**	<1	0.444 j	115	<1	NA	5.1	**39.3**	NA	NA	NA	<1	<0.2	NA	NA	1.321	NA	<5
CCR-208S	Edge of WB	West Ash Basin	Downgradient	10/09/2018	**5.9**	**34900**	**1400**	**930**	**5100**	<1	<1	77	<1	NA	0.799 j	**7.41**	NA	NA	NA	<1	<0.2	NA	NA	1.356	NA	<2
CCR-208S	Edge of WB	West Ash Basin	Downgradient	01/24/2019	**6.1**	**36200**	**1300**	**990**	**3800**	<1	<1	73	<1	NA	0.429 j	**7.43**	NA	NA	NA	<1	<0.2	NA	NA	0.63	NA	<2
CCR-209BR	Edge of WB	West Ash Basin	Downgradient	10/10/2018	6.5	**4420**	200	25	**770**	<1	<1	**743**	<1	NA	0.361 j	**14.9**	NA	NA	NA	<1	<0.2	NA	NA	3.246	NA	0.69
CCR-209BR	Edge of WB	West Ash Basin	Downgradient	01/24/2019	6.6	**4340**	220	27	**720**	<1	<1	**776**	<1	NA	0.375 j	**16.7**	NA	NA	NA	<1	<0.2	NA	NA	2.222	NA	0.56
CCR-209S	Edge of WB	West Ash Basin	Downgradient	10/10/2018	6.6	**3570**	**280**	25	**860**	<1	0.584 j	**836**	<1	NA	0.927 j	<1	NA	NA	NA	<1	<0.2	NA	NA	1.798	NA	0.52
CCR-209S	Edge of WB	West Ash Basin	Downgradient	01/24/2019	6.7	**3770**	**310**	29	**800**	<1	0.53 j	**939**	<1	NA	0.611 j	<1	NA	NA	NA	<1	<0.2	NA	NA	0.709	NA	0.51
CCR-210BR	Edge of WB	West Ash Basin	Downgradient	10/09/2018	**6.4**	**2510**	99	7.8	500	<1	<1	223	<1	NA	0.348 j	**3.68**	NA	NA	NA	<1	<0.2	NA	NA	3.427	NA	0.38
CCR-210BR	Edge of WB	West Ash Basin	Downgradient	01/24/2019	6.6	**2490**	98	6.4	410	<1	<1	199	<1	NA	<1	**3.59**	NA	NA	NA	<1	<0.2	NA	NA	2.788	NA	0.38
CCR-210S	Edge of WB	West Ash Basin	Downgradient	10/09/2018	6.6	**893**	26	12	420	<1	0.446 j	72	<1	NA	<1	**2.42**	NA	NA	NA	<1	<0.2	NA	NA	1.526	NA	0.41
CCR-210S	Edge of WB	West Ash Basin	Downgradient	01/24/2019	6.8	**909**	23	8.1	350	<1	0.52 j	63	<1	NA	<1	**2.79**	NA	NA	NA	<1	<0.2	NA	NA	0.731	NA	0.5
CCR-211BR	Edge of WB	West Ash Basin	Downgradient	10/09/2018	**6.2**	**1870**	46	42	360	<1	<1	116	<1	NA	<1	**1.16**	NA	NA	NA	<1	0.105 j	NA	NA	2.8458	NA	0.24
CCR-211BR	Edge of WB	West Ash Basin	Downgradient	01/24/2019	**6.4**	**1580**	38	40	320	<1	<1	106	<1	NA	<1	**1.14**	NA	NA	NA	<1	<0.2	NA	NA	2.3671	NA	0.21
CCR-211S	Edge of WB	West Ash Basin	Downgradient	10/09/2018	**6.4**	**3160**	57	49	500	<1	**23.1**	308	<1	NA	<1	**6.46**	NA	NA	NA	<1	<0.2	NA	NA	2.68	NA	0.44
CCR-211S	Edge of WB	West Ash Basin	Downgradient	01/24/2019	6.6	**2660**	46	44	410	<1	**25.6**	279	<1	NA	<1	**6.65**	NA	NA	NA	<1	<0.2	NA	NA	3.303	NA	0.38
CCR-212BR	Edge of WB	West Ash Basin	Downgradient	10/09/2018	**5.8**	<50	64	36	270	<1	<1	18	<1	NA	1.24	<1	NA	NA	NA	<1	<0.2	NA	NA	1.472	NA	0.078 j
CCR-212BR	Edge of WB	West Ash Basin	Downgradient	01/23/2019	**6.0**	<50	72	40	280	<1	<1	14	<1	NA	1.88	<1	NA	NA	NA	<1	<0.2	NA	NA	0.501	NA	0.056 j
CCR-213BR	Edge of WB	West Ash Basin	Downgradient	10/09/2018	**6.3**	<50	210	48	**780**	<1	<1	69	<1	NA	0.481 j	<1	NA	NA	NA	<1	<0.2	NA	NA	4.22	NA	0.1 j
CCR-213BR	Edge of WB	West Ash Basin	Downgradient	01/23/2019	6.6	<50	210	52	**720**	<1	<1	65	<1	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	NA	1.399	NA	<0.5
CCR-214BR	Edge of WB	West Ash Basin	Downgradient	10/09/2018	6.9	<50	36	50	430	<1	<1	70	<1	NA	0.713 j	<1	NA	NA	NA	<1	<0.2	NA	NA	1.135	NA	0.0931 j
CCR-214BR	Edge of WB	West Ash Basin	Downgradient	01/23/2019	7.1	<50	33	47	410	<1	0.443 j	75	<1	NA	0.946 j	<1	NA	NA	NA	0.354 j	<0.2	NA	NA	0.645	NA	0.063 j
CCR-215BR	Edge of WB	West Ash Basin	Downgradient	10/09/2018	6.7	<50	16	42	420	<1	<1	43	<1	NA	<1	<1	NA	NA	NA	0.352 j	<0.2	NA	NA	0.854	NA	0.23
CCR-215BR	Edge of WB	West Ash Basin	Downgradient	01/23/2019	6.9	<50	17	33	400	<1	<1	35	<1	NA	<1	<1	NA	NA	NA	0.443 j	<0.2	NA	NA	0.37	NA	0.24
CCR-216BR	Edge of WB	West Ash Basin	Downgradient	10/09/2018	**6.5**	<50	28	39	440	<1	<1	206	<1	NA	0.341 j	<1	NA	NA	NA	1.02	<0.2	NA	NA	1.278	NA	0.24
CCR-216BR	Edge of WB	West Ash Basin	Downgradient	01/23/2019	6.7	<50	32	40	460	<1	<1	207	<1	NA	<1	<1	NA	NA	NA	1.08	<0.2	NA	NA	0.4394	NA	0.23
CCR-217BR	Edge of WB	West Ash Basin	Downgradient	10/09/2018	**6.5**	<50	30	42	390	<1	<1	82	<1	NA	<1	<1	NA	NA	NA	0.413 j	<0.2	NA	NA	0.4276	NA	0.1
CCR-217BR	Edge of WB	West Ash Basin	Downgradient	01/30/2019	6.9	<50	27	47	340	<1	<1	69	<1	NA	<1	<1	NA	NA	NA	0.526 j	<0.2	NA	NA	1.313	NA	0.13
CCR-218BR	Edge of WB	West Ash Basin	Downgradient	10/09/2018	**6.4**	<50	32	44	340	<1	<1	124	<1	NA	0.417 j	<1	NA	NA	NA	<1	<0.2	NA	NA	0.978	NA	0.3
CCR-218BR	Edge of WB	West Ash Basin	Downgradient	01/23/2019	6.6	<50	30	45	330	<1	<1	120	<1	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	NA	0.3455	NA	0.28
CCR-219BR-BG IMP	---	---	---	04/02/2019	7.8	<50	9.7	<1	NA	<0.5	3.8	26	<0.1	<0.025	<0.5	<0.1	170	**76**	0.99	<0.5	<0.1	**0.46**	<10	1.075	0.00125	0.11 M1
CCR-219D-BG IMP	---	---	---	04/02/2019	6.8	<50	13	17	270	<1	<1	49	<1	<0.025	<1	<1	7.304 j	**398**	0.531 j	<1	<0.2	**1.48**	<5	0.593	0.000245	0.091 j
CW-01 IMP	North of EB on CB	East Ash Basin	Downgradient	07/25/2018	**6.0**	<50	14	99	430	<1	<1	121	<1	<0.025	<1	<1	51	33	0.954 j	0.51 j	0.179 j	**22.2**	1.919 j	NA	NA	0.6
CW-01	North of EB on CB	East Ash Basin	Downgradient	07/25/2018	**6.0**	<50	12	100	450	<1	<1	120	<1	NA	<5	<1	29	33	<5	<1	<0.2	**22.2**	<5	NA	NA	NA
CW-01 IMP	North of EB on CB	East Ash Basin	Downgradient	11/13/2018	**6.1**	<50	9.7	97	430	<1	<1	108	<1	<0.025	<1	0.985 j	238	**77**	1.02	0.544 j	<0.2	**24.7**	<5	0.633	0.000392	0.34
CW-01	North of EB on CB	East Ash Basin	Downgradient	11/13/2018	**6.1**	<50	11	99	420	<1	<1	123	<1	NA	<5	<1	126	49	<5	<1	<0.2	**22.5**	<5	NA	NA	NA
CW-01 IMP	North of EB on CB	East Ash Basin	Downgradient	04/24/2019	**5.8**	<50	9.9	97	460	<1	<1	NA	NA	0.058 P4	<1	0.55 j	24	**55**	NA	<1	NA	**17.9**	NA	NA	NA	NA
CW-01	North of EB on CB	East Ash Basin	Downgradient	04/24/2019	**5.8**	<50	11	96	480	<1	<1	143	<1	NA	<5	<1	33	**55**	<5	<1	<0.2	**18**	<5	NA	NA	NA
CW-02 IMP	North of WB, shore of cooling pond, in CB	West Ash Basin	Downgradient	07/25/2018	6.5	<50	16	85	420	<1	<1	87	<1	0.34	0.512 j	<1	210	**212**	0.385 j	<1	0.117 j	**21.5**	1.835 j	0.389	0.00188	0.67
CW-02	North of WB, shore of cooling pond, in CB	West Ash Basin	Downgradient	07/25/2018	6.5	<50	16	85	440	<1	<1	87	<1	NA	<5	<1	195	**187**	<5	<1	<0.2	**24.4**	<5	NA	NA	NA
CW-02 IMP	North of WB, shore of cooling pond, in CB	West Ash Basin	Downgradient	11/13/2018	6.7	<50	16	85	420	<1	<1	85	<1	0.54	0.561 j	<1	153	**99**	<1	<1	<0.2	**30.8**	<5	1.1817	0.00234	0.82
CW-02	North of WB, shore of cooling pond, in CB	West Ash Basin	Downgradient	11/13/2018	6.7	<50	16	89	410	<1	<1	86	<1	NA	<5	<1	158	**113**	<5	<1	<0.2	**32.5**	<5	NA	NA	NA
CW-02 CCR	North of WB, shore of cooling pond, in CB	West Ash Basin	Downgradient	01/24/2019	6.7	<50	17	71	430	<1	<1	87	<1	NA	0.777 j	<1	NA	NA	NA	<1	<0.2	NA	NA	0.4006	NA	0.85
CW-02 IMP	North of WB, shore of cooling pond, in CB	West Ash Basin	Downgradient	04/24/2019	**6.4**	<50	31	47	440	<1	1.32	NA	NA	<0.025	<1	<1	**25800**	**549**	NA	<1	NA	**11.7**	NA	0.358	0.00179	NA
CW-02	North of WB, shore of cooling pond, in CB	West Ash Basin	Downgradient	04/24/2019	**6.4**	<50	30	49	**540**	<1	<1	115	<1	NA	<5	<1	**465**	**515**	<5	<1	<0.2	**14.2**	<5	NA	NA	NA
CW-02D IMP	North of WB, shore of cooling pond, in CB	West Ash Basin	Downgradient	07/25/2018	6.5	17.873 j	16	130	420	<1	<1	150	<1	0.44	0.466 j	<1	<10	<5	<1	<1	<0.2	**12.4**	<5	1.757	0.00127	0.28
CW-02D	North of WB, shore of cooling pond, in CB	West Ash Basin	Downgradient	07/25/2018	6.5	<50	16	130	410	<1	<1	148	<1	NA	<5	<1	<10	<5	<5	<1	<0.2	**12.8**	<5	NA	NA	NA
CW-02D IMP	North of WB, shore of cooling pond, in CB	West Ash Basin	Downgradient	11/13/2018	6.6	19.807 j	15	130	400	<1	<1	145	<1	0.38	0.453 j	<1	<10	<5	<1	<1	<0.2	**13.2**	<5	0.556	0.00124	0.2
CW-02D	North of WB, shore of cooling pond, in CB	West Ash Basin	Downgradient	11/13/2018	6.6	<50	16	130	390	<1	<1	151	<1	NA	<5	<1	<10	<5	<5	<1	<0.2	**13.3**	<5	NA	NA	NA
CW-02D IMP	North of WB, shore of cooling pond, in CB	West Ash Basin	Downgradient	04/24/2019	6.5	22.856 j	15	120	420	<1	<1	NA	NA	0.47	0.769 j	<1	6.09 j	<5	NA	<1	NA	**13.1**	NA	0.458	0.00144	NA
CW-02D	North of WB, shore of cooling pond, in CB	West Ash Basin	Downgradient	04/24/2019	6.5	<50	16	120	420	<1	<1	153	<1	NA	<5	<1	<10	<5	<5	<1	<0.2	**13**	<5	NA	NA	NA
CW-03 IMP	On WB CB, on canal	West Ash Basin	Downgradient	07/25/2018	**6.4**	<50	60	69	470	<1	<1	135	<1	0.074	<1	<1	13	<5	0.348 j	0.433 j	<0.2	**3.7**	<5	NA	NA	0.21
CW-03	On WB CB, on canal	West Ash Basin	Downgradient	07/25/2018	**6.4**	<50	62	70	470	<1	<1	135	<1	NA	<5	<1	10	<5	<5	<1	<0.2	**3.43**	<5	NA	NA	NA
CW-03 IMP	On WB CB, on canal	West Ash Basin	Downgradient	11/13/2018	**6.1**	<50	18	27	210	<1	0.435 j	61	<1	0.044	1.12	**1.2**	**3320**	**116**	1.06	<1	<0.2	**9.72**	4.789 j	NA	NA	0.082 j

I/A

FACILITY NAME: ROXBORO
DATE UPDATED: 06/24/2019
)SHEET UPDATED BY: BRANDON RUSSO
)SHEET CHECKED BY: CRAIG EADY

	D PARAME	TED 40CFR257 APPENDIX III CONSTITUENTS p				INORGANIC PARAMETERS (TOTAL CONCENTRATION)														RADIONUCLIDES		ER PARAME
Reporting Units	S.U.	ug/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/mL	mg/L
15A NCAC 02L Standard	6.5-8.5	700	250	250	500	1*	10	700	4*	10	10	1*	300	50	100	20	0.2*	0.3*	1000	5^	0.03^	2
Provisional Background Threshold Values (Transition Zone Unit)	6.3-7.6	50	150	37	540	1	1	91	1	16.1	24.1	1	1173	405	5.22	1.78	0.2	30.2	12	5.45	0.00516	NE
Provisional Background Threshold Values (Bedrock Unit)	6.8-8.3	50	120	73.5	530	1	1	185	1	0.19	3.61	6.4	4227	1198	2.11	1	0.2	2.49	7	5.21	0.00324	NE

					D PARAME	TED 40CFR257 APPENDIX III CONSTITUENTS p				INORGANIC PARAMETERS (TOTAL CONCENTRATION)														RADIONUCLIDES		ER PARAME
Sample ID	Location Description	Associated Unit	Location With Respect to Groundwater Flow Direction	Sample Collection Date	pH	Boron	Chloride	Sulfate	Total Dissolved Solids	Antimony	Arsenic	Barium	Beryllium	Chromium (VI)	Chromium	Cobalt	Iron	Manganese	Nickel	Selenium	Thallium	Vanadium	Zinc	Total Radium	Total Uranium	Fluoride
CW-03	On WB CB, on canal	West Ash Basin	Downgradient	11/13/2018	6.1	<50	19	28	200	<1	<1	64	<1	NA	<5	1.15	3380	120	<5	<1	<0.2	10.1	<5	NA	NA	NA
CW-03 CCR	On WB CB, on canal	West Ash Basin	Downgradient	01/30/2019	6.2	<50	28	37	220	<1	<1	76	<1	NA	0.57 j	2	NA	NA	NA	<1	<0.2	NA	NA	0.992	NA	0.072 j
CW-03 IMP	On WB CB, on canal	West Ash Basin	Downgradient	04/24/2019	5.6	<50	59	51	240	<1	<1	NA	NA	0.035	0.403 j	0.68 j	249	131	NA	<1	NA	2.06	NA	NA	NA	NA
CW-03	On WB CB, on canal	West Ash Basin	Downgradient	04/24/2019	5.6	<50	61	52	290	<1	<1	105	<1	NA	<5	<1	377	130	<5	<1	<0.2	2.12	<5	NA	NA	NA
CW-03D IMP	On WB CB, on canal	West Ash Basin	Downgradient	07/25/2018	7.4	<50	25	32	320	<1	0.642 j	50	<1	0.079	<1	<1	24	4.933 j	0.366 j	<1	<0.2	2.73	2.623 j	NA	NA	0.18
CW-03D	On WB CB, on canal	West Ash Basin	Downgradient	07/25/2018	7.4	<50	24	32	320	<1	<1	52	<1	NA	<5	<1	23	<5	<5	<1	<0.2	2.76	<5	NA	NA	NA
CW-03D IMP	On WB CB, on canal	West Ash Basin	Downgradient	11/13/2018	7.5	<50	24	33	330	<1	0.654 j	64	<1	0.11	1.24	0.456 j	916	113	0.889 j	<1	<0.2	5.08	3.541 j	NA	NA	0.15
CW-03D	On WB CB, on canal	West Ash Basin	Downgradient	11/13/2018	7.5	<50	25	38	330	<1	<1	65	<1	NA	<5	<1	1020	117	<5	<1	<0.2	5.06	<5	NA	NA	NA
CW-03D IMP	On WB CB, on canal	West Ash Basin	Downgradient	04/24/2019	7.2	<50	25	32	350	<1	0.414 j	NA	NA	0.19	0.664 j	<1	<10	28	NA	<1	NA	2.16	NA	NA	NA	NA
CW-03D	On WB CB, on canal	West Ash Basin	Downgradient	04/24/2019	7.2	<50	27	33	360	<1	<1	44	<1	NA	<5	<1	<10	27	<5	<1	<0.2	2.02	<5	NA	NA	NA
CW-04 IMP	Southwest of WB in CB	West Ash Basin	Downgradient	07/25/2018	6.5	<50	28	38	320	<1	<1	124	<1	0.23	0.347 j	<1	5.373 j	<5	<1	0.467 j	<0.2	2.18	2.161 j	NA	NA	0.28
CW-04	Southwest of WB in CB	West Ash Basin	Downgradient	07/25/2018	6.5	<50	28	37	330	<1	<1	133	<1	NA	<5	<1	<10	<5	<5	<1	<0.2	2.09	<5	NA	NA	NA
CW-04 IMP	Southwest of WB in CB	West Ash Basin	Downgradient	11/14/2018	6.5	<50	28	39	330	<1	<1	131	<1	0.24	0.335 j,B2	<1	7.521 j,B2	<5	<1	0.411 j	<0.2	2.08	<5	NA	NA	0.26
CW-04	Southwest of WB in CB	West Ash Basin	Downgradient	11/14/2018	6.5	<50	28	38	320	<1	<1	130	<1	NA	<5	<1	33	<5	<5	<1	<0.2	2.21	<5	NA	NA	NA
CW-04 IMP	Southwest of WB in CB	West Ash Basin	Downgradient	04/23/2019	6.4	<50	27	37	350	<1	<1	NA	NA	0.21 P4,R0	0.735 j	<1	173	3.853 j	NA	<1	NA	2.46	NA	NA	NA	NA
CW-04	Southwest of WB in CB	West Ash Basin	Downgradient	04/23/2019	6.4	<50	27	37	360	<1	<1	130	<1	NA	<5	<1	76	<5	<5	<1	<0.2	2.37	<5	NA	NA	NA
CW-05 IMP	North of WB, on CB	West Ash Basin	Downgradient	07/25/2018	6.3	286	5.7	200	470	<1	<1	42	<1	0.33	0.449 j	<1	9.964001 j	<5	0.803 j	<1	<0.2	25.1	1.916 j	0.3297	0.000578	0.456 j
CW-05	North of WB, on CB	West Ash Basin	Downgradient	07/25/2018	6.3	283	5.8	200	490	<1	<1	42	<1	NA	<5	<1	12	<5	<5	<1	<0.2	25	<5	NA	NA	NA
CW-05 IMP	North of WB, on CB	West Ash Basin	Downgradient	11/13/2018	6.4	220	3.9	160	400	<1	<1	54	<1	0.36	0.362 j	<1	5.419 j	<5	<1	<1	<0.2	33.5	<5	0.589	0.000153 j	0.257 j
CW-05	North of WB, on CB	West Ash Basin	Downgradient	11/13/2018	6.4	211	4	120	370	<1	<1	57	<1	NA	<5	<1	11	<5	<5	<1	<0.2	34	<5	NA	NA	NA
CW-05 IMP	North of WB, on CB	West Ash Basin	Downgradient	04/24/2019	6.2	182	4.8	100	380	<1	<1	NA	NA	0.35	0.741 j	<1	6.956 j	<5	NA	<1	NA	27.1	NA	0.704	0.000131 j	NA
CW-05	North of WB, on CB	West Ash Basin	Downgradient	04/24/2019	6.2	182	5.1	96	350	<1	<1	47	<1	NA	<5	<1	<10	<5	<5	<1	<0.2	27.7	<5	NA	NA	NA
GMW-01A CCR	Edge of EB	East Ash Basin	Downgradient	10/08/2018	6.6	109	9.7	63	330	<1	<1	32	<1	NA	<1	1.69	NA	NA	NA	11	<0.2	NA	NA	0.5322	NA	0.27
GMW-01A CCR	Edge of EB	East Ash Basin	Downgradient	01/29/2019	6.9	116	8.6	85	380	<1	<1	36	<1	NA	<1	1.93	NA	NA	NA	5.18	<0.2	NA	NA	0.2805	NA	0.26
GMW-02 CCR	Edge of EB	East Ash Basin	Downgradient	10/08/2018	6.6	5290	29	930	1500	<1	<1	21	<1	NA	<1	<1	NA	NA	NA	3.16	<0.2	NA	NA	0.487	NA	0.09 j
GMW-02 CCR	Edge of EB	East Ash Basin	Downgradient	01/30/2019	6.7	5950	30	850	1500	<1	<1	21	<1	NA	0.658 j	<1	NA	NA	NA	3.21	<0.2	NA	NA	0.1	NA	<1
GMW-06	North of EB in CB	East Ash Basin	Downgradient	07/26/2018	6.4	2500	57	570	1300	<1	<1	31	<1	0.64	0.746 j	<1	8.106 j	5	1.01	61	<0.2	4.25	<5	1.536	0.00225	0.663 j
GMW-06 CCR	North of EB in CB	East Ash Basin	Downgradient	10/08/2018	6.4	2330	57	770 M2	1200	<1	<1	30	<1	NA	1.22 S1	<1	NA	NA	NA	57.3	0.091 j	NA	NA	1.01	NA	0.045 j
GMW-06 IMP	North of EB in CB	East Ash Basin	Downgradient	11/12/2018	6.3	2700	55	610	1300	<1	<1	31	<1	0.51	0.87 j	<1	51	8	0.751 j	57.6	<0.2	4.14	<5	0.796	0.00193	0.521 j
GMW-06	North of EB in CB	East Ash Basin	Downgradient	11/12/2018	6.3	2510	54.5	596	1260	NA	<1	30.1	NA	NA	1.34 j	NA	80	7.85	0.898 j	57.7	0.197 j	NA	2.39 j	NA	NA	0.605 j
GMW-06 CCR	North of EB in CB	East Ash Basin	Downgradient	01/30/2019	6.7	2720	57	800	1200	<1	<1	32	<1	NA	0.933 j	<1	NA	NA	NA	49.3	0.088 j	NA	NA	1.172	NA	0.089 j
GMW-06 IMP	North of EB in CB	East Ash Basin	Downgradient	04/30/2019	6.5	2800	58	600	1300	<1	<1	NA	NA	1.5	1.91	0.448 j	29	4.006 j	NA	50.8	NA	4.19	NA	NA	NA	NA
GMW-06	North of EB in CB	East Ash Basin	Downgradient	04/30/2019	6.5	2750	58.9	602	1270	NA	<1	45.8	NA	NA	1.61 j	NA	37	4.16 j	1.53 j	46.5	<0.2	NA	<5	NA	NA	0.521 j
GMW-07	Western edge of EB in CB	East Ash Basin	Downgradient	07/25/2018	6.4	2060	230	240	970	<1	1.39	187	<1	0.31 M1	1.17	<1	117	2.484 j	1.05	12	0.092 j	6.86	3.006 j	NA	NA	0.395 j
GMW-07 IMP	Western edge of EB in CB	East Ash Basin	Downgradient	11/13/2018	6.5	2470	300	340	870	<1	<1	168	<1	0.2	0.787 j	<1	283	7	0.515 j	17.5	<0.2	7.15	<5	NA	NA	<1
GMW-07	Western edge of EB in CB	East Ash Basin	Downgradient	11/13/2018	6.5	2490	214	243	900	NA	<1	177	NA	NA	1.31 j	NA	308	8.78	1.12 j	16.8	<0.2	NA	3.54 j	NA	NA	0.279 j
GMW-07 IMP	Western edge of EB in CB	East Ash Basin	Downgradient	04/30/2019	6.4	6040	460	710	2000	<1	<1	NA	NA	0.3	0.593 j	<1	16	<5	NA	16.3	NA	5.44	NA	NA	NA	NA
GMW-07	Western edge of EB in CB	East Ash Basin	Downgradient	04/30/2019	6.4	6230	476	738	950	NA	<1	112	NA	NA	0.614 j	NA	85.2	<5	0.761 j	15.7	<0.2	NA	1.82 j	NA	NA	0.275 j
GMW-08	Southern edge of EB in CB	East Ash Basin	Sidegradient	07/26/2018	6.5	3910	170	480	1400	<1	<1	41	<1	0.036	3.21	<1	42	52	1.4	<1	<0.2	2	3.954 j	NA	NA	0.511 j
GMW-08R	Southern edge of EB in CB	East Ash Basin	Sidegradient	09/06/2018	6.6	3580	170	440	1400	<1	0.636 j	64	<1	0.13	0.433 j	0.924 j	23	193	5.05	<1	<0.2	2.32	40	0.589	0.014	0.543 j
GMW-08R	Southern edge of EB in CB	East Ash Basin	Sidegradient	09/20/2018	6.6	3520	170	440	1300	<1	0.497 j	64	<1	0.16	0.423 j	0.774 j	27	171	3.88	<1	<0.2	2.29	29	0.848	0.0151	0.461 j
GMW-08R IMP	Southern edge of EB in CB	East Ash Basin	Sidegradient	11/12/2018	6.6	3440	170	430	1300	<1	0.734 j	84	<1	0.095	<1	0.728 j	44	258	3.69	0.38 j	<0.2	2.17	37	NA	NA	0.404 j
GMW-08R	Southern edge of EB in CB	East Ash Basin	Sidegradient	11/12/2018	6.6	3450	173	431	1240	NA	0.704 j	85.8	NA	NA	0.625 j	NA	47.5	263	3.73 j	0.324 j	<0.2	NA	37.4	NA	NA	0.466 j
GMW-08R	Southern edge of EB in CB	East Ash Basin	Sidegradient	01/30/2019	6.8	3420	170	400	1300	<1	0.636 j	86	<1	<0.025	<1	0.486 j	6.446 j	246	3.57	0.352 j	<0.2	1.96	30	NA	NA	0.116 j
GMW-08R IMP	Southern edge of EB in CB	East Ash Basin	Sidegradient	04/30/2019	6.6	3260	180	390	1300	<1	0.717 j	NA	NA	0.084	0.427 j	0.613 j	34	199	NA	<1	NA	2.2	NA	NA	NA	NA
GMW-08R	Southern edge of EB in CB	East Ash Basin	Sidegradient	04/30/2019	6.6	3290	178	404	1250	NA	0.7 j	78.3	NA	NA	<5	NA	34.3	206	2.72 j	<1	<0.2	NA	22.5	NA	NA	<1
GMW-09	Southeast edge of EB in CB	East Ash Basin	Sidegradient	07/26/2018	6.0	<50	4.2	40	190	<1	<1	58	<1	0.13	<1	<1	14	<5	<1	<1	<0.2	3.76	<5	NA	NA	0.11
GMW-09 CCR	Southeast edge of EB in CB	East Ash Basin	Sidegradient	10/08/2018	6.3	<50	3.3	21	140	<1	<1	38	<1	NA	0.358 j	<1	NA	NA	NA	<1	<0.2	NA	NA	0.594	NA	0.13
GMW-09 IMP	Southeast edge of EB in CB	East Ash Basin	Sidegradient	11/12/2018	6.1	<50	2.9	14	230	<1	<1	31	<1	0.13	<1	<1	50	<5	<1	<1	<0.2	3.91	<5	NA	NA	0.16
GMW-09	Southeast edge of EB in CB	East Ash Basin	Sidegradient	11/12/2018	6.1	<50	2.85	13.1	137	NA	<1	29.1	NA	NA	1.07 j	NA	41.9	<5	<5	<1	0.121 j	NA	1.76 j	NA	NA	0.133
GMW-09 CCR	Southeast edge of EB in CB	East Ash Basin	Sidegradient	01/29/2019	6.3	<50	2.5	13	170	<1	<1	30	<1	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	NA	0.458	NA	0.11
GMW-09 IMP	Southeast edge of EB in CB	East Ash Basin	Sidegradient	04/30/2019	6.1	<50	4	29	160	<1	<1	NA	NA	0.11	0.725 j	<1	123	2.057 j	NA	<1	NA	3.7	NA	NA	NA	NA
GMW-09	Southeast edge of EB in CB	East Ash Basin	Sidegradient	04/30/2019	6.1	<50	3.55	26.8	190	NA	<1	48	NA	NA	1.05 j	NA	52.2	<5	0.662 j	<1	0.114 j	NA	<5	NA	NA	0.146
GMW-10	Northern edge of EB in CB	East Ash Basin	Downgradient	07/26/2018	5.7	100	19	40	220	<1	<1	90	<1	0.16	<1	<1	69	<5	2.22	2.39	<0.2	2.85	2.071 j	NA	NA	0.13
GMW-10 CCR	Northern edge of EB in CB	East Ash Basin	Downgradient	10/08/2018	6.0	132	19	59	230	<1	<1	101	<1	NA	0.556 j	<1	NA	NA	NA	3.97	<0.2	NA	NA	0.937	NA	0.14
GMW-10 IMP	Northern edge of EB in CB	East Ash Basin	Downgradient	11/12/2018	5.9	138	18	61	140	<1	<1	104	<1	0.16	<1	<1	39	<5	1.46	4.87	<0.2	2.4	<5	NA	NA	0.15
GMW-10	Northern edge of EB in CB	East Ash Basin	Downgradient	11/12/2018	5.9	67.8	19.3	47.1	213	NA	<1	80.4	NA	NA	1.09 j	NA	107	2.43 j	2.23 j	2.35	<0.2	NA	3.64 j	NA	NA	0.138
GMW-10 CCR	Northern edge of EB in CB	East Ash Basin	Downgradient	01/30/2019	6.0	150	19	65	230	<1	<1	112	<1	NA	0.41 j	<1	NA	NA	NA	4.8	<0.2	NA	NA	0.814	NA	0.1
GMW-10 IMP	Northern edge of EB in CB	East Ash Basin	Downgradient	04/30/2019	5.9	125	20	51	230	<1	<1	NA	NA	0.24	0.617 j	<1	30	<5	NA	3.65	NA	2.5	NA	NA	NA	NA
GMW-10	Northern edge of EB in CB	East Ash Basin	Downgradient	04/30/2019	5.9	109	20.3	50.6	255	NA	<1	97.1	NA	NA	0.494 j	NA	27.7	<5	2.01 j	2.93	<0.2	NA	7.02	NA	NA	0.139
GMW-11	Northern edge of EB in CB	East Ash Basin	Downgradient	07/27/2018	6.4	3450	29	520	930	<1	<1	49	<1	0.22	0.641 j	<1	162	2.981 j	5.6	96.6	<0.2	6.27	2.369 j	NA	NA	0.422 j
GMW-11 IMP	Northern edge of EB in CB	East Ash Basin	Downgradient	11/12/2018	6.4	2190	31	350	840	<1	<1	40	<1	0.3	0.668 j	<1	25	<5	3.54	100	<0.2	6.61	<5	NA	NA	0.371 j
GMW-11	Northern edge of EB in CB	East Ash Basin	Downgradient	11/12/2018	6.4	1960	30.2	352	752	NA	<1	40.3	NA	NA	0.772 j	NA	66.7	<5	3.76 j	95.5	<0.2	NA	3.01 j	NA	NA	<1

I/A

FACILITY NAME: ROXBORO
DATE UPDATED: 06/24/2019
SHEET UPDATED BY: BRANDON RUSSO
SHEET CHECKED BY: CRAIG EADY

	D PARAME	TED 40CFR257 APPENDIX III CONSTITUENTS p				INORGANIC PARAMETERS (TOTAL CONCENTRATION)														RADIONUCLIDES		R PARAME
Reporting Units	**S.U.**	**ug/L**	**mg/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**pCi/L**	**ug/mL**	**mg/L**
15A NCAC 02L Standard	**6.5-8.5**	**700**	**250**	**250**	**500**	**1***	**10**	**700**	**4***	**10**	**10**	**1***	**300**	**50**	**100**	**20**	**0.2***	**0.3***	**1000**	**5^**	**0.03^**	**2**
Provisional Background Threshold Values (Transition Zone Unit)	**6.3-7.6**	**50**	**150**	**37**	**540**	**1**	**1**	**91**	**1**	**16.1**	**24.1**	**1**	**1173**	**405**	**5.22**	**1.78**	**0.2**	**30.2**	**12**	**5.45**	**0.00516**	**NE**
Provisional Background Threshold Values (Bedrock Unit)	**6.8-8.3**	**50**	**120**	**73.5**	**530**	**1**	**1**	**185**	**1**	**0.19**	**3.61**	**6.4**	**4227**	**1198**	**2.11**	**1**	**0.2**	**2.49**	**7**	**5.21**	**0.00324**	**NE**

					D PARAME	TED 40CFR257 APPENDIX III CONSTITUENTS p				INORGANIC PARAMETERS (TOTAL CONCENTRATION)														RADIONUCLIDES		R PARAME
Sample ID	**Location Description**	**Associated Unit**	**Location With Respect to Groundwater Flow Direction**	**Sample Collection Date**	**pH**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Manganese**	**Nickel**	**Selenium**	**Thallium**	**Vanadium**	**Zinc**	**Total Radium**	**Total Uranium**	**Fluoride**
GMW-11 IMP	Northern edge of EB in CB	East Ash Basin	Downgradient	04/30/2019	6.6	**1620**	32	**320**	**820**	<1	<1	NA	NA	0.41	0.73 j	<1	<10	<5	NA	**111**	NA	**7.56**	NA	NA	NA	NA
GMW-11	Northern edge of EB in CB	East Ash Basin	Downgradient	04/30/2019	6.6	**1640**	33.7	**335**	**804**	NA	<1	38.2	NA	NA	0.518 j	NA	4.19 j	<5	3.53 j	**104**	<0.2	NA	9.95	NA	NA	<1
GPMW-01BR	Northwest of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	07/31/2018	6.6	**1620**	25	**1200**	**1800**	<1	1.06	47	<1	<0.025	<1	0.54 j	**833**	**141**	1.49	<1	<0.2	**0.824 B2**	1.828 j	NA	NA	<2
GPMW-01BR	Northwest of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	11/15/2018	6.6	**1600**	21	**1100**	**1700**	<1	0.743 j	45	<1	<0.025	<1	0.474 j	**593**	**99**	1.61	<1	<0.2	**0.74**	9	NA	NA	<2
GPMW-01BR	Northwest of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	05/01/2019	**6.5**	**1580**	19	**1100**	**1700**	<1	0.732 j	NA	NA	<0.025	<1	0.417 j	**512**	**100**	NA	0.568 j	NA	**0.734**	NA	NA	NA	NA
GPMW-01D	Northwest of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	07/31/2018	6.6	**1110**	24	**1200**	**1800**	<1	<1	57	<1	<0.025	<1	<1	53	**62**	0.566 j	<1	<0.2	**4.1 B2**	<5	NA	NA	<2
GPMW-01D	Northwest of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	11/15/2018	6.6	**1150**	21	**1200**	**1700**	<1	<1	56	<1	<0.025	0.425 j	<1	66	**57**	0.674 j	<1	<0.2	**4.33**	1.924 j	NA	NA	<2
GPMW-01D CCR	Northwest of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	01/30/2019	6.6	**1240**	20	**1100**	**1700**	<1	<1	57	<1	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	NA	0.2979	NA	<2
GPMW-01D	Northwest of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	05/01/2019	**6.5**	**1200**	19	**1100**	**1800**	<1	<1	NA	NA	<0.025	<1	<1	18	**54**	NA	0.502 j	NA	**4.48**	NA	NA	NA	NA
GPMW-01S	Northwest of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	07/31/2018	**6.2**	**1940**	21	**1400**	**2000**	<1	<1	68	<1	<0.025	<1	**9.56**	231	**3360**	7.44	<1	<0.2	**4.64 B2**	<5	NA	NA	0.95 j
GPMW-01S	Northwest of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	11/15/2018	**6.2**	**2180**	13	**1200**	**1700**	<1	<1	57	<1	<0.025	<1	**12.3**	**345**	**3720**	6.61	<1	0.151 j	**4.59**	9	NA	NA	<2
GPMW-01S	Northwest of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	05/01/2019	**6.2**	**1900**	12	**930**	**1500**	<1	<1	NA	NA	0.032	0.388 j	**8.92**	60	**3030**	NA	<1	NA	**5.04**	NA	NA	NA	NA
GPMW-02BR	North of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	07/31/2018	**6.5**	**2530**	61	**1100**	**2000**	<1	<1	59	<1	<0.025	<1	0.474 j	139	**1030**	4.62	<1	<0.2	**1.39 B2**	<5	NA	NA	<2
GPMW-02BR	North of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	11/15/2018	6.6	**2570**	63	**1200**	**2000**	<1	<1	59	<1	<0.025	<1	0.684 j	**332**	**1220**	4.92	<1	<0.2	**1.74**	2.608 j	NA	NA	<2
GPMW-02BR	North of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	05/01/2019	**6.4**	**2520**	52	**1200**	**2100**	<1	<1	NA	NA	<0.025 P4,R1	0.456 j	0.719 j	152	**1310**	NA	<1	NA	**1.87**	NA	NA	NA	NA
GPMW-02D	North of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	07/31/2018	6.7	<50	54	**610**	**1200**	<1	2.31	323	<1	<0.025	<1	**6.61**	**93700**	**9520**	<1	<1	<0.2	**0.612 B2**	2.458 j	NA	NA	0.491 j
GPMW-02D	North of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	11/15/2018	6.7	<50	52	**680**	**1100**	<1	2.43	292	<1	<0.025	0.358 j	**7.31**	**93000**	**10100**	<1	<1	<0.2	**0.748**	<5	NA	NA	<1
GPMW-02D	North of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	05/01/2019	6.5	24.701 j	51	**690**	**1200**	<1	2.28	NA	NA	<0.025 P4	0.48 j	**6.82**	**98000**	**11400**	NA	<1	NA	**0.62**	NA	NA	NA	NA
GPMW-03BR	North of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	07/31/2018	7.5	238	17	**440**	**760**	<1	1.01	27	<1	<0.025	<1	<1	66	6	<1	<1	<0.2	**0.466 B2**	2.049 j	NA	NA	0.921 j
GPMW-03BR	North of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	11/15/2018	7.4	221	16	**440**	**720**	<1	1.75	26	<1	<0.025	<1	0.345 j	190	**100**	0.587 j	<1	<0.2	**0.368**	4.648 j	NA	NA	<1
GPMW-03BR	North of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	05/01/2019	7.4	196	15	**510**	**760**	<1	1.93	NA	NA	<0.025	0.355 j	<1	**476**	**93**	NA	<1	NA	0.174 j	NA	NA	NA	NA
GPMW-03D	North of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	07/31/2018	**6.0**	**1240**	14	**1200**	**1800**	<1	<1	33	<1	0.061	<1	**6.02**	**355**	**617**	2.86	**68.1**	<0.2	**1.39 B2**	2.182 j	NA	NA	<2
GPMW-03D	North of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	11/15/2018	**6.0**	**1300**	12	**1300**	**1800**	<1	<1	32	<1	0.07	<1	**1.26**	276	**250**	2.88	**76.4**	0.088 j	**1.72**	3.001 j	NA	NA	<2
GPMW-03D	North of the GSA, edge of RR, outside of CB	Gypsum Storage Area	Downgradient	05/01/2019	**5.9**	**897**	11	**1200**	**1900**	<1	<1	NA	NA	<0.025	0.451 j	**3.06**	45	**334**	NA	**73.2**	NA	**1.22**	NA	NA	NA	NA
HWMW-01BR	Toe of WB main dam, in CB	West Ash Basin	Downgradient	04/09/2019	7.5	33.721 j	13	140	490	<1	<1	8	<1	<0.025	<1	<1	136	**67**	<1	<1	<0.2	0.121 j	<5	0.972	0.000848	0.2965 j
MW-01BR	North of EB, on CB	East Ash Basin	Downgradient	07/31/2018	**6.4**	**1330**	41	98	**610**	0.798 j	0.368 j	354	<1	0.065	3.63	**1.83**	**438**	**959**	7.18	4.16	<0.2	**12 B2**	15	NA	NA	0.4
MW-01BR	North of EB, on CB	East Ash Basin	Downgradient	11/14/2018	6.5	**1930**	44	140	**660**	0.845 j	<1	266	<1	0.17	1.83 B2	**1.68**	**371 B2**	**598**	4.11	11.1	<0.2	**18.2**	7 B	NA	NA	0.39
MW-01BR	North of EB, on CB	East Ash Basin	Downgradient	04/29/2019	6.7	**3380**	45	230	**830**	<1	<1	NA	NA	0.26	1.03	0.98 j	137	**166**	NA	18.5	NA	**19.3**	NA	NA	NA	NA
MW-01BRL	North of EB, on CB	East Ash Basin	Downgradient	04/09/2019	7.0	22.934 j	42	99	**620**	<1	0.888 j	16	<1	<0.025	0.511 j	<1	**2150**	**1480**	<1	<1	<0.2	**0.359**	<5	1.01	0.000516	0.2385 j
MW-02	Toe of WB main dam, in CB	West Ash Basin	Downgradient	07/26/2018	**6.1**	**3290**	**860**	220	**2500**	<1	<1	304	<1	0.13	0.682 j	**1.13**	168	**80**	3.98	<1	0.159 j	**4.95**	<5	1.17	0.00325	<2
MW-02 CCR	Toe of WB main dam, in CB	West Ash Basin	Downgradient	10/09/2018	**6.0**	**3550**	**910**	220	**2600**	<1	<1	292	<1	NA	0.691 j	**1.04**	NA	NA	NA	<1	<0.2	NA	NA	2.52	NA	<2
MW-02	Toe of WB main dam, in CB	West Ash Basin	Downgradient	11/15/2018	**5.8**	**3780**	**930**	220	**2400**	<1	<1	287	<1	0.11	1.18	**1.24**	186	**71**	7.48	<1	<0.2	**5.28**	1.765 j	0.1338	0.00403	<2
MW-02 CCR	Toe of WB main dam, in CB	West Ash Basin	Downgradient	01/23/2019	**6.0**	**3340**	**810**	180	**2100**	<1	<1	268	<1	NA	1.53	0.953 j	NA	NA	NA	<1	<0.2	NA	NA	0.0833	NA	<2
MW-02	Toe of WB main dam, in CB	West Ash Basin	Downgradient	04/29/2019	**6.1**	**4090**	**900**	210	**2300**	0.753 j	<1	NA	NA	0.095	6.42	0.773 j	158	**59**	NA	<1	NA	**4.85**	NA	0.377	0.00428	NA
MW-02BR	Between EB and WB, in CB	West Ash Basin	Downgradient	07/31/2018	**6.2**	<50	100	49	**520**	<1	0.617 j	**1140**	<1	<0.025 M1	<1	**3.35**	**16100**	**1290**	0.551 j	<1	<0.2	0.193 j,B2	2.03 j	NA	NA	0.1356 j
MW-02BR	Between EB and WB, in CB	West Ash Basin	Downgradient	11/16/2018	**5.8**	<50	99	48	470	<1	1.03	629	<1	<0.025	1.21	**5.06**	**15300**	**805**	0.893 j	<1	<0.2	<0.3	3.707 j	NA	NA	0.1028 j
MW-02BR	Between EB and WB, in CB	West Ash Basin	Downgradient	04/30/2019	6.6	<50	83	48	460	<1	0.543 j	NA	NA	<0.025 M1	**35.6**	**3.31**	**6280**	**364**	NA	<1	NA	**0.308**	NA	NA	NA	NA
MW-03BR	In gypsum storage area, in CB	East Ash Basin	Downgradient	07/27/2018	6.7	**2670**	68	**1500**	**2300**	<1	<1	36	<1	<0.025	<1	**1.12**	59	39	1.36	2.73	<0.2	**15.9**	3.451 j	0.4163	**0.0345**	<5
MW-03BR	In gypsum storage area, in CB	East Ash Basin	Downgradient	11/15/2018	6.7	**2860**	73	**1400**	**2300**	<1	<1	36	<1	<0.025	<1	**1.09**	121	37	1.29	2.4	<0.2	**17.2**	<5	0.62	**0.0403**	<2
MW-03BR	In gypsum storage area, in CB	East Ash Basin	Downgradient	04/29/2019	6.7	**2850**	74	**1300**	**2400**	<1	<1	NA	NA	0.033	0.478 j	**1.01**	91	35	NA	2.48	NA	**16.6**	NA	0.3235	**0.0415**	NA
MW-04BR	Southwest of WB in CB	West Ash Basin	Downgradient	07/25/2018	7.3	<50	18	32	270	0.619 j	1.37	43	<1	0.072 M1	0.43 j	<1	73	35	0.989 j	<1	<0.2	**0.861**	6	NA	NA	0.17
MW-04BR	Southwest of WB in CB	West Ash Basin	Downgradient	11/15/2018	7.5	17.334 j	19	32	260	<1	1.4	46	<1	0.055	<1	<1	**303**	**98**	0.521 j	<1	<0.2	0.19 j	<5	NA	NA	0.11
MW-04BR	Southwest of WB in CB	West Ash Basin	Downgradient	04/23/2019	7.3	<50	19	31	330	<1	1.63	NA	NA	0.046	0.465 j	<1	**446**	**113**	NA	<1	NA	0.212 j	NA	NA	NA	NA
MW-05BR	North of WB, on CB	West Ash Basin	Downgradient	07/26/2018	7.0	48.97 j	17	220	**560**	<1	0.386 j	14	<1	<0.025	<1	**5.6**	**347**	**275**	0.372 j	<1	<0.2	**0.451**	<5	1.422	0.00452	0.2595 j
MW-05BR	North of WB, on CB	West Ash Basin	Downgradient	11/14/2018	7.1	52	16	210	**520**	<1	0.484 j	14	<1	<0.025	<1	**7.68**	**303 B2**	**447**	<1	<1	0.094 j	**0.713**	<5	1.802	0.00275	<0.5
MW-05BR	North of WB, on CB	West Ash Basin	Downgradient	04/30/2019	7.2	59	16	210	**560**	<1	0.667 j	NA	NA	<0.025	0.657 j	**8.76**	**685**	**485**	NA	<1	NA	**0.679**	NA	2.48	0.00321	NA
MW-05D	North of WB, on CB	West Ash Basin	Downgradient	07/27/2018	**6.3**	696	12	**390**	**680**	0.712 j	<1	29	<1	0.67	0.657 j	<1	9.749 j	6	0.874 j	0.375 j	<0.2	**14**	2.462 j	0.2258	0.000237	0.469 j
MW-05D	North of WB, on CB	West Ash Basin	Downgradient	11/15/2018	**6.4**	**709**	11	**480**	**660**	0.774 j	<1	27	<1	1.3	1.21	<1	5.854 j	3.075 j	0.861 j	0.452 j	<0.2	**16**	2.948 j	0.558	0.000286	<1
MW-05D	North of WB, on CB	West Ash Basin	Downgradient	04/30/2019	**6.4**	568	15	**310**	**610**	0.753 j	0.405 j	NA	NA	1	1.25	<1	5.555 j	3.034 j	NA	0.673 j	NA	**12.8**	NA	0.186	0.000697	NA
MW-06BR	North of WB, on CB	West Ash Basin	Downgradient	05/01/2019	7.4	<50	8.6	21	240	<1	<1	NA	NA	<0.025	0.396 j	<1	294	**78**	NA	<1	NA	0.159 j	NA	0.549	0.000392	NA
MW-06D	North of WB, on CB	West Ash Basin	Downgradient	05/01/2019	6.6	<50	21	33	210	<1	<1	NA	NA	0.035	0.383 j	<1	7.296 j	3.533 j	NA	0.506 j	NA	**6.01**	NA	0.2842	0.000212	NA
MW-07BR	West of WB, outside of CB	West Ash Basin	Downgradient	07/27/2018	7.0	<50	7	26	180	<1	0.724 j	12	<1	0.15	<1	<1	75	17	<1	0.802 j	<0.2	**16.7**	8	NA	NA	0.2
MW-07BR	West of WB, outside of CB	West Ash Basin	Downgradient	11/13/2018	6.7	<50	6	26	180	<1	0.636 j	11	<1	0.18	<1	<1	53	19	<1	0.705 j	<0.2	**18.4**	9	NA	NA	0.24
MW-07BR	West of WB, outside of CB	West Ash Basin	Downgradient	04/25/2019	6.9	<50	4.9	28	200	<1	0.614 j	NA	NA	0.12	0.353 j	<1	6.983 j	3.799 j	NA	0.466 j	NA	**16.9**	NA	NA	NA	NA
MW-08BR	West of WB, outside of CB	West Ash Basin	Downgradient	07/30/2018	7.2	<50	25	27	380	0.78 j	0.355 j	30	<1	<0.025	0.516 j	<1	**1020**	**628**	1.32	<1	<0.2	**0.639**	16	NA	NA	0.22
MW-08BR	West of WB, outside of CB	West Ash Basin	Downgradient	11/15/2018	7.1	<50	24	26	350	<1	0.504 j	31	<1	<0.025	0.351 j	<1	**2110**	**741**	0.8 j	<1	<0.2	**0.346**	4.204 j	NA	NA	0.2
MW-08BR CCR	West of WB, outside of CB	West Ash Basin	Downgradient	01/28/2019	7.2	<50	24	27	370	<1	<1	31	<1	NA	0.448 j	<1	NA	NA	NA	<1	<0.2	NA	NA	0.484	NA	0.2
MW-08BR	West of WB, outside of CB	West Ash Basin	Downgradient	04/29/2019	7.2	<50	25	27	450	<1	<1	NA	NA	<0.025	0.443 j	<1	**1550**	**915**	NA	<1	NA	0.25 j	NA	NA	NA	NA
MW-09BR	Northwest of WB, outside of CB	West Ash Basin	Downgradient	07/30/2018	**6.2**	<50	15	23	240	<1	<1	28	<1	0.025	<1	**1.16**	59	**131**	1.2	<1	<0.2	**6**	7	0.339	0.000193 j	0.13
MW-09BR	Northwest of WB, outside of CB	West Ash Basin	Downgradient	11/14/2018	6.6	<50	17	24	220	<1	<1	29	<1	<0.025	0.513 j,B2	**1.27**	179 B2	**139**	0.533 j	<1	<0.2	**5.86**	<5	0.838	0.00019 j	0.11
MW-09BR CCR	Northwest of WB, outside of CB	West Ash Basin	Downgradient	01/28/2019	**6.3**	<50	19	24	230	<1	<1	35	<1	NA	<1	**1.18**	NA	NA	NA	<1	<0.2	NA	NA	1.36	NA	0.075 j
MW-09BR	Northwest of WB, outside of CB	West Ash Basin	Downgradient	04/29/2019	**6.5**	<50	20	24	250	<1	<1	NA	NA	<0.025	0.392 j	**1.09**	28	**128**	NA	<1	NA	**8.27**	NA	0.964	0.00024	NA
MW-108BRL	Edge of EB	East Ash Basin	Downgradient	04/09/2019	6.6	**5220**	21	**470**	**930**	**1.06**	1.27	20	<1	<0.025 M1,R1	0.596 j	0.415 j	207	**312**	1.32	<1	0.082 j	**2.27**	977	0.565	0.00265	0.305 j

I/A

FACILITY NAME:	**ROXBORO**		**PARAME**	**TED 40CFR257 APPENDIX III CONSTITUENTS**				**INORGANIC PARAMETERS (TOTAL CONCENTRATION)**														**RADIONUCLIDES**		**R PARAME**
DATE UPDATED:	**06/24/2019**	**Reporting Units**	**S.U.**	**ug/L**	**mg/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**pCi/L**	**ug/mL**	**mg/L**
SHEET UPDATED BY:	**BRANDON RUSSO**	**15A NCAC 02L Standard**	**6.5-8.5**	**700**	**250**	**250**	**500**	**1***	**10**	**700**	**4***	**10**	**10**	**1***	**300**	**50**	**100**	**20**	**0.2***	**0.3***	**1000**	**5^**	**0.03^**	**2**
SHEET CHECKED BY:	**CRAIG EADY**	**Provisional Background Threshold Values (Transition Zone Unit)**	**6.3-7.6**	**50**	**150**	**37**	**540**	**1**	**1**	**91**	**1**	**16.1**	**24.1**	**1**	**1173**	**405**	**5.22**	**1.78**	**0.2**	**30.2**	**12**	**5.45**	**0.00516**	**NE**
		Provisional Background Threshold Values (Bedrock Unit)	**6.8-8.3**	**50**	**120**	**73.5**	**530**	**1**	**1**	**185**	**1**	**0.19**	**3.61**	**6.4**	**4227**	**1198**	**2.11**	**1**	**0.2**	**2.49**	**7**	**5.21**	**0.00324**	**NE**

					PARAME	**TED 40CFR257 APPENDIX III CONSTITUENTS**				**INORGANIC PARAMETERS (TOTAL CONCENTRATION)**														**RADIONUCLIDES**		**R PARAME**
Sample ID	**Location Description**	**Associated Unit**	**Location With Respect to Groundwater Flow Direction**	**Sample Collection Date**	**pH**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Manganese**	**Nickel**	**Selenium**	**Thallium**	**Vanadium**	**Zinc**	**Total Radium**	**Total Uranium**	**Fluoride**
MW-108BRLL	Edge of EB	East Ash Basin	Downgradient	04/09/2019	7.6	**24300**	31	**2000**	**3100**	<1	<1	38	<1	<0.025	<1	**11.9**	**831**	**2620**	13.4	<1	<0.2	**2.03**	23	1.299	0.00786	<5
MW-10BR	South of CB	Background	Background	07/30/2018	7.0	<50	18	39	340	<1	<1	125	<1	0.14	<1	**15.8**	5.719 j	**191**	0.34 j	<1	<0.2	**2.78**	<5	0.809	0.00261	0.35
MW-10BR CCR	South of CB	Background	Background	10/09/2018	6.9	<50	19	39	320	<1	<1	118	<1	NA	<1	**12.9**	NA	NA	NA	0.41 j	<0.2	NA	NA	0.861	NA	0.4
MW-10BR	South of CB	Background	Background	11/14/2018	6.9	<50	19	39	310	<1	<1	122	<1	0.24	<1	**13.3**	14	**135**	<1	0.364 j	<0.2	**3.03**	<5	1.021	0.00238	0.32
MW-10BR CCR	South of CB	Background	Background	01/29/2019	6.9	<50	19	39	350	<1	<1	117	<1	NA	0.519 j	**12.3**	NA	NA	NA	0.337 j	<0.2	NA	NA	0.6388	NA	0.39
MW-10BR	South of CB	Background	Background	04/24/2019	6.9	<50	20	40	340	<1	<1	NA	NA	0.21	0.524 j	**10.7**	19	**122**	NA	0.416 j	NA	**2.79**	NA	0.3247	0.00232	NA
MW-11BR	North east of EB, in contractor lot	East Ash Basin	Downgradient	07/27/2018	6.6	<50	12	41	300	<1	<1	177	<1	0.26	<1	<1	42	23	1.8	<1	<0.2	**4.68**	2.754 j	-0.1665	0.000586	0.1
MW-11BR CCR	North east of EB, in contractor lot	East Ash Basin	Downgradient	10/08/2018	**6.4**	<50	14	42	320	<1	<1	187	<1	NA	<1	<1	NA	NA	NA	<1	0.087 j	NA	NA	1.328	NA	0.1
MW-11BR	North east of EB, in contractor lot	East Ash Basin	Downgradient	11/15/2018	6.7	<50	14	42	310	<1	<1	191	<1	0.11	<1	<1	4.562 j	33	2.92	<1	<0.2	**5.25**	<5	0.834	0.000683	<0.1
MW-11BR CCR	North east of EB, in contractor lot	East Ash Basin	Downgradient	01/29/2019	6.6	<50	13	43	350	<1	<1	178	<1	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	NA	0.829	NA	0.084 j
MW-11BR	North east of EB, in contractor lot	East Ash Basin	Downgradient	04/29/2019	6.8	<50	13	40	330	<1	<1	NA	NA	0.24	0.506 j	<1	<10	23	NA	<1	NA	**5.18**	NA	0.633	0.000706	NA
MW-11D	North east of EB, in contractor lot	East Ash Basin	Downgradient	07/27/2018	6.9	<50	17	37	280	<1	<1	189	<1	<0.025	<1	**6.18**	137	**1230**	2.74	<1	<0.2	**3.49**	2.146 j	0.74	0.000104 j	0.11
MW-11D CCR	North east of EB, in contractor lot	East Ash Basin	Downgradient	10/08/2018	**6.1**	<50	18	38	300	<1	<1	176	<1	NA	<1	**6.2**	NA	NA	NA	<1	<0.2	NA	NA	1.006	NA	0.13
MW-11D	North east of EB, in contractor lot	East Ash Basin	Downgradient	11/15/2018	**6.3**	<50	17	37	280	<1	<1	183	<1	<0.025	<1	**7.36**	114	**1390**	2.61	<1	<0.2	**3.36**	<5	0.2801	0.0000853 j	0.061 j
MW-11D CCR	North east of EB, in contractor lot	East Ash Basin	Downgradient	01/29/2019	**6.4**	<50	17	39	320	<1	<1	177	<1	NA	<1	**3.44**	NA	NA	NA	<1	<0.2	NA	NA	0.455	NA	0.11
MW-11D	North east of EB, in contractor lot	East Ash Basin	Downgradient	04/29/2019	**6.2**	<50	18	37	290	<1	<1	NA	NA	0.04	<1	**4.18**	42	**961**	NA	<1	NA	**3.7**	NA	-0.027	0.0000974 j	NA
MW-12BR	West of WB, in CB	West Ash Basin	Downgradient	07/31/2018	7.0	<50	54	39	450	<1	0.761 j	49	<1	<0.025	<1	**12.8**	**3350**	**1270**	0.646 j	<1	<0.2	**0.409 B2**	10	NA	NA	0.15
MW-12BR	West of WB, in CB	West Ash Basin	Downgradient	11/14/2018	7.1	<50	56	39	420	<1	0.745 j	44	<1	<0.025	<1	**21.9**	**3090 B2**	**1200**	<1	<1	<0.2	0.242 j	<5	NA	NA	0.14
MW-12BR	West of WB, in CB	West Ash Basin	Downgradient	04/29/2019	7.1	<50	49	37	420	<1	0.43 j	NA	NA	<0.025	<1	**17.7**	**2610**	**1160**	NA	<1	NA	0.26 j	NA	NA	NA	NA
MW-13BR	South of EB, outside of CB	East Ash Basin	Sidegradient	07/27/2018	**6.2**	<50	96	33	360	<1	<1	417	<1	0.05 M1	<1	**2.38**	153	**155**	2.08	<1	<0.2	**5.39**	4.954 j	0.98	0.000993	0.1208 j
MW-13BR CCR	South of EB, outside of CB	East Ash Basin	Sidegradient	10/08/2018	**6.1**	<50	90	33	380	<1	<1	370	<1	NA	0.337 j	**1.76**	NA	NA	NA	<1	<0.2	NA	NA	1.211	NA	0.102 j
MW-13BR	South of EB, outside of CB	East Ash Basin	Sidegradient	11/14/2018	**6.3**	<50	99	34	380	<1	<1	425	<1	0.14	0.455 j	**2.07**	70	**141**	1.38	<1	<0.2	**6.77**	2.011 j	0.514	0.0000832 j	0.1066 j
MW-13BR CCR	South of EB, outside of CB	East Ash Basin	Sidegradient	01/29/2019	**6.2**	<50	96	33	390	<1	<1	389	<1	NA	0.695 j	**1.98**	NA	NA	NA	<1	<0.2	NA	NA	1.535	NA	0.053 j
MW-13BR	South of EB, outside of CB	East Ash Basin	Sidegradient	04/24/2019	**6.1**	<50	93	32	410	<1	<1	NA	NA	0.12	0.499 j	**1.71**	50	**102**	NA	<1	NA	**6.68**	NA	0.2863	0.000074 j	NA
MW-14BR	Northeast of EB, outside of CB	Background	Background	07/25/2018	7.3	<50	47	13	360	0.373 j	0.479 j	35	<1	<0.025	0.895 j	**4.22**	**1730**	**397**	1.05	<1	<0.2	**0.522**	6	1.388	0.000328	0.18
MW-14BR	Northeast of EB, outside of CB	Background	Background	11/13/2018	7.2	<50	52	13	340	<1	0.503 j	36	<1	<0.025	<1	**2.68**	**1640**	**353**	<1	<1	<0.2	0.133 j	<5	1.88	0.000296	0.15
MW-14BR	Northeast of EB, outside of CB	Background	Background	04/23/2019	7.1	<50	47	12	390	<1	0.438 j	NA	NA	<0.025	1.92	**3.98**	**1640**	**384**	NA	<1	NA	0.198 j	NA	0.84	0.000184 j	NA
MW-15BR	Southwest of WB, outside of CB	Background	Background	07/30/2018	7.5	<50	41	32	380	<1	<1	16	<1	0.091	0.365 j	<1	**575**	38	0.698 j	<1	<0.2	0.238 j	<5	0.895	0.000549	0.0877 j
MW-15BR CCR	Southwest of WB, outside of CB	Background	Background	10/09/2018	7.8	18.259 j	42	31	340	<1	<1	16	<1	NA	0.431 j	<1	NA	NA	NA	<1	<0.2	NA	NA	0.4052	NA	0.0895 j
MW-15BR	Southwest of WB, outside of CB	Background	Background	11/14/2018	7.5	<50	42	33	320	<1	<1	17	<1	0.039	0.632 j,B2	<1	**598 B2**	41	0.402 j	<1	<0.2	0.282 j	<5	0.6186	0.000611	0.0746 j
MW-15BR CCR	Southwest of WB, outside of CB	Background	Background	01/28/2019	7.9	<50	40	33	330	<1	<1	15	<1	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	NA	0.43	NA	<0.1
MW-15BR	Southwest of WB, outside of CB	Background	Background	04/25/2019	7.4	<50	40	33	320	<1	<1	NA	NA	0.072	0.615 j	<1	**396**	30	NA	<1	NA	0.117 j	NA	0.3263	0.000601	NA
MW-15D	Southwest of WB, outside of CB	Background	Background	07/30/2018	**6.3**	<50	40	27	420	<1	<1	5	<1	3.1	2.59	<1	25	<5	6.6	<1	<0.2	**9.8**	<5	0.693	0.000628	0.0695 j
MW-15D CCR	Southwest of WB, outside of CB	Background	Background	10/09/2018	6.7	18.033 j	45	28	410	<1	<1	5	<1	NA	2.84	<1	NA	NA	NA	<1	<0.2	NA	NA	0.529	NA	0.0751 j
MW-15D	Southwest of WB, outside of CB	Background	Background	11/14/2018	6.5	<50	43	27	390	<1	<1	6	<1	2.9	2.72 B2	<1	18 B2	<5	6.03	<1	<0.2	**10.4**	3.497 j,B	0.281	0.000579	<0.1
MW-15D CCR	Southwest of WB, outside of CB	Background	Background	01/28/2019	6.8	<50	44	29	380	<1	<1	6	<1	NA	3.05	<1	NA	NA	NA	<1	<0.2	NA	NA	-0.073	NA	<0.1
MW-15D	Southwest of WB, outside of CB	Background	Background	04/25/2019	6.5	<50	52	35	360	<1	<1	NA	NA	3.8 P4	3.8	<1	59	3.346 j	NA	<1	NA	**10.2**	NA	0.025	0.000574	NA
MW-16BR	Southwest of EB, outside of CB	East Ash Basin	Sidegradient	07/27/2018	6.9	<50	9.2	22	260	<1	<1	66	<1	0.076	<1	<1	20	19	0.635 j	<1	<0.2	**3.05**	3.457 j	0.2249	0.00122	0.14
MW-16BR CCR	Southwest of EB, outside of CB	East Ash Basin	Sidegradient	10/08/2018	**6.0**	<50	9.6	23	270	<1	<1	60	<1	NA	<1	<1	NA	NA	NA	<1	0.181 j	NA	NA	0.516	NA	0.16
MW-16BR	Southwest of EB, outside of CB	East Ash Basin	Sidegradient	11/14/2018	6.9	<50	10	23	280	<1	<1	60	<1	0.13	<1	<1	8.511001 j	9	0.374 j	0.334 j	0.091 j	**3.22**	<5	1.214	0.00105	0.13
MW-16BR CCR	Southwest of EB, outside of CB	East Ash Basin	Sidegradient	01/30/2019	7.0	<50	9.7	22	260	<1	<1	60	<1	NA	0.363 j	<1	NA	NA	NA	<1	0.105 j	NA	NA	0.1228	NA	0.14
MW-16BR	Southwest of EB, outside of CB	East Ash Basin	Sidegradient	04/29/2019	6.9	<50	9.9	21	330	<1	<1	NA	NA	0.086	0.525 j	<1	16	10	NA	<1	NA	**3.2**	NA	0.149	0.00104	NA
MW-17BR	East of EB, outside of CB	East Ash Basin	Sidegradient	07/26/2018	7.2	<50	13	37	370	<1	<1	97	<1	<0.025	<1	<1	**1820 M2**	**341**	<1	<1	0.082 j	0.221 j	<5	0.7127	0.000275	0.14
MW-17BR CCR	East of EB, outside of CB	East Ash Basin	Sidegradient	10/08/2018	7.2	<50	12	37	360	<1	<1	92	<1	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	NA	0.687	NA	0.15
MW-17BR	East of EB, outside of CB	East Ash Basin	Sidegradient	11/13/2018	7.2	<50	13	36	360	<1	0.365 j	91	<1	0.029	<1	<1	244	**181**	0.505 j	<1	<0.2	**0.332**	<5	1.375	0.000201	0.11
MW-17BR CCR	East of EB, outside of CB	East Ash Basin	Sidegradient	01/29/2019	7.2	<50	12	37	400	<1	0.356 j	88	<1	NA	0.464 j	<1	NA	NA	NA	<1	<0.2	NA	NA	0.986	NA	0.13
MW-17BR	East of EB, outside of CB	East Ash Basin	Sidegradient	04/24/2019	7.2	<50	13	36	390	<1	<1	NA	NA	0.093	0.577 j	<1	**321**	**227**	NA	<1	NA	**0.31**	NA	0.498	0.000225	NA
MW-18BR	Southeast of WB, outside of CB	Background	Background	07/30/2018	7.9	<50	130	12	**530**	<1	<1	88	<1	<0.025	<1	**1.62**	**1270**	**833**	0.424 j	<1	<0.2	0.233 j	2.18 j	**6.695**	0.000409	0.2525 j
MW-18BR CCR	Southeast of WB, outside of CB	Background	Background	10/09/2018	7.9	<50	130	14	**510**	<1	0.35 j	100	<1	NA	<1	**1.02**	NA	NA	NA	<1	<0.2	NA	NA	2.699	NA	0.07 j
MW-18BR	Southeast of WB, outside of CB	Background	Background	11/14/2018	8.1	<50	130	16	500	<1	0.4 j	99	<1	<0.025	1.43 B2	**1.6**	**822 B2**	**811**	0.463 j	<1	<0.2	**0.344**	17 B	1.75	0.000686	<0.5
MW-18BR CCR	Southeast of WB, outside of CB	Background	Background	01/28/2019	8.0	<50	130	15	440	<1	0.347 j	98	<1	NA	0.632 j	**2.6**	NA	NA	NA	<1	<0.2	NA	NA	1.357	NA	<0.2
MW-18BR	Southeast of WB, outside of CB	Background	Background	04/25/2019	7.7	<50	140	15	490	<1	<1	NA	NA	<0.025	0.448 j	**1.75**	**507**	**621**	NA	<1	NA	0.267 j	NA	1.909	0.000566	NA
MW-18D	Southeast of WB, outside of CB	Background	Background	07/30/2018	7.1	<50	150	33	**590**	<1	0.354 j	31	<1	2.8	3.51	<1	165	**86**	2.35	0.338 j	<0.2	**1.2**	2.94 j	1.156	0.0027	0.24 j
MW-18D CCR	Southeast of WB, outside of CB	Background	Background	10/09/2018	7.2	<50	160	33	**610**	<1	0.353 j	25	<1	NA	3.12	<1	NA	NA	NA	<1	<0.2	NA	NA	1.243	NA	0.21 j
MW-18D	Southeast of WB, outside of CB	Background	Background	11/14/2018	6.8	<50	170	29	**570**	<1	<1	46	<1	**12.1**	**12.7**	<1	180	**93**	1.65	0.475 j	<0.2	**1.13**	<5	1.664	0.00264	0.189 j
MW-18D CCR	Southeast of WB, outside of CB	Background	Background	01/28/2019	6.8	<50	130	32	420	<1	<1	36	<1	NA	4.96	<1	NA	NA	NA	<1	<0.2	NA	NA	0.5931	NA	<0.5
MW-18D	Southeast of WB, outside of CB	Background	Background	04/25/2019	6.9	<50	110	34	450	<1	<1	NA	NA	3.2	4.78	<1	61	20	NA	<1	NA	**1.4**	NA	0.5537	0.0034	NA
MW-19BRL	South of EB, outside of CB	Background	Background	07/27/2018	7.0	<50	77	17	430	<1	2.18	49	<1	<0.025	<1	<1	**3820**	**1440**	<1	<1	<0.2	**0.476**	4.399 j	1.278	<0.0002	0.1684 j
MW-19BRL	South of EB, outside of CB	Background	Background	11/14/2018	7.1	<50	73	23	470	<1	2.12	52	<1	<0.025	<1	<1	**3610**	**1470**	<1	<1	<0.2	**0.324**	<5	0.882	0.000143 j	0.1434 j
MW-19BRL	South of EB, outside of CB	Background	Background	04/24/2019	7.0	<50	70	25	480	<1	1.93	NA	NA	<0.025	<1	<1	**4280**	**1510**	NA	<1	NA	0.17 j	NA	1.735	0.000144 j	NA
MW-205BRL	Edge of WB	West Ash Basin	Downgradient	04/08/2019	6.8	**5990**	**570**	99	**1500**	<1	<1	179	<1	<0.025	0.598 j	**3.04**	288	**1800**	1.29	<1	<0.2	**0.757**	2.171 j	1.73	0.000672	<1
MW-205BRLL	Edge of WB	West Ash Basin	Downgradient	04/08/2019	7.0	**8240**	**840**	240	**2000**	<1	0.94 j	194	<1	<0.025	0.436 j	0.474 j	**4130**	**1690**	0.855 j	<1	0.124 j	0.229 j	<5	4.79	0.00299	<1
MW-205BRLLL	Edge of WB	West Ash Basin	Downgradient	04/08/2019	6.7	**18900**	**1900**	**500**	**4700**	<1	3.03	133	<1	<0.025 P4,R0	0.547 j	**2.59**	**2590**	**3140**	3.25	<1	0.089 j	**0.423**	**1060**	3.383	0.00667	<5

I/A

FACILITY NAME: ROXBORO
DATE UPDATED: 06/24/2019
)SHEET UPDATED BY: BRANDON RUSSO
)SHEET CHECKED BY: CRAIG EADY

	D PARAME	TED 40CFR257 APPENDIX III CONSTITUENTS p				INORGANIC PARAMETERS (TOTAL CONCENTRATION)															RADIONUCLIDES		ER PARAME
Reporting Units	**S.U.**	**ug/L**	**mg/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**pCi/L**	**ug/mL**	**mg/L**
15A NCAC 02L Standard	**6.5-8.5**	**700**	**250**	**250**	**500**	**1***	**10**	**700**	**4***	**10**	**10**	**1***	**300**	**50**	**100**	**20**	**0.2***	**0.3***	**1000**	**5^**	**0.03^**	**2**
Provisional Background Threshold Values (Transition Zone Unit)	**6.3-7.6**	**50**	**150**	**37**	**540**	**1**	**1**	**91**	**1**	**16.1**	**24.1**	**1**	**1173**	**405**	**5.22**	**1.78**	**0.2**	**30.2**	**12**	**5.45**	**0.00516**	**NE**
Provisional Background Threshold Values (Bedrock Unit)	**6.8-8.3**	**50**	**120**	**73.5**	**530**	**1**	**1**	**185**	**1**	**0.19**	**3.61**	**6.4**	**4227**	**1198**	**2.11**	**1**	**0.2**	**2.49**	**7**	**5.21**	**0.00324**	**NE**

					D PARAME	TED 40CFR257 APPENDIX III CONSTITUENTS p				INORGANIC PARAMETERS (TOTAL CONCENTRATION)															RADIONUCLIDES		ER PARAME
Sample ID	**Location Description**	**Associated Unit**	**Location With Respect to Groundwater Flow Direction**	**Sample Collection Date**	**pH**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Manganese**	**Nickel**	**Selenium**	**Thallium**	**Vanadium**	**Zinc**	**Total Radium**	**Total Uranium**	**Fluoride**
MW-208BRL	Edge of WB	West Ash Basin	Downgradient	04/09/2019	7.5	**865**	220	150	**720**	0.46 j	1.9	72	<1	<0.025	2.06	0.465 j	**1280**	**459**	0.653 j	<1	<0.2	**1.3**	9	1.02	0.00171	0.214 j
MW-208BRLL	Edge of WB	West Ash Basin	Downgradient	04/08/2019	7.8	**1400**	**390**	110	**990**	0.617 j	0.67 j	61	<1	<0.025	1.03	<1	236	**568**	<1	<1	0.086 j	0.16 j	<5	1.762	0.000484	<1
MW-208BRLLL	Edge of WB	West Ash Basin	Downgradient	04/08/2019	7.5	**1570**	**460**	**310**	**820**	<1	1.08	89	<1	<0.0025 M1	0.551 j	0.704 j	246	**789**	0.438 j	<1	<0.2	**0.626**	347	2.808	0.0132	<1
MW-20BRL	East of EB, outside of CB	East Ash Basin	Sidegradient	07/26/2018	7.4	<50	14	13	260	<1	<1	5	<1	<0.025	<1	<1	92	**437**	<1	<1	0.126 j	0.256 j	<5	NA	NA	0.13
MW-20BRL	East of EB, outside of CB	East Ash Basin	Sidegradient	11/15/2018	7.7	<50	14	13	240	<1	<1	5	<1	<0.025	<1	<1	67	**406**	<1	<1	<0.2	<0.3	5	NA	NA	0.073 j
MW-20BRL CCR	East of EB, outside of CB	East Ash Basin	Sidegradient	01/29/2019	7.0	<50	15	13	300	<1	<1	5	<1	NA	0.374 j	<1	NA	NA	NA	<1	<0.2	NA	NA	0.96	NA	0.1
MW-20BRL	East of EB, outside of CB	East Ash Basin	Sidegradient	04/24/2019	7.2	<50	14	13	260	<1	<1	NA	NA	0.028	<1	<1	64	**415**	NA	<1	NA	<0.3	NA	NA	NA	NA
MW-21BRLR	Southern edge of EB, in CB	East Ash Basin	Sidegradient	09/06/2018	7.4	45.315 j	28	40	360	<1	0.757 j	17	<1	0.03	<1	<1	30	**97**	0.382 j	<1	<0.2	**1.58**	16	0.83	0.00603	0.24
MW-21BRLR	Southern edge of EB, in CB	East Ash Basin	Sidegradient	09/20/2018	7.2	42.392 j	42	57	370	<1	0.924 j	18	<1	<0.025	<1	<1	13	**101**	0.359 j	<1	<0.2	**1.51**	23	0.3229	0.00562	0.23
MW-21BRLR	Southern edge of EB, in CB	East Ash Basin	Sidegradient	11/14/2018	7.4	52	80	98	490	<1	1.72	27	<1	<0.025	<1	<1	66 B2	**129**	<1	<1	<0.2	**1.14**	24 B	NA	NA	0.21
MW-21BRLR	Southern edge of EB, in CB	East Ash Basin	Sidegradient	01/30/2019	7.5	72	120	140	**580**	<1	3.25	30	<1	<0.025	0.44 j	<1	154	**159**	0.654 j	<1	<0.2	**0.614**	8	NA	NA	0.1946 j
MW-21BRLR	Southern edge of EB, in CB	East Ash Basin	Sidegradient	04/30/2019	7.4	117	160	200	**740**	<1	4.82	NA	NA	<0.025	0.415 j	0.371 j	296	**200**	NA	<1	NA	**0.458**	NA	NA	NA	NA
MW-22BR	Southwest edge of gypsum storage area	East Ash Basin	Downgradient	07/26/2018	**6.4**	**805**	20	**490**	**990**	<1	<1	72	<1	<0.025	<1	**7.37**	285	**488**	2.17	6.2	0.098 j	**0.859**	<5	NA	NA	<1
MW-22BR	Southwest edge of gypsum storage area	East Ash Basin	Downgradient	11/15/2018	6.6	**887**	21	**660**	**950**	<1	<1	51	<1	0.06	<1	**5.12**	89	**355**	1.62	11	<0.2	**1.24**	3.117 j	NA	NA	<1
MW-22BR	Southwest edge of gypsum storage area	East Ash Basin	Downgradient	04/30/2019	**6.5**	**781**	30	**400**	**860**	<1	<1	NA	NA	0.027	0.41 j	**1.86**	25	**373**	NA	11.7	NA	**1.24**	NA	NA	NA	NA
MW-22D	Southwest edge of gypsum storage area	East Ash Basin	Downgradient	07/26/2018	**6.0**	342	20	**1100**	**1800**	<1	<1	37	<1	<0.025	<1	**5.92**	6.862 j	**1610**	2.24	**149**	<0.2	**4.02**	2.01 j	NA	NA	1.124 j
MW-22D	Southwest edge of gypsum storage area	East Ash Basin	Downgradient	11/15/2018	**6.2**	641	16	**620**	**1100**	<1	<1	24	<1	<0.025	<1	**2.69**	11	**1020**	1.53	**31.3**	<0.2	**4.71**	1.959 j	NA	NA	<2
MW-22D	Southwest edge of gypsum storage area	East Ash Basin	Downgradient	04/30/2019	**5.8**	**820**	20	**580**	**1000**	<1	<1	NA	NA	0.025	0.382 j	**2.5**	6.69 j	**949**	NA	8.19	NA	**4.5**	NA	NA	NA	NA
MW-23BRR	West of EB, adjacent to EEI, outside of CB	East Ash Basin	Downgradient	07/26/2018	6.8	<50	38	15	270	<1	0.644 j	9	<1	<0.025	<1	<1	63	29	<1	<1	<0.2	**1.1**	7	NA	NA	0.13
MW-23BRR	West of EB, adjacent to EEI, outside of CB	East Ash Basin	Downgradient	11/13/2018	6.9	<50	39	15	250	<1	0.517 j	8	<1	<0.025 M1	<1	<1	42	24	<1	<1	<0.2	**0.858**	2.06 j	NA	NA	0.093 j
MW-23BRR CCR	West of EB, adjacent to EEI, outside of CB	East Ash Basin	Downgradient	01/29/2019	6.9	<50	38	15	280	<1	0.575 j	10	<1	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	NA	0.1299	NA	0.11
MW-23BRR	West of EB, adjacent to EEI, outside of CB	East Ash Basin	Downgradient	04/24/2019	6.8	<50	38	16	270	<1	0.561 j	NA	NA	<0.025	<1	<1	21	27	NA	<1	NA	**0.763**	NA	NA	NA	NA
MW-24BR	East of EB, in CB	East Ash Basin	Sidegradient	07/27/2018	7.8	36.453 j	24	65	260	**2.46**	4.39	57	<1	<0.025	0.628 j	<1	**367**	**105**	1.98	<1	<0.2	**0.396**	2.852 j	NA	NA	0.58
MW-24BR	East of EB, in CB	East Ash Basin	Sidegradient	11/14/2018	7.9	34.81 j	25	61	300	0.393 j	4.93	58	<1	0.094	<1	<1	**305**	**115**	<1	<1	<0.2	0.246 j	<5	NA	NA	0.54
MW-24BR	East of EB, in CB	East Ash Basin	Sidegradient	04/24/2019	7.9	41.176 j	25	60	320	<1	5.86	NA	NA	<0.025	0.72 j	<1	**414**	**123**	NA	<1	NA	<0.3	NA	NA	NA	NA
MW-25BR	East of EB, outside of CB	East Ash Basin	Sidegradient	07/26/2018	7.1	20.94 j	63	94	**570**	<1	4.04	65	<1	<0.025	<1	0.624 j	**2400**	**583**	0.776 j	<1	<0.2	0.285 j	<5	NA	NA	0.21
MW-25BR	East of EB, outside of CB	East Ash Basin	Sidegradient	11/13/2018	7.0	23.45 j	66	100	**560**	<1	2.54	65	<1	<0.025	<1	0.529 j	**2120**	**569**	<1	<1	<0.2	0.18 j	33	NA	NA	0.123 j
MW-26BR	Southeast of WB, outside of CB	West Ash Basin	Sidegradient	07/26/2018	7.2	<50	39	67	**510**	<1	5.54	65	<1	<0.025	0.443 j	0.847 j	**2300**	**570**	1.28	<1	0.09 j	**0.399**	9	NA	NA	0.13
MW-26BR	Southeast of WB, outside of CB	West Ash Basin	Sidegradient	11/14/2018	7.2	<50	39	69	**510**	<1	3.13	65	<1	<0.025	<1	0.627 j	**1620**	**530**	0.404 j	<1	<0.2	**0.317**	<5	NA	NA	0.12
MW-26BR	Southeast of WB, outside of CB	West Ash Basin	Sidegradient	04/24/2019	7.1	19.725 j	39	68	**520**	<1	2.54	NA	NA	<0.025	0.343 j	0.661 j	**1690**	**562**	NA	<1	NA	0.168 j	NA	NA	NA	NA
MW-27BR	North of EB, between EB and GSA, in CB	East Ash Basin	Downgradient	07/27/2018	7.2	<50	20	**260**	**620**	<1	1.58	26	<1	<0.025	<1	0.458 j	**711**	**268**	0.785 j	<1	<0.2	**0.4**	3.221 j	NA	NA	0.2195 j
MW-27BR	North of EB, between EB and GSA, in CB	East Ash Basin	Downgradient	11/14/2018	7.3	<50	21	**280**	**630**	<1	1.07	21	<1	<0.025	<1	<1	**480 B2**	**278**	<1	<1	<0.2	0.238 j	<5	NA	NA	0.1755 j
MW-27BR	North of EB, between EB and GSA, in CB	East Ash Basin	Downgradient	04/30/2019	7.2	<50	20	**280**	**670**	<1	1.32	NA	NA	<0.025	0.687 j	<1	**540**	**271**	NA	<1	NA	0.157 j	NA	NA	NA	NA
MW-28BR	Northeast of the EB and GSA, outside of CB	East Ash Basin	Upgradient	07/25/2018	7.5	49.234 j	28	67	380	0.566 j	4.05	37	<1	<0.025	0.595 j	<1	**671**	**214**	2.54	<1	0.088 j	**1.23**	2.373 j	NA	NA	0.24
MW-28BR	Northeast of the EB and GSA, outside of CB	East Ash Basin	Upgradient	11/13/2018	7.4	52	29	73	410	<1	4.03	35	<1	0.035	<1	<1	**514**	**222**	<1	<1	<0.2	**0.494**	<5	NA	NA	0.25
MW-28BR	Northeast of the EB and GSA, outside of CB	East Ash Basin	Upgradient	04/23/2019	7.5	61	28	77	490	<1	4.08	NA	NA	<0.025	0.484 j	<1	**545**	**242**	NA	<1	NA	**0.485**	NA	NA	NA	NA
MW-29BR	Northeast of the EB, outside of CB	East Ash Basin	Upgradient	07/25/2018	7.3	<50	11	11	270	<1	1.18	34	<1	<0.025	<1	<1	**380**	**77**	0.443 j	<1	<0.2	**0.34**	<5	NA	NA	0.18
MW-29BR	Northeast of the EB, outside of CB	East Ash Basin	Upgradient	11/13/2018	7.2	<50	11	11	260	<1	0.859 j	29	<1	<0.025	<1	<1	**331**	**81**	<1	<1	<0.2	0.169 j	<5	NA	NA	0.15
MW-29BR CCR	Northeast of the EB, outside of CB	East Ash Basin	Upgradient	01/29/2019	7.3	<50	11	12	300	<1	0.744 j	35	<1	NA	<1	<1	NA	NA	NA	<1	0.111 j	NA	NA	0.0994	NA	0.16
MW-29BR	Northeast of the EB, outside of CB	East Ash Basin	Upgradient	04/23/2019	7.3	<50	11	12	300	<1	1.44	NA	NA	0.15	0.364 j	<1	47	**174**	NA	<1	NA	**0.592**	NA	NA	NA	NA
MW-30BR	East of the EB, outside of CB	East Ash Basin	Upgradient	07/26/2018	6.8	25.522 j	32	62	450	<1	1.21	13	<1	<0.025	<1	0.529 j	**2180**	**1070**	0.601 j	<1	<0.2	**0.302**	3.02 j	NA	NA	0.12
MW-30BR	East of the EB, outside of CB	East Ash Basin	Upgradient	11/13/2018	6.9	27.242 j	32	63	470	<1	1.17	12	<1	<0.025	<1	0.511 j	**2080**	**1080**	<1	<1	<0.2	0.222 j	<5	NA	NA	0.09 j
MW-30BR CCR	East of the EB, outside of CB	East Ash Basin	Upgradient	01/29/2019	6.9	27.798 j	32	64	**510**	<1	0.927 j	13	<1	NA	0.375 j	0.496 j	NA	NA	NA	<1	<0.2	NA	NA	0.594	NA	0.11
MW-30BR	East of the EB, outside of CB	East Ash Basin	Upgradient	04/23/2019	6.8	26.342 j	32	63	**510**	<1	0.912 j	NA	NA	<0.025	0.38 j	0.413 j	**2210**	**1090**	NA	<1	NA	0.154 j	NA	NA	NA	NA
MW-31BR	West of the WB, outside of CB	West Ash Basin	Upgradient	07/27/2018	6.8	<50	28	34	370	<1	<1	41	<1	<0.025	<1	0.519 j	43	**361**	0.777 j	1.74	<0.2	**2.5**	2.102 j	NA	NA	0.1
MW-31BR	West of the WB, outside of CB	West Ash Basin	Upgradient	11/13/2018	7.0	<50	27	34	400	<1	<1	43	<1	<0.025	<1	0.513 j	9.125 j	**378**	<1	1.54	<0.2	**2.36**	2.466 j	NA	NA	0.065 j
MW-31BR	West of the WB, outside of CB	West Ash Basin	Upgradient	04/30/2019	6.8	<50	28	36	410	<1	<1	NA	NA	0.18	0.519 j	0.435 j	4.62 j	**213**	NA	1.66	NA	**2.18**	NA	NA	NA	NA
MW-32BR	West of the WB, outside of CB	West Ash Basin	Upgradient	07/26/2018	7.5	17.886 j	12	**330**	**690**	<1	1.78	27	<1	0.064	<1	<1	173	**117**	0.8 j	<1	<0.2	0.265 j	1.935 j	NA	NA	1.1
MW-32BR	West of the WB, outside of CB	West Ash Basin	Upgradient	11/13/2018	7.6	24.713 j	17	**380**	**660**	<1	2.74	30	<1	0.073	<1	<1	200	**137**	<1	<1	<0.2	**0.419**	<5	NA	NA	0.89
MW-32BR CCR	West of the WB, outside of CB	West Ash Basin	Upgradient	01/28/2019	7.5	29.014 j	16	**370**	**690**	<1	3.39	35	<1	NA	0.957 j	<1	NA	NA	NA	<1	<0.2	NA	NA	0.696	NA	0.8
MW-32BR	West of the WB, outside of CB	West Ash Basin	Upgradient	04/25/2019	7.4	32.716 j	14	**320**	**690**	<1	3.62	NA	NA	<0.025	0.566 j	<1	**417**	**174**	NA	<1	NA	0.266 j	NA	NA	NA	NA
MW-33BR	West of the WB, outside of CB	West Ash Basin	Upgradient	07/26/2018	**12.3**	<50	29	43	**1200**	<1	0.722 j	327	<1	0.15	<1	<1	3.558 j	<5	2.12	<1	0.088 j	**4.15**	<5	NA	NA	0.0592 j
MW-33BR	West of the WB, outside of CB	West Ash Basin	Upgradient	11/13/2018	**12.4**	<50	31	29	**1400**	<1	0.48 j	543	<1	0.23	<1	<1	<10	<5	1.89	0.362 j	<0.2	**3**	<5	NA	NA	<0.1
MW-33BR CCR	West of the WB, outside of CB	West Ash Basin	Upgradient	01/28/2019	**12.9**	<50	29	27	**1500**	<1	0.449 j	558	<1	NA	<1	<1	NA	NA	NA	<1	0.087 j	NA	NA	4.7	NA	0.056 j
MW-33BR	West of the WB, outside of CB	West Ash Basin	Upgradient	04/25/2019	**12.6**	<50	33	19	**1900**	0.859 j	0.436 j	NA	NA	0.17	<1	<1	17	<5	NA	0.418 j	NA	**1.76**	NA	NA	NA	NA
MW-34BR	Dry Fly Ash Handling Area	East Ash Basin	Downgradient	04/09/2019	7.2	**800**	36	**480**	**1000**	<1	<1	57	<1	<0.025	0.478 j	0.358 j	204	26	<1	5.79	<0.2	**4.08**	2.645 j	0.02	0.00683	<0.5
MW-34D	Dry Fly Ash Handling Area	East Ash Basin	Downgradient	04/09/2019	6.8	521	40	**690**	**1200**	<1	<1	77	<1	2.9	1.61	<1	24	12	<1	**24.3**	<0.2	**5.98**	<5	0.53	0.00368	<5
MW-35BR	Dry Fly Ash Handling Area	East Ash Basin	Downgradient	04/09/2019	7.2	**1460**	21	240	**630**	<1	<1	34	<1	0.17	0.97 j	**1.05**	226	**118**	0.568 j	4.37	<0.2	**3.54**	113	0.4205	0.00372	<0.5
MW-35D	Dry Fly Ash Handling Area	East Ash Basin	Downgradient	04/09/2019	**6.5**	**7880**	39	**700**	**1400**	<1	<1	75	<1	0.092	0.532 j	0.497 j	33	**103**	9.77	**39.7**	<0.2	**5.7**	32	1.841	0.0052	<5
MW-35S	Dry Fly Ash Handling Area	East Ash Basin	Downgradient	04/11/2019	6.5	**7820**	27	**640**	**1400**	<1	<1	87	<1	0.1	0.687 j	**1.9**	**363**	**226**	7.84	**37.2**	<0.2	**9.99**	3.045 j	0.67	0.0018	0.425 j
MW-36BR	Dry Fly Ash Handling Area	East Ash Basin	Downgradient	04/10/2019	6.7	**1070**	32	**940**	210	<1	<1	28	<1	<0.025	0.47 j	0.533 j	135	39	<1	9.91	<0.2	**2.14**	1.998 j	2.218	0.0117	<1
MW-36D	Dry Fly Ash Handling Area	East Ash Basin	Downgradient	04/10/2019	**6.5**	**1230**	21	**1300**	100	<1	<1	38	<1	<0.025	0.757 j	0.384 j	**309**	**173**	4.22	**24.9**	<0.2	**11.6**	24	0.2057	0.00455	0.472 j
MW-37BR	Dry Fly Ash Handling Area	East Ash Basin	Downgradient	04/10/2019	7.6	**4200**	23	**490**	200	<1	<1	62	<1	0.38	0.775 j	<1	14	**132**	0.765 j	**25.5**	<0.2	**2.18**	<5	1.232	0.00239	<1

I/A

FACILITY NAME: **ROXBORO**
DATE UPDATED: **06/24/2019**
SHEET UPDATED BY: **BRANDON RUSSO**
SHEET CHECKED BY: **CRAIG EADY**

	PARAME	TED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)															RADIONUCLIDES		R PARAME
Reporting Units	**S.U.**	**ug/L**	**mg/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**pCi/L**	**ug/mL**	**mg/L**
15A NCAC 02L Standard	**6.5-8.5**	**700**	**250**	**250**	**500**	**1***	**10**	**700**	**4***	**10**	**10**	**1***	**300**	**50**	**100**	**20**	**0.2***	**0.3***	**1000**	**5^**	**0.03^**	**2**
Provisional Background Threshold Values (Transition Zone Unit)	**6.3-7.6**	**50**	**150**	**37**	**540**	**1**	**1**	**91**	**1**	**16.1**	**24.1**	**1**	**1173**	**405**	**5.22**	**1.78**	**0.2**	**30.2**	**12**	**5.45**	**0.00516**	**NE**
Provisional Background Threshold Values (Bedrock Unit)	**6.8-8.3**	**50**	**120**	**73.5**	**530**	**1**	**1**	**185**	**1**	**0.19**	**3.61**	**6.4**	**4227**	**1198**	**2.11**	**1**	**0.2**	**2.49**	**7**	**5.21**	**0.00324**	**NE**

					PARAME	TED 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)															RADIONUCLIDES		R PARAME
Sample ID	**Location Description**	**Associated Unit**	**Location With Respect to Groundwater Flow Direction**	**Sample Collection Date**	**pH**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Manganese**	**Nickel**	**Selenium**	**Thallium**	**Vanadium**	**Zinc**	**Total Radium**	**Total Uranium**	**Fluoride**
MW-37D	Dry Fly Ash Handling Area	East Ash Basin	Downgradient	04/10/2019	**6.2**	499	21	**630**	110	<1	<1	52	<1	0.29	0.609 j	<1	36	7	2.09	9.43	<0.2	**4.92**	<5	0.2354	0.000648	<1
MW-37S	Dry Fly Ash Handling Area	East Ash Basin	Downgradient	04/11/2019	**6.3**	410	21	**550**	**1000**	<1	<1	83	<1	0.14	0.949 j	0.824 j	289	**156**	13.8	11.9	<0.2	**4.54**	10	0.362	0.000396	0.374 j
MW-39BR	South of WB, on CB	West Ash Basin	Upgradient	04/22/2019	8.5	<50	37	30	310	0.492 j	0.411 j	27	<1	0.64	1.68 B2	<1	13	**62**	0.546 j	<1	<0.2	**1.05**	<5	2.797	0.00365	0.2
MW-39D	South of WB, on CB	West Ash Basin	Upgradient	04/22/2019	**6.1**	<50	18	25	200	**5.63**	<1	45	<1	0.085	0.629 j,B2	0.648 j	45	**65**	1.89	<1	<0.2	**1.44**	11 B	0.766	0.0000761 j	0.1
RO-10-1	7391 Semora Road Semora, NC 27343	Private Well	Upgradient	06/20/2018	7.1	<100	220	18	**800**	<2	<5	230	<2	NA	<1	**1.9**	**510**	**840**	<10	<5	<9.999999E-02	**4.2**	<50	NA	NA	<0.2

COLOR NOTES

Bold highlighted concentration indicates exceedance of the 15A NCAC 02L .0202 Standard or the IMAC. (Effective date for 15A NCAC 02L .0202 Standard and IMAC is April 1, 2013)

Turbidity of Sample ≥ 10 NTUs

Provisional Background Threshold Values updated with Background Results through June 2017.

Analytical data review has not been completed for this dataset.

ABBREVIATION NOTES

BGS - below ground surface
BOD - Biologic Oxygen Demand
CB - Compliance Boundary
COD - Chemical Oxygen Demand
Deg C - Degrees Celsius
DMAs - dimethylarsinic acid
DUP - Duplicate
EB - East Ash Basin
EEI - Eastern Extension Impoundment of the East Ash Basin
Eh - Redox Potential
ft - Feet
GPM - gallons per minute
GSA - Gypsum Storage Area
IMAC - Interim Maximum Allowable Concentrations. From the 15A NCAC 02L Standard, Appendix 1, April, 1, 2013.
MDC - Minimum Detectable Concentration
MeSe - Methylseleninic acid
meg/100g - millequivalents per 100 grams
mg/kg - milligrams per kilogram
mg/L - milligrams per liter
mg-N/L - Milligram nitrogen per liter
MMAs - monomethylarsonic acid

MMAs - monomethylarsonic acid
NA - Not available or Not Applicable
NE - Not established
NM - Not measured
NTUs - Nephelometric Turbidity Units
pCi/L - picocuries per liter
PSRG - Primary Soil Remediation Goals
RL - Reporting Limit
RR - Railroad
SeCN - selnocynante
SEI - Southern Extension Impoundment of the West Ash Basin
SeMe (IV) - Selenomethionine
SPLP - Synthetic Precipitation Leaching Procedure
S.U. - Standard Units
TCLP - Toxicity Characteristic Leaching Procedure
ug/L - micrograms per liter
ug/mL - microgram per milliliter
umhos/cm - micromhos per centimeter
WB - West Ash Basin
Well Locations referenced to NAD83 and elevations referenced to NAVD88

I/A

ATTACHMENT C

2018 AND 2019 NPDES GROUNDWATER MONITORING REPORT

I/A

DUKE ENERGY.

526 South Church St.
Charlotte, NC 28202

P.O. Box 1006
Mail Code EC13K
Charlotte, NC 28201-1006
336-215-4576
704-382-6240 fax

File: 12520Q

August 16, 2018

NCDEQ – Division of Water Resources
Information Processing Unit
1617 Mail Service Center
Raleigh, NC 27699-1617

Subject:: Roxboro Steam Electric Plant
Groundwater Monitoring Sampling and Analysis Results
NPDES Permit #NC0003425

Dear Sir or Madam:

Duke Energy Progress, LLC. (DEP) sampled eight compliance wells around the ash basins at the Roxboro Steam Electric Plant on July 25, 2018. Attached are two copies of the results on DEQ approved electronic version of Form GW-59CCR.

Please contact Kim Witt at (336) 215-4576 or kimberlee.witt@duke-energy if you have any questions on the sampling results.

> *I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.*

Sincerely,

Jason Haynes
GM III Regulated Fossil
Roxboro Steam Electric Plant

Attachment

NCDEQ Cc : Debra Watts
Rick Bolich

I/A

Duke Cc (electronic):

Robert Howard
Kimberlee Witt
Lori Tollie
Ed Sullivan

I/A

GROUNDWATER QUALITY MONITORING COMPLIANCE REPORT FORM

Mail original and 1 copy to:
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY - INFORMATION PROCESSING UNIT
1617 MAIL SERVICE CENTER, RALEIGH, NC 27699-1617 Phone: (919) 733-3221

FACILITY INFORMATION

Please Print Clearly or Type

Facility Name: Roxboro Steam Electric Plant
Permit Name (if different): Duke Energy Progress, LLC
Facility Address: 1700 Dunnaway Road (Street)
Semora (City) NC (State) 27343 (Zip) County Person
Contact Person: Kim Witt
Well Location/Site Name: Roxboro Ash Pond Wells
Telephone# 336-215-4576
No. of wells to be sampled: 8 (from Permit)

Permit Type: NPDES
PERMIT Number: NC0003425
Expiration Date: 03/31/2012
TYPE OF PERMITTED OPERATION BEING MONITORED: Ash Impoundment Groundwater

Monitoring Well Construction Information

Well ID Number (From Permit)

		Units	CW-1	CW-2	CW-2D	CW-3	CW-3D	CW-4	CW-5	BG-1	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-
Well Depth [ft below land surface]		ft	39.75	17.50	29.90	11.40	46.50	39.00	19.50	52.00										
Measuring Point (toc) [ft above land surface]		ft	2.47	2.86	2.45	3.33	3.49	2.39	2.31	2.85										
Well Diameter		in	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0										
Screen Top [ft below land surface]		ft	19.95	7.70	25.10	3.40	41.70	24.20	4.70	32.50										
Screen Bottom [ft below land surface]		ft	39.75	17.50	29.90	11.40	46.50	39.00	19.50	52.00										
Relative Measuring Point Elevation		ft	508.24	424.60	424.60	451.79	451.61	479.65	459.74	533.74										

Sampling Information and Field Analysis

CHECK IF DRY WELL AT TIME OF SAMPLING			☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY
	15A-2L	Units	CW-1	CW-2	CW-2D	CW-3	CW-3D	CW-4	CW-5	BG-1	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-
Sample Date			07/25/2018	07/25/2018	07/25/2018	07/25/2018	07/25/2018	07/25/2018	07/25/2018	07/25/2018										
Volume of Water pumped/bailed		gal	0.28	0.46	1.25	1.20	2.00	0.34	1.50	2.17										
Temperature (00010)		deg. C	25	22	23	20	21	25	24	18										
Odor (00085)			None	None	None	None	None	None	None	None										
Appearance			Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear										
Turbidity (82078)		NTU	0.8	3.30	1.7	0.80	3.2	0.9	1.1	1.0										
Dissolved Oxygen (00300)		mg/L	0.69	1.24	3.5	3.64	2.05	1.64	3.92	4.13										
Oxidation Reduction Potential (00090)		mV	360	191	285	321	299	333	282	322										
Specific Cond - field (00094)		umhos/cm	668	756	663	817	519	597	618	564										
Water Level [ft below measuring pt.] (82546)		ft	24.60	13.70	13.70	5.20	2.76	28.40	10.27	38.51										
pH - field (00400)	6.5 - 8.5	SU	6.04	6.50	6.52	6.41	7.41	6.49	6.27	6.29										

Laboratory Information

Laboratory Name: Duke Energy Analytical Laboratory[2]
Sample Analysis Date: July 26 through August 6, 2018
Certification #: NC DENR # 248
Samples for metals were collected unfiltered: ☑ Yes ☐ No
and field acidified: ☑ Yes ☐ No

	IMAC[1]	15A-2L	Units	CW-1	CW-2	CW-2D	CW-3	CW-3D	CW-4	CW-5	BG-1	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-
TDS - Total Diss. Solids (70300)	—	500	mg/l	450	440	410	470	320	330	490	340										
Cl - Chloride (00940)	—	250	mg/l	12	16	16	62	24	28	5.8	18										
As - Arsenic (01002)	---	10	ug/l	<1	<1	<1	<1	<1	<1	<1	<1										
SO4 - Sulfate (00945)	—	250	mg/l	100	85	130	70	32	37	200	17										
Nitrate (NO3) as N (00620)	---	10	mg/l	<0.046	0.22	0.17	0.66	0.06	0.29	0.58	2.5										
Cd - Cadmium (01027)	---	2	ug/l	<1	<1	<1	<1	<1	<1	<1	<1										
Cr - Chromium (01034)	—	10	ug/l	<5	<5	<5	<5	<5	<5	<5	<5										
Cu - Copper (01042)	---	1	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005										
Fe - Iron (01045)	—	300	ug/l	29	195	<10	10	23	<10	12	26										
Hg - Mercury (71900)	—	1	ug/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05										
Mn - Manganese (01055)	---	50	ug/l	33	**187**	<5	<5	<5	<5	<5	<5										
Ni - Nickel (01067)	—	100	ug/l	<5	<5	<5	<5	<5	<5	<5	<5										
Pb - Lead (01051)	—	15	ug/l	<1	<1	<1	<1	<1	<1	<1	<1										
Zn - Zinc (01092)	---	1	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005										
Ba - Barium (01007)	—	700	ug/l	120	87	148	135	52	133	42	87										
B - Boron (01022)	---	700	ug/l	<50	<50	<50	<50	<50	<50	283	<50										
Tl - Thallium (01059)	0.2	NE	ug/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2										
Sb - Antimony (01097)	1	NE	ug/l	<1	<1	<1	<1	<1	<1	<1	<1										
Se - Selenium (01147)	—	20	ug/l	<1	<1	<1	<1	<1	<1	<1	<1										
Alkalinity - (00410)	—	NE	mg/l	223	292	206	301	213	227	135	243										
Al - Aluminum (01105)	—	NE	ug/l	20	10	<5	14	25	10	13	26										
Be - Beryllium (01012)	4	NE	ug/l	<1	<1	<1	<1	<1	<1	<1	<1										
HCO3 - Bicarbonate (00440)	—	NE	mg/l	223	292	206	301	213	227	135	243										
Ca - Calcium (00916)	---	NE	mg/l	42.3	43.8 (M4)	47.8	70.2	64.6	42.9	56.7	46.2 (M4)										
CO3 - Carbonate (00445)	—	NE	mg/l	<5	<5	<5	<5	<5	<5	<5	<5										
Co - Cobalt (01037)	1	NE	ug/l	<1	<1	<1	<1	<1	<1	<1	<1										
Mg - Magnesium (00927)	---	NE	mg/l	19.0	33.2	38.2	37.2	17.5	26.5	36.0	26 (M4)										
Mo - Molybdenum (01062)	—	NE	ug/l	<1	<1	<1	<1	3.07	5.73	<1	<1										
K - Potassium (00937)	---	NE	mg/l	2.50	1.22	2.48	3.73	4.78	4.26	0.901	1.79										
Na - Sodium (82035)	—	NE	mg/l	69 (M4)	71.8	36.4	54.1	18.6	44.6	28.8	32.9 (M4)										
TSS - Total Susp. Solids (70031)	—	NE	mg/l	<5	<5	<5	<5	<5	<5	<5	<5										
V - Vanadium (01087)	0.3	NE	ug/l	22.2	24.4	12.8	3.43	2.76	2.09	25.0	17.3										
Sr - Strontium (01082)	---	NE	mg/l	0.443	0.376	0.324	0.449	0.263	0.196	0.305	0.449										

Notes:
NE = Not Established
Turbidity is field analyzed for information use only.

BOLD values equal or exceed the corresponding 2L standard

Qualifiers: (M4): The spike recovery value was unusable since the analyte concentration in the sample was disproportionate to the spike level. The associated Laboratory Control Spike recovery was acceptable.

I certify that, to the best of my knowledge and belief, the information submitted in this report is true, accurate, and complete, and that the laboratory analytical data was produced using approved methods of analysis by a DWQ-certified laboratory. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Jason Haynes GM Regulated Fossil
Permittee (or Authorized Agent) Name and Title - Please print or type

Signature of Permittee (or Authorized Agent)

8-22-18
Date

GW-59CCR 09/2015

[1] The IMACs were issued in 2010, 2011, and 2012; however NCDEQ has not established a 2L for these constituents as described in 15A NCAC 02L.0202 (c). For this reason, IMACs noted on the report are for reference only.

[2] Alkalinity, Bicarbonate, and Carbonate were subcontracted by Duke Energy Analytical Laboratory to Pace Analytical Services, LLC in Huntersville, NC.

I/A

DUKE ENERGY.

526 South Church St.
Charlotte, NC 28202

P.O. Box 1006
Mail Code EC13K
Charlotte, NC 28201-1006
336-215-4576
704-382-6240 fax

File: 12520Q

December 12, 2018

NCDEQ – Division of Water Resources
Information Processing Unit
1617 Mail Service Center
Raleigh, NC 27699-1617

Subject:: Roxboro Steam Electric Plant
Groundwater Monitoring Sampling and Analysis Results
NPDES Permit #NC0003425

Dear Sir or Madam:

Duke Energy Progress, LLC. (DEP) sampled eight compliance wells around the ash basins at the Roxboro Steam Electric Plant on November 13 and 14, 2018. Attached are two copies of the results on DEQ approved electronic version of Form GW-59CCR.

Please contact Kim Witt at (336) 215-4576 or kimberlee.witt@duke-energy if you have any questions on the sampling results.

> *I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.*

Sincerely,

Jason Haynes

Jason Haynes
GM III Regulated Fossil
Roxboro Steam Electric Plant

Attachment

NCDEQ Cc : Debra Watts
Rick Bolich

I/A

Duke Cc (electronic):	Robert Howard Kimberlee Witt Lori Tollie Ed Sullivan

I/A

GROUNDWATER QUALITY MONITORING
COMPLIANCE REPORT FORM

Mail original and 1 copy to:
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY - INFORMATION PROCESSING UNIT
1617 MAIL SERVICE CENTER, RALEIGH, NC 27699-1617 Phone: (919) 733-3221

FACILITY INFORMATION

Please Print Clearly or Type

Facility Name: Roxboro Steam Electric Plant
Permit Name (if different): Duke Energy Progress, LLC
Facility Address: 1700 Dunnaway Road (Street)
Semora (City) NC (State) 27343 (Zip) County Person
Contact Person: Kim Witt Telephone# 336-215-4576
Well Location/Site Name: Roxboro Ash Pond Wells No. of wells to be sampled: 8 (from Permit)

Permit Type: NPDES Expiration Date: 03/31/2012
PERMIT Number: NC0003425
TYPE OF PERMITTED OPERATION BEING MONITORED: Ash Impoundment Groundwater

Monitoring Well Construction Information

			Well ID Number (From Permit)																	
		Units	CW-1	CW-2	CW-2D	CW-3	CW-3D	CW-4	CW-5	BG-1	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-
Well Depth (ft below land surface)		ft	39.75	17.50	29.90	11.40	46.50	39.00	19.50	52.00										
Measuring Point (toc) (ft above land surface)		ft	2.47	2.86	2.45	3.33	3.49	2.39	2.31	2.85										
Well Diameter		in	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0										
Screen Top (ft below land surface)		ft	19.95	7.70	25.10	3.40	41.70	24.20	4.70	32.50										
Screen Bottom (ft below land surface)		ft	39.75	17.50	29.90	11.40	46.50	39.00	19.50	52.00										
Relative Measuring Point Elevation		ft	508.24	424.60	424.60	451.79	451.61	479.65	459.74	533.74										

Sampling Information and Field Analysis

CHECK IF DRY WELL AT TIME OF SAMPLING			☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY
	15A-2L	Units	CW-1	CW-2	CW-2D	CW-3	CW-3D	CW-4	CW-5	BG-1	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-
Sample Date			11/13/2018	11/13/2018	11/13/2018	11/13/2018	11/13/2018	11/14/2018	11/13/2018	11/14/2018										
Volume of Water pumped/bailed		gal	0.28	0.37	1.06	10.14	7.65	0.46	1.34	2.76										
Temperature (00010)		deg. C	16	15	15	17	14	13	15	14										
Odor (00085)			None	None	None	None	None	None	None	None										
Appearance			Clear	Clear	Clear	Clear w/ Fines	Clear w/ Fines	Clear	Clear	Clear										
Turbidity (82078)		NTU	2.9	4.2	1.7	40.4	20.3	4.1	2.2	1.3										
Dissolved Oxygen (00300)		mg/L	0.49	2.07	2.55	0.29	3.86	1.75	6.45	4.34										
Oxidation Reduction Potential (00090)		mV	468	560	507	306	339	570	531	517										
Specific Cond - field (00094)		umhos/cm	879	962	852	311	546	616	556	566										
Water Level (ft below measuring pt.) (82546)		ft	22.25	12.15	12.10	3.22	0.89	27.90	7.95	37.74										
pH - field (00400)	6.5 - 8.5	SU	6.07	6.67	6.56	6.14	7.49	6.53	6.42	6.45										

Laboratory Information

Laboratory Name: Duke Energy Analytical Laboratory[2]
Sample Analysis Date: November 14 - 27, 2018
Certification #: NC DENR # 248
Samples for metals were collected unfiltered: ☑ Yes ☐ No
and field acidified: ☑ Yes ☐ No

	IMAC[1]	15A-2L	Units	CW-1	CW-2	CW-2D	CW-3	CW-3D	CW-4	CW-5	BG-1	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-
TDS - Total Diss. Solids (70300)	---	500	mg/l	420	410	390	200	330	320	370	310										
Cl - Chloride (00940)	---	250	mg/l	11	16	16	19	25	28	4	18										
As - Arsenic (01002)	---	10	ug/l	<1	<1	<1	<1	<1	<1	<1	<1										
SO4 - Sulfate (00945)	---	250	mg/l	99	89	130	28	38	38	120	18										
Nitrate (NO3) as N (00620)	---	10	mg/l	0.07	0.28	0.36	0.08	<0.023	0.23	0.43	2.6										
Cd - Cadmium (01027)	---	2	ug/l	<1	<1	<1	<1	<1	<1	<1	<1										
Cr - Chromium (01034)	---	10	ug/l	<5	<5	<5	<5	<5	<5	<5	<5										
Cu - Copper (01042)	---	1	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005										
Fe - Iron (01045)	---	300	ug/l	126	158	<10	3380	1020	33	11	19										
Hg - Mercury (71900)	---	1	ug/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05										
Mn - Manganese (01055)	---	50	ug/l	49	113	<5	120	117	<5	<5	<5										
Ni - Nickel (01067)	---	100	ug/l	<5	<5	<5	<5	<5	<5	<5	<5										
Pb - Lead (01051)	---	15	ug/l	<1	<1	<1	<1	<1	<1	<1	<1										
Zn - Zinc (01092)	---	1	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005										
Ba - Barium (01007)	---	700	ug/l	123	86	151	64	65	130	57	92										
B - Boron (01022)	---	700	ug/l	<50	<50	<50	<50	<50	<50	211	<50										
Tl - Thallium (01059)	0.2	NE	ug/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2										
Sb - Antimony (01097)	1	NE	ug/l	<1	<1	<1	<1	<1	<1	<1	<1										
Se - Selenium (01147)	---	20	ug/l	<1	<1	<1	<1	<1	<1	<1	<1										
Alkalinity - (00410)	---	NE	mg/l	239	265	191	88.1	210	223	139	233										
Al - Aluminum (01105)	---	NE	ug/l	92 (B1)	35 (B1)	<5 (B)	4030 (B1)	1130 (B1)	34	16 (B)	15										
Be - Beryllium (01012)	4	NE	ug/l	<1	<1	<1	<1	<1	<1	<1	<1										
HCO3 - Bicarbonate (00440)	---	NE	mg/l	239	265	191	88.1	210	223	139	233										
Ca - Calcium (00916)	---	NE	mg/l	46.4	42.8	48.2	22.7	69.7	41.8	41.3	47.3										
CO3 - Carbonate (00445)	---	NE	mg/l	<5	<5	<5	<5	<5	<5	<5	<5										
Co - Cobalt (01037)	1	NE	ug/l	<1	<1	<1	1.15	<1	<1	<1	<1										
Mg - Magnesium (00927)	---	NE	mg/l	20.6	32.6	38.5	12.4	18.3	25.8	26.6	26.9										
Mo - Molybdenum (01062)	---	NE	ug/l	<1	<1	<1	<1	3.12	5.69	<1	<1										
K - Potassium (00937)	---	NE	mg/l	2.72	1.24	2.54	1.64	4.83	4.13	0.878	1.84										
Na - Sodium (82035)	---	NE	mg/l	78.5	71.6	37.1	19.3	19.4	43.5	27.8	34.6										
TSS - Total Susp. Solids (70031)	---	NE	mg/l	6	<5	<5	<5	11	<5	<5	<5										
V - Vanadium (01087)	0.3	NE	ug/l	22.5	32.5	13.3	10.1	5.06	2.21	34.0	17.6										
Sr - Strontium (01082)	---	NE	mg/l	0.495	0.369	0.331	0.171	0.280	0.195	0.262	0.473										

Notes:
NE = Not Established
Turbidity is field analyzed for information use only.

BOLD values equal or exceed the corresponding 2L standard

Qualifiers:
(B): Target analyte detected in Method/Prep Blank at or above the reporting limit. Target analyte concentration in sample is less than 10X the concentration in the Method/Prep Blank. Analyte concentration in sample could be due to contamination.
(B1): Target analyte was detected in Method/Prep Blank at or above the reporting limit. Target analyte concentration in sample is below the reporting limit or greater than 10X the concentration of the target analyte detected in the Method/Prep Blank. Analyte concentration in the sample is not affected.

I certify that, to the best of my knowledge and belief, the information submitted in this report is true, accurate, and complete, and that the laboratory analytical data was produced using approved methods of analysis by a DWQ-certified laboratory. am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Jason Haynes GM III Reg Fossil
Permittee (or Authorized Agent) Name and Title - Please print or type

Jason Haynes
Signature of Permittee (or Authorized Agent)

12-12-18
Date

GW-59CCR 09/2015

[1] The IMACs were issued in 2010, 2011, and 2012; however NCDEQ has not established a 2L for these constituents as described in 15A NCAC 02L.0202 (c). For this reason, IMACs noted on the report are for reference only.
[2] Alkalinity, Bicarbonate, and Carbonate were subcontracted by Duke Energy Analytical Laboratory to Pace Analytical Services, LLC in Huntersville, NC.

I/A DUKE ENERGY. PROGRESS

Duke Energy Progress, LLC
Roxboro Steam Electric Plant
1700 Dunnaway Road
Semora, NC 27343

File: 12520Q

May 28, 2019

NCDEQ – Division of Water Resources
Information Processing Unit
1617 Mail Service Center
Raleigh, NC 27699-1617

Subject:: Roxboro Steam Electric Plant
Groundwater Monitoring Sampling and Analysis Results
NPDES Permit #NC0003425

Dear Sir or Madam:

Duke Energy Progress, LLC. (DEP) sampled eight compliance wells around the ash basins at the Roxboro Steam Electric Plant on April 23 and 24, 2019. Attached are two copies of the results on DEQ approved electronic version of Form GW-59CCR.

Please contact Kim Witt at (336) 215-4576 or kimberlee.witt@duke-energy if you have any questions on the sampling results.

> *I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.*

Sincerely,

Tom Copolo
GM III Regulated Fossil
Roxboro Steam Electric Plant

Attachment

NCDEQ Cc : Debra Watts
Rick Bolich

I/A DUKE ENERGY PROGRESS

Duke Energy Progress, LLC
Roxboro Steam Electric Plant
1700 Dunnaway Road
Semora, NC 27343

Duke Cc (electronic):

Robert Howard
Kimberlee Witt
Lori Tollie
Ed Sullivan

I/A

GROUNDWATER QUALITY MONITORING COMPLIANCE REPORT FORM

Mail original and 1 copy to:
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY - INFORMATION PROCESSING UNIT
1617 MAIL SERVICE CENTER, RALEIGH, NC 27699-1617 Phone: (919) 733-3221

FACILITY INFORMATION

Please Print Clearly or Type

Facility Name: Roxboro Steam Electric Plant
Permit Name (if different): Duke Energy Progress, LLC
Facility Address: 1700 Dunnaway Road (Street)
Semora (City) NC (State) 27343 (Zip) **County** Person

Permit Type: NPDES
PERMIT Number: NC0003425
Expiration Date: 03/31/2012
TYPE OF PERMITTED OPERATION BEING MONITORED Ash Impoundment Groundwater

Contact Person: Kim Witt
Telephone# 336-215-4576
Well Location/Site Name: Roxboro Ash Pond Wells
No. of wells to be sampled: 8 (from Permit)

Monitoring Well Construction Information

Well ID Number (From Permit)

		Units	CW-1	CW-2	CW-2D	CW-3	CW-3D	CW-4	CW-5	BG-1	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-
Well Depth (ft below land surface)		ft	39.75	17.50	29.90	11.40	46.50	39.00	19.50	52.00										
Measuring Point (toc) (ft above land surface)		ft	2.47	2.86	2.45	3.33	3.49	2.39	2.31	2.85										
Well Diameter		in	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0										
Screen Top (ft below land surface)		ft	19.95	7.70	25.10	3.40	41.70	24.20	4.70	32.50										
Screen Bottom (ft below land surface)		ft	39.75	17.50	29.90	11.40	46.50	39.00	19.50	52.00										
Relative Measuring Point Elevation		ft	508.24	424.60	424.60	451.79	451.61	479.65	459.74	533.74										

Sampling Information and Field Analysis

CHECK IF DRY WELL AT TIME OF SAMPLING			☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY
	15A-2L	Units	CW-1	CW-2	CW-2D	CW-3	CW-3D	CW-4	CW-5	BG-1	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-
Sample Date			04/24/2019	04/24/2019	04/24/2019	04/24/2019	04/24/2019	04/23/2019	04/24/2019	04/24/2019										
Volume of Water pumped/bailed		gal	0.50	0.50	0.75	1.00	0.40	3.00	1.00	1.25										
Temperature (00010)		deg. C	24.0	17.0	18.0	14.0	16.0	17.0	15.0	19.0										
Odor (00085)			Sulfur	None	None	None	None	None	None	None										
Appearance			Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear										
Turbidity (82078)		NTU	6.6	2.7	1.8	5.8	1.8	8.8	1.8	1.4										
Dissolved Oxygen (00300)		mg/L	0.25	0.21	2.79	0.3	5.1	0.96	3.3	4.47										
Oxidation Reduction Potential (00090)		mV	24	-53	30	107	111	27	108	88										
Specific Cond - field (00094)		umhos/cm	698	952	655	481	566	595	432	555										
Water Level (ft below measuring pt.) (82546)		ft	17.84	12.4	12.43	4.23	1.16	28.35	7.43	35.52										
pH - field (00400)	6.5 - 8.5	SU	5.8	6.4	6.5	5.6	7.2	6.4	6.2	6.0										

Laboratory Information

Laboratory Name Duke Energy Analytical Laboratory[2]
Sample Analysis Date April 24 - 30, 2019
Certification # NC DENR # 248
Samples for metals were collected unfiltered: ☑ Yes ☐ No
and field acidified: ☑ Yes ☐ No

	IMAC[1]	15A-2L	Units	CW-1	CW-2	CW-2D	CW-3	CW-3D	CW-4	CW-5	BG-1	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-
TDS - Total Diss. Solids (70300)	---	500	mg/l	480	**540**	420	290	360	360	350	350										
Cl - Chloride (00940)	---	250	mg/l	11	30	16	61	27	27	5.1	20										
As - Arsenic (01002)	---	10	ug/l	<1	<1	<1	<1	<1	<1	<1	<1										
SO4 - Sulfate (00945)	---	250	mg/l	96	49	120	52	33	37	96	16										
Nitrate (NO3) as N (00620)	---	10	mg/l	<0.046	0.15	0.37	0.04	<0.023	0.32	0.48	2.6										
Cd - Cadmium (01027)	---	2	ug/l	<1	<1	<1	<1	<1	<1	<1	<1										
Cr - Chromium (01034)	---	10	ug/l	<5	<5	<5	<5	<5	<5	<5	<5										
Cu - Copper (01042)	---	1	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005										
Fe - Iron (01045)	---	300	ug/l	33	**465**	<10	**377**	<10	76	<10	58										
Hg - Mercury (71900)	---	1	ug/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05										
Mn - Manganese (01055)	---	50	ug/l	**55**	**515**	<5	**130**	27	<5	<5	<5										
Ni - Nickel (01067)	---	100	ug/l	<5	<5	<5	<5	<5	<5	<5	<5										
Pb - Lead (01051)	---	15	ug/l	<1	<1	<1	<1	<1	<1	<1	<1										
Zn - Zinc (01092)	---	1	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005										
Ba - Barium (01007)	---	700	ug/l	143	115	153	105	44	130	47	96										
B - Boron (01022)	---	700	ug/l	<50	<50	<50	<50	<50	<50	182	<50										
Tl - Thallium (01059)	0.2	NE	ug/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2										
Sb - Antimony (01097)	1	NE	ug/l	<1	<1	<1	<1	<1	<1	<1	<1										
Se - Selenium (01147)	---	20	ug/l	<1	<1	<1	<1	<1	<1	<1	<1										
Alkalinity - (00410)	---	NE	mg/l	258	387	201	87.7	230	229	139	246										
Al - Aluminum (01105)	---	NE	ug/l	<10	16	<10	637	<10	116	<10	57										
Be - Beryllium (01012)	4	NE	ug/l	<1	<1	<1	<1	<1	<1	<1	<1										
HCO3 - Bicarbonate (00440)	---	NE	mg/l	258	387	201	87.7	230	229	139	246										
Ca - Calcium (00916)	---	NE	mg/l	48.8	52.2	47.6	32.0	75.4	42.7	37.9	47.5										
CO3 - Carbonate (00445)	---	NE	mg/l	<5	<5	<5	<5	<5	<5	<5	<5										
Co - Cobalt (01037)	1	NE	ug/l	<1	<1	<1	<1	<1	<1	<1	<1										
Mg - Magnesium (00927)	---	NE	mg/l	21.7	39.6	37.9	18.8	18.8	26.3	23.8	27.3										
Mo - Molybdenum (01062)	---	NE	ug/l	<1	<1	<1	<1	2.56	5.84	<1	<1										
K - Potassium (00937)	---	NE	mg/l	2.73	1.43	2.63	1.41	4.23	4.21	0.783	1.57										
Na - Sodium (82035)	---	NE	mg/l	77.3	96.6	37.2	32.0	19.1	44.4	30.0	34.4										
TSS - Total Susp. Solids (70031)	---	NE	mg/l	<5	<5	<5	<5	<5	<5	<5	<5										
V - Vanadium (01087)	0.3	NE	ug/l	18	14.2	13.0	2.12	2.02	2.37	27.7	20.4										
Sr - Strontium (01082)	---	NE	mg/l	0.512	0.459	0.320	0.287	0.285	0.192	0.231	0.463										

Notes:
NE = Not Established
Turbidity is field analyzed for information use only.

BOLD values equal or exceed the corresponding 2L standard

Qualifiers: None

I certify that, to the best of my knowledge and belief, the information submitted in this report is true, accurate, and complete, and that the laboratory analytical data was produced using approved methods of analysis by a DWQ-certified laboratory. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Tom Copolo
Permittee (or Authorized Agent) Name and Title - Please print or type

Signature of Permittee (or Authorized Agent)

05/29/19
Date

GW-59CCR 09/2015

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[1] The IMACs were issued in 2010, 2011, and 2012; however NCDEQ has not established a 2L for these constituents as described in 15A NCAC 02L.0202 (c). For this reason, IMACs noted on the report are for reference only.

[2] Alkalinity, Bicarbonate, and Carbonate were subcontracted by Duke Energy Analytical Laboratory to Pace Analytical Services, LLC in Huntersville, NC.

I/A

ADVANCED GeoServices
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Bednarcik Direct AGO Cross Ex. 13
Docket No. E-2, Sub 1219A

Hart Exhibit 57
Docket No. E-2, Sub 1219

THE ELM CONSULTING GROUP INTERNATIONAL LLC

ENVIRONMENTAL AUDIT IN SUPPORT OF THE COURT APPOINTED MONITOR

L. V. Sutton Energy Complex
Wilmington, North Carolina
USA

April 2019

Final Report Issued to:

Duke Energy and the Court Appointed Monitor

Prepared By:

Advanced GeoServices Corp.
and
The Elm Consulting Group International LLC

TABLE OF CONTENTS

1.0 INTRODUCTION

Advanced GeoServices Corp. (AGC) and The Elm Consulting Group International LLC (Elm) (collectively, the Audit Team) are conducting environmental compliance audits (the Audits) of certain coal combustion residuals (CCR) management locations owned or operated by Duke Energy Business Services LLC, Duke Energy Carolinas, LLC, and Duke Energy Progress, Inc. (collectively, Duke Energy). The Audits are being conducted under the direction of Mr. Benjamin Wilson, the Court Appointed Monitor, pursuant to an Order issued by the U.S. District Court, Eastern District of North Carolina, in case numbers 5:15-CR-62-H, 5:15-CR-67-H, and 5:15-CR-68-H.

The scope of the Audits is set forth in the plea agreements entered into by Duke Energy and the United States in the above cases, the Court's judgments in these cases, and a written Audit scoping document agreed to by Duke Energy and the United States.

1.1 BACKGROUND INFORMATION FOR THE L. V. SUTTON AUDIT

The subject of this report is the Audit completed at Duke Energy's L. V. Sutton Energy Complex located in Wilmington, NC (Sutton Facility). The on-site portion of the Audit was conducted on February 11-12, 2019 for a total of two days on-site. The Audit Team consisted of the following senior auditors:

Mr. Christopher Reitman, P.E. AGC	Project Director, Audit Team Leader, Sr. Subject Matter Expert (on-site)
Mr. Joseph Cotier, CPEA, Elm	Sr. Environmental Auditor (on-site)
Mr. Bernie Beegle, P.G., AGC	Sr. Subject Matter Expert (off-site)

The Sutton Facility was represented by:

- Mr. Jason Talbott, Station General Manager
- Mr. Tim Russell, CCP System Owner
- Mr. Don Gibbs, CCP Engineering & Closure Engineering
- Mr. Issa Zarzar, General Manager, Carolinas East Region, CCP Operations and Maintenance
- Mr. Bobby Barnes, Manager, Engineering & Closure Engineering
- Mr. Steve Gordy, CCP Projects
- Mr. Steve Cahoon, EHS CCP Permitting and Compliance
- Ms. Cynthia Winston, Manager, Environmental Permitting and Compliance
- Mr. John Toepfer, EHS CCP Waste & Groundwater
- Ms. Tammy Jett, EHS CCP Waste & Groundwater (by phone)
- Mr. Randy Hart, Regulatory Affairs
- Mr. Shane Johnson, Environmental Rover, EHS CCP Compliance
- Mr. Mike Phillips, Manager, EHS CCP Compliance
- Mr. Ricky Stroupe, EHS CCP Environmental Field Support
- Mr. Kent Tyndall, Station Environmental Field Support
- Mr. James Hailey, EHS CCP H&S Field Support
- Mr. Josh Schieffer, Station H&S Field Support
- Mr. Keith Higgins, EHS CCP Compliance

1.2 FACILITY OVERVIEW

The Duke Energy Sutton Facility is located at 801 Sutton Steam Plant Road, Wilmington, North Carolina. The Sutton Facility covers approximately 3500 acres and is located along the east side of the Cape Fear River and Sutton Lake (formerly the Sutton Facility cooling pond). According to Duke Energy personnel, the Sutton Facility first began power generation in 1954 and three coal burning units were operated until their retirement in November 2013. No coal combustion has occurred since 2013. Current power generation at the Sutton Facility is by natural gas-fired combined cycle and combustion turbine units. Since coal combustion has been terminated at the Sutton Facility, there was no active ash generation observed by the Audit Team.

1.2.1 Ash Management Activities

The 2015 Update to the Coal Ash Excavation Plan indicates ash generated by coal combustion was historically placed in the following three discrete areas on-site:

- 1971 Ash Basin – The 1971 Ash Basin was operated from 1971 to 1985. It was opened again in 2011 for temporary use during repair work and ash removal activities. The 1971 Ash Basin is unlined with a crest elevation of 28 feet mean sea level (msl). An area underneath, but within the footprint of the 1971 Ash Basin, contains additional CCR and is referred to as the 1971 Borrow Area. This area is below the groundwater table. The 1971 Ash Basin and the 1971 Borrow Area originally contained approximately 3.5 million tons of CCR. The southern dikes of the 1971 Ash Basin contain ash and will be excavated as part of the final closure. The 1971 Ash Basin has been intentionally breached, in accordance with design documents developed by Duke Energy and approved by the North Carolina Department of Environmental Quality (NCDEQ), to facilitate ongoing CCR removal activities, and currently a sheetpile wall separates the basin from Sutton Lake, which is considered a water of the state of North Carolina.

- 1984 Ash Basin – The 1984 Ash Basin was operated from 1984 to 2013. The 1984 Ash Basin reportedly has a 12-inch thick clay liner at the basin bottom which extends along the side slopes where it is protected by a 2-foot thick sand layer. The 1984 Ash Basin crest elevation is 34 feet msl. In 2006, an Interior Containment

Area (ICA) was constructed within the 1984 Ash Basin with a crest elevation of 42 feet msl. The 1984 Ash Basin originally contained an estimated 2.8 million tons of CCR. The CCR materials in the 1984 Ash Basin are currently being excavated and placed in the on-site Industrial Landfill.

- LOLA – The LOLA ("Lay of the Land Area") is located between the discharge canal and the former coal storage area or pile. It is believed by Duke Energy personnel that this area may have been used between 1954 and 1972. The LOLA and the LOLA dikes contain ash. Current plans call for the LOLA eastern dike to be excavated as part of the final closure and the LOLA western dike to remain in place with rip-rap armoring. This area contains approximately 686,000 tons of CCR and soil mixture at depths of 0 to 15 feet. The LOLA was listed on the North Carolina Inactive Hazardous Waste Sites Priority List, but the LOLA unit was officially moved to the NCDEQ Division of Water Resources on February 10, 2017 to facilitate management of this area, including post-closure groundwater remediation, in a manner consistent with the Ash Basins.

- Industrial Landfill – Over the last 3 years, Duke Energy has utilized an on-site landfill to contain the CCR materials removed from the 1971 and 1984 Ash Basins. The landfill was designed to accommodate up to eight cells. At the time of the Audit, Cell 3 had an interim cover, an interim cover was being placed on cell 4, cells 5, 6, and 7 were being actively filled, and cell 8 was active from contact with stormwater during Hurricane Florence.

1.2.2 Environmental Permits and Programs

The Sutton Facility operates under the environmental permits and programs described below:

- **National Pollutant Discharge Elimination System (NPDES) Wastewater Permitting** – NCDEQ issued the renewal of NPDES Permit No. NC0001422 on September 29, 2017 with an effective date of October 1, 2017 and an expiration date of September 30, 2022. The permit covers the following ash management related activities:

    - Outfall 001 – discharge from the Duke Energy discharge canal of Sutton Lake to the Cape Fear River (both waters of the State). In effect, outfall 001 is a mixing area where discharged waters, Sutton Lake, and the Cape Fear River converge. It includes ash pond water, recirculated cooling water, non-contact cooling water, and treated wastewater from Outfalls 002 and 004. The Wastewater Treatment System (WTS), operated by Duke Energy contractor Evoqua, Inc., treats ash pond water prior to discharge at Outfall 001. The renewed NPDES Permit also allows discharge of landfill leachate and groundwater extraction well water at Outfall 001 after treatment at the WTS. At the time of the Audit, the Sutton Facility was decanting waters from the 1984 Ash Basin as it continued the excavation of remaining ash.
    - Outfall 002 – discharge to Sutton Lake or the 1971 Ash Basin, including free water above the settled ash layer of the 1971 Ash Basin. This water included: coal pile runoff, low volume wastes, ash sluice waters, and stormwater runoff. Note that ash-related waters are no longer generated as the former coal-fired units have been demolished.
    - Outfall 004 – discharge to Outfall 001, including free water above the settled ash layer of the 1984 Ash Basin during dewatering. This water included: ash sluice water, coal pile runoff, low volume wastes and stormwater runoff. Note that ash-related waters are no longer generated as

the former coal-fired units have been demolished. All water from Outfall 004 has been routed as an internal discharge to Outfall 001.

- Outfall 008 – discharge to Sutton Lake from internal Outfalls 005, 006, 007, and 009 and internal stormwater Outfalls SW001 thru SW007.
- Outfall 010 – discharge to Sutton Lake via an emergency spillway for non-contact stormwater from the North Stormwater Pond at the landfill.
- Outfall 011 – discharge to the Sutton Facility Effluent Channel Lake via an emergency spillway for non-contact stormwater from the South Stormwater Pond at the landfill.

The NPDES permit requires separation of Outfalls 002 and 004 from the Sutton Lake discharge at Outfall 001. Duke Energy has initiated discussions with NCDEQ regarding the implementation of this requirement, including modeling of metals limits. This modeling has been submitted to NCDEQ, and Duke Energy is awaiting a response or input from NCDEQ.

The NPDES Permit has eliminated the groundwater monitoring requirements included in the earlier NPDES permit. However, Part I., Paragraph A(31) of the NPDES Permit states an exceedance of groundwater standards at or beyond the compliance boundary is subject to remediation action according to 15A NCAC 02L.0106(c), (d), or (e), as well as enforcement actions in accordance with North Carolina General Statute 143-215.6A through 143-215.6C.

Impact of Hurricane Florence

Hurricane Florence made landfall near Wrightsville Beach, North Carolina, a point approximately 14 miles due east-southeast of the Sutton Facility, on the morning of September 14, 2018. Based on review of the notes section of the electronic

Discharge Monitoring Report (eDMR) submitted to NCDEQ for September 2018, the Sutton Facility reported the following actions related to Hurricane Florence:

- Irregular Monitoring – There was no discharge from Outfall 001 from September 12 to September 26, 2018. Due to no discharge and the unsafe conditions, the required weekly sampling event was not conducted for the week of September 17 to September 23, 2018.
- Outfall 001 Discharge Pipe Damage – A section of the Outfall 001 discharge pipe was destroyed during Hurricane Florence. Duke Energy requested that discharge to the Effluent Channel be allowed while the pipe was being repaired. NCDEQ approved this request on September 25, 2018 and granted permission to discharge to the Effluent Channel through October 10, 2018. The discharge commenced at approximately 9:00 am on September 27, 2018. A sample for analysis was collected at approximately 2:00 pm. Because repairs took longer than expected, Duke Energy requested an extension of the Effluent Channel discharge through October 24, 2018. This request was made on October 8, 2018, with approval by NCDEQ provided on October 9, 2018. The discharge pipe was repaired and normal discharge to Outfall 001 commenced on October 11, 2018.
- Outfalls 010 and 011 – The North and South Pond Emergency Spillways (Outfalls 010 and 011, respectively) at the landfill both received stormwater during Hurricane Florence. Sutton Facility staff reported that the South Pond also received ash. There were no noted discharges from either Pond to Sutton Lake (Outfall 010) or the Effluent Channel (Outfall 011). Facility personnel attribute the lack of discharges to the extremely sandy soils that make-up the base of the North and South Ponds.
- Chlorides – Outfall 001 has a total chlorides limit of 230 mg/L (monthly average and daily maximum). The September 10, 2018 sample results for Outfall 001 noted a chlorides concentration of 1380 mg/L. As there had

been no other exceedances of the chlorides limit noted during the period of review, it seemed likely that the elevated chlorides was caused by tidal surge of sea water caused by Hurricane Florence.

- Cenospheres – Cenospheres (lightweight hollow beads that are a byproduct of coal combustion) originating from the landfill reportedly were discharged to a wetlands located north of and adjacent to the landfill and to Sutton Lake. Duke Energy reported the release to both the NCDEQ and the Army Corps of Engineers on September 17, 2018. The Army Corps of Engineers' response on September 25, 2018 recommended cleanup of the area and taking pictures. There was no documented reply from NCDEQ and no additional follow-up by the Army Corps of Engineers.

Several days following the main rain event associated with Hurricane Florence, the Cape Fear River, which is adjacent to Sutton Lake, crested and overflowed into Sutton Lake. The level of the water in the Sutton Lake subsequently rose and overtopped the 1971 Ash Basin's sheetpile wall and entered the Basin. Cenospheres, a type of CCR material which float, were observed in Sutton Lake. The source of these cenospheres may have been from the 1971 Ash Basin, although, as noted above, there were other specific releases which may have contributed to the cenospheres (i.e., there were known releases from other Sutton Facility areas).

- **NPDES Stormwater Permitting** – NCDEQ issued a revision to Individual Stormwater Permit No. SW8 150902 on December 2, 2016 as a North Master Stormwater Permit, now including activities at the ash basins. A revision to include site access roads was issued on July 25, 2017. The original stormwater permit, covering site generation activities, was issued by NCDEQ on October 7, 2015. This permit now covers electrical generation activities. Stormwater related to ash basin and landfill activities are covered in the Sutton Facility NPDES permit.

A Stormwater Pollution Prevention Plan (SWPPP) and associated erosion and sedimentation control plans cover the permitted activity.

- **NPDES Stormwater Construction Permitting** – An NCDEQ-issued stormwater construction permit governing activities related to ash basins and ash management has been issued to the Sutton Facility. This permit was issued by NCDEQ under its Stormwater General Permit for Construction Activities No. NCG010000.
  - NEWHA-2016-025 was issued on June 23, 2017 as a modification and consolidation of permits related to the Landfill Project Area Master Permit. A subsequent modification was issued by NCDEQ on March 21, 2018 and referred to as the Sitewide L.V. Sutton Energy Complex E&SC Modification.

An erosion and sedimentation control plan was in place for this project.

- **Title V Permitting** – The Sutton Facility's Title V Permit No. 01318T33 has an effective date of December 5, 2017 and an expiration date of June 30, 2019. A timely permit renewal application was submitted to NCDEQ on September 20, 2018. Submittal of the permit renewal application is required at least 9 months prior to permit expiration. The latest modification to the Title V Permit reflected removal of combustion turbine equipment. Fugitive dust for ash handling was listed as an insignificant source and identified as follows:
  - Source ID I67 – site-wide fugitive dust from ash handling, parking lots, and unpaved roads;
  - Source ID I76 – monofill; and
  - Source ID I77 – ash handling to support monofill.

Site-wide fugitive dust is further covered under Section 3.MM of the Permit. The Annual Compliance Certification for 2017 was submitted to NCDEQ on February 28, 2018.

- **Spill Prevention, Control and Countermeasure (SPCC) Plan** – Trans Ash, Inc. operates the basin excavation and landfill operation activities as a contractor to Duke Energy. Oil storage associated with those activities were addressed in the Trans Ash, Inc. SPCC Plan which was last revised on January 31, 2019.

- **Tier II Reporting** – Tier II hazardous chemicals inventory reporting was completed for 2017 on February 6, 2018. The Tier II report for 2018 is required to be submitted prior to March 1, 2019, and was not available to be reviewed at the time of the 2019 Audit.

- **Ash Disposal Permit** – Duke Energy transported ash from the 1971 and 1984 Ash Basins to the Brickhaven mine from June 2015 through June 2017. The Brickhaven mine is owned and operated by Charah, Inc., under NCDEQ-issued Permit No. 1910-STRUC-2015, Brickhaven No. 2. This permit was issued by NCDEQ on October 15, 2015.

- **Industrial Landfill Permit** – NCDEQ issued Duke Energy a Complex Industrial Landfill Permit to Construct No. 6512-INDUS-2016 with an issuance and effective date of September 22, 2016 and an expiration date of September 21, 2026.

  The permit allows construction of 11 landfill cells totaling 101.1 acres in three Phases at the Sutton Facility. NCDEQ issued Duke Energy a permit to operate Cell 3, Cell 4, Cell 5, and Cell 6 on July 6, 2017, August 25, 2017, December 7, 2017, and February 7, 2018, respectively. NCDEQ also issued Duke Energy a permit to operate Cells 7 and 8 on May 16, 2018. At the time of the Audit, Cell 3 had an interim cover; an interim cover was being placed on cell 4; cells 5, 6, and 7 were being actively filled; and cell 8 was active due to the receipt of contact stormwater during Hurricane Florence.

On December 21, 2018, Duke Energy notified NCDEQ that there was an Action Leakage Rate Exceedance (i.e., greater than 216 gallons per acre per day was leaking into the detection monitoring zone) in Cell 6 of the Landfill. On January 14, 2019, Duke Energy presented a Preliminary Assessment Report regarding this condition which presented operational responses to continue to assess and isolate the leak. Duke Energy personnel stated the leak may have been associated with Hurricane Florence reparation activities. Active efforts to move landfilled materials and find the leak were observed during the 2019 Audit by the Audit Team.

On January 4, 2017, the NCDEQ approved a Water Quality Plan for the Industrial Landfill. The Water Quality Plan includes semi-annual groundwater monitoring of eight wells for Phase 1 (cells 3 through 8). To date, Duke Energy has conducted four baseline groundwater sampling events at the Industrial Landfill and three semi-annual post-operational sampling events in October 2017, March 2018, and October 2018. Duke Energy submitted to the NCDEQ the Semi-Annual Groundwater Monitoring Report in July 2018 for the March 2018 sampling event. At the time of this 2019 Audit, the Semi-Annual Groundwater Monitoring Report for the October 2018 sampling event had not been issued to the NCDEQ. Once eight sampling events are conducted at the Industrial Landfill, Duke Energy will perform statistical analyses to determine background concentrations.

Based in part on the observed erodibility of the locally available cover soils during Hurricane Florence, Duke Energy modified the landfill closure to use Closure Turf, a synthetic turf-like product, as an alternative final landfill cover. This modification was approved for use by NCDEQ on December 20, 2018.

- **CAMA** – CAMA requirements include identification of drinking water supply wells within a half mile of the Sutton Facility, submission of Groundwater Assessment Plans, installation and multiple rounds of sampling from assessment wells, submission of Groundwater Assessment Reports summarizing groundwater investigations, submission of an Annual Groundwater Protection and Restoration Report, submission of Discharge Assessment Plans to characterize seeps, submission of a Groundwater Corrective Action Plan, and ash basin closure/removal activities, all of which have been completed by Duke Energy.

On October 19, 2017, under CAMA, Duke Energy submitted to NCDEQ the Revised Interim Monitoring Plans (IMPs) for groundwater monitoring for 14 Duke Energy facilities located in North Carolina, including the Sutton Facility. The revised facility IMPs require groundwater monitoring on a quarterly basis commencing the fourth quarter of calendar year 2017 pursuant to 15A NCAC 02L.0110, until Corrective Action Plans are accepted for the individual facilities or as directed otherwise by the NCDEQ. The quarterly sampling events will be conducted in conjunction with planned compliance monitoring sampling events for three quarters during the calendar year, supplemented with an additional sampling event conducted at each facility in order to provide four rounds of monitoring data to evaluate seasonal fluctuations during a year-long timeframe. The 2018 CAMA groundwater monitoring network consists of 64 wells. On December 21, 2018, NCDEQ issued Duke Energy optimized IMPs for all the 14 Duke Energy Facilities with groundwater sampling to begin in the first quarter of 2019.

Under CAMA, Duke Energy submitted to NCDEQ the 2018 Groundwater Protection and Restoration Annual Report on January 25, 2019, and the 2018 Surface Water Protection and Restoration Annual Report on January 21, 2019. Duke Energy also submitted to NCDEQ the CAMA 2018 Comprehensive Site Assessment Update dated January 31, 2018 for the Sutton Facility.

- **CCR Rule** – The 1971 and 1984 Ash Basins are subject to the CCR Rule because the Sutton Facility currently produces electricity. A CCR groundwater monitoring well network of six background wells and 59 down gradient wells has been established at the 1971 and 1984 Ash Basins. Nine CCR sampling events had been completed at the time of this audit. Electronic deliverables of the sampling were provided to the Audit Team. On January 10, 2018, Duke Energy submitted the CCR Annual Groundwater Monitoring and Corrective Action Report for the 1971 and 1984 Ash Basins to NCDEQ. Duke Energy plans to begin CCR assessment groundwater monitoring for CCR Rule Appendix IV parameters the week of February 19, 2018.

  The Initial Structural Stability Assessment states the foundation abutments would not be stable during a seismic event for both the 1971 and 1984 Ash Basins. The Initial Factor of Safety Assessment states the seismic minimum factor of safety is not met for the 1971 Ash Basin, and the dikes of both the 1971 and 1984 Ash Basins were constructed of soils that are susceptible to liquefaction. Duke Energy is addressing these issues through the ongoing excavation of the 1971 and 1984 Ash Basins.

The Industrial Landfill is subject to the CCR Rule because it receives CCR materials. A CCR groundwater monitoring well network of six background wells and 24 down gradient wells has been established at the Industrial Landfill.

On March 14, 2018, Duke Energy provided notice on Duke Energy's public website that the 1971 and 1984 Ash Basins are now in the CCR assessment monitoring program due to statistically significant increases over the background values of the Appendix III parameters.

On November 7, 2018, Duke Energy posted the required location restrictions for impoundments which stated the 1971 and 1984 Ash Basins did not meet the surface impoundment standard for placement above the uppermost aquifer (40 C.F.R. §257.60(a)), wetlands (40 C.F.R. § 257.61(a)), unstable areas, (40 C.F.R. §257.64(a)), or seismic impact zones (40 C.F.R. § 257.63(a))

On December 14, 2018, Duke Energy provided notice on Duke Energy's public website that the following CCR Rule Appendix IV constituents were detected at levels above the applicable Groundwater Protection Standards (GWPS):

- Arsenic
- Cobalt
- Lithium
- Molybdenum

Duke Energy was continuing to implement the groundwater assessment process prescribed by the CCR Rule at the time of the Audit.

Duke Energy has submitted to NCDEQ its 2018 CCR Annual Groundwater Monitoring and Corrective Action Reports for the 1971 and 1984 Ash Basins and the Industrial Landfill, dated January 18, 2019. Duke Energy is currently conducting statistical analyses on the Industrial Landfill CCR groundwater data to determine background concentrations.

Duke Energy has also developed numerous required CCR submittals which are identified on Tables 1a, 1b, and 1c.

1.2.3 Dam and Other Structural Permits and Approvals

Two active dams, for the 1971 Ash Basin and 1984 Ash Basin, exist on-site and are associated with ash management activities. The dams were grandfathered under North Carolina's Session Law 2009-390 (Senate Bill 1004, effective date January 1, 2010). Under this grandfathering, the original design of the dams is not subject to current design standards for new dam construction, although modifications after the effective date may be subject to these standards.

According to the 2018 Annual Inspection Report, the 1971 Ash Basin dam length was 7,000 feet in length with a maximum height of 24 feet, a crest at 28 feet above mean sea level and a reported pond area of 49.92 acres, prior to being breached. The breach, a permitted activity performed in 2018, is on the southwest side of the basin along the discharge canal and was accomplished with the installation of a sheetpile wall. The dam meets the size definition of "small" under the Dam Safety Regulations and is classified as "high hazard" by the NCDEQ on the Dam Inventory List. At the time of the 2018 Annual Inspection, on May 25, 2018, the basin contained 900,000 cubic yards of CCR and 430,000 cubic yards of impounded water. The Annual Inspection notes there were no signs of structural weakness in the 1971 Ash Basin impoundment.

The 2018 Annual Report indicates the 1984 Ash Basin dam is 10,000 feet in length with a maximum dam height of 32 feet, a maximum crest elevation of 34 feet above mean sea level (msl), and a pond area of 81.99 acres. The dam meets the size definition of "medium" under the Dam Safety Regulations and is classified as "high hazard" by NCDEQ. At the time of NCDEQ's 2018 Annual Inspection, the basin contained 2000 cubic yards of water and 1.2 million cubic yards of CCR. The Annual Report notes the 1984 Ash Basin impoundment was generally in good condition. Active removal of the ash was in progress in both the 1971 and 1984 Ash Basins at the time of the Audit.

Risers on both dams were grouted during 2018. The decommissioning of the 1971 and 1984 Ash Basin dams began in February 2018.

Both dams are immediately adjacent to Sutton Lake. As previously noted, Sutton Lake is considered Waters of the State and is used for recreational purposes.

1.2.4 Activities Completed Since Last Audit

During the 2018 Audit, the Audit Team observed Duke Energy efforts to close the 1971 and 1984 Ash Basins by the August 1, 2019 deadline specified in CAMA. Mechanical excavation of CCR from the 1971 Ash Basin was nearly complete, with the exception of one relatively small area on the north side, and dredging of the CCR below the water table had begun. Sheetpile was installed in sections of the 1971 Ash Basin along the discharge canal, adjacent to Sutton Lake, and along the LOLA. In early 2018, permits from NC Dam Safety were received to commence the sequenced removal of the berms of the 1971 and 1984 Ash Basins.

During this Audit, the Audit Team observed materials being mechanically dredged from the 1971 Ash Basin. The dredged CCR was discharged into the 1984 Ash Basin where it was allowed to dewater. Dewatered ash excavated from the 1984 Ash Basin was trucked to the on-site landfill.

Duke Energy personnel noted that as of January 1, 2019, 1.2 million tons of the estimated 2.46 million tons remained in the 1984 Ash Basin and 110,000 tons of the estimated 3.31 million tons remained in the 1971 Ash Basin. Overall, 2 million tons were disposed off-site and 4.45 million tons of material from the 1971 and 1984 Ash Basins will be placed in the on-site landfill.

On November 16, 2018, Duke Energy submitted a CAMA variance request to NCDEQ to extend the closure deadline by six months from August 1, 2019 to February 1, 2020. Duke Energy cited several permitting delays, two major hurricanes, and the extraordinary amount of rain in 2018, among other factors, in support of its request. NCDEQ held a public meeting in January 2019 and accepted public comments until February 4, 2019. NCDEQ's decision on the request remained pending at the time of the Audit.

The Sutton Facility is completing accelerated groundwater remediation. The plan includes extraction wells on the eastern side of the property which became operational in August 2017, an effectiveness monitoring report is submitted annually by May 15, with the most recent report submitted on May 11, 2018.

During September 2018, Hurricane Florence made landfall in close proximity to the Sutton Facility. Both the Hurricane itself, which produced approximately 30+ inches of rain, and the ensuing flood from the Cape Fear River had a substantial impact on Sutton Facility operations. The initial rainfall itself created a breach in cell 5 of the Industrial Landfill due to the ponding water. CCR materials including cenospheres moved from the landfill into Sutton Lake. On the northeast side of cell 3, deep rills developed, exposing CCR which eroded and migrated through a ditch and culvert onto the adjacent Wooten property. On the southwest side of the landfill, some material moved outside of cell 8 onto the south drainage basin but remained on the property.

2.0 AUDIT SCOPE AND SUBJECT MATTER

The Audit was completed in accordance with the court documents and the audit scoping document agreed to by Duke Energy and the United States. A description of the scope is provided as Attachment A. The Audit included ash management activities, including aspects of generation that affect the nature of the waste streams from the point of generation into surface impoundments or ash management basins, landfills, and/or storage piles. The Audit focused on the activities at the Sutton Facility since the date of the last Audit, which was February 12-13, 2018.

3.0 AUDIT FINDINGS

3.1 EXCEEDANCES OF THE STATE GROUNDWATER QUALITY STANDARDS

Requirement – The State groundwater rules establish maximum contaminant levels for groundwater at or beyond the compliance boundaries for the Ash Basins. *See* 15A NCAC 02L.0202. 15A NCAC 02L.0103(d) provides that "[n]o person shall conduct or cause to be conducted, any activity which causes the concentration of any substance to exceed that specified" under the Class GA standards or the interim maximum acceptable concentrations (IMACs) established for groundwater quality pursuant to 15A NCAC 02L.0202. Further, under N.C.G.S.A. § 143-215.1(i), "[a]ny person … who is required to obtain an individual permit … for a disposal system under the authority of N.C.G.S.A. § 143-215.1 [water pollution control] … shall have a compliance boundary … beyond which groundwater quality standards may not be exceeded." *See also* 15A NCAC 02L.0102(3) (defining "compliance boundary" as "a boundary around a disposal system at and beyond which groundwater quality standards may not be exceeded").

In addition, under N.C.G.S.A. § 143-215.6A(a)(1), civil penalties may be assessed against any person who violates any standard established by the NCDEQ under the authority of N.C.G.S.A. § 143-214.1, which covers groundwater standards.

Finding – Constituents exceeding the standards for Class GA waters, established in 15A NCAC 2L.0202, were documented in monitoring wells located at or beyond the compliance boundaries for the 1971 Ash Basin and the 1984 Ash Basin. The 2018 CAMA groundwater monitoring network consisted of 64 wells. Based on a review of the 2018 CAMA groundwater monitoring analyses, pH, boron, total dissolved solids (TDS), arsenic, cobalt, chromium (VI), chromium, iron, manganese, selenium, thallium, and vanadium all exceed the 2L groundwater standards or the NCDEQ-approved Provisional Background Threshold Values (PBTVs), if the PBTV was greater than the 2L or IMAC groundwater standards, one or more times at or beyond the compliance boundaries for the 1971 Ash Basin and the 1984 Ash Basin. Attachment B provides a summary of the 2018 CAMA groundwater data reviewed and a Figure showing the CAMA well locations.

Duke Energy has stated its opinion that, pursuant to a September 2015 Settlement Agreement with the NCDEQ, “Duke Energy is not subject to any further financial penalties for exceedances of groundwater standards” and “Duke Energy is not subject to any further enforcement action based on exceedances of groundwater standards as long as it remains in substantial compliance with CAMA groundwater requirements.”

The CAM has advised the Audit Team that the Audit scope does not include an evaluation of compliance with the September 2015 Settlement Agreement, and therefore the Audit Team does not take a position on Duke Energy’s opinion.

4.0 OPEN LINES OF INQUIRY

Open Lines of Inquiry are items identified by the Audit Team while on-site that, due to limited available information or the need for additional research, could not be determined as being in compliance or out of compliance.

4.1 AMENDMENT OF EMERGENCY ACTION PLAN (EAP) PROCEDURES

Requirement – The Disposal of Coal Combustion Residuals from Electric Utilities rule (CCR Rule) became effective on October 19, 2015. Under 40 C.F.R. § 257.53, a CCR surface impoundment or impoundment is defined as "a natural topographic depression, man-made excavation, or diked area, which is designed to hold an accumulation of CCR and liquids, and the unit treats, stores, or disposes of CCR." A dike is defined in the CCR Rule as an "embankment, berm, or ridge of either natural or man-made materials used to prevent the movement of liquids, sludges, solids, or other materials."

Under 40 C.F.R. § 257.73(a)(3)(i), "[n]o later than April 17, 2017, the owner or operator of a CCR unit determined to be either a high hazard potential CCR surface impoundment or a significant hazard potential CCR surface impoundment under paragraph (a)(2) of this section must prepare and maintain a written EAP. At a minimum the EAP must: (A) Define the events or circumstances involving the CCR unit that represent a safety emergency, along with a description of the procedures that will be followed to detect a safety emergency in a timely manner..."

Under 40 C.F.R. § 257.73(a)(3)(ii)(A), "[t]he owner or operator must amend the written EAP whenever there is a change in conditions that would substantially affect the EAP in effect."

Under 40 C.F.R. § 257.73(a)(3)(v), "[t]he EAP must be implemented once events or circumstances involving the CCR unit that represent a safety emergency are detected ..."

Open Line of Inquiry

Information Provided in the EAP and Annual Inspection Report

As required by the CCR Regulations, Duke Energy has posted an EAP on their website. The EAP was stamped by a professional engineer on September 13, 2018. On the certification page of the EAP, it states that the "1971 ASH POND DAM has been determined to be a high hazard potential CCR surface impoundment."

The Sutton Facility EAP describes the events and circumstances involving the CCR unit that represent safety emergencies, along with descriptions of the procedures that will be followed to detect, monitor, and respond to a developing safety emergency. The descriptions of the potential EAP activation conditions are all predicated on the dam remaining in place.

The EAP describes the following conditions associated with the dam:

- "Emergency Level 3 – Abnormal Event, slowly developing: This situation is not normal but has not yet threatened the operation or structural integrity of the dam, but possibly could if it continues to develop." An example provided in the EAP is the river level is rising and as a result of heavy rains and/or operational inflows that are less than three feet but greater than one foot below the dam crest.

- "Emergency Level 2 – Potential dam failure situation rapidly developing: This situation may eventually lead to dam failure and flash flooding downstream, but there is not an immediate threat of dam failure." An example in the EAP is when the reservoir or river level is 1 foot or less than the dam crest.

- "Emergency Level 1 – Urgent! Dam failure is imminent or in progress: This is an extremely urgent situation when a dam failure is occurring or obviously is about to occur and cannot be prevented. Flash flooding will occur downstream of the dam. This situation is also applicable when flow through the earth spillway is causing downstream flooding of people and roads." An example provided in the EAP is when the water from the reservoir or the river is flowing over the top of the dam.

Following the summary of activation conditions, Appendix B-7 of the EAP (page 115 of 120) states the 1971 Ash Basin Dam has been breached and does not hold any storage capacity currently due to the dam decommissioning activities under way. Appendix B-8, the Reservoir Elevation-Area-Volume and Spillway Capacity Data (page 116 of 120) provides similar information on the decommissioning of the 1971 Ash Basin Dam. These are the first references that the dam for the 1971 Ash Basin is decommissioned.

Section 1 of the 2018 Annual Report notes the 1971 Ash Basin Dam was intentionally breached. Section 5 of the 2018 Annual Report notes that the 1971 Ash Basin continues to impound 0.9 million cubic yards of CCR and 430,000 cubic yards of impounded water at the time of the May 31, 2018 inspection. The Audit Team understood this to mean the volume of water and CCR contained within the sheetpile wall and remaining 1971 Ash Basin dike structure.

2019 Audit Observations

During the 2019 Audit, the Audit Team observed a sheetpile wall separating the CCR and water within the 1971 Ash Basin from Sutton Lake. This sheetpile wall was an approved structure implemented in accordance with an NCDEQ dam breach design completed by Duke Energy. The sheetpile wall separated the coal ash within the 1971 Ash Basin from the adjacent Sutton Lake, which has been classified as a water of the state of North Carolina. Based on the definitions of both a CCR surface impoundment and a dike provided in the CCR rule and identified above, the

Audit Team believed the 1971 Ash Basin remained a CCR impoundment with the sheetpile wall functioning as a dike as defined in the CCR Rule (i.e., the sheetpile was constructed from a man-made material "to prevent the movement of solids or other materials") to contain the remaining CCR within the 1971 Ash Basin. Considering this, it is the opinion of the Audit Team that an EAP was required to be in effect for the Sutton Facility 1971 Ash Basin to be compliant with the CCR Rule.

Hurricane Florence (September 2018)

Hurricane Florence created a considerable series of challenges for CCR management activities at the Sutton Facility. As part of the storm, over 30+ inches of rain fell at the facility between September 13 and 16, 2018.

Several days following the main rain event associated with Hurricane Florence, the Cape Fear River, which is adjacent to Sutton Lake, crested and overflowed into Sutton Lake. In response to the storm impacts at the Sutton Facility, the EAP for the Sutton Lake Dam was activated. The level of the water in the Sutton Lake subsequently rose and overtopped the sheetpile wall and entered the 1971 Ash Basin. Cenospheres, a type of CCR material which float, were observed in Sutton Lake. The source of these cenospheres may have been from the 1971 Ash Basin, although there were other specific releases which may have contributed to the cenospheres (i.e., there were known releases from other Sutton Facility areas).

1971 Ash Basin EAP Activation

Duke Energy personnel stated the EAP had not been activated when water from Sutton Lake overtopped the sheetpile wall separating the Sutton Lake and the 1971 Ash Basin. Duke Energy personnel also clarified that since the dam had been decommissioned, the overtopping of the sheetpile wall and the possible release of cenospheres to Sutton Lake, was not considered a breach and there was no need for activation of the1971 Ash Basin EAP. Further, Duke Energy personnel also noted the Sutton Lake Dam EAP was activated since water from the Cape Fear River was overtopping the Sutton Lake Dam and entering Sutton Lake. This meant that the community and emergency responders in the area were informed of conditions at the Sutton Facility and storm management and recovery efforts were being coordinated with the local emergency responders.

Conclusions

The EAP is intended to be a safety planning document to assist an owner of a CCR surface impoundment and the surrounding community with coordination during an unexpected event which may impact the impoundment conditions. The EAP is intended to describe the sequence of notifications, monitoring, and actions to be taken associated with a safety emergency at a CCR surface impoundment. The owner or operator must amend the written EAP whenever there is a change in conditions that would substantially affect the EAP in effect.

The certification page for the EAP describes the “1971 ASH POND DAM” as “determined to be a high hazard potential CCR surface impoundment, . . .” without qualification. Although the appendix of the EAP did state the dam had been removed, the Audit Team believes the EAP should have been clearer on this point, since the beginning of the document stated the 1971 Ash Basin Dam was still in place. Further, since Duke Energy personnel believed the dam had been removed, there were apparently no identified actions in the EAP which may have necessitated the activation of the EAP, even though a clearly Abnormal Event was developing. Given that water entered the 1971 Ash Basin from Sutton Lake, the Audit Team believes this represented an Abnormal Event worthy of EAP activation.

Considering this information, the Audit Team believes the EAP should be amended to allow the Audit Team, Duke Energy field personnel, and the community to understand what criteria would necessitate whether the EAP should be activated when the dam is removed and only a sheetpile wall separates the Sutton Lake from the 1971 Ash Basin.

Under section (a)(3)(ii)(A) of the CCR Rule, the owner or operator must amend the written EAP whenever there is a change in conditions that would substantially affect the EAP. Considering the information presented above, the Audit Team was not able to verify this standard was met while they were on-site. Further, the Audit Team believes that EAP activation during dam breaching activities should be carefully reviewed, particularly in the mid-Atlantic regions which is subject to regular hurricane conditions, since the CCR impoundments may be particularly vulnerable during decommissioning activities.

The Audit Team understands that the notifications and the description to the emergency responders provided by Duke Energy in this instance would have been substantially the same as those provided during the activation of the EAP for Sutton Lake, since these conditions and the associated water management activities were integrated. Further, the Audit Team did review the Hurricane Florence planning and follow-up activities with Duke Energy personnel during the 2019 Audit and found the actions of Duke Energy to be carefully planned and extensive and although there was some migration of CCR cenospheres, there were no identified signs of long-term environmental impacts in the information reviewed by the Audit Team. However, decommissioning of the Ash Basin dams is an activity that should be carefully coordinated and communicated with the state and community, and the Audit Team believes additional attention to this issue is warranted.

5.0 AUDIT APPROACH

5.1 ON-SITE ACTIVITIES

During its time on-site, the Audit Team conducted an opening conference with facility personnel to discuss the scope of work and the plan for accomplishing necessary tasks while at the Sutton Facility. A site tour of the coal ash management and program support areas was subsequently completed. Following the tour, the Audit Team conducted a review of pertinent files, interviews with facility representatives, and verification of facility activities related to the Environmental Compliance Plans (ECPs), written programs, and permits. A debrief was conducted each Audit day to advise the facility representatives of Audit progress, Open Lines of Inquiry, possible Audit Findings, and needs for the next day. At the completion of the Audit, the Audit Team led a verbal discussion of draft Audit findings with facility representatives.

5.2 STANDARDS OF PRACTICE

The fieldwork portion of the Audit was conducted on February 11-12, 2019, with compliance reporting commencing May 14, 2015, the date of the court's judgments. The Audit focused on the activities at the facility since the date of the last Audit, which was February 12-13, 2018. The Audit was based on:

- Physical inspections of the facility;
- Examination of selected administrative and operating records made available by facility staff at the Audit Team's request;
- Interviews and discussions with key facility management and staff; and
- Verification procedures designed to assess the facility's application of, and adherence to, terms of the probation, environmental laws and regulations, and site policies and procedures. In addition, the Audit Team reviewed the facility's adherence to good management practices.

The Audit followed established audit protocols and procedures. It should be understood that the Audit consisted of evaluating a sample of practices and was conducted over a short period of time. Efforts were made toward sampling major facets of environmental performance during the period under review. This method is intended to uncover major system deficiencies and the Audit may not have identified all potential problems.

To support the overall independence of the Audit process, the Audit included an auditing professional certified by the Board of Environmental, Health and Safety Auditor Certifications (BEAC). BEAC is an accredited professional certification board that issues the Certified Professional Environmental Auditor (CPEA) designation to qualified auditors. Under BEAC, auditor independence is a key criterion for the implementation of an effective third-party audit program. The Audit was implemented in accordance with the standards related to auditor independence.

The process by which the Audit was conducted was consistent with the general state of the art of environment auditing and the best professional judgment of the Audit Team. To conduct the Audit, the team implemented a formal approach, drawing on process guidance from both BEAC and the Auditing Roundtable (AR) guidance documents. Guidance documents included:

- *Standards for the Professional Practice of Environmental, Health and Safety Auditing*. Prepared by the Board of Environmental, Health and Safety Auditor Certifications, 2008.

- ISO 19011:2002 – Guidelines for Quality and/or Environmental Management Systems Auditing. Prepared by the International Organization for Standardization, 2002.

- Standard for the Design and Implementation of an Environmental, Health and Safety Audit Program. Prepared by The Auditing Roundtable, Inc., 1995.

- Minimum Criteria for the Conduct of Environmental, Health and Safety Audits. Prepared by The Auditing Roundtable, Inc.

5.3 REPRESENTATIVE SAMPLING

When confronted with a large population of data to review or equipment to inspect, the Audit Team employed representative sampling techniques to evaluate records over the Audit period requested, and as necessary, for physical inspection of some types of common equipment. The sample size for record reviews or equipment inspections required professional judgment.

The Audit Team's judgement considered the following:

- The outcome of the evaluation of the records sampled. If problems are found in the representative sample, more records may need to be examined to evaluate compliance status.
- Potential for or severity of non-compliance.
- The general appearance and observed practices of certain operating areas.
- Information obtained during an interview that indicates a potential problem.
- Other specific information or guidance from the CAM.
- Time available during the Audit.

The Audit Team also employed the following types of sampling techniques, depending upon the characteristics of a specific population:

- Random sampling – every item has an equal chance of being selected.
- Interval sampling – select every n^{th} item, (e.g., every third manifest in chronological order as contained in facility files).
- Block sampling – auditor uses his/her judgment to select a specific block of items, (e.g., petroleum storage tank inspections from April to October).
- Stratified sampling – population is divided into groups, which are then sampled through random or judgmental techniques.

TABLES

TABLE 1a
1971 ASH BASIN - Plans and Reports Posted by Duke Energy Under the CCR Rule

DOCUMENT NAME	CATEGORY	RELEASE DATE
CCR Annual Groundwater Monitoring and Corrective Action Report 2018	Groundwater Monitoring and Corrective Action	03/01/2019
Notice of Initiation of Assessment of Corrective Measures	Groundwater Monitoring and Corrective Action	02/19/2019
Notice of Groundwater Protection Standard Exceedance 2018	Groundwater Monitoring and Corrective Action	12/14/2018
Annual Fugitive Dust Control Report 2018	Operating Criteria	12/05/2018
Wetlands	Location Restriction	11/07/2018
Unstable Areas	Location Restriction	11/07/2018
Seismic Impact Zones	Location Restriction	11/07/2018
Fault Areas	Location Restriction	11/07/2018
Placement Above Uppermost Aquifer	Location Restriction	11/07/2018
Emergency Action Plan for Sutton 1971 and 1984 Ash Ponds	Design Criteria	10/01/2018
CCR Annual Surface Impoundment Inspection Report 2018	Operating Criteria	07/17/2018
Annual Meeting with Local Emergency Responders 2018	Design Criteria	06/28/2018
Closure Plan Impoundments	Closure and Post Closure Care	06/19/2018
Inundation Map	Design Criteria	03/21/2018
Notice of Establishment of an Assessment Monitoring Program - Sutton 1971 Ash Basin	Groundwater Monitoring and Corrective Action	03/14/2018
Closure Plan Impoundments - 1971 and 1984 Ash Basins	Closure and Post Closure Care	02/27/2018
CCR Annual Groundwater Monitoring and Corrective Action	Groundwater	02/06/2018

TABLE 1a
(Continued)

DOCUMENT NAME	CATEGORY	RELEASE DATE
Report	Monitoring and Corrective Action	
Emergency Action Plan for Sutton 1971 and 1984 Ash Ponds Revision 007A	Design Criteria	01/25/2018
Sutton Inundation Maps	Design Criteria	01/25/2018
2017 Annual CCR Fugitive Dust Control Report-Sutton	Operating Criteria	11/29/2017
Groundwater Sampling and Analysis Program Selection of Statistical Method Certification-Sutton 1971 Ash Basin	Groundwater Monitoring and Corrective Action	10/25/2017
Groundwater Monitoring System Certification-Sutton 1971 Ash Basin	Groundwater Monitoring and Corrective Action	10/25/2017
Annual Meeting with Local Emergency Responders 2017	Design Criteria	07/21/2017
CCR Annual Surface Impoundment Inspection Report 2017	Operating Criteria	07/11/2017
CCR Fugitive Dust Control Plan Revision 1	Operating Criteria	07/11/2017
Closure Plan - 1971 and 1984 Ash Basins, Revision 1	Closure and Post Closure Care	03/16/2017
Notice of Intent to Close Sutton 1971 Ash Basin	Closure and Post Closure Care	02/16/2017
Annual Fugitive Dust Control Report 2016	Operating Criteria	12/05/2016
Inflow Design Flood Control System Revision 1	Design Criteria	11/22/2016
Initial Structural Stability Assessment Revision 1	Design Criteria	11/16/2016
Initial Structural Stability Assessment Revision 0	Design Criteria	11/16/2016
Initial Factor of Safety Assessment	Design Criteria	11/15/2016
Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016
Inflow Design Flood Control System	Operating Criteria	11/03/2016
History of Construction	Design Criteria	10/25/2016

TABLE 1a
(Continued)

DOCUMENT NAME	CATEGORY	RELEASE DATE
Initial Hazard Classification Assessment Certification	Design Criteria	10/12/2016
Existing Liner Design Criteria	Design Criteria	10/11/2016
Annual Surface Impoundment Report 2016	Operating Criteria	06/27/2016
Annual Surface Impoundment Report (Initial)	Operating Criteria	02/12/2016
Annual Surface Impoundment Report Revision 1	Operating Criteria	02/19/2016

*This summary of reports was downloaded on March 7, 2019

TABLE 1b
1984 ASH BASIN - Plans and Reports Posted by Duke Energy Under the CCR Rule

DOCUMENT NAME	CATEGORY	RELEASE DATE
CCR Annual Groundwater Monitoring and Corrective Action Report 2018	Groundwater Monitoring and Corrective Action	03/01/2019
Notice of Initiation of Assessment of Corrective Measures	Groundwater Monitoring and Corrective Action	02/19/2019
Notice of Groundwater Protection Standard Exceedance 2018	Groundwater Monitoring and Corrective Action	12/14/2018
Annual Fugitive Dust Control Report 2018	Operating Criteria	12/05/2018
Wetlands	Location Restriction	11/07/2018
Unstable Areas	Location Restriction	11/07/2018
Seismic Impact Zones	Location Restriction	11/07/2018
Fault Areas	Location Restriction	11/07/2018
Placement Above Uppermost Aquifer	Location Restriction	11/07/2018
Emergency Action Plan for Sutton 1971 and 1984 Ash Ponds	Design Criteria	10/01/2018
CCR Annual Surface Impoundment Inspection Report 2018	Operating Criteria	07/17/2018
Annual Meeting with Local Emergency Responders 2018	Design Criteria	06/28/2018
Closure Plan Impoundments	Closure and Post Closure Care	06/19/2018
Inundation Map	Design Criteria	03/21/2018
Notice of Establishment of an Assessment Monitoring Program - Sutton 1984 Ash Basin	Groundwater Monitoring and Corrective Action	03/14/2018
Closure Plan Impoundments - 1971 and 1984 Ash Basins	Closure and Post Closure Care	02/27/2018
CCR Annual Groundwater Monitoring and Corrective Action Report	Groundwater Monitoring and Corrective Action	02/06/2018
Emergency Action Plan for Sutton 1971 and 1984 Ash Ponds Revision 007A	Design Criteria	01/25/2018

TABLE 1b
(Continued)

DOCUMENT NAME	CATEGORY	RELEASE DATE
Sutton Inundation Maps	Design Criteria	01/25/2018
2017 Annual CCR Fugitive Dust Control Report-Sutton	Operating Criteria	11/29/2017
Groundwater Sampling and Analysis Program Selection of Statistical Method Certification-Sutton 1984 Ash Basin	Groundwater Monitoring and Corrective Action	10/25/2017
Groundwater Monitoring System Certification-Sutton 1984 Ash Basin	Groundwater Monitoring and Corrective Action	10/25/2017
Annual Meeting with Local Emergency Responders 2017	Design Criteria	07/21/2017
CCR Annual Surface Impoundment Inspection Report 2017	Operating Criteria	07/11/2017
CCR Fugitive Dust Control Plan Revision 1	Operating Criteria	07/11/2017
Closure Plan - 1971 and 1984 Ash Basins, Revision 1	Closure and Post Closure Care	03/16/2017
Notice of Intent to Close Sutton 1984 Ash Basin	Closure and Post Closure Care	02/16/2017
Annual Fugitive Dust Control Report 2016	Operating Criteria	12/05/2016
Initial Structural Stability Assessment Revision 1	Design Criteria	11/16/2016
Initial Structural Stability Assessment Revision 0	Design Criteria	11/16/2016
Initial Factor of Safety Assessment	Design Criteria	11/15/2016
Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016
Inflow Design Flood Control System	Operating Criteria	11/03/2016
History of Construction	Design Criteria	10/25/2016
Initial Hazard Classification Assessment Certification	Design Criteria	10/12/2016
Existing Liner Design Criteria	Design Criteria	10/11/2016
Annual Surface Impoundment Report 2016	Operating Criteria	06/27/2016
Annual Surface Impoundment Report (Initial)	Operating Criteria	02/12/2016
Annual Surface Impoundment Report Revision 1	Operating Criteria	02/19/2016

*This summary of reports was downloaded on March 7, 2019

TABLE 1c
CCP LANDFILL - Plans and Reports Posted by Duke Energy Under the CCR Rule

DOCUMENT NAME	CATEGORY	RELEASE DATE
CCR Annual Groundwater Monitoring and Corrective Action Report 2018	Groundwater Monitoring and Corrective Action	03/01/2019
Annual Fugitive Dust Control Report 2018	Operating Criteria	12/05/2018
CCR Annual Landfill Inspection Report 2018	Operating Criteria	11/19/2018
Design Criteria for Sutton CCP Landfill Cells 7 and 8 Liner, Leachate and Removal System	Design Criteria	05/01/2018
CCR Annual Groundwater Monitoring and Corrective Action Report	Groundwater Monitoring and Corrective Action	04/03/2018
Sutton Landfill Cell 6 Certification of Liner and Leachate Collection Removal System	Operating Criteria	02/16/2018
Certification of Leachate Collection and Removal System - Cell 5	Design Criteria	12/13/2017
2017 Annual CCR Fugitive Dust Control Report-Sutton	Operating Criteria	11/29/2017
CCR Annual Landfill Report 2017-Sutton CCP Landfill	Operating Criteria	11/29/2017
Fugitive Dust Control Plan Revision 1	Operating Criteria	07/21/2017
Placement above the Uppermost Aquifer - Sutton CCP Landfill	Location Restrictions	07/21/2017
Closure Plan for Sutton CCP Landfill	Closure and Post Closure Care	07/21/2017
Sutton CCP Landfill Certification of Leachate Collection and Removal System - Cells 3 & 4	Design Criteria	07/21/2017
Run On Run Off Control System Plan - Sutton CCP Landfill	Operating Criteria	07/21/2017
Post Closure Plan Sutton - CCP Landfill	Closure and Post Closure Care	07/21/2017

TABLE 1c
(Continued)

DOCUMENT NAME	CATEGORY	RELEASE DATE
Seismic Impact Zones Certification	Location Restrictions	07/21/2017
Unstable Areas	Location Restrictions	07/21/2017
Wetlands Certification - Sutton CCP Landfill	Location Restrictions	07/21/2017
Location Restrictions for Fault Areas	Location Restrictions	07/21/2017
Groundwater Monitoring System Certification	Groundwater Monitoring and Corrective Action	07/21/2017
Groundwater Sampling and Analysis Statistical Method Certification	Groundwater Monitoring and Corrective Action	07/21/2017
Sutton CCP Landfill Certification of Liner Equivalency	Design Criteria	12/13/2016
Sutton CCP Certification of Leachate Collection and Removal System - Cells 3 & 4	Design Criteria	12/13/2016

*This summary of reports was downloaded on March 7, 2019

ATTACHMENT A

ATTACHMENT A

AUDIT SCOPE

A-1 GENERAL AUDIT SCOPE ITEMS

The general Audit scope items included:

- Review and evaluation of documentation for maintenance and repair of structures and equipment used for coal ash disposal.

- Review and evaluation of documentation of modifications, failures, leaks, damage, disrepair and other problems at the coal ash management units.

- Review and evaluation of documentation of efforts to correct failures, leaks, damage, disrepair and other problems where they determine that employee/contractor actions were likely a primary or contributing cause to a compliance finding.

- Review and evaluation of documentation of communication of the items above within the organization.

- Review and evaluation of documentation associated with the specific environmental compliance items described below and laws, regulations, and policies associated these items.

- Review of compliance with administrative aspects and regulatory submissions related to coal ash management-specific regulations, including the Coal Combustion Residuals Rule found in 40 CFR Part 257, Subpart D.

More specific items which were addressed in the audits to comply with the general Audit scope are described below.

A-2 SPECIFIC COMPLIANCE WITH OTHER PROVISIONS OF THE PLEA AGREEMENTS

The following items related to specific items in the plea agreements were reviewed as part of the Audit:

1. Determine whether Defendants have opened, expanded, or reopened any coal ash or coal ash wastewater impoundment and, if so, verify that they are lined and do not allow unpermitted discharges of coal ash or coal ash wastewater to waters of the United States.

2. Review citations/notices of violation/notices of deficiency related to violations of federal, state, or local law to assure that they have been properly relayed to the court and, as appropriate under the plea agreements, determine their materiality.

3. Note any observations made during the audit that cause concern regarding the assets and/or security available to the Defendants to meet the obligations imposed by the court's judgment.

A-3 GENERAL ENVIRONMENTAL COMPLIANCE SUBJECT AREAS

The following items related to general environmental compliance were reviewed as part of the Audit:

1. Assess all waste streams from Duke Energy facilities with coal ash impoundments. Review Duke Energy's processes, procedures, and practices, as well as compliance with those processes, procedures, and practices, for:

   a. identifying waste streams (especially, but not limited to, waste streams with discharge points into bodies of water);
   b. identifying and communicating any modifications or changes, or potential modifications or changes, to waste streams;
   c. ensuring proper handling/disposal of waste streams;
   d. identifying, preventing, and mitigating any risks or hazards that could affect waste streams and/or the disposal of waste streams; and,
   e. ensuring proper permitting for waste streams.

For Item 1.d., the Audit Team evaluated such risk/hazard issues where there were compliance findings associated with waste streams.

2. Review and evaluate documentation of:

   a. maintenance and repair of structures and equipment related to coal ash disposal;
   b. modification of the coal ash impoundments and related pollution prevention equipment and structures;
   c. failures, leaks, damage, disrepair, and other problems;
   d. communication of the information described in a-c within the organization; and,
   e. efforts to correct failures, leaks, damage, disrepair, and other problems.

3. Assess the employees responsible for inspection, maintenance, and repair of coal ash basins and related structures and equipment. The assessment included an assessment of the workloads of such employees to assure that Duke Energy's facilities are adequately staffed. These assessments were made where the Audit Team determined that employee/contractor actions were likely a primary or contributing cause to a compliance finding.

4. Review the results and recommendations of any other audits (internal or external/state-mandated) and assess Duke Energy's implementation of those recommendations.

5. Review and assess Duke Energy's processes, procedures, and practices for identifying, communicating, and addressing problems and potential problems at its coal ash basins (leaks, unpermitted discharges, etc.).

6. Review and assess Duke Energy's policies, procedures, practices, and equipment for handling emergency releases from its coal ash basins and evaluate the personnel with duties in such situations.

7. Verify that Duke Energy is complying with its NPDES wastewater and stormwater permits, as well as other relevant environmental permits. This would include verifying Duke Energy's timely submission of permit applications, permit renewal applications, and responses to requests for additional information from the relevant regulatory authority.

8. Review and assess any actions or measures Duke Energy has undertaken to assure accountability and prevent recurrences when problems and/or failures occur (e.g., disciplinary actions, re-training, revision to policies and procedures, etc.). This review was conducted where the Audit Team determined that employee/contractor actions were likely a primary or contributing cause to a compliance finding.

9. Review and assess compliance with the following environmental regulations, as applicable to the management of coal ash:

a. Wastewater Discharges	40 CFR 122; 15A NCAC 2H.0100 *et seq*
b. Stormwater Discharges	40 CFR 122.26; 15A NCAC 2H.1000 *et seq;* NC General Permit (Construction) No. NCG010000
c. NC Groundwater Standards	15A NCAC 2L.0202(h)
d. Hazardous Waste Management	15A NCAC 13A .0100 to 13A .0107
e. Oil Pollution Prevention	40 CFR Part 112
f. Air Pollution (Title V)	15A NCAC 2Q, and
g. Hazardous Chemicals (Tier II)	40 CFR Part 370.

Reviews also included an analysis of overall compliance and the status and security of the asset. Subsequent reviews of individual facilities will evaluate the movement towards compliance. The Audit scope did not include an evaluation of compliance with the September 2015 Settlement Agreement with NCDEQ.

A-4 LIST OF PERMITS AND PROGRAMS DEEMED TO BE EITHER DIRECTLY OR INDIRECTLY IN SUPPORT OF ASH MANAGEMENT

During the Audit, the Audit Team reviewed a variety of written programs developed and implemented by Duke Energy and facility staff. State-issued permits and supporting documentation relative to environmental programs and geotechnical aspects of ash basin management were also requested and reviewed.

Requested documents, pertinent to management of ash in basins, landfills, ponds, etc., were outlined in the pre-Audit questionnaire for the facility and included, but were not limited to:

1. The Compliance Register developed for eTRAC for the facility.
2. The Duke Energy Operations Manual for the facility.
3. A site plan, site map, or aerial photo which shows the entire facility and key features of the facility, including NPDES outfalls associated environmental monitoring locations, storage tanks, etc.
4. Most recent two (2) years of maintenance, monitoring, and inspection records for each coal ash/CCR basin (just the physical inspections, not the groundwater records).
5. A “Phase 1 and Phase 2” summary of ash basin conditions prepared by an outside consultant.
6. Duke Energy’s permitting plans for addressing ash impoundments and landfills at the facility including the Site Analysis and Removal Plan.

7. Applicable pages from the Duke Energy basin-by-basin coal ash/CCR project tracking document for the facility.

8. Original basin/landfill/coal ash management unit construction records.

9. Documentation of changes to these units.

10. Coal ash unit construction permit application and approval.

11. State-issued permits and application materials for permits associated with coal ash/CCR management (including, e.g., dam permits).

12. Any currently effective state order, consent order, or similar state directive that addresses coal ash/CCR management at the facility.

13. Records required to be maintained in the facility's operating record under the federal CCR regulation and/or any state CCR regulatory program.

14. Records of off-site ash shipments from May 2015 forward.

15. Stormwater permit application and approval for all outfalls.

16. Industrial wastewater (NPDES/POTW) permit application and approval for all outfalls/discharges.

17. Industrial stormwater permit, sampling and monitoring records, and any corrective action plans (last two (2) years).

18. Stormwater Pollution Prevention Plan(s).

19. Landfill operating permit(s) with maintenance and monitoring requirements.

20. Landfill leak detection and groundwater monitoring records from the last two (2) years along with any workplans that describe the rationale for the monitoring system at the facility.

21. Air permits and applications for coal ash units and ancillary operations.

22. Testing and monitoring records completed to comply with air permits.

23. Any notices of violation associated with the coal ash/CCR management activities received over the last two (2) years.

24. Spill Prevention Control and Countermeasure Plan.

25. Community Right-to-Know:
    a. Lists of hazardous chemicals and/or MSDSs submitted;
    b. Tier I or II reports; and
    c. Form R (toxic release inventory) reports.

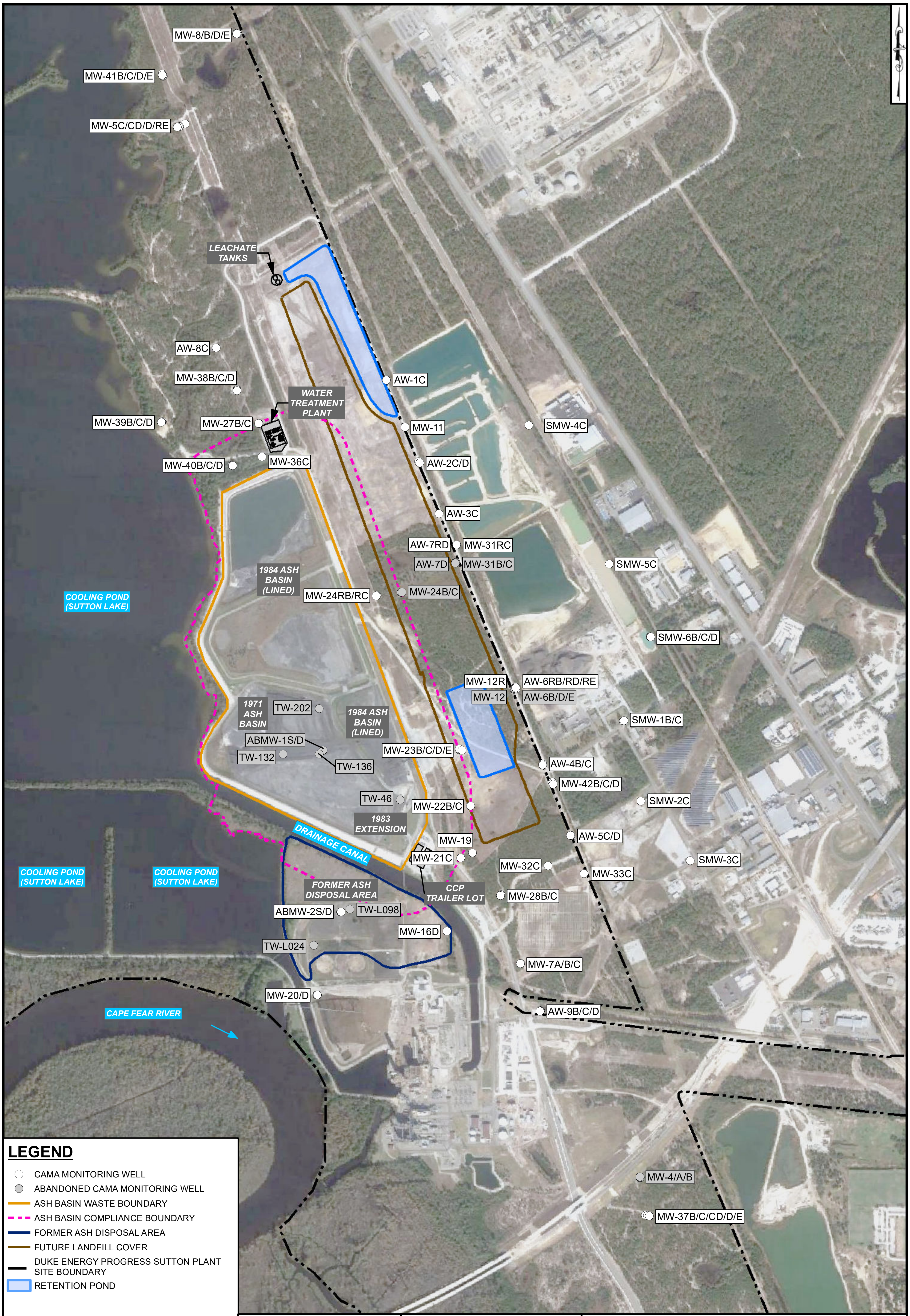
26. Copies of communications with employees and the public regarding availability of toll-free hotline and electronic mail inbox for reporting suspected environmental violations.

27. Management Systems:
    a. List of responsible party(ies) for each environmental activity.
    b. All environmental-related training records.
    c. All environmental policies and procedures.
    d. Organization chart.
    e. Site diagram identifying storage areas, tanks, etc.

ATTACHMENT B

Groundwater Compliance Boundaries and Exceedances

I/A



LEGEND

○ CAMA MONITORING WELL
● ABANDONED CAMA MONITORING WELL
ASH BASIN WASTE BOUNDARY
ASH BASIN COMPLIANCE BOUNDARY
FORMER ASH DISPOSAL AREA
FUTURE LANDFILL COVER
DUKE ENERGY PROGRESS SUTTON PLANT SITE BOUNDARY
▭ RETENTION POND

NOTES:

WELL LOCATIONS WERE DERIVED FROM VARIOUS SOURCES AND ARE A MIX OF SURVEYED AND APPROXIMATE LOCATIONS. THEREFORE, WELL LOCATIONS ARE TO BE DEEMED APPROXIMATE.

PROPERTY BOUNDARY PROVIDED BY DUKE ENERGY PROGRESS.

AERIAL PHOTOGRAPHY OBTAINED FROM GOOGLE EARTH PRO ON DECEMBER 7, 2017. AERIAL WAS COLLECTED ON OCTOBER 29, 2016.

DRAWING HAS BEEN SET WITH A PROJECTION OF NORTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3200 (NAD83).

synTerra

DUKE ENERGY PROGRESS

500 0 500 1,000
GRAPHIC SCALE IN FEET

148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
PHONE 864-421-9999
www.synterracorp.com

DRAWN BY: B. YOUNG
DATE: 01/10/2019
PROJECT MANAGER: P. WALDREP
CHECKED BY: B. WYLIE

FIGURE 6
CAMA WELL LOCATION MAP
L.V. SUTTON ENERGY COMPLEX
DUKE ENERGY PROGRESS, LLC
WILMINGTON, NORTH CAROLINA

P:\Duke Energy Progress.1026\00 GIS BASE DATA\Sutton\Map_Docs\Program\Sutton_WellLoc_CAMA_20190108.mxd

I/A

	PARAME	D 40CFR257 APPENDIX III CONSTITUENT				INORGANIC PARAMETERS (TOTAL CONCENTRATION)													
Reporting Units	S.U.	ug/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg-N/L	ug/L	ug/L	ug/L	pCi/L	mg/L
15A NCAC 02L Standard	6.5-8.5	700	250	250	500	1*	10	700	10	10	1*	300	50	10	20	0.2*	0.3*	5^	2
Provisional Background Threshold Values (Surficial Upper Unit)	3.9-5.0	50	4.73	15.6	25	1	1	45	0.03	1	4	1494	38	NE	1	0.2	0.621	2.75	NE
Provisional Background Threshold Values (Surficial Lower Unit)	4.9-7.4	50	23.6	16	210	1	5	97	0.12	1	3	13416	746	NE	1	0.2	1.68	5.32	NE
Provisional Background Threshold Values (Pee Dee Upper Unit)	7.8-9.3	3010	1932	277	2442	1	2.78	18.7	0.118	1	1	305	118	NE	1	0.2	1.91	4	NE
Provisional Background Threshold Values (Pee Dee Lower Unit)	6.9-9.7	4730	2567	171	3400	1	3	70	0.2	1	1	1230	93.9	NE	1	0.2	0.693	2.06	NE

				PARAME	D 40CFR257 APPENDIX III CONSTITUENT				INORGANIC PARAMETERS (TOTAL CONCENTRATION)													
Sample ID	Location Description	Sample Location Aquifer Name	Sample Collection Date	pH	Boron	Chloride	Sulfate	Total Dissolved Solids	Antimony	Arsenic	Barium	Chromium (VI)	Chromium	Cobalt	Iron	Manganese	Nitrate (as N)	Selenium	Thallium	Vanadium	Total Radium	Fluoride
ABMW-02D	Center of FADA	urficial Lowe	03/19/2018	7.2	**868**	33	80	380	<1	**155**	137	<0.025	<1	**3.69**	**2440**	**260**	NA	<1	<0.2	**0.619**	NA	0.59
ABMW-02S	Center of FADA	sh Pore Wate	03/19/2018	6.6	175	4.9	0.5	280	<1	**26**	**1760**	<0.025	<1	<1	**19400**	**628**	NA	<1	<0.2	**0.888**	NA	0.13
AW-01C	NE of basins outside CB at propety line	urficial Lowe	03/20/2018	**5.3**	45.636 j	8.9	22	50	<1	<1	89	0.24	0.368 j	<1	22	**96**	NA	<1	<0.2	0.19 j	NA	<0.1
AW-01C	NE of basins outside CB at propety line	urficial Lowe	06/19/2018	**5.6**	46.671 j	8.4	21	50	<1	<1	72	0.65	0.741 j	<1	32	41	NA	<1	<0.2	**0.337 B2**	NA	<0.1
AW-01C	NE of basins outside CB at property line	urficial Lowe	09/11/2018	**6.5**	53	8.9	22	68	<1	<1	73	0.65 M1	0.74 j	<1	20	**56**	NA	<1	0.082 j	0.244 j	NA	<0.1
AW-02C	E of basins outside CB at propety line	urficial Lowe	03/20/2018	**5.4**	21.308 j	7.3	20	35	<1	<1	26	<0.025	0.423 j	<1	228	14	NA	<1	<0.2	**0.567**	NA	<0.1
AW-02C	E of basins outside CB at propety line	urficial Lowe	06/20/2018	**4.8**	20.554 j	8.2	26	50	<1	<1	28	<0.025	0.774 j	<1	**432**	18	NA	0.369 j	<0.2	**0.575**	NA	0.0485 j
AW-02C	E of basins outside CB at property line	urficial Lowe	09/11/2018	**5.1**	34.27 j	8.4	27	63	<1	<1	28	<0.025	0.759 j	<1	269	17	NA	<1	<0.2	**0.815**	NA	0.047 j
AW-02D	E of basins outside CB at propety line	ee Dee Uppe	03/20/2018	8.1	**758**	180	23	**530**	<1	0.612 j	17	0.05	2.06	<1	**467**	38	NA	<1	<0.2	**0.675**	NA	0.66
AW-02D	E of basins outside CB at propety line	ee Dee Uppe	06/20/2018	8.1	**748**	160	21	**510**	<1	0.626 j	12	0.21	1.16	<1	179	21	NA	<1	<0.2	**0.408**	NA	0.77
AW-02D	E of basins outside CB at property line	ee Dee Uppe	09/11/2018	**8.5**	**747**	170	24	**540**	0.351 j	0.488 j	11	0.094	0.744 j	<1	131	19	NA	<1	<0.2	**0.395**	NA	0.7
AW-03C IMP	E of basins outside CB at propety line	urficial Lowe	03/20/2018	**5.5**	164	12	27	57	<1	1.63	33	<0.025	<1	**7.32**	**2920**	**433**	NA	<1	<0.2	**0.382**	0.1929	<0.1
AW-03C	E of basins outside CB at propety line	urficial Lowe	03/20/2018	**5.5**	193	13	28	85	<1	1.59	38	NA	<1	**7.52**	NA	NA	NA	<1	<1	NA	0.655	<0.1
AW-03C	E of basins outside CB at propety line	urficial Lowe	06/20/2018	**5.4**	180	14	26	83	<1	2.19	39	<0.025	<1	**7.63**	**3370**	**442**	NA	<1	<0.2	**0.404**	0.6391	<0.1
AW-03C	E of basins outside CB at property line	urficial Lowe	10/23/2018	**4.2**	70	8.8	27	42	<1	3.3	37	<0.025	<1	**46.1**	**508**	**307**	NA	<1	**0.497**	**0.882**	-0.0142	<0.1
AW-03C IAP	E of basins outside CB at property line	urficial Lowe	10/23/2018	**4.2**	78	9.2	37	39	<1	3.63	39	NA	<1	**46.1**	NA	NA	NA	<1	**0.434 j**	NA	0.0231	<0.1
AW-04B	E of basins outside CB at propety line	urficial Uppe	03/21/2018	**4.2**	30.549 j	3.4	39	100	<1	<1	130	<0.025	0.754 j	0.829 j	**314**	31	NA	<1	<0.2	**0.407**	NA	0.27
AW-04C IMP	E of basins outside CB at propety line	urficial Lowe	03/21/2018	**5.0**	**1060**	44	120	260	<1	0.831 j	80	0.027	4.12	**12.5**	**6020**	**711**	NA	<1	0.109 j	**11.5**	-0.1467	<0.2
AW-04C	E of basins outside CB at propety line	urficial Lowe	03/21/2018	**5.0**	**1200**	45	130	260	<1	0.84 j	84	NA	4.03	**13.2**	NA	NA	NA	0.41 j	<1	NA	0.627	<0.5
AW-04C	E of basins outside CB at propety line	urficial Lowe	06/20/2018	**5.2**	**983**	40	110	210	<1	<1	30	<0.025	0.613 j	**10.1**	**596**	**572**	NA	<1	<0.2	**0.887**	0.904	<0.2
AW-04C	E of basins outside CB at property line	urficial Lowe	10/23/2018	**5.2**	470	19	59	100	<1	0.349 j	24	<0.025	0.441 j	**9.23**	**360**	**210**	NA	0.498 j	0.181 j	**1.01**	1.051	<0.2
AW-04C IAP	E of basins outside CB at property line	urficial Lowe	10/23/2018	**5.2**	52	9.9	30	48	<1	<1	42	NA	0.434 j	**3.18**	NA	NA	NA	<1	<1	NA	0.894	<0.2
AW-05C	E of basins outside CB at propety line	urficial Lowe	03/22/2018	**5.0**	<50	5.6	19	39	<1	<1	25	0.025	<1	<1	25	7	NA	0.754 j	<0.2	**0.342**	NA	<0.1
AW-05C	E of basins outside CB at propety line	urficial Lowe	06/20/2018	**5.0**	<50	5.5	18	30	<1	<1	24	0.026	0.431 j	<1	34	7	NA	0.747 j	0.119 j	**0.362**	NA	<0.1
AW-05C	E of basins outside CB at property line	urficial Lowe	09/11/2018	**4.7**	<50	6.4	18	55	<1	<1	25	<0.025	<1	<1	8.117 j	5	NA	0.726 j	<0.2	**0.335**	NA	<0.1
AW-05D	E of basins outside CB at propety line	ee Dee Uppe	03/22/2018	**10.6**	369	110	13	370	<1	0.769 j	9	0.18	<1	0.642 j	28	<5	NA	<1	<0.2	0.19 j	NA	0.4
AW-05D	E of basins outside CB at propety line	ee Dee Uppe	06/20/2018	**10.2**	367	110	14	340	<1	0.714 j	8	0.28	<1	0.481 j	20	<5	NA	<1	<0.2	0.169 j	NA	0.39
AW-05D	E of basins outside CB at property line	ee Dee Uppe	09/11/2018	**9.7**	363	110	15	360	<1	0.552 j	8	0.15	<1	0.411 j	17	1.745 j	NA	<1	<0.2	0.24 j	NA	0.39
AW-06RB	E of basins outside CB at propety line	urficial Uppe	03/21/2018	**4.1**	19.108 j	9.3	13	48	<1	<1	21	<0.025	0.944 j	**1.51**	**617**	**53**	NA	<1	<0.2	<0.3	NA	0.076 j
AW-06RD IMP	E of basins outside CB at propety line	ee Dee Uppe	03/21/2018	**9.5**	**713**	160	13	480	<1	<1	9	<0.025	0.376 j	<1	53	<5	NA	<1	<0.2	0.195 j	NA	0.59
AW-06RD	E of basins outside CB at propety line	ee Dee Uppe	03/21/2018	**9.5**	**796**	160	11	470	<1	<1	9	NA	0.346 j	<1	NA	NA	NA	<1	<1	NA	0.639	0.68
AW-06RD	E of basins outside CB at propety line	ee Dee Uppe	06/20/2018	**9.0**	**724**	160	11	480	<1	<1	8	0.13	<1	<1	27	<5	NA	<1	0.087 j	0.158 j	NA	0.76
AW-06RD	E of basins outside CB at property line	ee Dee Uppe	10/23/2018	8.5	**714**	160	9.2	420	<1	<1	8	0.034	<1	<1	39	2.22 j	NA	<1	<0.2	0.254 j	NA	0.94
AW-06RD IAP	E of basins outside CB at property line	ee Dee Uppe	10/23/2018	8.5	**776**	160	9	430	<1	<1	8	NA	<1	<1	NA	NA	NA	<1	<1	NA	0.475	0.88
AW-06RE	E of basins outside CB at propety line	ee Dee Lowe	03/21/2018	**8.6**	**2260**	**650**	54	**1300**	<1	1.22	4.035 j	0.2	1.84	<1	201	30	NA	<1	<0.2	**2.53**	NA	1.4
AW-06RE	E of basins outside CB at propety line	ee Dee Lowe	06/20/2018	8.3	**2410**	**490**	52	**1300**	<1	1.52	3.874 j	0.037	0.726 j	<1	169	27	NA	<1	<0.2	**1.71**	NA	1.9
AW-06RE	E of basins outside CB at property line	ee Dee Lowe	10/23/2018	8.5	**2300**	**570**	57	**1300**	<1	1.28	4.013 j	0.092	0.764 j	<1	151	25	NA	<1	<0.2	**1.7**	NA	1.7
AW-07RD IMP	E of basins outside CB at propety line	ee Dee Uppe	03/21/2018	**9.1**	699	130	11	460	0.475 j	0.656 j	4.419 j	0.1	0.458 j	<1	54	7	NA	<1	0.109 j	0.292 j	NA	0.87
AW-07RD	E of basins outside CB at propety line	ee Dee Uppe	03/21/2018	**9.1**	**769**	130	11	450	0.334 j	0.582 j	4.776 j	NA	0.431 j	<1	NA	NA	NA	<1	<1	NA	0.281	0.92
AW-07RD	E of basins outside CB at propety line	ee Dee Uppe	06/20/2018	8.3	**707**	130	9.5	450	<1	0.618 j	4.468 j	0.087	0.591 j	<1	79	7	NA	<1	<0.2	**0.305**	NA	0.77
AW-07RD	E of basins outside CB at property line	ee Dee Uppe	10/23/2018	8.2	699	130	7	400	<1	0.444 j	4.025 j	0.067	<1	<1	42	9	NA	<1	<0.2	0.293 j	NA	0.91
AW-07RD IAP	E of basins outside CB at property line	ee Dee Uppe	10/23/2018	8.2	**729**	130	6.8	410	<1	0.378 j	3.946 j	NA	0.359 j	<1	NA	NA	NA	<1	<1	NA	0.476	0.73
AW-08B	N of basins outside CB	urficial Uppe	03/22/2018	**4.7**	<50	2.3	17	<25	<1	<1	14	<0.025	<1	0.59 j	**395**	25	NA	<1	<0.2	0.117 j	NA	0.0534 j
AW-08C	N of basins outside CB	urficial Lowe	03/22/2018	**5.2**	61	17	23	60	<1	<1	88	0.11	<1	0.585 j	54	33	NA	<1	<0.2	0.17 j	NA	<0.1
AW-08C	N of basins outside CB	urficial Lowe	06/19/2018	**5.0**	64	16	23	60	<1	<1	85	0.17	0.396 j	0.44 j	39	40	NA	<1	<0.2	**0.312 B2**	NA	<0.1
AW-08C	N of basins outside CB	urficial Lowe	09/10/2018	**5.1**	61	14	23	47	<1	<1	75	0.13	0.524 j	0.569 j	215	37	NA	<1	<0.2	**0.528**	NA	<0.1
AW-09B	SE of basins outside CB	urficial Uppe	03/20/2018	**4.6**	<50	2.6	7.5	<25	<1	<1	13	<0.025	<1	<1	52	27	NA	<1	<0.2	0.201 j	NA	0.21
AW-09C	SE of basins outside CB	urficial Lowe	03/20/2018	**5.0**	237	19	42	88	<1	<1	54	0.041	<1	0.446 j	11	**60**	NA	<1	0.148 j	**0.31**	NA	<0.1
AW-09C	SE of basins outside CB	urficial Lowe	06/20/2018	**4.9**	281	20	53	110	<1	<1	68	0.04	<1	0.469 j	18	**75**	NA	<1	0.1 j	**0.401**	NA	0.049 j
AW-09C	SE of basins outside CB	urficial Lowe	10/23/2018	**4.9**	166	11	31	64	<1	<1	47	<0.025	<1	<1	18	45	NA	<1	<0.2	0.279 j	NA	<0.1
AW-09D	SE of basins outside CB	ee Dee Uppe	03/20/2018	8.1	684	**260**	47	**630**	<1	0.547 j	10	0.032	1.12	<1	**558**	**52**	NA	<1	<0.2	**0.483**	NA	0.35 j

I/A

	PARAME	D 40CFR257 APPENDIX III CONSTITUENT				INORGANIC PARAMETERS (TOTAL CONCENTRATION)													
Reporting Units	**S.U.**	**ug/L**	**mg/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**mg-N/L**	**ug/L**	**ug/L**	**ug/L**	**pCi/L**	**mg/L**
15A NCAC 02L Standard	**6.5-8.5**	**700**	**250**	**250**	**500**	**1***	**10**	**700**	**10**	**10**	**1***	**300**	**50**	**10**	**20**	**0.2***	**0.3***	**5^**	**2**
Provisional Background Threshold Values (Surficial Upper Unit)	**3.9-5.0**	**50**	**4.73**	**15.6**	**25**	**1**	**1**	**45**	**0.03**	**1**	**4**	**1494**	**38**	**NE**	**1**	**0.2**	**0.621**	**2.75**	**NE**
Provisional Background Threshold Values (Surficial Lower Unit)	**4.9-7.4**	**50**	**23.6**	**16**	**210**	**1**	**5**	**97**	**0.12**	**1**	**3**	**13416**	**746**	**NE**	**1**	**0.2**	**1.68**	**5.32**	**NE**
Provisional Background Threshold Values (Pee Dee Upper Unit)	**7.8-9.3**	**3010**	**1932**	**277**	**2442**	**1**	**2.78**	**18.7**	**0.118**	**1**	**1**	**305**	**118**	**NE**	**1**	**0.2**	**1.91**	**4**	**NE**
Provisional Background Threshold Values (Pee Dee Lower Unit)	**6.9-9.7**	**4730**	**2567**	**171**	**3400**	**1**	**3**	**70**	**0.2**	**1**	**1**	**1230**	**93.9**	**NE**	**1**	**0.2**	**0.693**	**2.06**	**NE**

				PARAME	D 40CFR257 APPENDIX III CONSTITUENT				INORGANIC PARAMETERS (TOTAL CONCENTRATION)													
Sample ID	**Location Description**	**Sample Location Aquifer Name**	**Sample Collection Date**	**pH**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Manganese**	**Nitrate (as N)**	**Selenium**	**Thallium**	**Vanadium**	**Total Radium**	**Fluoride**
AW-09D	SE of basins outside CB	ee Dee Uppe	06/20/2018	7.8	**716**	250	49	**660**	<1	0.527 j	11	<0.025	1.46	<1	**558**	**52**	NA	<1	0.168 j	**0.719**	NA	0.65
AW-09D	SE of basins outside CB	ee Dee Uppe	10/23/2018	7.9	687	**270**	52	**630**	<1	0.487 j	10	<0.025	0.632 j	<1	**367**	47	NA	<1	<0.2	**0.436**	NA	0.54
BMW-01 CCR	E of basins inside CB	urficial Uppe	02/21/2018	**4.5**	<50	11	58	160	<1	<1	165	NA	<1	<1	NA	NA	NA	1.58	<0.2	NA	1.265	0.13
BMW-01	E of basins inside CB	urficial Uppe	03/20/2018	**4.5**	23.747 j	10	31	140	<1	<1	164	NA	<5	0.334 j	8.534 j	23	**14**	1.14	<0.2	0.234 j	NA	0.064 j
BMW-01 CCR	E of basins inside CB	urficial Uppe	05/23/2018	**4.7**	20.447 j	10	29	170	<1	<1	147	NA	<1	<1	NA	NA	NA	0.596 j	<0.2	NA	1.674	0.077 j
BMW-01	E of basins inside CB	urficial Uppe	10/29/2018	**5.0**	34.5 j	4.07	22.3	44	NA	<1	65.6	NA	<5	NA	6.07 j	12.2	1.39	0.568 j	NA	NA	NA	<0.1
BMW-02 CCR	E of basins inside CB	urficial Uppe	02/21/2018	**6.0**	<50	14	15	140	<1	3.33	16	NA	3.48	<1	NA	NA	NA	<1	<0.2	NA	0.587	<0.1
BMW-02	E of basins inside CB	urficial Uppe	03/20/2018	**6.3**	22.688 j	14 M2	16 M2	150	<1	3.02	24	NA	8	0.878 j	**4990**	26	0.0108 j	<1	<0.2	**8.03**	NA	<0.1
BMW-02 CCR	E of basins inside CB	urficial Uppe	05/22/2018	**6.0**	28.57 j	3.2	14	130	<1	4.46	32	NA	7.95	0.94 j	NA	NA	NA	<1	<0.2	NA	1.29	0.0504 j
BMW-02	E of basins inside CB	urficial Uppe	10/30/2018	**6.3**	76	9.12	21.3	147	NA	**29.3**	91.2	NA	1.35 j	NA	**2980**	45.1	8.1E-03 j	0.458 j	NA	NA	NA	<0.1
BMW-03 CCR	E of basins inside CB	urficial Uppe	02/21/2018	**5.0**	<50	13	33	140	<1	<1	69	NA	<1	**2.4**	NA	NA	NA	<1	<0.2	NA	1.53	0.11
BMW-03 IAP	E of basins inside CB	urficial Uppe	03/20/2018	**5.2**	37.554 j	13	30	120	<1	<1	47	NA	<1	**1.78**	NA	NA	NA	<1	<1	NA	1.066	0.0942 j
BMW-03	E of basins inside CB	urficial Uppe	03/20/2018	**5.2**	35.019 j	12	30	110	<1	<1	52	NA	<5	**2.16**	15	20	7.6	<1	<0.2	0.244 j	NA	<0.1
BMW-03 CCR	E of basins inside CB	urficial Uppe	05/23/2018	**4.9**	19.178 j	8.9	24	110	<1	<1	28	NA	1.67	**2.1**	NA	NA	NA	<1	<0.2	NA	3.38	<0.1
BMW-03	E of basins inside CB	urficial Uppe	10/24/2018	**4.7**	43.954 j	4.3	53	110	<1	<1	31	NA	0.359 j	**1.49**	NA	NA	NA	<1	<1	NA	0.839	0.091 j
BMW-03	E of basins inside CB	urficial Uppe	10/29/2018	**4.8**	43.3 j	5.51	54	110	NA	<1	22.5	NA	<5	NA	7.91 j	4.84 j	1.83	0.354 j	NA	NA	NA	0.0435 j
BMW-04 CCR	E of basins inside CB	urficial Uppe	02/20/2018	7.1	<50	2.6	2.2	72	<1	<1	12	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.5092	<0.1
BMW-04 IAP	E of basins inside CB	urficial Uppe	03/20/2018	7.2	<50	2.2	2.7	88	<1	0.559 j	6	NA	<1	<1	NA	NA	NA	<1	<1	NA	0.43	0.0844 j
BMW-04	E of basins inside CB	urficial Uppe	03/20/2018	7.2	<50	2.2	2.7	87	<1	0.685 j	6	NA	<5	<1	176	49	0.0075 j	<1	0.094 j	**0.648**	NA	<0.1
BMW-04 CCR	E of basins inside CB	urficial Uppe	05/22/2018	7.2	<50	3.6	6.3	93	<1	<1	9	NA	0.364 j	<1	NA	NA	NA	<1	<0.2	NA	0.561	0.093 j
BMW-04	E of basins inside CB	urficial Uppe	10/24/2018	7.0	46.407 j	9	34	270	**1.38**	0.57 j	21	NA	0.732 j	<1	NA	NA	NA	2.09	<1	NA	0.761	0.051 j
BMW-04	E of basins inside CB	urficial Uppe	10/29/2018	6.9	52.9	9.41	42.1	256	NA	<1	21.2	NA	<5	NA	16.2	<5	0.72	2.67	NA	NA	NA	<0.1
CCR-109B	Toe of Dam, W of 1984	urficial Uppe	02/20/2018	6.8	537	28	64	230	<1	**77**	99	NA	1.45	**2.41**	NA	NA	NA	<1	<0.2	NA	0.049	0.41
CCR-109B	Toe of Dam, W of 1984	urficial Uppe	05/22/2018	6.6	663	26	140	380	<1	**44.9**	150	NA	1.05	**2.6**	NA	NA	NA	<1	<0.2	NA	0.7168	0.36
CCR-109C	Toe of Dam, W of 1984	urficial Lowe	02/20/2018	6.7	**1420**	41	120	430	<1	**122**	153	NA	<1	**11.9**	NA	NA	NA	<1	<0.2	NA	0.669	<0.2
CCR-109C	Toe of Dam, W of 1984	urficial Lowe	05/22/2018	6.6	**1100**	36	110	410	0.391 j	**105**	138	NA	1.32	**10.6**	NA	NA	NA	<1	<0.2	NA	0.634	0.26
CCR-109D	Toe of Dam, W of 1984	ee Dee Uppe	02/20/2018	8.3	**1270**	**290**	43	**760**	<1	<1	<5	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.2945	0.93
CCR-109D	Toe of Dam, W of 1984	ee Dee Uppe	05/22/2018	8.3	**1240**	250	45	**750**	<1	<1	3.553 j	NA	0.356 j	<1	NA	NA	NA	<1	<0.2	NA	0.44	1
CCR-110B	Toe of Dam, W of 1984	urficial Uppe	02/20/2018	6.5	**3320**	150	140	**530**	<1	**133**	149	NA	1.04	<1	NA	NA	NA	<1	<0.2	NA	1.959	<0.5
CCR-110B	Toe of Dam, W of 1984	urficial Uppe	05/22/2018	**6.4**	**3760**	100	130	**520**	<1	**80.5**	140	NA	1.43	0.368 j	NA	NA	NA	<1	<0.2	NA	2.18	0.086 j
CCR-110C	Toe of Dam, W of 1984	urficial Lowe	02/20/2018	6.8	**1980**	80	150	410	<1	**106**	66	NA	<1	**10.3**	NA	NA	NA	<1	<0.2	NA	0.6574	<0.5
CCR-110C	Toe of Dam, W of 1984	urficial Lowe	05/22/2018	6.9	**1890**	78	140	450	<1	**89.2**	64	NA	0.452 j	**12.1**	NA	NA	NA	<1	<0.2	NA	1.309	0.1926 j
CCR-110D	Toe of Dam, W of 1984	ee Dee Uppe	02/20/2018	**11.0**	**796**	190	38	**510**	<1	1.82	21	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.3223	0.55
CCR-110D	Toe of Dam, W of 1984	ee Dee Uppe	05/22/2018	**11.5**	639	150	34	460	0.377 j	1.21	27	NA	0.476 j	<1	NA	NA	NA	<1	<0.2	NA	0.627	0.59
CCR-111B	Toe of Dam, W of 1984	urficial Uppe	02/20/2018	6.7	**2670**	55	51	**510**	<1	**188**	53	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.5764	0.16 M1
CCR-111B	Toe of Dam, W of 1984	urficial Uppe	05/22/2018	6.7	**2490**	33	29	470	<1	**238**	53	NA	0.563 j	0.491 j	NA	NA	NA	<1	<0.2	NA	1.213	0.19
CCR-111C	Toe of Dam, W of 1984	urficial Lowe	02/20/2018	6.5	**1570**	55	120	320	<1	**66.2**	35	NA	<1	**14.8**	NA	NA	NA	<1	<0.2	NA	0.511	<0.2
CCR-111C	Toe of Dam, W of 1984	urficial Lowe	05/22/2018	6.6	**1740**	58	110	350	<1	**47.2**	35	NA	0.346 j	**9.48**	NA	NA	NA	<1	<0.2	NA	3.758	<0.2
CCR-111D	Toe of Dam, W of 1984	ee Dee Uppe	02/21/2018	8.4	**717**	150	66	**540**	<1	<1	9	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.1232	0.74
CCR-111D	Toe of Dam, W of 1984	ee Dee Uppe	05/22/2018	8.3	**715**	140	56	500	<1	0.414 j	4.745 j	NA	0.829 j	<1	NA	NA	NA	<1	<0.2	NA	0.8592	0.57
CCR-112B	Toe of Dam, W of 1984	urficial Uppe	02/20/2018	**6.2**	**1660**	85	73	330	<1	**122**	81	NA	<1	**1.48**	NA	NA	NA	<1	**0.282**	NA	0.5642	0.26
CCR-112B	Toe of Dam, W of 1984	urficial Uppe	05/22/2018	**6.3**	**1350**	70	51	290	<1	**142**	73	NA	0.814 j	**1.93**	NA	NA	NA	<1	**0.271**	NA	2.783	0.3
CCR-112C	Toe of Dam, W of 1984	urficial Lowe	02/20/2018	6.6	**1020**	23	52	220	<1	1.82	47	NA	<1	**1.14**	NA	NA	NA	<1	**0.652**	NA	0.2	<0.1
CCR-112C	Toe of Dam, W of 1984	urficial Lowe	05/22/2018	6.6	**914**	12	31	170	<1	8.2	52	NA	<1	0.881 j	NA	NA	NA	<1	**0.678**	NA	0.129	0.0784 j
CCR-112D	Toe of Dam, W of 1984	ee Dee Uppe	02/20/2018	8.1	661	180	18	**520**	<1	<1	<5	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.3545	<0.5
CCR-112D	Toe of Dam, W of 1984	ee Dee Uppe	05/22/2018	8.1	682	170	20	500	<1	0.714 j	6	NA	3.26	<1	NA	NA	NA	<1	<0.2	NA	0.896	0.49
CCR-113B	Toe of Dam, W of 1984	urficial Uppe	02/21/2018	**6.4**	564	55	69	260	<1	**133**	176	NA	<1	**3.33**	NA	NA	NA	<1	**1.5**	NA	0.361	0.31
CCR-113B	Toe of Dam, W of 1984	urficial Uppe	05/23/2018	**6.2**	470	70	130	360	0.664 j	**137**	361	NA	0.62 j	**4.27**	NA	NA	NA	<1	**1.98**	NA	1.536	0.31
CCR-113C	Toe of Dam, W of 1984	urficial Lowe	02/21/2018	6.6	359	16	37	130	<1	**10.7**	51	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.718	0.19
CCR-113C	Toe of Dam, W of 1984	urficial Lowe	05/23/2018	6.6	351	18	38	130	<1	**21.7**	52	NA	0.654 j	**1.08**	NA	NA	NA	<1	<0.2	NA	0.871	0.15
CCR-113D	Toe of Dam, W of 1984	ee Dee Uppe	02/21/2018	8.5	**979**	**300**	94	**890**	<1	<1	17	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.2416	0.74
CCR-113D	Toe of Dam, W of 1984	ee Dee Uppe	05/23/2018	8.1	**988**	**320**	110	**870**	<1	0.521 j	16	NA	0.368 j	<1	NA	NA	NA	<1	<0.2	NA	0.564	0.55

I/A

	PARAMED 40CFR257 APPENDIX III CONSTITUENT					INORGANIC PARAMETERS (TOTAL CONCENTRATION)													
Reporting Units	**S.U.**	**ug/L**	**mg/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**mg-N/L**	**ug/L**	**ug/L**	**ug/L**	**pCi/L**	**mg/L**
15A NCAC 02L Standard	**6.5-8.5**	**700**	**250**	**250**	**500**	**1***	**10**	**700**	**10**	**10**	**1***	**300**	**50**	**10**	**20**	**0.2***	**0.3***	**5^**	**2**
Provisional Background Threshold Values (Surficial Upper Unit)	**3.9-5.0**	**50**	**4.73**	**15.6**	**25**	**1**	**1**	**45**	**0.03**	**1**	**4**	**1494**	**38**	**NE**	**1**	**0.2**	**0.621**	**2.75**	**NE**
Provisional Background Threshold Values (Surficial Lower Unit)	**4.9-7.4**	**50**	**23.6**	**16**	**210**	**1**	**5**	**97**	**0.12**	**1**	**3**	**13416**	**746**	**NE**	**1**	**0.2**	**1.68**	**5.32**	**NE**
Provisional Background Threshold Values (Pee Dee Upper Unit)	**7.8-9.3**	**3010**	**1932**	**277**	**2442**	**1**	**2.78**	**18.7**	**0.118**	**1**	**1**	**305**	**118**	**NE**	**1**	**0.2**	**1.91**	**4**	**NE**
Provisional Background Threshold Values (Pee Dee Lower Unit)	**6.9-9.7**	**4730**	**2567**	**171**	**3400**	**1**	**3**	**70**	**0.2**	**1**	**1**	**1230**	**93.9**	**NE**	**1**	**0.2**	**0.693**	**2.06**	**NE**

				PARAMED 40CFR257 APPENDIX III CONSTITUENT					INORGANIC PARAMETERS (TOTAL CONCENTRATION)													
Sample ID	**Location Description**	**Sample Location Aquifer Name**	**Sample Collection Date**	**pH**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Manganese**	**Nitrate (as N)**	**Selenium**	**Thallium**	**Vanadium**	**Total Radium**	**Fluoride**
CCR-114B IMP	N of basins inside CB	Surficial Uppe	02/21/2018	6.7	70	4.5	13	130	<1	<1	40	<0.025	<1	<1	50	<5	NA	<1	<0.2	**0.644**	NA	<0.1
CCR-114B	N of basins inside CB	Surficial Uppe	02/21/2018	6.7	79	4.8	13	130	<1	<1	45	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.1368	<0.1
CCR-114B	N of basins inside CB	Surficial Uppe	05/23/2018	6.9	72	5	15	120	0.683 j	0.346 j	54	NA	0.545 j	<1	NA	NA	NA	<1	0.125 j	NA	0.346	<0.1
CCR-114C IMP	N of basins inside CB	Surficial Lowe	02/21/2018	6.8	130	4.1	13	55	**3.42**	<1	12	<0.025	<1	<1	28	<5	NA	**34.8**	**0.308**	**4.23**	NA	<0.1
CCR-114C	N of basins inside CB	Surficial Lowe	02/21/2018	6.8	131	4.1	14	71	**3.7**	<1	13	NA	<1	<1	NA	NA	NA	**36.1**	**0.315**	NA	0.5899	<0.1
CCR-114C	N of basins inside CB	Surficial Lowe	05/23/2018	6.6	134	3.2	12	63	**3.92**	0.466 j	14	NA	<1	<1	NA	NA	NA	**32.9**	**0.276**	NA	0.402	<0.1
CCR-114D IMP	N of basins inside CB	Pee Dee Uppe	02/21/2018	**9.0**	**987**	**290**	19	**720**	<1	<1	6	0.051	<1	<1	17	<5	NA	<1	<0.2	<0.3	NA	0.71
CCR-114D	N of basins inside CB	Pee Dee Uppe	02/21/2018	**9.0**	**1040**	**290**	11	**700**	<1	<1	7	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.0884	0.75
CCR-114D	N of basins inside CB	Pee Dee Uppe	05/23/2018	**8.9**	**1050**	**280**	18	**710**	<1	<1	7	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.2169	0.68
CCR-115B IMP	N of basins inside CB	Surficial Uppe	02/20/2018	6.8	<50	2	7.1	92	**3.73**	<1	30	0.04 M1	<1	<1	46	<5	NA	1.23	**0.272**	**0.498**	NA	<0.1
CCR-115B	N of basins inside CB	Surficial Uppe	02/20/2018	6.8	<50	2	7	49	**3.76**	<1	32	NA	<1	<1	NA	NA	NA	1.3	**0.274**	NA	0.495	<0.1
CCR-115B	N of basins inside CB	Surficial Uppe	05/23/2018	6.5	41.514 j	2.2	7.9	49	**3.5**	<1	45	NA	0.391 j	<1	NA	NA	NA	0.882 j	**0.268**	NA	1.069	0.086 j
CCR-115C IMP	N of basins inside CB	Surficial Lowe	02/20/2018	**6.3**	432	40	86	220	<1	1.62	32	<0.025	4.1	**11**	**1130**	**148**	NA	20	<0.2	**2.04**	NA	<0.2
CCR-115C	N of basins inside CB	Surficial Lowe	02/20/2018	**6.3**	450	40	88	200	<1	1.71	34	NA	4.01	**11.5**	NA	NA	NA	**21.2**	**0.224**	NA	0.674	<0.2
CCR-115C	N of basins inside CB	Surficial Lowe	05/23/2018	**6.1**	389	34	74	170	<1	0.795 j	31	NA	0.48 j	**5.55**	NA	NA	NA	6.56	0.102 j	NA	0.4371	<0.1
CCR-115D IMP	N of basins inside CB	Pee Dee Uppe	02/20/2018	8.3	**706**	240	20	**600**	<1	<1	<5	<0.025	<1	<1	174	15	NA	<1	<0.2	**0.389**	NA	0.62
CCR-115D	N of basins inside CB	Pee Dee Uppe	02/20/2018	8.3	667	**270**	23	**610**	<1	<1	<5	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.0019	<0.5
CCR-115D	N of basins inside CB	Pee Dee Uppe	05/23/2018	8.1	655	240	26	**570**	<1	0.581 j	4.082 j	NA	0.476 j	<1	NA	NA	NA	<1	<0.2	NA	0.473	0.33 j
CCR-116B	N of basins inside CB	Surficial Uppe	02/20/2018	**6.4**	<50	4.9	1	42	<1	<1	9	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.667	<0.1
CCR-116B	N of basins inside CB	Surficial Uppe	05/21/2018	**6.3**	<50	11	5.7	82	0.573 j	<1	12	NA	0.41 j	**3.93**	NA	NA	NA	1.22	<0.2	NA	0.642	0.0547 j
CCR-116C	N of basins inside CB	Surficial Lowe	02/20/2018	**5.8**	279	19	59	110	<1	<1	38	NA	<1	**1.64**	NA	NA	NA	14.1	**0.202**	NA	-0.0494	<0.1
CCR-116C	N of basins inside CB	Surficial Lowe	05/21/2018	**5.8**	300	21	58	140	0.839 j	0.473 j	51	NA	1.16	0.99 j	NA	NA	NA	8.8	**0.255**	NA	0.951	0.0593 j
CCR-117B	E of basins inside CB	Surficial Uppe	02/20/2018	6.6	<50	3.5	2	34	<1	<1	<5	NA	1	<1	NA	NA	NA	2.08	<0.2	NA	0.0387	<0.1
CCR-117B	E of basins inside CB	Surficial Uppe	05/22/2018	**6.4**	<50	7.5	10	140	0.449 j	<1	5	NA	0.334 j	<1	NA	NA	NA	2.72	<0.2	NA	1.15	0.0554 j
CCR-117C	E of basins inside CB	Surficial Lowe	02/20/2018	**6.0**	200	16	41	99	**1.04**	<1	79	NA	<1	<1	NA	NA	NA	2.34	<0.2	NA	0.754	<0.1
CCR-117C	E of basins inside CB	Surficial Lowe	05/22/2018	**5.9**	93	5.2	22	42	**1.09**	<1	40	NA	<1	**1.27**	NA	NA	NA	<1	0.094 j	NA	0.25838	<0.1
CCR-118B	E of basins inside CB	Surficial Uppe	02/20/2018	6.8	<50	3.1	1.8	120	<1	<1	<5	NA	<1	<1	NA	NA	NA	1.09	<0.2	NA	0.375	<0.1
CCR-118B	E of basins inside CB	Surficial Uppe	05/22/2018	6.5	21.382 j	9.5	33	150	<1	<1	7	NA	<1	<1	NA	NA	NA	7.21	<0.2	NA	0.489	<0.1
CCR-118C	E of basins inside CB	Surficial Lowe	02/20/2018	6.6	161	3.6	6.8	<25	**1.92**	<1	20	NA	<1	<1	NA	NA	NA	6.1	**0.638**	NA	0.2385	<0.1
CCR-118C IAP	E of basins inside CB	Surficial Lowe	03/21/2018	6.6	82	2.6	5.6	49	**3.13**	0.564 j	10	NA	<1	0.431 j	NA	NA	NA	9.58	**0.802 j**	NA	0.19	0.085 j
CCR-118C	E of basins inside CB	Surficial Lowe	05/22/2018	6.6	76	2.5	4.9	<25	**2.79**	0.78 j	10	NA	<1	0.507 j	NA	NA	NA	3.64	**0.551**	NA	0.2094	0.0813 j
CCR-118C IAP	E of basins inside CB	Surficial Lowe	10/24/2018	**6.1**	98	2.7	5.9	49	**2.02**	<1	17	NA	<1	<1	NA	NA	NA	14.6	**0.549 j**	NA	0.0612	0.054 j
CCR-119B	E of basins inside CB	Surficial Uppe	02/20/2018	7.1	72	4.3	2	31	<1	<1	7	NA	<1	<1	NA	NA	NA	1.14	<0.2	NA	0.1528	<0.1
CCR-119B	E of basins inside CB	Surficial Uppe	05/22/2018	7.2	83	4.8	1.9	<25	0.678 j	<1	7	NA	<1	<1	NA	NA	NA	1.62	<0.2	NA	0.163	0.0707 j
CCR-119C	E of basins inside CB	Surficial Lowe	02/20/2018	**6.0**	**748**	43	62	190	<1	<1	39	NA	<1	**2.52**	NA	NA	NA	<1	<0.2	NA	1.571	<0.2
CCR-119C	E of basins inside CB	Surficial Lowe	05/22/2018	**6.3**	553	30	41	170	<1	**21.9**	35	NA	<1	**3.26**	NA	NA	NA	<1	0.112 j	NA	0.2127	0.0576 j
CCR-120B	E of basins inside CB	Surficial Uppe	02/20/2018	6.6	<50	6.7	69	170	<1	<1	38	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	-0.0727	<0.1
CCR-120B	E of basins inside CB	Surficial Uppe	05/22/2018	6.6	38.843 j	7.3	60	180	<1	<1	29	NA	<1	0.453 j	NA	NA	NA	0.34 j	<0.2	NA	0.0778	0.0526 j
CCR-120C	E of basins inside CB	Surficial Lowe	02/20/2018	**5.2**	**875**	73	120	280	<1	<1	75	NA	<1	**27.2**	NA	NA	NA	<1	<0.2	NA	0.932	<0.2
CCR-120C	E of basins inside CB	Surficial Lowe	05/22/2018	**5.1**	**874**	70	120	290	<1	0.624 j	57	NA	<1	**35.1**	NA	NA	NA	<1	<0.2	NA	0.126	<0.2
CCR-121B	E of basins inside CB	Surficial Uppe	02/20/2018	6.5	<50	4.1	4.2	60	<1	<1	<5	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.2302	<0.1
CCR-121B	E of basins inside CB	Surficial Uppe	05/22/2018	6.5	<50	4.4	4.9	65	<1	<1	3.027 j	NA	0.545 j	<1	NA	NA	NA	0.751 j	<0.2	NA	0.1669	0.0512 j
CCR-121C	E of basins inside CB	Surficial Lowe	02/20/2018	**6.3**	81	3.5	8	65	<1	1.49	37	NA	<1	<1	NA	NA	NA	1.3	<0.2	NA	0.1304	<0.1
CCR-121C	E of basins inside CB	Surficial Lowe	05/22/2018	**6.3**	80	19	21	120	<1	1.41	43	NA	<1	<1	NA	NA	NA	11.1	0.088 j	NA	-0.07776	0.0427 j
CCR-122B	E of basins inside CB	Surficial Uppe	02/20/2018	**6.3**	<50	2.7	39	160	<1	<1	57	NA	<1	<1	NA	NA	NA	5.53	<0.2	NA	0.016	<0.1
CCR-122B	E of basins inside CB	Surficial Uppe	05/22/2018	**6.3**	30.164 j	2.4	45	140	<1	<1	34	NA	0.546 j	**1.22**	NA	NA	NA	4.31	<0.2	NA	1.379	<0.1
CCR-122C	E of basins inside CB	Surficial Lowe	02/20/2018	**6.1**	**1530**	77	110	300	<1	<1	27	NA	<1	**5.82**	NA	NA	NA	<1	<0.2	NA	0.1223	<0.5
CCR-122C	E of basins inside CB	Surficial Lowe	05/22/2018	**6.1**	**1430**	57	82	260	<1	<1	29	NA	<1	**5.58**	NA	NA	NA	<1	0.131 j	NA	0.4305	<0.2
CCR-123B	E of basins inside CB	Surficial Uppe	02/20/2018	**6.2**	<50	4.2	14	72	<1	<1	5	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	-0.0648	<0.1
CCR-123B	E of basins inside CB	Surficial Uppe	05/22/2018	**6.1**	18.21 j	4.2	13	65	0.471 j	0.42 j	5	NA	0.908 j	<1	NA	NA	NA	<1	<0.2	NA	0.771	0.0528 j
CCR-123C	E of basins inside CB	Surficial Lowe	02/20/2018	**6.4**	325	5.7	30	100	<1	**79.9**	19	NA	<1	<1	NA	NA	NA	1.66	**0.213**	NA	0.2958	0.25
CCR-123C	E of basins inside CB	Surficial Lowe	05/22/2018	**6.1**	154	5.3	73	170	<1	**64.9**	19	NA	<1	0.718 j	NA	NA	NA	<1	<0.2	NA	0.659	0.18

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	PARAME	D 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)													
Reporting Units	**S.U.**	**ug/L**	**mg/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**mg-N/L**	**ug/L**	**ug/L**	**ug/L**	**pCi/L**	**mg/L**
15A NCAC 02L Standard	**6.5-8.5**	**700**	**250**	**250**	**500**	**1***	**10**	**700**	**10**	**10**	**1***	**300**	**50**	**10**	**20**	**0.2***	**0.3***	**5^**	**2**
Provisional Background Threshold Values (Surficial Upper Unit)	**3.9-5.0**	**50**	**4.73**	**15.6**	**25**	**1**	**1**	**45**	**0.03**	**1**	**4**	**1494**	**38**	**NE**	**1**	**0.2**	**0.621**	**2.75**	**NE**
Provisional Background Threshold Values (Surficial Lower Unit)	**4.9-7.4**	**50**	**23.6**	**16**	**210**	**1**	**5**	**97**	**0.12**	**1**	**3**	**13416**	**746**	**NE**	**1**	**0.2**	**1.68**	**5.32**	**NE**
Provisional Background Threshold Values (Pee Dee Upper Unit)	**7.8-9.3**	**3010**	**1932**	**277**	**2442**	**1**	**2.78**	**18.7**	**0.118**	**1**	**1**	**305**	**118**	**NE**	**1**	**0.2**	**1.91**	**4**	**NE**
Provisional Background Threshold Values (Pee Dee Lower Unit)	**6.9-9.7**	**4730**	**2567**	**171**	**3400**	**1**	**3**	**70**	**0.2**	**1**	**1**	**1230**	**93.9**	**NE**	**1**	**0.2**	**0.693**	**2.06**	**NE**

				PARAME	D 40CFR257 APPENDIX III CONSTITUENTS				INORGANIC PARAMETERS (TOTAL CONCENTRATION)													
Sample ID	**Location Description**	**Sample Location Aquifer Name**	**Sample Collection Date**	**pH**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Manganese**	**Nitrate (as N)**	**Selenium**	**Thallium**	**Vanadium**	**Total Radium**	**Fluoride**
CCR-124B	E of basins inside CB	Surficial Uppe	02/19/2018	**5.9**	<50	2.5	6.5	60	<1	<1	36	NA	<1	<1	NA	NA	NA	13.8	**0.482**	NA	0.465	<0.1
CCR-124B	E of basins inside CB	Surficial Uppe	05/23/2018	**5.8**	30.923 j	2.7	6.2	35	0.858 j	<1	39	NA	1.09	<1	NA	NA	NA	15.5	**0.317**	NA	0.631	<0.1
CCR-124C	E of basins inside CB	Surficial Lowe	02/19/2018	**6.2**	**1380**	51	120	360	<1	**83.5**	92	NA	<1	**6.41**	NA	NA	NA	<1	<0.2	NA	1.898	0.3
CCR-124C IAP	E of basins inside CB	Surficial Lowe	03/21/2018	**6.0**	**1080**	38	120	310	<1	**51**	96	NA	0.346 j	**4.93**	NA	NA	NA	<1	<1	NA	1.395	0.23
CCR-124C	E of basins inside CB	Surficial Lowe	05/23/2018	**6.2**	**1010**	37	100	280	<1	**49.5**	98	NA	0.422 j	**3.96**	NA	NA	NA	<1	**0.286**	NA	1.975	0.25
CCR-124C IAP	E of basins inside CB	Surficial Lowe	10/24/2018	**5.9**	176	4.9	36	110	<1	8.54	28	NA	<1	**1.82**	NA	NA	NA	<1	<1	NA	0.1271	0.28
CCR-201C	E of basins inside CB	Surficial Lowe	02/21/2018	**4.9**	<50	7.4	21	57	<1	<1	59	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.307	<0.1
CCR-201C	E of basins inside CB	Surficial Lowe	05/23/2018	**5.8**	26.71 j	8.1	21	53	<1	<1	59	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.594	<0.1
CCR-201D	E of basins inside CB	Pee Dee Uppe	02/21/2018	**11.4**	439	130	43	**540**	<1	3.56	39	NA	<1	<1	NA	NA	NA	1.37	<0.2	NA	0.384	0.7
CCR-201D	E of basins inside CB	Pee Dee Uppe	05/23/2018	**11.4**	471	130	44	**520**	<1	3.14	39	NA	0.446 j	<1	NA	NA	NA	1.09	<0.2	NA	0.1569	0.66
CCR-202C	E of basins inside CB	Surficial Lowe	02/21/2018	**5.8**	198	9.8	23	76	<1	1.75	27	NA	<1	**3.05**	NA	NA	NA	<1	<0.2	NA	0.424	<0.1
CCR-202C	E of basins inside CB	Surficial Lowe	05/23/2018	**5.8**	136	6.6	18	58	<1	1.4	28	NA	<1	**1.58**	NA	NA	NA	<1	<0.2	NA	0.644	<0.1
CCR-202D	E of basins inside CB	Pee Dee Uppe	02/21/2018	7.7	588	110	100	**590**	<1	5.51	22	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.3771	0.8
CCR-202D	E of basins inside CB	Pee Dee Uppe	05/23/2018	7.6	599	110	93	**560**	<1	4.63	21	NA	0.803 j	<1	NA	NA	NA	<1	<0.2	NA	0.876	0.74
CCR-203C	E of basins inside CB	Surficial Lowe	02/21/2018	**5.7**	**897**	56	77	240	<1	<1	24	NA	<1	**6.09**	NA	NA	NA	3.39	<0.2	NA	0.5	<0.2
CCR-203C	E of basins inside CB	Surficial Lowe	05/23/2018	**5.6**	**1040**	71	88	260	<1	<1	38	NA	1.18	**6.98**	NA	NA	NA	3.39	<0.2	NA	0.333	<0.1
CCR-203D	E of basins inside CB	Pee Dee Uppe	02/21/2018	7.6	574	100	81	**530**	<1	3.32	23	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.46	0.83
CCR-203D IAP	E of basins inside CB	Pee Dee Uppe	03/20/2018	7.6	594	110	73	500	<1	2.94	22	NA	<1	<1	NA	NA	NA	<1	<1	NA	0.574	0.69
CCR-203D	E of basins inside CB	Pee Dee Uppe	05/23/2018	7.7	590	100	65	500	<1	3.14	23	NA	0.566 j	<1	NA	NA	NA	<1	<0.2	NA	0.169	0.72
CCR-203D IAP	E of basins inside CB	Pee Dee Uppe	10/24/2018	7.4	592	99	52	470	<1	2.61	22	NA	<1	<1	NA	NA	NA	<1	<1	NA	0.2768	0.71
CCR-204C	E of basins inside CB	Surficial Lowe	02/21/2018	**6.2**	153	6.8	21	86	<1	<1	53	NA	2.98	<1	NA	NA	NA	<1	<0.2	NA	0.866	<0.1
CCR-204C	E of basins inside CB	Surficial Lowe	05/23/2018	**6.0**	143	14	27	82	<1	<1	30	NA	0.929 j	<1	NA	NA	NA	<1	<0.2	NA	0.0678	<0.1
CCR-204D	E of basins inside CB	Pee Dee Uppe	02/21/2018	7.6	463	96	52	450	<1	3.25	26	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	1.081	0.56
CCR-204D	E of basins inside CB	Pee Dee Uppe	05/23/2018	7.5	461	91	46	480	<1	2.84	26	NA	0.408 j	<1	NA	NA	NA	<1	<0.2	NA	1.025	0.55
CCR-205C	E of basins inside CB	Surficial Lowe	02/20/2018	6.7	**1120**	58	99	300	<1	2.24	70	NA	<1	**5.59**	NA	NA	NA	<1	<0.2	NA	0.1828	<0.2
CCR-205C IAP	E of basins inside CB	Surficial Lowe	03/20/2018	6.9	**1230**	65	100	330	<1	1.7	76	NA	<1	**6.49**	NA	NA	NA	<1	<1	NA	0.3676	<0.5
CCR-205C	E of basins inside CB	Surficial Lowe	05/22/2018	6.7	**1200**	55	90	280	<1	1.88	58	NA	0.516 j	**8.16**	NA	NA	NA	<1	0.163 j	NA	1.269	0.1118 j
CCR-205C IAP	E of basins inside CB	Surficial Lowe	10/24/2018	**6.4**	**1010**	33	65	220	<1	1.85	36	NA	<1	**5.46**	NA	NA	NA	<1	<1	NA	0.4321	0.04 j
CCR-205D	E of basins inside CB	Pee Dee Uppe	02/20/2018	7.9	**777**	130	67	**550**	<1	4.23	30	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.7621	0.74
CCR-205D IAP	E of basins inside CB	Pee Dee Uppe	03/20/2018	8.0	**806**	130	61	**550**	<1	3.64	30	NA	0.371 j	<1	NA	NA	NA	<1	<1	NA	0.3434	0.87
CCR-205D	E of basins inside CB	Pee Dee Uppe	05/22/2018	7.9	**770**	120	53	**510**	<1	3.82	30	NA	0.404 j	<1	NA	NA	NA	<1	<0.2	NA	1.584	0.71
CCR-205D IAP	E of basins inside CB	Pee Dee Uppe	10/24/2018	7.7	**786**	120	53	**530**	<1	3.34	28	NA	<1	<1	NA	NA	NA	<1	<1	NA	0.501	0.8
CCR-206C	E of basins inside CB	Surficial Lowe	02/21/2018	6.8	174	12	8.1	100	<1	2.19	32	NA	<1	**1.84**	NA	NA	NA	<1	<0.2	NA	0.5324	<0.1
CCR-206C	E of basins inside CB	Surficial Lowe	05/22/2018	**6.4**	103	4.8	2	51	<1	1.71	25	NA	<1	0.965 j	NA	NA	NA	<1	<0.2	NA	0.104	0.0811 j
CCR-206D	E of basins inside CB	Pee Dee Uppe	02/21/2018	7.7	**727**	120	70	**570**	<1	3.62	23	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	-0.457	0.75
CCR-206D	E of basins inside CB	Pee Dee Uppe	05/22/2018	7.8	**743**	120	57	**540**	<1	3.1	23	NA	0.458 j	<1	NA	NA	NA	<1	<0.2	NA	0.893	0.72
CCR-207C	E of basins inside CB	Surficial Lowe	02/21/2018	**5.8**	252	28	66	150	<1	<1	64	NA	<1	**23.8**	NA	NA	NA	<1	<0.2	NA	0.516	<0.1
CCR-207C	E of basins inside CB	Surficial Lowe	05/22/2018	**5.2**	140	9.6	29	65	<1	<1	26	NA	0.565 j	**6.51**	NA	NA	NA	3.61	0.131 j	NA	1.221	<0.1
CCR-207D	E of basins inside CB	Pee Dee Uppe	02/21/2018	**9.6**	551	150	64	**560**	<1	2.99	35	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.657	0.65
CCR-207D	E of basins inside CB	Pee Dee Uppe	05/22/2018	**9.2**	543	140	55	**540**	0.481 j	3.37	35	NA	0.457 j	<1	NA	NA	NA	<1	<0.2	NA	1.518	0.6
CCR-208C	E of basins inside CB	Surficial Lowe	02/20/2018	**5.1**	<50	2.9	8.7	<25	<1	<1	29	NA	<1	<1	NA	NA	NA	1.98	<0.2	NA	0.5616	<0.1
CCR-208C	E of basins inside CB	Surficial Lowe	05/22/2018	**5.1**	33.55 j	3.2	12	<25	<1	<1	25	NA	<1	<1	NA	NA	NA	1.78	<0.2	NA	0.417	0.0569 j
CCR-208D	E of basins inside CB	Pee Dee Uppe	02/20/2018	**9.4**	**779**	240	140	**860**	<1	5.06	24	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.55	0.52
CCR-208D	E of basins inside CB	Pee Dee Uppe	05/22/2018	**9.5**	**776**	230	120	**830**	0.341 j	4.37	21	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.908	0.72
DMW-01 CCR	E of basins inside CB	Surficial Uppe	02/20/2018	**4.7**	<50	13	8.6	88	<1	<1	363	NA	<1	**1.22**	NA	NA	NA	<1	<0.2	NA	**5.08**	<0.1
DMW-01	E of basins inside CB	Surficial Uppe	03/20/2018	**4.5**	26.887 j	9.1	11	78	<1	<1	265	NA	<5	0.978 j	112	45	9.5	<1	<0.2	**0.305**	NA	0.054 j
DMW-01 CCR	E of basins inside CB	Surficial Uppe	05/22/2018	**4.5**	31.674 j	5.5	4.7	49	<1	<1	153	NA	<1	0.435 j	NA	NA	NA	<1	<0.2	NA	3.259	0.0921 j
DMW-01	E of basins inside CB	Surficial Uppe	10/29/2018	**4.8**	29.1 j	2.25	12.9	33	NA	<1	108	NA	<5	NA	8.23 j	22	1.03	<1	NA	NA	NA	<0.1
DMW-02 CCR	E of basins inside CB	Surficial Uppe	02/21/2018	**4.4**	<50	36	6.5	260	<1	<1	253	NA	<1	<1	NA	NA	NA	<1	**0.375**	NA	**13.96**	0.2
DMW-02	E of basins inside CB	Surficial Uppe	03/20/2018	**4.3**	40.365 j	34	3.2	170	<1	<1	165	NA	<5	0.584 j	152	**179**	**26**	<1	**0.264**	**0.495**	NA	0.14
DMW-02 CCR	E of basins inside CB	Surficial Uppe	05/22/2018	**4.7**	28.243 j	14	20	120	<1	<1	95	NA	0.496 j	<1	NA	NA	NA	<1	0.111 j	NA	4.55	0.0949 j
DMW-02	E of basins inside CB	Surficial Uppe	10/30/2018	**5.1**	32.5 j	5.54	11.6	78	NA	<1	28.3	NA	<5	NA	12.8	26.2	2.04	0.447 j	NA	NA	NA	<0.1

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	PARAMED 40CFR257 APPENDIX III CONSTITUENT					INORGANIC PARAMETERS (TOTAL CONCENTRATION)														
Reporting Units	S.U.	ug/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg-N/L	ug/L	ug/L	ug/L	pCi/L	mg/L
15A NCAC 02L Standard	6.5-8.5	700	250	250	500	1*	10	700	10	10	1*	300	50	10	20	0.2*	0.3*	5^	2
Provisional Background Threshold Values (Surficial Upper Unit)	3.9-5.0	50	4.73	15.6	25	1	1	45	0.03	1	4	1494	38	NE	1	0.2	0.621	2.75	NE
Provisional Background Threshold Values (Surficial Lower Unit)	4.9-7.4	50	23.6	16	210	1	5	97	0.12	1	3	13416	746	NE	1	0.2	1.68	5.32	NE
Provisional Background Threshold Values (Pee Dee Upper Unit)	7.8-9.3	3010	1932	277	2442	1	2.78	18.7	0.118	1	1	305	118	NE	1	0.2	1.91	4	NE
Provisional Background Threshold Values (Pee Dee Lower Unit)	6.9-9.7	4730	2567	171	3400	1	3	70	0.2	1	1	1230	93.9	NE	1	0.2	0.693	2.06	NE

				PARAMED 40CFR257 APPENDIX III CONSTITUENT					INORGANIC PARAMETERS (TOTAL CONCENTRATION)													
Sample ID	**Location Description**	**Sample Location Aquifer Name**	**Sample Collection Date**	**pH**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Manganese**	**Nitrate (as N)**	**Selenium**	**Thallium**	**Vanadium**	**Total Radium**	**Fluoride**
DMW-03 CCR	E of basins inside CB	urficial Uppe	02/21/2018	**4.8**	<50	6.4	47	100	<1	<1	29	NA	<1	<1	NA	NA	NA	4.08	<0.2	NA	1.355	<0.1
DMW-03 IAP	E of basins inside CB	urficial Uppe	03/20/2018	**4.9**	41.388 j	9.6	47	120	<1	<1	30	NA	<1	0.81 j	NA	NA	NA	4.4	<1	NA	0.659	0.11
DMW-03	E of basins inside CB	urficial Uppe	03/20/2018	**4.9**	39.9 j	9.5	43	120	<1	<1	28	NA	<5	0.815 j	12	<5	5.7	4.43	<0.2	0.217 j	NA	<0.1
DMW-03 CCR	E of basins inside CB	urficial Uppe	05/23/2018	**5.1**	39.878 j	12	36	110	<1	<1	41	NA	0.339 j	0.707 j	NA	NA	NA	3.2	<0.2	NA	2.149	<0.1
DMW-03	E of basins inside CB	urficial Uppe	10/24/2018	**5.3**	43.557 j	4.4	39	120	<1	<1	14	NA	<1	0.55 j	NA	NA	NA	3.51	<1	NA	0.425	0.067 j
DMW-03	E of basins inside CB	urficial Uppe	10/30/2018	**5.5**	41.6 j	6.76	40.8	139	NA	<1	11.1	NA	<5	NA	8.62 j	<5	1.34	3.9	NA	NA	NA	0.0811 j
DMW-04 CCR	E of basins inside CB	urficial Uppe	02/21/2018	**5.9**	<50	4.1	43	110	<1	<1	10	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	1.107	<0.1
DMW-04 IAP	E of basins inside CB	urficial Uppe	03/21/2018	**6.1**	49.765 j	2.8	38	110	<1	<1	6	NA	<1	<1	NA	NA	NA	<1	<1	NA	0.4661	0.0541 j
DMW-04	E of basins inside CB	urficial Uppe	03/21/2018	**6.1**	45.208 j	2.8	38	110	<1	<1	6	NA	<5	<1	4.065 j	13	2.9	<1	<0.2	0.295 j	NA	<0.1
DMW-04 CCR	E of basins inside CB	urficial Uppe	05/23/2018	**5.5**	29.713 j	4.6	36	85	<1	<1	22	NA	1.02	<1	NA	NA	NA	<1	<0.2	NA	0.563	<0.1
DMW-04	E of basins inside CB	urficial Uppe	10/24/2018	**5.0**	41.425 j	2.8	32	80	<1	<1	31	NA	<1	0.446 j	NA	NA	NA	<1	<1	NA	0.665	0.095 j
DMW-04	E of basins inside CB	urficial Uppe	10/29/2018	**5.4**	37.2 j	3.52	36.8	66	NA	<1	27.6	NA	<5	NA	6.97 j	4.3 j	0.761	<1	NA	NA	NA	0.0685 j
MW-05B CCR	N of basins outside CB	urficial Uppe	02/19/2018	**4.9**	<50	2.6	5.8	<25	<1	<1	40	NA	<1	**2.91**	NA	NA	NA	<1	<0.2	NA	1.245	<0.1
MW-05B CCR	N of basins outside CB	urficial Uppe	05/21/2018	**4.6**	<50	2.5	6.7	<25	<1	<1	40	NA	<1	**2.98**	NA	NA	NA	<1	<0.2	NA	1.673	0.0615 j
MW-05C CCR	N of basins outside CB	urficial Lowe	02/19/2018	**5.8**	<50	13	11	55	<1	<1	22	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.1027	<0.1
MW-05C	N of basins outside CB	urficial Lowe	03/19/2018	**5.8**	31.407 j	14	11	55	<1	<1	24	0.078	<1	0.449 j	15	21	NA	<1	<0.2	0.171 j	2.47	<0.1
MW-05C CCR	N of basins outside CB	urficial Lowe	05/21/2018	**5.6**	26.691 j	11	11	66	<1	<1	21	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.8089	0.0566 j
MW-05C	N of basins outside CB	urficial Lowe	06/18/2018	**5.2**	29.518 j	12	11	37	<1	<1	20	0.039	<1	<1	8.267 j	11	NA	<1	<0.2	**0.308 B2**	0.254	0.0536 j
MW-05C	N of basins outside CB	urficial Lowe	09/10/2018	**5.5**	33.573 j	15	13	38	<1	<1	25	0.09	<1	0.764 j	13	31	NA	<1	<0.2	0.121 j	0.466	<0.1
MW-05CD	N of basins outside CB	ee Dee Uppe	03/19/2018	**9.1**	**1200**	**290**	110	**880**	<1	1.11	10	0.039	0.345 j	<1	92	32	NA	<1	<0.2	**0.807**	0.2107	0.9
MW-05CD	N of basins outside CB	ee Dee Uppe	06/18/2018	**9.3**	**1190**	**300**	100	**860**	<1	1.19	9	0.043	0.408 j	<1	50	23	NA	<1	<0.2	**1 B2**	0 U	0.88
MW-05CD	N of basins outside CB	ee Dee Uppe	09/10/2018	**9.0**	**1140**	**290**	94	**860**	0.573 j	1.2	8	<0.025	1.23	<1	31	6	NA	<1	<0.2	**0.948**	0.578	0.72
MW-05D CCR	N of basins outside CB	ee Dee Uppe	02/19/2018	8.1	**2570**	**630**	94	**1500**	<1	<1	9	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.456	1.6
MW-05D	N of basins outside CB	ee Dee Uppe	03/19/2018	8.2	**2730**	**640**	91	**1500**	<1	0.931 j	8	<0.025	<1	<1	138	28	NA	<1	0.174 j	0.299 j	0.561	1.6
MW-05D CCR	N of basins outside CB	ee Dee Uppe	05/21/2018	8.0	**2540**	**600**	89	**1500**	<1	1	8	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.594	1.5
MW-05D	N of basins outside CB	ee Dee Uppe	06/18/2018	8.0	**2590**	**650**	94	**1500**	<1	1.02	8	<0.025	<1	<1	117	23	NA	<1	<0.2	**0.338 B2**	0.25056	1.5
MW-05D	N of basins outside CB	ee Dee Uppe	09/10/2018	7.8	**2570**	**650**	88	**1500**	<1	0.791 j	7	0.039	<1	<1	171	25	NA	<1	<0.2	**0.347**	0.501	1.4
MW-05RE	N of basins outside CB	ee Dee Lowe	03/19/2018	8.1	**3940**	**1300**	**260**	**2800**	<1	<1	16	0.038	<1	<1	153	27	NA	<1	<0.2	**0.472**	NA	**2.3**
MW-05RE	N of basins outside CB	ee Dee Lowe	06/18/2018	8.2	85	30	23	190	0.405 j	1.26	3.155 j	0.22	<1	<1	55	3.828 j	NA	<1	<0.2	**2.19 B2**	NA	0.17
MW-05RE	N of basins outside CB	ee Dee Lowe	09/10/2018	8.1	44.776 j	15	17	130	0.438 j	1.36	4.083 j	0.11 M1	0.501 j	<1	82	4.564 j	NA	0.339 j	0.143 j	**2.06**	NA	0.13
MW-07A	SE of basins at CB	urficial Uppe	03/20/2018	**4.7**	<50	1.2	2	<25	<1	<1	7	0.025	<1	0.483 j	238	1.992 j	NA	<1	<0.2	0.3	NA	0.049 j
MW-07B	SE of basins at CB	urficial Uppe	03/20/2018	**4.8**	<50	1.4	8.8	<25	<1	<1	13	<0.025	<1	<1	44	10	NA	<1	<0.2	**0.511**	NA	0.051 j
MW-07C	SE of basins at CB	urficial Lowe	03/20/2018	**5.0**	566	28	84	160	<1	<1	60	0.04	<1	**5.41**	43	**334**	NA	<1	<0.2	**0.409**	NA	<0.1
MW-07C	SE of basins at CB	urficial Lowe	06/20/2018	**4.7**	360	15	60	94	<1	<1	42	0.046	<1	0.986 j	8.176 j	**131**	NA	<1	<0.2	0.289 j	NA	0.1102 j
MW-07C	SE of basins at CB	urficial Lowe	09/11/2018	**5.1**	240	10	39	100	<1	<1	34	0.046	<1	0.542 j	6.673 j	**68**	NA	<1	<0.2	0.271 j	NA	0.0794 j
MW-08	NE of basins outside CB	urficial Lowe	03/20/2018	**5.6**	32.594 j	12	14	44	<1	<1	37	<0.025	<1	0.916 j	29	**164**	NA	<1	0.131 j	0.187 j	0.74	<0.1
MW-08	NE of basins outside CB	urficial Lowe	06/18/2018	**5.5**	29.937 j	14	15	52	<1	<1	40	<0.025	<1	0.665 j	.169001	**119**	NA	<1	<0.2	**0.4 B2**	0.37	0.0552 j
MW-08	NE of basins outside CB	urficial Lowe	09/10/2018	**5.7**	33.851 j	13	13	52	<1	<1	42	<0.025	<1	0.753 j	17	**222**	NA	<1	<0.2	0.276 j	0.1916	0.0469 j
MW-08B	NE of basins outside CB	urficial Uppe	09/10/2018	**6.3**	<50	4.1	4.2	47	<1	1.35	5	<0.025	0.788 j	**1.12**	**6780**	14	NA	<1	<0.2	**0.551**	-0.009	<0.1
MW-08D	NE of basins outside CB	ee Dee Uppe	09/10/2018	**9.4**	**2830**	**740**	87	**1800**	<1	1.36	23	0.094	<1	<1	24	<5	NA	<1	<0.2	**0.501**	0.8295	1.2
MW-08E	NE of basins outside CB	ee Dee Lowe	03/20/2018	8.3	**4210**	**1700**	120	**3300**	<1	0.673 j	10	<0.025	<1	<1	**546**	12	NA	<1	<0.2	<0.3	NA	<5
MW-08E	NE of basins outside CB	ee Dee Lowe	06/18/2018	8.0	**4320**	**1700**	97	**3100**	<1	<1	10	0.069	0.641 j	<1	**554**	13	NA	<1	<0.2	0.273 j,B2	NA	**3.4 j**
MW-08E	NE of basins outside CB	ee Dee Lowe	09/11/2018	**11.4**	**2710**	**1000**	75	**2500**	0.713 j	0.339 j	456	**24.6**	**21**	**2.4**	7.498 j	<5	NA	0.796 j	<0.2	0.28 j	4.17	**2.315 j**
MW-11	E of basins outside CB	urficial Lowe	03/20/2018	**4.5**	36.029 j	7.8	21	41	<1	<1	62	0.045	<1	0.475 j	146	**70**	NA	<1	<0.2	**0.516**	NA	<0.1
MW-11	E of basins outside CB	urficial Lowe	06/19/2018	**4.6**	31.901 j	8.3	26	42	<1	<1	64	0.05	<1	0.477 j	92	**60**	NA	<1	<0.2	**0.474 B2**	NA	0.0518 j
MW-11	E of basins outside CB	urficial Lowe	09/11/2018	**4.7**	38.36 j	7.9	31	62	<1	<1	60	0.04	<1	0.342 j	112	**71**	NA	<1	<0.2	**0.541**	NA	0.0479 j
MW-12R IMP	E of basins outside CB	urficial Lowe	03/21/2018	**5.2**	**838**	41	250	440	<1	0.64 j	65	<0.025	1.04	**4.43**	**2540**	**573**	NA	<1	0.106 j	**0.327**	NA	<0.2
MW-12R	E of basins outside CB	urficial Lowe	03/21/2018	**5.2**	**871**	41	230	430	<1	0.627 j	64	NA	0.939 j	**4.33**	NA	NA	NA	<1	<1	NA	0.964	<0.2
MW-12R	E of basins outside CB	urficial Lowe	06/20/2018	**5.9**	523	25	**290**	**620**	<1	0.859 j	52	<0.025 P4	0.582 j	**1.65**	**1240**	**345**	NA	0.56 j	0.134 j	**0.399**	NA	<0.5
MW-12R	E of basins outside CB	urficial Lowe	09/11/2018	**6.2**	509	25	**280**	**700**	<1	0.892 j	60	<0.025	0.44 j	**2.31**	**3330**	**648**	NA	0.523 j	0.098 j	**0.42**	NA	<0.5
MW-12R IAP	E of basins outside CB	urficial Lowe	09/11/2018	**6.2**	547	27	**270**	**660**	<1	0.889 j	61	NA	0.398 j	**2.17**	NA	NA	NA	0.531 j	<1	NA	NA	<0.5
MW-16D	NE corner of FADA	urficial Lowe	03/19/2018	**4.8**	585	98	100	310	<1	0.578 j	38	<0.025	<1	**4.52**	**1080**	**239**	NA	<1	<0.2	**2.33**	NA	0.1412 j

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	PARAMED 40CFR257 APPENDIX III CONSTITUENTS					INORGANIC PARAMETERS (TOTAL CONCENTRATION)													
Reporting Units	S.U.	ug/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg-N/L	ug/L	ug/L	ug/L	pCi/L	mg/L
15A NCAC 02L Standard	6.5-8.5	700	250	250	500	1*	10	700	10	10	1*	300	50	10	20	0.2*	0.3*	5^	2
Provisional Background Threshold Values (Surficial Upper Unit)	3.9-5.0	50	4.73	15.6	25	1	1	45	0.03	1	4	1494	38	NE	1	0.2	0.621	2.75	NE
Provisional Background Threshold Values (Surficial Lower Unit)	4.9-7.4	50	23.6	16	210	1	5	97	0.12	1	3	13416	746	NE	1	0.2	1.68	5.32	NE
Provisional Background Threshold Values (Pee Dee Upper Unit)	7.8-9.3	3010	1932	277	2442	1	2.78	18.7	0.118	1	1	305	118	NE	1	0.2	1.91	4	NE
Provisional Background Threshold Values (Pee Dee Lower Unit)	6.9-9.7	4730	2567	171	3400	1	3	70	0.2	1	1	1230	93.9	NE	1	0.2	0.693	2.06	NE

				PARAMED 40CFR257 APPENDIX III CONSTITUENTS					INORGANIC PARAMETERS (TOTAL CONCENTRATION)													
Sample ID	**Location Description**	**Sample Location Aquifer Name**	**Sample Collection Date**	**pH**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Manganese**	**Nitrate (as N)**	**Selenium**	**Thallium**	**Vanadium**	**Total Radium**	**Fluoride**
MW-16D	NE corner of FADA	Surficial Lowe	06/20/2018	**4.7**	571	98	100	280	<1	0.596 j	39	<0.025 P4	<1	**4.43**	**1090**	**221**	NA	<1	0.136 j	**1.9**	NA	0.122 j
MW-16D	NE corner of FADA	Surficial Lowe	10/23/2018	**5.1**	539	100	99	330	<1	0.449 j	42	<0.025	<1	**4.3**	**1020 B2**	**195**	NA	<1	<0.2	**1.64**	NA	0.036 j
MW-19	E of basins at CB	Surficial Lowe	03/21/2018	**6.3**	**1140**	21	75	190	<1	1.34	53	0.033	<1	**1.92**	295	**331**	NA	<1	**0.26**	**1.11**	NA	<0.2
MW-19	E of basins at CB	Surficial Lowe	06/19/2018	**6.2**	**1020**	21	69	170	<1	0.939 j	52	0.036	<1	**1.24**	179	**224**	NA	0.378 j	0.197 j	**1.3 B2**	NA	<0.2
MW-19	E of basins at CB	Surficial Lowe	09/11/2018	**6.1**	**1030**	18	65	160	<1	1.19	51	0.041	<1	**1.47**	261	**294**	NA	<1	0.176 j	**1.47**	NA	0.0491 j
MW-20	South of FADA, old plant area	Surficial Uppe	03/19/2018	7.0	33.305 j	5.3	110	370	<1	0.435 j	97	0.046	<1	**1.09**	**1560**	**74**	NA	<1	0.132 j	**18.6**	NA	0.3875 j
MW-20	South of FADA, old plant area	Surficial Uppe	06/20/2018	6.8	32.552 j	6.8	250	**520**	<1	2.33	49	0.025 P4	0.361 j	**2.92**	**5870**	**51**	NA	2.06	0.151 j	**172**	NA	0.24
MW-20	South of FADA, old plant area	Surficial Uppe	10/23/2018	6.7	96	8.4	**600**	**960**	<1	0.771 j	409	0.1	<1	0.434 j	**366 B2**	**192**	NA	<1	**0.303**	**14.9**	NA	0.115 j
MW-20D	South of FADA, old plant area	Surficial Lowe	03/19/2018	7.2	330	62	64	300	<1	3.16	57	<0.025	<1	0.383 j	**1660**	**292**	NA	<1	0.081 j	0.243 j	NA	0.12
MW-20D	South of FADA, old plant area	Surficial Lowe	06/20/2018	7.1	335	59	64	270	<1	4.44	57	<0.025	0.363 j	0.972 j	**607**	**344**	NA	<1	<0.2	0.286 j	NA	0.12
MW-20D	South of FADA, old plant area	Surficial Lowe	10/23/2018	7.1	70	67	44	250	<1	<1	36	<0.025 M1	<1	<1	**831 B2**	**76**	NA	<1	<0.2	**0.324**	NA	0.055 j
MW-21C	E of basins at CB	Surficial Lowe	03/21/2018	6.6	**748**	15	45	140	<1	**30.2**	39	<0.025	<1	**3.92**	**2550**	**316**	NA	<1	0.093 j	**0.906**	NA	0.039 j
MW-21C	E of basins at CB	Surficial Lowe	06/19/2018	**6.2**	650	13	39	120	<1	**13.1**	44	<0.025	<1	**2.01**	**434**	**205**	NA	<1	0.134 j	**3.31 B2**	NA	0.141 j
MW-21C	E of basins at CB	Surficial Lowe	09/11/2018	**6.2**	600	12	36	120	<1	**16**	53	<0.025	<1	**4.28**	**1130**	**358**	NA	<1	0.102 j	**0.985**	NA	0.0951 j
MW-22B	E of basins at CB	Surficial Uppe	03/21/2018	**5.7**	<50	2.2	3.3	34	<1	<1	6	0.16	<1	<1	17	6	NA	<1	0.1 j	0.251 j	NA	<0.1
MW-22B	E of basins at CB	Surficial Uppe	06/19/2018	**4.9**	<50	2.6	3.9	<25	<1	<1	7	0.18	<1	<1	8.91 j	6	NA	<1	<0.2	0.267 j,B2	NA	<0.1
MW-22B	E of basins at CB	Surficial Uppe	09/11/2018	**5.2**	<50	3.4	3.2	<25	<1	<1	6	0.09	<1	<1	<10	6	NA	<1	<0.2	0.197 j	NA	<0.1
MW-22C	E of basins at CB	Surficial Lowe	03/21/2018	6.8	**1000**	20	56	170	<1	<1	51	0.027	<1	**2.66**	79	**252**	NA	1.91	**0.231**	**0.357**	NA	<0.2
MW-22C	E of basins at CB	Surficial Lowe	06/19/2018	**6.2**	**1130**	25	66	180	<1	<1	58	<0.025	<1	**2.78**	92	**281**	NA	1.24	**0.26**	**0.33 B2**	NA	<0.2
MW-22C	E of basins at CB	Surficial Lowe	09/11/2018	**6.2**	**1020**	22	57	180	<1	<1	58	<0.025	<1	**3.48**	65	**327**	NA	1.54	0.186 j	0.266 j	NA	0.0447 j
MW-23B	E of basins at CB	Surficial Uppe	03/21/2018	**6.3**	21.184 j	2.6	11	71	<1	<1	19	0.056 M1	<1	<1	5.404 j	3.278 j	NA	1.28	<0.2	**0.499**	NA	<0.1
MW-23B	E of basins at CB	Surficial Uppe	06/20/2018	**6.2**	<50	2.3	11	58	<1	<1	17	0.074	<1	<1	16	2.193 j	NA	0.598 j	<0.2	**0.342**	NA	0.0606 j
MW-23B	E of basins at CB	Surficial Uppe	10/22/2018	**5.8**	<50	5.3	20	100	<1	<1	29	0.079	<1	<1	8.276 j	2.073 j	NA	0.561 j	<0.2	**0.367**	NA	0.0399 j
MW-23C	E of basins at CB	Surficial Lowe	03/21/2018	6.5	261	5.7	19	65	<1	<1	33	0.043	<1	**9.69**	26	20	NA	4.86	0.096 j	**0.497**	NA	<0.1
MW-23C	E of basins at CB	Surficial Lowe	06/20/2018	**6.4**	146	3.4	13	54	<1	<1	26	0.06 M1,R1	<1	**5.92**	24	14	NA	4.4	<0.2	**0.429**	NA	0.0517 j
MW-23C	E of basins at CB	Surficial Lowe	10/23/2018	**6.1**	134	3.1	21	65	<1	<1	44	0.047	0.394 j	**7.98**	244 B2	19	NA	4.44	<0.2	**0.76**	NA	<0.1
MW-23D	E of basins at CB	Pee Dee Uppe	03/21/2018	**9.0**	**821**	160	20	**520**	<1	0.667 j	3.716 j	0.068	0.48 j	<1	45	8	NA	<1	<0.2	**0.41**	0.348	0.62
MW-23D	E of basins at CB	Pee Dee Uppe	06/20/2018	8.3	**884**	160	19	**540**	<1	0.882 j	4.255 j	0.044	0.719 j	<1	63	11	NA	<1	0.112 j	**0.372**	0.495	0.76
MW-23D	E of basins at CB	Pee Dee Uppe	10/22/2018	**9.2**	**880**	160	20	**520**	<1	0.667 j	4.002 j	0.044	<1	<1	56	13	NA	<1	<0.2	0.283 j	0.595	0.74
MW-23E	E of basins at CB	Pee Dee Lowe	03/21/2018	**9.5**	**2420**	**700**	140	**1400**	<1	0.644 j	8	<0.025	0.367 j	<1	12	<5	NA	<1	<0.2	**0.331**	0.274	1.6
MW-23E	E of basins at CB	Pee Dee Lowe	06/20/2018	**9.1**	**2400**	**510**	100	**1400**	<1	0.621 j	8	0.03	0.442 j	<1	16	<5	NA	<1	<0.2	**0.371**	0.2519	2
MW-23E	E of basins at CB	Pee Dee Lowe	10/22/2018	**9.4**	**2450**	**500**	99	**1300**	<1	0.517 j	7	0.041	<1	<1	13	<5	NA	<1	<0.2	0.243 j	0.1046	1.8
MW-24RB	E of basins inside CB	Surficial Uppe	03/22/2018	**5.6**	<50	2.9	4.2	<25	<1	<1	15	<0.025	<1	<1	195	13	NA	<1	<0.2	0.127 j	NA	<0.1
MW-24RB	E of basins inside CB	Surficial Uppe	06/20/2018	**5.3**	<50	2.8	3.6	<25	<1	<1	25	<0.025	<1	<1	14	9	NA	<1	<0.2	0.111 j	NA	0.0417 j
MW-24RB	E of basins inside CB	Surficial Uppe	09/11/2018	**4.9**	19.178 j	4.4	4.2	42	<1	<1	44	0.031	<1	<1	42	22	NA	<1	<0.2	0.128 j	NA	0.0647 j
MW-24RC	E of basins inside CB	Surficial Lowe	03/22/2018	6.5	43.389 j	2.7	3.6	<25	0.641 j	<1	6	0.037	<1	0.513 j	**337**	9	NA	<1	**0.251**	**0.452**	NA	<0.1
MW-24RC	E of basins inside CB	Surficial Lowe	06/20/2018	**6.3**	73	1.4	4	<25	0.548 j	0.391 j	7	<0.025	<1	0.634 j	**348**	8	NA	<1	**0.291**	**0.518**	NA	0.0414 j
MW-24RC	E of basins inside CB	Surficial Lowe	09/11/2018	**6.2**	54	2.9	4.8	39	0.851 j	<1	7	<0.025	<1	0.855 j	211	3.023 j	NA	0.612 j	**0.284**	**0.576**	NA	<0.1
MW-27B	N of basins at CB	Surficial Uppe	03/22/2018	**4.5**	39.434 j	3	15 M2	<25	<1	<1	44	0.083	<1	0.716 j	13	25	NA	5.01	0.118 j	0.176 j	NA	<0.1
MW-27B	N of basins at CB	Surficial Uppe	06/20/2018	**4.6**	26.65 j	2.8	16	33	<1	<1	40	0.058	<1	0.615 j	5.313 j	23	NA	4.69	<0.2	0.226 j	NA	<0.1
MW-27B	N of basins at CB	Surficial Uppe	09/10/2018	**4.8**	38.124 j	2.8	12	<25	<1	<1	40	0.061	<1	0.794 j	10	22	NA	4.33	0.1 j	0.144 j	NA	<0.1
MW-27C	N of basins at CB	Surficial Lowe	03/22/2018	**4.4**	240	28	64	120	<1	<1	33	0.05	<1	**1.2**	38	**90**	NA	**21.6**	0.153 j	0.264 j	0.262	<0.1
MW-27C	N of basins at CB	Surficial Lowe	06/20/2018	**4.8**	260	30	67	120	<1	<1	35	0.061	0.42 j	**1.42**	105	**93**	NA	**24.3**	0.124 j	**0.56**	0.933	<0.1
MW-27C	N of basins at CB	Surficial Lowe	09/10/2018	**4.7**	248	28	64	110	<1	<1	31	0.082	<1	**1.36**	77	**78**	NA	**21.4**	0.156 j	**0.427**	0.928	<0.1
MW-28B	SE of basins beyond CB	Surficial Uppe	03/21/2018	**5.9**	<50	3.4	9.6	61	<1	<1	45	0.072	1.11	<1	7.908 j	38	NA	<1	0.094 j	0.126 j	NA	<0.1
MW-28B	SE of basins beyond CB	Surficial Uppe	06/19/2018	**5.3**	<50	4.1	11	34	<1	<1	43	0.081	0.369 j	<1	103	**75**	NA	<1	<0.2	**0.377**	NA	0.0844 j
MW-28B	SE of basins beyond CB	Surficial Uppe	09/11/2018	**5.1**	<50	3.6	11	55	<1	<1	51	0.044	0.672 j	<1	4.225 j	42	NA	<1	<0.2	0.2 j	NA	0.12
MW-28C	SE of basins beyond CB	Surficial Lowe	03/21/2018	**5.3**	22.904 j	3	12	53	<1	<1	44	0.2	0.363 j	<1	11	17	NA	<1	<0.2	**0.471**	NA	<0.1
MW-28C	SE of basins beyond CB	Surficial Lowe	06/19/2018	**4.8**	<50	3.1	11	32	<1	<1	40	0.22 P4	0.437 j	<1	13	17	NA	<1	0.097 j	**0.506**	NA	0.053 j
MW-28C	SE of basins beyond CB	Surficial Lowe	09/11/2018	**5.0**	<50	3.1	8.4	33	<1	<1	36	0.21	<1	<1	5.208 j	18	NA	<1	<0.2	**0.433**	NA	0.0466 j
MW-31RC IMP	E of basins outside CB at propety line	Surficial Lowe	03/21/2018	**5.1**	**799**	78	82	250	<1	<1	30	<0.025	0.378 j	**69.6**	**5120**	**1100**	NA	<1	0.178 j	**0.32**	0.568	<0.5
MW-31RC	E of basins outside CB at propety line	Surficial Lowe	03/21/2018	**5.1**	**847**	75	87	240	<1	<1	32	NA	<1	**61.9**	NA	NA	NA	<1	<1	NA	0.679	<0.5

I/A

	PARAME	D 40CFR257 APPENDIX III CONSTITUENT				INORGANIC PARAMETERS (TOTAL CONCENTRATION)														
Reporting Units	**S.U.**	**ug/L**	**mg/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**mg-N/L**	**ug/L**	**ug/L**	**ug/L**	**pCi/L**	**mg/L**
15A NCAC 02L Standard	**6.5-8.5**	**700**	**250**	**250**	**500**	**1***	**10**	**700**	**10**	**10**	**1***	**300**	**50**	**10**	**20**	**0.2***	**0.3***	**5^**	**2**
Provisional Background Threshold Values (Surficial Upper Unit)	**3.9-5.0**	**50**	**4.73**	**15.6**	**25**	**1**	**1**	**45**	**0.03**	**1**	**4**	**1494**	**38**	**NE**	**1**	**0.2**	**0.621**	**2.75**	**NE**
Provisional Background Threshold Values (Surficial Lower Unit)	**4.9-7.4**	**50**	**23.6**	**16**	**210**	**1**	**5**	**97**	**0.12**	**1**	**3**	**13416**	**746**	**NE**	**1**	**0.2**	**1.68**	**5.32**	**NE**
Provisional Background Threshold Values (Pee Dee Upper Unit)	**7.8-9.3**	**3010**	**1932**	**277**	**2442**	**1**	**2.78**	**18.7**	**0.118**	**1**	**1**	**305**	**118**	**NE**	**1**	**0.2**	**1.91**	**4**	**NE**
Provisional Background Threshold Values (Pee Dee Lower Unit)	**6.9-9.7**	**4730**	**2567**	**171**	**3400**	**1**	**3**	**70**	**0.2**	**1**	**1**	**1230**	**93.9**	**NE**	**1**	**0.2**	**0.693**	**2.06**	**NE**

				PARAME	D 40CFR257 APPENDIX III CONSTITUENT				INORGANIC PARAMETERS (TOTAL CONCENTRATION)													
Sample ID	**Location Description**	**Sample Location Aquifer Name**	**Sample Collection Date**	**pH**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Manganese**	**Nitrate (as N)**	**Selenium**	**Thallium**	**Vanadium**	**Total Radium**	**Fluoride**
MW-31RC	E of basins outside CB at propety line	Surficial Lowe	06/20/2018	**4.8**	634	55	81	200	<1	<1	26	<0.025	<1	**46.1**	**3910**	**887**	NA	<1	<0.2	**0.303**	0.407	<0.2
MW-31RC	E of basins outside CB at property line	Surficial Lowe	10/23/2018	**5.4**	350	30	42	92	<1	<1	20	<0.025	<1	**25.1**	**2060**	**524**	NA	<1	<0.2	0.184 j	0.41033	<0.2
MW-31RC IAP	E of basins outside CB at property line	Surficial Lowe	10/23/2018	**5.4**	345	31	51	88	<1	<1	20	NA	<1	**24.4**	NA	NA	NA	<1	<1	NA	0.333	<0.1
MW-32C	SE of basins outside CB	Surficial Lowe	03/20/2018	**4.2**	<50	3	6.7	<25	<1	<1	51	<0.025	<1	<1	4.687 j	33	NA	<1	0.107 j	0.238 j	1.431	<0.1
MW-32C	SE of basins outside CB	Surficial Lowe	06/19/2018	**4.2**	<50	3.2	7.9	<25	<1	<1	75	<0.025 P4	<1	<1	6.08 j	34	NA	0.399 j	<0.2	**0.326 B2**	0.976	0.0648 j
MW-32C	SE of basins outside CB	Surficial Lowe	09/11/2018	**4.8**	<50	2.8	8.5	29	<1	<1	66	<0.025	<1	<1	7.191 j	31	NA	<1	<0.2	0.238 j	1.103	0.0776 j
MW-33C	SE of basins oustside CB near property line	Surficial Lowe	03/20/2018	**5.2**	<50	3.3	9.8	28	<1	<1	38	0.06	<1	<1	11	29	NA	<1	0.157 j	**0.325**	0.4597	<0.1
MW-33C	SE of basins oustside CB near property line	Surficial Lowe	06/19/2018	**4.7**	<50	2.1	7.8	<25	<1	<1	27	0.043	<1	<1	18	16	NA	<1	<0.2	**0.394 B2**	0.238	<0.1
MW-33C	SE of basins oustside CB near property line	Surficial Lowe	09/11/2018	**5.1**	<50	2.1	8.8	39	<1	<1	30	0.025	<1	<1	13	18	NA	<1	<0.2	**0.308**	0.086	0.0465 j
MW-36C	N of basins inside CB	Surficial Lowe	03/22/2018	**5.5**	308	22	61	130	<1	<1	33	0.43	0.439 j	**1.2**	31	20	NA	**27.1**	**0.298**	**0.548**	0.2128	<0.1
MW-36C	N of basins inside CB	Surficial Lowe	06/19/2018	**5.6**	297	22	60	110	<1	<1	34	0.27	0.439 j	**1.16**	54	21	NA	**26.7**	0.105 j	**0.492 B2**	0.253	<0.1
MW-36C	N of basins inside CB	Surficial Lowe	09/10/2018	**5.5**	251	16	48	93	<1	0.397 j	33	0.22	1.48	**1.48**	**794**	18	NA	**20.1**	0.091 j	**2.85**	-0.067	<0.1
MW-37B CCR	SE of basins outside CB	Surficial Uppe	02/19/2018	**4.8**	<50	4.7	3.5	<25	<1	<1	8	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.387	0.24
MW-37B	SE of basins outside CB	Surficial Uppe	03/20/2018	**4.7**	<50	4.5	2.9	<25	<1	<1	8	<0.025	<1	<1	8.531 j	4.42 j	NA	<1	0.19 j	<0.3	0.81	0.14 j
MW-37B CCR	SE of basins outside CB	Surficial Uppe	05/21/2018	**4.4**	<50	3.6	5.3	<25	<1	<1	8	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	0.761	0.24
MW-37B	SE of basins outside CB	Surficial Uppe	06/19/2018	**4.5**	<50	4.2	4.8	<25	<1	<1	8	<0.025 P4	<1	<1	19	5	NA	<1	<0.2	**0.301**	0.722	0.23
MW-37B	SE of basins outside CB	Surficial Uppe	09/11/2018	**4.4**	<50	3.4	6.6	<25	<1	<1	7	<0.025	<1	<1	.157001	3.586 j	NA	<1	<0.2	0.178 j	0.5829	0.19
MW-37C CCR	SE of basins outside CB	Surficial Lowe	02/19/2018	**6.2**	<50	3.2	8.9	86	<1	2.24	27	NA	<1	**2.12**	NA	NA	NA	<1	<0.2	NA	0.599	<0.1
MW-37C	SE of basins outside CB	Surficial Lowe	03/20/2018	**6.2**	<50	3.2	8.5	62	<1	2.56	27	<0.025	0.429 j	**2.48**	**8460**	**247**	NA	<1	0.115 j	**0.804**	0.1116	<0.1
MW-37C CCR	SE of basins outside CB	Surficial Lowe	05/21/2018	**6.1**	<50	3.1	9	82	<1	2.92	30	NA	0.671 j	**2.9**	NA	NA	NA	<1	0.085 j	NA	0.518	<0.1
MW-37C	SE of basins outside CB	Surficial Lowe	06/19/2018	**5.9**	<50	3	8.1	63	<1	2.29	25	<0.025	0.424 j	**1.81**	**8220**	**209**	NA	<1	0.09 j	**0.945**	0.841	<0.1
MW-37C	SE of basins outside CB	Surficial Lowe	09/11/2018	**6.0**	<50	3	6.3	50	<1	2.48	19	<0.025	0.774 j	**1.91**	**6990**	**140**	NA	<1	0.096 j	**1.1**	0.429	<0.1
MW-37CD	SE of basins outside CB	ee Dee Uppe	03/19/2018	**10.1**	55	6.9	3.9	180	0.581 j	5.95	11	0.15	1.55	<1	**461**	4.717 j	NA	0.358 j	<0.2	**10.6**	0.959	0.23
MW-37CD	SE of basins outside CB	ee Dee Uppe	06/19/2018	**9.7**	47.743 j	6.8	7.1	150	0.737 j	6.87	12	<0.025 P4	1.86	<1	**377**	4.376 j	NA	0.416 j	<0.2	**12.8**	0.144	0.24
MW-37CD	SE of basins outside CB	ee Dee Uppe	09/11/2018	**9.7**	52	6.8	8.7	170	0.879 j	8.4	14	0.28	2.68	<1	**377**	4.439 j	NA	0.386 j	<0.2	**16.8**	0.0744	0.26
MW-37D CCR	SE of basins outside CB	ee Dee Uppe	02/19/2018	8.5	122	49	8	190	<1	1.24	6	NA	<1	<1	NA	NA	NA	<1	<0.2	NA	1.123	0.19
MW-37D	SE of basins outside CB	ee Dee Uppe	03/19/2018	**8.6**	131	49	8.2	200	<1	1.38	6	0.035	<1	<1	74	18	NA	<1	<0.2	**0.659**	0.408	0.2
MW-37D CCR	SE of basins outside CB	ee Dee Uppe	05/21/2018	8.5	126	47	8.1	200	<1	1.54	6	NA	0.383 j	<1	NA	NA	NA	<1	<0.2	NA	0.641	0.19
MW-37D	SE of basins outside CB	ee Dee Uppe	06/19/2018	**8.7**	122	50	8.6	190	<1	1.49	6	<0.025	<1	<1	68	15	NA	<1	<0.2	**0.902**	0.2629	0.18
MW-37D	SE of basins outside CB	ee Dee Uppe	09/11/2018	**8.6**	130	48	8.4	190	<1	1.08	6	0.031	0.444 j	<1	102	19	NA	<1	<0.2	**0.744**	0.431	0.17
MW-37E	SE of basins outside CB	ee Dee Lowe	03/20/2018	8.4	**1460**	**550**	81	**1100**	**2.73**	<1	5	0.13	**30.2**	<1	296	14	NA	<1	<0.2	**0.416**	0.447	0.803 j
MW-37E	SE of basins outside CB	ee Dee Lowe	06/19/2018	8.3	**1540**	**420**	95	**1100**	0.845 j	<1	4.27 j	0.056	2.78	<1	164	15	NA	<1	<0.2	**0.376**	0.4093	1.4
MW-37E	SE of basins outside CB	ee Dee Lowe	09/11/2018	**9.3**	**1500**	**400**	81	**1100**	**7.09**	<1	13	0.057	3.94	<1	132	7	NA	<1	<0.2	**0.336**	0.71	1.3
MW-38B	N of basins outside CB	Surficial Uppe	03/22/2018	**4.6**	<50	5	18	26	<1	<1	22	<0.025	<1	0.42 j	6.982 j	26	NA	<1	<0.2	0.183 j	NA	0.0814 j
MW-38B	N of basins outside CB	Surficial Uppe	06/18/2018	**4.6**	<50	4.1	19	<25	<1	<1	20	<0.025	<1	0.404 j	5.73 j	16	NA	<1	0.084 j	0.29 j,B2	NA	0.0954 j
MW-38B	N of basins outside CB	Surficial Uppe	09/11/2018	**4.7**	<50	4.1	20	<25	<1	<1	21	<0.025	<1	0.396 j	24	17	NA	<1	<0.2	0.182 j	NA	0.0811 j
MW-38C	N of basins outside CB	Surficial Lowe	03/22/2018	**5.3**	247	43	65	150	<1	<1	35	0.68	0.578 j	**1.28**	16	**300**	NA	14.7	<0.2	0.204 j	0.365	<0.1
MW-38C	N of basins outside CB	Surficial Lowe	06/18/2018	**5.6**	251	47	62	160	<1	<1	37	0.64	0.574 j	**1.78**	15	**294**	NA	17.1	0.171 j	**0.343 B2**	0.112	<0.1
MW-38C	N of basins outside CB	Surficial Lowe	09/11/2018	**5.5**	223	34	53	120	<1	<1	30	0.51	0.501 j	**1.04**	3.597 j	**217**	NA	14.2	<0.2	0.23 j	0.273	<0.1
MW-38D	N of basins outside CB	ee Dee Uppe	03/22/2018	**9.8**	**1370**	**380**	99	**950**	<1	0.398 j	48	0.16	<1	<1	70	14	NA	<1	<0.2	**0.793**	0.4945	0.802 j
MW-38D	N of basins outside CB	ee Dee Uppe	06/18/2018	**8.6**	**1560**	**500**	140	**1300**	<1	<1	6	0.074	<1	<1	94	12	NA	<1	0.136 j	**0.802 B2**	0.124	1.2
MW-38D	N of basins outside CB	ee Dee Uppe	09/11/2018	**11.2**	**776**	230	51	**780**	<1	<1	216	0.4 M1	0.342 j	<1	4.587 j	<5	NA	<1	<0.2	0.191 j	1.599	0.626 j
MW-39B	N of basins outside CB	Surficial Uppe	03/22/2018	**5.9**	19.455 j	4.4	<0.1	35	<1	0.467 j	2.124 j	<0.025	1.5	0.393 j	**5150**	**94**	NA	<1	0.086 j	**1.25**	NA	<0.1
MW-39B	N of basins outside CB	Surficial Uppe	06/19/2018	**5.7**	18.107 j	5.1	<0.1	41	<1	0.511 j	1.78 j	<0.025	1.68	0.379 j	**5970**	**84**	NA	<1	<0.2	**1.23**	NA	<0.1
MW-39B	N of basins outside CB	Surficial Uppe	09/11/2018	**5.7**	<50	5	<0.1	58	<1	0.467 j	1.833 j	<0.025	1.28	0.376 j	**4760**	**85**	NA	<1	<0.2	**0.953**	NA	<0.1
MW-39C	N of basins outside CB	Surficial Lowe	03/22/2018	**5.4**	<50	5.3	7.3	<25	<1	0.482 j	85	<0.025	0.634 j	**1.09**	**1330**	**57**	NA	<1	0.083 j	**2.42**	-0.3406	<0.1
MW-39C	N of basins outside CB	Surficial Lowe	06/19/2018	**5.3**	<50	4.5	7.7	<25	<1	0.396 j	70	<0.025	0.461 j	0.626 j	**949**	**58**	NA	0.46 j	<0.2	**20.2**	0.568	<0.1
MW-39C	N of basins outside CB	Surficial Lowe	09/11/2018	**5.3**	24.331 j	6.4	9.9	52	<1	0.485 j	76	<0.025	0.361 j	0.406 j	**759**	**67**	NA	0.819 j	<0.2	**13**	0.5035	<0.1
MW-39D	N of basins outside CB	ee Dee Uppe	03/22/2018	**10.5**	**1080**	**410**	41	**1100**	<1	0.913 j	8	0.066	0.385 j	<1	15	<5	NA	<1	<0.2	0.118 j	0.6731	0.694 j
MW-39D	N of basins outside CB	ee Dee Uppe	06/19/2018	**10.5**	**1070**	**440**	44	**1100**	<1	0.992 j	8	0.047	0.706 j	<1	22	<5	NA	<1	0.111 j	0.202 j	0.444	0.827 j
MW-39D	N of basins outside CB	ee Dee Uppe	09/11/2018	**10.3**	**1080**	**410**	47	**1200**	<1	0.859 j	7	0.046	<1	<1	6.734 j	<5	NA	<1	<0.2	0.196 j	0.08292	0.756 j
MW-40B	N of basins outside CB	Surficial Uppe	03/22/2018	**5.2**	30.182 j	2.7	17	51	<1	<1	18	0.029 M1	0.432 j	0.993 j	**6020**	19	NA	<1	**0.244**	**0.551**	NA	<0.1

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	PARAMED 40CFR257 APPENDIX III CONSTITUENT					INORGANIC PARAMETERS (TOTAL CONCENTRATION)													
Reporting Units	**S.U.**	**ug/L**	**mg/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**mg-N/L**	**ug/L**	**ug/L**	**ug/L**	**pCi/L**	**mg/L**
15A NCAC 02L Standard	**6.5-8.5**	**700**	**250**	**250**	**500**	**1***	**10**	**700**	**10**	**10**	**1***	**300**	**50**	**10**	**20**	**0.2***	**0.3***	**5^**	**2**
Provisional Background Threshold Values (Surficial Upper Unit)	**3.9-5.0**	**50**	**4.73**	**15.6**	**25**	**1**	**1**	**45**	**0.03**	**1**	**4**	**1494**	**38**	**NE**	**1**	**0.2**	**0.621**	**2.75**	**NE**
Provisional Background Threshold Values (Surficial Lower Unit)	**4.9-7.4**	**50**	**23.6**	**16**	**210**	**1**	**5**	**97**	**0.12**	**1**	**3**	**13416**	**746**	**NE**	**1**	**0.2**	**1.68**	**5.32**	**NE**
Provisional Background Threshold Values (Pee Dee Upper Unit)	**7.8-9.3**	**3010**	**1932**	**277**	**2442**	**1**	**2.78**	**18.7**	**0.118**	**1**	**1**	**305**	**118**	**NE**	**1**	**0.2**	**1.91**	**4**	**NE**
Provisional Background Threshold Values (Pee Dee Lower Unit)	**6.9-9.7**	**4730**	**2567**	**171**	**3400**	**1**	**3**	**70**	**0.2**	**1**	**1**	**1230**	**93.9**	**NE**	**1**	**0.2**	**0.693**	**2.06**	**NE**

				PARAMED 40CFR257 APPENDIX III CONSTITUENT					INORGANIC PARAMETERS (TOTAL CONCENTRATION)													
Sample ID	**Location Description**	**Sample Location Aquifer Name**	**Sample Collection Date**	**pH**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Manganese**	**Nitrate (as N)**	**Selenium**	**Thallium**	**Vanadium**	**Total Radium**	**Fluoride**
MW-40B	N of basins outside CB	urficial Uppe	06/19/2018	**5.8**	23.998 j	3.6	26	68	<1	<1	20	<0.025	0.449 j	**1.69**	**12200**	23	NA	<1	**0.207**	**0.442 B2**	NA	<0.1
MW-40B	N of basins outside CB	urficial Uppe	09/10/2018	**5.5**	25.145 j	3.8	39	74	<1	<1	21	<0.025	0.556 j	**1.74**	**10900**	24	NA	<1	0.198 j	**0.436**	NA	<0.1
MW-40C	N of basins outside CB	urficial Lowe	03/22/2018	**6.1**	432	43	85	220	<1	<1	26	<0.025	<1	**2.57**	6.517 j	**103**	NA	**40.9**	**0.232**	**0.502**	NA	<0.2
MW-40C	N of basins outside CB	urficial Lowe	06/19/2018	**6.0**	450	44	82	200	<1	<1	27	<0.025	0.416 j	**3.61**	12	**177**	NA	**89.7**	**0.211**	**0.532 B2**	NA	<0.2
MW-40C	N of basins outside CB	urficial Lowe	09/10/2018	**5.9**	427	45	82	210	<1	<1	27	<0.025	<1	**3.04**	7.526 j	39	NA	**51.9**	**0.205**	**0.442**	NA	<0.2
MW-40D	N of basins outside CB	ee Dee Uppe	03/22/2018	**9.7**	**1200**	**360**	59	**960**	<1	0.605 j	7	0.088	0.701 j	<1	33	<5	NA	<1	<0.2	0.29 j	NA	0.8
MW-40D	N of basins outside CB	ee Dee Uppe	06/19/2018	**9.4**	**1210**	**360**	66	**1000**	<1	0.629 j	8	<0.025	0.827 j	<1	51	<5	NA	<1	<0.2	**0.376 B2**	NA	1
MW-40D	N of basins outside CB	ee Dee Uppe	09/10/2018	**9.3**	**1220**	**350**	64	**980**	<1	0.474 j	8	<0.025	0.36 j	<1	22	<5	NA	<1	<0.2	0.233 j	NA	0.912 j
MW-41B	N of basins outside CB	urficial Uppe	09/10/2018	**4.9**	<50	2.1	11	<25	<1	<1	17	<0.025	0.364 j	**1.5**	**703**	17	NA	<1	<0.2	<0.3	0.037	0.0506 j
MW-41C	N of basins outside CB	urficial Lowe	09/10/2018	**6.4**	<50	3.2	0.82	<25	<1	**12.2**	7	<0.025	0.623 j	**3.35**	**23300**	**180**	NA	<1	<0.2	**0.736**	0.1305	<0.1
MW-41D	N of basins outside CB	ee Dee Uppe	09/10/2018	8.4	**2470**	**610**	64	**1400**	0.982 j	1.28	16	<0.025	0.709 j	<1	135	8	NA	<1	<0.2	**0.345**	0.397	1.2
MW-41E	N of basins outside CB	ee Dee Lowe	03/20/2018	7.8	**4100**	**1400**	89	**2900**	<1	<1	30	<0.025 M1	0.397 j	<1	**749**	32	NA	<1	<0.2	0.253 j	NA	0.912 j
MW-41E	N of basins outside CB	ee Dee Lowe	06/18/2018	7.7	**4220**	**1400**	94	**2900**	<1	<1	36	0.025	0.669 j	<1	**730**	30	NA	<1	<0.2	**0.356 B2**	NA	**2.2**
MW-41E	N of basins outside CB	ee Dee Lowe	09/11/2018	7.9	**4110**	**1300**	110	**2800**	0.661 j	1.39	70	0.18	1.53	<1	75	27	NA	<1	<0.2	**0.838**	NA	1.772 j
MW-42B	E of basins outside CB	urficial Uppe	10/23/2018	**6.2**	<50	4	9	33	<1	<1	29	<0.025	<1	<1	**1620**	**342**	NA	<1	<0.2	0.233 j	0.4689	<0.1
MW-42C	E of basins outside CB	urficial Lowe	10/23/2018	**5.5**	213	6.8	29	89	<1	<1	37	<0.025	0.441 j	0.413 j	**712**	33	NA	2.6	<0.2	**0.331**	0.415	<0.1
MW-42D	E of basins outside CB	ee Dee Uppe	10/23/2018	**8.8**	493	130	8.8	410	<1	0.362 j	4.897 j	<0.025	0.856 j	<1	206 B2	13	NA	<1	<0.2	**0.51**	0.034	0.61
MW-IAP-01D	E of basins outside CB at propety line	ee Dee Uppe	03/21/2018	8.0	**874**	190	32	**560**	0.381 j	2.93	6	NA	0.631 j	<1	NA	NA	NA	<1	<1	NA	0.1541	0.89
MW-IAP-01D	E of basins outside CB at property line	ee Dee Uppe	10/24/2018	7.8	**822**	190	29	**590**	0.374 j	2.56	7	NA	0.525 j	<1	NA	NA	NA	<1	<1	NA	0.873	0.84
SMW-01B IMP	E of basins outside CB on adjacent property	urficial Uppe	03/21/2018	**4.8**	301	17	80	140	<1	<1	77	<0.025	0.436 j	<1	**913**	29	NA	<1	<0.2	0.285 j	NA	<0.2
SMW-01B	E of basins outside CB on adjacent property	urficial Uppe	03/21/2018	**4.8**	333	17	89	140	<1	<1	79	NA	0.381 j	<1	NA	NA	NA	<1	<1	NA	1.376	0.1386 j
SMW-01B	E of basins outside CB on adjacent property	urficial Uppe	10/24/2018	**3.8**	45.912 j	0.99	13	51	<1	<1	18	NA	0.392 j	<1	NA	NA	NA	<1	<1	NA	1.247	0.062 j
SMW-01C IMP	E of basins outside CB on adjacent property	urficial Lowe	03/21/2018	**4.8**	**799**	44	130	250	<1	0.413 j	33	<0.025	0.445 j	**3.22**	**362**	**554**	NA	<1	<0.2	**1.03**	NA	<0.5
SMW-01C	E of basins outside CB on adjacent property	urficial Lowe	03/21/2018	**4.8**	**898**	46	140	260	<1	0.432 j	35	NA	0.364 j	**3.35**	NA	NA	NA	<1	<1	NA	0.339	<0.5
SMW-01C	E of basins outside CB on adjacent property	urficial Lowe	06/19/2018	**4.7**	**850**	44	140	240	<1	0.498 j	32	<0.025	<1	**2.96**	**328**	**578**	NA	<1	0.106 j	**0.813 B2**	NA	<0.5
SMW-01C	E of basins outside CB on adjacent property	urficial Lowe	10/24/2018	**4.4**	**743**	36	120	200	<1	0.415 j	31	<0.025	<1	**2.28**	**408**	**492**	NA	<1	<0.2	**0.423**	NA	<0.5
SMW-01C IAP	E of basins outside CB on adjacent property	urficial Lowe	10/24/2018	**4.4**	**710**	36	110	220	<1	0.376 j	30	NA	<1	**2.18**	NA	NA	NA	<1	<1	NA	0.914	<0.5
SMW-02C IMP	E of basins outside CB on adjacent property	urficial Lowe	03/21/2018	**5.5**	322	26	60	150	<1	<1	41	<0.025	<1	**1.03**	**1120**	**422**	NA	<1	<0.2	**0.362**	0	<0.1
SMW-02C	E of basins outside CB on adjacent property	urficial Lowe	03/21/2018	**5.5**	344	27	62	150	<1	<1	41	NA	<1	**1.05**	NA	NA	NA	<1	<1	NA	0.2681	<0.1
SMW-02C	E of basins outside CB on adjacent property	urficial Lowe	06/19/2018	**5.2**	354	26	72	140	<1	<1	44	<0.025 M1	0.38 j	**2.69**	**962**	**452**	NA	<1	0.165 j	**0.564 B2**	NA	0.0425 j
SMW-02C	E of basins outside CB on adjacent property	urficial Lowe	10/24/2018	**4.7**	288	18	62	110	<1	0.454 j	37	<0.025	<1	**5.04**	**1040**	**488**	NA	<1	<0.2	**0.566**	NA	<0.1
SMW-02C IAP	E of basins outside CB on adjacent property	urficial Lowe	10/24/2018	**4.7**	274	18	58	140	<1	0.376 j	36	NA	0.373 j	**4.81**	NA	NA	NA	<1	<1	NA	0.383	<0.1
SMW-03C IMP	E of basins outside CB on adjacent property	urficial Lowe	03/21/2018	**5.3**	295	32	78	180	<1	0.518 j	81	<0.025	<1	**3.33**	**1630**	**326**	NA	<1	<0.2	**0.377**	NA	<0.1
SMW-03C	E of basins outside CB on adjacent property	urficial Lowe	03/21/2018	**5.3**	326	32	83	180	<1	0.528 j	85	NA	<1	**3.49**	NA	NA	NA	<1	<1	NA	0.0093	<0.2
SMW-03C	E of basins outside CB on adjacent property	urficial Lowe	06/19/2018	**4.9**	349	36	92	160	<1	<1	74	<0.025	<1	**6.36**	262	**360**	NA	<1	<0.2	**0.644 B2**	NA	0.0424 j
SMW-03C	E of basins outside CB on adjacent property	urficial Lowe	10/24/2018	**4.7**	195	17	85	140	<1	<1	64	<0.025	<1	**7.18**	75	**315**	NA	<1	<0.2	0.298 j	NA	<0.2
SMW-03C IAP	E of basins outside CB on adjacent property	urficial Lowe	10/24/2018	**4.7**	190	17	74	160	<1	<1	62	NA	<1	**7**	NA	NA	NA	<1	<1	NA	1.315	<0.2
SMW-04C IMP	E of basins outside CB on adjacent property	urficial Lowe	03/21/2018	**5.6**	44.21 j	9.3	26	58	<1	<1	28	<0.025	<1	**2.99**	39	24	NA	<1	<0.2	**0.643**	NA	<0.1
SMW-04C	E of basins outside CB on adjacent property	urficial Lowe	03/21/2018	**5.6**	49.117 j	9.8	28	73	<1	0.376 j	29	NA	<1	**3.14**	NA	NA	NA	<1	<1	NA	-0.2083	0.0519 j
SMW-04C	E of basins outside CB on adjacent property	urficial Lowe	06/19/2018	**5.3**	45.214 j	9.6	32	64	<1	<1	47	<0.025	<1	**3.3**	81	28	NA	<1	0.122 j	**0.466**	NA	0.0519 j
SMW-04C	E of basins outside CB on adjacent property	urficial Lowe	10/23/2018	**5.6**	48.569 j	9.6	27	56	<1	<1	41	<0.025	<1	**3.11**	33	25	NA	<1	<0.2	**0.394**	NA	<0.1
SMW-04C IAP	E of basins outside CB on adjacent property	urficial Lowe	10/23/2018	**5.6**	533	19	71	110	<1	<1	26	NA	0.337 j	**9.85**	NA	NA	NA	0.748 j	<1	NA	0.4397	<0.1
SMW-05B	E of basins outside CB on adjacent property	urficial Uppe	03/22/2018	6.6	58 B2	7.3	32	120	<1	0.836 j	10	NA	<1	<1	NA	NA	NA	<1	<1	NA	0.726	0.0461 j
SMW-05B	E of basins outside CB on adjacent property	urficial Uppe	10/24/2018	**6.4**	61	6.9	21	140	<1	0.833 j	12	NA	0.379 j	<1	NA	NA	NA	<1	<1	NA	1.41	<0.1
SMW-05C IMP	E of basins outside CB on adjacent property	urficial Lowe	03/22/2018	**4.9**	243	19	57	83	<1	<1	53	0.074	0.393 j	0.752 j	35	48	NA	<1	<0.2	0.186 j	NA	<0.1
SMW-05C	E of basins outside CB on adjacent property	urficial Lowe	03/22/2018	**4.9**	258 B2	20	38	76	<1	<1	54	NA	0.433 j	0.715 j	NA	NA	NA	<1	<1	NA	1.104	0.0453 j
SMW-05C	E of basins outside CB on adjacent property	urficial Lowe	06/19/2018	**4.9**	229	19	44	79	<1	<1	58	<0.025	0.355 j	**1.45**	26	**59**	NA	<1	0.16 j	0.184 j	NA	0.0572 j
SMW-05C	E of basins outside CB on adjacent property	urficial Lowe	10/24/2018	**4.9**	245	17	35	70	<1	<1	60	<0.025	<1	**1.24**	32	**75**	NA	<1	<0.2	0.176 j	NA	<0.1
SMW-05C IAP	E of basins outside CB on adjacent property	urficial Lowe	10/24/2018	**4.9**	235	17	35	110	<1	<1	59	NA	0.366 j	**1.24**	NA	NA	NA	<1	<1	NA	0.447	0.0418 j
SMW-06B IMP	E of basins outside CB on adjacent property	urficial Uppe	03/22/2018	**6.1**	47.912 j	7.2	33	91	<1	<1	27	<0.025	<1	<1	67	23	NA	<1	<0.2	**0.844**	NA	<0.1
SMW-06B	E of basins outside CB on adjacent property	urficial Uppe	03/22/2018	**6.1**	66 B2	7.3	33	80	<1	<1	27	NA	<1	<1	NA	NA	NA	<1	<1	NA	1.565	<0.1
SMW-06B	E of basins outside CB on adjacent property	urficial Uppe	10/24/2018	**5.8**	61	7	26	79	<1	<1	28	NA	<1	<1	NA	NA	NA	<1	<1	NA	1.05	<0.1

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	PARAMED 40CFR257 APPENDIX III CONSTITUENT					INORGANIC PARAMETERS (TOTAL CONCENTRATION)														
Reporting Units	**S.U.**	**ug/L**	**mg/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**mg-N/L**	**ug/L**	**ug/L**	**ug/L**	**pCi/L**	**mg/L**
15A NCAC 02L Standard	**6.5-8.5**	**700**	**250**	**250**	**500**	**1***	**10**	**700**	**10**	**10**	**1***	**300**	**50**	**10**	**20**	**0.2***	**0.3***	**5^**	**2**
Provisional Background Threshold Values (Surficial Upper Unit)	**3.9-5.0**	**50**	**4.73**	**15.6**	**25**	**1**	**1**	**45**	**0.03**	**1**	**4**	**1494**	**38**	**NE**	**1**	**0.2**	**0.621**	**2.75**	**NE**
Provisional Background Threshold Values (Surficial Lower Unit)	**4.9-7.4**	**50**	**23.6**	**16**	**210**	**1**	**5**	**97**	**0.12**	**1**	**3**	**13416**	**746**	**NE**	**1**	**0.2**	**1.68**	**5.32**	**NE**
Provisional Background Threshold Values (Pee Dee Upper Unit)	**7.8-9.3**	**3010**	**1932**	**277**	**2442**	**1**	**2.78**	**18.7**	**0.118**	**1**	**1**	**305**	**118**	**NE**	**1**	**0.2**	**1.91**	**4**	**NE**
Provisional Background Threshold Values (Pee Dee Lower Unit)	**6.9-9.7**	**4730**	**2567**	**171**	**3400**	**1**	**3**	**70**	**0.2**	**1**	**1**	**1230**	**93.9**	**NE**	**1**	**0.2**	**0.693**	**2.06**	**NE**

				PARAMED 40CFR257 APPENDIX III CONSTITUENT					INORGANIC PARAMETERS (TOTAL CONCENTRATION)														
Sample ID	**Location Description**	**Sample Location Aquifer Name**	**Sample Collection Date**	**pH**	**Boron**	**Chloride**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Barium**	**Chromium (VI)**	**Chromium**	**Cobalt**	**Iron**	**Manganese**	**Nitrate (as N)**	**Selenium**	**Thallium**	**Vanadium**	**Total Radium**	**Fluoride**
SMW-06C IMP	E of basins outside CB on adjacent property	urficial Lowe	03/22/2018	**4.9**	251	20	72	120	<1	<1	56	<0.025	<1	**5.6**	249	**323**	NA	<1	<0.2	**0.43**	NA	0.0732 j
SMW-06C	E of basins outside CB on adjacent property	urficial Lowe	03/22/2018	**4.9**	267 B2	21	65	120	<1	<1	56	NA	<1	**5.09**	NA	NA	NA	<1	<1	NA	0.4097	0.0461 j
SMW-06C	E of basins outside CB on adjacent property	urficial Lowe	06/19/2018	**5.0**	195	16	61	100	<1	0.781 j	45	<0.025 P4	0.626 j	**4.29**	**1120**	**262**	NA	<1	0.094 j	**1.88**	NA	0.0498 j
SMW-06C	E of basins outside CB on adjacent property	urficial Lowe	10/24/2018	**4.9**	245	20	73	120	<1	<1	60	<0.025	<1	**4.64**	**325**	**322**	NA	<1	<0.2	**0.804**	NA	0.0398 j
SMW-06C IAP	E of basins outside CB on adjacent property	urficial Lowe	10/24/2018	**4.9**	235	21	63	160	<1	<1	57	NA	<1	**4.61**	NA	NA	NA	<1	<1	NA	0.564	<0.1
SMW-06D IMP	E of basins outside CB on adjacent property	ee Dee Uppe	03/22/2018	8.1	**1080**	190	11	**650**	<1	1.55	20	0.16	0.715 j	<1	148	35	NA	<1	<0.2	**1.23**	0	1.2
SMW-06D	E of basins outside CB on adjacent property	ee Dee Uppe	03/22/2018	8.1	**1110 B2**	190	8.9	**650**	<1	1.5	20	NA	0.555 j	<1	NA	NA	NA	<1	<1	NA	-0.397	1.2
SMW-06D	E of basins outside CB on adjacent property	ee Dee Uppe	06/19/2018	8.1	**1120**	200	1.8	**700**	<1	1.49	17	0.085	0.536 j	<1	141	27	NA	<1	0.138 j	**1.15**	NA	1.2
SMW-06D	E of basins outside CB on adjacent property	ee Dee Uppe	10/24/2018	8.3	**1160**	190	4.9	**670**	<1	1.35	17	0.055	0.451 j	<1	158	29	NA	<1	<0.2	**1.04**	NA	1
SMW-06D IAP	E of basins outside CB on adjacent property	ee Dee Uppe	10/24/2018	8.3	**1110**	190	3.2	**720**	<1	1.31	18	NA	0.441 j	<1	NA	NA	NA	<1	<1	NA	0.2925	1

COLOR NOTES

Bold highlighted concentration indicates exceedance of the 15A NCAC 02L .0202 Standard or the IMAC. (Effective date for 15A NCAC 02L .0202 Standard and IMAC is April 1, 2013)

Turbidity of Sample ≥ 10 NTUs

Provisional Background Concentrations updated with Background Results through September 2017.

Analytical data review has not been completed for this dataset.

ABBREVIATION NOTES	
BGS - below ground surface	ND - Not detected
BOD - Biologic Oxygen Demand	NE - Not established
CB - Compliance Boundary	NA - Not available or Not Applicable
COD - Chemical Oxygen Demand	ND - Not detected
Deg C - Degrees Celsius	NE - Not established
DMAs - dimethylarsinic acid	NM - Not measured
DUP - Duplicate	NTUs - Nephelometric Turbidity Units
Eh - Redox Potential	pCi/L - picocuries per liter
ft - Feet	PSRG - Primary Soil Remediation Goals
GPM - gallons per minute	RL - Reporting Limit
IMAC - Interim Maximum Allowable Concentrations - From the 15A NCAC	SeCN - selnocynante
MDC - Minimum Detectable Concentrati	SeMe (IV) - Selenomethionine
MeSe - Methylseleninic acid	SPLP - Synthetic Precipitation Leaching Procedure
mg/kg - milligrams per kilogram	S.U. - Standard Units
mg/L - milligrams per liter	TCLP - Toxicity Characteristic Leaching Procedure
mg-N/L - Milligram nitrogen per liter	ug/L - micrograms per liter
MMAs - monomethylarsonic acid	ug/mL - microgram per milliliter
mV - millivolts	umhos/cm - micromhos per centimeter
NA - Not available or Not Applicable	Well Locations referenced to NAD83 and elevations referenced to NAVD88

Bednarcik Direct AGO Cross Ex. 14
Docket No. E-2, Sub 1219A

Hart Exhibit 58
Docket No. E-2, Sub 1219

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THE ELM CONSULTING GROUP INTERNATIONAL LLC

ENVIRONMENTAL AUDIT IN SUPPORT OF THE COURT APPOINTED MONITOR

W. H. Weatherspoon Power Plant
Lumberton, North Carolina
USA

April 2019

Final Report Issued to:

Duke Energy and the Court Appointed Monitor

Prepared By:

Advanced GeoServices Corp.
and
The Elm Consulting Group International LLC

TABLE OF CONTENTS

1.0 INTRODUCTION

Advanced GeoServices Corp. (AGC) and The Elm Consulting Group International LLC (Elm) (collectively, the Audit Team) are conducting environmental compliance audits (the Audits) of certain coal combustion residuals (CCR) management locations owned or operated by Duke Energy Business Services LLC, Duke Energy Carolinas, LLC, and Duke Energy Progress, Inc. (collectively, Duke Energy). The Audits are being conducted under the direction of Mr. Benjamin Wilson, the Court Appointed Monitor, pursuant to an Order issued by the U.S. District Court, Eastern District of North Carolina, in case numbers 5:15-CR-62-H, 5:15-CR-67-H, and 5:15-CR-68-H.

The scope of the Audits is set forth in the plea agreements entered into by Duke Energy and the United States in the above cases, the Court's judgments in these cases, and a written Audit scoping document agreed to by Duke Energy and the United States.

1.1 BACKGROUND INFORMATION FOR THE W. H. WEATHERSPOON AUDIT

The subject of this report is the Audit completed at Duke Energy's W. H. Weatherspoon Power Plant located in Lumberton, North Carolina (Weatherspoon Facility). The Audit was conducted on February 13-14, 2019 for a total of two days on-site. The Audit Team consisted of the following senior auditors:

•	Mr. Christopher Reitman, P.E., AGC	Project Director, Audit Team Leader, Sr. Subject Matter Expert (on-site)
•	Mr. Joseph Cotier, CPEA, Elm	Sr. Environmental Auditor (on-site)
•	Mr. Bernie Beegle, P.G., AGC	Sr. Subject Matter Expert (off-site)

The Weatherspoon Facility was represented by:

- Mr. Tim Russell, CCP System Owner
- Mr. Issa Zarzar, General Manager, Carolinas East Region, CCP Operations and Maintenance
- Ms. Asha Sree, CCP Engineering & Closure Engineering
- Mr. Bobby Barnes, Manager, Engineering & Closure Engineering
- Mr. Steve Gordy, CCP Projects
- Mr. Steve Cahoon, EHS CCP Permitting and Compliance
- Ms. Anne Pifer, Manager, EHS CCP Permitting and Compliance
- Ms. Bryson Sheetz, EHS CCP Waste & Groundwater
- Ms. Tammy Jett, EHS CCP Waste & Groundwater (by phone)
- Mr. Randy Hart, Regulatory Affairs
- Mr. Shane Johnson, Environmental Rover, EHS CCP Compliance
- Mr. Mike Phillips, Manager, EHS CCP Compliance
- Mr. John Slothower, EHS CCP Environmental Field Support
- Mr. Kent Tyndall, Station Environmental Field Support
- Mr. Josh Schieffer, Station H&S Field Support
- Mr. Keith Higgins, EHS CCP Compliance

1.2 FACILITY OVERVIEW

The Duke Energy Weatherspoon Facility is located at 491 Power Plant Road, Lumberton, North Carolina. The Weatherspoon Facility is located along the east side of the Lumber River and according to Duke Energy personnel first began power generation in 1949. Duke personnel stated that three coal-fired power plants were operated during the facility's history with Units 1, 2, and 3 having been retired in 2011. No coal combustion has occurred since 2011. Four fast-start combustion turbines (CTs) were installed circa 1971-1972; the CTs operate on number 2 fuel oil.

The Weatherspoon Facility also continues to operate and maintain an approximately 225-acre Cooling Pond, and the infrastructure at the facility remained substantially the same as during the 2018 Audit. Since there was no coal combustion at the facility, there was no active ash generation observed by the Audit Team.

1.2.1 Ash Management Activities

Limited information is available regarding the early ash management activities on-site. These activities likely began with production of power, which Duke Energy personnel stated was in 1949. Duke Energy also reported that the existing Ash Basin was split into several discrete sections identified as Areas A through G on drawings provided by Duke Energy. The first available design drawings for the Ash Basin were reportedly from 1979, and it is sometimes referred to as the 1979 Ash Basin by Duke Energy.

Duke Energy has completed several upgrades to the 1979 Ash Basin over the last five years. These upgrades have included reshaping and regrading the slopes on the northern end of the basin, regrading the interior of the northern side of the basin to facilitate interior drainage, constructing an alternative overflow discharge area within the basin, constructing a reverse filter at the outlet of the basin, upgrading the toe drain on the south side of the basin, spraying a synthetic coating on portions of the basin to reduce erosion, and constructing an "Effluent Channel" to redirect seepage from Jacob Swamp towards the Cooling Pond. The 1979 Ash Basin modifications were completed either voluntarily by Duke Energy or in accordance with directives from the state of North Carolina to increase the integrity of the 1979 Ash Basin.

The Cooling Pond is an integral part of the on-site water management system. The Cooling Pond is used to treat CCR contact stormwater, CCR seepage, and CCR leachate.

Current plans call for the 1979 Ash Basin to be closed through removal of the 2,450,000 tons of CCR which were originally estimated to be present at the Weatherspoon Facility. Duke Energy is currently implementing an ash beneficiation project. This project includes excavation of the ash and off-site beneficial use of the CCR material in cement.

1.2.2 Environmental Permits and Programs

The portions of the Weatherspoon Facility subject to this Audit operate under the following environmental permits and programs:

- **National Pollutant Discharge Elimination System (NPDES) Wastewater Permitting** – The period of review included review of two separate NPDES permits for the Weatherspoon Facility, as follows:

  1. The North Carolina Department of Environmental Quality (NCDEQ) issued NPDES Permit No. NC0005363 with an effective date of January 1, 2010 and an expiration date of July 31, 2014. A timely permit renewal application package was submitted to NCDEQ on January 28, 2014. Permit renewal application amendments or updates were submitted to NCDEQ as follows:
     - October 10, 2014 – request for inclusion of seeps;
     - March 23, 2015 – submission of chemical characterization of water for dewatering of the 1979 Ash Basin; and
     - August 21, 2017 – request to construct an emergency spillway adjacent to Outfall 001 allowing discharge from the cooling pond to the Lumber River under emergency circumstances.

The permit covered the following ash management activities:

- Outfall 001 – This outfall discharges from the Cooling Pond to the Lumber River and includes recirculated cooling water, coal pile, stormwater runoff, ash sluice water, treated domestic wastewater, chemical metal cleaning, and low volume wastewater including reject water from operation of a reverse osmosis unit.

- Section B(1) addressed stormwater for the Weatherspoon Facility. However, NCDEQ sent a letter to Duke Energy on June 15, 2011 approving Duke Energy's request to remove all stormwater requirements from the Permit.

Part III.B of the NPDES Permit's Other Requirements requires groundwater monitoring if requested by NCDEQ. The Weatherspoon Facility operates an NPDES groundwater network of 4 wells: 3 compliance (down-gradient) wells and 1 background well, for determining compliance with groundwater limits pursuant to 15A NCAC 02L.0200. The NPDES groundwater network was sampled and reported tri-annually (March, June, and October). The last sampling event conducted under this permit was October 2018. As noted below, the new NDPES permit does not require groundwater monitoring.

2. The renewed NPDES Permit No. NC0005363 was issued on August 3, 2018 and became effective on November 1, 2018. The permit carries an expiration date of October 31, 2023. Changes to the NPDES permit included:

- <u>Increased number of parameters to monitor at Outfall 001 during discharge to the Lumber River</u>: During Hurricane Florence, there was an influx of stormwater to the Cooling Pond as well as the overtopping of water from Jacob's Creek into the Cooling Pond. Due to these events, Duke Energy opened the gate at Outfall 001 and discharged water to the Lumber River from September 15 to September 30, 2018. Required monitoring was completed on September 17, 2018.

- Inclusion of Internal Outfall 001A for monitoring ash pond dewatering at the immediate exit pipe of the ash pond (Pond 4): This outfall discharges to the Cooling Pond and ultimately to Outfall 001.
- Inclusion of Internal Outfall 115A for monitoring seven constructed seeps located at the eastern toe of the 1979 Ash Basin: The seeps included are S-11, S-12, S-13, S-14, S-25, S-26, and S-27. An additional 13 seeps have been identified at the Weatherspoon Facility. According to Duke Energy, these non-constructed seeps will be included in a Special Order by Consent (SOC) to be issued by NCDEQ at a date in the near future. This outfall discharges to the Cooling Pond and ultimately to Outfall 001.
- Inclusion of monthly In-Stream monitoring in the Lumber River: This monitoring must be conducted if Outfall 001 has a discharge within the previous 24 months. During Hurricane Florence, there was an influx of stormwater to the Cooling Pond as well as the overtopping of water from Jacob's Creek into the Cooling Pond. Due to these events, Duke Energy opened the gate at Outfall 001 and discharged water to the Lumber River from September 15 to September 30, 2018. In-stream monitoring commenced in November 2018 upon the renewed NPDES Permit becoming effective.
- Inclusion of annual fish tissue monitoring in the Lumber River: Fish tissue must be analyzed for arsenic, mercury, and selenium with the sampling results to be submitted to NCDEQ with the next permit renewal application.
- Removal of the requirement for conducting groundwater monitoring.

The renewed NPDES Permit has eliminated the groundwater monitoring requirements included in the earlier NPDES permit. However, Part I, Paragraph A(8) of the renewed NPDES Permit states an exceedance of groundwater standards at or beyond the compliance boundary is subject to remediation action according to 15A NCAC 02L.0106(c), (d), or (e), as well as enforcement actions in accordance with North Carolina General Statute 143-215.6A through 143-215.6C.

- **NPDES Stormwater Permitting** – NCDEQ issued an Individual Stormwater Permit, No. NCS000589, to Duke Energy on February 1, 2017, with an effective date of February 1, 2017 and an expiration date of January 31, 2022. Implementation of the monitoring and the Stormwater Pollution Prevention Plan (SWPPP) was required to be completed prior to removal and beneficial use of ash from the 1979 Ash Basin. Three stormwater outfalls described below must be monitored during ash hauling activities:
  - SW-1 – areas draining the access road and discharges to an unnamed tributary to the Lumber River;
  - SW-2 – areas draining the access road, ditches along the abandoned railroad line, the administration building, and a vegetated area adjacent to the power plant; and discharges to an unnamed tributary to the Lumber River; and
  - SW-3 – areas discharging along the western edge of the access road and picnic area adjacent to the power plant and discharges to an unnamed tributary to the Lumber River.

The SWPPP was developed and implemented on July 21, 2017. With ash hauling commencing on September 13, 2017, inspections and monitoring required by the stormwater permit and described in the SWPPP began during the third quarter of 2017.

On December 14, 2018, a stormwater sample was collected at Outfall SW-2. The total suspended solids (TSS) result was 110 mg/L. The permit states a benchmark value of 100mg/L for TSS. An exceedance of a benchmark value does not constitute a violation but does require specific actions to be taken by the permitted facility. The first exceedance of a benchmark value requires the facility to implement actions listed as Tier One. Based on review of available records, the Weatherspoon completed all Tier One actions related to the exceedance of the TSS benchmark value.

- **NPDES Stormwater Construction Permitting** – NCDEQ has issued three stormwater construction permits governing activities related to the ash basin and ash management under its General Permit for Construction Activities, No. NCG010000. The three permits, ROBES-2016-007, ROBES-2016-013, and ROBES-2018-001, were all closed based on a NCDEQ inspection that took place on November 29, 2018. There were no other stormwater construction permits in place at the Weatherspoon Facility at the time of the Audit.

- **Title V Permitting** – NCDEQ Title V Permit No. 06094T21 was issued and also became effective on April 4, 2017 and has an expiration date of March 31, 2022. Site-wide fugitive dust is covered under Section 3.MM of the Permit. Duke Energy calculated potential emissions for particulate matter from excavation and hauling activities to be approximately 3.5 tons per year, below the permitting threshold of 5 tons per year. The Annual Compliance Certification for 2017 was submitted to NCDEQ on February 24, 2018.

- **Spill Prevention, Control and Countermeasure (SPCC) Plan** – BHI, Inc. operates the basin excavation activities as a contractor to Duke Energy. Oil storage associated with those activities were addressed in the BHI, Inc. SPCC Tier I Qualified Plan which was last revised on April 16, 2018.

- **Tier II Reporting** – The Tier II hazardous chemicals inventory report for 2017 was submitted on February 24, 2018.

- **Coal Ash Management Act (CAMA)** – CAMA requirements include identification of drinking water supply wells within a half mile of the facility, submission of Groundwater Assessment Plans, installation and multiple rounds of sampling from assessment wells, submission of Groundwater Assessment Reports summarizing groundwater investigations, submission of an Annual Groundwater Protection and Restoration Report, submission of Discharge Assessment Plans to characterize seeps, submission of a Groundwater Corrective Action Plan, and 1979 Ash Basin closure/removal. CAMA identifies the Weatherspoon Facility as an intermediate risk facility and requires closure by December 31, 2024 unless the CCR is being beneficiated. Since CCR is being beneficiated, this closure deadline has been extended to December 31, 2029.

  On October 19, 2017, Duke Energy submitted Revised Interim Monitoring Plans (IMPs) to NCDEQ for groundwater at 14 Duke Energy facilities located in North Carolina, including the Weatherspoon Facility. The revised facility monitoring is required on a quarterly basis, commencing the fourth quarter of calendar year 2017 pursuant to 15A NCAC 02L.0110, until Corrective Action Plans are accepted for the individual facilities or as directed otherwise by NCDEQ. The quarterly sampling events will be conducted in conjunction with planned compliance monitoring sampling events for three quarters during the calendar year, supplemented with an additional sampling event conducted at each facility in order to provide four rounds of monitoring data to evaluate seasonal fluctuations during a year-long timeframe. The 2018 CAMA groundwater monitoring network at the Weatherspoon Facility consisted of 39 wells. On December 21, 2018, NCDEQ issued Duke Energy optimized Interim Monitoring Plans (IMPs) for all the 14 Duke Energy Facilities with groundwater sampling to begin in the first quarter of 2019.

Duke Energy submitted to NCDEQ the required 2018 Groundwater Protection and Restoration Annual Report on January 25, 2019 and the 2018 Surface Water Protection and Restoration Annual Report on January 21, 2019, both specific to the Weatherspoon Facility. Duke Energy plans to submit the CAMA Comprehensive Site Assessment Update for the Weatherspoon Facility to NCDEQ by June 2020.

- **Cooling Pond** – In a letter dated July 8, 2016, the NCDEQ requested that Duke Energy assess the distribution of CCR in the Cooling Pond. The purpose of the assessment is to determine if potential coal ash constituents in the Cooling Pond may be an additional contributing source to groundwater contamination. As part of the assessment, three new groundwater monitoring wells were installed on the Cooling Pond dike and were screened in the upper surficial unconfined aquifer. The Cooling Pond groundwater network consists of these three new wells (AW-04S, AW-05S, and AW-06S) and four existing piezometers (PZ-100 through PZ-103). Duke Energy submitted to the NCDEQ a Cooling Pond Assessment Report dated May 26, 2017. The Cooling Pond Assessment Report stated that visual inspections of 23 of 24 Cooling Pond sediment cores identified the presence of coal ash. The Report also noted that cobalt and manganese were the only two constituents in the Cooling Pond down-gradient groundwater samples with concentrations greater than the NCDEQ 2L standards. Duke Energy conducted a second groundwater sampling event during August 2017. Duke Energy has not received any comments from NCDEQ regarding the Cooling Pond Assessment Report and the Cooling Pond wells continue to be sampled as part of IMP activities.

- **CCR Rule** – The 1979 Ash Basin is subject to the CCR Rule because the Weatherspoon Facility currently produces electricity during periods of peak demand. A CCR groundwater monitoring well network of two background wells and 12 down-gradient wells has been established at the 1979 Ash Basin.

  In previous Audits, it was noted the Initial Structural Stability Assessment states the foundation abutments of the 1979 Ash Basin would not be stable during a seismic event. The Initial Factor of Safety Assessment states the seismic minimum factor of safety is not met and the dikes are constructed of soils that are susceptible to liquefaction. Duke Energy plans to address these issues once the CCR materials present in the 1979 Ash Basin have been excavated and removed.

  On April 3, 2018, Duke Energy provided notice on Duke Energy's public website that the 1979 Ash Basin is in the CCR assessment monitoring program due to statistically significant increases over the background values of the Appendix III parameters.

  On November 7, 2018, Duke Energy posted the required location restrictions for impoundments, which stated the 1979 Ash Basin did not meet the surface impoundment standard for placement above the uppermost aquifer (40 C.F.R. § 257.60(a)), wetlands (40 C.F.R. § 257.61(a)), unstable areas, (40 C.F.R. §257.64(a)), or seismic impact zones (40 C.F.R. § 257.63(a)).

  On December 14, 2018, Duke Energy provided notice on Duke Energy's public website that the following CCR Rule Appendix IV constituents were detected at levels above the applicable Groundwater Protection Standard (GWPS).

- Arsenic
- Radium 226 and 228 combined

On January 18, 2019, Duke Energy issued the CCR Annual Groundwater Monitoring and Corrective Action Report for the 1979 Ash Basin. Duke Energy has also developed numerous submittals required by the CCR Rule, as shown in Table 1.

Duke Energy was continuing to implement the groundwater assessment process prescribed by the CCR Rule at the time of the Audit.

1.2.3 Dam and Other Structural Permits and Approvals

The 1979 Ash Basin is identified by the state ID No. ROBES-009. The 2018 Annual Ash Basin Inspection Report indicates the 1979 Ash Basin has a maximum structural height of 28 feet, a surface area of 56 acres, and contains 2,320,000 tons of ash. According to the 2014 Annual Inspection Report, the dam is classified as a small high-hazard dam. Since there are currently no ash generation activities at the facility, ash is no longer sluiced into the 1979 Ash Basin and the 1979 Ash Basin is considered inactive with regard to ash disposal activities.

The 2018 Annual Report notes a few areas were observed with vegetation which appeared to be sparse, particularly along the northern slope. However, overall, the vegetation appeared to be well-maintained. Portions of the slope are covered with an erosion-resistant covering called Posi-Shell®. Observations during the Audit indicated the Posi-Shell® was functioning well. A CCTV inspection of the principal spillway was completed on March 14, 2018. Based on the inspection, "no modifications or repairs were recommended" by the independent reviewing engineer working for Duke Energy.

The dam was grandfathered under North Carolina's Session Law 2009-390 (Senate Bill 1004, effective date January 1, 2010). Under this grandfathering, the original design of the 1979 Ash Basin dam is not subject to current design standards for new dam construction, although modifications after the effective date may be subject to these standards.

1.2.4 Update Since Last Audit

Current plans call for the 1979 Ash Basin to be closed through the removal of the originally estimated 2,450,000 tons of CCR which were present in the 1979 Ash Basin at the Weatherspoon Facility. On September 13, 2017, Duke Energy began ash removal from the 1979 Ash Basin for beneficial use off-site at two cement companies with plants located in Holly Hill and Harleyville, South Carolina. Duke Energy is currently dewatering the 1979 Ash Basin and utilizing equipment and methods on-site to excavate and move the CCR off-site. As of January 19, 2019, 344,109 tons of ash had been removed from the Weatherspoon Facility, including 261,432 tons since the 2018 Audit. Duke Energy estimates that all of the 1979 Ash Basin closure activities will be completed by 2029. To the extent that there is any remaining CCR in the 1979 Ash Basin after beneficiation operations have permanently ceased, Duke Energy plans on excavating the CCR and transferring it to a permitted disposal facility.

Duke Energy submitted an Excavation and Soil Sampling Plan to NCDEQ in December 2017 and is planning to submit the Weatherspoon 1979 Ash Basin Closure Plan on September 30, 2019.

2.0 AUDIT SCOPE AND SUBJECT MATTER

The Audit was completed in accordance with the court documents and the audit scoping document agreed to by Duke Energy and the United States. A description of the scope is provided as Attachment A. The Audit included a review of ash management activities, including aspects of generation that affect the nature of the waste streams from the point of generation into surface impoundments or ash management basins, landfills, and/or storage piles. The Audit focused on the activities at the Weatherspoon Facility since the date of the last Audit, which was February 14-15, 2018.

3.0 AUDIT FINDINGS

3.1 EXCEEDANCE OF THE STATE GROUNDWATER QUALITY STANDARDS

Requirement – The State groundwater rules establish maximum contaminant levels (MCLs) for groundwater at or beyond the compliance boundary for the Ash Basin. *See* 15A NCAC 02L.0202. 15A NCAC 02L.0103(d) provides that "[n]o person shall conduct or cause to be conducted, any activity which causes the concentration of any substance to exceed that specified" under the Class GA standards or the interim maximum acceptable concentrations (IMACs) established for groundwater quality pursuant to 15A NCAC 02L.0202. Further, under N.C.G.S.A. § 143-215.1(i), "[a]ny person … who is required to obtain an individual permit … for a disposal system under the authority of N.C.G.S.A. § 143-215.1 [water pollution control] … shall have a compliance boundary … beyond which groundwater quality standards may not be exceeded." *See also* 15A NCAC 02L.0102(3) (defining "compliance boundary" as "a boundary around a disposal system at and beyond which groundwater quality standards may not be exceeded").

In addition, under N.C.G.S.A. § 143-215.6A(a)(1), civil penalties may be assessed against any person who violates any standard established by the NCDEQ under the authority of N.C.G.S.A. § 143-214.1, which covers groundwater standards.

Finding – Constituents exceeding the standards for Class GA waters, established in 15A NCAC 2L.0202, were documented in monitoring wells located at or beyond the compliance boundary for the Weatherspoon Facility's 1979 Ash Basin. A review of the 2018 NPDES groundwater monitoring well data showed that pH and iron exceeded the 2L groundwater standards. Attachment B provides a summary of the 2018 NPDES groundwater data reviewed and a Figure showing the NPDES well locations.

The 2018 CAMA groundwater monitoring network consisted of 39 wells. Based on a review of the January 2018 CAMA groundwater monitoring analyses, cobalt, iron, and manganese exceeded the 2L groundwater standards or the NCDEQ-approved provisional background threshold values (PBTVs), if the PBTV was greater than the 02L, one or more times at or beyond the compliance boundary of the 1979 Ash Basin. These exceedances of cobalt, iron, and manganese were observed in wells located near the Cooling Pond. The Cooling Pond groundwater network consists of three wells identified as AW-04S, AW-05S, and AW-06S.

Duke has stated its opinion that, pursuant to a September 2015 Settlement Agreement with the NCDEQ, "Duke Energy is not subject to any further financial penalties for exceedances of groundwater standards" and "Duke Energy is not subject to any further enforcement action based on exceedances of groundwater standards as long as it remains in substantial compliance with CAMA groundwater requirements."

The CAM has advised the Audit Team that the Audit scope does not include an evaluation of compliance with the September 2015 Settlement Agreement, and therefore the Audit Team does not take a position on Duke Energy's opinion.

4.0 OPEN LINES OF INQUIRY

Open Lines of Inquiry are items identified by the Audit Team while on-site that, due to limited available information, an unsettled area of law, or the need for additional research, could not be determined as being in compliance or out of compliance.

4.1 CLEAN WATER ACT DISCHARGES THROUGH WETLANDS

Requirements – Sections 301 and 402 of the federal Clean Water Act (CWA) prohibit the discharge of any pollutant into the waters of the United States except in compliance with a permit issued pursuant to the CWA under the National Pollutant Discharge Elimination System (NPDES) by the U.S. EPA or a state with an approved program. 33 U.S.C. §§ 1311(a), 1342. NCDEQ implements an approved NPDES program in North Carolina under 15A NCAC 2H.0100 *et seq*. "Waters of the United States" is defined in part as including wetlands, i.e., "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation adapted for life in saturated soil conditions." 40 C.F.R. § 110.1 (defining "navigable waters" and "waters of the U.S."). The U.S. Army Corps of Engineers issues jurisdictional determinations, which determine whether a wetland qualifies as "waters of the United States." At other Duke Energy facilities, NCDEQ has taken the position that a seep discharging into a jurisdictional wetland can be subject to NPDES permitting.

Open Line of Inquiry

The following Open Line of Inquiry is similar to those in the 2017 and 2018 Audits. In 2017 and 2018, several seeps were observed with CCR impacts. During the 2019 Audit, only one seep, Area of Wetness S-16, contained a contaminant of concern (boron) and is believed to have been impacted by CCR residuals.

Existing Conditions

Contaminated seepage exists around the 1979 Ash Basin and is collected in channels at the base of the 1979 Ash Basin. There are two discrete channels that capture the contaminated seepage from the 1979 Ash Basin. Based on a data review, contaminated seepage discharges were identified during the 2017 Audit at seeps identified as S-04, S-11, S-12, S-13, S-14, S-15, S-23, and S-24 on the western and southern sides of the basin. The flows are combined with discharges S-02, S-03, and S-05 from the eastern side of the basin, which are conveyed in a recently constructed effluent channel. Preliminary wetlands drawings completed by consultants for Duke Energy, and included as Attachment C to this report, show these flows discharge to wetlands prior to entering the Cooling Pond. The area of wetlands shown on the preliminary mapping provided in Attachment C was not certified as a jurisdictional wetland at the time of the Audit. None of these seeps were sampled during 2018. This may have been due to dewatering activities within the 1979 Ash Basin, which has reduced seepage pressure.

On the western side of the 1979 Ash Basin, contaminated seepage discharges from S-9 and S-16 flow in a discrete channel. The flow in the discrete channel discharges through an area shown as wetlands on the preliminary wetlands drawings, prior to entering the Cooling Pond. Discharges from S-9 and S-16 did not pass through an outfall prior to entering the wetlands. During the 2019 Audit, many of the seeps were not flowing and only location S-16 was found to have CCR related compounds.

Any water which enters the Cooling Pond from the 1979 Ash Basin may discharge through Outfall 001 into the Lumber River. However, due to the unique hydrogeological conditions in the area, water discharged to the Cooling Pond either infiltrates or evaporates, and Duke Energy personnel reported that there is rarely a discharge through Outfall 001 into the Lumber River.

During the 2017, 2018, and 2019 Audits, only preliminary wetlands mapping completed by Duke Energy's consultants was available and it was not clear whether seepage from the 1979 Ash Basin was entering a jurisdictional wetland area. As of the date of the 2019 Audit, Duke Energy had not yet received a jurisdictional determination from the Army Corps of Engineers.

At the time of the 2019 Audit, NCDEQ had issued the renewed NPDES permit for the Weatherspoon Facility, which included coverage for the engineered seeps. Duke Energy personnel also expected a Special Order by Consent (SOC) to address the remaining non-engineered seeps in the near future, although a specific schedule has not yet been established.

Open Line of Inquiry

The available information suggests the seepage from the 1979 Ash Basin may be entering a jurisdictional wetland area, which would make the wetland a water of the State and the United States, prior to reaching the approved NPDES outfall. In the absence of information on whether the discharges from the channels is to a jurisdictional wetlands area, the Audit Team cannot conclude whether there is a violation of Sections 301 and 402 of the Clean Water Act. For this reason, this is considered to be an Open Line of Inquiry.

5.0 AUDIT APPROACH

5.1 ON-SITE ACTIVITIES

During its time on-site, the Audit Team conducted an opening conference with facility personnel to discuss the scope of work and the plan for accomplishing necessary tasks while at the Weatherspoon Facility. A site tour of the coal ash management and program support areas was subsequently completed. Following the tour, the Audit Team conducted a review of pertinent files, interviews with facility representatives, and verification of facility activities related to the Environmental Compliance Plans (ECPs), written programs, and permits. A debrief was conducted each Audit day to advise the facility representatives of Audit progress, Open Lines of Inquiry, possible Audit Findings, and needs for the next day. At the completion of the Audit, the Audit Team led a verbal discussion of draft Audit findings with facility representatives.

5.2 STANDARDS OF PRACTICE

The fieldwork portion of the Audit was conducted on February 13-14, 2019, with compliance reporting commencing May 14, 2015, the date of the court's judgments. The Audit focused on the activities at the facility since the date of the last Audit, which was February 14-15, 2018. The Audit was based on:

- Physical inspections of the facility;
- Examination of selected administrative and operating records made available by facility staff at the Audit Team's request;
- Interviews and discussions with key facility management and staff; and
- Verification procedures designed to assess the facility's application of, and adherence to, terms of the probation, environmental laws and regulations, and site policies and procedures. In addition, the Audit Team reviewed the facility's adherence to good management practices.

The Audit followed established audit protocols and procedures. It should be understood that the Audit consisted of evaluating a sample of practices and was conducted over a short period of time. Efforts were made toward sampling major facets of environmental performance during the period under review. This method is intended to uncover major system deficiencies and the Audit may not have identified all potential problems.

To support the overall independence of the Audit process, the Audit included an auditing professional certified by the Board of Environmental, Health and Safety Auditor Certifications (BEAC). BEAC is an accredited professional certification board that issues the Certified Professional Environmental Auditor (CPEA) designation to qualified auditors. Under BEAC, auditor independence is a key criterion for the implementation of an effective third-party audit program. The Audit was implemented in accordance with the standards related to auditor independence.

The process by which the Audit was conducted was consistent with the general state of the art of environment auditing and the best professional judgment of the Audit Team. To conduct the Audit, the team implemented a formal approach, drawing on process guidance from both BEAC and the Auditing Roundtable (AR) guidance documents. Guidance documents included:

- *Standards for the Professional Practice of Environmental, Health and Safety Auditing*. Prepared by the Board of Environmental, Health and Safety Auditor Certifications, 2008.

- ISO 19011:2002 – Guidelines for Quality and/or Environmental Management Systems Auditing. Prepared by the International Organization for Standardization, 2002.

- Standard for the Design and Implementation of an Environmental, Health and Safety Audit Program. Prepared by The Auditing Roundtable, Inc., 1995.

- Minimum Criteria for the Conduct of Environmental, Health and Safety Audits. Prepared by The Auditing Roundtable, Inc.

5.3 REPRESENTATIVE SAMPLING

When confronted with a large population of data to review or equipment to inspect, the Audit Team employed representative sampling techniques to evaluate records over the Audit period requested, and as necessary, for physical inspection of some types of common equipment. The sample size for record reviews or equipment inspections required professional judgment.

The Audit Team's judgement considered the following:

- The outcome of the evaluation of the records sampled. If problems are found in the representative sample, more records may need to be examined to evaluate compliance status.
- Potential for or severity of non-compliance.
- The general appearance and observed practices of certain operating areas.
- Information obtained during an interview that indicates a potential problem.
- Other specific information or guidance from the CAM.
- Time available during the Audit.

The Audit Team also employed the following types of sampling techniques, depending upon the characteristics of a specific population:

- Random sampling – every item has an equal chance of being selected.

- Interval sampling – select every nth item, (e.g., every third manifest in chronological order as contained in facility files).

- Block sampling – auditor uses his/her judgment to select a specific block of items, (e.g., petroleum storage tank inspections from April to October).

- Stratified sampling – population is divided into groups, which are then sampled through random or judgmental techniques.

TABLE

TABLE 1
1979 ASH BASIN - Plans and Reports Posted by Duke Energy Under the CCR Rule

DOCUMENT NAME	CATEGORY	RELEASE DATE
CCR Annual Groundwater Monitoring and Corrective Action Report 2018	Groundwater Monitoring and Corrective Action	03/01/2019
Notice of Initiation of Assessment of Corrective Measures	Groundwater Monitoring and Corrective Action	02/19/2019
Notice of Groundwater Protection Standard Exceedance 2018	Groundwater Monitoring and Corrective Action	12/14/2018
Annual Fugitive Dust Control Report 2018	Operating Criteria	12/05/2018
Wetlands	Location Restriction	11/07/2018
Unstable Areas	Location Restriction	11/07/2018
Seismic Impact Zones	Location Restriction	11/07/2018
Fault Areas	Location Restriction	11/07/2018
Placement Above Uppermost Aquifer	Location Restriction	11/07/2018
Emergency Action Plan for Weatherspoon 1979 Ash Basin	Design Criteria	10/01/2018
CCR Annual Surface Impoundment Inspection Report 2018	Operating Criteria	07/17/2018
Annual Meeting with Local Emergency Responders 2018	Design Criteria	05/23/2018
Notice of Establishment of an Assessment Monitoring Program	Groundwater Monitoring and Corrective Action	04/03/2018
CCR Annual Groundwater Monitoring and Corrective Action Report	Groundwater Monitoring and Corrective Action	02/06/2018
Emergency Action Plan for Weatherspoon 1979 Ash Basin Revision 007A	Design Criteria	01/25/2018
Weatherspoon Inundation Plan	Design Criteria	01/25/2018
Notice of Intent to Close Weatherspoon 1979 Ash Basin R1	Closure and Post Closure Care	12/13/2017
2017 Annual CCR Fugitive Dust Control Report-Weatherspoon	Operating Criteria	11/29/2017

TABLE 1
(Continued)

DOCUMENT NAME	CATEGORY	RELEASE DATE
Groundwater Sampling and Analysis Program Selection of Statistical Method Certification-Weatherspoon 1979 Ash Basin	Groundwater Monitoring and Corrective Action	11/06/2017
Groundwater Monitoring System Certification-Weatherspoon 1979 Ash Basin	Groundwater Monitoring and Corrective Action	11/06/2017
CCR Fugitive Dust Control Plan Revision 1	Operating Criteria	07/11/2017
CCR Annual Surface Impoundment Inspection Report 2017	Operating Criteria	07/11/2017
Annual Meeting with Local Emergency Responders 2017	Design Criteria	06/21/2017
Annual Fugitive Dust Control Report 2016	Operating Criteria	12/05/2016
Initial Structural Stability Assessment Revision 1	Design Criteria	11/16/2016
Initial Structural Stability Assessment Revision 0	Design Criteria	11/16/2016
Initial Factor of Safety Assessment	Design Criteria	11/15/2016
Closure Plan for Impoundments	Closure and Post Closure Care	11/11/2016
Inflow Design Flood Control System	Operating Criteria	11/03/2016
History of Construction	Design Criteria	10/25/2016
Initial Hazard Classification Assessment Certification	Design Criteria	10/12/2016
Existing Liner Design Criteria	Design Criteria	10/11/2016
Notification of Intent to Initiate Closure - Inactive CCR Surface Impoundments	Closure and Post Closure Care	01/12/2016
Annual Surface Impoundment Report (Initial)	Operating Criteria	02/12/2016
Annual Surface Impoundment Report Revision 1	Operating Criteria	02/19/2016
Annual Surface Impoundment Report 2016	Operating Criteria	06/23/2016

*This summary of reports was downloaded on March 7, 2019

ATTACHMENT A

ATTACHMENT A
AUDIT SCOPE

A-1 GENERAL AUDIT SCOPE ITEMS

The general Audit scope items included:

- Review and evaluation of documentation for maintenance and repair of structures and equipment used for coal ash disposal.
- Review and evaluation of documentation of modifications, failures, leaks, damage, disrepair and other problems at the coal ash management units.
- Review and evaluation of documentation of efforts to correct failures, leaks, damage, disrepair and other problems where they determine that employee/contractor actions were likely a primary or contributing cause to a compliance finding.
- Review and evaluation of documentation of communication of the items above within the organization.
- Review and evaluation of documentation associated with the specific environmental compliance items described below and laws, regulations, and policies associated these items.
- Review of compliance with administrative aspects and regulatory submissions related to coal ash management-specific regulations, including the Coal Combustion Residuals Rule found in 40 CFR Part 257, Subpart D.

More specific items which were addressed in the audits to comply with the general Audit scope are described below.

A-2 SPECIFIC COMPLIANCE WITH OTHER PROVISIONS OF THE PLEA AGREEMENTS

The following items related to specific items in the plea agreements were reviewed as part of the Audit:

1. Determine whether Defendants have opened, expanded, or reopened any coal ash or coal ash wastewater impoundment and, if so, verify that they are lined and do not allow unpermitted discharges of coal ash or coal ash wastewater to waters of the United States.

2. Review citations/notices of violation/notices of deficiency related to violations of federal, state, or local law to assure that they have been properly relayed to the court and, as appropriate under the plea agreements, determine their materiality.

3. Note any observations made during the audit that cause concern regarding the assets and/or security available to the Defendants to meet the obligations imposed by the court's judgment.

A-3 GENERAL ENVIRONMENTAL COMPLIANCE SUBJECT AREAS

The following items related to general environmental compliance were reviewed as part of the Audit:

1. Assess all waste streams from Duke Energy facilities with coal ash impoundments. Review Duke Energy's processes, procedures, and practices, as well as compliance with those processes, procedures, and practices, for:

a. identifying waste streams (especially, but not limited to, waste streams with discharge points into bodies of water);
b. identifying and communicating any modifications or changes, or potential modifications or changes, to waste streams;
c. ensuring proper handling/disposal of waste streams;
d. identifying, preventing, and mitigating any risks or hazards that could affect waste streams and/or the disposal of waste streams; and,
e. ensuring proper permitting for waste streams.

For Item 1.d., the Audit Team evaluated such risk/hazard issues where there were compliance findings associated with waste streams.

2. Review and evaluate documentation of:

a. maintenance and repair of structures and equipment related to coal ash disposal;
b. modification of the coal ash impoundments and related pollution prevention equipment and structures;
c. failures, leaks, damage, disrepair, and other problems;
d. communication of the information described in a-c within the organization; and,
e. efforts to correct failures, leaks, damage, disrepair, and other problems.

3. Assess the employees responsible for inspection, maintenance, and repair of coal ash basins and related structures and equipment. The assessment included an assessment of the workloads of such employees to assure that Duke Energy's facilities are adequately staffed. These assessments were made where the Audit Team determined that employee/contractor actions were likely a primary or contributing cause to a compliance finding.

4. Review the results and recommendations of any other audits (internal or external/state-mandated) and assess Duke Energy's implementation of those recommendations.

5. Review and assess Duke Energy's processes, procedures, and practices for identifying, communicating, and addressing problems and potential problems at its coal ash basins (leaks, unpermitted discharges, etc.).

6. Review and assess Duke Energy's policies, procedures, practices, and equipment for handling emergency releases from its coal ash basins and evaluate the personnel with duties in such situations.

7. Verify that Duke Energy is complying with its NPDES wastewater and stormwater permits, as well as other relevant environmental permits. This would include verifying Duke Energy's timely submission of permit applications, permit renewal applications, and responses to requests for additional information from the relevant regulatory authority.

8. Review and assess any actions or measures Duke Energy has undertaken to assure accountability and prevent recurrences when problems and/or failures occur (e.g., disciplinary actions, re-training, revision to policies and procedures, etc.). This review was conducted where the Audit Team determined that employee/contractor actions were likely a primary or contributing cause to a compliance finding.

9. Review and assess compliance with the following environmental regulations, as applicable to the management of coal ash:

a. Wastewater Discharges	40 CFR 122; 15A NCAC 2H.0100 *et seq*
b. Stormwater Discharges	40 CFR 122.26; 15A NCAC 2H.1000 *et seq;* NC General Permit (Construction) No. NCG010000
c. NC Groundwater Standards	15A NCAC 02L.0202(h)
d. Hazardous Waste Management	15A NCAC 13A.0100 to 13A.0107
e. Oil Pollution Prevention	40 CFR Part 112
f. Air Pollution (Title V)	15A NCAC 2Q, and
g. Hazardous Chemicals (Tier II)	40 CFR Part 370.

Reviews also included an analysis of overall compliance and the status and security of the asset. Subsequent reviews of individual facilities will evaluate the movement towards compliance. The Audit scope did not include an evaluation of compliance with the September 2015 Settlement Agreement with NCDEQ.

A-4 LIST OF PERMITS AND PROGRAMS DEEMED TO BE EITHER DIRECTLY OR INDIRECTLY IN SUPPORT OF ASH MANAGEMENT

During the Audit, the Audit Team reviewed a variety of written programs developed and implemented by Duke Energy and facility staff. State-issued permits and supporting documentation relative to environmental programs and geotechnical aspects of ash basin management were also requested and reviewed.

Requested documents, pertinent to management of ash in basins, landfills, ponds, etc., were outlined in the pre-Audit questionnaire for the facility and included, but were not limited to:

1. The Compliance Register developed for eTRAC for the facility.

2. The Duke Energy Operations Manual for the facility.

3. A site plan, site map, or aerial photo which shows the entire facility and key features of the facility, including NPDES outfalls associated environmental monitoring locations, storage tanks, etc.

4. Most recent two (2) years of maintenance, monitoring, and inspection records for each coal ash/CCR basin (just the physical inspections, not the groundwater records).

5. A “Phase 1 and Phase 2” summary of ash basin conditions prepared by an outside consultant.

6. Duke Energy’s permitting plans for addressing ash impoundments and landfills at the facility.

7. Applicable pages from the Duke Energy basin-by-basin coal ash/CCR project tracking document for the facility.

8. Original basin/landfill/coal ash management unit construction records.

9. Documentation of changes to these units.

10. Coal ash unit construction permit application and approval.

11. State-issued permits and application materials for permits associated with coal ash/CCR management (including, e.g., dam permits).

12. Any currently effective state order, consent order, or similar state directive that addresses coal ash/CCR management at the facility.

13. Records required to be maintained in the facility's operating record under the federal CCR regulation and/or any state CCR regulatory program.

14. Records of off-site ash shipments from May 2015 forward.

15. Stormwater permit application and approval for all outfalls.

16. Industrial wastewater (NPDES/POTW) permit application and approval for all outfalls/discharges.

17. Industrial stormwater permit, sampling and monitoring records, and any corrective action plans (last two (2) years).

18. Stormwater Pollution Prevention Plan(s).

19. Landfill operating permit(s) with maintenance and monitoring requirements.

20. Landfill leak detection and groundwater monitoring records from the last two (2) years along with any workplans that describe the rationale for the monitoring system at the facility.

21. Air permits and applications for coal ash units and ancillary operations.

22. Testing and monitoring records completed to comply with air permits.

23. Any notices of violation associated with the coal ash/CCR management activities received over the last two (2) years.

24. Spill Prevention Control and Countermeasure Plan.

25. Community Right-to-Know:
    a. Lists of hazardous chemicals and/or MSDSs submitted;
    b. Tier I or II reports; and
    c. Form R (toxic release inventory) reports.

26. Copies of communications with employees and the public regarding availability of toll-free hotline and electronic mail inbox for reporting suspected environmental violations.

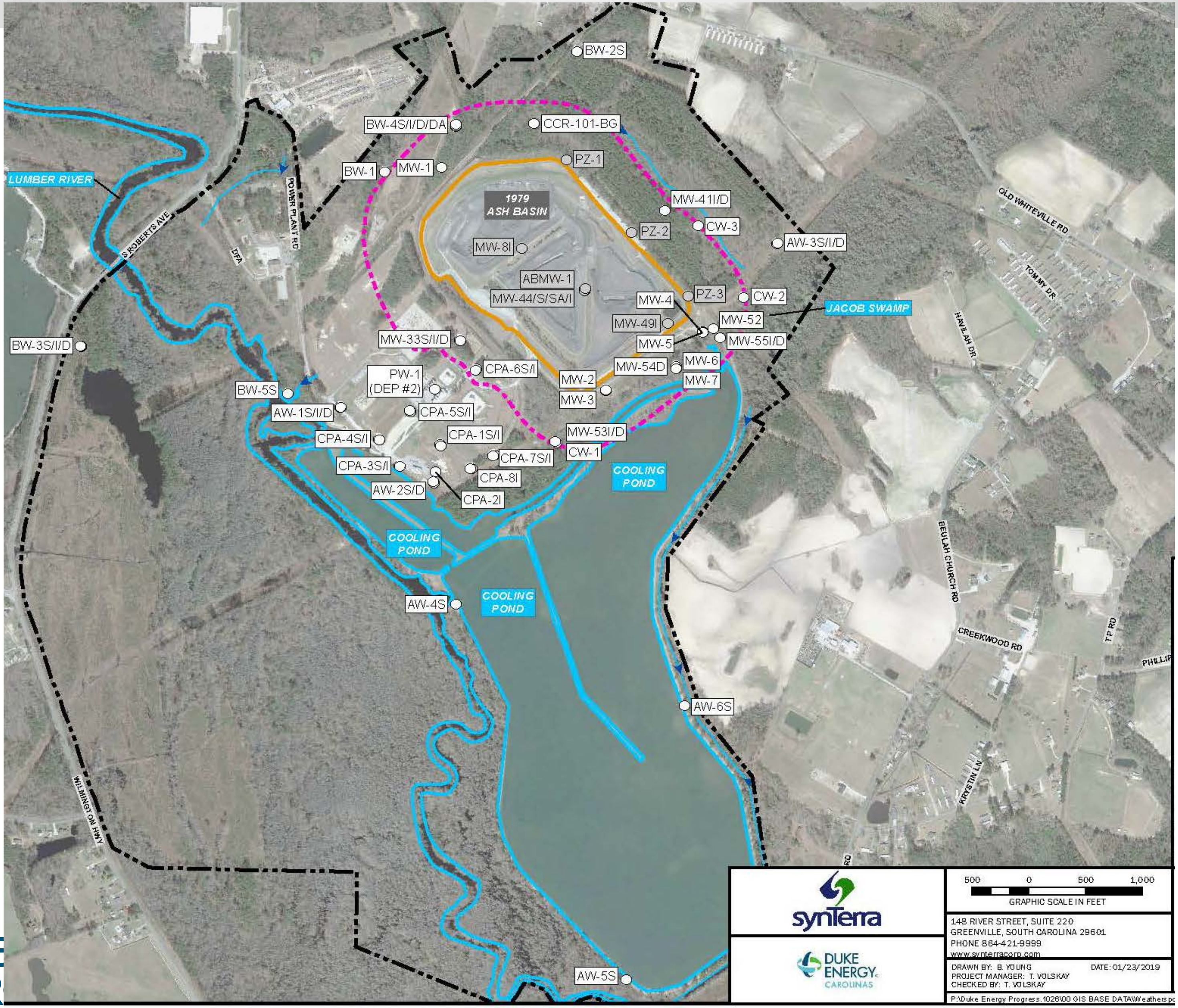
27. Management Systems:
    a. List of responsible party(ies) for each environmental activity.
    b. All environmental-related training records.
    c. All environmental policies and procedures.
    d. Organization chart.
    e. Site diagram identifying storage areas, tanks, etc.

ATTACHMENT B

2017 CAMA Groundwater Exceedances and Figure Showing the CAMA Well Locations

I/A

Weatherspoon Ash Basin – NPDES/CAMA Wells



I/A

WEATHERSPOON
12/05/2018
BRANDON RUSSO
TED VOLSKAY

	PARAM	CFR257 APPENDIX III CONSTITU			INORGANIC PARAMETERS (TOTAL CONCENTRATION)								IONUCLI
Reporting Units	**S.U.**	**ug/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**pCi/L**
15A NCAC 02L Standard	**6.5-8.5**	**700**	**250**	**500**	**1***	**10**	**4***	**1***	**300**	**50**	**0.2***	**0.3***	**5^**
Provisional Background (Surficial Unit)	**3.2-6.9**	**50**	**13.7**	**90.3**	**1**	**1.35**	**1**	**1**	**9422**	**39**	**0.2**	**4.2**	**6.463**
Provisional Background (Lower Yorktown Unit)	**5.5-5.7**	**50**	**1.3**	**75**	**1**	**1**	**1**	**1**	**2070**	**20**	**0.2**	**2.61**	**5.4**
Provisional Background (Pee Dee Unit)	**6.9-8.3**	**50**	**0.24**	**130**	**1**	**1**	**1**	**1**	**1550**	**41**	**0.2**	**0.32**	**3.55**

					PARAM	CFR257 APPENDIX III CONSTITU			INORGANIC PARAMETERS (TOTAL CONCENTRATION)								IONUCLI
Sample ID	**Location Description**	**Associated Unit**	**Sample Location Aquifer Name**	**Sample Collection Date**	**pH**	**Boron**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Beryllium**	**Cobalt**	**Iron**	**Manganese**	**Thallium**	**Vanadium**	**Total Radium**
AW-01D	W of plant	Ash Basin	Pee Dee	02/26/2018	7.2	<50	27	110	<1	<1	<1	<1	**1840**	30	<0.2	<0.3	NA
AW-01D	W of plant	Ash Basin	Pee Dee	05/22/2018	7.1	19.867 j	26	110	<1	<1	<1	<1	**1860**	27	<0.2	**0.356**	NA
AW-01D	W of plant	Ash Basin	Pee Dee	08/09/2018	6.9	18.6 j	26	120	<1	<1	<1	<1	**807**	15	<0.2	0.236 j	NA
AW-01D	W of plant	Ash Basin	Pee Dee	10/16/2018	6.7	19.571 j	28	120	<1	<1	<1	<1	**1050**	17	<0.2	<0.3	NA
AW-01I	W of plant	Ash Basin	Lower Yorktown	02/26/2018	**5.0**	<50	6.5	29	<1	<1	<1	<1	**2520**	37	<0.2	**0.388**	NA
AW-01I	W of plant	Ash Basin	Lower Yorktown	05/22/2018	**4.9**	38.657 j	6.8	31	<1	1.02	<1	0.484 j	**1540**	32	<0.2	**0.475**	NA
AW-01I	W of plant	Ash Basin	Lower Yorktown	08/09/2018	**4.6**	46.103 j	6.3	<25	<1	0.621 j	<1	0.561 j	**1460**	35	0.131 j	**0.313**	NA
AW-01I	W of plant	Ash Basin	Lower Yorktown	10/16/2018	**5.2**	41.539 j	6.2	27	<1	0.768 j	<1	0.549 j	**1590**	32	<0.2	0.186 j	NA
AW-01S	W of plant	Ash Basin	Surficial	02/26/2018	**4.7**	<50	3.4 M2	<25	<1	<1	<1	<1	**405**	<5	<0.2	**0.885**	NA
AW-01S	W of plant	Ash Basin	Surficial	05/22/2018	**5.0**	<50	3.1	<25	<1	<1	<1	<1	100	1.876 j	<0.2	**0.389**	NA
AW-01S	W of plant	Ash Basin	Surficial	08/09/2018	**4.2**	22.176 j	3.5	30	<1	<1	<1	<1	**385**	3.269 j	0.1 j	**0.67**	NA
AW-01S	W of plant	Ash Basin	Surficial	10/16/2018	**4.7**	30.303 j	3.4	<25	<1	<1	<1	<1	95	3.08 j	<0.2	0.112 j	NA
AW-02D	SW of plant	Ash Basin	Pee Dee	02/26/2018	7.3	<50	4.1	160	<1	<1	<1	<1	**424**	18	<0.2	<0.3	NA
AW-02D	SW of plant	Ash Basin	Pee Dee	05/21/2018	7.1	20.668 j	13	170	<1	<1	<1	<1	**353**	16	<0.2	0.267 j	NA
AW-02D	SW of plant	Ash Basin	Pee Dee	08/09/2018	7.3	17.904 j	10	160	<1	<1	<1	<1	191	13	<0.2	**0.353**	NA
AW-02D	SW of plant	Ash Basin	Pee Dee	10/16/2018	7.2	23.927 j	6.6	160	<1	<1	<1	<1	70	3.344 j	0.105 j	0.167 j	NA
AW-02S	SW of plant	Ash Basin	Surficial	02/26/2018	**3.6**	68	**260**	240	<1	<1	**6.3**	**37.8**	**974**	**353**	**0.208**	<0.3	NA
AW-02S	SW of plant	Ash Basin	Surficial	05/21/2018	**3.5**	52	150	160	<1	<1	**5.96**	**26.9**	286	**185**	0.134 j	0.217 j	NA
AW-02S	SW of plant	Ash Basin	Surficial	08/09/2018	**3.4**	105	**290**	220	<1	0.411 j	**6.89**	**23.3**	**471**	**221**	**0.452**	0.295 j	NA
AW-02S	SW of plant	Ash Basin	Surficial	10/16/2018	**3.7**	105	230	180	<1	<1	**5.78**	**17.7**	195	**142**	**0.454**	<0.3	NA
AW-03D	Wetlands E of AB	Ash Basin	Pee Dee	02/27/2018	7.1	<50	1.2	140	<1	<1	<1	<1	**1040**	32	<0.2	<0.3	NA
AW-03D	Wetlands E of AB	Ash Basin	Pee Dee	05/22/2018	6.9	<50	1.3	130	<1	<1	<1	<1	**974**	30	<0.2	0.256 j	NA
AW-03D	Wetlands E of AB	Ash Basin	Pee Dee	08/07/2018	6.5	<50	1.3	130	<1	<1	<1	<1	**992**	31	<0.2	0.233 j	NA
AW-03D	Wetlands E of AB	Ash Basin	Pee Dee	10/17/2018	6.9	<50	1.4	140	<1	<1	<1	<1	**907**	29	<0.2	<0.3	NA
AW-03I	Wetlands E of AB	Ash Basin	Lower Yorktown	02/27/2018	**6.4**	<50	6	60	<1	<1	<1	<1	**341**	**100**	<0.2	<0.3	NA
AW-03I	Wetlands E of AB	Ash Basin	Lower Yorktown	05/22/2018	**5.8**	<50	3.8	53	<1	0.711 j	<1	0.992 j	**542**	**183**	<0.2	**0.337**	NA
AW-03I	Wetlands E of AB	Ash Basin	Lower Yorktown	08/07/2018	**5.8**	<50	3.3	40	<1	0.517 j	<1	0.73 j	259	**100**	<0.2	0.215 j	NA
AW-03I	Wetlands E of AB	Ash Basin	Lower Yorktown	10/17/2018	**6.1**	<50	3.3	71	<1	1.35	<1	0.894 j	**728**	**162**	<0.2	<0.3	NA
AW-03S	Wetlands E of AB	Ash Basin	Surficial	02/27/2018	**5.0**	<50	1.5	29	<1	<1	<1	<1	207	14	<0.2	<0.3	NA
AW-03S	Wetlands E of AB	Ash Basin	Surficial	05/22/2018	**4.7**	<50	1.6	26	<1	<1	<1	0.792 j	**406**	13	0.083 j	**0.369**	NA
AW-03S	Wetlands E of AB	Ash Basin	Surficial	08/07/2018	**4.4**	18.832 j	2.1	<25	<1	<1	<1	0.568 j	**2300**	12	<0.2	0.249 j	NA
AW-03S	Wetlands E of AB	Ash Basin	Surficial	10/17/2018	**5.0**	31.174 j	2.4	48	<1	0.883 j	<1	0.621 j	**4600**	13	0.153 j	**1.49**	NA
AW-04S	On NW Dike at Cooling Pond	Cooling Pond	Surficial	08/07/2018	**4.4**	209	230	310	<1	1.09	3.12	**4.19**	**19000**	**482**	<0.2	**0.849**	1.336
AW-04S	On NW Dike at Cooling Pond	Cooling Pond	Surficial	10/17/2018	**4.6**	226	240	240	<1	0.761 j	2.62	**2.71**	**12500**	**335**	<0.2	**0.642**	1.311
AW-05S	On SW Dike at Cooling Pond	Cooling Pond	Surficial	08/07/2018	**5.6**	405	0.79	110	<1	0.786 j	<1	<1	145	11	<0.2	**1.62**	0.983
AW-05S	On SW Dike at Cooling Pond	Cooling Pond	Surficial	10/17/2018	**5.7**	415	1	110	<1	0.83 j	<1	<1	115	11	<0.2	**1.65**	0.636
AW-06S	On SE Dike at Cooling Pond	Cooling Pond	Surficial	08/07/2018	**6.4**	61	11	220	<1	9.6	<1	**3.15**	**15700**	38	<0.2	**0.398**	3.5
AW-06S	On SE Dike at Cooling Pond	Cooling Pond	Surficial	10/17/2018	6.5	42.931 j	7.7	180	<1	7.6	<1	**2.19**	**11300**	30	<0.2	<0.3	2.557
BW-01 IMP	N of Plant and AB	Background	Surficial	03/01/2018	**4.1**	51	61	140	<1	<1	<1	<1	**707**	11	<0.2	**7.36**	NA
BW-01	N of Plant and AB	Background	Surficial	03/01/2018	**4.1**	51	46	140	<1	<1	<1	<1	**898**	11	<0.2	**9.05**	NA
BW-01	N of Plant and AB	Background	Surficial	05/21/2018	**4.2**	71	43	91	<1	1.01	<1	0.433 j	**1800**	17	<0.2	**16.8**	NA
BW-01	N of Plant and AB	Background	Surficial	06/18/2018	**4.3**	76	45 M2	86	<1	<1	<1	<1	**321**	18	<0.2	**5.18**	NA
BW-01	N of Plant and AB	Background	Surficial	08/08/2018	**3.6**	72	39	61	<1	0.419 j	<1	0.526 j	275	19	<0.2	**5**	NA
BW-02D	Old Whiteville Rd	Background	Pee Dee	02/27/2018	**11.5**	<50	17	120	**1.48**	1.44	<1	**1.14**	32	<5	<0.2	**28.6**	NA
BW-02I	Old Whiteville Rd	Background	Lower Yorktown	02/27/2018	7.5	<50	0.13	140	<1	<1	<1	<1	**1160**	21	<0.2	**1.82**	NA
BW-02S	Old Whiteville Rd	Background	Surficial	02/27/2018	**4.5**	<50	8.8	26	<1	<1	<1	<1	**1030**	13	<0.2	**0.875**	**6.62**
BW-02S	Old Whiteville Rd	Background	Surficial	05/22/2018	**4.4**	<50	7.9	31	<1	0.438 j	<1	0.352 j	**1760**	11	<0.2	**1.96**	1.64
BW-02S	Old Whiteville Rd	Background	Surficial	08/08/2018	**4.6**	25.621 j	9	350	<1	1.47	0.425 j	0.491 j	**5120**	14	<0.2	**19.3**	**5.57**
BW-02S	Old Whiteville Rd	Background	Surficial	10/17/2018	**4.5**	22.437 j	9.1	130	<1	0.892 j	<1	0.432 j	**3340**	14	<0.2	**6.09**	2.64
BW-03D	NC Hwy 721	Background	Pee Dee	02/27/2018	6.8	<50	0.17	78	<1	<1	<1	<1	**947**	24	<0.2	<0.3	4.425
BW-03D	NC Hwy 721	Background	Pee Dee	05/21/2018	6.8	23.485 j	0.16	100	<1	<1	<1	<1	**1010**	26	<0.2	0.251 j	1.188

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	PARAM	CFR257 APPENDIX III CONSTITU			INORGANIC PARAMETERS (TOTAL CONCENTRATION)								IONUCLI
Reporting Units	**S.U.**	**ug/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**pCi/L**
15A NCAC 02L Standard	**6.5-8.5**	**700**	**250**	**500**	**1***	**10**	**4***	**1***	**300**	**50**	**0.2***	**0.3***	**5^**
Provisional Background (Surficial Unit)	**3.2-6.9**	**50**	**13.7**	**90.3**	**1**	**1.35**	**1**	**1**	**9422**	**39**	**0.2**	**4.2**	**6.463**
Provisional Background (Lower Yorktown Unit)	**5.5-5.7**	**50**	**1.3**	**75**	**1**	**1**	**1**	**1**	**2070**	**20**	**0.2**	**2.61**	**5.4**
Provisional Background (Pee Dee Unit)	**6.9-8.3**	**50**	**0.24**	**130**	**1**	**1**	**1**	**1**	**1550**	**41**	**0.2**	**0.32**	**3.55**

					PARAM	CFR257 APPENDIX III CONSTITU			INORGANIC PARAMETERS (TOTAL CONCENTRATION)								IONUCLI
Sample ID	**Location Description**	**Associated Unit**	**Sample Location Aquifer Name**	**Sample Collection Date**	**pH**	**Boron**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Beryllium**	**Cobalt**	**Iron**	**Manganese**	**Thallium**	**Vanadium**	**Total Radium**
BW-03D	NC Hwy 721	Background	Pee Dee	08/08/2018	6.7	21.91 j	0.48	100	<1	<1	<1	**2.15**	**613**	24	<0.2	0.224 j	1.618
BW-03D	NC Hwy 721	Background	Pee Dee	10/17/2018	6.6	23.738 j	0.25	110	<1	<1	<1	0.46 j	**672**	22	<0.2	<0.3	1.252
BW-03I	NC Hwy 721	Background	Lower Yorktown	02/27/2018	**5.5**	<50	0.34	37	<1	<1	<1	<1	**1540**	14	<0.2	**3.41**	2.847
BW-03I	NC Hwy 721	Background	Lower Yorktown	05/21/2018	**5.3**	18.484 j	0.0934 j	58	<1	0.464 j	<1	<1	**1790**	14	<0.2	**3.03**	1.204
BW-03I	NC Hwy 721	Background	Lower Yorktown	08/08/2018	**5.0**	<50	<0.1	45	<1	<1	<1	<1	**1260**	12	<0.2	**1.55**	1.251
BW-03I	NC Hwy 721	Background	Lower Yorktown	10/17/2018	**5.2**	<50	0.23	50	<1	<1	0.482 j	<1	**1520**	14	<0.2	**2.74**	2.068
BW-03S	NC Hwy 721	Background	Surficial	02/27/2018	**5.2**	<50	0.47	42	<1	<1	<1	<1	**2860**	18	<0.2	**3.78**	1.497
BW-03S	NC Hwy 721	Background	Surficial	05/21/2018	**5.1**	20.089 j	0.18	50	<1	0.487 j	<1	0.818 j	**2530**	19	0.122 j	**4.48**	0.7938
BW-03S	NC Hwy 721	Background	Surficial	08/08/2018	**4.7**	<50	0.98	34	<1	0.653 j	0.755 j	0.947 j	**2480**	20	0.152 j	**3.84**	0.456
BW-03S	NC Hwy 721	Background	Surficial	10/17/2018	**5.0**	22.062 j	0.21	51	<1	0.47 j	<1	0.757 j	**2610**	20	<0.2	**3.56**	0.597
BW-04D	N of AB	Background	Black Creek	02/26/2018	7.4	<50	1.2	140	<1	<1	<1	<1	**579**	25	<0.2	**0.406**	NA
BW-04D	N of AB	Background	Black Creek	05/21/2018	7.1	19.985 j	1.4	150	<1	<1	<1	<1	**448**	23	<0.2	**0.431**	1.516
BW-04D	N of AB	Background	Black Creek	08/08/2018	7.3	<50	1.3	140	<1	<1	<1	<1	**373**	21	<0.2	0.19 j	1.243
BW-04D	N of AB	Background	Black Creek	10/17/2018	7.3	19.415 j	1.4	140	<1	<1	<1	<1	**697**	23	<0.2	**0.302**	1.227
BW-04I	N of AB	Background	Lower Yorktown	02/26/2018	7.7	<50	0.44	130	<1	<1	<1	<1	**899**	50	<0.2	**0.408**	0.425
BW-04I	N of AB	Background	Lower Yorktown	05/21/2018	7.3	<50	0.16	140	<1	<1	<1	<1	**766**	40	<0.2	**0.348**	0.369
BW-04I	N of AB	Background	Lower Yorktown	08/08/2018	7.6	<50	<0.1	140	<1	<1	<1	<1	**1220**	**61**	<0.2	0.18 j	0.78
BW-04I	N of AB	Background	Lower Yorktown	10/17/2018	7.5	<50	<0.1	150	<1	<1	<1	<1	**957**	45	<0.2	<0.3	0.554
BW-04S	N of AB	Background	Surficial	02/26/2018	**4.7**	<50	1.6	33	<1	<1	<1	<1	100	13	<0.2	<0.3	3.2
BW-04S	N of AB	Background	Surficial	05/21/2018	**4.6**	<50	0.6	31	<1	<1	0.397 j	0.542 j	244	7	<0.2	**0.815**	3.117
BW-04S	N of AB	Background	Surficial	08/08/2018	**5.1**	<50	0.9	<25	<1	<1	<1	0.484 j	224	3.361 j	<0.2	**0.654**	0.691
BW-04S	N of AB	Background	Surficial	10/17/2018	**4.6**	<50	1.1	<25	<1	<1	<1	<1	101	3.481 j	<0.2	0.2 j	0.573
BW-05S	SW of AB	Background	Surficial	02/26/2018	**5.5**	<50	0.86	66	<1	<1	<1	<1	**6520**	**70**	<0.2	**1.88**	NA
BW-05S	SW of AB	Background	Surficial	08/08/2018	**5.3**	29.017 j	0.17	49	<1	<1	<1	<1	**5150**	48	<0.2	**2.23**	1.131
BW-05S	SW of AB	Background	Surficial	10/16/2018	6.6	28.324 j	0.72	120	<1	<1	<1	<1	**10000**	**110**	<0.2	**0.677**	0.11
CCR-101-BG IMP	N of AB	Background	Lower Yorktown	02/28/2018	**6.0**	<50	1.4	56	<1	<1	<1	<1	56	9	<0.2	**0.596**	1.807
CCR-101-BG	N of AB	Background	Lower Yorktown	02/28/2018	**6.0**	<50	1.5	47	<1	<1	<1	<1	NA	NA	<0.2	NA	4.893
CCR-101-BG IMP	N of AB	Background	Lower Yorktown	05/23/2018	**5.7**	<50	1.7	53	<1	0.525 j	<1	<1	177	9	0.084 j	**0.947**	2.192
CCR-101-BG	N of AB	Background	Lower Yorktown	05/23/2018	**5.7**	<50	1.7	57	<1	0.567 j	<1	<1	NA	NA	<0.2	NA	1.518
CCR-101-BG IMP	N of AB	Background	Lower Yorktown	08/07/2018	**5.5**	<50	1.1	35	<1	0.477 j	<1	<1	200	10	<0.2	**0.432**	2.3683
CCR-101-BG IMP	N of AB	Background	Lower Yorktown	10/17/2018	**5.9**	<50	1.5	57	<1	0.631 j	<1	<1	130	9	<0.2	**0.858**	1.173
CCR-102	W of AB	Ash Basin	Surficial	02/28/2018	**4.7**	305	**320**	490	<1	<1	<1	**2.06**	NA	NA	<0.2	NA	**10.57**
CCR-102	W of AB	Ash Basin	Surficial	05/21/2018	**4.7**	321	**450**	**510**	<1	1.01	<1	**1.9**	NA	NA	0.124 j	NA	**14.56**
CCR-103	W of AB	Ash Basin	Surficial	02/28/2018	**5.3**	<50	73	120	<1	1.16	<1	<1	NA	NA	<0.2	NA	2.188
CCR-103	W of AB	Ash Basin	Surficial	05/21/2018	**4.8**	<50	80	130	<1	1.67	<1	0.746 j	NA	NA	0.158 j	NA	3.184
CCR-104	W of AB	Ash Basin	Surficial	02/28/2018	7.4	<50	37	180	<1	<1	<1	<1	NA	NA	<0.2	NA	2.775
CCR-104	W of AB	Ash Basin	Surficial	05/23/2018	7.0	<50	37	200	<1	<1	<1	<1	NA	NA	<0.2	NA	2.146
CCR-105	W of AB	Ash Basin	Surficial	02/28/2018	**6.0**	54	46	160	<1	2.89	<1	<1	NA	NA	<0.2	NA	3.15
CCR-105	W of AB	Ash Basin	Surficial	05/23/2018	**5.8**	55	44	140	<1	2.61	<1	0.729 j	NA	NA	<0.2	NA	1.12
CCR-106	W of AB	Ash Basin	Surficial	02/28/2018	7.2	179	130	380	<1	<1	<1	<1	NA	NA	<0.2	NA	2.4
CCR-106	W of AB	Ash Basin	Surficial	05/23/2018	6.9	199	130	400	<1	<1	<1	<1	NA	NA	<0.2	NA	3.263
CCR-107	S of AB	Ash Basin	Surficial	02/28/2018	7.1	**2070**	190	**560**	<1	<1	<1	<1	NA	NA	<0.2	NA	0.67
CCR-107	S of AB	Ash Basin	Surficial	05/23/2018	6.9	**2070**	180	**600**	<1	0.435 j	<1	<1	NA	NA	<0.2	NA	1.884
CCR-108	E of AB	Ash Basin	Surficial	02/28/2018	6.6	**1500**	99	340	<1	1.6	<1	**2.61**	NA	NA	<0.2	NA	**6.47**
CCR-108	E of AB	Ash Basin	Surficial	05/23/2018	**6.3**	**1490**	84	330	<1	2.62	<1	**2.52**	NA	NA	<0.2	NA	3.83
CCR-109	E of AB	Ash Basin	Surficial	02/28/2018	7.2	463	160	**510**	<1	<1	<1	<1	NA	NA	<0.2	NA	3.08
CCR-109	E of AB	Ash Basin	Surficial	05/23/2018	7.0	458	150	500	<1	0.347 j	<1	<1	NA	NA	<0.2	NA	2.353
CCR-110	E of AB	Ash Basin	Surficial	02/28/2018	**6.1**	631	160	360	<1	<1	<1	<1	NA	NA	<0.2	NA	2.54
CCR-110	E of AB	Ash Basin	Surficial	05/23/2018	**5.9**	609	150	370	<1	<1	<1	<1	NA	NA	<0.2	NA	2.153
CCR-111	E of AB	Ash Basin	Surficial	02/28/2018	6.8	334	34	**560**	<1	<1	<1	<1	NA	NA	**0.246**	NA	4.723
CCR-111	E of AB	Ash Basin	Surficial	05/23/2018	6.5	350	34	**580**	<1	0.512 j	<1	<1	NA	NA	0.186 j	NA	1.43
CW-01 IMP	SW of AB	Ash Basin	Surficial	03/01/2018	**5.6**	<50	14	62	<1	1.19	<1	<1	**1840**	39	<0.2	**0.975**	NA
CW-01	SW of AB	Ash Basin	Surficial	03/01/2018	**5.6**	<50	14	72	<1	1.21	<1	<1	**1880**	41	<0.2	**0.953**	NA

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	PARAM	CFR257 APPENDIX III CONSTITU			INORGANIC PARAMETERS (TOTAL CONCENTRATION)								IONUCLI
Reporting Units	**S.U.**	**ug/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**pCi/L**
15A NCAC 02L Standard	**6.5-8.5**	**700**	**250**	**500**	**1***	**10**	**4***	**1***	**300**	**50**	**0.2***	**0.3***	**5^**
Provisional Background (Surficial Unit)	**3.2-6.9**	**50**	**13.7**	**90.3**	**1**	**1.35**	**1**	**1**	**9422**	**39**	**0.2**	**4.2**	**6.463**
Provisional Background (Lower Yorktown Unit)	**5.5-5.7**	**50**	**1.3**	**75**	**1**	**1**	**1**	**1**	**2070**	**20**	**0.2**	**2.61**	**5.4**
Provisional Background (Pee Dee Unit)	**6.9-8.3**	**50**	**0.24**	**130**	**1**	**1**	**1**	**1**	**1550**	**41**	**0.2**	**0.32**	**3.55**

					PARAM	CFR257 APPENDIX III CONSTITU			INORGANIC PARAMETERS (TOTAL CONCENTRATION)								IONUCLI
Sample ID	**Location Description**	**Associated Unit**	**Sample Location Aquifer Name**	**Sample Collection Date**	**pH**	**Boron**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Beryllium**	**Cobalt**	**Iron**	**Manganese**	**Thallium**	**Vanadium**	**Total Radium**
CW-01	SW of AB	Ash Basin	Surficial	05/22/2018	**5.4**	20.291 j	9.1	53	<1	1.34	<1	<1	**1440**	35	<0.2	**1.23**	NA
CW-01	SW of AB	Ash Basin	Surficial	06/18/2018	**6.0**	<50	12	86	<1	<1	<1	<1	**2110**	40	<0.2	**0.652**	NA
CW-01	SW of AB	Ash Basin	Surficial	08/09/2018	**5.2**	24.255 j	5.5	39	<1	1.67	<1	<1	**1490**	32	<0.2	**1.19**	NA
CW-01 IMP	SW of AB	Ash Basin	Surficial	10/16/2018	**5.7**	21.327 j	7.2	57	<1	1.14	<1	<1	**1310**	30	<0.2	**0.823**	NA
CW-01	SW of AB	Ash Basin	Surficial	10/16/2018	**5.7**	<50	<0.1	57	<1	1.18	<1	<1	**1350**	31	<0.2	**0.911**	NA
CW-02 IMP	SE of AB	Ash Basin	Surficial	03/01/2018	7.5	<50	8.4	150	<1	1.42	<1	<1	**1110**	15	<0.2	**1.09**	NA
CW-02	SE of AB	Ash Basin	Surficial	03/01/2018	7.5	<50	7.9	160	<1	1.44	<1	<1	**1190**	16	<0.2	**1.08**	NA
CW-02	SE of AB	Ash Basin	Surficial	05/22/2018	7.3	<50	9.6	140	<1	1.06	<1	<1	**862**	20	<0.2	**0.312**	NA
CW-02	SE of AB	Ash Basin	Surficial	06/18/2018	7.3	<50	9.6	160	<1	<1	<1	<1	237	15	<0.2	**0.462**	NA
CW-02	SE of AB	Ash Basin	Surficial	08/07/2018	7.1	<50	8.8	160	<1	<1	<1	<1	112	12	<0.2	**0.4**	NA
CW-02 IMP	SE of AB	Ash Basin	Surficial	10/16/2018	7.3	<50	10	150	<1	0.856 j	<1	<1	**610**	12	<0.2	0.104 j	NA
CW-02	SE of AB	Ash Basin	Surficial	10/16/2018	7.3	<50	10	140	<1	<1	<1	<1	**763**	11	<0.2	<0.3	NA
CW-03 IMP	E of AB	Ash Basin	Surficial	03/01/2018	6.6	71	57	210	<1	<1	<1	<1	**537**	35	<0.2	**0.533**	2.1214
CW-03	E of AB	Ash Basin	Surficial	03/01/2018	6.6	73	55	220	<1	<1	<1	<1	**562**	38	<0.2	**0.546**	NA
CW-03	E of AB	Ash Basin	Surficial	05/22/2018	6.5	37.623 j	30	140	<1	<1	<1	0.35 j	**675**	36	<0.2	**0.623**	3.909
CW-03	E of AB	Ash Basin	Surficial	06/18/2018	6.5	<50	12	120	<1	<1	<1	<1	**859**	30	<0.2	**0.556**	NA
CW-03	E of AB	Ash Basin	Surficial	08/07/2018	6.8	<50	4.3	110	<1	<1	<1	<1	**876**	26	<0.2	**0.419**	1.254
CW-03 IMP	E of AB	Ash Basin	Surficial	10/16/2018	6.6	78	38	160	<1	0.508 j	<1	<1	**540**	30	<0.2	**0.804**	1.036
CW-03	E of AB	Ash Basin	Surficial	10/16/2018	6.6	<50	9.9	100	<1	<1	<1	<1	289	23	<0.2	**0.672**	NA
MW-01	NW of AB	Background	Surficial	02/26/2018	**4.7**	<50	3.8	25	<1	<1	<1	<1	100	11	<0.2	<0.3	2.83
MW-01 CCR	NW of AB	Background	Surficial	02/26/2018	**4.7**	<50	4.6	36	<1	<1	<1	<1	NA	NA	<0.2	NA	2.7543
MW-01	NW of AB	Background	Surficial	05/21/2018	**4.4**	<50	3	<25	<1	<1	0.436 j	0.454 j	125	10	<0.2	**0.322**	1.4882
MW-01 CCR	NW of AB	Background	Surficial	05/21/2018	**4.4**	<50	2.3	<25	<1	<1	<1	0.353 j	NA	NA	<0.2	NA	**5.91**
MW-01	NW of AB	Background	Surficial	08/08/2018	**3.6**	<50	3	<25	<1	<1	<1	0.363 j	119	9	<0.2	0.137 j	2.58
MW-01	NW of AB	Background	Surficial	10/17/2018	**4.5**	<50	5.9 M2	27	<1	<1	<1	0.43 j	52	10	<0.2	<0.3	3.63
MW-02	S of AB	Ash Basin	Lower Yorktown	03/01/2018	7.4	<50	32	200	<1	<1	<1	<1	259	47	<0.2	**0.85**	3.057
MW-02	S of AB	Ash Basin	Lower Yorktown	05/23/2018	7.1	<50	29	180	<1	<1	<1	<1	**1240**	33	<0.2	**0.408**	1.172
MW-02	S of AB	Ash Basin	Lower Yorktown	08/08/2018	7.0	<50	30	180	<1	<1	<1	<1	**438**	25	<0.2	0.232 j	3.624
MW-02	S of AB	Ash Basin	Lower Yorktown	10/17/2018	7.1	<50	31	190	<1	<1	<1	<1	**593**	27	<0.2	<0.3	2.55
MW-03	S of AB	Ash Basin	Surficial	03/01/2018	**6.4**	**1400**	7.2	330	<1	6.16	<1	<1	**1460**	**83**	<0.2	**4.79**	1.709
MW-03 CCR	S of AB	Ash Basin	Surficial	03/01/2018	**6.4**	**1470**	7.3	340	<1	6.28	<1	<1	NA	NA	<0.2	NA	4.506
MW-03	S of AB	Ash Basin	Surficial	05/23/2018	**6.4**	**1460**	10	320	<1	**13.8**	<1	<1	**4790**	**111**	<0.2	**0.582**	1.067
MW-03 CCR	S of AB	Ash Basin	Surficial	05/23/2018	**6.4**	**1410**	11	330	<1	**14.8**	<1	<1	NA	NA	<0.2	NA	1.587
MW-03	S of AB	Ash Basin	Surficial	08/08/2018	**6.2**	**1690**	11	320	<1	**18**	<1	<1	**4190**	**111**	<0.2	**0.687**	2.104
MW-03	S of AB	Ash Basin	Surficial	10/18/2018	**6.3**	**1910**	8.7	310	<1	**16**	<1	<1	**3870**	**118**	<0.2	**0.597**	1.326
MW-04	S of AB	Ash Basin	Lower Yorktown	02/27/2018	**6.4**	**2040**	170	410	<1	<1	<1	**4.15**	27	**648**	**0.46**	<0.3	**5.111**
MW-04 CCR	S of AB	Ash Basin	Lower Yorktown	02/27/2018	**6.4**	**2000**	140	410	<1	<1	<1	**4.54**	NA	NA	**0.456**	NA	**5.521**
MW-04	S of AB	Ash Basin	Lower Yorktown	05/23/2018	**6.3**	**1940**	130	400	<1	<1	<1	**4.38**	61	**696**	**0.4**	0.243 j	2.445
MW-04 CCR	S of AB	Ash Basin	Lower Yorktown	05/23/2018	**6.3**	**1940**	130	410	<1	<1	<1	**4.65**	NA	NA	**0.497**	NA	2.301
MW-04	S of AB	Ash Basin	Lower Yorktown	08/06/2018	**6.0**	**2320**	140	430	<1	<1	<1	**3.45**	19	**715**	**0.452**	0.158 j	1.935
MW-04	S of AB	Ash Basin	Lower Yorktown	10/17/2018	**6.3**	**2110**	140	400	<1	0.798 j	<1	**6.63**	**1310**	**736**	**0.385**	**0.416**	2.072
MW-05	S of AB	Ash Basin	Surficial	02/27/2018	**5.2**	155	63	120	<1	2.7	<1	**1.8**	**21000**	35	<0.2	**1.58**	2.474
MW-05	S of AB	Ash Basin	Surficial	05/23/2018	**4.9**	299	61	140	<1	2.63	<1	**1.02**	**11700**	22	0.11 j	**0.448**	1.644
MW-05	S of AB	Ash Basin	Surficial	08/06/2018	**4.1**	209	55	100	<1	2.53	<1	**1.21**	**12400**	24	0.174 j	**0.69**	2.568
MW-05	S of AB	Ash Basin	Surficial	10/17/2018	**4.9**	258	56	110	<1	2.68	<1	**1.18**	**11200**	21	<0.2	**2.42**	2.074
MW-06	SE of AB	Ash Basin	Surficial	02/27/2018	**6.0**	617	140	300	<1	<1	<1	**1.3**	**8640**	40	<0.2	**0.34**	2.93
MW-06	SE of AB	Ash Basin	Surficial	05/23/2018	6.7	134	55	240	<1	1.14	<1	<1	**9820**	39	<0.2	0.226 j	2.106
MW-06	SE of AB	Ash Basin	Surficial	08/07/2018	**6.2**	443	88	280	<1	0.787 j	<1	<1	**2360**	31	<0.2	0.287 j	2.406
MW-06	SE of AB	Ash Basin	Surficial	10/16/2018	**6.2**	594	110	310	<1	1.09	<1	0.444 j	**4750**	50	<0.2	0.259 j	2.112
MW-07	SE of AB	Ash Basin	Lower Yorktown	02/27/2018	7.5	<50	13	160	<1	<1	<1	<1	**533**	17	<0.2	<0.3	1.202
MW-07	SE of AB	Ash Basin	Lower Yorktown	05/23/2018	6.8	25.177 j	12	170	<1	<1	<1	<1	195	19	0.105 j	<0.3	0.22925
MW-07	SE of AB	Ash Basin	Lower Yorktown	08/07/2018	7.1	25.456 j	12	170	<1	<1	<1	<1	**1690**	**62**	<0.2	0.172 j	0.651
MW-07	SE of AB	Ash Basin	Lower Yorktown	10/16/2018	7.1	21.357 j	12	170	<1	<1	<1	<1	**1120**	**52**	<0.2	<0.3	0.499

I/A

WEATHERSPOON
12/05/2018
BRANDON RUSSO
TED VOLSKAY

	PARAM	CFR257 APPENDIX III CONSTITU			INORGANIC PARAMETERS (TOTAL CONCENTRATION)								IONUCLI
Reporting Units	S.U.	ug/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L
15A NCAC 02L Standard	**6.5-8.5**	**700**	**250**	**500**	**1***	**10**	**4***	**1***	**300**	**50**	**0.2***	**0.3***	**5^**
Provisional Background (Surficial Unit)	3.2-6.9	50	13.7	90.3	1	1.35	1	1	9422	39	0.2	4.2	6.463
Provisional Background (Lower Yorktown Unit)	5.5-5.7	50	1.3	75	1	1	1	1	2070	20	0.2	2.61	5.4
Provisional Background (Pee Dee Unit)	6.9-8.3	50	0.24	130	1	1	1	1	1550	41	0.2	0.32	3.55

					PARAM	CFR257 APPENDIX III CONSTITU			INORGANIC PARAMETERS (TOTAL CONCENTRATION)								IONUCLI
Sample ID	Location Description	Associated Unit	Sample Location Aquifer Name	Sample Collection Date	pH	Boron	Sulfate	Total Dissolved Solids	Antimony	Arsenic	Beryllium	Cobalt	Iron	Manganese	Thallium	Vanadium	Total Radium
MW-33D	In AB	Ash Basin	Pee Dee	02/26/2018	7.0	<50	**260**	**580**	<1	<1	<1	<1	**9000**	**113**	<0.2	<0.3	NA
MW-33D	In AB	Ash Basin	Pee Dee	05/22/2018	6.7	<50	250	**600**	<1	<1	<1	<1	**10300**	**117**	<0.2	0.134 j	NA
MW-33D	In AB	Ash Basin	Pee Dee	08/08/2018	6.8	<50	250	**580**	<1	<1	<1	<1	**9710**	**113**	<0.2	0.254 j	NA
MW-33D	In AB	Ash Basin	Pee Dee	10/16/2018	7.0	<50	230	**570**	<1	<1	<1	<1	**8610**	**112**	<0.2	<0.3	NA
MW-33I	W of AB	Ash Basin	Lower Yorktown	02/26/2018	6.8	<50	220	**620**	<1	<1	<1	<1	**8930**	**126**	<0.2	<0.3	NA
MW-33I	W of AB	Ash Basin	Lower Yorktown	05/22/2018	6.7	<50	210	**640**	<1	<1	<1	<1	**8680**	**113**	<0.2	**0.376 B2**	NA
MW-33I	W of AB	Ash Basin	Lower Yorktown	08/08/2018	6.7	<50	220	**640**	<1	<1	<1	<1	**11300**	**136**	<0.2	0.204 j	NA
MW-33I	W of AB	Ash Basin	Lower Yorktown	10/16/2018	6.7	<50	210	**620**	<1	<1	<1	<1	**9490**	**125**	<0.2	0.129 j	NA
MW-33S	W of AB	Ash Basin	Surficial	02/26/2018	**5.0**	<50	52	110	<1	<1	<1	**1.62**	**4480**	**70**	<0.2	**1.56**	NA
MW-33S	W of AB	Ash Basin	Surficial	05/22/2018	**4.7**	40.338 j	98	190	<1	0.52 j	<1	**2.78**	**11500**	**115**	<0.2	**1.07**	NA
MW-33S	W of AB	Ash Basin	Surficial	08/08/2018	**4.9**	47.105 j	54	120	<1	0.66 j	<1	**1.5**	**4760**	**61**	<0.2	**2.76**	NA
MW-33S	W of AB	Ash Basin	Surficial	10/16/2018	**5.0**	37.923 j	45	110	<1	0.701 j	<1	**1.63**	**5460**	**71**	<0.2	**1.69**	NA
MW-41D	E of AB	Ash Basin	Pee Dee	02/27/2018	6.9	<50	<0.1	150	<1	<1	<1	<1	**1710**	34	<0.2	<0.3	NA
MW-41D	E of AB	Ash Basin	Pee Dee	05/22/2018	6.7	<50	<0.1	140	<1	<1	<1	<1	**1740**	34	0.169 j	**0.396**	NA
MW-41D	E of AB	Ash Basin	Pee Dee	08/07/2018	**6.5**	<50	<0.1	150	<1	<1	<1	<1	**1620**	34	<0.2	0.21 j	NA
MW-41D	E of AB	Ash Basin	Pee Dee	10/18/2018	7.0	<50	<0.1	150	<1	<1	<1	<1	**1450**	35	<0.2	<0.3	NA
MW-41I	E of AB	Ash Basin	Lower Yorktown	02/27/2018	7.3	<50	22	190	<1	<1	<1	<1	**1290**	23	<0.2	<0.3	NA
MW-41I	E of AB	Ash Basin	Lower Yorktown	05/22/2018	7.2	<50	22	190	<1	<1	<1	<1	**878**	22	<0.2	**0.342**	NA
MW-41I	E of AB	Ash Basin	Lower Yorktown	08/07/2018	6.9	<50	22	180	<1	<1	<1	<1	**384**	23	<0.2	0.209 j	NA
MW-41I	E of AB	Ash Basin	Lower Yorktown	10/18/2018	7.4	<50	21	180	<1	<1	<1	<1	**403**	23	<0.2	0.122 j	NA
MW-52	S of AB	Ash Basin	Surficial	02/28/2018	**5.0**	255	35	120	<1	<1	<1	**1.3**	**1710**	26	<0.2	**0.433**	3.961
MW-52	S of AB	Ash Basin	Surficial	05/23/2018	**4.9**	338	46	130	<1	0.476 j	<1	**1.97**	**1990**	**51**	0.09 j	**0.344**	1.915
MW-52	S of AB	Ash Basin	Surficial	08/06/2018	**4.4**	347	43	120	<1	0.379 j	<1	0.907 j	**573**	12	0.112 j	**0.346**	2.649
MW-52	S of AB	Ash Basin	Surficial	10/16/2018	**4.6**	384	37	110	<1	<1	<1	**1.03**	**400**	32	<0.2	0.2 j	4.647
MW-53D	SW of AB	Ash Basin	Pee Dee	03/01/2018	7.3	<50	19	160	<1	<1	<1	<1	139	<5	<0.2	<0.3	NA
MW-53D	SW of AB	Ash Basin	Pee Dee	05/22/2018	7.0	<50	16	150	<1	<1	<1	<1	**310**	31	<0.2	0.211 j	NA
MW-53D	SW of AB	Ash Basin	Pee Dee	08/09/2018	6.7	<50	15	150	<1	<1	<1	<1	**1180**	38	<0.2	0.213 j	NA
MW-53D	SW of AB	Ash Basin	Pee Dee	10/16/2018	7.2	<50	20	150	<1	<1	<1	<1	**977**	29	<0.2	<0.3	NA
MW-53I	SW of AB	Ash Basin	Lower Yorktown	03/01/2018	7.0	<50	25	170	<1	<1	<1	<1	**906**	24	<0.2	<0.3	NA
MW-53I	SW of AB	Ash Basin	Lower Yorktown	05/22/2018	6.7	<50	24	150	<1	<1	<1	<1	**656**	24	0.081 j	**0.387**	NA
MW-53I	SW of AB	Ash Basin	Lower Yorktown	08/09/2018	6.8	<50	24	160	<1	<1	<1	<1	**636**	24	<0.2	0.239 j	NA
MW-53I	SW of AB	Ash Basin	Lower Yorktown	10/16/2018	7.2	<50	26	170	<1	<1	<1	<1	**648**	25	<0.2	<0.3	NA
MW-54D	SE of AB	Ash Basin	Pee Dee	02/27/2018	7.1	<50	<0.1	130	<1	<1	<1	<1	217	23	<0.2	<0.3	NA
MW-54D	SE of AB	Ash Basin	Pee Dee	05/23/2018	6.9	<50	<0.1	150	<1	<1	<1	<1	230	24	<0.2	<0.3	NA
MW-54D	SE of AB	Ash Basin	Pee Dee	08/07/2018	6.6	<50	<0.1	130	<1	<1	<1	<1	251	25	<0.2	0.16 j	NA
MW-54D	SE of AB	Ash Basin	Pee Dee	10/16/2018	7.0	<50	<0.1	140	<1	<1	<1	<1	222	25	<0.2	0.129 j	NA
MW-55D	SE of AB	Ash Basin	Pee Dee	02/27/2018	7.1	<50	<0.1	110	<1	<1	<1	<1	**1090**	34	<0.2	<0.3	1.001
MW-55D	SE of AB	Ash Basin	Pee Dee	05/22/2018	6.8	<50	<0.1	150	<1	<1	0.34 j	<1	**1030**	32	<0.2	**0.303**	0.382
MW-55D	SE of AB	Ash Basin	Pee Dee	08/06/2018	**6.4**	<50	<0.1	140	<1	<1	<1	<1	**1010**	33	<0.2	0.116 j	0.34
MW-55D	SE of AB	Ash Basin	Pee Dee	10/16/2018	7.0	<50	0.0798 j	140	<1	<1	<1	<1	**1040**	34	<0.2	<0.3	0.092
MW-55I	SE of AB	Ash Basin	Lower Yorktown	02/27/2018	**6.4**	**1100**	67	360	<1	<1	<1	**1.54**	35	**57**	<0.2	<0.3	4.177
MW-55I	SE of AB	Ash Basin	Lower Yorktown	05/22/2018	**6.4**	**1080**	67	390	<1	<1	<1	**1.44**	30	49	0.165 j	0.287 j,B2	1.34
MW-55I	SE of AB	Ash Basin	Lower Yorktown	08/06/2018	**6.3**	**1160**	67	380	<1	<1	<1	**1.37**	35	**55**	**0.217**	0.144 j	1.572
MW-55I	SE of AB	Ash Basin	Lower Yorktown	10/16/2018	**6.4**	**1230**	65	380	<1	<1	<1	**1.31**	43	**58**	**0.211**	0.114 j	0.761
PW-01	Plant Production Well	Ash Basin	Black Creek	02/28/2018	7.5	<50	0.81	120	<1	<1	<1	<1	**2100**	39	<0.2	<0.3	NA
PW-01	Plant Production Well	Ash Basin	Black Creek	05/23/2018	6.7	22.989 j	1.3	130	<1	<1	<1	<1	**816**	43	0.125 j	0.153 j	NA
PW-01	Plant Production Well	Ash Basin	Black Creek	08/08/2018	6.8	24.621 j	1.2	120	<1	<1	<1	<1	**2280**	**51**	<0.2	0.278 j	NA
PW-01	Plant Production Well	Ash Basin	Black Creek	10/18/2018	7.5	22.839 j	0.27	130	<1	<1	<1	<1	**3820**	**52**	<0.2	<0.3	NA

COLOR NOTES

Bold highlighted concentration indicates exceedance of the 15A NCAC 02L .0202 Standard or the IMAC. (Effective date for 15A NCAC 02L .0202 Standard and IMAC is April 1, 2013)

Turbidity of Sample ≥ 10 NTUs

Provisional Background Threshold Values reflect the values represented in the NCDEQ letter dated 10/11/2017.

I/A

WEATHERSPOON
12/05/2018
BRANDON RUSSO
TED VOLSKAY

	PARAM	**CFR257 APPENDIX III CONSTITU**			**INORGANIC PARAMETERS (TOTAL CONCENTRATION)**								**IONUCLI**
Reporting Units	**S.U.**	**ug/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**pCi/L**
15A NCAC 02L Standard	**6.5-8.5**	**700**	**250**	**500**	**1***	**10**	**4***	**1***	**300**	**50**	**0.2***	**0.3***	**5^**
Provisional Background (Surficial Unit)	**3.2-6.9**	**50**	**13.7**	**90.3**	**1**	**1.35**	**1**	**1**	**9422**	**39**	**0.2**	**4.2**	**6.463**
Provisional Background (Lower Yorktown Unit)	**5.5-5.7**	**50**	**1.3**	**75**	**1**	**1**	**1**	**1**	**2070**	**20**	**0.2**	**2.61**	**5.4**
Provisional Background (Pee Dee Unit)	**6.9-8.3**	**50**	**0.24**	**130**	**1**	**1**	**1**	**1**	**1550**	**41**	**0.2**	**0.32**	**3.55**

					PARAM	**CFR257 APPENDIX III CONSTITU**			**INORGANIC PARAMETERS (TOTAL CONCENTRATION)**								**IONUCLI**
Sample ID	**Location Description**	**Associated Unit**	**Sample Location Aquifer Name**	**Sample Collection Date**	**pH**	**Boron**	**Sulfate**	**Total Dissolved Solids**	**Antimony**	**Arsenic**	**Beryllium**	**Cobalt**	**Iron**	**Manganese**	**Thallium**	**Vanadium**	**Total Radium**

Analytical data review has not been completed for this dataset.

ABBREVIATION NOTES

BGS - below ground surface
BOD - Biologic Oxygen Demand
CB - Compliance Boundary
COD - Chemical Oxygen Demand
Deg C - Degrees Celsius
DMAs - dimethylarsinic acid
DUP - Duplicate
Eh - Redox Potential
ft - Feet
GPM - gallons per minute
IMAC - Interim Maximum Allowable Concentrations. From the 15A NCAC 02L Standard, Appendix 1, April, 1, 2013.
meq/100g - millequivalents per 100 grams
MDC - Minimum Detectable Concentration
MeSe - Methylseleninic acid
mg/kg - milligrams per kilogram
mg/L - milligrams per liter
mg-N/L - Milligram nitrogen per liter
MMAs - monomethylarsonic acid

mV - millivolts
NA - Not available or Not Applicable
ND - Not detected
NE - Not established
NM - Not measured
NTUs - Nephelometric Turbidity Units
pCi/L - picocuries per liter
PSRG - Primary Soil Remediation Goals
RL - Reporting Limit
SeCN - selnocynante
SeMe (IV) - Selenomethionine
SPLP - Synthetic Precipitation Leaching Procedure
S.U. - Standard Units
TCLP - Toxicity Characteristic Leaching Procedure
ug/L - micrograms per liter
ug/mL - microgram per milliliter
umhos/cm - micromhos per centimenter
Well Locations referenced to NAD83 and elevations referenced to NAVD88

I/A

From: Sheetz, Bryson
To: "White, Kenneth B"
Cc: Lanter, Steven (Steven.Lanter@ncdenr.gov); eric.g.smith@ncdenr.gov; Sullivan, Ed M; Toepfer, John R; Czop, Ryan; Ogallo, LeToya Fields; Hanchey, Matthew F.; Tyndall, Kent; "Allen, Trent"
Subject: Duke Energy - Weatherspoon NPDES GW Monitoring Report - June 2018
Date: Thursday, July 19, 2018 12:10:00 PM
Attachments: Weatherspoon GW Monitoring Report for 2018.06.18.pdf

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Kent,

Please find attached the Weatherspoon June 2018 Groundwater Monitoring Report that has been submitted via certified mail to the NCDEQ-DWQ Information Processing Unit. Duke Energy sampled three ash basin compliance wells (CW-1, CW-2, and CW-3) and one background well (BW-1) on June 18, 2018. The following is a summary of the 2L exceedances from this event:

- BW-1, CW-1, and CW-3 below pH of 6.5
- BW-1, CW-1, and CW-3 above iron standard.

Please let me know of any questions you have regarding these results.

Thanks,

Bryson Sheetz

Engineer II
EHS CCP Waste & Groundwater Programs
O: 980-373-6636 C: 706-910-9638
bryson.sheetz@duke-energy.com

I/A

ESTIMATED SUBMITTAL DATE **November 26, 2018**	**MUST BE SUBMITTED BEFORE** **November 30, 2018**

W. H. WEATHERSPOON PLANT
GROUNDWATER MONITORING REPORT SUBMITTAL
File: WSPN 12520-Q

☒ Date Mailed ☐ Date Hand Delivered 11/27/2018

this REVIEWER page only goes with FILE copy

October 2018 Sampling Event

REVIEWER, TITLE	**REVIEW TYPE**	**REVIEW DATE**	**INITIAL and DATE**
R. K. Tyndall, Environmental Specialist	Reviewer	November 26, 2018	11/26/2018
T. A. Hanes, Station Manager	Cover Letter/Report	November 21, 2018	

RETURN TO :	**R. K. Tyndall**	o: f: c:	**910-341-4775** **910-341-4791** **910-409-9430**

This report provides Groundwater Monitoring reporting data

MAILING INSTRUCTIONS:

Mail the original and one (1) copies CERTIFIED to:

Division of Water Quality
Information Processing Unit
1617 Mail Service Center
Raleigh, NC 27699-1617

I/A

DUKE ENERGY
PROGRESS

W. H. Weatherspoon Plant
491 Power Plant Rd
Lumberton, NC 28358

Mailing Address:
Sherwood Smith Jr. Energy Complex
198 Energy Way
Hamlet, NC 28345

o: 910.205.2101
f: 910.205.2047

November 26, 2018

Certified Mail # 7017 2680 0000 1260 9003 (2 copies)
NCDEQ-DWQ, Information Processing Unit
1617 Mail Service Center
Raleigh, NC 27699-1621

Subject: Weatherspoon October 2018 Groundwater Monitoring Report Submittal

Dear Aquifer Protection Supervisor:

Duke Energy Progress, LLC (DEP) sampled three ash basin compliance wells (CW-1, CW-2, and CW-3) at the Weatherspoon Steam Electric Plant (NPDES Permit #NC0005363) on October 16, 2018. The background well (BW-1) was inaccessible due to local flooding resulting from Hurricane Florence. Please find attached two copies of the results on the DEQ approved electronic version of the Groundwater Compliance Report Form (GW-59CCR).

All values reported on the attached reports are dependent on the accuracy of approved analytical methods used to measure parameters.

The NPDES permit (NC0005363) was re-issued on August 3, 2018, and became effective November 1, 2018. This is the last groundwater compliance event per the prior permit requirements.

If there are any questions, please contact either:

- R. Kent Tyndall, Environmental Professional for the W. H. Weatherspoon Plant; phone (910) 341-4775 or e-mail Kent.Tyndall@duke-energy.com; or
- Bryson Sheetz, Waste and Groundwater Engineer at our Corporate Headquarters (South Church Street Building), phone (980) 373-6636 or email Bryson.Sheetz@duke-energy.com.

I, certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Sincerely,

Danny Faile for Thomas A. Hanes
Station Manager

I/A

GROUNDWATER QUALITY MONITORING COMPLIANCE REPORT FORM

Mail original and 1 copy to:
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY - INFORMATION PROCESSING UNIT
1617 MAIL SERVICE CENTER, RALEIGH, NC 27699-1617 Phone: (919) 733-3221

FACILITY INFORMATION
Please Print Clearly or Type
Facility Name: Weatherspoon Power Plant
Permit Name (if different): Duke Energy Progress, LLC
Facility Address: 491 Power Plant Road (Street)
Lumberton (City) NC (State) 28358 (Zip) **County** Robeson

Permit Type: NPDES
PERMIT Number: NC0005363
Expiration Date: 07/31/2014
TYPE OF PERMITTED OPERATION BEING MONITORED Ash Impoundment Groundwater

Contact Person: Bryson Sheetz **Telephone#** 980-373-6636
Well Location/Site Name: Weatherspoon Ash Pond Wells **No. of wells to be sampled:** 4 (from Permit)

Monitoring Well Construction Information

Well ID Number (From Permit)

		Units	BW-1	CW-1	CW-2	CW-3	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-
Well Depth [ft below land surface]		ft	20.00	14.00	14.50	14.50														
Measuring Point (toc) [ft above land surface]		ft	3.36	3.13	2.72	3.12														
Well Diameter		in	2.0	2.0	2.0	2.0														
Screen Top [ft below land surface]		ft	5.00	4.00	4.50	4.50														
Screen Bottom [ft below land surface]		ft	20.00	14.00	14.50	14.50														
Relative Measuring Point Elevation		ft	142.82	116.84	113.41	119.08														

Sampling Information and Field Analysis

CHECK IF DRY WELL AT TIME OF SAMPLING			☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY
	15A-2L	Units	BW-1	CW-1	CW-2	CW-3	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-
Sample Date			NS	10/16/2018	10/16/2018	10/16/2018														
Volume of Water pumped/bailed		gal	NS	1.66	0.37	1.06														
Temperature (00010)		deg. C	NS	23	23	23														
Odor (00085)			NS	Minor Musty	None	None														
Appearance			NS	Brown Tint	Clear	Clear														
Turbidity (82078)		NTU	NS	9.3	5.4	2.1														
Dissolved Oxygen (00300)		mg/L	NS	0.40	0.37	1.26														
Oxidation Reduction Potential (00090)		mV	NS	207	73	217														
Specific Cond - field (00094)		umhos/cm	NS	89	285	217														
Water Level [ft below measuring pt.] (82546)		ft	NS	4.29	4.50	4.80														
pH - field (00400)	6.5 - 8.5	SU	NS	**5.68**	7.27	6.55														

Laboratory Information

Laboratory Name Duke Energy Analytical Laboratory[2]
Sample Analysis Date October 17 - 23, 2018
Certification # NC DENR # 248
Samples for metals were collected unfiltered: ☑ Yes ☐ No
and field acidified: ☑ Yes ☐ No

	IMAC[1]	15A-2L	Units	BW-1	CW-1	CW-2	CW-3	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-
TDS - Total Diss. Solids (70300)	---	500	mg/l	NS	57	140	100														
Cl - Chloride (00940)	---	250	mg/l	NS	3.9	5.5	7.5														
As - Arsenic (01002)	---	10	ug/l	NS	1.18	<1	<1														
SO4 - Sulfate (00945)	---	250	mg/l	NS	<0.1	10	9.9														
Nitrate (NO3) as N (00620)	---	10	mg/l	NS	0.09	0.17	0.02														
Cd - Cadmium (01027)	---	2	ug/l	NS	<1	<1	<1														
Cr - Chromium (01034)	---	10	ug/l	NS	<5	<5	<5														
Cu - Copper (01042)	---	1	mg/l	NS	<0.005	<0.005	<0.005														
Fe - Iron (01045)	---	300	ug/l	NS	**1350**	**763**	289														
Hg - Mercury (71900)	---	1	ug/l	NS	<0.05	<0.05	<0.05														
Mn - Manganese (01055)	---	50	ug/l	NS	31	11	23														
Ni - Nickel (01067)	---	100	ug/l	NS	<5	<5	<5														
Pb - Lead (01051)	---	15	ug/l	NS	<1	<1	<1														
Zn - Zinc (01092)	---	1	mg/l	NS	<0.005	<0.005	<0.005														
Ba - Barium (01007)	---	700	ug/l	NS	25	24	35														
B - Boron (01022)	---	700	ug/l	NS	<50	<50	<50														
Tl - Thallium (01059)	0.2	NE	ug/l	NS	<0.2	<0.2	<0.2														
Sb - Antimony (01097)	1	NE	ug/l	NS	<1	<1	<1														
Se - Selenium (01147)	---	20	ug/l	NS	<1	<1	<1														
Alkalinity - (00410)	---	NE	mg/l	NS	26.4	124	88.8														
Al - Aluminum (01105)	---	NE	ug/l	NS	516	7	103														
Be - Beryllium (01012)	4	NE	ug/l	NS	<1	<1	<1														
HCO3 - Bicarbonate (00440)	---	NE	mg/l	NS	26.4	124	88.8														
Ca - Calcium (00916)	---	NE	mg/l	NS	8.37	48.9	34.6														
CO3 - Carbonate (00445)	---	NE	mg/l	NS	<5	<5	<5														
Co - Cobalt (01037)	1	NE	ug/l	NS	<1	<1	<1														
Mg - Magnesium (00927)	---	NE	mg/l	NS	0.623	1.17	1.06														
Mo - Molybdenum (01062)	---	NE	ug/l	NS	<1	1.07	<1														
K - Potassium (00937)	---	NE	mg/l	NS	1.29	0.613	0.81														
Na - Sodium (82035)	---	NE	mg/l	NS	6.67	3.60	5.44														
TSS - Total Susp. Solids (70031)	---	NE	mg/l	NS	<5	<5	<5														
V - Vanadium (01087)	0.3	NE	ug/l	NS	**0.911**	<0.3	**0.672**														
Sr - Strontium (01082)	---	NE	mg/l	NS	0.056	0.209	0.192														

Notes:
Turbidity is field analyzed for information use only.
NE = Not Established
NS = Not Sampled (inaccessible due to local flooding)

BOLD values equal or exceed the corresponding 2L standard

Qualifiers: None

I certify that, to the best of my knowledge and belief, the information submitted in this report is true, accurate, and complete, and that the laboratory analytical data was produced using approved methods of analysis by a DWQ-certified laboratory. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Danny Faile for Thomas A. Hanes, Station Manager
Permittee (or Authorized Agent) Name and Title - Please print or type

Signature of Permittee (or Authorized Agent)

11/26/18
Date

GW-59CCR 09/2015

1 -The IMACs were issued in 2010, 2011, and 2012; however NCDEQ has not established a 2L for these constituents as described in 15A NCAD 02L.0202 (c). For this reason, IMAC's noted on the report are for reference only.

2 -Alkalinity, Bicarbonate, and Carbonate were subcontracted by Duke Energy Analytical Laboratory to Pace Analytical Services, LLC in Huntersville, NC.

I/A

ESTIMATED SUBMITTAL DATE **November 26, 2018**	**MUST BE SUBMITTED BEFORE** **November 30, 2018**

W. H. WEATHERSPOON PLANT

GROUNDWATER MONITORING REPORT SUBMITTAL

File: WSPN 12520-Q

☒ Date Mailed ☐ Date Hand Delivered 11/27/2018

this REVIEWER page only goes with FILE copy

October 2018 Sampling Event

REVIEWER, TITLE	**REVIEW TYPE**	**REVIEW DATE**	**INITIAL and DATE**
R. K. Tyndall, Environmental Specialist	Reviewer	November 26, 2018	11/26/2018
T. A. Hanes, Station Manager	Cover Letter/Report	November 21, 2018	

RETURN TO :	**R. K. Tyndall**	o: f: c:	**910-341-4775** **910-341-4791** **910-409-9430**

This report provides Groundwater Monitoring reporting data

MAILING INSTRUCTIONS:

Mail the original and one (1) copies CERTIFIED to:

Division of Water Quality
Information Processing Unit
1617 Mail Service Center
Raleigh, NC 27699-1617

I/A

DUKE ENERGY
PROGRESS

W. H. Weatherspoon Plant
491 Power Plant Rd
Lumberton, NC 28358

Mailing Address:
Sherwood Smith Jr. Energy Complex
198 Energy Way
Hamlet, NC 28345

o: 910.205.2101
f: 910.205.2047

November 26, 2018

Certified Mail # 7017 2680 0000 1260 9003 (2 copies)
NCDEQ-DWQ, Information Processing Unit
1617 Mail Service Center
Raleigh, NC 27699-1621

Subject: Weatherspoon October 2018 Groundwater Monitoring Report Submittal

Dear Aquifer Protection Supervisor:

Duke Energy Progress, LLC (DEP) sampled three ash basin compliance wells (CW-1, CW-2, and CW-3) at the Weatherspoon Steam Electric Plant (NPDES Permit #NC0005363) on October 16, 2018. The background well (BW-1) was inaccessible due to local flooding resulting from Hurricane Florence. Please find attached two copies of the results on the DEQ approved electronic version of the Groundwater Compliance Report Form (GW-59CCR).

All values reported on the attached reports are dependent on the accuracy of approved analytical methods used to measure parameters.

The NPDES permit (NC0005363) was re-issued on August 3, 2018, and became effective November 1, 2018. This is the last groundwater compliance event per the prior permit requirements.

If there are any questions, please contact either:

- R. Kent Tyndall, Environmental Professional for the W. H. Weatherspoon Plant; phone (910) 341-4775 or e-mail Kent.Tyndall@duke-energy.com; or
- Bryson Sheetz, Waste and Groundwater Engineer at our Corporate Headquarters (South Church Street Building), phone (980) 373-6636 or email Bryson.Sheetz@duke-energy.com.

I, certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Sincerely,

Danny Faile for Thomas A. Hanes
Station Manager

I/A

GROUNDWATER QUALITY MONITORING COMPLIANCE REPORT FORM

Mail original and 1 copy to: DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY - INFORMATION PROCESSING UNIT
1617 MAIL SERVICE CENTER, RALEIGH, NC 27699-1617 Phone: (919) 733-3221

FACILITY INFORMATION

Please Print Clearly or Type

Facility Name: Weatherspoon Power Plant
Permit Name (if different): Duke Energy Progress, LLC
Facility Address: 491 Power Plant Road (Street)
Lumberton (City) NC (State) 28358 (Zip) County Robeson

Permit Type: NPDES
PERMIT Number: NC0005363
Expiration Date: 07/31/2014
TYPE OF PERMITTED OPERATION BEING MONITORED: Ash Impoundment Groundwater

Contact Person: Bryson Sheetz
Telephone# 980-373-6636
Well Location/Site Name: Weatherspoon Ash Pond Wells
No. of wells to be sampled: 4 (from Permit)

Monitoring Well Construction Information

Well ID Number (From Permit)

		Units	BW-1	CW-1	CW-2	CW-3	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-
Well Depth [ft below land surface]		ft	20.00	14.00	14.50	14.50														
Measuring Point (toc) [ft above land surface]		ft	3.36	3.13	2.72	3.12														
Well Diameter		in	2.0	2.0	2.0	2.0														
Screen Top [ft below land surface]		ft	5.00	4.00	4.50	4.50														
Screen Bottom [ft below land surface]		ft	20.00	14.00	14.50	14.50														
Relative Measuring Point Elevation		ft	142.82	116.84	113.41	119.08														

Sampling Information and Field Analysis

CHECK IF DRY WELL AT TIME OF SAMPLING			☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY	☐ DRY
	15A-2L	Units	BW-1	CW-1	CW-2	CW-3	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-
Sample Date			NS	10/16/2018	10/16/2018	10/16/2018														
Volume of Water pumped/bailed		gal	NS	1.66	0.37	1.06														
Temperature (00010)		deg. C	NS	23	23	23														
Odor (00085)			NS	Minor Musty	None	None														
Appearance			NS	Brown Tint	Clear	Clear														
Turbidity (82078)		NTU	NS	9.3	5.4	2.1														
Dissolved Oxygen (00300)		mg/L	NS	0.40	0.37	1.26														
Oxidation Reduction Potential (00090)		mV	NS	207	73	217														
Specific Cond - field (00094)		umhos/cm	NS	89	285	217														
Water Level [ft below measuring pt.] (82546)		ft	NS	4.29	4.50	4.80														
pH - field (00400)	6.5 - 8.5	SU	NS	**5.68**	7.27	6.55														

Laboratory Information

Laboratory Name: Duke Energy Analytical Laboratory[2]
Sample Analysis Date: October 17 - 23, 2018
Certification #: NC DENR # 248

Samples for metals were collected unfiltered: ☑ Yes ☐ No
and field acidified: ☑ Yes ☐ No

	IMAC[1]	15A-2L	Units	BW-1	CW-1	CW-2	CW-3	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-	MW-
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Mg - Magnesium (00927)	---	NE	mg/l	NS	0.623	1.17	1.06														
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Qualifiers: None

I certify that, to the best of my knowledge and belief, the information submitted in this report is true, accurate, and complete, and that the laboratory analytical data was produced using approved methods of analysis by a DWQ-certified laboratory. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Danny Faile for Thomas A. Hanes, Station Manager
Permittee (or Authorized Agent) Name and Title - Please print or type

Signature of Permittee (or Authorized Agent)

11/26/18
Date

GW-59CCR 09/2015

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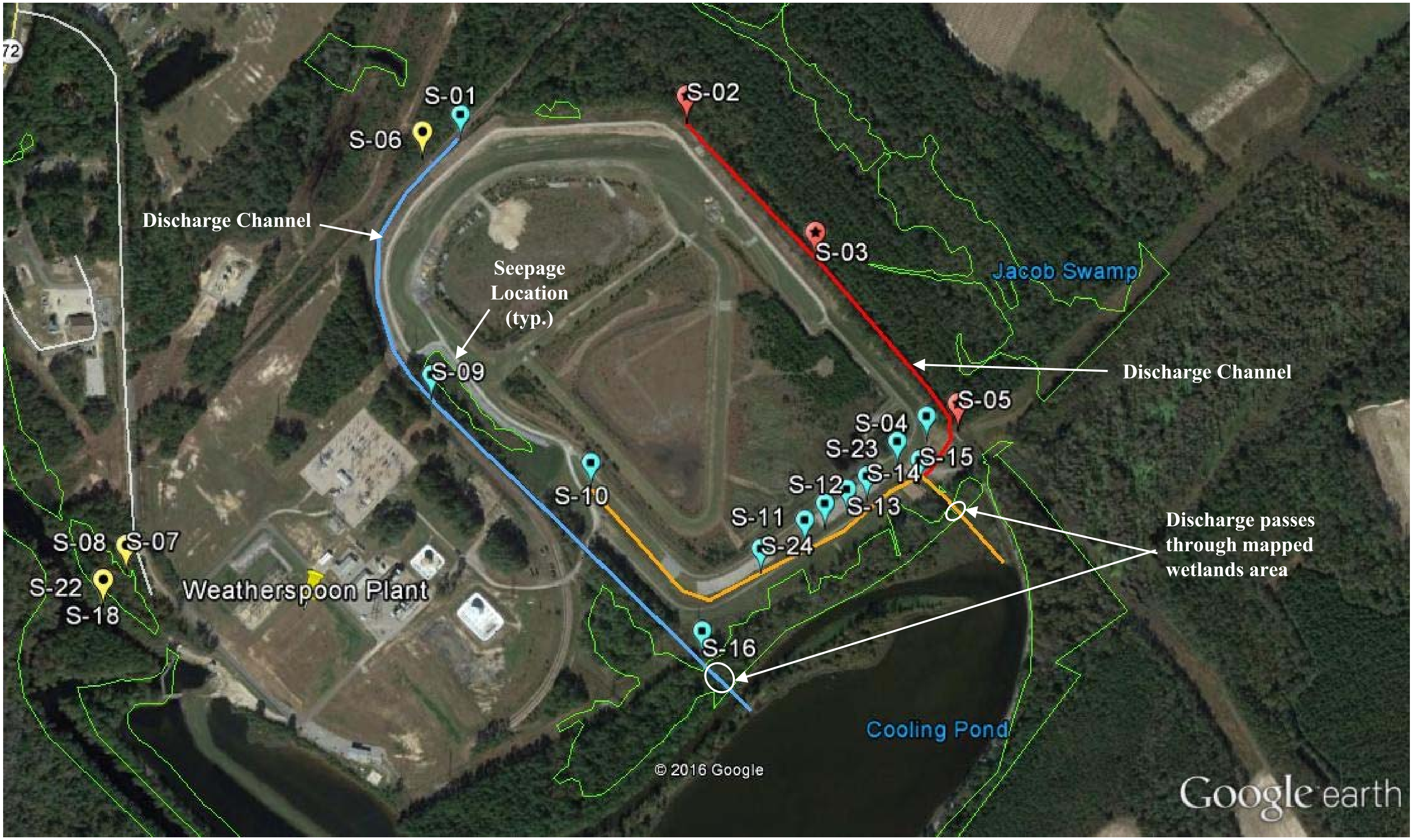
[2] -Alkalinity, Bicarbonate, and Carbonate were subcontracted by Duke Energy Analytical Laboratory to Pace Analytical Services, LLC in Huntersville, NC.

ATTACHMENT C

Seepage Channels and Wetlands

I/A

ATTACHMENT C
Seepage Channels and Wetlands



Note: December 2015 Wetlands delineation map complilied by AMEC

I/A

Bednarcik Direct AGO Cross Ex. 15
Docket No. E-2, Sub 1219A

Hart Exhibit 36
Docket No. E-2, Sub 1219

Gatorian, Michael

From: Ryan, Kenneth
Sent: Monday, August 22, 2011 10:44 AM
To: 'Antunes Steven'
Cc: Minix, Joshua
Subject: FW: CPL
Attachments: Document.pdf

Steven:

Atty-Client Communication/Work Product

Ken

From: Peter Alvey [mailto:palvey@rouxinc.com]
Sent: Monday, August 22, 2011 8:22 AM
To: Ryan, Kenneth
Subject: FW: CPL

Atty-Client Communication/Work Product

Pete

From: Malanchuk, John [mailto:jmalanchuk@em-law.com]
Sent: Thursday, August 18, 2011 10:24 AM
To: Peter Alvey
Subject: FW: CPL

Peter-

Here is the answer from Progress. With this I am happy to give you my assurance that nothing else exists re closure plans for the ash ponds.

Redacted

Good luck.

John

John L. Malanchuk PhD

Eisenstein Malanchuk LLP
1048 Potomac Street NW
Washington, DC 20007
202.965.4700
202.965.1808 Fax

From: Toepfer, John [mailto:John.Toepfer@pgnmail.com]
Sent: Thursday, August 18, 2011 10:05 AM
To: Malanchuk, John
Cc: Kemp, Daniel; Madewell, Alan; Holt, Fred
Subject: RE: CPL

John – the Cape Fear Plant NPDES permit has been updated recently and will go into effect Sept. 1, 2011. You were sent the NPDES permit for Cape Fear which is valid through August 2011. Within the permit that goes into effect September 1, 2011, there is a requirement for Ash Pond Closure. I attach that one page with that language. No other PEC NPDES permit has this language. As of today (08/18/11), PEC has not completed closure plans for any ash pond in the system. PEC is beginning the process to develop a closure plan for the Weatherspoon Plant ash pond since the coal fired portion of this plant is slated to cease operation in October 2011. Let me know of any questions. thanks

John R. Toepfer, P.E.
Senior Environmental Specialist
410 S. Wilmington Street/PEB4
Raleigh, NC 27601

919-546-7863 phone
VN: 770-7863
919-632-3714 cell
919-546-4409 fax

From: Malanchuk, John [mailto:jmalanchuk@em-law.com]
Sent: Friday, August 12, 2011 11:27 AM
To: Toepfer, John
Subject: FW: CPL

John-

Please see the email below. This is from the environmental consultant representing the insurance company, AEGIS. Am I safe giving Peter my assurance per his request below? (I assume he means no other permits than the ones I sent him.)

Thanks,

John

John L. Malanchuk PhD

Eisenstein Malanchuk LLP
1048 Potomac Street NW
Washington, DC 20007
202.965.4700
202.965.1808 Fax

From: Peter Alvey [mailto:palvey@rouxinc.com]
Sent: Friday, August 12, 2011 10:07 AM
To: Malanchuk, John
Subject: CPL

John,

I received the permits. As I am sure you discovered also, they don't say much about the operation or closure of the ash ponds. At a minimum I will need an assertion by you or CPL that no permits for the ponds exist and that no closure plans are available for the ponds.

Thanks,

Peter Alvey

****

Peter Alvey, P.E.
Vice President
Roux Associates, Inc.
2000 Spring Road
Suite 420
Oak Brook, Illinois 60523
Telephone (630) 572-3300
Direct Dial (630) 468-1051
Fax (630) 572-8841

Email: palvey@rouxinc.com

Roux Associates, Inc.

http://www.rouxinc.com

We solve our clients' most challenging environmental problems.

I/A

A. 6. Intake Screen Backwash

The discharge of intake screen backwash is permitted without limitations or monitoring requirements.

A. 7. Biocide Condition

The permittee shall not use any biocides except those approved in conjunction with the permit application. The permittee shall notify the Director in writing not later than ninety (90) days prior to instituting use of any additional biocide used in cooling systems which may be toxic to aquatic life other than those previously reported to the Division of Water Quality. Such notification shall include completion of Biocide Worksheet Form 101 and a map locating the discharge point and receiving stream. Completion of a Biocide Worksheet 101 is not necessary for the introduction of a new biocide into an outfall currently being tested for toxicity.

A. 8. Domestic Wastewater Treatment Plant

The domestic wastewater treatment plant shall be properly operated and maintained to ensure treatment of sanitary effluent to secondary standards.

A. 9. Groundwater Monitoring Well Construction and Sampling

The permittee shall conduct groundwater monitoring to determine the compliance of this NPDES permitted facility with the current groundwater Standards found under 15A NCAC 2L .0200. The monitoring shall be conducted in accordance with the Sampling Plan approved by the Division.

A. 10. Section 316 (b) of CWA

The permittee shall comply with the Cooling Water Intake Structure Rule per 40 CFR 125.95.

A. 11. Structural Integrity Inspections of Ash Pond Dam

The facility shall meet the dam design and dam safety requirements per 15A NCAC 2K.

A. 12. Ash Pond Closure

The facility shall prepare an Ash Pond Closure Plan in anticipation of the facility closure. This Plan shall be submitted to the Division one year prior to the closure of the facility.

A. 13. Fish Tissue Monitoring Near Ash Pond Discharge

The facility shall conduct fish tissue monitoring once during the permit term and submit the results with the NPDES permit renewal application. The objective of the monitoring is to evaluate potential uptake of pollutants by fish tissue near the Ash Pond discharge. The parameters analyzed in fish tissue shall be arsenic, selenium, and mercury. The monitoring shall be conducted in accordance with the Sampling Plan approved by the Division.

Bednarcik Direct AGO Cross Ex. 16
Docket No. E-2, Sub 1219A

I/A

Hart Exhibit 40
Docket No. E-2, Sub 1219

Recently the Company has retired designated fossil units in NC while their associated ash basins continue to remain active for a period. In some cases, waste streams other than ash (e.g., coal pile run-off, drains, etc.) will need to continue to be transported to the ash basins for treatment until those plant support systems can be decommissioned fully. Currently federal regulatory programs do not specifically address the decommissioning and closure of ash basins; however, state regulations provide some options for closure framework. The company is working closely with NCDENR to define a closure process that provides a framework for certainty in the absence of specific federal regulatory requirements.

It is important for the corporation to move forward with ash basin closures under the process to be submitted to NCDENR, to minimize environmental risks and costs (mostly O&M) associated with maintaining ash basins for an extended period until federal rulemakings are complete and final. Other timing considerations include:

1. Ash basin closures can take years to complete so beginning the process is important.
2. While a final federal coal combustion residuals (CCR) rule is not expected before 2014, and lack of a federal ruling introduces an element of uncertainty, state requirements exist now. There is reasonable belief with internal company experts that any federal rule would be based on Subtitle D requirements to be implemented by the states.
3. Until the ash basin is dewatered, the NPDES permit must be maintained, or possibly renewed in certain cases, thus opening the renewal process to regulatory and greater public scrutiny (including public comments supporting clean closure). O&M Costs would continue to accumulate especially while the permit is active.
4. Dewatering the ash basins in accordance with the NPDES permit will over a relatively brief time reduce and/or eliminate seepage which the company is currently addressing.
5. Shaping and capping the ash basins soon after dewatering will help address possible dusting issues. Other dusting measures during dewatering will be needed.
6. Capping the basins soon will help begin the process of natural attenuation or other means to reduce constituents in groundwater. Constituent levels monitored in groundwater wells can take many years to observe substantial reductions.
7. Ash basin closure has recently seen increased attention and scrutiny and that scrutiny can only be expected to increase while the ash basins have no approved closure plan and reasonable efforts to close them are not underway.

To address these concerns representatives from Environmental, Strategic Engineering, and Plant Demolition conducted a Value Stream Analysis in 2012 to develop a standard process for ash basin closure option evaluation and decision-making, including factors such as timing, technologies, environmental and geotechnical considerations, risks, resources, and costs. The team developed a combined company ash basin closure process, which was analyzed using the Weatherspoon site. The team then completed a Kepner-Tregoe problem solving/decision analysis to determine the best closure design options for the Weatherspoon ash basin closure using site scoping information already collected.

[redacted]

I/A While the site conditions supported a simple soil cover in earlier analysis, the K-T analysis considered other factors including environmental protection, long-term maintenance costs, public perception and risk minimization, and concluded that an HDPE geo-synthetic cap system would be the best solution for Weatherspoon ash basin closure.

The recommended strategy is to dewater, cap the Weatherspoon ash basin, and monitor. The ash basin strategy does not address lay-of land ash disposal areas such as landfills and possibly other historic ash placements. An engineering design is currently being performed for ash basin closure at Weatherspoon based on the recommended strategy. The conceptual design was utilized to further define scope, cost, and schedule of ash basin closures. This design will be submitted to NCDENR in May 2013, expecting final approval in July 2013.

Once NCDENR approval is received, the team recommends closure of the Weatherspoon ash basin for the following reasons.

1. This closure strategy process and NCDENR approval will establish precedent with the state on the method for future ash basin closure.
2. The Weatherspoon ash basin is one of the simplest and smallest basins on the system. Cost for closure is estimated to be approximately $18 - $34 million. It will provide a useful test case for lessons learned that can be applied to future closures.
3. Defining future costs for closure is critical to estimating liabilities for corporate reporting.
4. While the federal Coal Combustion Residual (CCR) rule has not yet been finalized, EPA's current thinking, based on recent agency comments, is that regulation of CCR disposal under RCRA Subtitle D may be "adequate".
5. It is anticipated that final CCR regulations requiring ash basin closure will be finalized no earlier than 2014. Assuming a Subtitle D rule contemplated by federal legislative efforts, state rulemaking will be initiated to create the framework for state implementation of the federal program. Duke Energy's retired plants in the Carolinas have at least 20 ash basins that will need to be closed. It is important that the corporation be proactive in developing the expertise in closure methods and have the qualified contractors on board to help meet this challenge.
6. The Plant Demolition and Retirement team includes individuals who are capable of performing the work utilizing trained fuel handling operators and existing equipment for basin grading. The project will be supplemented with engineering, QA and liner/specialty contractors. Future ash basin closures will be managed similarly to Weatherspoon. However, grading services may be contracted depending on in-house resource availability.

Current activities include budget development with Strategic Engineering and Cape Fear, Dan River, Lee (NC), and Buck ash basins site characterization studies.

[redacted] [redacted]
[redacted]

O&M Cost Reduction:

Anticipated ongoing O&M work for retired facilities include:

1. Inspections
2. Dike maintenance (Mowing slopes, brush cutting, toe ditch and interior slope maintenance)
3. Fugitive dust mitigation
4. Repairs as needed (reseeding, runoff, animal burrow)

Anticipated cost per site is $50K-$150k

Support for the Process of natural attenuation caused by capping:

Attached are selected pages from the most recent groundwater monitoring report conducted by Blackrock Engineers for the Roxboro landfill. Note highlighted discussion from a couple of sections of the report regarding the downward trend in contaminant concentrations and the fact that the lined landfill is partially intended to minimize recharge and thus allow for concentration reduction to occur which is happening. Following the text is a series of graphs that support the generally downward concentration trend.

Roxboro Landfill
Groundwater Data Tr

Capital cost bases:

The range provided for closure is based on $18 million closure estimate based on Belews Creek ash land fill closure and $34 million estimate from Strategic Engineering.

[redacted]

I/A Bednarcik Direct AGO Cross Ex. 17
Docket No. E-2, Sub 1219A

Hart Exhibit 3
Docket No. E-2, Sub 1219

FILED
MAY 14 2015
JULIE RICHARDS JOHNSTON, CLERK
US DISTRICT COURT, EDNC
BY DEP CLK

UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF NORTH CAROLINA
WESTERN DIVISION
No. 5:15-CR-62-H
No. 5:15-CR-67-H
No. 5:15-CR-68-H

UNITED STATES OF AMERICA)
)
v.) JOINT FACTUAL STATEMENT
)
DUKE ENERGY BUSINESS SERVICES LLC)
DUKE ENERGY CAROLINAS, LLC)
DUKE ENERGY PROGRESS, INC.)

I. <u>INTRODUCTION</u>

Defendants Duke Energy Business Services LLC ("DUKE ENERGY BUSINESS SERVICES"), Duke Energy Carolinas, LLC ("DUKE ENERGY CAROLINAS"), and Duke Energy Progress, Inc. ("DUKE ENERGY PROGRESS"),(collectively referred to as "Defendants") and the United States of America, by and through the United States Attorneys for the Eastern District of North Carolina, the Middle District of North Carolina and the Western District of North Carolina and the Environmental Crimes Section of the United States Department of Justice (collectively referred to herein as "the United States" or "the government"), hereby agree that this Joint Factual Statement is a true and accurate statement of the Defendants' criminal conduct and that it provides a sufficient basis for the Defendants' pleas of guilty to the following charging documents and the terms of the Plea Agreements:

United States v. Duke Energy Business Services, LLC, and Duke Energy Progress, Inc., No. 5:15-CR-62-H;

United States v. Duke Energy Business Services, LLC, Duke Energy Carolinas, LLC, and Duke Energy Progress, Inc., No. 5:15-CR-67-H; and

United States v. Duke Energy Business Services, LLC, Duke Energy Carolinas, LLC, and Duke Energy Progress, Inc., No. 5:15-CR-68-H.

The charges from the Middle District of North Carolina and the Western District of North Carolina have been transferred to the Eastern District of North Carolina for purposes of plea pursuant to Fed. R. Crim. P. 20. The Defendants' guilty pleas are to be entered pursuant to the Plea Agreements signed and dated this same day.

II. OVERVIEW AND BACKGROUND

Dan River Steam Station - Middle District of North Carolina

1. From at least January 1, 2012, DUKE ENERGY CAROLINAS and DUKE ENERGY BUSINESS SERVICES failed to properly maintain and inspect the two stormwater pipes underneath the primary coal ash basin at the Dan River Steam Station in Eden, North Carolina. On February 2, 2014, one of those pipes failed, resulting in the discharge of approximately 27 million gallons of coal ash wastewater and between 30,000 and 39,000 tons of coal ash into the Dan River. The coal ash travelled more than 62 miles downriver to the Kerr Lake Reservoir on the border of

North Carolina and Virginia. Video camera inspections of the other pipe, conducted in the aftermath of the spill, revealed that the other pipe had also deteriorated, allowing coal ash wastewater to leak into the pipe, and that DUKE ENERGY CAROLINAS and DUKE ENERGY BUSINESS SERVICES had not taken appropriate action to prevent unauthorized discharges from the pipe.

Cape Fear Steam Electric Plant –
Middle District of North Carolina

2. DUKE ENERGY PROGRESS and DUKE ENERGY BUSINESS SERVICES also failed to maintain the riser structures in two of the coal ash basins at the Cape Fear Steam Electric Plant, resulting in the unauthorized discharges of leaking coal ash wastewater into the Cape Fear River.

Asheville, Riverbend, & Lee Steam Stations –
Eastern and Western Districts of North Carolina

3. Additionally, DUKE ENERGY CAROLINAS' and DUKE ENERGY PROGRESS's coal combustion facilities throughout North Carolina allowed unauthorized discharges of pollutants from coal ash basins via "seeps" into adjacent waters of the United States. Three of those facilities include the Asheville Steam Electric Generating Plant, the H.F. Lee Steam Electric Plant, and the Riverbend Steam Station. At those facilities, discharges from naturally occurring seeps were channeled by DUKE ENERGY CAROLINAS and DUKE ENERGY BUSINESS SERVICES to flow through

engineered drains and ditches into waters of the United States without obtaining or maintaining the necessary permits.

4. The Defendants' conduct violated the Federal Water Pollution Control Act (commonly referred to as the "Clean Water Act," or "CWA"). 33 U.S.C. §§ 1251 et seq. More specifically, the criminal investigation, conducted out of the Eastern District of North Carolina, revealed the following:

DEFENDANTS AND CORPORATE STRUCTURE

5. Duke Energy Corporation is an energy company headquartered in Charlotte, North Carolina.

6. Duke Energy Corporation is a holding company whose direct and indirect subsidiaries operate in the United States and Latin America. Duke Energy Corporation's wholly-owned subsidiaries include: DUKE ENERGY CAROLINAS; Progress Energy, Inc. ("Progress Energy"); DUKE ENERGY PROGRESS; and DUKE ENERGY BUSINESS SERVICES.

7. DUKE ENERGY CAROLINAS, a North Carolina limited liability company, is a regulated public utility primarily engaged in the generation, transmission, distribution and sale of electricity in portions of North Carolina and South Carolina.

8. Progress Energy, a North Carolina corporation headquartered in Raleigh, North Carolina, is a holding company which holds, among other entities, DUKE ENERGY PROGRESS.

9. DUKE ENERGY PROGRESS, a North Carolina corporation, is a regulated public utility primarily engaged in the generation, transmission, distribution and sale of electricity in portions of North Carolina and South Carolina. Prior to the July 2, 2012, merger between Duke Energy Corporation and Progress Energy, Inc., DUKE ENERGY PROGRESS was known as Carolina Power & Light, Inc., d/b/a Progress Energy Carolinas.

10. "Progress Energy Carolinas" will refer to DUKE ENERGY PROGRESS before the merger.

11. DUKE ENERGY BUSINESS SERVICES provides shared services to all of Duke Energy Corporation's operating utilities nationwide, including: Legal Counsel; Central Engineering & Services; Environmental, Health & Safety; Ethics and Compliance; and Coal Combustion Products.

12. During the time period relevant to the charges, within the State of North Carolina, the Defendants and/or their predecessors owned and operated the following facilities with coal ash basins:

FACILITY	**OWNER/ OPERATOR**	**NUMBER OF COAL ASH BASINS**	**ADJACENT WATERS OF THE UNITED STATES**	**FEDERAL JUDICIAL DISTRICT**
Allen Steam Station (Gaston County)	Duke Energy Carolinas	2	Lake Wylie & Catawba River	WDNC
Asheville Steam Electric Generating Plant (Buncombe County)	Duke Energy Progress	2	French Broad River	WDNC

I/A

Belews Creek Steam Station (Stokes County)	Duke Energy Carolinas	1	Belews Lake & Dan River	MDNC
Buck Steam Station (Rowan County)	Duke Energy Carolinas	3	Yadkin River & High Rock Lake	MDNC
Cape Fear Steam Electric Plant (Chatham County)	Duke Energy Progress	5	Cape Fear River	MDNC
Cliffside Steam Station (Rutherford & Cleveland Counties)	Duke Energy Carolinas	3	Broad River	WDNC
Dan River Steam Station (Rockingham County)	Duke Energy Carolinas	2	Dan River	MDNC
H.F. Lee Steam Electric Plant (Wayne County)	Duke Energy Progress	5	Neuse River	EDNC
L.V. Sutton Electric Plant (New Hanover County)	Duke Energy Progress	2	Cape Fear River & Sutton Lake[1]	EDNC
Marshall Steam Station (Catawba County)	Duke Energy Carolinas	1	Lake Norman	WDNC
Mayo Steam Electric Plant (Person County)	Duke Energy Progress	1	Mayo Lake	MDNC
Riverbend Steam Station (Gaston County)	Duke Energy Carolinas	2	Catawba River	WDNC
Roxboro Steam Electric Plant (Person County)	Duke Energy Progress	2	Hyco River	MDNC
Weatherspoon Steam Electric Plant (Robeson County)	Duke Energy Progress	1	Lumber River	EDNC

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[1] While the parties agree that Sutton Lake receives wastewater from the L.V. Sutton Electric Plant, the status of Sutton Lake as a "water of the State" or "water of the United States" is part of ongoing federal civil litigation. <u>See</u> <u>Cape Fear River Watch, Inc. v. Duke Energy Progress, Inc</u>., 25 F.Supp.3d 798, 808-809 (2014). The Defendants do not concede that Sutton Lake is a jurisdictional water in this Joint Factual Statement.

COAL COMBUSTION PLANTS AND COAL ASH BASINS

13. Power plants that generate electricity through the combustion of coal create a number of waste byproducts. Among those waste byproducts are "coal combustion residuals" or "CCRs." CCRs include fly ash, bottom ash, coal slag, and flue gas desulfurized gypsum. Fly ash and bottom ash are both commonly referred to as "coal ash." Coal ash contains various heavy metals and potentially hazardous constituents, including arsenic, barium, cadmium, chromium, lead, manganese, mercury, nitrates, sulfates, selenium, and thallium. Coal ash has not been defined, itself, as a "hazardous substance" or "hazardous waste" under federal law, although some constituents of coal ash may be hazardous in sufficient quantities or concentrations.

14. Coal ash basins (also known as "coal ash ponds," "coal ash impoundments," or "ash dikes") may be part of the waste treatment system at coal-fired power plants. Historically, the Defendants' coal ash basins were unlined earthen impoundments and typically operated as follows: Coal ash was mixed with water to form slurry. The coal ash slurry was carried through sluice pipe lines to the coal ash basin. Settling occurred in the coal ash basin, in which particulate matter and free chemical components separated from the slurry and settled at the bottom of the basin. Less contaminated water remained at the surface of the basin, from which it could eventually be

discharged if authorized under relevant law and permits. In some instances, such as the Dan River Steam Station, water at the surface of the primary basin, flowed into a secondary basin, where further settling and treatment occurred before its discharge into a water of the United States.

15. Coal ash basins generally continued to store settled ash and particulate material for years or decades. From time to time, the Defendants dredged settled coal ash from the basins, storing the ash in dry stacks on plant property.

16. A total of approximately 108 million tons of coal ash are currently held in coal ash basins owned and operated by the Defendants in North Carolina. Duke Energy Corporation subsidiaries also operate facilities with coal ash basins in South Carolina (approximately 5.99 million tons of coal ash), Kentucky (approximately 1.5 million tons of coal ash), Indiana (approximately 35.6 million tons of coal ash), and Ohio (approximately 5.9 million tons of coal ash).

17. Each of the Defendants' facilities in North Carolina with coal ash basins sought and received permits to discharge treated coal ash wastewater through specified permitted outfalls into waters of the United States, including those listed in paragraph 12.

III. LEGAL AND REGULATORY BACKGROUND

CLEAN WATER ACT

18. The Clean Water Act is a federal law enacted to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. § 1251(a).

19. The Act prohibits the discharge of any pollutant into waters of the United States except in compliance with a permit issued pursuant to the CWA under the National Pollutant Discharge Elimination System ("NPDES") by the United States Environmental Protection Agency ("EPA") or by a state with an approved permit program. 33 U.S.C. §§ 1311(a) and 1342.

20. The Act defines "discharge of a pollutant" as "the addition of any pollutant to navigable waters from any point source." 33 U.S.C. § 1362(12). The term "pollutant" includes a wide range of materials, including solid waste and industrial waste. 33 U.S.C. § 1362(6). Coal ash and coal ash wastewater are pollutants.

21. A "point source" is a "confined and discrete conveyance, including . . . any pipe . . . from which pollutants are or may be discharged." 33 U.S.C. § 1362(14). Pipes and channelized ditches conveying stormwater or wastewater to surface waters are point sources.

22. "Navigable waters" are defined in the Act as "waters of the United States." 33 U.S.C. § 1362(7). "Waters of the United States" include rivers and streams "which would affect or could affect interstate or foreign commerce including any such waters . . . [w]hich are or could be used by interstate or foreign travelers for recreational or other purposes . . . [and the] [t]ributaries of [such] waters." 40 C.F.R. § 122.2. The following rivers are "waters of the United States": (1) Broad River; (2) French Broad River; (3) Cape Fear River; (4) Catawba River; (5) Dan River; (6) Yadkin-Pee Dee River; (7) Neuse River; (8) Lumber River; (9) Roanoke River; (10) Hyco River; (11) all tributaries of those rivers, including the South Fork of the Catawba River and Crutchfield Branch; and (12) all lakes and reservoirs exchanging water with those rivers, including, but not limited to, Belews Lake, Lake Norman, Mayo Lake, High Rock Lake, Sutton Lake,[2] and Kerr Reservoir.

23. Permits regulating discharges of pollutants (other than dredge and fill material) to waters of the United States are issued under the NPDES permit program. See 33 U.S.C. § 1342. Under the NPDES permit program, persons or entities who wish to discharge one or more pollutants must apply for an permit from the proper state or federal agency. See 40 C.F.R. § 122.21. A "permit" is "an authorization, license, or equivalent

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[2] See note 1, supra.

control document issued by EPA or an 'approved State' to implement the requirements of [the CWA]." "Permit" does not include a "draft permit" or a "proposed permit" which has not yet been the subject of final agency action. 40 C.F.R. § 122.2 (emphasis added). Thus, an application for a permit does not provide the applicant with authority or permission to discharge under the Act.

24. States can seek approval from EPA to administer and enforce the CWA NPDES permit program. 33 U.S.C. § 1342(b). EPA's approval of a state program does not affect the United States' ability to enforce the Act's provisions. 33 U.S.C. § 1342(i).

25. On October 19, 1975, EPA approved the State of North Carolina's application to administer the NPDES Program. 40 Fed. Reg. 51493-05 (Nov. 5, 1975).

26. NPDES permits typically contain, among other things, effluent limitations; water quality standards; monitoring and reporting requirements; standard conditions applicable to all permits; and special conditions where appropriate. See 33 U.S.C. § 1342; 40 C.F.R. §§ 122.41-122.50.

27. All of DUKE ENERGY CAROLINAS' and DUKE ENERGY PROGRESS's facilities with coal ash basins in North Carolina are required to comply with the following Standard Conditions,

incorporated into their NPDES permit. See also 40 C.F.R. § 122.41.

a. The Permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit with a reasonable likelihood of adversely affecting human health or the environment. Standard Conditions, Section B(2) ("General Conditions").

b. The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Standard Conditions, Section C(2) ("Operation and Maintenance of Pollution Controls").

IV. FACTUAL BASIS FOR PLEA AND RELEVANT CONDUCT

DAN RIVER STEAM STATION

28. DUKE ENERGY CAROLINAS owns and operates the Dan River Steam Station ("DAN RIVER"), located on the Dan River in the Roanoke River Basin near Eden, North Carolina. DAN RIVER began operating in 1949 as a coal combustion plant. The coal combustion unit at DAN RIVER was retired in 2012. DUKE ENERGY CAROLINAS now operates a combined cycle natural gas facility to generate steam and electricity at DAN RIVER.

29. In 1956, the first coal ash basin at DAN RIVER was constructed to store existing and future coal ash. This basin is commonly referred to as the "Primary Ash Basin."

30. Two stormwater pipes run under the Primary Ash Basin: a 48-inch stormwater pipe and a 36-inch stormwater pipe. Both

were designed to carry stormwater from the site to the Dan River.

31. The 48-inch stormwater pipe predates the Primary Ash Basin. As installed in 1954, the 48-inch stormwater pipe was composed of galvanized corrugated metal pipe ("CMP").

32. From 1968 to 1969, the Primary Ash Basin was expanded over the original outfall of the 48-inch stormwater pipe. When the Primary Ash Basin was expanded, the 48-inch stormwater pipe was extended using reinforced concrete. After the expansion, the 48-inch stormwater pipe was a total of 1130 feet in length, of which approximately 786 feet was corrugated metal pipe and approximately 344 feet was reinforced concrete pipe ("RCP").

33. The 36-inch stormwater pipe is composed of reinforced concrete pipe that is approximately 600 feet in length.

34. Between 1976 and 1977, the expanded Primary Ash Basin was divided to form a second basin, commonly referred to as the "Secondary Ash Basin."

35. The Primary Ash Basin has a surface area of approximately 27 acres and a total storage capacity of approximately 477 acre-feet (or 155,431,132 gallons). The Secondary Ash Basin has a surface area of approximately 12 acres and a total storage capacity of approximately 187 acre-feet (or 60,934,277 gallons). In 2013, the basins contained a total of

approximately 1,150,000 cubic yards (or 232,270,130 gallons) of coal ash.

36. In a 2009 EPA Dam Safety Assessment, it was noted that the Primary and Secondary coal ash basins were:

> Classified as a significant hazard potential structure due to the environmental damage that would be caused by misoperation or failure of the structure.

DAN RIVER STEAM STATION NPDES PERMIT

37. On January 31, 2013, the State of North Carolina, through its Department of Environment and Natural Resources ("DENR") - Division of Water Resources ("DWR"), issued a new NDPES permit to DUKE ENERGY CAROLINAS. Effective March 2013, NPDES Permit NC0003468 ("the Dan River Permit"), and authorized the discharge of wastewater from specified outfalls at DAN RIVER.

38. The Dan River Permit required, among other things, that the facility meet the dam design and dam safety requirements set forth in North Carolina regulations at 15A NCAC 2K.

39. Pursuant to 15A NCAC 2K.0301, dams such as the Primary Ash Basin at DAN RIVER are subject to annual safety inspections by state authorities.

40. In 2006, DUKE ENERGY CAROLINAS, with the assistance of DUKE ENERGY BUSINESS SERVICES, applied for a NDPES stormwater permit for the 48-inch and the 36-inch pipes. As of February 2, 2014, DENR had not issued DUKE ENERGY CAROLINAS an individual or general NDPES stormwater permit for either the 48-inch or 36-inch pipe.

41. A NPDES stormwater permit is different than the NPDES permit issued for the discharge of wastewater from a treatment system. Stormwater permits generally do not allow the discharge of wastewater or particulates from coal ash basins or other industrial processes.

42. Neither the 48-inch nor the 36-inch stormwater pipe was a permitted outfall under the Dan River permit for wastewater. Neither DUKE ENERGY CAROLINAS nor any predecessor received authorization pursuant to the CWA and NPDES program to discharge wastewater from the coal ash basins or coal ash stored in those basins from either the 48-inch or 36-inch stormwater pipe under the Primary Coal Ash Basin at DAN RIVER.

1979 DOCUMENTED PROBLEMS WITH STORMWATER PIPES

43. In 1979, DUKE ENERGY CAROLINAS (at that time called Duke Power Company) inspected the 48-inch stormwater pipe through its Design Engineering and Station Support group. Although no major leaks were identified, engineers noted water

leaking into the pipe. Repairs to the 48-inch stormwater pipe were undertaken in response to this inspection.

44. Also in 1979, the Design Engineering and Station Support group inspected the 36-inch stormwater pipe. Twenty-two joints in the 36-inch pipe were noted for major leaks. DUKE ENERGY CAROLINAS/Duke Power Company employees recommended that the company repair the leaks or reroute the drain lines, noting that the discharges could be violations of EPA regulations. Repairs to the 36-inch stormwater pipe were undertaken in response to this inspection.

INSPECTIONS OF DAN RIVER COAL ASH BASINS AND DUKE ENERGY'S RESPONSE TO RECOMMENDATIONS

45. Pursuant to the requirements of North Carolina's dam safety laws, from 1981 through 2007, DUKE ENERGY CAROLINAS/Duke Power Company hired consultants to perform inspections of the coal ash basins at DAN RIVER every five years. The consultants generated reports containing their observations and recommendations that were provided to and reviewed by DUKE ENERGY CAROLINAS/Duke Power Company. In the same time period and pursuant to the same laws, DUKE ENERGY CAROLINAS/Duke Power Company performed its own annual inspections of the coal ash basins. DUKE ENERGY CAROLINAS/Duke Power Company also performed less-detailed monthly inspections of the coal ash basins.

46. In 1981, Engineering Firm #1 conducted the first of five independent inspections of DAN RIVER's ash basins. The report clearly identified the 48-inch pipe as part CMP/part RCP and the 36-inch pipe as RCP. **(See Appendix, Diagram 1).**

47. The 1981 report made the following recommendation, among others:

> The culverts which pass beneath the primary basin may become potential sources of problems, particularly as they age. As noted previously, there seemed to be more water leaving the 52/36-inch culvert than entering it. It is recommended that within the next several months the flow rate at each of the culverts be established, then checked at 6-month intervals thereafter. If there is a significantly greater flow of water leaving the pipes than entering them, the pipes should be inspected for leakage, as was done in 1979, and any needed repairs implemented.

48. The original schematic drawings in the 1981 report were maintained on site at DAN RIVER.

49. A 1984 Annual Inspection report prepared by DUKE ENERGY CAROLINAS/Duke Power Company recommended that "[f]low in the culverts beneath the primary basin should continue to be monitored at six month intervals" and that "[t]he corrugated metal pipe at the west end of the basin should be monitored in future inspections for further damage from seepage flow."

50. A 1985 Annual Inspection report prepared by DUKE ENERGY CAROLINAS/Duke Power Company clearly identified the 48-inch stormwater pipe as CMP. At least one of the engineers who participated in the 1985 annual inspection continues to work for

DUKE ENERGY BUSINESS SERVICES, although currently in a different capacity, and, in fact, conducted two inspections of the Primary and Secondary Ash Basins in 2008.

51. In 1986, Engineering Firm #1 conducted the "Second Five-Year Independent Consultant Inspection of the Ash Dikes" at DAN RIVER. The report clearly identified the 48-inch pipe as part CMP/part RCP and the 36-inch pipe as RCP. Employees of DUKE ENERGY CAROLINAS/Duke Power Company accompanied the consultant during field inspections.

52. The 1986 report repeated the recommendation noted in 1981:

> The monitoring program appears adequate, except it would be desirable to quantitatively (rather than qualitatively) monitor the inflow and outflow at the 52/36-inch diameter culvert, as recommended in the 1981 inspection report, to check for joint leakage. It would also be desirable to do quantitative monitoring of inflow and outflow of the 48-inch diameter culvert that also passes beneath the ash basin; part of this culvert is constructed of corrugated metal pipe which would be expected to have less longevity of satisfactory service than the reinforced concrete pipes.
>
> . . .
>
> It is recommended that quantitative monitoring of inflow and outflow be done at the culverts which pass under the ash basin to check for potential leakage. It is recommended that this monitoring be done at 6-month intervals. If there is a significant difference between inflow and outflow, or whenever there is some cause to suspect leakage, the inside of the culverts should be inspected for leakage.

53. In the 1986 Annual Inspection report, engineers for DUKE ENERGY CAROLINAS/Duke Power Company asked the DAN RIVER personnel to perform the following tasks:

> Quantitatively monitor the inflow and outflow at the two culverts that pass under the ash basin. Instructions are provided on the attached form and tables. Monitoring should begin within thirty days after the installation of V-notched weirs at the inlets and continue at six-month intervals. Random tests at various depths of flow should be made using a bucket and stop watch to verify flow rates given in the attached tables before beginning the monitoring schedule. Results of these tests should be transmitted to Design Engineering.

54. DUKE ENERGY CAROLINAS did not install V-notched weirs at the inlets. Flow monitoring, while apparently performed between 1991 and 1998, was not reported on the requested forms.

55. In 1991, Engineering Firm #2 performed the Third Five-Year Independent Consultant Inspection of the ash basins at DAN RIVER. The report noted that the two stormwater pipes passed under the Primary Ash Basin, but incorrectly identified the entire length of the 48-inch pipe as RCP. During the review process and prior to submission to the North Carolina Utilities Commission, engineers for DUKE ENERGY CAROLINAS/Duke Power Company did not correct the error. This erroneous description of the 48-inch stormwater pipe was repeated in the 1998, 2001 and 2007 Five-Year Independent Consultant Inspection reports produced by Engineering Firms #1 and #3 and not corrected by DUKE ENERGY CAROLINAS/Duke Power Company.

56. The 1991 report repeated the prior monitoring recommendations:

> As was previously recommended, the inflow and outflow of the drainage pipes extending under the ash basins should be monitored for the quantity flowing in versus that flowing out and the turbidity of the discharge. If a disparity becomes evident or if there is evidence of turbidity, the pipes should be checked for leaks.

57. The 1998 Fourth Independent Consultant Inspection report prepared by Engineering Firm #1 made the following recommendation for monitoring of the stormwater pipes:

> The outflow of the drainage pipes extending under the primary ash basins to the river should be monitored for turbidity of the discharge, which would be indicative of soil entrance into the pipes through leaks under the basin. The appearance of turbidity would make it advisable to perform a TV camera inspection of the pipe to help determine if the leak or leaks are a threat.

58. The recommendation in the 1998 report was repeated in identical language in the 2001 and 2007 Five-Year Inspection reports prepared by Engineering Firm #1 and #3, respectively.

59. In the 2007 Sixth Five-Year Independent Consultant Inspection report, Engineering Firm #3 noted that DUKE ENERGY CAROLINAS engineers had not performed annual inspections since 2001, and also had not performed monthly inspections in 2003. The firm expressed concern over the qualifications of the DUKE ENERGY CAROLINAS employees assigned to perform monitoring. Engineering Firm #3 recommended "that Duke reinstitute more

clearly defined engineering responsibility for the receiving and plotting of data from the dikes at the individual stations."

60. After 2008, DUKE ENERGY CAROLINAS installed a metal platform over rip rap (large rocks) along the outer wall of the coal ash basin to better enable employees to access the river bank near the outfalls of the 48-inch and 36-inch stormwater pipes. However, DUKE ENERGY CAROLINAS employees were still unable to view the 36-inch stormwater pipe outfall.

61. A 2009 EPA Dam Safety Assessment, prepared for EPA by an engineering contractor, restated the recommendations of the Sixth Five-Year Independent Consultant Inspection report and recommended that DUKE ENERGY CAROLINAS complete the implementation of those recommendations as described in the Sixth Five-Year Independent Consultant Inspection Report. Based on information received from DUKE ENERGY CAROLINAS, the EPA Dam Safety Assessment reported that "[v]isual monitoring of the outflow from the drainage pipes that go under the Primary Basin is performed on a monthly basis." EPA's contractor observed that during its field inspection in May 2009, the outflow from the 48-inch and 36-inch pipes was clear.

62. The last monthly inspection of the stormwater pipes occurred on January 31, 2014. The form created by DUKE ENERGY CAROLINAS for recording observations during the monthly inspections did not provide any specific space for reporting

observations of the stormwater pipes and the DUKE ENERGY CAROLINAS employee who performed the inspection did not independently record any observations of the pipes on the form for the January 31, 2014, inspection. According to the DUKE ENERGY CAROLINAS employee who performed the January 31, 2014, she did not observe turbidity in the water flowing from the 48-inch stormwater pipe. She could not see the discharge from the 36-inch stormwater pipe due to the location of the outfall in relation to her observation point on the scaffolding.

63. Between 1999 and 2008, and again from January 2013 through January 31, 2014, DUKE ENERGY CAROLINAS employees did not perform any visual inspections of the 36-inch stormwater pipe.

64. Between 1999 and 2008, during the months from May to September, DUKE ENERGY CAROLINAS employees were generally not able to conduct visual inspections of the flow from the 48-inch pipe because it was too difficult to access the end of the pipe from land as the result of vegetative growth and the presence of snakes.

65. Each of the DUKE ENERGY CAROLINAS employees responsible for monitoring the flow from the stormwater pipes from 1991 to December 2012 was aware that the 48-inch stormwater pipe was composed of corrugated metal.

ADDITIONAL DUKE ENERGY DOCUMENTATION THAT THE 48-INCH STORMWATER PIPE WAS CMP

66. On or about January 22, 2014, Engineering Firm #4 finished a draft document titled "Design Report - DRAFT Ash Basin Closure - Conceptual Design for Dan River Steam Station." Appendix 4 of the Report identifies the 48-inch stormwater pipe as "CMP," although that information was not separately stated in the body of the report. In preparing the report, Engineering Firm #4 engineers relied on documentation provided by DUKE ENERGY CAROLINAS and DUKE ENERGY BUSINESS SERVICES, including a 2008 schematic of the Primary Ash Basin that correctly identified the 48-inch stormwater pipe as CMP. Engineers with DUKE ENERGY BUSINESS SERVICES' Central Engineering office worked with Engineering Firm #4 in the preparation of the conceptual design and reviewed the draft documents but did not notice the labeling of the 48-inch stormwater pipe in Appendix 4.

67. A 2009 schematic entitled "Rough Grading - Overall Grading Plan for Dan River Combined Cycle" provided to DUKE ENERGY CAROLINAS by one of its contractors also identified the 48-inch stormwater pipe as CMP.

68. As of the date of the Dan River spill, record-keeping and information-sharing practices at DUKE ENERGY CAROLINAS and DUKE ENERGY BUSINESS SERVICES did not ensure that information such as the actual composition of the 48-inch pipe was

communicated from employees with knowledge to engineers and employees making budget decisions. Additionally, engineers in DUKE ENERGY BUSINESS SERVICES, with responsibility for DAN RIVER, had not sufficiently reviewed the records available to them and, therefore, continued to operate under the erroneous belief that the 48-inch pipe was made entirely of RCP.

RECOMMENDATION FOR CAMERA INSPECTIONS BY DUKE ENERGY PROGRAM ENGINEERING

69. From at least 2011 through February 2014, DUKE ENERGY BUSINESS SERVICES had a group of engineers assigned to support fossil impoundment and dam inspections. The group was known as "Program Engineering."

70. In May 2011, a Senior Program Engineer and a Program Engineer with responsibilities covering DAN RIVER, recommended that the budget for DAN RIVER include camera inspections of the pipes within the Primary and Secondary Ash Basins. The estimated total cost for the camera inspection of four pipes, including the 48-inch stormwater pipe, within the Primary and Secondary Coal Ash Basins was $20,000.

71. DUKE ENERGY CAROLINAS did not provide funding for the camera inspection.

72. Upon learning that the camera inspection was not funded, the DAN RIVER Station Manager called the Vice-President

of Transitional Plants and Merger Integration, who was in charge of approving the budget at DAN RIVER and other facilities. The Station Manager told the Vice-President that DAN RIVER needed the camera inspections, that the station did not know the conditions of the pipes, and that if one of the pipes failed, there would be environmental harm. The request was still denied.

73. In May 2012, the Senior Program Engineer and the Program Engineer again recommended that the budget for DAN RIVER include camera inspections of the 48-inch and 36-inch stormwater pipes underneath the Primary Ash Basin, along with two additional pipes within the Primary and Secondary Ash Basins. The estimated total costs for the camera inspection was $20,000. The reason noted on the budget request form was "internal recommendation due to age of piping system."

74. By e-mail dated May 30, 2012, the Senior Program Engineer indicated his intention to eliminate the camera survey budget line item for stormwater pipes at DAN RIVER in light of the anticipated closure of the basins.

75. In response to the Senior Program Engineer's May 30, 2012, email, the DAN RIVER Equipment Owner, employed by DUKE ENERGY BUSINESS SERVICES and responsible for monitoring the Primary Ash Basin wrote, in part:

> I would think with the basin closing you would want to do the camera survey. I don't think the drains have ever been checked and since they go under the basin I would like to ensure that we are eliminating any risk before closing the basins.

76. In response to the Senior Program Engineer's May 30, 2012, email, another DUKE ENERGY BUSINESS SERVICES employee advised:

> I don't know if this changes your opinion, but [it] isn't likely that the ash basin will close in 2013. We have to submit a plan to the state at least one year prior to closure and we haven't even begun to prepare that.

77. On a date unknown but sometime between May 2012 and July 2012, at an in-person meeting, a DUKE ENERGY BUSINESS SERVICES Program Engineer asked the Vice-President of Transitional Plants and Merger Integration whether camera inspections of the stormwater pipes would be funded. The Vice-President said no.

78. In June 2012, preliminary engineering plans for closing the DAN RIVER coal ash basins called for the removal of both the 48-inch and 36-inch pipes. However, between 2012 and 2014, there was no set date for closing and no formal closure plan had been submitted to DENR. In December 2012, the DAN RIVER ash basin closure was not projected to be completed until 2016.

79. DUKE ENERGY CAROLINAS did not provide funding for the camera inspections of the stormwater pipes and no camera

inspections were performed prior to February 2, 2014. If a camera inspection had been performed as requested, the interior corrosion of the elbow joint in the 48-inch pipe would likely have been visible.

80. From at least January 1, 2012, through February 2, 2014, DUKE ENERGY CAROLINAS and DUKE ENERGY BUSINESS SERVICES failed to take reasonable steps to minimize or prevent discharge of coal ash to the Dan River that would adversely affect the environment and failed to properly operate and maintain the DAN RIVER coal ash basins and the related stormwater pipes located beneath the Primary Coal Ash Basin, thus, negligently violating the DAN RIVER NPDES permit.

FEBRUARY 2014 DISCHARGES INTO THE DAN RIVER

81. On February 2, 2014, a five-foot long elbow joint within the sixty-year-old corrugated metal section of the 48-inch pipe under the Primary Ash Basin at DAN RIVER failed, resulting in the release of coal ash wastewater and coal ash into the Dan River.

82. Later inspection of the elbow joint, after its retrieval from the Dan River, revealed extensive corrosion of the metal of the elbow joint initiating at the bottom center of the elbow. The parties disagree about some of the factors that contributed to the extensive corrosion. Nevertheless, the age of the pipe was at or beyond the reasonably expected serviceable

life for CMP under similar conditions. Ultimately, the combination of the corrosion and the weight of the coal ash basin over the elbow joint caused it to buckle, fail, and be pushed through the end of the 48-inch stormwater pipe into the Dan River.

83. Between approximately 1:30 p.m. and approximately 2:00 p.m. on February 2, 2014, a security guard at DAN RIVER noticed that the level of the wastewater in the Primary Ash Basin had dropped significantly.

84. The security guard immediately notified DUKE ENERGY CAROLINAS employees in the control room for the adjacent natural gas-powered combined cycle plant. The DUKE ENERGY CAROLINAS Shift Supervisor on duty went to the Primary Ash Basin and observed a large sinkhole. The Shift Supervisor saw only residual water and mud left in the basin. The Shift Supervisor alerted other DUKE ENERGY CAROLINAS and DUKE ENERGY BUSINESS SERVICES employees in order to begin response efforts.

85. After the initial discovery of the sinkhole in the Primary Ash Basin on February 2, 2014, an employee who responded to the site circulated photographs of the Primary Ash Basin to other DUKE ENERGY CAROLINAS and DUKE ENERGY BUSINESS SERVICES employees via e-mail at approximately 3:49 p.m.

86. Photographs attached to the 3:49 p.m. e-mail reflected the status of the basin. **(See Appendix, Photographs 1 - 4).**

87. From on or about February 2, 2014, through February 8, 2014, the unpermitted discharge of approximately 27 million gallons of coal ash wastewater and between 30,000 and 39,000 tons of coal ash into the Dan River occurred through the 48-inch pipe from the Primary Coal Ash Basin.

88. According to the U.S. Fish and Wildlife Service, coal ash from the release traveled more than 62 miles down the Dan River, from the Middle District of North Carolina, through the Western District of Virginia, and into the John H. Kerr Reservoir in the Eastern District of North Carolina and Eastern District of Virginia.

89. On or about February 8, 2014, DUKE ENERGY CAROLINAS sealed the outfall of the 48-inch pipe, halting the discharge of coal ash wastewater and coal ash into the Dan River.

DISCHARGES FROM THE 36-INCH STORMWATER PIPE

90. On February 6, 2014, an interior video inspection of the 36-inch stormwater pipe revealed: (1) infiltration of wastewater occurring through a number of joints; (2) water jets from pressurized infiltration at three joints; (3) separation in one joint near the outfall point; (4) cracks running lengthwise through several pipe segments; and (5) sections of ponding water indicating irregular vertical alignment.

91. Analysis of water samples from the 36-inch pipe revealed that the line was releasing wastewater that contained

elevated levels of arsenic. On February 14, 2014, the arsenic concentration in the effluent at the outfall of the 36-inch pipe was 140 ug/L. On February 17, 2014, the arsenic concentration in the effluent at the same point was 180 ug/L. The North Carolina water quality standard for the protection of human health for arsenic is 10 ug/L and the water quality standard for the protection of freshwater aquatic life is 50 ug/L.

92. Discharge of contaminated wastewater continued from the 36-inch pipe between February 6, 2014, and February 21, 2014. The nature of the wastewater infiltration into the 36-inch stormwater pipe and DUKE ENERGY CAROLINAS employees' visual and auditory confirmation of flow from the 36-inch pipe indicates that discharge from the 36-inch pipe began a significant period of time before February 6, 2014. The discharge began at least as early as January 1, 2012, continued until February 21, 2014, and was not authorized by a NPDES permit.

93. On February 21, 2014, DUKE ENERGY CAROLINAS sealed the 36-inch stormwater pipe.

RESPONSE COSTS FOR DAN RIVER RELEASE

94. Thus far, DUKE ENERGY CAROLINAS and federal, state, and local governments have spent over $19 million responding to the spill.

95. Drinking water intakes in the Dan River watershed, including those for the Cities of Danville, Virginia Beach, and Chesapeake and for the Halifax County Service Authority in Virginia were temporarily closed and were required to undertake additional monitoring for contamination. Monitoring results indicated that the water treatment plants along the Dan River were able to adequately treat and remove the coal ash and related contaminants from the spill.

96. The North Carolina Department of Health and Human Services issued an advisory against consuming fish from or recreational contact with the Dan River from the point of the spill to the North Carolina - Virginia border from February 12, 2014, to July 22, 2014.

97. DUKE ENERGY CAROLINAS has reimbursed many entities for their expenditures in the aftermath of the spill. Nonetheless, at least two localities and one federal agency have not yet been fully reimbursed. Those entities and their expenditures are: (1) Virginia Beach, $63,309.45; (2) Chesapeake, Virginia, $125,069.75; and (3) the United States Army Corps of Engineers, $31,491.11.

CAPE FEAR STEAM ELECTRIC PLANT

98. DUKE ENERGY PROGRESS (formerly "Progress Energy Carolinas") owns the Cape Fear Steam Electric Plant ("CAPE

FEAR"), located adjacent to the Cape Fear River, just south of the confluence of the Haw and Deep Rivers and approximately two miles southeast of Moncure, North Carolina.

99. CAPE FEAR has a total of five coal ash basins. Three of the basins, constructed in 1956, 1963, and 1970 have been inactive for many years. Two of the basins, constructed in 1978 and 1985 continued to receive coal ash slurry and other forms of wastewater through at least November 2011.

100. The 1978 ash basin had a storage capacity of 880 acre-feet (approximately 286,749,258 gallons), a surface area of 43 acres, and a maximum structural height of 27 feet. The 1978 ash basin included a "riser," also known as a "stand pipe," used under normal operation to allow the passive and permitted discharge of wastewater treated by settlement from the basin. The riser was constructed of vertically stacked 18-inch diameter concrete pipe sections.

101. The 1985 ash basin had a storage capacity of 1764 acre-feet (approximately 574,801,921 gallons), a surface area of 65 acres, and a maximum structural height of 28 feet. The 1985 ash basin included a riser constructed of vertically stacked 48-inch diameter concrete pipe sections.

102. In a 2009 EPA Dam Safety Assessment, both the 1978 and 1985 coal ash basins at CAPE FEAR were classified as having "significant hazard potential," as previously defined.

103. By December 2011, DUKE ENERGY PROGRESS/Progress Energy Carolinas ceased electric power generation at CAPE FEAR. As a result of the cessation of operation, coal ash slurry was no longer received by the 1978 or 1985 coal ash basin, although each basin continued to receive rainwater or stormwater.

INSPECTIONS OF CAPE FEAR ASH BASINS, MONITORING RECOMMENDATIONS, AND DETECTION OF LEAKING RISERS

104. DUKE ENERGY PROGRESS/Progress Energy Carolinas engaged outside firms to perform annual and five-year inspections of the coal ash basins at CAPE FEAR, as required by state law.

105. On or about May 1, 2008, Engineering Firm #3, hired by DUKE ENERGY PROGRESS/Progress Energy Carolinas, conducted an annual inspection of the CAPE FEAR coal ash basins and generated a report of its observations, conclusions, and recommendations. The report was submitted to DUKE ENERGY PROGRESS/Progress Energy Carolinas and reviewed by the plant manager and environmental coordinator for CAPE FEAR.

106. The 2008 annual inspection report described the condition of the risers in the 1978 and 1985 coal ash basins as "marginal" and estimated that the risers were "likely to develop problems" in two to five years from the date of the report. The report further recommended that DUKE ENERGY PROGRESS/Progress Energy Carolinas perform its own inspections of the risers in

the 1978 and 1985 ash basins by boat, in order to better assess the condition of the risers.

107. The recommendation to inspect the risers using a boat was repeated in annual reports produced by engineering firms and submitted to DUKE ENERGY PROGRESS/Progress Energy Carolinas in 2009 and 2010, and to DUKE ENERGY PROGRESS in 2012 and 2013.

108. At no time from May 1, 2008, until March 2014 did DUKE ENERGY PROGRESS/Progress Energy Carolinas perform inspections of the risers in the 1978 or 1985 ash basins by boat.

109. At some time during the summer of 2011, but on a date unknown, the DUKE ENERGY PROGRESS/Progress Energy Carolinas Environmental Coordinator and the NPDES Subject Matter Expert responsible for CAPE FEAR visited the site. During their visit, they became aware that the risers in the 1978 and 1985 coal ash basins were leaking. During the fall of 2011, but on a date unknown, they informed DUKE ENERGY PROGRESS/Progress Energy Carolinas management that repairs were needed on the risers. No additional inspection or monitoring of the risers was undertaken by DUKE ENERGY PROGRESS/Progress Energy Carolinas as a result of their observations prior to March 2014.

110. The 2012 Five-Year Independent Consultant Report, produced on January 26, 2012, by Engineering Firm #4, noted that the skimmer located at the top of the riser in the 1978 ash basin was corroded and tilted. The skimmer was designed to

prevent debris from being discharged from the basin or clogging the riser.

111. Photographs included with the 2012 Five-Year Independent Consultant Report show the skimmer on the riser in the 1978 coal ash basin sitting askew. **(See Appendix, Photographs 5 & 6).**

112. Photographs included with the 2012 Five-Year Independent Consultant Report show the skimmer on the riser in the 1985 coal ash basin. **(See Appendix, Photograph 7).**

113. Annual inspection reports for 2012 and 2013 also reported that the riser in the 1978 ash basin was damaged, deteriorated, and tilted. The annual reports recommended that DUKE ENERGY PROGRESS/Progress Energy Carolinas replace or repair the skimmer on the riser in the 1978 ash basin.

114. At no time from January 26, 2012, through March 2014 did DUKE ENERGY PROGRESS/Progress Energy Carolinas repair or replace the skimmer on the riser in the 1978 coal ash basin.

115. The annual inspection report produced on or about June 24, 2013, by Engineering Firm #4 and submitted to DUKE ENERGY PROGRESS noted that a "trickle of flow" was observed at the outfalls leading from the risers in the 1978 and 1985 ash basins which the report concluded indicated possible leakage.

DEWATERING OF THE ASH BASINS AND REPAIR OF RISERS

116. During the summer of 2013, on a date unknown, an employee of DUKE ENERGY BUSINESS SERVICES contacted a contractor specializing in diving and underwater pipe repair and mentioned the possible need for riser repair at CAPE FEAR. The contractor was not engaged at that time and no schedule for the potential work was discussed.

117. Also during the summer of 2013, DUKE ENERGY PROGRESS and DUKE ENERGY BUSINESS SERVICES were engaged in planning for the closure of the coal ash basins at CAPE FEAR. On or about July 11, 2013, consulting engineers assisting DUKE ENERGY PROGRESS and DUKE ENERGY BUSINESS SERVICES in planning for ash basin closure produced and provided to DUKE ENERGY PROGRESS and DUKE ENERGY BUSINESS SERVICES a "site investigation plan" that included plans for locating, inspecting, and determining the composition of risers and discharge pipes for each ash basin.

118. As part of the ongoing planning for ash basin closure, DUKE ENERGY PROGRESS and DUKE ENERGY BUSINESS SERVICES sought to eliminate the need for NPDES permits for CAPE FEAR, in keeping with its "Ash Basin Closure Strategy." This strategy would reduce continuing operation and maintenance costs at the plant while ash basin closure was pending. DUKE ENERGY PROGRESS and DUKE ENERGY BUSINESS SERVICES knew that in order to eliminate

the NPDES permits, the coal ash basins would have to be in a "no flow" state. To reach that state, DUKE ENERGY PROGRESS needed to eliminate the riser leaks at the 1978 and 1985 coal ash basins as well as lower the level of the contents of the ash basins to prevent water from overtopping the risers during a 25-year rain event. These requirements were discussed by a number of DUKE ENERGY PROGRESS and DUKE ENERGY BUSINESS SERVICES employees during the summer of 2013, including the DUKE ENERGY BUSINESS SERVICES NPDES Subject Matter Expert and the DUKE ENERGY BUSINESS SERVICES Director of Plant Demolition and Retirement.

119. Also as part of the ongoing planning for ash basin closure at CAPE FEAR, DUKE ENERGY PROGRESS and DUKE ENERGY BUSINESS SERVICES recognized that dewatering the ash basins was a necessary and time-consuming part of the process of closing an ash basin. DUKE ENERGY PROGRESS and DUKE ENERGY BUSINESS SERVICES further believed that dewatering the coal ash basins would "lessen hydrostatic pressure" and "over a relatively brief time reduce and/or eliminate seepage." At the time, seepage was the subject of threatened citizen law suits, a series of state-filed civil complaints, and significant public concern.

120. DUKE ENERGY PROGRESS and DUKE ENERGY BUSINESS SERVICES also believed that dewatering the 1978 and 1985 coal ash basins prior to repairing the risers would provide a safer environment

for contractors performing repair work. DUKE ENERGY PROGRESS and DUKE ENERGY BUSINESS SERVICES employees knew that the leaks in the risers were likely being caused by cracks or failures in the grout between the concrete pipe sections that were underwater. The employees did not know how far underwater the leaks or grout failures were or how many sections of the pipe would need repair. Because the risers were filled with air but surrounded by water, underwater repair of the risers could be hazardous to the divers due to a phenomenon known as "differential pressure." DUKE ENERGY PROGRESS and DUKE ENERGY BUSINESS SERVICES employees believed that removing the standing water from the 1978 and 1985 basins to at or below the level of the leaking portions of the risers would eliminate the risk from differential pressure.

121. Beginning on or about August 16, 2013, and continuing through on or about September 30, 2013, employees and contractors for DUKE ENERGY PROGRESS and DUKE ENERGY BUSINESS SERVICES began developing a work plan for pumping water from the 1985 ash basin at CAPE FEAR.

122. On or about September 30, 2013, DUKE ENERGY PROGRESS employees began pumping water from the 1985 ash basin at CAPE FEAR, using a Godwin pump and hoses.

123. On or about October 2, 2013, two days after pumping began at the 1985 ash basin, a DUKE ENERGY BUSINESS SERVICES

engineer assigned to the plant retirement program emailed a representative of a contracting company specializing in underwater pipe repair. In the email, the engineer indicated that there were "several potential opportunities at [the] Cape Fear plant that we would like you to look at." The engineer went on to describe one of the opportunities as:

> Ash pond riser repairs. Two ponds' risers leak. There is a slow trickle out of the discharge of the concrete riser pipes at two ash ponds. We may elect to stop the leak. Could you provide a ballpark for providing the investigation and repair services? Could you also describe what the process would be?

124. On or about October 22, 2013, the underwater pipe repair contractor submitted to DUKE ENERGY PROGRESS and DUKE ENERGY BUSINESS SERVICES a project estimate titled "Abandonment of Intakes and Leak Sealing" that included four tasks, including "Ash Pond Riser Repairs."

125. On or about January 13, 2014, DUKE ENERGY PROGRESS began dewatering operations at the 1978 coal ash basin at CAPE FEAR, using a Godwin pump and hoses similar to those used at the 1985 coal ash basin, as well as the same work plan.

126. On or about January 24, 2014, DUKE ENERGY PROGRESS signed a contract, through DUKE ENERGY BUSINESS SERVICES, acting as its agent, with the underwater pipe repair contractor for various projects at CAPE FEAR relating to plant decommissioning and coal ash basin closure, as addressed in the October 22,

2014, project estimate. One of the projects was repair work on the risers in the 1978 and 1985 coal ash basins. The contract specified that work under the contract would "start on or about January 27, 2014 and shall be completed no later than December 31, 2014." The contract did not identify specifically when the work would begin on the risers.

127. On or about March 11, 2014, DENR officials from both the DWR and the Division of Mineral and Land Resources visited CAPE FEAR to perform an inspection. The DENR officials were accompanied by several DUKE ENERGY PROGRESS and DUKE ENERGY BUSINESS SERVICES employees during their inspection. DENR observed the Godwin pumps at the 1985 and 1978 ash basins along with obvious signs of a significant drop in the water level in the coal ash basins and disturbances in the surface of the coal ash in the basins. **(See Appendix, Photographs 8 - 10).**

128. At the conclusion of the DENR inspection on March 11, 2014, a dispute arose between DENR officials and DUKE ENERGY PROGRESS and DUKE ENERGY BUSINESS SERVICES employees over whether DUKE ENERGY PROGRESS had been authorized by DENR-DWR to discharge water from the coal ash basins using Godwin pumps.

129. On or about March 19 and 20, 2014, an employee of the underwater pipe repair contractor performed video inspections of the risers in the 1978 and 1985 coal ash basins. The contractor observed that in the discharge pipe leading from the riser in

the 1985 coal ash basin, the visibility in one area was "next to nothing." The visibility was negatively impacted by turbidity and debris in the pipe. The contractor observed a "slow trickle" of water intruding into the riser in the 1978 coal ash basin. At the time of the camera inspections, the water level in both coal ash basins had already been lowered below the uppermost joints of the risers and, thus, below the level of some of the leaks.

130. No other camera inspections were conducted of the risers between 2008 and March 19, 2014.

131. On or about March 19 and 20, 2014, employees and agents of the underwater pipe repair contractor replaced and resealed the grout between the concrete pipe sections of the risers in the 1978 and 1985 coal ash basins. **(See Appendix, Photographs 11 through 14).**

132. Between at least January 1, 2012, and January 24, 2014, DUKE ENERGY PROGRESS and DUKE ENERGY BUSINESS SERVICES failed to properly maintain the risers in the 1978 and 1985 coal ash basins at CAPE FEAR in violation of the applicable NPDES permit.

HISTORICAL SEEPS AND DISCHARGES FROM COAL ASH BASINS

133. DUKE ENERGY CAROLINAS' and DUKE ENERGY PROGRESS's coal ash basins are comprised of earthen dams. Over time, "seeps" developed in the dam walls. "Seeps" occur when water, often

carrying dissolved chemical constituents, moves through porous soil and emerges at the surface. Seeps are common in earthen dams. The Defendants have identified nearly 200 distinct seeps at the Defendants' coal ash basins throughout North Carolina in permit modification applications filed in 2014. Not all seeps necessarily reach waters of the United States. However, some of the discharge from seeps is collected and moved through engineered drains or channels to waters of the United States. Other seeps are simply allowed to flow across land surfaces to waters of the United States. Each of the facilities listed in the table at paragraph 12 had seeps of some form.

134. Water from seeps may transport pollutants. Wastewater sampled from various seep locations at DUKE ENERGY CAROLINAS and DUKE ENERGY PROGRESS coal ash basins in 2014 was found to contain constituents including aluminum, arsenic, barium, boron, chloride, chromium, copper, fluoride, lead, manganese, nickel, selenium, thallium, and zinc, and was additionally found to be acidic.

135. On June 7, 2010, EPA issued interim guidance to assist NPDES permitting authorities with establishing appropriate permit requirements for wastewater discharges from coal ash basins at power plants. In the guidance, EPA advised with respect to point source discharges of seepage:

> If the seepage is directly discharged to waters of the United States, it is likely discharged via a discrete conveyance and thus is a point source discharge. Seepage discharges are expected to be relatively minor in volume compared to other discharges at the facility and could be inadvertently overlooked by permitting authorities. Although little data are available, seepage consists of [coal combustion residuals] including fly ash and bottom ash and fly ash transport water and [flue-gas desulfurization] wastewater. If seepage is discharged directly via a point source to a water of the U.S., the discharge must be addressed under the NPDES permit for the facility.

136. Since at least 2010, seepage from DUKE ENERGY CAROLINAS' and DUKE ENERGY PROGRESS's coal ash basins at certain of their 14 coal-fired power plants in North Carolina entered waters of the United States through discrete conveyances.

137. Wetlands may also suffer impacts from the operation of coal-fired plants. Coal ash basins were historically sited near rivers and are, therefore, often located in or near riparian wetlands and some coal ash basins have hydrologic connections to wetlands via groundwater or seeps.

138. Since 2010, as part of the NPDES permitting process in North Carolina, coal-fired plants are required to monitor groundwater to assure natural resources are protected in accordance with federal and state water quality standards. Monitoring of groundwater at coal ash basins owned by DUKE ENERGY CAROLINAS and DUKE ENERGY PROGRESS has shown exceedances of groundwater water quality standards for pollutants under and near the basins including arsenic, boron, cadmium, chromium,

iron, manganese, nickel, nitrate, selenium, sulfate, thallium, and total dissolved solids.

139. At various times between 2010 and 2014 the Defendants included general references to seeps in correspondence and permit applications with DENR and disclosed more detailed information concerning certain seeps, including engineered seeps (i.e., man-made channels). The Defendants did not begin gathering and providing detailed, specific, and comprehensive data concerning seeps, and particularly seeps discharging to waters of the United States, at each of the North Carolina coal ash basins to DENR until after the DAN RIVER spill in 2014.

140. After the coal ash spill at DAN RIVER in 2014, DUKE ENERGY CAROLINAS and DUKE ENERGY PROGRESS, with the assistance of DUKE ENERGY BUSINESS SERVICES, filed NPDES permit renewal and/or modification applications seeking authorization for certain seeps that discharged, via a point source, directly to a water of the United States. These applications are currently pending as DENR considers the impacts of the seeps and discharges on the receiving waters of the United States.

H.F. LEE STEAM ELECTRIC PLANT

141. DUKE ENERGY PROGRESS owns the H. F. Lee Steam Electric Plant ("LEE"), which is located in Goldsboro, North Carolina. LEE (formerly known as the "Goldsboro Plant") began operation

shortly after World War II and added additional coal-fired combustion units in 1952 and 1962. The plant retired the coal-fired units in September of 2012.

142. LEE used several coal ash basins in the past. Only one of the remaining coal ash basins still contains water and ash sluiced from LEE (the "active coal ash basin"). The active ash basin sits on the north side of the Neuse River. **(See Appendix, Photograph 15).**

143. The active coal ash basin is triangle-shaped and includes a primary basin and a small secondary settling basin. The treatment system is designed so that water discharges from the primary basin into the secondary basin and from the secondary basin into the Neuse River.

144. The NPDES permit No. NC0003417 for LEE, effective November 1, 2009, authorized two discharges into the Neuse River — one from the active coal ash basin ("Outfall 001") and one from the cooling water pond ("Outfall 002"). A 2010 modification of the 2009 permit also authorized a third outfall ("Outfall 003") from a combined cycle generation facility. Water does not currently discharge from the active coal ash basin into the Neuse River via Outfall 001.

145. Beginning at a time unknown but no later than October 2010, DUKE ENERGY PROGRESS/Progress Energy Carolinas identified a seep on the eastern embankment of the active coal ash basin.

This seep was adjacent to an area of seepage that was identified and repaired in 2009 and 2010. This seep in 2010 collected and flowed to a "flowing ditch" outside of the active coal ash basin. This seep was repaired in May of 2011.

146. Additional seeps on the eastern side of the active coal ash basin also flowed into the same drainage ditch as the seep identified in October 2010. The drainage ditch discharged into the Neuse River at latitude 35.379183, longitude -78.067533. The drainage ditch was not an authorized outfall under the NPDES permit. In 2014, DUKE ENERGY PROGRESS identified the GPS coordinates of four seeps on the eastern side of the coal ash basin as: latitude 35.380510, longitude -78.068532; latitude 35.382767, longitude -78.069655; latitude 35.386968, longitude -78.071942; and latitude 35.379492, longitude -78.067718.

147. On February 20, 2013, DENR personnel sampled water in three locations from the drainage ditch. This sampling occurred after DENR personnel from the Land Quality Section observed a seep near the southeast corner of the ash pond dike. The seep collected in the unpermitted discharge ditch and flowed into the Neuse River. Water quality analysis of samples from the drainage ditch showed exceedances of state water quality standards for chloride, arsenic, boron, barium, iron, and manganese. This discharge of wastewater into the Neuse River

from the drainage ditch at LEE was not authorized under the NPDES permit.

148. On March 11, 2014, DENR personnel again sampled wastewater from the drainage ditch referenced previously. The ditch showed exceedances for iron and manganese.

149. Unpermitted discharges, in violation of the applicable NPDES permit, occurred at LEE from at least October 1, 2010, through December 30, 2014.

RIVERBEND STEAM STATION

150. DUKE ENERGY CAROLINAS owns and operates the Riverbend Steam Station ("RIVERBEND"), located in Gaston County, North Carolina, approximately 10 miles from the city of Charlotte and immediately-adjacent to Mountain Island Lake, on a bend in the Catawba River. Mountain Island Lake is the primary source of drinking water for residents of Gaston and Mecklenburg Counties.

151. RIVERBEND began commercial operation in 1929 and its combustion units were retired in April 2013, with plans to demolish it after 2016. It has two unlined coal ash basins along Mountain Island Lake, with dams reaching up to 80 feet in height. The RIVERBEND dams are designated in a 2009 EPA Dam Safety Assessment as "Significant Hazard Potential," as previously defined. RIVERBEND contains approximately 2,730,000 million tons of stored coal ash.

152. The RIVERBEND NPDES permit, No. NC0004961, was issued on March 3, 1976, and has been renewed subsequently, with the current NPDES Permit expiring on February 28, 2015. The RIVERBEND NPDES permit allows the facility to discharge wastewater to the Catawba River from three "permitted outfalls" in accordance with the effluent limitations and monitoring requirements regarding flow, suspended solids, oil and grease, fecal coliform, copper, iron, arsenic, selenium, mercury, phosphorus, nitrogen, pH, and chronic toxicity, as well as other conditions set forth therein. Wastewater from the coal ash basin was to be discharged, after treatment by settling, through one of the monitored and permitted outfalls.

153. On December 4 through December 6, 2012, DENR conducted inspections of RIVERBEND and discovered unpermitted discharges of wastewater from the coal ash basin into the Catawba River. Among the unpermitted discharges at RIVERBEND is a seep identified in a 2014 permit modification application as Seep 12, an engineered drain to discharge coal ash contaminated wastewater into the river. RIVERBEND Seep 12 is located at latitude 35.36796809, longitude -80.95935079. **(See Appendix, Photographs 16 through 18).** At some time unknown, but prior to December 2012, one or more individuals at RIVERBEND created the unpermitted channel that allowed contaminated water from the coal ash basin to be discharged into the river.

154. The unpermitted seep resulted in documented unpermitted discharges from 2011 through 2013 containing elevated levels of arsenic, chromium, cobalt, boron, barium, nickel, strontium, sulfate, iron, manganese, and zinc into the Catawba River.

155. Unpermitted discharges, in violation of the applicable NPDES permit, occurred at RIVERBEND from at least November 8, 2012, through December 30, 2014.

ASHEVILLE STEAM ELECTRIC GENERATING PLANT

156. DUKE ENERGY PROGRESS owns and operates the Asheville Steam Electric Generating Plant ("ASHEVILLE"), in Buncombe County, North Carolina.

157. ASHEVILLE is a coal-powered electricity-generating facility in the Western District of North Carolina. It has two unlined coal ash basins, one constructed in 1964 and the other constructed in 1982. The basins, each approximately 45 acres in size, hold a total of approximately 3,000,000 tons of coal ash waste. **(See Appendix, Photograph 19).** The basins were each characterized in the 2009 EPA Dam Safety Assessment as "High Hazard Potential," meaning that "failure or mis-operation results will probably cause loss of human life."

158. The ASHEVILLE NPDES permit, number NC0000396, was issued in 2005 and expired in 2010. Progress Energy Carolinas (now DUKE ENERGY PROGRESS) filed a timely permit renewal

application on June 11, 2010. DENR has not yet issued a new permit and ASHEVILLE continues to operate under the terms of the 2005 NPDES permit.

159. On May 13, 2011, DUKE ENERGY PROGRESS/Progress Energy Carolinas sought authority to relocate the settling basin and permitted discharge outfall at ASHEVILLE from its original location near the 1964 coal ash basin to a location approximately 3,000 feet away, latitude 35.47367 and longitude -82.504, in order to allow "stabilization work" on the 1964 ash pond impoundment.

160. On March 11, 2013, DENR staff inspected ASHEVILLE and identified seeps flowing from toe drains at the 1964 coal ash basins. The engineered seep from the 1964 coal ash basin has continued to discharge pollutants. This engineered seep is not authorized under the applicable NPDES permit. Engineered seeps from the 1964 coal ash basin are located at latitude 35.468319, longitude -82.549104 and latitude 35.466943, longitude -82.548502. These engineered seeps discharge through the toe drain to the French Broad River.

161. Unpermitted discharges, in violation of the applicable NPDES permit, occurred at ASHEVILLE from at least May 31, 2011, through December 30, 2014.

BROMIDE IMPACTS FROM FGD SYSTEMS

162. As described above, DUKE ENERGY CAROLINAS owns and operates Belews Creek Steam Station ("BELEWS") in Stokes County, North Carolina, and Cliffside Steam Station ("CLIFFSIDE") in Rutherford and Cleveland Counties, North Carolina.

163. As part of its efforts to comply with the Clean Air Act and North Carolina Clean Smokestacks Act, DUKE ENERGY CAROLINAS installed Flue Gas Desulfurization ("FGD") "scrubbers" to significantly reduce or eliminate certain air pollutants, such as sulfur dioxide and nitrogen oxide at several coal-fired facilities. FGD scrubbers isolate certain pollutants from coal combustion emissions into the air and ultimately divert those pollutants, including bromides, into a gypsum slurry that is eventually routed to the facility's coal ash basins. At times, portions of the slurry may be diverted for reuse in products such as wall board.

164. FGD installation was completed and the scrubbers at BELEWS became fully operational at the end of 2008.

165. When bromide comes into contact with chlorine-based water treatment systems, it can contribute to the formation of compounds known as trihalomethanes ("THMs"). There are no general federal or state water limits for the discharge of bromides to surface water. However, there are state and federal limits for total trihalomethanes ("total THMs") under the Safe

Drinking Water Act. If ingested in excess of the regulatory limits over many years, THMs may cause adverse health effects, including cancer.

DISCHARGE OF BROMIDES AT BELEWS

166. Beginning in 2008 or 2009, the City of Eden ("Eden"), downstream from BELEWS, noted an increase in total THMs in its drinking water.

167. Prior to the installation of the FGD scrubbers, DUKE ENERGY CAROLINAS reported to DENR in its BELEWS NPDES permit applications that bromide occurred in its waste stream at a level too low to detect. When BELEWS applied for a NPDES permit modification in 2009, it made no new disclosures concerning bromide levels because the modification did not relate to bromide and there were no federal or state limitations for bromide discharge.

168. DUKE ENERGY CAROLINAS tested for bromides, as well a number of other potential pollutants, at BELEWS in 2008-2009 to evaluate the effects of the FGD wastewater treatment system. Those test results showed that bromides were discharged from BELEWS into the Dan River. This did not violate the NDPES permit for the facility.

169. In consultation with an outside contractor, in January 2011, Eden determined that an increase in bromides contributed

to the increase in total THMs it had witnessed beginning in 2008-2009.

170. In early 2011, Eden tested the water entering its water treatment facility from the Dan River and performed water tests upstream to determine the source of the bromides.

171. On May 10, 2011, Eden notified DUKE ENERGY CAROLINAS that it was having difficulty with increasing levels of total THMs in its treated drinking water and requested DUKE ENERGY CAROLINAS' bromide sampling data from the outflow of BELEWS. An impending reduction in the threshold for total THMs (required by an EPA rule promulgated under the Safe Drinking Water Act) triggered Eden's particular interest in the pollutant, especially given that Eden was at the upper limit of the then-permissible total THM range.

172. As a result of the water testing, Eden identified the source of the increased bromides as BELEWS, which discharges into the Dan River. Eden shared this information and its test results with DUKE ENERGY CAROLINAS on June 7, 2011.

173. Shortly thereafter, DUKE ENERGY CAROLINAS and DUKE ENERGY BUSINESS SERVICES internally agreed that the increased bromides very likely came from BELEWS and, combined with a number of other factors, had likely caused the THM increase at Eden. DUKE ENERGY CAROLINAS and DUKE ENERGY BUSINESS SERVICES

also agreed internally that the increased bromides were likely the result of the FGD scrubber system.

174. In mid-June 2011, DUKE ENERGY CAROLINAS contacted the Town of Madison ("Madison"), which also draws water from the Dan River and processes that water for drinking and which is closer to BELEWS than Eden. DUKE ENERGY CAROLINAS informed Madison of its findings and Madison asked to be part of the discussions with Eden about reducing bromide levels. DUKE ENERGY CAROLINAS and DUKE ENERGY BUSINESS SERVICES employees met with Eden and Madison several times between June 2011 and April 2012 to discuss reducing total THMs in their drinking water.

175. DUKE ENERGY CAROLINAS informed DENR of the increase in bromide levels in its effluent when it filed its NPDES permit renewal application for BELEWS on August 29, 2011. In the application, DUKE ENERGY CAROLINAS listed bromide as a pollutant present in outfalls 001 (into Belews Lake) and 003 (into Dan River). The largest concentration of bromide was listed as 6.9 mg/L from Outfall 003, which translates to 6.9 parts per million (ppm) or 6907 parts per billion (ppb). This bromide result appears to have been taken from a sample of water collected in January 2011 and analyzed after Eden had brought the issue to DUKE ENERGY CAROLINAS' attention.

176. At the time DUKE ENERGY CAROLINAS filed its NPDES permit renewal application for BELEWS, none of the previous permits had placed any restrictions or limits on bromides.

177. In mid-October 2011, Eden informed DUKE ENERGY CAROLINAS that Madison had violated its limit on total THMs. DUKE ENERGY CAROLINAS was also informed that Henry County, Virginia, (which purchases Eden's water) violated its total THM limit. Dan River Water (another purchaser of Eden's water) also violated its total THM limit.

178. On November 16, 2011, DENR's Winston-Salem Regional Office held a meeting with DUKE ENERGY CAROLINAS, DUKE ENERGY BUSINESS SERVICES, Eden, and Madison regarding the bromide issue. All participants agreed that the total THM problem was caused by bromides entering the Dan River from BELEWS. DUKE ENERGY CAROLINAS was not aware of the relationship between bromides and THMs until Eden brought the matter to DUKE ENERGY CAROLINAS' attention in 2011.

179. Since the November 2011 meeting, DUKE ENERGY CAROLINAS has entered into written agreements with Eden and Madison to assist them with a portion of the costs of modifying and modernizing their water treatment systems.

DISCHARGE OF BROMIDES AT CLIFFSIDE

180. Beginning at about the time DUKE ENERGY CAROLINAS responded to Eden's initial complaints regarding the bromide

discharge at BELEWS, DUKE ENERGY CAROLINAS conducted an initiative to monitor bromide discharge at other locations employing FGD scrubbers.

181. As a result of this initiative, in or about early August 2011, DUKE ENERGY CAROLINAS also internally identified the CLIFFSIDE facility in western North Carolina as one that could pose a potential THM problem in light of the relatively shallow river (the Broad River) into which CLIFFSIDE discharged and the presence of relatively close downstream facilities that drew drinking water from the Broad River.

182. The last CLIFFSIDE NPDES permit was issued in January 2011 and did not reference bromide.

183. DUKE ENERGY CAROLINAS AND DUKE ENERGY BUSINESS SERVICES informed neither downstream communities nor DENR regarding this discharge from CLIFFSIDE. As of the date of this joint factual statement, the parties are not aware of a community downstream from CLIFFSIDE that has reported elevated levels of total THMs due to an increase in bromide discharge from the facility, but acknowledge the possibility that one or more communities may have been affected.

184. In 2013, DUKE ENERGY CAROLINAS installed a spray dry absorber for one of the two FGD scrubber units at the CLIFFSIDE facility which reduced the bromide discharge from CLIFFSIDE.

The other FGD scrubber unit at CLIFFSIDE operates only intermittently.

SUTTON FACILITY

185. DUKE ENERGY PROGRESS owns and operates the L.V. Sutton Steam Station ("SUTTON") in New Hanover County, North Carolina. SUTTON houses two coal ash basins, one constructed in 1971 and one constructed in 1984.

186. Located near SUTTON is the community of Flemington. Flemington's water supply has a history of water-quality problems. In 1978, an adjacent landfill, designated as a "Superfund" site, contaminated Flemington's drinking water and caused authorities to construct new wells.

187. Flemington's new wells are located near SUTTON's coal ash basins. They are located down-gradient from the SUTTON coal ash basins, meaning groundwater ultimately flows from the coal ash basins toward the Flemington wells.

188. DUKE ENERGY PROGRESS/Progress Energy Carolinas has monitored groundwater around SUTTON since 1990. Monitoring particularly focused on a boron plume emanating from the coal ash ponds.

189. From at least 2010 through 2013, the groundwater monitoring wells at SUTTON reported unnaturally elevated levels of some constituents, including manganese, boron, sulfate, and total dissolved solids.

190. Flemington's public utility also tested its water quality. Those tests showed exceedances of barium, manganese, sodium, and sulfate in 2013.

191. In June and July 2013, Flemington's public utility concluded that boron from SUTTON's ash ponds was entering its water supply. Tests of water from various wells at and near SUTTON from that period showed elevated levels of boron, iron, manganese, thallium, selenium, cadmium, and total dissolved solids.

192. In October 2013, DUKE ENERGY PROGRESS entered into an agreement with the Cape Fear Public Utility Authority to share costs for extending a municipal water line to the Flemington community.

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I/A

SO AGREED, THIS 20th DAY OF FEBRUARY, 2015.

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Eastern District of North Carolina
North Carolina

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SO AGREED, this the 20 day of February, 2015.

DUKE ENERGY CAROLINAS, LLC.
Defendant

BY:
JULIA S. JANSON
Executive Vice-President,
Chief Legal Officer, and
Corporate Secretary

Authorized Designated Official for
Duke Energy Carolinas, LLC

JAMES P. COONEY, III
Womble Carlyle Sandridge & Rice LLP
Counsel for the Defendant

I/A

SO AGREED, this the 20 day of February, 2015.

DUKE ENERGY PROGRESS, INC.
Defendant

BY:
JULIA S. JANSON
Executive Vice-President,
Chief Legal Officer, and
Corporate Secretary

Authorized Designated Official for
Duke Energy Progress, Inc.

JAMES P. COONEY, III
Womble Carlyle Sandridge & Rice LLP
Counsel for the Defendant

I/A

SO AGREED, this the 20 day of February, 2015.

DUKE ENERGY BUSINESS SERVICES, INC.
Defendant

BY: ______________________________
JULIA S. JANSON
President and Chief Legal Officer

Authorized Designated Official for
Duke Energy Business Services, LLC

____
JAMES P. COONEY, III
Womble Carlyle Sandridge & Rice LLP
Counsel for the Defendant

I/A

United States v. Duke Energy Business Services LLC, et al.

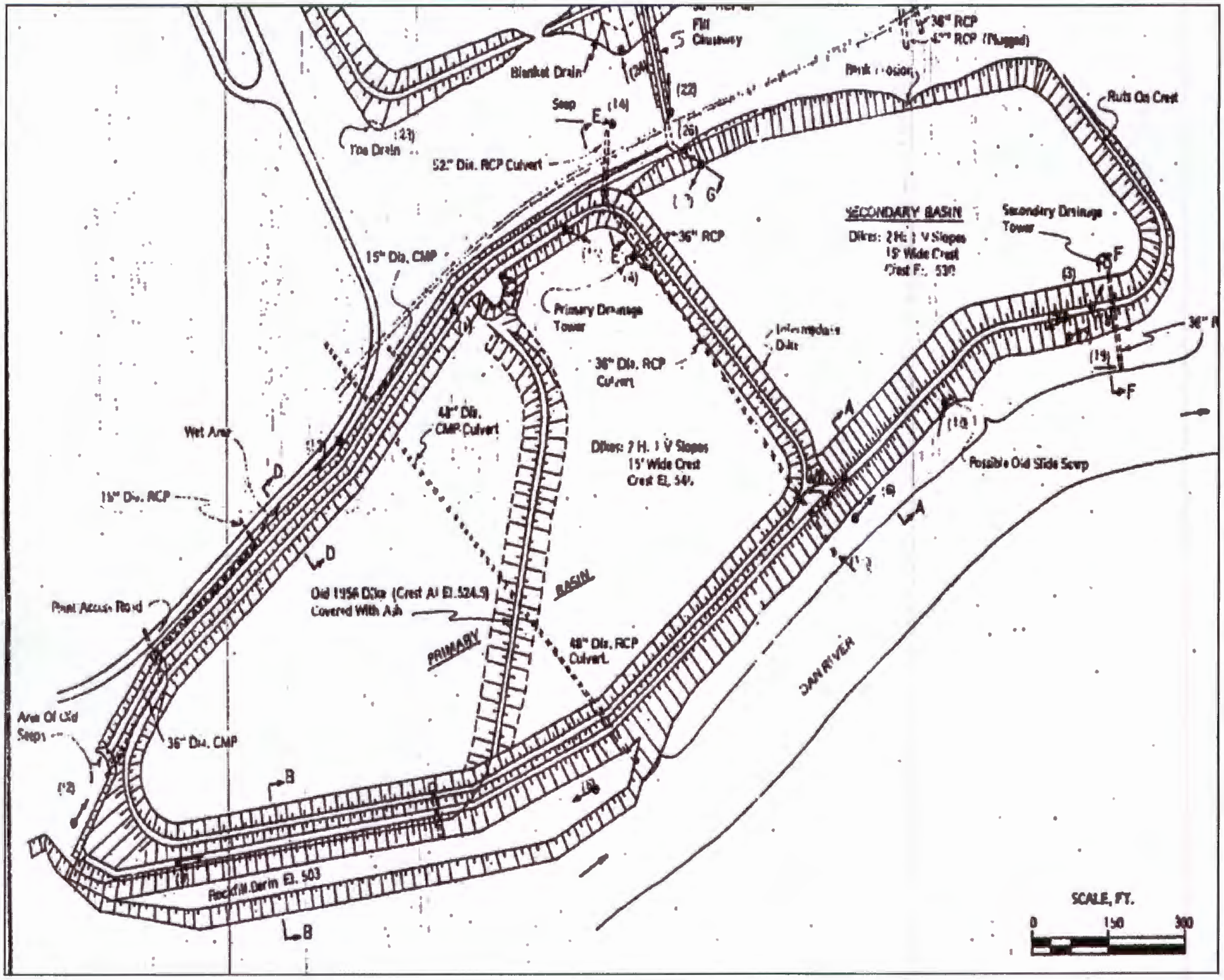
APPENDIX

TO JOINT FACTUAL STATEMENT

February 20, 2015

I/A

Diagram 1. Engineering Firm #1, Report of Safety Inspection – Duke Power Dan River Steam Station Ash Dikes, at Fig. 4 (1981).



I/A

Photograph 1. Photograph of DAN RIVER coal ash basin during spill, attached to 2/2/2014, 3:49 p.m. e-mail from Duke Energy Business Services employee.

I/A

Photograph 2. Photograph of DAN RIVER coal ash basin during spill, attached to 2/2/2014, 3:49 p.m. e-mail from Duke Energy Business Services employee.

I/A

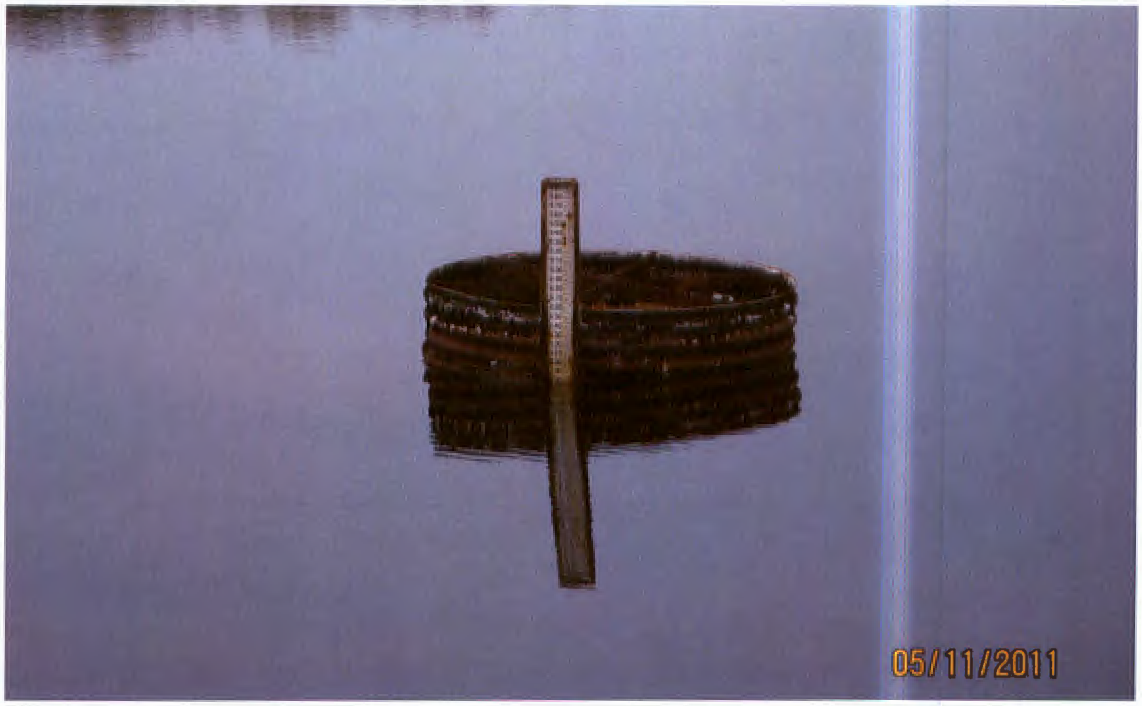
Photograph 3. Photograph of DAN RIVER coal ash basin during spill, attached to 2/2/2014, 3:49 p.m. e-mail from Duke Energy Business Services employee.

I/A

Photograph 4. Photograph of DAN RIVER coal ash basin during spill, attached to 2/2/2014, 3:49 p.m. e-mail from Duke Energy Business Services employee.

Photograph 5. Riser in CAPE FEAR 1978 coal ash basin from 2012 Five Year Independent Consultant Report.

Photograph 6. Riser in CAPE FEAR 1978 coal ash basin from 2012 Five Year Independent Consultant Report.



I/A

Photograph 7. Riser in CAPE FEAR 1985 coal ash basin from 2012 Five Year Independent Consultant Report.

Photograph 8. 3/11/14 aerial photograph of CAPE FEAR 1978 coal ash basin with Godwin pump and truck.

I/A

Photograph 9. 3/11/14 aerial photograph of CAPE FEAR 1985 coal ash basin with Godwin pump and truck.

Photograph 10. 3/11/14 aerial photograph of CAPE FEAR 1985 coal ash basin with Godwin pump and truck.

Photograph 11. 3/19/14 photograph of CAPE FEAR 1978 coal ash basin riser, prior to repair work.

I/A

Photograph 12. 3/19/14 photograph of CAPE FEAR 1985 coal ash basin riser, prior to repair work.

Photograph 13. 3/19/14 photograph of old grout on CAPE FEAR coal ash basin riser.

Photograph 14. 3/19/14 photograph of new grout on CAPE FEAR coal ash basin riser.

I/A

Photograph 15. Aerial Photograph of LEE from 2011 EPA Dam Safety Assessment report.

I/A

Photograph 16. Aerial photograph depicting location of RIVERBEND Seep 12.

I/A

Photograph 17. Photograph of RIVERBEND Seep 12.

I/A

Photograph 18. Photograph of RIVERBEND Seep 12.

I/A

Photograph 19. Aerial photograph of ASHEVILLE.

I/A

Bednarcik Direct AGO Cross Ex. 18
Docket No. E-2, Sub 1219A

Hart Exhibit 2
Docket No. E-2, Sub 1219

OFFICIAL COPY

Sept 02 2020

IN THE UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF NORTH CAROLINA
WESTERN DIVISION

UNITED STATES OF AMERICA,)
)
)
) **Case No.**
) **5:15-CR-62-H**
) **5:15-CR-67-H**
DUKE ENERGY BUSINESS SERVICES, LLC;) **5:15-CR-68-H**
DUKE ENERGY CAROLINAS, LLC;)
DUKE ENERGY PROGRESS, INC.,)
Defendants.)

PLEA TO CRIMINAL INFORMATION AND SENTENCING HEARING
BEFORE SENIOR JUDGE MALCOLM J. HOWARD
MAY 14, 2015; 10:00 A.M.
GREENVILLE, NORTH CAROLINA

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Proceedings recorded by mechanical stenography, transcript produced by computer.

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P R O C E E D I N G S

- - - o0o - - -

THE COURT: Good morning, ladies and gentlemen, and welcome to the United States District Court for the Eastern District of North Carolina sitting here in Greenville.

Madam Clerk, call the calender for the matters for disposition this morning.

THE CLERK: Calling for a plea pursuant to a criminal information and sentencing: United States of America versus Duke Energy Business Services, United States of America versus Duke Energy Progress, United States of America versus Duke Energy Carolinas; Case Numbers 5:15-CR-62-1H, 5:15-CR-67-1H, 5:15-CR-68-1H.

THE COURT: On or about February 20, 2015, the United States filed criminal informations in each of the three Federal Districts in North Carolina, charging three corporations that are before the Court today, all of whom are subsidiaries of Duke Energy, with violations of the Clean Water Act.

At the same time the defendant corporations consented to transfer of jurisdiction of the cases from Middle District and from Western District over to the Eastern District pursuant to what is called Rule 20 of the Federal Rules of Criminal Procedure. Therefore all three of these cases, one from the Middle District, one from the Western District and the original one in the Eastern District, are now before this Court for disposition.

After these matters were transferred, they were assigned to me in the normal and regular method of case assignment within our district. We're going to now proceed with the arraignment in these matters during the course of today.

I'll begin this morning by inviting counsel to present themselves and whomever they desire to present, beginning with the United States Government, Ms. Rangarajan.

MS. RANGARAJAN: Thank you, Your Honor. Banu Rangarajan on behalf of the United States from the Eastern District of North Carolina. Seated with me at counsel table, sir, is Lana Pettus with the Department of Justice Environmental Crimes Section. From the Western District of North Carolina, Your Honor, Steve Kaufman.

MR. KAUFMAN: Good morning, Your Honor.

MS. RANGARAJAN: Also with the Eastern District of North Carolina we have Jodi Mazer, who is a Special Assistant; Seth Wood, who is an Assistant United States Attorney; and Erin Blondel, Assistant United States Attorney.

From the Middle District of North Carolina, Your Honor, we have JoAnna McFadden, A.U.S.A.

MS. McFADDEN: Good morning, Your Honor.

MS. RANGARAJAN: And Deputy Chief Stephen Inman, sir.

And seated behind counsel are all of the Special

Agents that have been working on the case with us. We have Scott Faircloth, Diane Taggart, Bennett Strickland, Cecil Cherry, Mike Woods, Jerry Polk, Judy Billings, Maureen O'Mara, and at counsel table, Kevin LaPointe.

Your Honor, we also have with us today U.S. Attorneys Jill Rose and Thomas Walker from the Western and Eastern Districts of North Carolina.

THE COURT: You are outstanding with your recollection of names.

MS. RANGARAJAN: Thank you, Your Honor.

THE COURT: Mr. Cooney, on behalf of the defendants?

MR. COONEY: I'm going to have to check my driver's license for mine after that performance, Your Honor.

THE COURT: Yes, sir.

MR. COONEY: I'm Jim Cooney with Womble Carlyle and I'm assisted at counsel table by Karen Popp with Sidley and Austin in Washington, D.C., by Claire Rauscher of Womble Carlyle, and by Dave Buente of Sidley and Austin again of Washington, D.C.

THE COURT: Very good. Thank you, Mr. Cooney.

All right. We will begin the arraignment process of these three different corporations, and I'm going to inquire of Mr. Cooney: Who will be representing the companies today?

MR. COONEY: Ms. Julia Janson, Your Honor.

THE COURT: All right. Ms. Janson, will you please stand, ma'am, for a moment.

Madam Clerk, will you administer an oath to Ms. Janson.

THE CLERK: Place your left hand on the bible and raise your right hand. Please state your name.

MS. JANSON: Julia Janson.

THE COURT: Do you swear that the answers you will make to the Court will be the truth to the best of your knowledge and understanding, so help you God?

MS. JANSON: I do.

THE CLERK: Thank you.

THE COURT: All right. There's going to be a whole series of questions for you, Ms. Janson, as the representative of your companies. I would like you to remain standing for a few minutes and we'll get some of this out of the way, but then it will be too long for you to have to stand and so I'll permit you to be seated later on.

MS. JANSON: I appreciate that.

THE COURT: Let me begin by asking you, now that you have been sworn, for the record, please state your full name.

MS. JANSON: My full name is Julia Smoot Janson.

THE COURT: And what is your position with the defendant Duke Energy Progress?

MS. JANSON: My position with Duke Energy Progress is I am a Director of the company as well as Executive

Vice President, Chief Legal Officer and Corporate Secretary.

THE COURT: And what is your position with the defendant Duke Energy Business Services?

MS. JANSON: My positions with Duke Energy Business Services are as President and Chief Legal Officer.

THE COURT: And what are your positions with the entity Duke Energy Carolinas?

MS. JANSON: Executive Vice President, Chief Legal Officer and Corporate Secretary.

THE COURT: Ms. Janson, are you 18 years of age or older?

MS. JANSON: I am.

THE COURT: Thank you. How far did you go in school?

MS. JANSON: I have a J.D.

THE COURT: Are you currently or have you recently been treated for any issues of a medical nature, other than routine matters?

MS. JANSON: No, sir.

THE COURT: The real top question we have to ask routine defendants, have you been treated for any mental illness in recent months, and I forego that with you.

In the past 24 hours have you taken any medicine of any kind or any other matters that might impair your ability to understand these proceedings?

MS. JANSON: No, Your Honor.

THE COURT: Do you understand what is going on today?

MS. JANSON: I do.

THE COURT: Mr. Cooney, do you have any reason to doubt Ms. Janson's competency or her ability to understand what is happening in court today?

MR. COONEY: I have none, Your Honor.

THE COURT: Ms. Rangarajan, does the Government have any reason to doubt Ms. Janson's competency or her ability to understand these proceedings?

MS. RANGARAJAN: No, Your Honor.

THE COURT: The Court finds as a fact that Ms. Julia Janson is competent to appear, understand the nature of these proceedings and to assist the Court in these matters.

Now you may be seated for a moment, Ms. Janson and Mr. Cooney.

If at any time, Ms. Janson, you do not understand a question, or even you, Mr. Cooney, that I ask, do not try to answer it, just tell me you don't understand and I'll try to rephrase, and if at any time you want to talk to each other, you may do so.

Now, Counsel, Mr. Cooney, do we have a corporate resolution authorizing Ms. Janson to enter pleas on behalf of Duke Energy Progress?

MR. COONEY: We do, Your Honor. We have a resolution in connection with the Memorandum of Plea Agreement and another resolution specifically authorizing Ms. Janson to enter pleas today before the Court.

THE COURT: First as to Duke Energy Progress, has every member of the Board of Directors of Duke Energy Progress affixed his or her signature to this resolution before the Court authorizing Ms. Janson to enter a plea on behalf of the corporation?

MR. COONEY: They have, Your Honor.

THE COURT: Are you satisfied that the corporate charter and bylaws of Duke Energy Progress empower the Board of Directors to authorize this person to enter a plea of guilty to a criminal charge against the corporation?

MR. COONEY: I am, Your Honor.

THE COURT: And are you satisfied that Ms. Janson has the authority on behalf of Duke Energy Progress to enter pleas today?

MR. COONEY: Yes, I am, and she does.

THE COURT: The same questions as to Duke Energy Carolinas, and I know that's repetitive, but, see, we have to make a record of all these matters. Has every member or manager of Duke Energy Carolinas affixed his or her signature to the resolution authorizing Ms. Janson to enter pleas on behalf of that entity?

MR. COONEY: They have, Your Honor.

THE COURT: And are you satisfied that the organizational and governing documents of Duke Energy Carolinas empower the members or managers to authorize a person to enter a guilty plea to criminal charges against that business entity?

MR. COONEY: I am, Your Honor.

THE COURT: And finally, are you satisfied Ms. Janson has the authority to act on behalf of Duke Energy Carolinas in entering pleas today?

MR. COONEY: I am, Your Honor, and she does.

THE COURT: And finally on this issue as to Duke Energy Business Services, has every member or manager of Duke Energy Services affixed his or her signature onto this resolution before the Court authorizing Ms. Janson to enter pleas on behalf of that entity?

MR. COONEY: It has, Your Honor, and if I can explain that, Duke Energy Business Services is a sole member LLC, the sole member of that LLC is in turn a corporation, that corporation has authorized Duke Energy Business Services, LLC to enter and in addition that corporation has authorized Ms. Janson to enter a plea on behalf of Duke Energy Business Services, LLC.

THE COURT: And you're satisfied that the organization and governing documents of Business Services empower those spokespersons to authorize Ms. Janson to enter a guilty plea to the charges against that business entity?

MR. COONEY: I am, Your Honor.

THE COURT: And finally, are you satisfied Ms. Janson does in fact have the authority to act on behalf of Duke Energy Business Services in entering pleas today?

MR. COONEY: I am, Your Honor, and she does.

THE COURT: Counsel for the Government, do you have any reason to doubt that Ms. Janson is competent and has the proper authority to act on behalf of each of the three defendant corporations that are before the Court today?

MS. RANGARAJAN: Your Honor, the Government has no reason to doubt her ability and competency to enter the pleas in the plea agreements.

THE COURT: All right. The Court finds as a fact that Julia Janson has the authority of the defendant corporations, Duke Energy Progress, Duke Energy Carolinas and Duke Energy Business, to act on their behalf and enter pleas today.

Mr. Cooney, you may present the clerk, Madam Clerk, your documents.

MR. COONEY: Thank you, Your Honor.

THE COURT: Right now in the routine business of the Court I must summarize the charges in these matters, and I begin with Duke Energy Progress and I'll be asking questions of you, Ms. Janson, under the authority previously explained.

You may continue to be seated and you might need the microphone in front of you.

Have you been furnished with a copy of all the charges, all of which are misdemeanors in the Federal Court System, contained in these criminal informations against the defendant Duke Energy Progress?

MS. JANSON: I have.

THE COURT: Now, I have to summarize the charge that's before the Court from the Eastern District of North Carolina as to Duke Energy Progress, and that is just a one count charge that there was negligent discharge of pollutants from a point source or aiding and abetting between the time frame of October 1, 2010 and December 30, 2014 in violation of the Clean Water Act.

Second, as to the charges in the Middle District of North Carolina that are before the Court, that's docket 5:15-CR-67, Counts 5 and 6 are against Duke Energy Progress, and Count 5 charges failure to maintain treatment system equipment and related appurtenances and aiding and abetting between the time period January 1, 2012 and January 24, 2014, in violation of the Clean Water Act statutes.

And finally in the Middle District case as to Duke Energy Progress, Count number 6, failure to maintain treatment system equipment and related appurtenances and/or aiding and abetting between the same dates in violation of the Clean Water Act.

And finally as to the Western District of

North Carolina, criminal information, count number 2 as to Duke Energy Progress, negligent discharge of pollutants from a point source or aiding and abetting between May 31, 2011 and December 30, 2014.

Now, each of these offenses carries the following penalty: Not more than five years probation; the greater of: Not less than $2500 nor more than $25,000 per day of violation; $200,000; or twice the gross gain or loss; a $125 special assessment as to each count; and restitution, if applicable.

Ms. Janson, do you understand the charges against the defendant corporation, this is Duke Energy Progress, and do you understand the maximum punishments that could apply to this particular corporation?

MS. JANSON: I do.

THE COURT: If imposed by the Court, is the defendant corporation, Duke Energy Progress, financially able to pay a substantial fine and make full restitution to any victim of the offenses in these cases?

MS. JANSON: It is, Your Honor.

THE COURT: All right. Now, as to Duke Energy Carolinas, Limited Liability Corporation, have you been furnished a copy of all of the charges, all of which again are misdemeanors, contained in the criminal information against Duke Energy Carolinas?

MS. JANSON: I have.

THE COURT: I summarize by saying in the Middle District of North Carolina there are four counts as to Duke Energy Carolinas: Negligent discharge of pollutants from a point source or aiding and abetting, February 2, 2014 to February 8, 2014; failure to maintain treatment systems and equipment and related appurtenances or aiding and abetting through the dates January 1, 2012, February 2, 2014; third count, negligent discharge of pollutants again, for a different date and time, that is January 1, 2012 to February 21, 2014; and finally Count 4 in the Middle District as to Carolinas Corporation, failure to maintain treatment systems and related appurtenances on the dates January 1, 2012 to February 6, 2014. Correction, that's Middle District of North Carolina. That's the summary of the charges.

And finally as to the Western District of North Carolina, one count as to this particular defendant, Duke Energy Carolinas, negligent discharge of pollutants from a point source and aiding and abetting between November 8, 2012 and December 30, 2014.

Now, each of these offenses, as I've said before, carry not more than five years probation; the greater of not less than $2500 or more than $25,000 per day of violation; $200,000; or twice the gross gain or loss; and a $125 special assessment.

Do you understand the charges against the defendant business entity Duke Energy Carolinas and the maximum punishments that I've just stated?

MS. JANSON: I do, Your Honor.

THE COURT: If imposed by the Court, is the defendant corporation Duke Energy Carolinas financially able to pay a substantial fine and make full restitution to any victim of the offenses in that case?

MS. JANSON: It is.

THE COURT: Now finally, in the third case, Duke Energy Business Services, have you been furnished a copy of the charges, all of which are misdemeanors, as relates to Duke Energy Business Services?

MS. JANSON: I have, Your Honor.

THE COURT: And as to the case in the Eastern District of North Carolina there is one count, negligent discharge of pollutants from a point source or aiding and abetting, between the times of October 1, 2010 and December 30, 2014, in violation of the Clean Water Act.

As to the Middle District of North Carolina there are six charges as it relates to Duke Energy Business Services, and I have -- I'll try to summarize them as quickly as possible. Count 1 is negligent discharge during the period February 2, 2014 to February 8, 2014; failure to maintain treatment system equipment and related appurtenances, January 1, 2012 to

February 2, 2014; negligent discharge from a point source in Count 3, January 1, 2012 to February 21, 2014; count number 4 in the Middle District, failure to maintain treatment system equipment and related appurtenances between January 1, 2012 and February 6, 2014; in Count 5 failure to maintain treatment and related appurtenances between January 1, 2012 and January 24, 2014; and finally Count 6 in the Middle District, failure to maintain treatment system equipment and related appurtenances between January 1, 2012 and January 24, 2014.

Mr. Court Reporter, can you keep up with me?

COURT REPORTER: Yes.

THE COURT: Thank you.

And finally as to the charges in the Western District as relates to Business Services, two counts, the negligent discharge of pollutants from a point source or aiding and abetting between November 8, 2012 and December 30, 2014; and count number 2 in the Western District, negligent discharge of pollutants from a point source, aiding and abetting, between May 31, 2011 and December 30 in 2014.

Each offense carries the same penalties that I previously stated for the other two corporations, probation of not more than five years; the greater fine of 2500 but not more than 25,000 per day; 200,000; or twice the gross gain or loss; and a $125 special assessment.

Ms. Janson, do you understand the charges against the entity Duke Energy Business Services?

MS. JANSON: I do, Your Honor.

THE COURT: And if imposed by the Court is Duke Energy Business Services financially able to pay a substantial fine and make full restitution to any victims of the offense?

MS. JANSON: It is.

THE COURT: Thank you, ma'am.

I'd point out that the Eastern District of North Carolina is comprised of the 44 counties basically from Wake County going straight up to the Virginia line and from Wake County going down through Harnett County, Cumberland County, Robeson County, everything back to the coast. That has comprised the Eastern District of North Carolina for more than 75 years. The Middle District of North Carolina is comprised of the counties from Durham to Winston Salem basically. And the Western District of North Carolina is comprised of the counties again basically from Charlotte up through the mountains all the way to the Tennessee line. So there are three Federal Court districts in the State of North Carolina.

There are 94 Federal Court districts in the United States Court System, that includes 89 Federal Districts among the 50 states and then there are five Federal Court districts including the District of Puerto Rico, the District of Guam, the District of the Virgin Islands, the District of the Mariana Islands and the District of Columbia, and that's how our Federal Court system -- for those of you who are not attorneys and don't know about this. So our issues today just involve these three districts.

Now, I'm going to take up the Rule 44 colloquy.

Ms. Janson, as you know, each of the three defendant corporations or business entities in this matter are represented by the same attorneys. Now, I'm required by law to advise you as the representative of these corporations that the United States Constitution gives every defendant, even a corporation, the right to effective assistance of a counsel. When one lawyer represents two or more defendants in a case, the lawyer may have trouble representing all the defendants with the same fairness. This is a conflict of interest that denies the defendant the right to effective assistance of counsel. Such conflicts are always a potential problem because different defendants may have different degrees of involvement, and each defendant, according to our Constitution and the interpretations thereof, has the right to a lawyer who represents only it.

Ms. Janson, did you receive a document as to each defendant's -- each defendant which lists some of the various ways in which dual representation might work to a defendant's disadvantage?

MS. JANSON: I did, Your Honor.

THE COURT: And have you had a chance to review those documents?

MS. JANSON: I have.

THE COURT: Have you had a chance to discuss the potential disadvantages with the attorneys who represent the defendants in these cases?

MS. JANSON: I have, Your Honor.

THE COURT: And do you want me to read out loud these disadvantages or have you read and understand them?

MS. JANSON: I have read and understand them.

THE COURT: Do you have any questions of me regarding these potential issues?

MS. JANSON: I do not, Your Honor.

THE COURT: Do you wish to speak with any other independent lawyer about the wisdom of waiving the right to separate counsel?

MS. JANSON: I do not, Your Honor.

THE COURT: Mr. Cooney, please advise the Court regarding your ability and your colleagues' to effectively represent all three defendants before the Court today, and do you have any reason to believe that a conflict in these matters will prevent you from providing effective assistance of counsel or causes prejudice to any of the defendants?

MR. COONEY: Your Honor, we've discussed this thoroughly with each other and also with our clients. We believe very strongly it's to the clients' advantage to be represented by single counsel, and I have no question about our ability to render Constitutionally effective assistance for each of these defendants in these cases.

THE COURT: Ms. Karen Popp, do you agree with the statements made by Mr. Cooney?

MS. POPP: Yes, Your Honor.

THE COURT: Ms. Claire Rauscher?

MS. RAUSCHER: I do, Your Honor.

THE COURT: And finally David Buente, do you agree with Cooney?

MR. BUENTE: Of course I agree with Mr. Cooney, Your Honor.

THE COURT: Ms. Janson, having been advised of each defendant's right to effective representation and having assured the Court that you, one, understand the potential conflict of interest; second, understand the potential perils of dual representations; and third, having discussed this matter with the attorneys for the defendants, do not wish to discuss this matter with separate independent counsel; on behalf of Duke Energy Progress, do you hereby voluntarily waive the Sixth Amendment right of protection of separate counsel?

MS. JANSON: I do, Your Honor.

THE COURT: And have you also signed the waiver indicating the same?

MS. JANSON: I have.

THE COURT: And on behalf of Duke Energy Carolinas, do you hereby voluntarily waive the Sixth Amendment protection of separate counsel and have you signed the waiver form?

MS. JANSON: I do and I have.

THE COURT: And finally as to Duke Energy Business, do you hereby voluntarily waive the Sixth Amendment protection of counsel and have you signed that waiver?

MS. JANSON: I do and I have, Your Honor.

THE COURT: All right. Mr. Cooney, do we have those waivers or have you already handed them up?

MR. COONEY: Your Honor, I have them here and I'll be happy to hand them up to the Clerk.

THE COURT: Let's go ahead and do that. Folks need a little break from me.

All right. The charges. I'm going to now advise the defendants of certain rights afforded them, and this recitation will be intended for the benefit of the representative of these defendants, to wit Ms. Janson.

When I ask you, Ms. Janson, whether you understand these rights, an affirmative answer shall indicate to me that you on behalf of each Duke Energy -- strike that. Duke Energy Progress, number two, Duke Energy Carolinas, and Duke Energy Business Services, understand these rights, so I won't have to repeat it three times.

So I begin by saying: Do you understand and agree to proceed in this way? When you answer yes or no to one, it's as to all three. Correct?

MS. JANSON: I agree, Your Honor.

THE COURT: All right. Do you and all of your respective corporate officers and directors or members and managers understand that the defendants have a right to plead not guilty to the charges presented?

MS. JANSON: We do.

THE COURT: And do you and all of your respective corporation officers and directors and members and managers understand that the corporation or business entity has a right to a trial by jury and the assistance of counsel at such trial?

MS. JANSON: We do, Your Honor.

THE COURT: And do you and these same persons understand that you have a right to confront and cross-examine witnesses at such a trial?

MS. JANSON: We do.

THE COURT: And do you understand, and on behalf of these other folks, that the defendant corporations would not have to prove that they are innocent and that the corporation or business entity would be presumed to be innocent at such a trial?

MS. JANSON: We do, Your Honor.

THE COURT: And do you understand, and the corporate officers and directors and members and managers, that at such a trial the Government would have to prove that the corporation or business entity is guilty beyond a reasonable doubt?

MS. JANSON: We understand, Your Honor.

THE COURT: And do you understand that these same folks have the right -- you would have the right to testify through its directors, officers, members, managers, agents, employees or otherwise at such a trial?

MS. JANSON: We do.

THE COURT: And finally -- not quite finally, but we're getting there -- do you on behalf of the corporation officers and directors and members understand that if I accept a plea or pleas of guilty today, the corporation or business entity will have forfeited its right to a trial and the other rights I've just described?

MS. JANSON: We understand, Your Honor.

THE COURT: Do you and all these folks understand that today I will proceed ultimately to enter judgment of guilty and sentence the corporations or business entity on the basis of these guilty pleas?

MS. JANSON: We do.

THE COURT: And finally, do you and your respective corporation officers, directors, members and managers understand that the Court may order the corporation or business entity to make restitution to victims of the offenses?

MS. JANSON: We do, Your Honor.

THE COURT: Okay. Plea agreements.

Before me are three plea agreements that have been filed in this court. I've obviously seen them before, but these are the original and official ones, and I'm going to begin with the plea agreement between the Government and the defendant Duke Energy Progress.

Now, the Duke Energy Progress plea agreement has 51 pages and appears to be signed by you, Ms. Janson, on behalf of the Duke Energy Corporation as well as your counsel and many of the Government counsel. Did you in fact sign this plea agreement on behalf of Duke Energy Progress, Ms. Janson?

MS. JANSON: I did, Your Honor.

THE COURT: Did you have an opportunity to read and to discuss this plea agreement with your corporate attorneys and did you in fact do so before you signed it on behalf of Duke Energy Progress?

MS. JANSON: I did.

THE COURT: And does the plea agreement represent in its entirety any and all agreements Duke Energy Progress has with the United States and the United States Attorney?

MS. JANSON: Yes, Your Honor.

THE COURT: Do you understand the terms, the language, the words, the sentences, even any legal phrases that are used in the plea agreement?

MS. JANSON: I do.

THE COURT: And it's my understanding that you in fact are a lawyer.

MS. JANSON: I am.

THE COURT: Did you discuss with counsel the appeal waiver contained in paragraph 3(e) on page 10 and do you understand that by entering into this plea agreement and entering a plea of guilty on behalf of Duke Energy Progress you may be giving up the corporation's right to appeal or collaterally attack all or any part of any conviction or sentence imposed in this case?

MS. JANSON: I did discuss and I do understand.

THE COURT: Do you have any questions about the plea agreement in Duke Energy Progress?

MS. JANSON: I do not, Your Honor.

THE COURT: Other than what's in this plea agreement, has anyone made any other or different promises to you or to the corporation in order to get Duke Energy Progress to plead guilty?

MS. JANSON: No, sir.

THE COURT: Has anyone threatened the corporation in any way in order to persuade Duke Energy Progress to either accept the plea agreement or to plead guilty?

MS. JANSON: They have not, Your Honor.

THE COURT: Is Duke Energy pleading guilty of its own free will because it is in fact guilty?

MS. JANSON: It is.

THE COURT: And do you understand that if I accept the corporation's plea of guilty today Duke Energy Progress can't come back later and ask for a trial?

MS. JANSON: I do.

THE COURT: Have you answered all of my questions truthfully?

MS. JANSON: I have.

THE COURT: Do you need any more time to think about the plea or discuss the plea with counsel before entering a plea on behalf of Duke Energy Progress?

MS. JANSON: I do not, Your Honor.

THE COURT: Now Duke Energy Carolinas.

This plea agreement has 54 pages and appears to be signed by you on behalf of Duke Energy Carolinas, by your attorneys and by some eight other lawyers on behalf of the prosecution by the Government. Did you in fact sign this on behalf of Duke Energy Carolinas?

MS. JANSON: I did, Your Honor.

THE COURT: Did you have an opportunity to read and discuss this plea agreement with your attorney before you signed it?

MS. JANSON: I did.

THE COURT: Does the plea agreement represent in its entirety all agreements between Duke Energy and the

United States and the U.S. Attorneys?

MS. JANSON: It does.

THE COURT: Did you understand the terms, the words, the sentences, before you signed it?

MS. JANSON: I did, Your Honor.

THE COURT: Did you discuss with counsel the appeal waiver contained in paragraph 3(e) on page 11 of this plea agreement?

MS. JANSON: I did.

THE COURT: And did you have any questions about the plea agreement?

MS. JANSON: No, sir.

THE COURT: And do you understand that that plea agreement may prevent you or the corporation from raising any appeal or any collateral attack?

MS. JANSON: I understand, Your Honor.

THE COURT: Other than what's in the plea agreement, has anyone made any other or different promises to get Duke Energy Carolinas to plead guilty?

MS. JANSON: They have not.

THE COURT: Has anyone threatened the business entity in any way to persuade Duke Energy Carolinas to either accept the plea agreement or to plead guilty?

MS. JANSON: No, sir.

THE COURT: Is in fact Duke Energy Carolinas pleading guilty of its own free will because it is in fact guilty?

MS. JANSON: It is.

THE COURT: Do you understand that if I accept this entity's plea today, Duke Energy can't come back later -- Duke Energy Carolinas can't come back later and ask for a trial?

MS. JANSON: I understand.

THE COURT: Have you answered all these questions truthfully?

MS. JANSON: I have.

THE COURT: Do you need any more time to think about the plea or discuss it further with counsel?

MS. JANSON: I do not, Your Honor.

THE COURT: Finally Duke Energy Business Services.

This plea agreement is 45 pages long and appears to be signed by you on behalf of Duke Energy Business Services and by your attorney and by eight lawyers or more on behalf of the prosecuting office of the U.S. Government. Did you in fact sign the Duke Energy Business Services plea agreement?

MS. JANSON: I did, Your Honor.

THE COURT: Did you have an opportunity to read and discuss it with your lawyer?

MS. JANSON: I did.

THE COURT: Does it represent in its entirety all agreements between Duke Energy Business and the United States?

MS. JANSON: It does.

THE COURT: Did you understand the terms, the language, the words, the sentences, legal phrases in the plea agreement?

MS. JANSON: I do understand, Your Honor.

THE COURT: Did you discuss with counsel the appeal waiver contained on page 5, paragraph 3D, and do you understand that this may prevent the corporation from any appeal or collateral attack on any part of the conviction?

MS. JANSON: I did discuss and I do understand.

THE COURT: Do you have any questions about the Duke Business Service plea agreement?

MS. JANSON: I do not.

THE COURT: Has anyone threatened you or the business entity in any way to persuade Duke Energy Business to either accept the plea or plead guilty?

MS. JANSON: They have not.

THE COURT: Is Duke Energy pleading guilty of its own free will because it is in fact guilty?

MS. JANSON: It is.

THE COURT: Do you understand that if I accept the plea of Duke Energy Business today you can't come back later for a trial?

MS. JANSON: I understand.

THE COURT: Have you answered all of my questions in this case truthfully?

MS. JANSON: I have.

THE COURT: Do you need any more time to think about the plea or discuss the plea with your counsel?

MS. JANSON: I do not.

THE COURT: All right. The Court is satisfied -- does the United States have any objection to the Court approving these plea agreements?

MS. RANGARAJAN: No objection from the Government, Your Honor.

THE COURT: Let the record reflect the Court has executed the approval of the plea agreements in the three cases before the Court, Duke Energy Business, Duke Energy Progress and Duke Energy Carolinas.

All right. I'm now going to ask for the entry of plea and I'm going to begin -- this would be for each of the three different criminal informations in the three districts, and I'll begin with Case Number 5:15-CR-62, which is the Eastern District of North Carolina's charge.

All right. Ms. Janson, I'm going to ask you to stand now.

How does Duke Energy Progress plead to Count 1 of the criminal information in the Eastern District of North Carolina, that's Case Number 62?

MS. JANSON: Guilty.

THE COURT: And how does Duke Energy Business Services, LLC plead to Count 1 of the criminal information in the Eastern District?

MS. JANSON: Guilty, Your Honor.

THE COURT: Did Duke Energy Progress and Duke Energy Business Services, as charged in Count 1, by and through their employees acting within the scope of their employment, negligently discharge pollutants from a point source into a water of the United States in violation of certain aspects of the Clean Water Act? Did they do that?

MS. JANSON: Yes, sir.

THE COURT: And did they by and through their employees fail to exercise the degree of care that someone of ordinary prudence would have exercised in the same circumstance with respect to the discharge of coal ash and coal ash wastewater from an unpermitted drainage ditch at the Lee Steam Electric Plant in Goldsboro, North Carolina into the Neuse River? Did they do that?

MS. JANSON: Yes, Your Honor.

THE COURT: All right. Now, in the Middle District of North Carolina there are six counts, so this is going to take a little bit longer.

How does Duke Energy Business Corporation -- strike that.

How does Duke Energy Business Service Corporation plead to Count 1 of the Middle District's Case Number, 67?

MS. JANSON: Guilty.

THE COURT: And how does Duke Energy Carolinas plead to Count 1 of the Middle District case?

MS. JANSON: Guilty, Your Honor.

THE COURT: All right. Did in fact in Count 1 Duke Energy Business and Duke Energy Carolinas, by and through their employees acting within the scope of their employment, negligently discharge pollutants from a point source into a water of the United States without a permit?

MS. JANSON: Yes.

THE COURT: And did Duke Energy Business Services and Duke Energy Carolinas by and through its employees fail to exercise the degree of care that someone of ordinary prudence would have exercised in the same circumstance with respect to the discharge of coal ash and coal ash wastewater through a 48-inch storm pipe running beneath the primary ash basin at the Dan River Steam Station in Eden, North Carolina into the Dan River? Did they do that?

MS. JANSON: Yes, sir.

THE COURT: All right. That's Count 1. Now Count 2.

Count 2 also has Duke Energy Business Service and Duke Energy Carolinas. How does Duke Energy Business Service plead to Count 2 in the Middle District?

MS. JANSON: Guilty.

THE COURT: And how does Duke Energy Carolinas plead to Count 2 in the Middle District?

MS. JANSON: Guilty, Your Honor.

THE COURT: And did both of these entities, by and through their employees acting within the scope of their employment, negligently violate a condition of its permit in that they failed to exercise the due care that someone of ordinary prudence would have exercised with respect to the maintenance and inspection of the 48-inch storm pipe running beneath the primary ash basin in Dan River in violation of Part II, Standard Conditions for NDPES permits? Did they do that?

MS. JANSON: Yes, Your Honor.

THE COURT: All right. That's Count 2. Now Count 3.

Count 3 charges Business Services and Energy Carolinas. How does Duke Energy Business Services plead to Count 3, negligent discharge of pollutants from a point source, in the Middle District?

MS. JANSON: Guilty, Your Honor.

THE COURT: And how does Duke Business Services plead to Count 3?

MS. JANSON: Guilty.

THE COURT: Strike that. I'm still on Count 3, or am I on Count 4? Business Services twice. I'm still on Count 3, it charges Business Services and Duke Energy Carolinas, and as to both -- as to Business Services, you've already -- you said -- how do you plead?

MR. COONEY: Guilty, Your Honor.

THE COURT: As to Energy Carolinas how do you plead?

MS. JANSON: Guilty.

THE COURT: And did they negligently discharge pollutants from a point source or aiding and abetting in Count 3?

MS. JANSON: Yes, sir.

THE COURT: All right. Now we're going to Count 4, failure to maintain treatment systems, and that charges Duke Energy and Business and Corporate -- and Carolinas, Count 4.

How does Business Services plead to Count 4?

MS. JANSON: Guilty, Your Honor.

THE COURT: And how does Energy Carolinas plead to Count 4?

MS. JANSON: Guilty.

THE COURT: And did they, as charged in Count 4, fail to maintain treatment systems and related appurtenances, as set out in the bill between January 1st, 2012 and February 21, 2014?

MS. JANSON: Yes.

THE COURT: Count 5, failure to maintain treatment systems and related appurtenances, it charges Business Services and Energy Progress this time.

Now, how do you plead on Count 5 as to Duke Energy Business Services?

MS. JANSON: Guilty, Your Honor.

THE COURT: And how do you plead on Count 5 as to Duke Energy Progress?

MS. JANSON: Guilty.

THE COURT: And did Duke Energy Progress and Duke Energy Business Services, as charged in Count 5, between January 1, 2012 and January 24, 2014, in the Middle District of North Carolina, by and through its employees, fail to exercise the degree of care that someone with ordinary prudence would have exercised in the same circumstance with respect to the inspection of the risers within the 1978 coal ash basin at Cape Fear Electric Station in Moncure, North Carolina?

MS. JANSON: Guilty.

THE COURT: And finally Count 6. We're getting there. Just bear with us.

How does Duke Energy Business Services plead to Count 6, failure to maintain treatment system equipment?

MS. JANSON: Guilty.

THE COURT: All right. How does Duke Energy Progress plead to Count Number 6 in Case Number 67 in the Middle District?

MS. JANSON: Guilty, Your Honor.

THE COURT: And did these corporations, acting within the -- through their employees, acting within the scope of their employment, negligently violate a condition of its permit with respect to the maintenance and inspection of the riser within the 1985 coal ash basin at Cape Fear Electric Steam Station in Moncure, North Carolina? Did it do that?

MS. JANSON: Yes, sir.

THE COURT: All right. That takes care of the Middle District. Now we're down to the last bill of information, which is the Western District of North Carolina, and it carries just two counts, Count 1, criminally negligent discharge of pollutants, charges Duke Energy Business and Duke Energy Carolinas. How do they plead to Count 1 of the charges from the Western District of North Carolina, Business Services, Ms. Janson?

MS. JANSON: Guilty, Your Honor.

THE COURT: And how does Duke Energy Carolinas plead to Count 1 of the Western District charge?

MS. JANSON: Guilty.

THE COURT: And did they as charged in Count 1 between November 8, 2012 and December 30, 2014, in Gaston County, within the Western District of North Carolina, fail to exercise the degree of care that someone of ordinary prudence would have exercised as relates to coal ash and coal ash wastewater from an unpermitted and engineered drain from a coal ash basin at the Riverbend Steam Station in Catawba County?

Did they do that?

MS. JANSON: Yes, sir.

THE COURT: That's Count 1. And then Count 2 in the Western District charges Duke Energy Business Services and Duke Energy Progress, and that has to do with the Buncombe County issue of criminally negligent discharge of pollutants. How does Business Services plead to Count 2 of the 68 criminal information?

MS. JANSON: Guilty, Your Honor.

THE COURT: And how does Duke Energy Progress plead to Count 2 of the Western District's criminal information, the Buncombe County issue?

MS. JANSON: Guilty.

THE COURT: Now, did in fact Business Services and Duke Energy Progress, by and through their employees acting within the scope of their employment, fail to exercise the degree of care that someone of ordinary prudence would have exercised as relates to the unpermitted and engineered outfall from a coal ash basin at the Asheville Steam Electric Generating Plant through an unpermitted and engineered toe drain into the French Broad River, in violation of the National Pollutant Discharge Elimination System? Did in fact those employees do that?

MS. JANSON: Yes.

THE COURT: All right. You may be seated.

MS. JANSON: Thank you.

THE COURT: That concludes the receipt of the pleas in these cases. At this time the Court will receive the presentation of a factual basis from the Government, but before they do that -- I've got to receive the factual basis and then I'll see if Mr. Cooney has any objection, and after that I will be asking are there any victims, but I want to take a ten minute recess for the convenience of everybody.

Marshal, we're going to be in recess for let's say 15 minutes and then we'll come back.

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(Recess at 10:54 a.m. until 11:09 a.m.)

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THE COURT: Now, at this time the Court will receive the presentation by the United States of a factual basis so I might have an independent factual basis for accepting the pleas of the corporations.

Let the record reflect the parties have filed a joint factual statement which is attached as an exhibit to each of the defendants' plea agreements in each of the three files. The Court hereby accepts that factual statement and incorporates it into the record as support for the factual basis for the defendants' pleas.

The Government may now provide a synopsis of all the salient facts it desires to present regarding what the

Government believes it could prove at a trial beyond a reasonable doubt as it relates to these charges that have been pled to.

Ms. Rangarajan, will you be presenting on behalf of the Government?

MS. RANGARAJAN: Thank you, Your Honor. Actually it will be myself and Ms. Pettus that will be presenting on behalf of the Government. We are splitting the charges, Your Honor.

THE COURT: I'll hear you in whatever order you desire.

MS. RANGARAJAN: Thank you, sir.

Your Honor, by way of summary, with respect to Counts 1 through 4 of Case Number 5:15-CR-67, which are the four charges arising under the Clean Water Act against Defendants Duke Energy Carolinas and Duke Energy Business Services in the Middle District for the negligent discharge of pollutants from two stormwater pipes running underneath the primary coal ash basin at the Dan River Steam Station and the negligent failure to maintain those stormwater pipes, the evidence at trial would show as follows: That on February 2nd, 2014, a portion of the 48-inch stormwater pipe running underneath the primary ash basin at the Dan River Steam Station near Eden, North Carolina, in the Middle District of North Carolina, failed, resulting in the unpermitted discharge of approximately 27 million gallons of coal ash wastewater and between 30,000 and 39,000 tons of coal ash into that Dan River.

The coal ash, sir, traveled more than 62 miles downriver from the Middle District of North Carolina through the Western District of Virginia and into the Kerr Reservoir, both in the Eastern Districts of North Carolina and Virginia.

Shortly after the spill, video camera inspections were conducted of the second pipe, the 36-inch stormwater pipe. That video camera inspection revealed that the second pipe had also deteriorated and was allowing coal ash wastewater to leak and be discharged into the Dan River.

So how did this happen? This happened through the failure of Duke Energy Carolinas and Duke Energy Business Services to exercise reasonable care in preventing the negligent discharge and maintaining that equipment.

By way of background, sir, Duke Energy Carolinas is a energy utility company that owns and operates several facilities in North Carolina, including the Dan River facility. Duke Energy Business Services is a subsidiary of Duke Energy Corporation and it is in essence a human resources company, it provides shared services to all of the utilities of Duke Energy Corporation nationwide. Some of those services include engineering services and environmental services.

The Dan River facility itself began operations in 1949 and ceased operations in terms of coal combustion in 2012. As with all of Duke Energy coal combustion plants in

North Carolina, the Dan River facility has large earthen basins to store and treat the byproducts of coal combustion, such as fly ash and bottom ash. The Dan River itself has two such coal ash basins known as the primary ash basin and the Secondary Ash Basin. In 2013 the basins contained a combined total of roughly 232 million tons -- or million gallons of coal ash.

Underneath that primary ash basin were two stormwater pipes, the 48-inch stormwater pipe and the 36-inch stormwater pipe. The 48-inch stormwater pipe when originally installed was made of corrugated metal. In 1967, 1968, the primary ash basin was expanded and with it the stormwater pipe was expanded. During the time of that expansion the second portion of the 48-inch pipe was reinforced concrete. With respect to the 36-inch pipe, it was reinforced concrete pipe.

As set forth in more detail in the joint factual statement, as of 1979, engineers working for Duke Energy Carolinas, what was formally Duke Power Company, discovered and repaired major leaks in the 36-inch pipe and leaks in the 48-inch, and over time Duke Energy Carolinas and its -- and Duke Power Company, which it's formerly known as, continued to receive warnings of potential failures or problems that could arise with these pipes, and those come in the form of independent consultant reports and other annual inspections performed internally by Duke Energy itself.

Pursuant to North Carolina law, Duke Energy Carolinas hired consultants to perform five year inspections of its basin. The first inspection in 1981 cautioned that, quote, the culverts which pass beneath the primary basin may become potential problems, particularly as they age, and that report recommended that the flow of water through the pipes be quantitatively monitored to determine if there were leaks.

In the second inspection in 1986 the consultant noted that part of the 48-inch stormwater pipe was, quote, constructed of corrugated metal pipe, which would be expected to have less longevity of satisfactory service than the reinforced concrete pipes, and again recommended quantitative flow monitoring.

In 1991 -- in the 1991 inspection report, quantitative flow monitoring was again recommended for the stormwater pipes; however, at that time the independent consultant erroneously identified the entire length of that 48-inch pipe as being reinforced concrete pipe, as opposed to it being part metal, part concrete.

During the review process, however, engineers with Duke Energy Carolinas/Duke Power Company did not correct the error. The error was repeated again in the 1998 independent consultant report, the 2001 independent consultant report and the 2007 consultant report, and it was not corrected in each of those reports by Duke Energy Carolinas or Duke Power Company employees. Some of those same engineers also failed to perform the required annual inspections from the period of 2001 to 2007 at those basins.

Now, despite the erroneous identification of the 48-inch stormwater pipe as being reinforced concrete in these independent consultant reports, each of the Duke Energy Carolinas employees responsible for monitoring the flow from the stormwater pipes from 1999 to December, 2012, was aware that the 48-inch stormwater pipe was composed of corrugated metal. Some of those same employees though failed to perform monthly inspections for months or years at a time for various reasons as described in the joint factual statement.

As of February, 2014, sir, the record keeping and information sharing practices at Duke Energy Carolinas and Duke Energy Business Services did not ensure that critical information such as the fact that the 48-inch stormwater pipe was part metal and part concrete was communicated from employees with knowledge to engineers and employees making budget decisions. In addition, the engineers responsible for the Dan River facility had not sufficiently reviewed the records available to them, including original schematics and historical inspection reports, and therefore continued to operate under the erroneous belief that the 48-inch pipe was all reinforced concrete.

In May, 2011 a senior engineer and a program engineer, so two individuals at Duke Energy Business Services assigned to work specifically on coal ash issues at the Dan River facility, recommended that in the upcoming budget, for the facility to include camera inspections of the four pipes in or near the coal ash basins. There are actually four pipes that run throughout the two basins, two underneath the primary basin, one that connects the primary to the secondary basin and then a pipe that goes from the secondary basin to the Dan River, the discharge pipe, and that is a permanent outfall, sir.

The estimated cost of the camera inspection for all four pipes was $20,000, roughly $5,000 per pipe. Duke Energy Carolinas did not provide the funding. When Duke Energy Carolinas did not provide the funding, the Dan River station manager called the Vice President in charge of approving the Dan River budget and told the Vice President three things: One, the Dan River facility needed the camera inspections; two, the facility did not know the conditions of the pipes; and three, if one of the pipes failed, there would be environmental harm. The Vice President did not change his mind. The camera inspections were not funded.

In May, 2012 the same two engineers again recommended camera inspections of the pipes because of -- and the reason they advanced was aging of the pipe systems. Duke Energy Carolinas again did not provide funding for the camera inspections. Had they done so, the actual composition of the

48-inch pipe would have been made known and the leaks would have been seen in the 36-inch pipe.

Ultimately, on February 2nd, 2014, a date well beyond the reasonable service life of corrugated metal pipe under similar conditions, a five foot long corrugated metal elbow joint within the 60-year-old corrugated metal section of the stormwater pipe, that 48-inch pipe, failed, resulting in the release of coal ash and coal ash wastewater into the Dan River. The combination of corrosion in the elbow joint and the weight of the coal ash basin over the elbow joint caused it to buckle, fail and be pushed through the end of the 48-inch stormwater pipe into the Dan River. The elbow joint was recovered from the Dan River itself later. The discharge continued until the outfall was plugged on February 8th, 2014.

The discharge from the 36-inch pipe caused by infiltration of wastewater, some spraying into the pipe in pressurized jets through the joints between sections of pipe and lengthwise cracks in some pipe sections, was stopped on February 21st, 2014. The evidence indicates that the discharge -- the evidence would indicate at trial that the discharge from the 36-inch pipe began at least as early as January 1st, 2012. The Dan River facility, sir, did not have a permit or authorization to discharge wastewater or coal ash from the primary ash basin through either the 48-inch or the 36-inch stormwater pipe, and that would be some of the evidence that the Government would be prepared to present at trial with respect to Counts 1 through 4 in Docket Number 5:15-CR-67, sir.

THE COURT: All right. Thank you, Ms. Rangarajan.

Ms. Pettus, I look forward to hearing from you, ma'am.

MS. PETTUS: Yes, Your Honor. Thank you.

With respect to Counts 5 and 6 --

THE COURT: Remind us of where you -- I know that Ms. Rangarajan is an Assistant U.S. Attorney in the Eastern District, and for the record state where you are employed.

MS. PETTUS: Of course, Your Honor. I'm a senior trial attorney with the Environmental Crimes Section of the Environment and Natural Resources of the U.S. Department of Justice, and I am located generally in Washington, D.C.

THE COURT: Thank you, ma'am. You may proceed.

MS. PETTUS: Thank you.

I will pick up starting with Counts 5 and 6 in the Middle District criminal information, Case Number 5:15-CR-67. Those counts charge violations of the Clean Water Act by Defendants Duke Energy Business Services and Duke Energy Progress for negligent failure to maintain equipment at coal ash basins at the Cape Fear Steam Electric Plant.

The evidence with respect to those counts would show as follows: The Cape Fear Steam Electric Plant is located near Moncure, North Carolina in the Middle District of

North Carolina. It is owned by Duke Energy Progress, which was formerly known as Progress Energy Carolinas. It is also a public utility company.

The Cape Fear plant has a total of five coal ash basins. The charges in this case are based on two of those coal ash basins, one which was constructed in or about 1978 and the other that was constructed in or about 1985. The 1978 coal ash basin had a storage capacity of nearly 287 million gallons and the 1985 coal ash basin had a storage capacity of nearly 575 million gallons.

Duke Energy Progress stopped electric power generation at the Cape Fear plant in December, 2011. Essentially the plant was retired. At that point coal ash and wastewater simply remained in the 1985 and the 1978 coal ash basins. Each basin contained a structure known as a riser, that's essentially a vertical pipe that sits in the coal ash basin and allows the discharge of water from the basin under normal operation. So essentially as material settles out of the wastewater that has accumulated in the basin and the water level itself rises, it eventually overtops the top of the riser and trickles down and it's discharged in accordance with the permit for the facility.

From no later than January 1st, 2012 to January 24th, 2014, Duke Energy Progress and Duke Energy Business Services failed to properly maintain those risers in the 1985 and 1978 coal ash basins.

As required by State law, Duke Energy Progress conducted and hired other companies to conduct annual inspections of the coal ash basins and also hired consultants to perform five year independent consultant inspections of the coal ash basins at the Cape Fear plant.

In 2008 the annual report recommended inspecting the risers in both coal ash basins using a boat, because at that time the condition of the risers was marginal and the risers were considered likely to develop problems within the next two to five years. The recommendation was repeated in inspection reports through the year 2013, but Duke Energy Progress never performed an inspection of the risers by boat.

The 2012 independent consultant inspection also documented that the skimmer on top of the riser, essentially a circular piece of metal preventing trash from floating into the riser, was also in disrepair on the 1978 basin.

In addition to the inspection reports, in 2011 employees of Duke Energy Progress visited the Cape Fear plant and determined that the risers in both the 1978 and 1985 coal ash basins were in fact leaking based on the flow of wastewater to the discharge pipes. They informed their management that repairs were needed and were further supported by the 2013 annual inspection that also documented leakage from the riser. Nevertheless, no additional inspection or monitoring of the risers was undertaken by Duke Energy Progress until March of 2014.

On or about January 24th, 2014, Duke Energy Progress through Duke Energy Business Services entered into a contract with an underwater pipe repair contractor for, among other things, repair work on those risers in the two coal ash basins. The repair work was to occur at some time between January 27, 2014 and December 21st, 2014, but no start date was specifically identified. That repair work was ultimately not conducted until on or about March 19th and 20th of 2014.

With respect to Count Number 1 in Case Number 5:15-CR-62 in the Eastern District of North Carolina, that charges a violation of the Clean Water Act by Defendants Duke Energy Business Services and Duke Energy Progress for negligent unpermitted discharge of coal ash or coal ash wastewater from a coal ash basin at the H.F. Lee Steam Electric Plant.

The evidence for that count would show as follows: That the H.F. Lee Steam Electric Plant is located in Goldsboro, North Carolina in the Eastern District of North Carolina and is owned by Duke Energy Progress. The plant contains a number of previously used coal ash basins, only one of which is active and continues to contain water and coal ash.

Duke Energy Progress had a NPDES permit, which is a type of permit under the Clean Water Act, that was issued in 2009 for that particular coal ash facility. The NPDES permit authorized three discharge points or outfalls for the plant, one was for the active coal ash basin, one was for a cooling water pond and one was for a separate electricity generation facility that was natural gas powered that's also on the site but not related to the coal ash facility.

The Lee plant had a number of seeps. Seeps occur in earthen dams and impoundments when water that often carries dissolved chemical constituents moves through poor soil and emerges at the surface of the ground. Duke Energy Progress and Duke Energy Carolinas have documented nearly 200 of these seeps at their coal ash basins in North Carolina. Seeps are discharges for the purposes of the Clean Water Act when they reach a water of the United States. Now, there may be some dispute over the legal niceties of exactly what circumstances account for that purpose, but in general parlance.

One of the seeps at the Lee plant identified in October, 2010 flowed into a drainage ditch outside the coal ash basin which led to the Neuse River. That seep was repaired in May, 2011. At least four additional seeps have been identified that flow into the same drainage ditch. That drainage ditch was not an outfall permitted under the plant's NPDES permit. Wastewater from the ditch was sampled and analyzed in February, 2013 and again in March of 2014. Testing showed that that wastewater did contain pollutants such as chloride, arsenic, boron, barium, iron and manganese. Unpermitted discharges occurred from the drainage ditch from at least October 1, 2010 to December 30th, 2014.

Moving on to the criminal information from the Western District of North Carolina, with respect to Count 1 in Case Number 5:15-CR-68, which charges a violation of the Clean Water Act for the Defendants Duke Energy Business Services and Duke Energy Carolinas for negligent unpermitted discharge of coal ash and coal ash wastewater from a coal ash basin at the Riverbend Steam Station, that evidence would show that the Riverbend Steam Station is located in Gaston County, North Carolina in the Western District of North Carolina and is owned by Duke Energy Carolinas. The Riverbend Station has two coal ash basins adjacent to Mountain Island Lake which store approximately 2,730,000 tons of coal ash.

Duke Energy Carolinas held a NPDES permit for the Riverbend Station. The NPDES permit authorized three outfalls to the facility. On some date unknown but prior to December, 2012, one or more individuals at Riverbend employed by Duke Energy Carolinas allowed a seep to flow into an unpermitted channel that allowed contaminated water from the coal ash basin to be discharged into an engineered channel that led to the Catawba River. The unpermitted seep contained elevated levels of arsenic, chromium, cobalt, boron, barium, nickel, strontium, sulphate, iron, manganese and zinc. Unpermitted discharges occurred from at least November --

THE COURT: Slow down now. He's got to get all these things. Tell what those bad things were again.

MS. PETTUS: The pollutants included elevated levels of arsenic, chromium, cobalt, boron, barium, nickel, strontium, sulphate, iron, manganese and zinc. Those are all considered pollutants under the Clean Water Act.

The unpermitted discharges from the ditch at Riverbend occurred from at least November 8th, 2012 to December 30th, 2014.

With respect to Count 2 in Case Number 5:15-CR-68, which charges a violation of the Clean Water Act for defendants Duke Energy Business Services and Duke Energy Progress for negligent unpermitted discharge of coal ash and coal ash wastewater from a coal ash basin at the Asheville Steam Electric Generating Plant, the evidence would show that the Asheville Steam Electric Generating Plant is located in Buncombe County, North Carolina in the Western District of North Carolina and is owned by Duke Energy Progress.

The Asheville plant also has two coal ash basins, one constructed in 1964, the other constructed in 1982, and they hold approximately 3 million tons of coal ash.

Duke Energy Progress held a NPDES permit for the Asheville plant identifying permitted outfalls for that plant. At least two seeps flowed into engineered toe drains at the base of the 1964 coal ash basin and ultimately discharged into the French Broad River. This discharge was unpermitted and occurred from at least May 31st, 2011 to December 30th, 2014.

THE COURT: Thank you, Ms. Pettus.

Does that conclude the statement of what you believe could be proved at a trial, Ms. Pettus?

MS. PETTUS: That does, Your Honor.

THE COURT: Ms. Rangarajan?

MS. RANGARAJAN: Yes, sir.

THE COURT: Anything further?

MS. RANGARAJAN: Nothing further, Your Honor.

THE COURT: All right. Mr. Cooney, on behalf of the defendants, do you have any objection to the contentions by the United States?

MR. COONEY: Your Honor, we have stipulated to the existence of a factual basis for these pleas. There are two corrections I would like to make based on the joint factual statement.

First, Ms. Rangarajan indicated that the 48-inch pipe underneath the Dan River was well beyond its useful life. That is not what is in the joint factual statement. The joint factual statement states specifically it was at the end of its useful life. This was installed roughly in 1954, it's got roughly a 60 year useful life, so it was right there in 2014. That's what the parties agreed to as part of the joint factual stipulation, and that's what the Government stipulated to.

Second, Ms. Pettus indicated that though the repair contract was signed in January of 2014 -- and by the way, the earlier stipulation is paragraph 182 of the joint factual statement.

Ms. Pettus indicated that while the repair contract from Cape Fear was signed in January of 2014, the repairs were not undertaken until March of 2014. Paragraph 120 of the joint factual statement indicates the reason for that is that the water level needed to be lowered in the ponds in order to permit divers to safely work on the risers, and that's because of a phenomenon known as differential pressure. If something happens while the divers are underwater to those risers, it could kill the divers, and so the delay was caused by the fact that the water level needed to be lowered as set forth in paragraph 120 of the joint factual statement.

Other than that I have no objections.

THE COURT: All right. I'm satisfied. All I inquired or asked was for them to give what they believed they could prove, it would have been up to a jury, and I find that just the choice of words "well beyond" versus "at the end of" is close enough, but your objection and concern is noted and will be a part of the record, and as to the issue of the repair, I understand the contentions and we'll go from there.

All right. The Court hereby approves and accepts the memoranda of plea agreements in these cases as previously stated. The Court is satisfied with the responses given during this immediate session of this hearing and makes the following finding on the record.

Madam U.S. Attorney, under the Rules I'm required to inquire pursuant to 18 U.S. Code 3717(a)(4), are there any victims present at the arraignment who desire to be heard, so far as you know?

MS. RANGARAJAN: Your Honor, there are no victims that have made themselves known to the Government to be heard today. The Government did, as the Court knows, make effort to identify victims, including poling the gallery as folks entered this morning. Nobody has presented themselves and requested a right to allocute, so there are no victims as defined under the Crime Victims Rights Act for the Court to hear from this morning.

THE COURT: All right. The Court inquires of the audience, is there anyone here who perceives themselves as a victim who wishes to be heard?

There being no such response, we will continue.

All right. It's time for the entry of the general judgment in this matter and I do so. It is the finding of the Court in each of the cases presented, those are the file numbers of 5:15-CR-62 from the Eastern District of North Carolina, File Number 5:15-CR-67 from the Middle District of North Carolina, and File Number 5:15-CR-68 from the Western

District of North Carolina, the Court finds that Ms. Janson is fully competent and capable of entering informed pleas on behalf of each defendant, Duke Energy Carolinas, Duke Energy Business Services and Duke Energy Progress, and that the pleas of guilty are knowingly and voluntarily made, supported by an independent factual basis containing each of the elements of the offense. The pleas are therefore accepted. The defendant Duke Energy Business Services, LLC is hereby adjudged guilty of Count 1 of the criminal information in the Eastern District of North Carolina; it is adjudged guilty of Counts 1, 2, 3, 4, 5 and 6 of the criminal information in File 15-CR-67 in the Middle District of North Carolina; and finally Duke Energy Business Service is adjudged guilty of Counts 1 and 2 of the criminal information in File Number 5:15-CR-68 from the Western District of North Carolina.

Defendant Duke Energy Progress, Incorporated is hereby adjudged guilty of Count 1 of the criminal information in File 5:15-CR-62 from the Eastern District of North Carolina; Duke Energy Progress, Inc. is found guilty of Counts 5 and 6 of the criminal information in File Number 5:15-CR-67 from the Middle District of North Carolina; and Duke Energy Progress, Inc. is found guilty of Count 2 of the criminal information in File Number 5:15-CR-68 from the Western District of North Carolina.

Now, as to the Defendant Duke Energy Carolinas, LLC, it is hereby adjudged and found that Energy Carolinas is found guilty of Counts 1, 2, 3 and 4 of the criminal information in File 5:15-CR-67 from the Middle District of North Carolina and guilty of Count 1 of the criminal information in file 5:15-CR-68. The Court hereby approves and accepts each memoranda of plea agreement. Because the plea agreements in these cases were executed pursuant to Rule 11(c)(1)(C), each defendant is hereby informed that the agreed dispositions will be included in their respective judgments.

The Court intends to proceed to sentencing without the preparation of a presentence report, as the parties have waived a presentence report by the United States Probation Office. The Court has had as its assistance during the preparation for accepting these pleas and passing judgment in this case -- had the assistance of two Senior United States Probation Officers, Mr. John Wasco, please stand, and Mr. Dwayne Benfield, please stand, who are the assigned probation officers to this case as we came to it today and as it goes forward from here.

The next step in this matter is the sentencing of the three defendants. I'm going to have to have another fairly, well, short recess of about an hour, and when I come back I will hear from the defendants through counsel as to what they want as far as an allocution or what they would like for me to hear, and then if there's anything further from the

United States, I'll hear that, and then I will proceed to sentence the three entities today.

The hour is now 11:40 something, I'm going to recess Court until 1:00 p.m. and we'll come back, and I would anticipate that we could get all the sentencings accomplished within approximately an hour to an hour and a half.

Anything further from the United States before we recess for midday, Ms. Rangarajan?

MS. RANGARAJAN: No, sir.

THE COURT: Mr. Cooney?

MR. COONEY: None, Your Honor.

THE COURT: All right. Marshal, court will be in recess until 1:00 p.m.

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(Recess at 11:41 a.m. until 12:58 p.m.)

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THE COURT: Good afternoon, ladies and gentlemen.

As we are aware, we've completed all the preliminaries in these arraignment proceedings and we're now prepared to go forward. This is the appropriate time to hear before judgment is finally passed certain matters or any matters that the defense desires to bring to my attention.

First off, Madam U.S. Attorney, is the Government ready to proceed this afternoon?

MS. RANGARAJAN: We are, Your Honor. Thank you.

THE COURT: Mr. Cooney, are the defendants ready to proceed?

MR. COONEY: Yes, we are, Your Honor.

THE COURT: All right. I'm ready to hear from you, sir, or your team, however you want to do it.

MR. COONEY: Thank you, Your Honor. You'll be hearing from myself, from Ms. Popp, Ms. Rausher, and then finally from Ms. Janson. We'll not trifle with the Court's patience. We'll recall the admonition that you gave me yesterday that no one remembers who spoke before Lincoln at the Gettysburg Address.

THE COURT: You'll also remember that the Ten Commandments contain 297 words and the Bill of Rights 463. Recently a Federal directive that came out of the city where some of these people come from, a directive to regulate the price of cabbage contained 28,911 words. I look forward to hearing whatever you want to tell me this afternoon.

MR. COONEY: I will be longer than the Bill of Rights but shorter than cabbage, I can promise that.

Your Honor, before I begin, as an officer of the court, I want to bring to the Court's attention the professionalism and integrity of the United States Attorney's Offices and the Department of Justice. We have appreciated the high ethical standards they've held and the professionalism with which they've approached this matter, and I can assure the

Court and the public that the United States has been zealously represented in this. This was a long, hard investigation, we've reached a complex agreement that we're going to urge the Court to enter, but I wanted to thank the prosecutors in this case for their professionalism throughout this.

THE COURT: Thank you. I know they appreciate it.

MR. COONEY: Your Honor, as you know, I represent three companies, two of which have been in existence in this state in one form or another for 110 years. Duke Energy Progress is the old Carolina Power and Light, Duke Energy Carolinas is the old Duke Power, and these companies together were the first companies to bring electricity to North Carolina.

When the first farmers went in and turned on their lights or people listened to the radio, it was likely on power that was brought to them by these companies, and these companies helped transform this state from a rural agricultural state into a manufacturing state and now into a high tech research economy, and throughout that time they provided a lot of jobs to a lot of people.

Right now we have 13,000 employees and 8,000 retirees who depend on these companies, and these are good jobs, these are the kind of jobs that you can build dreams on, and for 110 years no one ever accused these companies of committing a crime, and certainly these companies were never convicted of committing a crime, and all of that changed at 11:40 a.m. when Your Honor adjudged them guilty of crimes.

The reason the companies are here and the reason they entered into these plea agreements goes back to something Lynn Good, the Chief Executive Officer, did in the days immediately following Dan River. She told that community and she told this State and she told this company we were going to make it right and we were going to take responsibility, and that's what we've done today and that's what these companies have done today.

I want to talk for a second about the kinds of crimes that the company has acknowledged and pleaded guilty to. These are crimes of negligence. These are negligence-based crimes. There is no charge and the company has not pleaded guilty to anything that says the company willfully committed a crime or intentionally committed a crime or knowingly committed a crime. There's no allegation that the company had a business plan to avoid the environmental laws or a business plan or any kind of a plan that told them that they were not to try to do the best they could for the environment. These are negligence-based crimes that quite frankly the company, when it took a look at its own conduct in the days and weeks following Dan River, concluded that it was obligated to do better, that it should have done better, and that is the essence of negligence, which is why the companies were willing to plead guilty to these negligence-based crimes.

What I'd like to do, Your Honor, is talk very briefly about kind of the three baskets of things we're dealing with, which are Dan River, Cape Fear and then what we call the seeps in general, and I'll be very brief, but I want to begin with Dan River.

In the days following the Dan River spill -- let me get this on. There we go.

In the days following the Dan River spill, in addition to committing tremendous resources that you'll hear about to try to correct the spill, to stop what was going on, the company also began an in-depth inquiry into what happened at Dan River, what caused this, and within a few weeks and months and as a result of this what the company learned was that its employees had made a series of independent errors and other errors had occurred over a long period of time, nearly 60 years, that had coalesced leading to the Dan River spill.

As Ms. Rangarajan pointed out in the joint factual statement, the employees had not consistently inspected the ash basins, had not inspected them in a consistent manner, that there was confusion about what the stormwater pipe was made out of, and I'll get into that a little later, that the engineers had recommended a video camera inspection and that recommendation had been turned down because the thought was the pipe was going to be removed soon and hadn't exhibited any problems. So there were a number of errors that were made, certainly that decision was one of them, and in hindsight the company certainly believes that that video camera inspection should have occurred and would have given it valuable information.

So Ms. Rangarajan was right in her factual summary about all of these, and in fact when the company discovered all of this we had a meeting on June 22nd, 2014 with the U.S. Attorney's office and we did a presentation for them and brought them the e-mails and the documents that showed that and acknowledged that right from the beginning. As I told Ms. Rangarajan, as far as Dan River goes, we ought to be able to agree on the facts, and we were able to do so, I think, to a dramatic extent.

Now, let me explain a little bit about what's going on at Dan River, because these ash basins are all kind of different. That's an overhead view of the two basins at Dan River. Now, in the media the basins are portrayed sometimes as you dig a hole and you throw stuff in it and you leave it there, and that's just not correct. These are permitted wastewater treatment systems, they're permitted by the Government, they're regulated by EPA and by DENR and by various divisions of DENR, and the way these work is on basic engineering principles, they work on the same engineering principles that municipal wastewater systems work on and industrial wastewater systems work on. These are principles of settling. These are settling ponds.

So at Dan River, as Ms. Rangarajan mentioned, we have a primary ash pond, and what would happen is coal byproducts, what was left over from the burning of coal, would come into the primary ash basin, they would mix it with water so that it could be handled and wouldn't fly all over the place, it would then settle. The solids would settle out and the cleaner water on the top would eventually be pumped into the secondary ash basin, where more settling would occur, and in fact there's kind of a wetlands associated with that secondary ash basin, and then once enough settling occurred, the water at the top that had been fully treated at that point would be discharged through the permitted outfall into the Dan River, and that's the permit that the company had.

Now, the stormwater pipe -- and there's roughly where the permitted ash outfall is. Now, the stormwater pipe that we're talking about ran under the primary ash basin and it ran from a wetlands area on the left to the Dan River. That stormwater pipe had nothing to do with the operation of the coal ash basin, it was just simply a pipe that was built so that stormwater from one part of the property could get to another part of the property underneath the ash basin. It was first installed in 1954 and then was expanded later in the 1960s.

So at the time of the Dan River spill, that stormwater pipe ran roughly 1,000 feet, so it was a lengthy pipe, and as Ms. Rangarajan pointed out, when the ash basin was expanded and that pipe was expanded, it had reinforced concrete on either end with a middle section of corrugated metal. That X marks roughly the spot where the pipe failed.

After the pipe failed, a video camera inspection was done of the entire pipe and the entire pipe was intact and showed no major problems except for a five foot section of pipe, it's a bend section, and that's a picture of the pipe that we pulled out of the Dan River in April of 2014 that the company was able to locate and bring out and the representatives of the Government were with us.

What we discovered when we pulled it out is there had been extensive corrosion, we think due in part to a manufacturing defect that had occurred 60 years earlier in terms of where asphalt paving was placed, and we think that in part may have been responsible for the way in which the pipe failed, but the problem was the pipe failed all at once, and it failed on the bottom, and because it failed on the bottom there was no leaking on the top to give us any warning there was a problem with the pipe, it just simply corroded and then the weight caused it to collapse.

Now, Ms. Rangarajan talked a little bit about the composition of the pipe. This was an unusual pipe because you had corrugated metal and then you had extensions on either end, and part of the problem was the company had not clearly labeled the fact that you really had a pipe with two different kinds of materials in it, and pursuant to a North Carolina Utilities Commission order, every five years the company had an independent inspector come out and do an independent inspection of the basins to examine what was wrong and make some recommendations. In 1991 -- they would do drawings with each of these reports, and in the 1991 report the drawing showed the pipe as being RCP, you see that 48-inch RCP, that stands for reinforced concrete, and Ms. Rangarajan is right, the company didn't catch that in 1991 and that error was repeated every five years literally up through 2014, and what happened of course is as a new engineer would come in who had responsibility for the coal ash basins, they would logically go to the last inspection report, because you want to know what were the basins like at the last inspection, are there any issues I need to deal with, and they might go to the report before that, and so by 2014 there was literally 23 years of documents that tended to label this thing as reinforced concrete, and so the independent engineers kept missing it and frankly the Duke engineers missed it because of that, an error, an independent error, it was certainly not intentional on anyone, but that complicated the ability to deal with this pipe.

In addition, Ms. Rangarajan talked about a series of recommendations for quantitative inflow and outflow monitoring, how much water is going in the stormwater pipe, how much water is going out. Those recommendations were actually abandoned in the early '90s because we developed a new technology with fiberoptics, you could put video cameras in these, and so the new recommendations were always you need to examine the water coming out of the pipe and see if it's cloudy, and if it's cloudy then you need to do a video camera inspection, and the theory on that was a basic engineering principle, that the pipe will leak before it fails. Pipes tend not to fail all at once, they tend to show signs of it, but the problem here, as Ms. Rangarajan pointed out, is usually you expect a pipe to corrode at the top where all the weight is, but this one corroded at the bottom, and because it corroded at the bottom there wasn't a lot of leakage going on and so that lulled everyone into a false sense of security that in fact this pipe is in pretty good shape, and that was, frankly, what was going on when the recommendation was made to do a video camera inspection.

Now, let me set the context for that, because Ms. Rangarajan is right, engineers within the company said it might be a good idea to do a video camera inspection of these pipes, they're old, we're not sure what kind of condition they're in, and you're closing down the coal ash steam station.

The coal ash part of Dan River was closed down in 2012, it doesn't burn any more coal, this basin is not receiving any more coal ash, so they said why don't we look at the stormwater pipe with a video camera. The response, quite frankly, was, well, here is the problem, we're going to remove that pipe, and what I've got up on the screen is actually a schematic drawing of a plan that was presented to DENR in October of 2013 in which the coal ash basin would be dewatered, ash dried out and then moved away from the river, and then as you can see, both the 48-inch and the 36-inch pipes were going to be removed.

So the person who makes the final decision was under the belief that these pipes are going to be removed soon. We've never had a problem with them. Does it make sense to spend money to do a video camera inspection? Obviously in retrospect the answer is yes, the company needed to do that, and frankly the company should have done it at that time, but the belief was the pipes would no longer be there very much longer and you don't need to do that.

The problem is the company didn't appreciate there was corrosion at the bottom, they weren't going to get any signs of it, and quite frankly they ran out of time, the pipe failed before they could remove it.

I'd like to talk, if I can for a second, about the response to Dan River. This spill occurred on February 2nd and at Dan River the area in which the spill occurred didn't have any power going out to the basins, there were no lights, there's no electricity out there, you need a lot of heavy equipment to move in all of a sudden, and just to kind of give you a sense of it, remember where the break is, it's kind of deep into the ash basin itself, so what the company did is it sent literally hundreds of people out there within a few days and formed two teams to try to deal with this.

One team tried to plug it from the river, which required the construction of a barge to see if you could approach it from the river. Remember, we're talking about a place without power to begin with.

Another team tried to approach it from the ash basin itself. Of course the ash basin is not a stable environment, so the company went to a rock quarry 20 miles away and brought in 10,000 tons of new rock to build a stable platform so they could try to get to that leak where it occurred.

So you had these two massive teams, one trying to work from the river, another trying to build a platform in the ash basin so they could get to that pipe, and that week in particular, Your Honor, there was wind, there was snow, all the temperatures were freezing, and this was all being done essentially from an abandoned building near these coal ash basins, and the company did it, they did it in a timely fashion and they did it without injuring anyone and in a safe manner.

They were able to plug this pipe within six days and that took a herculean engineering effort.

But the company's response didn't just stop there. The company was also worried and was ordered to do testing, so this is a chart of what the arsenic levels were at the Danville Water Plant during this period of time, because Danville is the first community that's downstream from the Dan River Steam Station. Arsenic is one of the elements that can be in coal ash and it's an element that people worry about.

So on this chart with the red line, you see it at 10, is the level for -- safe level for human consumption. You get above 10, you've got a real problem. You want to keep everything below 10. The blue line are the actual arsenic measurements at the Danville Water Treatment Plant.

Fortunately there was never a problem in terms of these kinds of chemicals in the Danville water system. The Danville water treatment system was able to handle it and there were no threats from that, and in fact the Environmental Protection Agency itself has said that. This is a screen shot from the Environmental Protection Agency's own website in which they say there have been no human health screening levels exceeded in either the surface water or in sediments for contaminants associated with coal ash and that EPA's drinking water samples have shown no impacts to the local water, and in fact by July of 2014, we think in part due to Duke's response, the EPA said that Dan River was back to its pre-coal ash spill quality.

Now, this was a significant event to the environment, no one is trying to diminish that, but it appears to have been a limited event as well and human health was not threatened at any time during this.

In addition, to achieve this the company spent $7.3 million to repair that pipe, to try to get it blocked. They spent more than $5 million to remediate the river, to remove the coal ash deposits in the river that they've been directed to remove. They spent -- they just paid the Virginia Department of Environmental Quality two and a half million dollars to remediate the issues in the Eastern and Western Districts of Virginia. They spent an additional $348,000 in lab analysis alone and tested everywhere from the Dan River up into the Kerr Lake Reservoir to make sure there were no risks to humans. They spent 3.15 million for sediment removal, 700,000 in just resource assessments, how are the fisheries doing, how are the mollusks doing, what does the riparian environment look like. They spent an additional -- close to $1 million for additional labor over six days, and the total forecast costs associated with this are around $20 million, but that's just the response to this pipe. The company did more than that.

This has been a transformative event. Companies are a little bit like human beings, things can happen to them in their lives that change them forever, and whatever Duke Energy was prior to February 2nd, 2014, it is different now after February 2nd, 2014, and you can see that in some of the responses, because they went immediately beyond just saying we need to fix Dan River and they went immediately beyond in telling everyone our customers are not going to pay for that, we're going to pay for it.

We started saying do we have any other Dan Rivers in the system, what do we need to do to make sure our other coal ash basins don't have pipes that we don't -- that we don't realize are either corroding or may not be built the way we think they're built. So it spread out over 32 coal ash basins across the State of North Carolina and immediately began conducting video inspections of every riser and horizontal pipe associated with a coal ash basin. That came out to nearly three miles of linear feet of pipe that were inspected. A mile and a half of corrugated metal piping was inspected. Nearly a mile of reinforced concrete piping was inspected. They inspected almost a mile of other linear feet of piping, and they reinspected every dam to make sure there were no problems anywhere else.

As a result of those inspections they also took some additional safety measures, and I'm putting some of those in there, but essentially sealing up corrugated metal pipes and installing slip lining and plugging risers and permanently retiring risers and a number of other things that they believe are going to make these coal ash basins more safe while they're retired and can avoid another Dan River.

So we have a response, the immediate response to Dan River, then we have a company-wide response to their operations, but I told you it's a changed company and let me tell you and show you how else it's changed, and it's done that through permanent organizational changes.

One of the problems with Dan River that the company uncovered that we presented to the Government and that Ms. Rangarajan had talked about was the fact that we had people at the ash basin who knew things that the engineers didn't. Duke operates under a system where a major piece of infrastructure like a turbine or a coal ash basin has an equipment owner and that person is responsible for maintaining that piece of equipment. For the coal ash basins, the equipment owner often was not an engineer, but the people who actually had to do the engineering obviously were engineers but they were in a different place, and so what the company realized is we were dividing knowledge, which is exactly what Ms. Rangarajan talked about, and so rather than having a division of knowledge, what they have done is they have tried to streamline the organization and put a higher level of expertise managing these coal ash basins.

Now, to do that, what they did is they first formed something called ABSAT, and that's referenced in the plea agreement, it stands for the Ash Basin Strategic Action Task Force, and that was a group put together within three days of Dan River, it's led by a retired admiral from the Nuclear Navy and he was in charge of making sure the coal ash basins are safe, that we do the inspections, and then how do we need to restructure, and more importantly how are we going to close these things, how are we going to act in an environmentally responsible manner, make sure these things are functioning until they're closed.

In addition the company has formed something called a CCP or a Coal Combustion Products organization. That organization is dedicated solely to coal combustion products, how to store them, what to do with them, how to recycle them, how to manage them. They then went out and formed something called a National Ash Management Advisory Board, and these are all referred to in the plea, and what the company did is it gathered experts from all over the country and put them on an advisory board to help us deal with this problem, help us design engineering techniques, design approaches to closure, design approaches to maintenance that will make sure not only that we do what we're supposed to do but that the company sets a new level for the engineering and for the maintenance of these ash basins.

So now what happens, Your Honor, is engineers are directly responsible for these ash basins, they are the equipment owners, they have several engineering degrees, so that we can put that knowledge together in one place.

In addition, ABSAT is working on formulating closure strategies and evaluations, how are we going to close these ponds, dry up this ash and either keep it in place in a safe manner or move it in a safe manner while the CCP organization is managing these ash basins on a day-to-day basis, and a person in that CCP portion is actually going to be our Chief Compliance Officer, interfacing with Probation and the Court during the term of probation.

Finally, the leadership of the environmental health and safety organization has been replaced, they are no longer in those positions and there is brand new leadership to create this new standard that the company wants to create. This was done to centralize control in management which had been diffused before, this was done to bring more engineering expertise and this was done to have direct accountability, and those were some of the lessons this company learned from Dan River.

Now I want to spend a couple minutes talking about Cape Fear. Cape Fear is a little bit different than Dan River, because in Cape Fear you don't have a primary pond and a secondary pond, you actually have two separate settling ponds.

So again, what happens with Cape Fear is the coal ash slurries would go into these ponds and they would settle and then the treated water on the top, as Ms. Pettus described, would go into the top of the risers and then go through a channel into a permitted outfall and eventually into the river, and that was what the permit provided for and the way these basins functioned.

We talked a lot about risers. I want to show you a picture of one. That structure there that's standing up in the water is a riser. This a huge structure, it's basically a series of concrete cylinders that are grouted and cemented on top of each other, and this is old infrastructure, this plant has been operating or was operating since the 1940s, it closed down about four years ago, doesn't produce electricity anymore, but over time the grouting in the risers deteriorated and that permitted the treated water to leak in through the side rather than through the top, which meant that the water was going into the discharge system in a way that was different than described in the permit, and of course the permit requires us to maintain these risers so they don't leak, and those were the bases for those pleas.

Now, the only other thing I really want to add about Cape Fear is these pleas have nothing to do with a dispute that arose between the company and DENR over whether the company was authorized to repair the risers or authorized to repair the risers in the way in which the company believed they needed to be repaired. I think it's fair to say there is a dispute even with the Government about those issues. These pleas have nothing to do with that and don't address that. Those are separate issues that are being fought out through an NOV process with DENR in State Court.

Now, what I'd like to do is just spend a few minutes talking about seeps and toe drains, and you've heard some of that today from Ms. Pettus. Essentially a seep is something that occurs with an earthen impoundment, and I've got a picture up there, and you can see in the foreground -- you'll see that rock, and then in the foreground you'll see some wet areas. That's actually a picture of one of the ash basins, and the wet areas in the foreground are a seep.

Now, seeps are really a natural aspect of earthen impoundments, they occur naturally, you know, they can either come from groundwater themselves, because these are close to rivers, or they can come from the ash basins, and in fact the U.S. Army Corps of Engineers 30 years ago recognized that all earth and rock-filled dams are subject to seepage, and DENR ten years ago said all earth dams have seepage resulting from water percolating slowly through the dam and its foundation.

In 2009, after the TVA coal ash spill, EPA went out throughout the country and inspected every coal ash basin in the country, there are close to 1,000 of them, and these are all earthen impoundments, they're typically maintained either by industries or by utilities that burn coal, and what EPA found is that there were seeps at all of the earthen impoundments. I mean, the fact that you have an earthen impoundment that seeps is no secret, the EPA knew about that, DENR knew about that, the dam safety people knew about that.

I think it's fair to say Ms. Rangarajan -- I mean Ms. Pettus talked about some of the legal nuances of seeps, because it's fair to say there is a disagreement among us about whether a seep by itself that simply percolates up and may reach a water of the United States is a violation of the law. The Government takes the position it is. That issue is not resolved in this plea. What the company did in this plea is it acknowledged it should not have had specific engineering structures that take seeps, pull them together and then put them into a water of the United States, unless it was part of the permit.

So the pleas here deal with specific engineered features, not with every seep, because as you'll see from the joint factual statement, we have close to 200 seeps, and obviously there were only pleas to six, so we believe that was a fair compromise with the Government. The Government's position is different than ours on seeps in general, and frankly that's still being worked out as the Government deals with other entities and we go through a permitting process.

The thing about seeps is that the easiest way to control a seep is to let us dry out the coal ash and move it and close those basins. We can't -- the plea agreement requires this company to comply with the Coal Ash Management Act to remove ash from four high priority sites. We can't move an ounce of coal ash until the company receives the permits it needs to receive.

The company wants to close these basins down. The Government wants to see them closed down. We agree that's the environmentally responsible thing to do, but we can't do anything until we can move water out of them and then get permits to do something with the ash, and so a lot of that is dependent on a permitting process that we certainly don't control and the Government doesn't control but we will be reporting on regularly to the Court.

Finally, I'd like to mention something that wasn't mentioned in the factual statement because there's been no accusation of wrongdoing, but it is contained in both the plea agreement and the factual statement, and that's bromide. Bromide is not toxic to human beings. There are no real levels for bromide.

What happened in 2002, North Carolina in a very progressive move passed the Clean Smokestacks Act, which basically required companies like Duke that were burning coal to put scrubbers on top of coal fired facilities. The scrubbers have taken out hundreds of thousands of tons of emissions from the air. They've been a huge success. They've reduced this company's emissions in some areas by 80 to 90 percent.

Now, a byproduct of the scrubbers is -- it includes gypsum, for example, and the company actually manufactures wallboard from that, but also bromide, and no one knew that bromide was really going to be a byproduct of these scrubbers until they got installed and started running full time.

Now, putting bromide into a river is not a violation of the permit, it didn't violate anything, Duke hasn't been accused of doing anything wrong by doing that, and bromide by itself is not going to cause a problem. The problem arose specifically with Belews Creek in Eden because Eden was using an older chlorine-based water treatment system and the flows were not as great as it had been in the past, and what happens when bromide comes into contact in sufficient amounts with a chlorine-based treatment system is it generates an element called TTHMs, which can cause human health problems, and you saw that referred to in the joint factual statement. So the company began working with Eden and also the Town of Madison to try to upgrade their water systems, and we're in the process of doing that today.

This is where I think the Government asked for something appropriate and then was very creative in working with us, because they knew we were working with Eden and Madison, we have scrubbers at Cliffside and other places, we're not aware of any other town that may have a problem with it, but since we are going to have a Court-appointed monitor in place anyway, what the Government suggests and what we agreed to do and what we created was a claims process for those towns that see a TTHM increase, believe that they're downstream from a scrub plant, believe it's being caused by bromide, to come in and present their claim to the Court-appointed monitor, we'll present whatever evidence we may have, the Court-appointed monitor will make a decision and then we have a right of appeal or the town would have a right of appeal with the Court for a final decision, but that is a clean, simplified way to take care of an environmental problem that frankly was an unintended consequence that no one knew was going to happen when scrubbers were put on coal fired plants, and I think that's one of the creative aspects of this plea agreement that I appreciate the Government being willing to consider and, frankly, that started with the Government's suggestions.

Your Honor, I'm getting ready to turn this over for a second, but the Court noted that these pleas were filed on February 20th, 2015. That morning, and I don't know if you remember that day, but it was bitterly cold, we set a lot of weather records that day, and that day, just before the sun rose, the people in North Carolina asked for more power than these companies had ever generated before in their history and the companies met that demand, so even as the companies were filing this criminal plea to accept responsibility and to make things right, they were still focused on their primary mission, they were keeping people warm, they were keeping the lights on, and that's what they intend to do throughout this period of probation and I urge the Court to go ahead and accept this plea agreement, and I'd like to let Ms. Popp address the Court.

THE COURT: Thank you. Thank you very kindly, Counsel.

Ms. Popp, I'll be glad to hear you, ma'am.

MS. POPP: Your Honor, thank you.

Judge, in addition to the remediation steps that Duke Energy has taken, we also wanted to bring to your attention that the company has fully cooperated in an exemplary way with the Government's investigation throughout. That cooperation has been immediate, it was thorough and it was continuous.

From day one, the company's response to the Dan River spill, the company has done the right thing. It was management's instructions from the very beginning that the company would cooperate with the Government to help them to be transparent. Duke has been guided by that commitment, a commitment to go where the facts take them, regardless of the impact that it would have on business, and the speed at which the company has worked in cooperation has been extraordinary, especially given the magnitude of the issues that this case presents.

We appreciate that the Government has moved quickly, that the Government wanted to resolve the issues quickly, and we have responded by moving expeditiously in doing so.

We respect the thoroughness with which the Government has investigated this case, and Duke Energy has not held back in its cooperation along the way. Indeed, we spent an enormous number of hours, a lot of work, and we've engaged in frank and open communications throughout the investigation, we have facilitated access to evidence and we've produced an enormous amount of evidence, and on this slide I just want to give you a few statistics in that regard.

We've produced documents to the Government 51 times totaling over 1.6 million pages. We helped make available and schedule interviews for 50 Duke employees, some of whom went into the grand jury. We made presentations to the Government, some of which you've heard about today, and we've made presentations on evidence that we discovered that were unfavorable. We wanted to bring that to the Government's attention immediately and to make sure that they understood it, that they had access to it.

The Government asked for expedited production of documents in addition to the ones that we were giving them on a rolling basis, on a weekly basis, and we did that, Judge, 22 times, and we've disclosed documents that we weren't required to disclose. We went beyond the search terms that the Government had asked us to use, and when we found documents, we turned them over to the Government, brought them to their attention and explained them to them.

Judge, in sum, not only has this company engaged in extraordinary, exemplary remediation, we've engaged in full disclosure. We've been in full cooperation mode, helpful mode, including resolving this matter expeditiously, and it's in the spirit that Duke has responded to the Dan River spill, with that spirit to be fully cooperative, Judge. Thank you.

THE COURT: Thank you, Ms. Popp.

Yes. Ms. Claire.

MS. RAUSCHER: Thank you, Your Honor.

Your Honor, I have the privilege of talking to you just a little bit about the company. Duke Energy, as you heard, has been in existence for over 100 years. It has a very proud history in this state of providing power, employment and service to the citizens of this state.

Not only does it provide power, but the service that it provides is very significant here. For example, 6 million customers are provided with power by the company. That includes individuals, that includes families and that includes businesses. So throughout the state almost everybody in the state gets their power from the company.

There are 13,200 employees employed by the company, there are 8700 retirees, and there are thousands of contractors who work for the company. So once again, the company is providing jobs and benefits to the citizens of this great state.

Not only are there jobs, but the tax base that's provided by this company is significant. You know, here on this slide, for example, just the tax base to the local governments is in excess of $122 million last year. That's just to local governments.

Economic development. The company is a huge driver of economic development in this state. For example, in the last -- in 2013 and 2014 Duke Energy helped -- their activities resulted in $1.87 billion in capital investment as well as the creation of 9400 new jobs in this state, and just as an example, Your Honor, Gildan Textiles, one of the companies that came into the state, Clearwater Paper, TransCarolina Products, and I remember several years ago Google built a data center in the western part of the state and it was a huge economic boon, and Duke Energy was one of the major drivers of them relocating or having that farm here.

Not only do we have the economic development, but you have to look at the charitable contributions and contributions of the employees. In 2012 through 2014, three years, in hours and in dollars, Duke Energy employees have provided

$138 million in charitable contributions and volunteer hours, and that's to groups like United Way, the arts, museums, and going out in the community and doing community service.

So as you can see, Your Honor, the company has an amazingly positive impact on the state and it's important to the state.

Now, you heard my colleagues say earlier that the Dan River spill was a transformative event for this company, and it was. From day one Lynne Good, the CEO of the company, said not only are we going to make this right, but we're going to do what it takes to make that right, and they continue to fulfill that promise today.

It's clear that the company will continue to monitor the coal ash basins and will close the coal ash basins at some point, and that's their goal and that's what they want to do, but I think it's important for Your Honor to understand that they're going to not only continue to do that during the five years of probation, but they're going to continue to do that beyond, because they're committed to providing a safe environment, to providing safe operations and also to ensure the environment is sustained in this community.

Now, at this time, Your Honor, I'd like to recognize Julia Janson. As you know, she's the Executive Vice President, Chief Legal Officer of Duke Energy, but throughout her career she's had rising and various increased responsibilities in the company, including Senior Vice President of Ethics and Compliance. She calls North Carolina her home with her family and she is a proud member of the senior management team at the company and she would like to address the Court on behalf of the company.

THE COURT: I'll be glad to hear you, Ms. Janson.

MS. JANSON: Thank you, Your Honor.

So you've heard a lot today about our company and the actions we took in the wake of the Dan River spill. I have to tell you, I started with this company about a week after I took the Bar Exam and I will disclaim that that was over a quarter of a century ago.

I find this to be an extraordinary company made up of 28,000 caring men and women who get up every day to strive to serve our customers, and that's our mission, that's what we do. Safety is our highest priority, and that includes the safety of our customers, our contractors, the environment and the communities that we serve, and so on behalf of everyone at Duke Energy we want to again apologize for the incident at Dan River. We quickly took accountability, we moved swiftly to fix the issue, and we've reformed our operations in ways we could have never dreamed possible. We stand ready to move ash and will do so as quickly as the State process will allow us to do that.

We've got really high expectations of ourselves and the Dan River incident didn't meet those expectations, but I hope that our actions demonstrate how much we've learned. We're a new, different and better company, our operations have been strengthened and we look forward to working with the Government throughout this process.

Just as importantly and maybe more importantly, we've been working hard to restore the trust and confidence of the communities that we serve and our customers and will continue to do that, and I really want to thank you for the opportunity to address the Court.

THE COURT: Thank you, Ms. Janson.

Any further?

MR. COONEY: Nothing further at this time, Your Honor.

THE COURT: All right. Thank you.

Madam U.S. Attorney.

MS. RANGARAJAN: Thank you, Your Honor.

Your Honor, again, Lana and I will split the argument on behalf of the Government. I will start, sir.

While the defendants have undertaken corporate restructuring to address the problems that they have had in systemic failures within the communication between engineers and employees, it took the third largest coal ash spill in the nation's history to bring about that change and to motivate that change. And yes, they've cooperated in the Federal criminal investigation, they have taken remedial action, they are a large company, they employ a lot of people; all of those factors were taken into consideration in the plea negotiations, in resolving the case going forward, but we're here today, Your Honor, to ask you to accept those terms of the plea agreements and impose those terms for a reason. It is the offense conduct in this case, the history in this case, the negligence in this case that warrant the terms set forth in that plea.

Now, I don't have a PowerPoint presentation for the Court, but I do have one slide, but we'll have to switch -- and we do have the supporting documentation for the Court, but in the interest of brevity I just want to focus on the history that was set forth in the joint factual statement, because while this company has been around for 100 plus years, for 30 years, Your Honor, they have had failures in this company, they have failed to listen to their own engineers, they have failed to listen to recommendations, and they have failed to do inspections that they were required to do.

This started with Dan River in the '70s. In '79 they knew there were problems. You move into the '80s and their engineers are paying attention. Some of those engineers that went on the inspections in '84, '85 and '86 did inspections in 2008 and are still with the company today, so they had engineers with knowledge about what is at Dan River, what's in the basin, throughout this timeframe, but in the '80s they were recommending -- their own engineers recommended that they install notches, basically measuring/sampling systems in the 48-inch pipe, in the 36-inch pipe. They didn't do it, and then over time, as is set forth in the plea agreement, in the joint factual statement, there were other failures.

Their own engineers -- this wasn't the erroneous error in 1991 by an independent consultant. The consultants did fail and made that erroneous classification, but Duke itself, its employees failed to take action as well. So it's a cumulative negligence, Your Honor, and it is that negligence, it's that offense conduct in allowing the negligent discharge of coal ash and coal ash wastewater into the waters of the United States, it's the failing to maintain equipment at Dan River and Cape Fear, it is the seeps and discharges that they allowed to be channelized through ditches and engineered conveyances, all of that conduct that warrants in this case the terms of that plea agreement, which because of the systemic historical problems with the company, there needs to be five years of solid oversight and supervision by this Court.

Now, the defendant -- defense counsel mentioned that they didn't do the camera inspections because they thought the basins were going to close. We note in 2011 the camera inspection wasn't funded and in 2012 the camera inspection wasn't funded.

During that 2012 discussion between the engineers and the equipment owners about whether or not this camera inspection should be funded, they specifically discussed basin closure, and the folks on the ground responded, we don't think it's going to close in 2013, we don't know when it's going to close, in essence, and the timeline suggests that Dan River is not closing until 2016. So in 2012 they're willing to take the $5,000 gamble and not do the video camera inspections because eventually it's going to close down. But you know what one of the equipment owners said to them? In light of the basin closing, don't you think we should know what we have? And they didn't follow up, they still denied the camera inspection, and so that is why we are here. We are here to make sure that going forward the company is on a strong environmental compliance plan but that there is also independent oversight by this Court and a Court-appointed monitor.

It is the defendants' failure to listen to their employees and to rely on those employees' expertise, it is the historic systemic problems within the company that brought them here, but it is also, Your Honor, the breach of the public's trust. The public trusted Duke Energy for the last 30 plus years to manage its coal ash basins reasonably and with ordinary care, and they failed. They pled guilty to negligently handling its coal ash basins, the equipment there, and for allowing seeps and discharges into the waters of the

United States. For those reasons, Your Honor, the terms of the plea are appropriate here and should be vigorously pursued by the Court over the next five years, and that is the Government's response with respect to Dan River.

THE COURT: Thank you. Ms. Pettus.

MS. PETTUS: Thank you, Your Honor.

I want to start just by touching also on the question of harm a little bit. It was referenced in the defendants' presentation in terms of the drinking water system and so forth.

The defendants correctly noted that the levels of arsenic and other contaminants in the water column and the sediment in the Dan River were found by EPA to have returned to normal by July of 2014. Also water treatment facilities managed to adequately treat the water for drinking purposes in the aftermath of the spill, and of course the implication of that is that the harm from the spill is limited.

In some respects that's true, and we're all really fortunate for that. No one wants that spill to have been any worse than it was. And while there were no harms like documented fish kills or human injuries, we do need to clarify, so that you understand the basis of the plea, that that's not the entire story on harm. In fact, there was a piece of an article that was shown in the defendants' presentation that was from July 15th of 2014, the Danville Register & Bee. If you read down further in the article, it cites the EPA's representative explaining that even though the EPA has finished its monitoring and is moving on, the State Department of Environmental Quality and Inland Game and Fisheries for the State of Virginia is going to be there continuing to take tests over time.

The reason for that is that the full extent of the ecological harm, longterm sense, is still being determined. That's because full assessments of that kind of harm from spills like this one can take a significant amount of time to determine. In some cases biologists need to observe and monitor populations of flora and fauna over several years to fully understand the effects of certain kinds of exposures.

In the case of the Dan River spill there is a natural resource damage assessment and restoration process underway that is being led by Natural Resource trustees from North Carolina, Virginia and the U.S. Department of Interiors Fish and Wildlife Service. That process exists to assess the impacts of the coal ash release on natural resources. They focus on injuries to habitat, surface water, sediment, aquatic species, migratory birds and the human uses of those resources. They also determine ways to restore those. That is generally funded by the responsible party, such as the defendants, and the defendants are participating in that process, but it is not yet complete. The plea agreement specifically avoids interfering in that process and makes no representations about the possible outcome of that process. Nonetheless, we believe that the significant fine in this case captures how seriously we view the ecological and possible ecological effects of this spill.

In addition to any ecological harm, there is of course the readily calculable harm of the cost of responding to the spill. The defendants touched on that in their presentation and it's also discussed in the joint factual statement. That is the direct basis for the fine amount for Count 1 in the Middle District charges in this case.

Then there are the nearly impossible to quantify costs of the alarm, stress, concern and worry of the people in the communities along the Dan River who woke up the morning after the Super Bowl in 2014 to an ash gray river. That is another reason why the significant fines imposed by the terms of this plea agreement are appropriate.

To touch briefly on some of the other charges, in the case of the risers at Cape Fear, similar to the situation at the Dan River facility, Duke Energy Progress had received warnings in inspections from 2008 to 2013 that they needed to more closely inspect their risers because the condition was marginal and they were expected to develop problems in the next two to five years.

There was no follow-through on the recommendations.

Fortunately, unlike the Dan River spill, there was no catastrophic results, but in 2011 Duke Energy Progress' own employees notified management that the risers had in fact begun to leak and needed repair. Again, there was no action, no follow-through and no accountability for nearly three years. The defendants have admitted to that in pleading guilty.

In the case of the seeps and discharges at the Lee, Riverbend and Asheville facilities, the Eastern and Western District charges, the defendants, like all of the entities they cite, were well aware that earthen dams have seeps. We totally agree that is common knowledge. The Government and the defendants may disagree on whether some subcategories of seeps are illegal or not, but there is clearly no dispute that you are not supposed to channel seeps directly into a river without a permit. That's true whether it's a small amount, whatever the constituents are and whether or not it has a measurable effect on water quality on its own, because if we are going to preserve the quality of our water, the cumulative effect of pollution from all sources matters.

The fact that the defendants were aware that their earthen coal ash basins would inevitably have seeps and did not take precautions to ensure that those seeps were not being channeled through ditches and other conveyances constructed by its employees to nearby rivers, which was in fact allowed to occur for a period of years at each of those facilities, is again indicative of a need for change in the culture of the defendants and their management of the coal ash basins. That culture and poor management had a deleterious effect cumulatively on the watersheds and wetlands throughout North Carolina, which the community service payment and wetlands mitigation payment in the plea agreement are designed to address.

The terms and conditions of the plea agreement coupled with the five year term of probation with the Court-appointed monitor are designed to ensure lasting and meaningful changes, that the defendants continue on their professed new path, and to prevent this type of neglect from happening in the future, and for that we urge the Court again to accept the terms of the plea agreement and hope that that will be successfully adhered to over the next five years.

THE COURT: All right. Thank you very much.

The Court now arrives at the time to pass its judgment in the case. It's been an hour. It's going to take me at least 45 minutes, I think, to sentence the three defendants, so I'm going to take just a ten minute recess, Marshal.

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(Recess at 1:59 p.m. until 2:09 p.m.)

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THE COURT: The time has arrived to pass judgment in this matter. I've made up my mind in the various cases.

I'm going to sentence the defendants in the order of Duke Energy Carolinas first, Duke Energy Progress second and Duke Energy Business Services third.

The Court finds, based on a thorough review of the joint factual statement of the parties, the plea agreement, the sentencing memoranda and the hearing today, that it has sufficient information in the record to meaningfully exercise its sentencing authority pursuant to United States sentencing laws and to impose sentence in this case; therefore the preparation of a presentence report is waived.

I have to state the fine calculations under Chapter 8 and note that they do not apply in this case because these charges are brought under the Clean Water Act. Nevertheless, in the Duke Energy Carolinas case, as to Count 1 and through 4, the penalty is up to five years probation, that's in the 67 case, the Middle District case, and the fine range for Count 1 is $17,500 to $38,455,000. In Count 2 the fine range is 1.910 -- it's $1,910,000 to $19,100,000. In Count 3 it's $1,957,500 to $19,575,000. Finally, in Count 4 of the Middle District case it's the same, $1,957,500 to $19,575,000. Finally, as to the 68 case, the Western District case, as to Count 1 the penalty is up to five years probation, fine range of $1,957,500 to $19,575,000.

Now, the Court has considered all of the factors set forth in 18 U.S. Code Section 3553(a) and 3572. Pursuant to the Sentencing Reform Act of 1984 and in accord with the Supreme Court decision in United States v. Booker, it is the judgment of the Court that the defendant Duke Energy Carolinas is hereby placed on probation for a term of five years. This term consists of five years on Counts 1 through 4 of docket ending with 67 and five years on Count 1 of docket ending with 68, all to run concurrently.

While on probation the defendant shall not commit another Federal, State or local crime. If the defendant learns of any violation committed by any of its agents or employees within the scope of their employment during the term of probation, the defendant shall have five business days to notify the U.S. Probation Office of the violation.

The defendant shall comply with all Federal, State and other regulations relating to coal ash during the period of the probation. The defendant shall not have any new notices of violation, notices of deficiencies or other criminal or civil or administrative enforcement actions with respect to coal ash while on probation. It shall be considered to be a violation of probation if the defendant receives any new notices of violation, notices of deficiencies or other criminal or civil or administrative enforcement actions with respect to coal ash based on its conduct, including the failure to act, occurring after entry of this judgment, in which a final assessment, after the conclusion of any appeal is more than $5,000. Any conduct or condition resulting in a final assessment of more than $15,000 shall be presumed to be material and in violation of this probation. The Court will not consider there to be a violation of the conditions of probation if the defendant complies with Federal environmental laws when they are in direct conflict between State and Federal environment laws. The Court also will not deem it to be a violation of probation if the enforcement action is based upon information disclosed by the defendant in its 2004 Topographical Map and Discharge Assessment or in its 2014 National Pollution Discharge Elimination System permit renewal application.

Further, the defendant shall comply with the following additional conditions, and they number now number 1 through 17. I ask you to pay attention.

The defendant shall cooperate fully with the United States Probation Office during the period of supervision, including truthfully answering any inquiries by our probation office. The defendant shall provide the probation office with the following: Full access to any of the defendant's operating locations; ten days prior notice of any intended change in principal business or mailing addresses; notice of any material change in the defendant's economic circumstance that might affect the defendant's ability to pay fines or meet other financial obligations set forth in this judgment.

The defendant and its co-defendants, Progress and Business Services, shall pay for Court-appointed monitoring as set forth in Paragraphs 2A through 2I of Exhibit A of this judgment. Exhibit A has been provided to the parties and they have agreed generally to the conditions contained therein.

The defendant shall develop, adopt and implement and fund a comprehensive nationwide environmental compliance plan and a comprehensive statewide environmental compliance plan as set forth in Paragraphs 3A and 3I of Exhibit A. Exhibit A has been provided to the parties as previously stated.

The defendant shall adopt, implement and enforce a comprehensive environmental training program for all domestic employees as set forth in Paragraph 4A of Exhibit A.

The defendant shall cooperate with the Bromide claims remediation process as detailed in the plea agreement.

The defendant shall identify or establish a position as a compliance officer at the Vice President level or higher who will liaison with the CAM and the United States Probation Office as set forth in paragraphs of Exhibit A.

The defendant shall ensure that any new, expanded or reopened coal ash or coal ash wastewater impoundments at any facilities own by the defendant are lined. At such impoundments the defendant shall ensure there are no unpermitted discharges of coal cash or coal ash wastewater from any engineered, channelized or naturally occurring seeps. Coal ash and wastewater impoundments will be subject to inspection by the Court-Appointed Administrator and/or the United States Probation Officers at any time.

The defendant shall record appropriate reserves on a financial statement for the purpose of recognizing the projected obligation to retire its coal ash impoundments in North Carolina. At the time of the signing of the plea agreement the obligation was currently estimated at a total of $2 billion. Each year during the term of probation, beginning on the date of this judgment, and occurring by March 31 of each year thereafter, the defendant shall cause the Chief Financial Officer of Duke Energy Corporation to certify to the Court, the United States Probation Office and the CAM and the United States that the defendant and Duke Energy have sufficient assets reserved to meet the obligations imposed by law or regulation or as may otherwise be necessary to fulfill the defendant's obligation with respect to its coal ash impoundments within the State of North Carolina. If the Court-Appointed Administrator has any concerns regarding the assets available to meet obligations imposed by the judgment, the CAM shall immediately notify the Court and/or the U.S. Probation Officer and the parties.

The defendant shall cause its parent holding company, Duke Energy Corporation, to record appropriate reserves on its consolidated financial statements for the purpose of recognizing the projected obligation to retire all coal ash impoundments, including those in North Carolina. This obligation is currently estimated at a total of $3.4 billion on Duke Energy's balance sheet for all coal ash impoundments. Each year during the term of probation, beginning on the date of judgment, and occurring by March 31 of each year, the defendant shall cause the Chief Financial Officer of Duke Energy Corporation, in accordance with the Guaranty Agreement between the parties, to certify to the Court, the U.S. Probation Officer, the Court-Appointed Administrator and the United States that the defendant and Duke Energy have sufficient assets reserved to meet the obligations imposed by law or regulations or as may otherwise be necessary to fulfill the obligation with respect to its coal ash impoundments within the State of North Carolina.

The defendant shall, throughout the entire probation, maintain unused borrowing capacity in the amount of $250 million under the Master Credit Facility as a security to meet its obligation to close or remediate any coal ash impoundments.

The defendant shall make, as set forth in the plea agreement, a community service payment totaling $13.5 million to the National Fish and Wildlife Foundation, a nonprofit organization established pursuant to Federal law, 16 U.S. Code

Section 3701-10. This payment is to be made within 60 days of today and proof of such payment is to be provided to the United States Probation Office.

The defendant shall pay, as set forth in the plea agreement, $5 million to an unauthorized -- strike that, to an authorized wetlands mitigation bank or conservation trust for the purchase of riparian/wetland, riparian land, or restoration equivalent property located in the Broad River Basin, French Broad River Basin, Cape Fear River Basin, Catawba River Basin, Dan River Basin, Yadkin-Pee Dee River Basin, Neuse River Basin, Lumber River Basin, and Roanoke River Basin as set forth in Paragraph 12A of Exhibit A of this judgment. Exhibit A has been provided to the parties, and they have agreed to the conditions contained therein. The mitigation payment is in addition to and does not replace Duke Energy Corporation's public commitment to fund its $10 million Water Resources Fund for environmental and other philanthropic projects along lakes and rivers in the Southeast, or the required $5 million payment by Duke Energy Progress in a related case.

The defendant shall within five business days of this judgment place a full-page (132 column inches) public apology in at least two national newspapers and a major newspaper in each of the cities of Raleigh, Greensboro and Charlotte, North Carolina. The language of the public apology has been agreed upon by the parties and is contained in Exhibit C of the plea agreement. Proof of such public apology shall be provided to the United States Probation Office within seven days of being placed in the respective paper.

The defendant shall not seek or take credit for any fine, restitution, community service payment, mitigation payment, or funding of the environmental compliance plan, including the costs associated with the hiring or payment of staff or consultants needed to assist the Court-Appointed Administrator, in any related civil or administrative proceedings, including but not limited to the Natural Resources Damages Assessment process.

The defendant shall not capitalize into inventory or basis or take any tax deductions in the United States or elsewhere on any portion of the monetary payments (fines, restitution, community service, mitigation or funding of the environmental compliance plans) imposed as a part of this judgment; provided, however, that nothing in the judgment shall bar or prevent the defendant from appropriately capitalizing or seeking an appropriate tax deduction for restitution in connection with the remediation of bromide claims.

The defendant shall not reference the burden of or the costs associated with compliance with the criminal fines, restitution related to counts of conviction, community service payments, the mitigation obligation, cost of cleanup in response to the February 2, 2014 release at Dan River Steam Station and funding of the environmental compliance plan in any request or application for a rate increase on its customers.

The defendant shall exercise its best efforts to comply with each and all of the obligations under both the National Environmental Plan and the North Carolina Environmental Plan. Any attempted reliance on the force majeure clause to excuse performance or timely performance of any condition should be exercised by the defendant in accordance with the provisions of the plea agreement.

The special conditions of probation shall hereafter be subject to review by the Court upon petition or motion by the United States Probation Office, the Court-Appointed Monitor, either of the parties, or on its own motion.

Now, it is further ordered that Duke Energy Carolinas shall pay to the United States a special assessment of $625, which is due and payable immediately.

It is further ordered that the defendant make restitution to the following victims in the following amounts. This is as to Duke Energy Carolinas now.

To the City of Virginia Beach for coal ash spill, $63,309.45.

To the City of Chesapeake, Virginia, the amount of $125,069.75.

To the Army Corps of Engineers in Wilmington, North Carolina, $31,491.11.

Any payment made by this defendant shall be divided among the victims named in proportion to their compensable damage.

Payments of restitution shall be made to the Clerk of the Eastern District of North Carolina at its Raleigh headquarters.

It is further ordered that the defendant in this case, Duke Energy Carolinas, shall pay to the United States of America a total fine in the amount of $53,600, which amount shall bear interest at the lawfully prescribed rate until paid. These fines totaling $53,600,000 are allocated as $38 million on Count 1 of Docket 67, $2 million on Count 2 of Docket 67, $9.5 million on Count 3 of Docket 67, and $2.1 million on Count 1 of Docket 68.

I'm reminded a moment ago when I said the total amount of the fines to Duke Energy Carolinas was 53,000, it totals $53,600,000.

Now, payment of the total fine, the numbers I've just stated, shall be made to the Clerk of Court for the Eastern District of North Carolina at 310 New Bern Avenue, Raleigh, NC by 1:00 p.m. tomorrow, Friday, May 15, 2015.

That concludes the statement of the sentence in the case of United States versus Duke Energy Carolinas.

Mr. Probation Officer, do you know of any required changes to further comply with the sentencing law?

MR. WASCO: No, Your Honor. Thank you.

THE COURT: Mr. Cooney, on behalf of the defendant Duke Energy Carolinas, are there any objections to the sentence as just stated by the Court?

MR. COONEY: We have no objection, Your Honor. There is one clarification. Your Honor had a reference about the ability of the company to capitalize into inventory costs that would be incurred regardless of the compliance plan and also to seek rate recovery for costs that would be incurred regardless of the compliance plan here, that's provided for specifically in the plea, and I just wanted to put that in the record.

THE COURT: It's going to be exactly the way it was in the plea.

MR. COONEY: Thank you, Your Honor.

THE COURT: Any objection by the United States to the judgment as stated?

MS. RANGARAJAN: No, Your Honor.

THE COURT: Then by virtue of the authority duly invested in me, I hereby impose upon Duke Energy Carolinas, Inc. the conditions and fines and other matters as just stated by the Court.

Now, I'm required to remind the defendant that if you believe the underlying guilty pleas were somehow involuntary or if there was other fundamental defects in the proceeding, then you may have a right to appeal. If you believe the judgment as to the probation is unlawful or improper, you may have a right to appeal. If there's a basis for appeal, the appeal must be filed with the Clerk of this Court within 14 days of today.

Mr. Cooney, I request you advise your client of this obligation.

MR. COONEY: I will do, Your Honor. Thank you.

THE COURT: All right. I will now go to the defendant Duke Energy Progress, Inc.

The Court finds based on a thorough review of the joint factual statements of the parties, the plea agreement, the sentencing memoranda, it has sufficient information in the record to meaningfully exercise its sentencing authority in this case; therefore, the preparation of a presentence report is waived after reviewing the joint factual statement and other pertinent information, considering the matters presented here today, and the Court accepts the plea agreement as binding upon the Court.

In this case, Duke Energy Progress, the maximum penalties authorized by law for each of the counts, so that's one count in the 62 case, two counts in the 67 case and one count in the 68 case, the maximum fine in the 62 case is 3 million -- strike that. The fine range, minimum to maximum, is $3,880,000 to $38,800,000 as to Count 1, as to Count 5 and 6 in the 67 case the fine range is $1,887,500 to $18,875,000, and the same as to Count Number 6 in Case 67. In Case 68 the fine range -- that's the Western District, the fine range is from $3,275,000 to $32,750,000. These fine ranges are based on days of violation and so forth.

Now, the Court has considered all of the factors set forth in the various sentencing laws. Now, pursuant to the Sentencing Reform Act of '84 and in accordance with the Supreme Court decision in United States v. Booker, it is the judgment of the Court that the defendant, Duke Energy Progress, Inc., is hereby placed on probation for a term of five years. This term consists of five years on each of the counts in each of the three criminal informations, all such terms to run concurrently. While on probation, the defendant shall not commit another Federal, State or local crime. If the defendant learns of any such violations committed by its agents or employees within the scope of their employment during the term of probation, the defendant shall within five business days notify the United States Probation Office of the violations.

The defendant, Duke Energy Progress, Inc., shall comply with all Federal, State and other regulations regarding coal ash during the period of probation. The defendant shall not have any new notices of violation, notices of deficiency or other criminal or civil or administrative actions with respect to coal ash while on probation. It shall be considered to be a violation of probation if the defendant receives any new notices of violation, notices of deficiency or other criminal or civil or administrative enforcement actions with respect to coal ash based on conduct, including the failure to act, occurring after the entry of this judgment in which a final assessment, after the conclusions of appeals, is more than $5,000. Any conduct resulting in a final assessment of more than 15 would be presumed to be a material violation.

The Court will not consider it to be a violation of the conditions of probation if the defendant complies with Federal environmental laws when there is a direct conflict between State and Federal environmental laws. The Court will also not deem it a violation of probation if the enforcement action is based upon information disclosed by the defendant in the 2014 Topographical Map and Discharge Assessment and/or its 2014 National Pollutant Discharge Elimination System permit renewal application.

The defendant shall comply with the following additional conditions, and they're very similar to what I previously stated in the Carolinas case, but I'll have to go through them again for the record.

The defendant shall fully cooperate with the United States Probation Office during the period of supervision, including truthfully answering any inquiries by the probation office. The defendant shall provide the probation office with full access to any of the defendant's operating locations; 10 days notice, prior notice, of any intended change in principal business or mailing address; a notice of material change in the defendant's economic circumstance that may affect the defendant's ability to pay fines or meet financial obligations as set forth in the judgment.

The defendant and its two co-defendants, Duke Energy Carolinas and Duke Energy Business, shall pay for a Court-Appointed Monitor as set forth in Exhibit A of this judgment.

The defendant shall develop, adopt, implement and fund a comprehensive nationwide environmental compliance plan and a comprehensive statewide environmental compliance plan as set out in Exhibit A of the judgment.

The defendant shall adopt, implement and enforce a comprehensive environmental training program for all domestic employees as set forth in Exhibit A of this judgment.

The defendant shall cooperate with the Bromide claims remediation process as detailed in the plea agreement.

The defendant shall identify or establish a position as a compliance officer at the Vice President level or higher within Duke Energy Progress who will liaison with the CAM and the United States Probation Officer as set forth in Exhibit A of the judgment.

The defendant shall ensure that any new, expanded or reopened coal ash or coal ash wastewater impoundment at any facility observed by the defendant are lined.

The defendant shall record appropriate reserves on financial statements for the purpose of recognizing the projected obligation to retire its coal ash impoundments in North Carolina. At the time of the signing of the plea agreement, the obligation as to this defendant was currently estimated at a total of $1.4 billion. Each year during the term of probation, beginning on the date of judgment, and occurring by March 31 of each year thereafter, the defendant shall cause the Chief Financial Officer of Duke Energy Corporation to certify to the Court, the United States Probation Officer or the CAM, and the United States, that the defendant and Duke Energy have sufficient assets reserved to meet the obligation imposed by law or regulation or as may otherwise be necessary to fulfill the defendant's obligation with respect to its coal ash impoundments within the State of North Carolina.

The defendant shall cause its parent holding company, Duke Energy, to record appropriate reserves on its consolidated financial statements for the purpose of recognizing the projected obligation to retire all coal ash impoundments, including those in North Carolina. This obligation is currently estimated at $3.4 billion on Duke Energy's balance sheet.

The defendant shall, throughout the term of probation, maintain unused borrowing capacity in the amount of $250 million under the Master Credit Facility as security to meet its obligation to close or remediate any coal ash impoundments. The defendant shall certify this capacity to the CAM on an annual basis or more often if required.

The defendant shall make, as set forth in the plea agreement, a community service payment totaling $10.5 million to the National Fish and Wildlife Foundation, a nonprofit organization organized under Federal law. This payment is to be made within 60 days of this judgment.

This is a different one. This is Progress. There was another one under Carolinas a moment ago.

Now, this defendant, Progress, shall also set forth -- as set forth in the plea agreement, pay 5 million to an authorized wetlands mitigation bank or conservation trust for the purchase of riparian/wetland, riparian land, or restoration equivalent located in the Broad River Basin, the French Broad River Basin, Cape Fear River Basin, Catawba River Basin, Dan River Basin, Yadkin-Pee Dee River Basin, Neuse River Basin, Lumber River Basin, Roanoke River Basin, as set forth in Exhibit A of the judgment. This mitigation payment is in addition to and does not replace Duke Energy's commitment to fund its $10 million Water Resources Fund for environmental and philanthropic projects along lakes and rivers in the Southeast, or the required $5 million payment by Duke Energy Carolinas in the related case.

This defendant also will have five business days after entry of this judgment to place a full-page (132 column inches) public apology in at least two national newspapers and a major newspaper in each of the Raleigh, Greensboro and Charlotte, North Carolina papers. The language of the public apology has been agreed upon by the parties and is contained in Exhibit C of the plea agreement. Proof of such apology shall be provided to the United States Probation Officer within seven days of being placed.

The defendant shall not seek or take credit for any fine, restitution, community service payment, mitigation payment, or funding of environmental compliance plans, including the costs associated with the hiring or payment of staff or consultants to the CAM, in any related civil or administrative proceedings, including but not limited to the National Resource Damage Assessment process.

The defendant shall not capitalize into inventory or basis or take as a tax deduction in the United States or elsewhere any portion of the monetary payments, including fine, restitution, community service, mitigation, or funding of the environmental compliance plans, imposed as a part of this judgment; provided, however, that nothing in this judgment shall bar or prevent the defendant from appropriately capitalizing or seeking an appropriate tax deduction for restitution in connection with the remediation of bromide and for costs which would have been incurred by the defendant regardless of the environmental compliance and the like.

The defendant shall not reference the burden of, or the cost associated with, compliance with the criminal fines, restitution, community service payments, mitigation, costs of cleanup, and funding of the environmental compliance plans, in any request or application for a rate increase on its customers; provided, however, that nothing in the judgment shall bar or prevent the defendant from seeking appropriate recovery for restitution in connection with the remediation of bromide claims as set forth.

The defendant shall exercise its best efforts to comply with each and all of the obligations under the North Carolina and the national environmental plan. Any attempted reliance on the force majeure clause to excuse performance or timely performance of any condition shall be -- should be exercised by the defendant in accordance with the provisions of the plea agreement.

The special conditions of probation shall hereafter be subject to review by the Court upon petition or motion by any of the parties.

It is ordered that the defendant shall pay the special assessment in this case, Energy Progress, of $500. That will be in four counts of $125 each.

Although provisions of the Victim and Witness Protection Plan are applicable, as there are no identifiable victims as relates to these particular issues outstanding, it is ordered that the defendant shall pay to -- now, it is further ordered that the defendant, Duke Energy Progress, shall pay to the United States a total fine of $14,400,000, which amount shall bear interest at the lawful prescribed rate. These fines are imposed in Docket 62, Count 1 at $3,900,000 and Docket 67 at Count 5 and Count 6 each at $3.5 million, and in Docket 68 on Count 2 at $3.5 million, for a total of, as just stated, $14,400,000 to Duke Energy Progress.

The Court notes for the record the fine imposed on each count as sought by the Government and agreed to by the defendant is within the fine range established by the statute in each count.

Payment of this fine shall be made to the Clerk of the Eastern District of North Carolina at its Raleigh headquarters by 1:00 p.m. on Friday, May 15, that is tomorrow.

That concludes the statement of the sentence as to Duke Energy Progress.

Mr. Probation Officer, do you know of any required changes to further comply with the sentencing laws?

MR. WASCO: No, Your Honor. Thank you.

THE COURT: Mr. Cooney, any objections?

MR. COONEY: No, just the same issue I noted for Duke Energy Carolinas, and it's going to be in compliance with the plea agreement, on the rate increases.

THE COURT: Correct.

Madam U.S. Attorney, any objections?

MS. RANGARAJAN: No objections, Your Honor.

THE COURT: All right. We've got one more.

I look over to you folks, that's always where my jury sits and that's who I try to talk to. I don't care about the rest of you people. So if I look over there, then look at y'all, I say, well, that isn't my jury. Our jury here comes from the Outer Banks and Halifax County and fishermen down from Carteret County, and you guys don't look like fishermen from Carteret County.

Appellate rights, Duke Energy Progress. The judgment I've just passed, I am required to state for the record that if the defendant Duke Energy Progress believes that the underlying guilty plea was somehow involuntary or if there was some other fundamental defect in the proceeding, they may have a right to appeal. If they believe the fine range and the probation terms as stated by the Court and issued by the Court are incorrect, they may have the right to appeal. In any extent, you have 14 days from today to file your notice of appeal with the Clerk of this Court. Mr. Cooney, do you understand?

MR. COONEY: I do, Your Honor, and will discuss that with my client.

THE COURT: Okay. Now, finally, Duke Energy Business Services.

The Court finds based on a thorough review of the joint factual statement, the plea agreements, the sentencing memoranda, that it has sufficient information in the record to exercise its sentencing authority and to impose sentence in this case without a presentence report.

The Court has considered all of the factors set forth in 18 U.S. Code Section 3553 and 3572, and pursuant to the Sentencing Act of 1984 and in accordance with the Supreme Court decision in United States v. Booker, it is the judgment of the Court that the defendant Duke Energy Business Services, LLC is hereby placed on probation for a term of five years. This term consists of five years on Count 1 of Docket 62, five years on Count 1 through 6 of Docket 67 and five years on Counts 1 and 2 of Docket 68, all to run concurrently for a total probation term of five years. While on probation the defendant shall not commit another Federal, State or local crime. If the defendant learns of any such violations committed by its agents or employees within the scope of employment, it shall notify the probation office within five business days.

The defendant shall comply with all Federal, State and local regulations relating to coal ash during the period of probation. The defendant shall not have any new notices of violation. It shall be considered a violation of probation if the defendant receives any new notice or notices of deficiency or other criminal or civil or administrative enforcement actions with respect to coal ash based on conduct, including the failure to act, occurring after entry of this judgment in which the final assessment after the conclusion of appeals of more than $5,000. Any conduct resulting in a final assessment of more than 15 shall be presumed to be a material violation.

The Court will not consider there to be a violation of probation if the defendant complies with Federal environmental laws. The Court will not deem it a violation of probation if the enforcement action is based upon information already disclosed in some of the filings.

The defendant shall cooperate fully with U.S. probation during the period of supervision, including truthfully answering any inquiries. The defendant shall provide the probation officer with the following: Full access to any of the defendant's operating locations; 10 days notice of changes of address; any notice of material change in the defendant's economic circumstance that might affect the defendant's ability to pay fines or meet financial obligations.

The defendant and its co-defendants, Carolinas and Progress, shall pay for a Court-Appointed Monitor as set forth in Exhibit A of this judgment. Exhibit A has been provided to the parties and they have agreed to the conditions contained therein.

The defendant shall develop, adopt and fund a comprehensive nationwide environmental compliance plan and a comprehensive statewide environmental compliance plan as set forth in Exhibit A.

The defendant shall adopt, implement and enforce a comprehensive environmental training program for all domestic employees as set forth in Exhibit A.

The defendant shall cooperate with the Bromide claim remediation process as detailed in the plea agreement.

The defendant shall identify or establish a position as a compliance officer at the Vice President level of this corporation, Business Services, who will liaison with the CAM and the United States Probation Office as required in Exhibit A.

The defendant shall ensure that any new, expanded, or reopened coal ash or coal ash wastewater impoundments at any facilities owned by the defendants are lined. At such impoundments the defendant shall ensure there are no unpermitted discharges of coal ash or coal ash wastewater from any engineered, channelized or naturally occurring seeps. Coal ash and wastewater impoundments will be subject to inspection by the CAM and/or United States Probation Officers at any time.

The defendant shall along with the other defendants place a newspaper ad in Raleigh, Greensboro and Charlotte and notify the Probation Office within seven days of the ad.

The defendant shall not seek or take credit for any fine, restitution, community service and so forth in any related civil or administrative proceeding, including but not limited to the National Resources Damage Assessment Process.

The defendant shall not capitalize into inventory or basis or take as a tax deduction in the United States or elsewhere any portion of the monetary payments (fines, restitution, community service, mitigation, or funding of the environmental compliance plans) imposed as a part of this judgment; provided, however, that nothing in the judgment shall bar or prevent the defendant from appropriately capitalizing or seeking an appropriate tax deduction for restitution in connection with the remediation of bromide or for costs which would have been incurred by the defendant regardless of environment compliance.

The defendant shall not reference the burden or the costs associated with compliance with the criminal fines, restitution related to counts of conviction, community service payments, the mitigation, cost of cleanup in response to the Dan River issue, and funding of the environmental compliance plan in requests or applications for a rate increase to its customers; provided, however, nothing in this judgment shall bar or prevent the defendant from seeking appropriate recovery for restitution in connection with the remediation of bromide.

The defendant shall exercise its best efforts to comply with all its obligations under both the North Carolina and the national environmental plans. Any attempted reliance on force majeure, acts of God, clause to excuse performance or timely performance of any condition of the national or North Carolina environment plan should be exercised by the defendant in accordance with the provisions in the plea agreement.

The special conditions of probation shall hereafter be subject to review by the Court upon petition or motion by the United States, the CAM or either of the parties on its own motion.

The special assessment, that's the $125 per count, is assessed against Duke Energy Business Services in the amount of $1,125.

The Court finds that in light of the total criminal penalties of $68 million being paid by its co-defendants, Duke Energy Progress, Inc. and Duke Energy Carolinas, and the overall corporate structure as it relates to this defendant, no further fine is necessary as to Duke Energy Business Services, Inc., therefore there is no fine set forth against Duke Energy Business Services, Inc.

That concludes the statement of the sentences.

Mr. Probation Officer, do you know of any required change to further comply with the United States sentencing standards?

MR. WASCO: Your Honor, just for the record, if the Court would consider making the appropriate statements as to the fine ranges per count.

THE COURT: For the record, the range, the fine range for Business Energy Services, Business Services, on the 62 case, the Eastern District case, all three, they're changed in all three of them, Eastern, Middle and West, the probation term in every count is up to five years, and then the fine range in the Eastern District, that's 62, it will be $3,880,000 to $38,800,000. The fine range in 67 would have been, Count 1, $17,500 to $38,455,850. Count 2, $1,910,000 to $19,100,000. Count 3, $1,957,500 to $19,575,000. The same for Count 4. And then Count 5 and 6 are each $1,887,500 to $18,875,500. And then in the Western District, Count 1 was $1,957,500 to $19,575,000, and Count 2 was $3,275,000 to $32,750,000.

Does that satisfy you, Mr. Probation Officer?

MR. WASCO: Yes, sir. Thank you.

THE COURT: All right. Now, there is no fine to Duke Energy after the fines -- to Business, the fines are to the two others, the major.

That concludes the -- okay. I now have to ask.

MR. COONEY: No objections, Your Honor.

THE COURT: Do you have any objection to the sentence as stated for Duke Business Services?

MR. COONEY: No, Your Honor.

THE COURT: Madam U.S. Attorney?

MS. RANGARAJAN: No, Your Honor.

THE COURT: Then by virtue of the authority duly invested in me, I impose upon Duke Energy Business Services the judgment that I have just stated, and that same statement would be applicable to all two of the others, and that concludes the sentencing part.

MR. COONEY: Your Honor, for the record, I will advise my client of their appellate rights as well.

THE COURT: I got a lot of help here this afternoon. I guess I need it.

Anyway, we will get the judgments, the official judgments done, because I know Duke wants the judgment before you pay the fine tomorrow, don't you?

You will get them done this afternoon, and probably within the next hour; is that right, Lisa?

THE CLERK: Maybe within the next couple. It will be done today.

THE COURT: It will be done today.

Now, I do want to echo what both counsel said. Mr. Cooney made a very beautiful statement about how cooperative and helpful the United States and how honorable they had been, the attorneys have been with him, and Ms. Rangarajan said the same thing back to him, and I want to say that I've been as the Court dealing with this matter now for, I don't know, 60 days or so, it's taken about half my time, I don't know what it's going to be like for the next five years, but I do want to acknowledge that no one could have been more cooperative than -- well, starting with the Government team, Ms. Rangarajan, Ms. Pettus, Ms. Blondel right here; and then Mr. Cooney and Claire Rauscher and David Buente and Karen Popp, you've all been very cooperative and helpful and very professional.

It would have been exceedingly different -- I've been sitting here 28 years and I've had some very, very fine lawyers, but I don't know that I've had any more fine than the seven or eight of you, and I've had a whole lot of sorry ones, but I'm not going to -- you all are certainly well past that, but I want to thank you for your cooperation.

I also -- we discussed yesterday afternoon amongst counsel and the Court that there were no remaining documents to remain sealed after today. Is that still the position of the United States?

MS. RANGARAJAN: Your Honor, the Government had moved to unseal. It's my understanding that the defendants no longer object.

THE COURT: No longer object.

MS. RANGARAJAN: That is correct.

THE COURT: Okay. You're just trying to make the record clear, you've been wanting to do this for a while, haven't you?

MS. RANGARAJAN: Yes, sir.

THE COURT: And the old Judge just wouldn't cooperate with you.

Here is the order, Madam Clerk. Everything is unsealed in this case.

Now if we can go back to my speech, this is a complex case and it will take some effort. I'm impressed with the statements made by the lawyers, but I'm particularly impressed with Ms. Janson's statement. I believe that Duke does want to help and cooperate, and I know you're -- I think you want to, and I believe you, but you're going to have to because they're going to force you to, and that's their responsibility, and then I've got to supervise it all, but we will try to work together and go from there.

I checked the other day. So far as I can ascertain, in the history of our Court, certainly in the Eastern District, I think for the entire state, this is the largest criminal fine that has ever been imposed, and we've had a Federal District Court in the State of North Carolina since sometime -- I think it was March of 1790. That's 225 years.

Finally, I am not a judge that routinely lectures the defendants and I don't plan to begin that today. I tried to do my job in this case. That completes this matter.

Is there anything else in this matter for today that the United States desires to be addressed? Ms. Rangarajan?

MS. RANGARAJAN: No, Your Honor. Thank you, sir.

THE COURT: Anything the defendants, any of the defendants, want to addresses today, Mr. Cooney?

MR. COONEY: No, Your Honor.

THE COURT: Thank you all.

Marshal, that concludes this hearing and the Court will be adjourned.

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(Proceedings concluded at 3:01 p.m.)

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CERTIFICATE

This is to certify that the foregoing transcript of proceedings taken in a plea to criminal information and sentencing hearing in the United States District Court is a true and accurate transcript of the proceedings taken by me in machine shorthand and transcribed by computer under my supervision, this the 4th day of June, 2015.

/S/ DAVID J. COLLIER

DAVID J. COLLIER
OFFICIAL COURT REPORTER

I/A

North Carolina Department of Natural Resources & Community Development

James B. Hunt, Jr., Governor   Howard N. Lee, Secretary

DIVISION OF ENVIRONMENTAL MANAGEMENT

Hart Exhibit 24
Docket No. E-2, Sub 1219

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Bednarcik Direct AGO Cross Ex. 19
Docket No. E-2, Sub 1219A

Apr 02 2020

August 16, 1978

Colonel Adolph A. Hight, District Engineer
Wilmington District Corps of Engineers
P. O. Box 1890
Wilmington, North Carolina 28402

SUBJECT: Draft Environmental Impact Statement
Carolina Power & Light Company
Mayo Project
Person County, North Carolina

Dear Colonel Hight:

The Division of Environmental Management staff has discussed the subject Environmental Impact Statement with members of your staff in an effort to resolve matters pertaining to the Crutchfield Branch and the construction of an ash settling pond in the upper reaches of Crutchfield Branch. Following discussions held during the week beginning August 7, 1978, it was decided that adequate control could likely be provided for the Crutchfield Branch segment of the project through the NPDES permit process. These decisions were made pursuant to requirements of both the Federal Water Pollution Control Act and N. C. General Statutes relative to wastewater treatment and discharges.

The Crutchfield Branch portion of the project envisions the construction of an ash settling pond on the upper portion of Crutchfield Branch. This pond constitutes a wastewater treatment facility which will discharge the treated wastewaters back to the main lake at the Mayo project. The concern expressed relative to the Crutchfield segment related to ground water contamination and the resultant discharge of pollutants downstream of the dam on Crutchfield Branch. Both State and Federal law require that prior to such discharges being made, a NPDES permit is required as part of the processing of the Mayo project NPDES permit. It is the State's intention to stipulate as follows:

1. The Company shall be required to complete the ground water studies and provide controls as necessary for the prevention of pollutant materials from entering ground water and thereby reentering the surface waters some point downstream of the proposed dam.

Hart Exhibit 24
Docket No. E-2, Sub 1219

2. There shall be no discharge from the proposed ash settling pond to Crutchfield Branch except as may be provided by a NPDES permit issued for such discharge. All discharges from the ash pond not covered by such NPDES permit shall be discharged to the cooling water makeup pond for the project.

3. The Company shall provide such testing as is necessary to assure that pollutants are not discharged to the ground waters and thereby to the downstream point of the Crutchfield Branch in violation of the provisions stated above.

We believe that by including this language in the NPDES permit for the Mayo project sufficient controls will be available to assure that examination of potential ground water pollution is completed and that appropriate remedial action is taken by the Company prior to the completion of the project. If I can be of further assistance or if further clarification is needed, do not hesitate to contact me.

Sincerely yours,

A. F. McRorie

A. F. McRorie
Director

cc: CP&L

I/A
Bednarcik Direct AGO Cross Ex. 20
Docket No. E-2, Sub 1219A

Hart Exhibit 7
Docket No. E-2, Sub 1219

OFFICIAL COPY

Sept 02 2020

Coal Combustion Waste Damage Case Assessments

U.S. Environmental Protection Agency
Office of Solid Waste

July 9, 2007

With the exception of the documents listed below, the documents referenced throughout this assessment are available from the docket to the Notice of Data Availability on the Disposal of Coal Combustion Wastes in Landfills and Surface Impoundments at www.regulations.gov, docket ID EPA-HQ-RCRA-2006-0796, through internet links provided, or from other identified sources.

1. Application of Don Frame Trucking, Inc. Petitioner for a Judgment Pursuant to Article 78 of the CPLR against the New York State Department of Environmental Conservation Respondent; Supreme Court of the State of New York County of Chautauqua (July 22, 1988). Order G11278.
2. Selenium Posting on Hyco Lake Rescinded, North Carolina Department of Health and Human Services (NCDHHS), August 2001.
3. Feasibility Study for the Y-12 Chestnut Ridge Operable Unit 2 Filled Coal Ash Pond, Oak Ridge, Tennessee. DOE/OR/02-1259&D1. August 1994.
4. Final Site Investigation Report on Groundwater Contamination, Township of Pines, Porter County, Indiana. December 2002.
5. Texas Bureau of Health (TBH). 1992. Fish Advisory: Brandy Branch Reservoir. May 1992.
6. Texas Commission on Environmental Quality (TCEQ). 2003. Improving Water Quality in Brandy Branch Reservoir; One TMDL for Selenium. February 2003.
7. Report: Sulfate Investigation, Miamiview Landfill, Hamilton County, Ohio. Prepared for the Cincinnati Gas & Electric Company by Dames & Moore. December 13, 1994. Available in the docket titled Availability of Report to Congress on Fossil Fuel Combustion: Request for Comments and Announcement of Public Hearing, EPA-HQ-RCRA-1999-0022-0632.

I/A

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Summary of Coal Combustion Waste Damage Case Assessments

I. Summary

Under the Bevill Amendment for the "special waste" categories of the Solid Waste Disposal Act, EPA was statutorily required to examine "documented cases in which danger to human health or the environment has been proved" from the disposal of coal combustion wastes. The criteria used to determine whether danger to human health and the environment has been proven are described in detail in the May 2000 Regulatory Determination at 65 FR 32224. For the May 2000 Regulatory Determination for Wastes from the Combustion of Fossil Fuels (Regulatory Determination), the Agency determined there were approximately 300 CCW landfills and 300 CCW surface impoundments used by 440 coal fired utilities.

In comments on the March 1999 Report to Congress on Wastes from the Combustion of Fossil Fuels, public interest groups identified 59 cases in which they alleged damage to human health or the environment had been caused by fossil fuel combustion wastes[1]. The Agency reviewed each of the cases. That review resulted in identifying nine of the 11 damage cases cited in the May 2000 Regulatory Determination[2] (see Table 1 below for complete listing of the 11 proven damage cases[3]). Of the remaining 50 cases, 25 were classified as "potential" damage cases as

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[1] Letter from the Hoosier Environmental Council to the RCRA Docket Information Center regarding the CCW RTC, June 11, 1999, Letter from the Hoosier Environmental Council and the Citizens Coal Council to the RCRA Docket Information Center regarding the CCW RTC, June 14, 1999 and Letter from the Hoosier Environmental Council, et. al., to Dennis Ruddy regarding the CCW RTC, September 24, 1999.

[2] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000. Memorandum from SAIC to Dennis Ruddy regarding Review of Causative Factors for Coal Combustion Waste Damage Cases, November 29, 2000.

[3] Per the May 2000 Regulatory Determination, 65 FR 32224 (http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2000_register&docid=fr22my00-22.pdf) and Section 1.4.4 of the 1999 Report to Congress (http://www.epa.gov/epaoswer/other/fossil/volume_2.pdf), proven damage cases are those with (i)documented exceedances of primary MCLs or other health-based standards measured in ground water at sufficient distance from the waste management unit to indicate that hazardous constituents have migrated to the extent that they could cause human health concerns, and/or (ii) where a scientific study demonstrates there is documented evidence of another type of damage to human health or the environment (e.g., ecological damage), and/or (iii) where there has been an administrative ruling or court decision with an explicit finding of specific damage to human health or the environment. In cases of co-management of CCWs with other industrial waste types, CCWs must be clearly implicated in the reported damage.

The May 2000 Regulatory Determination falls short of providing a comprehensive definition of the review criteria ("test of proof") for assessing the validity of damage case allegations; it only discusses the review criteria in response to public comments on the review process of the Cement Kiln Dust (CKD) proposed rule, and focuses only on the location of the exceedance point with respect to the source term (32224 CFR 65):

"Proven damage cases were those with documented MCL exceedances that were measured in ground water at a sufficient distance from the waste management unit to indicate that hazardous constituents had migrated to the extent that they could cause human health concerns."

The "test of proof" criteria were fully defined on pp. 3-4 of the *Technical Background Document to the Report to Congress on Remaining Waste from Fossil Fuel Combustion: Potential Damage Cases* (1999):

defined in the Regulatory Determination[4] and five cases were determined to be not applicable to the Regulatory Determination. Four of these five cases could not be linked to coal combustion wastes and the other was at a coal mine, which is outside the scope of this NODA. Of the remaining 20 cases, one damage case was the result of wastes other than coal combustion wastes; one was not considered because it was an illegal, unpermitted dump; and 18 cases were indeterminate due to insufficient information[5].

Table 1. Eleven Damage Cases Cited in the May 2000 Regulatory Determination

Damage Case	Wastes Present	Event	Criteria (Test of Proof)	Comment
Coal-Fired Utility Comanaged Wastes				
Chisman Creek (VA)	Coal ash and petroleum coke landfill.	Se primary MCL exceedance; V, Se, and sulfate in residential drinking water wells.	Scientific[6]/Administrative[7]	Was put on NPL. EPA required remediation: new water supply to nearby residents, capping disposal area, ground water treatment, relocation of surface water tributary; other possible sources of contamination.

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http://www.epa.gov/epaoswer/other/fossil/ffc2_397.pdf. This language, in turn, is derived from the 1993 *Report to Congress on Cement Kiln Dust Waste*: http://www.epa.gov/epaoswer/other/ckd/cement2.htm.

According to the 1993 CKD Report to Congress (Chapter Five), Section 8002(o)(4) of RCRA requires that EPA's study of CKD waste examine "documented cases in which danger to human health or the environment has been proved." In order to address this requirement, EPA defined danger to human health to include both acute and chronic effects (e.g., directly observed health effects such as elevated blood lead levels or loss of life) associated with management of CKD waste. Danger to the environment includes the following types of impacts: (1) Significant impairment of natural resources; (2) Ecological effects resulting in degradation of the structure or function of natural ecosystems and habitats; and (3) Effects on wildlife resulting in damage to terrestrial or aquatic fauna.

[4] Per the May 2000 Regulatory Determination, 65 FR 3224, potential damage cases are those with (1) documented exceedances of primary MCLs or other health-based standards only directly beneath or in very close proximity to the waste source, and/or (2) documented exceedances of secondary MCLs or other health-based standards on-site or off-site.

[5] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000.

[6] Where a scientific study demonstrates there is documented evidence of damage to human health or the environment other than ground water contamination (e.g., ecological damage).

[7] Where there has been an administrative ruling by a state or federal agency, or court decision with an explicit finding of specific damage to human health or the environment [e.g., listing on EPA's National Priorities List (NPL)].

Damage Case	Wastes Present	Event	Criteria (Test of Proof)	Comment
Faulkner Offsite Disposal Facility (MD)	Coal ash and pyritic mill rejects.	Low pH; exceedance of State standard; landfill and collection pond seepage and discharges resulted in plant and fish impacts to adjacent wetlands.	Scientific/Administrative	State required remediation included pond liners, landfill cover, and sequestration of pyrites.
DPC – Old E.J. Stoneman Ash Pond (WI)	Coal ash, demineralizer regenerant, other water treatment wastes.	Cd and Cr primary MCL exceedance; 'gross contamination' by pond cited by State – Elevated levels of Zn and sulfate; Boron near 5 mg/L in private drinking water well.	Administrative	State required Closure plan and relocation of town water supply well.
Basin Electric W.J. Neal Station (ND)	Coal ash and sludge; comanaged wastes probable.	Cr exceeded state standard and other metals detected at elevated levels in downgradient sediments and ground water.	Administrative (limited information available)	State required the site closed and capped, NFRAP (No Further Remedial Action Planned).
VEPCO – Possum Point (VA)	Coal ash, pyrites, oil ash, water treatment wastes, and boiler cleaning wastes	Cd primary MCL exceedance in ground water; ground water contaminated with Cd and Ni, attributed to pyrites and oil ash.	Administrative	Response included sequestration of oil ash, pyrites, and metal cleaning wastes to separate lined units.
WEPCO Hwy 59 Ash Landfill (WI)	Coal ash and mill rejects; other comanaged wastes probable.	Boron exceedance of state standard in down gradient ground water; elevated levels of As, Fe, Se, Mn, sulfate in private drinking water wells.	Scientific / Administrative	State required additional monitoring for problem/damage assessment.
Alliant Nelson Dewey (WI)	Coal ash, comanaged wastes.	Boron exceedance of state standard in down gradient ground water; elevated levels of As, Se, Fl, sulfate in ground water.	Administrative	State required company to investigate and assess problem; remedial action change to dry ash handling and modify landfill cover to reduce infiltration.

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Damage Case	Wastes Present	Event	Criteria (Test of Proof)	Comment
Coal Creek Station (ND)	Coal ash, comanaged wastes.	Se and As exceedance of primary MCL in ground water on site; elevated sulfate and chloride levels in down gradient ground water.	Administrative	Impacted shallow ground water aquifer. State required additional impoundment liners.
Non-Utility Coal Combustion Waste Sites				
Salem Acres (MA)	Large volume; many other wastes present including municipal solid waste and industrial solid waste.	PAHs, VOCs, PCBs, metals including As and Cr; in soils, surface-waters, and ground water.	Administrative (on NPL)[8]	Contribution of FFC wastes to damage not separable from other wastes. Remedial measures taken including excavation, treatment, removal of sludges and soils.
Lemberger Landfill, Inc.[9] (WI)	Comanaged wastes; many other materials including municipal solid waste; adjacent site contains industrial solid waste.	Elevated levels of As, Cr, and Pb onsite, VOCs, PCBs. VOCs in private water wells initiated action.	Administrative (on NPL)[10]	Contribution of FFC wastes to damage not separable from other wastes.
Don Frame Trucking Fly Ash Landfill (NY)	Coal ash, other materials.	Pb exceedance of primary MCL action level in down gradient ground water; elevated levels of Mn, sulfate, TDS in a water supply well.	Administrative	State required remedial action: site closure landfill cover; post-closure care and monitoring.

Soon after the publication of the Regulatory Determination, the Agency conducted a reevaluation of the damage cases identified in the Regulatory Determination, including the 11 proven damage

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[8] http://yosemite.epa.gov/r1/npl_pad.nsf/f52fa5c31fa8f5c885256adc0050b631/C8A4A5BEC0121F048525691F0063F6F3?OpenDocument

[9] Reclassified as a potential damage case. See Section III., Potential Damage Cases. Memorandum from SAIC to Dennis Ruddy regarding Review of Causative Factors for Coal Combustion Waste Damage Cases, November 29, 2000.

[10] http://www.epa.gov/superfund/sites/npl/nar735.htm

cases, the four additional ecological damage cases[11] which were identified in comments on the 1999 Report to Congress, the illegal disposal case, and the two potential damage cases attributed to non-utility coal combustion waste in the 1999 Report to Congress. As a result of this review, one of the cases identified in the Regulatory Determination as an ecological damage case, and the case identified as an illegal disposal case were reclassified as proven damage cases due to contamination of ground water from the disposal of CCW in sand and gravel pits and another site, the Lemberger Landfill, was reclassified as a potential damage case [12].

In October 2000, the Agency began collecting additional information from its own experience, from state agencies, and from commenters to clarify the details of the 18 previously indeterminate cases, which were included as part of the 59 cases identified by the public interest groups in their comments on the March 1999 Report to Congress. After analyzing this additional information, EPA classified three of the 18 cases as proven damage cases, nine as potential damage cases, and six as cases without documented evidence of proven or potential damage or where the damage could not be clearly attributed to CCW. Two of the three proven damage cases involved management of CCW in sand and gravel pits and the third - a surface impoundment[13].

Finally, in February 2002, environmental- and citizen-organizations submitted to the Agency 16 alleged cases of damage[14]. Some of these cases had been submitted to EPA previously and evaluated for the 1999 Report to Congress. The Agency evaluated ten of the 16 cases[15]; one case was not evaluated because it involves minefilling of CCW, which, while under the scope of the 2000 Regulatory Determination, is outside the scope of this NODA that deals exclusively with surface disposal. The other five cases were not evaluated because they involved allegations with little or no supporting information. Of the ten cases evaluated, one case has been categorized as a proven damage case with documented off-site damages to ground water, while six cases were categorized as potential damage cases due to on-site exceedances of primary or secondary MCLs[16]. Another damage case was determined to be a proven ecological damage case as a result of documented impacts to fish and other wildlife on-site; this case also has been categorized as a potential (human health) damage case due to documented exceedances of primary and secondary MCLs attributable to an inactive CCW surface impoundment detected in on-site monitoring wells. Finally, one case was rejected because monitoring data for the site

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[11] Ecological damages are damages to mammals, amphibians, fish, benthic layer organisms and plants.

[12] Memorandum from SAIC to Dennis Ruddy regarding Review of Causative Factors for Coal Combustion Waste Damage Cases, November 29, 2000.

[13] Memorandum from SAIC to Dennis Ruddy regarding Final Revised Report on Resolution of 18 Previously Indeterminate Candidate Damage Cases, March 5, 2003.

[14] Letter from the Hoosier Environmental Council, et. al., to Dennis Ruddy regarding the CCW RTC, September 24, 1999.

[15] Compendium of nineteen alleged coal combustion wastes damage cases, May 3, 2007.

[16] See Potential DCs, Section III of this document.

revealed no exceedances of primary or secondary MCLs attributable to coal combustion waste placement at the site, while another site is an oil burning facility and, therefore, is not covered by the May 2000 Regulatory Determination[17].

In August 2005, another damage case was recorded when a dam confining a surface impoundment in eastern Pennsylvania failed. This damage case resulted in discharge of coal-ash contaminated water into the Delaware River and concomitant pollution of ground water when an unlined surface impoundment was temporarily used to divert the ash from the breached impoundment. Other than obtaining verification of the event from state authorities, the Agency did not conduct an independent evaluation of this case[18].

In summary, EPA gathered or received information on 135 possible damage cases and has evaluated 85 of these cases. Six of the 50 cases that were not evaluated were minefills and outside the scope of this NODA. The remaining 44 cases that were not evaluated involved allegations with little or no supporting information. (See Table 2: Fossil Fuel Combustion (FFC) Damage Case Resolution, excluding minefills)

Of the 85 cases evaluated, EPA determined that 24 were proven cases of damage[19]. Sixteen were determined to be proven damages to ground water and eight were determined to be proven damages to surface water. Four of the proven damages to ground water were from unlined landfills, five were from unlined surface impoundments, one was due to a liner failure at a surface impoundment, and the remaining six were from unlined sand and gravel pits. Another 43 cases were determined to be potential damages to ground water or surface water. Four of the potential damage cases were attributable to oil combustion wastes. The remaining 18 alleged damage cases were not considered to be proven or potential damage cases; they were, therefore, rejected due to either (1) lack of any evidence of damage or (2) lack of evidence that damages were uniquely associated with CCW[20].

Of the 16 proven cases of damages to ground water, the Agency has been able to confirm that corrective actions have been completed in six cases and are ongoing in nine cases. The Agency has not received information regarding the one remaining case. Corrective actions measures at these CCW management units vary depending on site specific circumstances and include formal closure of the unit, capping, the installation of new liners, ground water treatment, ground water monitoring, and combinations of these measures.

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[17] Status of Alleged Damage Cases Submitted by HEC, et. al., to Dennis Ruddy, February, 2002.

[18] PA DEP Press Release, December 27, 2005.

[19] See Proven Damage Cases, Section II of this document. In addition to the documents previously cited, additional discussions of proven damages can be found in the Memorandum from SAIC to Dennis Ruddy regarding Additional Information Regarding Fossil Fuel Combustion Waste Damage Cases, April 20, 2000; and Ecological Assessment of Ash Deposition and Removal, Euharlee Creek, Georgia Power Bowen Plant.

[20] See Rejected Cases Excluding Minefills, Section IV of this document.

Table 2. Fossil Fuel Combustion (FFC) Damage Case Resolution, excluding minefills (Updated 2/03/05)

Occurence	State	Final Proven	Final Potential	Final Rejected	Indeter-minate	Not re-evaluated	Non-FFC	Sand & Gravel Pit	Non-Utility	Oil Comb. Waste	Eco-Damage
TVA Widows Creek	AL		X								
TVA Colbert Plant	AL		X								
Arizona Public Serv Cholla Station	AZ		X								
Comanche, PSCC	CO				X						
Pierce Site	CT				X						
Hunts Brook Watershed (3 sites)	CT				X						
FP&L - Lansing Smith Plant (part 1)	FL		X								
TECO Big Bend Electric Plant	FL										
TECO Polk Power Station	FL										
FP&L Port Everglades (EPRI #6)	FL		X (oil)							X	
FP&L Riviera (EPRI #10)	FL		X (oil)							X	
FPC P.L. Bartow (EPRI #66)	FL		X (oil)							X	
Georgia Power Bowen	GA	X									
Muscatine County	IA		X								
American Coal Corp. #5 CCR Landfill	IA			X							
Star Coal Co. #6 CCR Landfill	IA			X							
Star Coal Co. #14 CCR Landfill	IA			X							
Powerton Plant	IL		X					X			
ntral IL Light Duck Creek	IL		X								
Power Hennepin Station	IL		X								
IL Power Havana Plant	IL		X								
IL Power - Vermillion	IL		X								
Cent. IL PSC - Hutsonville Station	IL		X								
IL Power - Wood River	IL		X								
Cofeen, White, Brewer Ash Landfill	IL		X								
Turris Coal Company Elkhart Mine	IL			X							
Michigan City Site	IN		X								
Bailly Station	IN		X								
RM Schaffer Station (Schahfer)	IN		X								
SIGECO - AB Brown	IN		X								
IP&L - Petersburg Station	IN		X								
Hoosier Energy Merom Landfill	IN		X								
Yard 520 Landfill Pines	IN	X									
Indiana-Kentucky Electric Clifty Creek Station	IN				X						
Cinergy/Cinn. G&E - East Bend/Boon County - FGD	KY		X								
LG&E Mill Creek Plant	KY				X						
LG&E Cane Run Plant	KY				X						
Salem Acres	MA	X									
Vitale Fly Ash Pit	MA	X						X			
Rezendes Ash Landfill (South Main Street Site/Freetown)	MA		X					X			
Copicut Road Monofill, Freetown	MA			X				X			
E Salem Harbor, Salem	MA				X						
Brayton Point (EPRI #27)	MA		X (oil)							X	

I/A

Table 2. Fossil Fuel Combustion (FFC) Damage Case Resolution, excluding minefills (Updated 2/03/05)

Occurence	State	Final Proven	Final Potential	Final Rejected	Indeter-minate	Not re-evaluated	Non-FFC	Sand & Gravel Pit	Non-Utility	Oil Comb. Waste	Eco-Damage
PEPCO Faulkner	MD	X									
Constellation Energy Crofton	MD				X						
Brandywine Disposal Site	MD				X						
Lansing Board P&L - N. Lansing Landfill	MI	X						X			
Thompson Landfill	MI			X							
Motor Wheel, Inc	MI							X			
Dagget Sand & Gravel, Inc	MI				X			X			
Sherburne County Plant	MN		X								
Colstrip Power Plant	MT										
Hyco Lake (CP&L Roxboro)	NC	X									X
Belews Lake	NC	X									X
Duke Power - Allen Plant	NC		X								
Ecusta Ash Monofill	NC					X			X		
BASF Industrial Landfill	NC					X			X		
Neal Station BESI	ND	X									
Coop Power & United Power - Coal Creek	ND	X									
Montana-Dakota - Heskett Station	ND		X								
Stanton Site, United Power	ND				X						
Leland Olds Site, Basin Electric	ND				X						
Don Frame Trucking	NY	X									
AES Creative Weber Site	NY		X								
Central Hudson G&E - Danskammer Site	NY		X								
C.R. Huntley Ash Landfill	NY		X								
Cinergy/Cinn. G&E - Miamiview Landfill	OH		X					X			
Cinergy/Cinn. G&E - Beckjord Station	OH		X								
Muskingum River Power Plant Impoundments	OH			X							
Cardinal Fly Ash Reservoir II Impoundment	OH			X							
Cardinal PFBC Monofill	OH			X							
Stuart Station Monofill	OH			X							
Gavin Impoundments	OH			X							
Kyger Creek Power Plant Impoundments	OH			X							
Lake Erie	OH			X							X
Conesville FGD Landfill (part 1)	OH		X								
Tristate Asphalt Flyash Landfill	OH				X						
Muskogee Env. Ash Site	OK			X							
Western Farmers Ash Site	OK			X							
Public Service Ash Site	OK			X							
Fort Gibson Fly Ash Monofill	OK				X						
Grand River Dam Authority	OK				X						
IMCO	OK				X						
Elrama Plant	PA		X								
Hatsfield Ferry Power Plant, Greene County	PA				X						
Zullinger Quarry	PA				X						

Table 2. Fossil Fuel Combustion (FFC) Damage Case Resolution, excluding minefills (Updated 2/03/05)

Occurence	State	Final Proven	Final Potential	Final Rejected	Indeter-minate	Not re-evaluated	Non-FFC	Sand & Gravel Pit	Non-Utility	Oil Comb. Waste	Eco-Damage
Veterans Quarry, Domino Salvage	PA				X						
Shawville Site, Penelec	PA				X						
Montour Ash Disposal Area	PA				X						
SC Elec & Gas Canadys Plant	SC	X									
Savannah Riv. Project	SC	X									X
SCE&G McMeekin Station	SC				X						
Chestnut Ridge Y-12 Steam Plant Operable Unit 2	TN	X									X
TVA Bull Run Steam Plant	TN		X								
Brandy Branch Reservoir	TX	X									X
Welsh Reservoir	TX	X									X
Martin Creek Reservoir	TX	X									X
JT Deely Power Plant, San Antonio Public Services	TX				X						
VEPCO Possum Pt (Virginia Power)	VA	X								OCW & CCW	
VEPCO Chisman (Virginia Power)	VA	X						X			
Clinch River (part 1)	VA			X							X
Dixie Caverns Landfill	VA			X			X				
Chesterfield, Virginia Power	VA				X						
Georgia Pacific Industrial Waste Landfill, Big Island	VA					X			X		
airyland Power Stoneman (Old E.J. oneman)	WI	X									
WEPCO Hwy 59	WI	X						X			
Alliant Nelson Dewey	WI	X									
WEPCO Cedar Sauk Landfill (part 1)	WI	X						X			
WEPCO Port Washington	WI	X						X			
Alliant Rock River	WI		X								
Alliant Edgewater 1-4	WI		X								
Wisconsin Power Pulliam Ash	WI		X								
Dairyland Power Alma On-site Landfill	WI		X								
Dairyland Power Alma Off-site Landfill	WI		X								
Lemberger Landfill	WI		X					X			
Genoa #3, Dairyland Power Cooperative (DPC)	WI				X						
Old Columbia, WPL	WI				X						
Oak Creek, WEPCO	WI				X						
New Columbia, WPL	WI				X						
Locks Mill Landfill	WI					X			X		
Biron On-site Landfill	WI					X			X		
Kraft Division Off-site Landfill	WI					X			X		
Niagara of Wisconsin Paper Corporation Flyash Landfill	WI					X			X		
RPC Landfill #1	WI					X			X		
RPC Landfill #2	WI					X			X		
RPC Pine Lake Landfill	WI					X			X		
Ward Paper Company Landfill	WI					X			X		
asant Prairie, WEPCO	WI				X						
Dave Johnston Power Plant	WY		X								

I/A

Proven Coal Combustion Waste Damage Cases

II. Proven Damage Cases

Per the 2000 Regulatory Determination, 65 FR 32224 and the *Technical Background Document to the Report to Congress on Remaining Waste from Fossil Fuel Combustion: Potential Damage Cases* (1999), classifying damage to groundwater as a proven damage case requires the satisfaction of at least one of the following "tests of proof"[21]:

> 1) Scientific investigation: Damages that are found to exist as part of the findings of a scientific study. Such studies should include both formal investigations supporting litigation or a state enforcement action, and the results of technical tests (such as monitoring of wells). Scientific studies must demonstrate that damages are significant in terms of impacts on human health or the environment. For example, information on contamination of drinking water aquifer must indicate that contaminant levels exceed drinking water standards.
> (2) Administrative ruling. Damages are found to exist through a formal administrative ruling, such as the conclusions of a site report by a field inspector, or through existence of an enforcement that cited specific health or environmental damages.
> (3) Court decision. Damages are found to exist through the ruling of a court or through an out-of-court settlement.
> (4) As a practical matter, EPA employed a fourth criterion in determining whether damages are proven: available information needed to clearly implicate fossil fuel combustion wastes in the damage observed.

The above definition does not limit proven damage cases only to those sites with a primary MCL exceedance(s) in ground water distant from the waste management unit. A case still may be considered proven under the scientific investigation test if a scientific study demonstrates there is

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[21] The May 2000 Regulatory Determination falls short of providing a comprehensive definition of the review criteria ("test of proof") for assessing the validity of damage case allegations; it only discusses the review criteria in response to public comments on the review process of the Cement Kiln Dust (CKD) proposed rule, and focuses only on the location of the exceedance point with respect to the source term (32224 CFR 65):

"Proven damage cases were those with documented MCL exceedances that were measured in ground water at a sufficient distance from the waste management unit to indicate that hazardous constituents had migrated to the extent that they could cause human health concerns."

The "test of proof" criteria were fully defined on pp. 3-4 of the *Technical Background Document to the Report to Congress on Remaining Waste from Fossil Fuel Combustion: Potential Damage Cases* (1999): http://www.epa.gov/epaoswer/other/fossil/ffc2_397.pdf. This language, in turn, is derived from the 1993 *Report to Congress on Cement Kiln Dust Waste*: http://www.epa.gov/epaoswer/other/ckd/cement2.htm.

According to the 1993 CKD Report to Congress (Chapter Five), Section 8002(o)(4) of RCRA requires that EPA's study of CKD waste examine "documented cases in which danger to human health or the environment has been proved." In order to address this requirement, EPA defined danger to human health to include both acute and chronic effects (e.g., directly observed health effects such as elevated blood lead levels or loss of life) associated with management of CKD waste. Danger to the environment includes the following types of impacts: (1) Significant impairment of natural resources; (2) Ecological effects resulting in degradation of the structure or function of natural ecosystems and habitats; and (3) Effects on wildlife resulting in damage to terrestrial or aquatic fauna.

documented evidence of another type of damage to human health or the environment (e.g., ecological damage).

1. Salem Acres Site, Massachusetts[22]

History: Fly ash disposal occurred at this site from at least 1952 to 1969. The site was originally contaminated by fly ash, sewage sludge, tannery waste and materials from a landfill on the site. The contamination was confined to the southernmost 13 acres of the 235 acre parcel and consisted of polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), dioxins/furans, volatile organic compounds (VOCs), chromium, arsenic, beryllium, vanadium and thallium.

EPA proposed adding the Salem Acres site to the NPL on October 15, 1984, and added it to the final list on June 10, 1986[23]. On May 26, 1987, EPA signed a Consent Order with the South Essex Sewerage District (SESD) to perform the studies to examine the nature and extent of contamination and present technical options for cleanup. In December 1993, EPA signed a Consent Decree with the SESD to clean up the lagoons. The EPA also signed a separate Consent Decree with the Massachusetts Electric Company to clean up the fly ash pile on site. In October 1994, the EPA signed a Consent Order with DiBase Salem Realty Trust, the owner of the property and remaining party, to clean up the landfill and three debris piles.

Cleanup of the site was addressed in two stages: initial actions and a long-term remedial phase focusing on cleanup of the entire site. In 1987, lagoon water was removed and disposed of, the slurry wall at the disposal areas was capped and a fence was installed. In 1988, EPA covered the sludge pits with a high density polyethylene synthetic cap, removed the liquid wastes from the disposal pits to an off-site storage facility, and constructed concrete cut-off walls to prevent further releases into the wetlands. In 1990, repairs were made to a monitoring well and a security fence on site, and signs were posted to further restrict access.

The South Essex Sewerage District completed an investigation into the nature and extent of the soil and sludge contamination in early 1993. The investigation defined the contaminants of concern and recommended alternatives for final cleanup. Ground water at the site and adjacent wetlands demonstrated only minor contamination and therefore, no further remedial actions were planned. EPA selected a final remedy for the site, including sludge-fixation with fly ash and other substances such as cement and soil, as necessary and disposed of off-site to a secured landfill. A contingent remedy includes the installation of an EPA-approved cap. In 1995, the fly ash area and "old landfill" on site were excavated and the contaminated material was taken off site to a municipal landfill. Final site restoration of these areas occurred in 1996. The sludge lagoon cleanup was completed in the fall of 1997 and final site restoration was completed in the

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[22] Memorandum from SAIC to Dennis Ruddy regarding Additional Information Regarding Fossil Fuel Combustion Waste Damage Cases, April 20, 2000.

[23] http://yosemite.epa.gov/r1/npl_pad.nsf/f52fa5c31fa8f5c885256adc0050b631/C8A4A5BEC0121F048525691F0063F6F3?OpenDocument

spring of 1998. In the summer of 1999, fly ash was removed from the wetland adjacent to the former fly ash pile. The wetland was restored at this time. The site was officially deleted from the National Priorities List (NPL) effective July 23, 2001[24]. The site now allows for unrestricted land use

Basis for Consideration as a Proven Damage Case: The criteria for classifying this site as a proven damage case were (1) Scientific – Arsenic and chromium exceeded (health-based) primary MCLs, and (2) Administrative – The site has been placed on the NPL list, and EPA signed a Consent Order with the owner to clean up the lagoons.

2. City of Beverly/Vitale Brothers Fly Ash Pit, Massachusetts[25]

History: This site is an abandoned gravel and sand mine that was used as an unpermitted landfill from the 1950's until the mid-1970s. The site was operated by the Vitale Brothers until 1980, when the City of Beverly Conservation Commission gained ownership because of failure to pay property taxes. On the site, the Vitale Brothers accepted and disposed saltwater-quenched fly ash from New England Power Company along with other wastes. Leaking underground storage tanks containing petroleum products were also located at the site. In 1973, fly ash at the site eroded into a nearby swamp and a stream that is a tributary to a surface drinking water supply. The erosion created a damming effect and resulted in flooding of neighboring property. In 1988, surface water sampling of the stream revealed levels of iron and manganese significantly greater than upstream levels. Additionally, there were complaints of fugitive dust from the site from neighbors located 500 feet away. Air sampling on one occasion in 1988 revealed arsenic concentrations of 2 parts per billion. Finally, 1988 ground water sampling found arsenic and selenium in excess of their primary MCLs and aluminum, iron, and manganese in excess of secondary MCLs. According to the State, fly ash is the suspected source of contamination in all of these media.

Fly ash is disposed at the site at depths from 14 to 36 feet. Not only is the site unlined, but ground water depth at the site is between 10 and 21 feet, indicating the likelihood of direct contact with fly ash. Fly ash also is observed to be present at the surface of the site with no cover or other surface runoff, erosion, or fugitive dust controls. Finally, the site is located in close proximity to a wetland and a surface water body.

The site has a long history of noncompliance with local and State laws and regulations. Following the completion of a Comprehensive Site Assessment and Risk Characterization in preparation for potential remedial action under Massachusetts regulations for the assessment and cleanup of hazardous waste sites, the fly ash was removed and the site was redesigned with special attention to protecting the adjacent water courses from erosion[26]. The Vitale Flyash site

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[24] Ibid

[25] Memorandum from SAIC to Dennis Ruddy regarding Review of Causative Factors for Coal Combustion Waste Damage Cases, November 29, 2000.

[26] http://www.erosioncontrol.com/ecm_0603_erosion.html

submitted a site closure report February 1, 2007, and a preliminary screening of the site closure report is underway[27].

Basis for Consideration as a Proven Damage Case: This case was not counted as a proven damage case in the 1999 Regulatory Determination because it was a case of illegal disposal not representative of historical or current disposal practices. The case, however, otherwise meets the criteria for a proven damage case for the following reasons: (1) Scientific – (i) selenium and arsenic exceeded (health-based) primary MCLs, and (ii) there is evidence of contamination of nearby wetlands and surface waters; and (2) Administrative - the facility was the subject of several citations and the State has enforced remedial actions.

3. Don Frame Trucking, Inc. Fly Ash Landfill, New York[28]

History: This solid waste management facility had been used for disposal of fly ash, bottom ash, and other material including yard sweepings generated by the Niagara Mohawk Power Corporation's Dunkirk Steam Station. The age of the facility was not identified in the materials provided. The available monitoring data for this facility include quarterly water quality analysis and various miscellaneous data collected at the facility from March 1989 through September 1998. These data show down-gradient levels of lead greater than the primary MCL Action Level. These exceedances occurred in 1989 and 1996. The data also document elevations from background of sulfate, total dissolved solids, and manganese, including levels of manganese in a water supply well greater than the secondary MCL.

As a result of the contamination, Don Frame Trucking recommended to the New York State Department of Environmental Conservation (NYSDEC) that the affected water supply well should immediately be connected to a public water supply. Also, on September 16, 1988, Don Frame Trucking, Inc. was directed to cease receiving the aforementioned wastes at the facility no later than October 15, 1988, in accordance with the standards contained in 6 NYCRR Part 360.[29] The site was divided into five separate sections. The NYSDEC directed Don Frame Trucking, Inc. to place two feet of a "final cover" over Section I. The soil should have a coefficient of permeability of 1 x 10^{-5} cm/sec. NYSDEC directed Section II to be covered with 18 inches of clay cover with a coefficient of permeability of 1 x 10^{-7} in two shifts. Once the permeability was tested and considered acceptable, NYSDEC directed Don Frame Trucking, Inc. to place six additional inches of topsoil was over the clay cover and then seed and mulch the section. Eighteen inches of clay with a coefficient of permeability of 1 x 10^{-7} was also directed to be placed on Sections III, IV, and V, followed by reseeding and mulching. Don Frame Trucking, Inc. was instructed to finish all remediation procedures by October 15, 1988, and then provide

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[27] MADEP tracking number 3-00230; email message from Patricia Donahue, MADEP, July 9, 2007.

[28] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000.

[29] Application of Don Frame Trucking, Inc. Petitioner for a Judgment Pursuant to Article 78 of the CPLR against the New York State Department of Environmental Conservation Respondent; Supreme Court of the State of New York County of Chautauqua (July 22, 1988). Order G11278.

certification by a licensed professional engineer that the facility was closed in accordance with the rules and regulations as stipulated by the NYSDEC by October 21, 1988. Post-closure ground water and surface water monitoring and maintenance were also expected to continue for 30 years after final closure of the entire facility.

Basis for Consideration as a Proven Damage Case:(1) Scientific - The lead levels found in down-gradient wells exceed the primary MCL Action Level; (2) Administrative - The State has required remedial action as a result of the contamination; and (3) Court order – The owner was directed, by the Supreme Court of the State of New York County of Chautauqua (July 22, 1988), to cease receiving the aforementioned wastes at the facility no later than October 15, 1988.

4. Virginia Electric Power Co. (VEPCO) Possum Point, VA[30]

History: EPA identified this site as a proven damage case in the March 1999 Report to Congress. It is described in detail in the Report and supporting technical background documents in the rulemaking docket.

The technical background document[31] states: "One additional documented damage case is the Virginia Electric and Power Company (VEPCO) Possum Point Site, described in the 1993 Regulatory Determination. This is an active facility with 40-acre unlined ash ponds with solids dredged to 80-acre lined ponds. These ponds received coal ash, pyrites, water treatment wastes, boiler cleaning wastes, and oil ash. Ground water monitoring found cadmium at concentrations 3.6 times and nickel, at 26.4 times the primary MCLs. Monitoring for vanadium was conducted but no results were given. The elevated concentrations were attributed to the pyrites and oil ash. These wastes, along with metal cleaning wastes, were ordered sequestered to separate lined units."

The 1999 Report to Congress[32] states: "**Possum Point, Virginia** (described in the 1993 Supplemental Analysis). At this site, oil ash, pyrites, boiler chemical cleaning wastes, coal fly ash, and coal bottom ash were comanaged in an unlined pond, with solids dredged to a second pond. Levels of cadmium above 0.01 mg/L were recorded prior to 1986 (the primary MCL is 0.005 mg/L). After that time, remedial actions were undertaken to segregate wastes (oil ash and low volume wastes were believed to be the source of contamination). Following this action, cadmium concentrations were below 0.01 mg/L."

Basis for Consideration as a Proven Damage Case: Based on evidence on exceedances of cadmium and nickel, the State pursued an Administrative Action by requiring the removal of the waste, thus qualifying it as a proven damage case.

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[30] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000.

[31] Technical Background Document For the Report to Congress On Remaining Wastes from Fossil Fuel Combustion: Potential Damage Cases, March 15, 1999 (http://www.epa.gov/epaoswer/other/fossil/ffc2_397.pdf)

[32] http://www.epa.gov/epaoswer/other/fossil/volume_2.pdf

5. PEPCO Morgantown Generating Station Faulkner Off-site Disposal Facility, Maryland[33]

History: Landfills at this site manage fly ash, bottom ash, and pyrites from the Morgantown Generating Station starting in 1970. Unlined settling ponds also are used at the site to manage stormwater runoff and leachate from the ash disposal area. In 1991, the State found that water quality was degraded in the underlying aquifer and that ground water contamination had migrated to nearby surface waters (including a stream and a wetland area). The impacts included vegetative damages, orange staining from iron precipitation, and low pH. Because of the ground water migration, the operator was cited for unpermitted discharges to surface water. The low pH impacts are believed to have resulted from pyrite oxidation. The low pH may also have contributed to the migration of other contaminants. Additionally, ground water beneath the facility is shallow. Documentation shows the water table is very close to the bottom of the ash disposal area at the down-gradient end of the facility and well above the base of the settling ponds used to manage stormwater runoff and leachate from the ash disposal area.

Remedial measures at the site included closure and capping of older units, installation of liners in newer units, installation of a slurry wall to prevent ground water migration, and sequestration of pyrites. EPA identified this site as a proven damage case in the March 1999 Report to Congress. It is described in detail in the Report and supporting technical background documents in the rulemaking docket.

Basis for Consideration as a proven Damage Case: EPA has categorized this case as a proven damage case for the following reasons: (1) Scientific - Ground water contamination migrated off-site; and (2) Administrative - The State required remedial action.

6. Virginia Power Yorktown Power Station Chisman Creek Disposal Site, Virginia[34]

History: This site consists of three parcels of land that cover 27 acres. Between 1957 and 1974, abandoned sand and gravel pits at the site received fly ash from the combustion of coal and petroleum coke at the Yorktown Power Station. Disposal at the site ended in 1974 when Virginia Power began burning oil at the Yorktown plant. In 1980, nearby shallow residential wells became contaminated with vanadium and selenium. Water in the wells turned green and contained selenium above the primary MCL and sulfate above the secondary MCL. Investigations in response to the discolored drinking water found heavy metal contamination in the ground water around the fly ash disposal areas, in onsite ponds, and in the sediments of Chisman Creek and its tributaries. Arsenic, beryllium, chromium, copper, molybdenum, nickel, vanadium, and selenium were detected above background levels.

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[33] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000. Memorandum from SAIC to Dennis Ruddy regarding Review of Causative Factors for Coal Combustion Waste Damage Cases, November 29, 2000.

[34] Ibid. Compendium of nineteen alleged coal combustion wastes damage cases, May 3, 2007.

The contamination at the site's vicinity was caused by the combination of several factors: (i) The facility was operated with no dust or erosion controls; (ii) The facility is unlined and located in close proximity to drinking water wells, and ground water at the site was very shallow and possibly in contact with disposed waste.; (iii) A surface water tributary passed through or near the disposal areas.

In September 1983, EPA added the site to the National Priorities List (NPL)[35] under the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA). Cleanup began in late 1986 and was conducted in two parts. The first part addressed the fly ash pits and contaminated ground water and included the following steps:

- Extension of public water to 55 homes with contaminated well water,
- Capping the disposal pits with soil (2 pits) or compacted clay (1 pit) overlain with topsoil and vegetative growth,
- Ground water and leachate collection for treatment and to lower the water table beneath the pits, and
- Post-closure monitoring.

The second part addressed the onsite ponds, a freshwater tributary stream, and the Chisman Creek estuary and included the following steps:

- Relocation of a 600-foot portion of the tributary to minimize contact with the fly ash disposal areas,
- Diversion of surface runoff, and
- Long-term monitoring for the ponds, tributary, and estuary.

Construction of all cleanup components was completed on December 21, 1990. The site has been redeveloped as a public park. Following the completion (in December 2006) of its third five-year review of the site, EPA determined that the remedial action at Operable Unit 1 is protective in the short term because the extent of the vanadium contamination in the shallow ground water aquifer is not presently known. EPA is presently working with Virginia Power to determine the extent of the vanadium contamination and to amend the restriction to make sure it provides the necessary assurance that it will be protective over time.

Basis for Consideration as a Proven Damage Case: EPA identified this site as a proven damage case in the March 1999 Report to Congress. It is described in detail in the Report and supporting technical background documents in the rulemaking docket. EPA has categorized this case as a proven damage case for the following reasons: (1) Scientific – (i) Drinking water wells contained selenium above the (health-based) primary MCL and (ii) There is evidence of surface water and sediment contamination; and (2) Administrative - The site was remediated under CERCLA.

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[35] http://epa.gov/reg3hwmd/npl/VAD980712913.htm

7. Hyco Lake, Roxboro, North Carolina[36]

History: This case was originally identified by a public interest group in a table alleging selenium contamination, and a selenium fish consumption advisory[37].

Hyco Lake was constructed in 1964 as a cooling water source for the CP&L Roxboro Steam Electric Plant. The lake received discharges from the plant's ash-settling ponds containing high levels of selenium. The selenium accumulated in the fish in the lake, affecting reproduction and causing declines in fish populations in the late 1970s and 1980s. The North Carolina Department of Health and Human Services issued a fish consumption advisory in 1988[38].

In 1990, CP&L installed a dry ash handling system to meet new permit limits for selenium. To determine the effectiveness of the new handling system, the Department of Water Quality is requiring long-term monitoring of the lake. Based on the results of fish tissue sampling, the fish consumption advisory has been rescinded in stages starting in 1994[39]. It was completely rescinded in August, 2001[40].

Basis for Consideration as a Proven Damage Case: This case is categorized as a proven ecological damage case for the following reasons: (1) Scientific - declines in fish populations were observed (1970s & 1980s); (2) Administrative - The State concluded that the impacts were attributable to the ash ponds, and issued a fish consumption advisory as a result of the contamination.

8. Georgia Power Company, Plant Bowen, Cartersville, GA[41]

History: This unlined CCW management unit was put in service in 1968. On July 28, 2002, a sinkhole developed in the (coal) ash pond of the Georgia Power Company - Plant Bowen Facility (coal-fired generating facility). The sinkhole ultimately reached four acres and a depth of thirty

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[36] Compendium of nineteen alleged coal combustion wastes damage cases, May 3, 2007.

[37] Letter from the Hoosier Environmental Council to the RCRA Docket Information Center regarding comments on the May 2000 Regulatory Determination, September 19, 2000.

[38] Selenium Posting on Hyco Lake Rescinded, North Carolina Department of Health and Human Services (NCDHHS), August 2001.

[39] Roanoke River Basinwide Water Quality Plan, Section B, Chapter 5: Roanoke River Subbasin 03-02-05, North Carolina Department of Environment and Natural Resources (NCDENR), July 2001. Available at http://h2o.enr.state.nc.us/basinwide/roanoke/2001/2001_Roanoke_wq_management_plan.htm

[40] Selenium Posting on Hyco Lake Rescinded, North Carolina Department of Health and Human Services (NCDHHS), August 2001.

[41] Compendium of nineteen alleged coal combustion wastes damage cases, May 3, 2007. Ecological Assessment of Ash Deposition and Removal, Euharlee Creek, Georgia Power Bowen Plant, available in the docket to the CCW NODA (EPA-HQ-RCRA-2006-0796).

feet. The integrity of the ash pond dikes did not appear to be compromised. The company estimated that 2.25 million gallons of ash/water mixture was released to an unnamed tributary of the Euharlee Creek, containing 281 tons of ash. Georgia's Department of Natural Resources alleges an unpermitted discharge of water containing approximately 80 tons of ash slurry entered Euharlee Creek through a stormwater drainage pipe resulting in a temporary degradation of public waters.

Georgia Department of Natural Resources issued a consent order on November 20, 2002. The order contained the following provisions:

- Fine of $31,250 was imposed;
- Company to perform ecological impact study of the ash discharge into Euharlee Creek and recommend remedial action;
- Company to submit proposed dredging plan if necessitated by impact study;
- Company to submit report on actions taken to fill sinkhole and grout fissures under the dike;
- Company to perform geological engineering assessment of the ash pond stability and recommend corrective actions to address future sinkhole development;
- Company to submit a revised ash water management plan;
- Georgia EPD approved corrective action plans shall be implemented; and
- Company shall submit interim progress report and final schedule for completion of implementation of corrective action plans.

Basis for Consideration as a Proven Damage Case: (1) Scientific - unpermitted discharge of water containing ash slurry into the Euharlee Creek resulting in a temporary degradation of public waters; and (2) Administrative - Georgia Department of Natural Resources issued a consent order requiring, among others, a fine and corrective action.

9. Department of Energy - Oak Ridge Y-12 Plant Chestnut Ridge Operable Unit 2 DOE Oak Ridge Reservation, Oak Ridge, Tennessee[42]

History: This case was originally identified by public commenters in a table that alleged aluminum, arsenic, iron, and selenium contamination, as well as fish deformities and a region of a stream where no fish are found[43].

Chestnut Ridge Operable Unit (OU) 2 consists of Upper McCoy Branch, the Filled Coal Ash Pond (FCAP), and the area surrounding the sluice channel formerly associated with coal ash disposal in the FCAP. Upper McCoy Branch runs from the top of Chestnut Ridge across the FCAP into Rogers Quarry. The FCAP is an 8.5 acre area. The sluice channel area extends approximately 1,000 feet from the crest of Chestnut Ridge to the edge of the FCAP.

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[42] Compendium of nineteen alleged coal combustion wastes damage cases, May 3, 2007.

[43] Letter from HEC et. al., to Dennis Ruddy, February, 2002.

The FCAP is an ash retention impoundment used to dispose of coal ash slurry from the Y-12 steam plant. It was constructed in 1955 by building an earthen dam across a northern tributary of Upper McCoy Branch, and was designed to hold 20 years of ash. By July of 1967, the impoundment was filled to within four feet of the top of the earthen dam. Once the impoundment was no longer able to retain the ash solids, the slurry was released directly into Upper McCoy Branch through direct flow over the earthen dam. In 1967 and 1968, Upper McCoy Branch was diverted into Rogers Quarry. Between 1967 and 1989, the ash slurry flowed directly from the FCAP into Upper McCoy Branch and then into Rogers Quarry. In 1989, a bypass pipe was constructed to carry the slurry directly from the steam plant to Rogers Quarry. Disposal of ash into Rogers Quarry was discontinued in 1990, when a chemical vacuum system and a bottom ash dewatering system were installed at the plant. Both fly ash and bottom ash are now disposed in a landfill. Existing ash deposits were left in place. Erosion of both the spillway and the ash itself has occurred, leading to releases of ash into Upper McCoy Branch[44].

In the mid-1980s, the Y-12 plant began investigation and ground water monitoring at a number of locations within its boundaries, as required under RCRA and by the Tennessee Department of Environmental Conservation (TDEC). The entire Oak Ridge Reservation was placed on the NPL in 1989. CERCLA requires all sites under investigation to complete a remedial investigation to determine the nature and extent of contamination, evaluate the risks to public health and the environment, and determine remedial action goals. The Remedial Investigation for OU conducted in two phases. Phase I was conducted by CH2M Hill in the Upper McCoy Branch zone. Phase II was conducted by CDM Federal in the FCAP and sluice area zones. Both investigations consisted of surface and ground water, soil, and ash sampling. The table below shows a summary of the results of the monitoring programs[45].

Table 3. Oak Ridge Y-12 Plant Chestnut Ridge Operable Unit 2 Surface and Ground Water Monitoring Programs

Monitoring type	Monitoring location	Constituents with exceedances of ambient/ reference/background concentrations	Constituents with exceedance of MCLs or SMCLs
Surface Water	Upper McCoy Branch (Phase I)	Al, Fe, Cu	Al, As, Fe, Mn
	Upper McCoy Branch (Phase II)	Al, As, Ca, Mn, K, Na	Al, As, Mn
	FCAP Pond Water	Al, As, Ba, Ca, Cr, Cu, Fe, Pb, Mg, Mn, K, Na, V, Zn	Al, As, Fe, Mn

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[44] Feasibility Study for the Y-12 Chestnut Ridge Operable Unit 2 Filled Coal Ash Pond, Oak Ridge, Tennessee. DOE/OR/02-1259&D1. August 1994.

[45] Ibid.

Monitoring type	Monitoring location	Constituents with exceedances of ambient/ reference/background concentrations	Constituents with exceedance of MCLs or SMCLs
	Spring Water	Al, As, Ba, Ca, Pb, Mn, Hg, K, V, Zn	Al, As, Fe, Pb, Mn
Ground Water	Upper McCoy Branch (Phase I)	Al, Ba, Ca, Co, Cu, Fe, K, Mg, Mn, Na, Se, Zn	Al, Fe, Mn
	Upper McCoy Branch (Phase II)	information not provided	Mn
	Sluice Channel Area	information not provided	Mn
Soil	Near Upper McCoy Branch (Phase II)	Al, As, Ba, Fe, Mn, K, Na	Not applicable
	Near FCAP	Al, As, K, Na	Not applicable
Ash	Entire Site	No background data	Not applicable

Biological monitoring has also been conducted at the site as part of a RCRA Facility Investigation (RFI) required by the 1984 Hazardous and Solid Waste Amendments to RCRA, and as part of the Phase I Remedial Investigation. The biological monitoring conducted for the RFI included toxicity testing, bioaccumulation studies, fish community assessments, and a benthic macro-invertebrate community assessment. Biological monitoring for the Phase I RI consisted of toxicity testing, a benthic macro-invertebrate assessment, a soil (ash) invertebrate survey, and bioaccumulation studies[46].

The conclusions for the RFI biological monitoring programs were as follows:

- Toxicity testing: The results of the toxicity testing did not show significant evidence for toxic conditions in Upper McCoy Branch.
- Bioaccumulation studies:
    - Concentrations of selenium, arsenic, and possibly thallium were elevated in largemouth bass from Rogers Quarry, relative to bass from another nearby site;
    - Arsenic exceeded screening criteria;
    - Some fish from Rogers Quarry had deformed bony structures (these effects were not described in literature as effects of arsenic or selenium); and
    - Bioaccumulation was not indicated in Upper McCoy Branch discharge

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[46] Ibid.

- Fish community assessment: The results indicate that Upper McCoy Branch is under severe stress:
    - No fish populations were found above Rogers Quarry; and
    - Downstream sunfish populations had high percentages of deformed heads and eroded fins.
- Benthic Macro-invertebrate Community Assessment: The results were indicative of moderate stress. The stress appears to be habitat alteration as a result of ash deposition within the stream channel and possibly leaching of potential toxicants from the ash.

The conclusions for the RI biological monitoring programs were as follows:

- Toxicity testing: The results did not show toxic conditions in Upper McCoy Branch.
- Benthic Macro-invertebrate Assessment: The results exhibited no strong evidence of impact at Upper McCoy Branch. There were some differences in July samples, which could be due to natural variations between the two locations, or could be due to low flow conditions increasing concentrations of contaminants from the ash.
- Soil (ash) Invertebrate Study: No invertebrates were found in samples from the sluice channel area or the FCAP, indicating this is not a possible pathway for contamination of the food chain.
- Bioaccumulation Studies:
    - Vegetation: The results show that selenium uptake into plants is a possible source of exposure to soil invertebrates and small mammals.
    - Small mammals: The study found higher concentrations of arsenic, selenium and lead in animals from the FCAP than in animals from a reference site.

A remedial action was conducted to stabilize the filled coal ash pond, McCoy Bridge dam holding contaminated pond sediments in place. A wetland, removed during stabilization activities, was re-constructed as part of the remedial action. Physical work was completed in March 1997. The remedial action report was approved in May 1997[47].

<u>Basis for Consideration as a Proven Damage Case:</u> This case has been categorized as a proven ecological damage case based on scientific documentation of impacts to fish and other wildlife on-site. This case has also been categorized as a potential (human health) damage case based on (1) Scientific basis - Exceedances of primary and secondary MCLs were detected in on-site monitoring locations, and (2) Administrative grounds - Federal RCRA and the Tennessee Department of Environmental Conservation (TDEC) requirements, including placement of the entire Oak Ridge Reservation on the NPL.

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[47] http://www.epa.gov/region4/waste/npl/npltn/oakridtn.htm

10. South Carolina Electric & Gas Canadys Plant, South Carolina[48]

History: This facility is a coal-fired power plant located along the Edisto River approximately 10 miles south of St. George, South Carolina. Ash from the power plant is mixed with water and managed in an ash storage pond. The facility operated an unlined, 80-acre ash pond from 1974 to 1989. A new, 95-acre ash pond lined with a bentonite slurry wall began operation in 1989.

Since 1982, arsenic has consistently been found in monitoring wells surrounding the old ash pond at levels above the MCL. Nickel also has occasionally been found above a State standard in a single monitoring well adjacent to the old ash pond. Because of these results, DHEC required the facility to delineate the extent of the contamination surrounding the old ash pond. The contamination was found to extend beyond the original property boundary of the facility, but the operator was allowed to buy neighboring property under State policy at the time. The investigation also showed that the contamination was not reaching the Edisto River and that its vertical extent was limited by a confining geologic unit 15 to 30 feet below the property. The facility is currently deactivating the old ash pond, with ash being removed and sold to a cement company. DHEC concluded that further migration of contaminants was not likely given the ground water conditions and the ongoing deactivation. In 1996, therefore, DHEC approved a mixing zone with ongoing monitoring around the old ash pond. The mixing zone establishes a compliance boundary around the old ash pond. Arsenic concentrations above the MCL are permitted within the mixing zone, but not at or outside of the compliance boundary.

The new ash pond extends beyond the compliance boundary of the old ash pond. Sampling in May 2000 found arsenic above its MCL at, and external to, the compliance boundary in wells that are adjacent to the new ash pond. Resampling in June 2000 confirmed the noncompliance. The facility's engineering contractor and DHEC suspect this arsenic contamination is associated with a separate plume originating from the new ash pond. DHEC suspects improper anchoring or a breach of the slurry wall surrounding the new ash pond. Based on a geophysical investigation, the facility's engineering contractor concluded that the slurry wall appears to have failed in various locations, allowing multiple seeps. The contractor noted that drought-like conditions during the preceding three years have caused a site-wide decrease in the water table. The increase in potentiometric head between the new ash pond and the falling water table may be a contributing factor to the breaches in the slurry wall. The facility has proposed additional monitoring to delineate the extent of the new arsenic plume and an extension of the compliance boundary to encompass the new ash pond. The facility also is evaluating possible corrective action alternatives for repairing or replacing the slurry wall. The extent of the new plume has not yet been fully delineated and DHEC has not yet determined what response may be required of the facility.

This site was initially classified as indeterminate because there was no information on the extent of the contamination (on-site or off-site), quantitative data on whether arsenic levels exceeded State standards, or confirmation that the contamination was attributable to fossil fuel combustion waste. In a follow-up assessment conducted after the Regulatory Determination, a representative

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[48] Memorandum from SAIC to Dennis Ruddy regarding Final Revised Report on Resolution of 18 Previously Indeterminate Candidate Damage Cases, March 5, 2003.

from South Carolina's Department of Health and Environmental Control (DHEC) confirmed that there is arsenic contamination attributable to two coal combustion waste (CCW) management units at this site. According to the DHEC contact, it is unlikely that there are any ground water supply wells or other human exposure points in the vicinity of the facility. Furthermore, ground water supply wells in the region typically are drilled beneath the underlying confining geologic unit.

Basis for Consideration as a Proven Damage Case: Scientific - There are exceedances of the health-based standard for arsenic at this site. While there are no known human exposure points nearby, some recent exceedances have been detected outside an established regulatory boundary.

11. Belews Lake, North Carolina[49]

History: This Lake was impounded in the early 1970s to serve as a cooling reservoir for a large coal-fired power plant. Fly ash produced by the power plant was disposed in a settling basin, which released selenium-laden effluent in return flows to the Lake. Due to the selenium contamination, 16 of the 20 fish species originally present in the reservoir were entirely eliminated, including all the primary sport fish. The pattern of selenium contamination from the plant and fish impacts persisted from 1974 to 1985. In late 1985, under mandates from the State of North Carolina, the power company changed operations for fly ash disposal, and selenium-laden effluent no longer entered the Lake.

A fish advisory was issued for selenium in 1993 which was rescinded December 31, 2000[50].

Basis for Consideration as a Proven Damage Case: EPA has categorized this case as a proven ecological damage case for the following reasons: (1) Scientific evidence of extensive impacts on fish populations due to direct discharge to a surface water body, and (2) Administrative - The State required changes in operating practices to mitigate the contamination.

12. U.S. Department of Energy Savannah River Project, South Carolina[51]

History: The Savannah River Project commenced operations and disposal of ash in 1952. At this site, a coal-fired power plant sluices fly ash to a series of open settling basins. A continuous flow of sluice water exits the basins, overflows, and enters a swamp that in turn discharges to Beaver Dam Creek. Observations of bullfrogs of all developmental stages in the settling basins and swamp suggest that the mixture of pollutants that characterize the site does not prevent

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[49] Memorandum from SAIC to Dennis Ruddy regarding Review of Causative Factors for Coal Combustion Waste Damage Cases, November 29, 2000.

[50] http://134.67.99.49/scripts/esrimap.dll?Name=Listing&Cmd=NameQuery&Left=-178.215026855469&Right=-52.6202812194824&Top=83.1083221435547&Bottom=-14.3755550384521&shp=3&shp=6&idChoice=3&loc=on&NameZoom=NC%20-%20Belews%20Lake

[51] Memorandum from SAIC to Dennis Ruddy regarding Review of Causative Factors for Coal Combustion Waste Damage Cases, November 29, 2000.

completion of the life cycle. However, bullfrog tadpoles inhabiting the site have oral deformities and impaired swimming and predator avoidance abilities. There also is evidence of metabolic impacts on water snakes inhabiting the site.

Basis for Consideration as a Proven Damage Case: EPA has categorized this case as a proven ecological damage case for the following reasons: (1) Scientific evidence of impacts on several species in a nearby wetland caused by releases from the ash settling ponds.

13. Dairyland Power Cooperative E.J. Stoneman Generating Station Ash Disposal Pond, Wisconsin[52]

History: This facility is an unlined pond that managed ash, demineralizer regenerant, and sand filter backwash from the 1950's until 1987. During the facility's operating life, ground water monitoring of on-site wells around the pond found cadmium and chromium in excess of primary MCLs and sulfate, manganese, iron, and zinc in excess of secondary MCLs. Nearby private drinking water wells showed levels of sulfate and boron elevated from background. As a result, the State concluded that other constituents could reach the drinking water wells in the future.[53] Because of the evidence of ground water contamination and because the facility violated State location standards, the State denied the operator's proposal to continue operation of the pond. The State also required the operator to close the facility and provide alternative drinking water to the affected residences. The history of contamination also led the State to require a new landfill on the site to be constructed with a double liner and leachate collection.

In addition to being unlined, the unconsolidated soils beneath the site consist of highly permeable sand and gravel (estimated permeability of 10^{-2} cm/sec). The pond was located close to the Mississippi River, in violation of the State's requirement for 300 feet of separation from navigable rivers. The proximity to the river caused variable water table levels and periods of ground water mounding, during which the depth of ground water beneath the unit was very shallow (possibly as low as 1 foot). Finally, the pond was located closer to 15 water supply wells than allowed by State standards.

Basis for Consideration as a Proven Damage Case: EPA identified this site as a proven damage case in the March 1999 Report to Congress. It is described in detail in the Report and supporting technical background documents in the rulemaking docket. EPA has categorized this case as a proven damage case for the following reasons: (1) Scientific - Cadmium and chromium exceeded (health-based) primary MCLs, and contamination migrated to nearby, private drinking water wells; and (2) Administrative - The State required closure of the facility.

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[52] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000. Memorandum from SAIC to Dennis Ruddy regarding Review of Causative Factors for Coal Combustion Waste Damage Cases, November 29, 2000.

[53] More recent monitoring data confirm this conclusion, with cadmium exceeding the primary MCL and iron and manganese exceeding secondary MCLs in the drinking water wells.

14. WEPCO Highway 59 Landfill, Wisconsin[54]

History: This site is located in an old sand and gravel pit and received fly ash and bottom ash between 1969 and 1978. Ground water monitoring between 1988 and 1998 found sulfate, boron, manganese, chloride, and iron above the State's Enforcement Standards (ES) and arsenic above the State's Preventive Action Level (PAL) in nearby private wells. Other down-gradient monitoring wells showed sulfate, boron, iron, and manganese in excess of the ES and selenium and chloride in excess of PALs. State agency staff considered this site one of the most seriously affected coal ash sites in the State. The State required a continuation of monitoring at this closed facility in 1982 and an investigation into ground water contamination in 1994.

The facility is unlined and the soil underlying the site consists of fine to coarse sands and gravel with minor amounts of silt and clay and is believed to be relatively permeable. The original sand and gravel pit included an area of standing water. The presence of the standing water is attributed to the elevation of the ground water table exceeding the base of the pit in this area. Waste was disposed directly into this area to a depth of 5 to 10 feet below the water table. (Note also that the facility is located in close proximity to a wetland, although there is no documentation of impact to flora in the wetland.)

Basis for Consideration as a Proven Damage Case: EPA has categorized this case as a proven damage case of the following reasons: (1) Scientific - Although the boron standard was not health-based at the time of the exceedances, the boron levels reported for the facility would have exceeded the State's recently promulgated health-based ES for boron; and contamination from the facility appears to have migrated to off-site private wells; and (2) Administrative - As a result of the various PAL and ES exceedances, the State required a ground water investigation.

15. Alliant (formerly Wisconsin Power & Light) Nelson Dewey Ash Disposal Facility, Wisconsin[55]

History: This facility was originally constructed in the early 1960's as a series of settling basins for sluiced ash and permitted by the State in 1979. Waste disposal at the site resulted in exceedances of the State's Preventative Action Levels (PALs) for arsenic, selenium, sulfate, boron, and fluoride. These exceedances occurred within the design management zone of the facility. Waste disposal also has resulted in exceedances of the State's Enforcement Standards (ES) for boron, fluoride, and sulfate outside the design management zone of the facility. As a result of these exceedances, the State required an investigation of ground water contamination in 1993. In 1996, the facility began converting to dry ash management and covering/closing phases of the facility.

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[54] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000. Memorandum from SAIC to Dennis Ruddy regarding Review of Causative Factors for Coal Combustion Waste Damage Cases, November 29, 2000.

[55] Ibid.

Soil underlying the site consists of unconsolidated glacial outwash deposits of relatively high permeability (estimated between 10^{-2} and 10^{-5} cm/sec). The facility is not only unlined, but was originally designed to allow sluiced liquids to infiltrate to ground water, with direct discharge to surface water occurring only occasionally. For much of their life, the basins operated with a relatively high hydraulic head. In fact, in 1986, the facility began using direct discharge to reduce the hydraulic head in response to PAL exceedances for sulfate. This combination of conditions resulted in a ground water mound beneath the ash disposal area. While depth to ground water at the site is generally approximately 10 feet, the height of the ground water mound was estimated at 5 to 8 feet, resulting in an estimated effective depth to ground water of only 2 to 5 feet underneath the disposal area.

Basis for Consideration as a Proven Damage Case: EPA has categorized this case as a proven damage case for the following reasons: (1) Scientific - Although the boron standard was not health-based at the time of the exceedances, the boron levels reported for the facility would have exceeded the State's recently promulgated health-based ES for boron; and (2) Administrative - As a result of the various PAL and ES exceedances, the State required a ground water investigation, and the facility took action to remediate ground water contamination and prevent further contamination.

16. WEPCO Cedar-Sauk Landfill, Wisconsin[56]

History: This facility is an abandoned sand and gravel pit that received coal combustion waste from the WEPCO Port Washington Power Plant from 1969 to 1979. After closure of the facility, ground water monitoring revealed exceedances of the primary MCL for selenium, the State standard for boron, and the secondary MCL for sulfate. Vegetative damage resulting from boron uptake also was observed in a nearby wetland. Presumably, this damage is the result of ground water migration to the wetland. As a result, the State required installation of relief wells to confine and remediate the contamination plume and installation of an upgraded cover at the site. The facility is not only unlined, but was constructed over shallow ground water[57] in highly permeable (10^{-3} to 10^{-2} cm/sec) media. Some time after closure, the water table rose, saturating portions of the ash fill. Furthermore, the original soil cover installed at closure -- less than 2 feet in places -- was found to be insufficient. Finally, the site was located in close proximity to a wetland.

EPA identified this site in its original 1988 Report to Congress on Wastes from the Combustion of Fossil Fuels by Electric Utility Power Plants and analyzed it further in the supplemental analysis conducted for its 1993 Regulatory Determination[58]. This case was not counted as a

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[56] Ibid.

[57] Quantitative data on the original depth to ground water are not available, but documentation on the site reports that the water table was near the base of the original pit.

[58] Supplemental Analysis of Potential Risks to Human Health and the Environment from Large-Volume Coal Combustion Waste. U.S. EPA., July 30, 1993. Available from the docket for the 1993 Regulatory Determination for Fossil Fuel Combustion (Part 1), EPA-HQ-RCRA-1993-0042-1642.

proven damage case in the 1999 Report to Congress, however, because there was no evidence of comanagement of low-volume wastes at the site.

Basis for Consideration as a Proven Damage Case: EPA has categorized this case as a proven damage case for the following reasons: (1) Scientific - Selenium in ground water exceeded the (health-based) primary MCL, and there was clear evidence of vegetative damage; and (2) Administrative - The State required remedial action.

17. Wisconsin Electric Power Co. (WEPCO) Port Washington Facility, Wisconsin[59]

History: Originally, the commenters identified this Wisconsin site in a table that alleged fly ash contaminated several drinking water wells with boron and selenium. Following a preliminary evaluation by the EPA, this site was initially classified as indeterminate because (i) the commenters did not identify the source of the information, and (ii)
No quantitative data or further information about this site was available.

In the course of reassessment conducted following the Regulatory Determination, a copy of the original Water Well Journal article cited by the commenters was obtained from the National Ground Water Association (NGWA). The article presented instances in which boron and selenium concentrations exceeded standards in a well located down-gradient of the CCW disposal site. Contact was established with Wisconsin Department of Natural Resources (DNR) Waste Management Program. The DNR representative reported that the site affects a residential, private water well supply. He located the well at about 250 feet south of an old quarry that was filled to 40-60 feet in depth with fly ash from the Wisconsin Electric Power Company. The power company placed fly ash in the quarry from 1948-1971, so the ash had been there at least 20 years prior to the contamination described by the article.

In lieu of providing up-gradient well monitoring data, the DNR representative stated with certainty that in his best professional judgment the boron levels reported for the well are not naturally occurring. He also is confident that the contaminants come from the quarry because of the proximity to the monitoring well. He added that boron is characteristic of coal ash and that geologically there is no naturally-occurring source in that area of Wisconsin that would produce boron levels that high. However, he was not aware that a boron standard existed at the time of the exceedances. He reiterated that the selenium concentration exceeds the selenium standard reported in the article. Based on today's standard of 50ug/L, the levels of selenium reported would not be considered a compliance problem.

Based on the information provided by the State, contamination from this facility appears to have migrated to off-site private wells. Documentation to confirm this analysis was received in the form of a laboratory report from the State Laboratory of Hygiene. Samples collected at the John & Dolly Keating Port Washington Sample Tap Pit (an off-site drinking water well) showed very high concentrations of boron. Although the State did not have a health-based standard for boron at the time of the exceedances, the boron levels reported for the facility would have exceeded the State's recently promulgated health-based enforcement standard for boron. Samples collected

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[59] Memorandum from SAIC to Dennis Ruddy regarding Final Revised Report on Resolution of 18 Previously Indeterminate Candidate Damage Cases, March 5, 2003.

also showed elevated selenium concentrations, but the levels detected would not exceed the current primary MCL.

Basis for Consideration as a Proven Damage Case: This case is categorized as a proven damage case based on a scientific observation - The off-site exceedance of a health-based standard for selenium, caused by the fact that the site is an unlined former sand and gravel quarry and is in close proximity to drinking water wells.

18. Lansing Board of Water & Light (LBWL) North Lansing Landfill, Michigan[60]

History: The North Lansing Landfill (NLL), a former gravel quarry pit, was licensed in 1974 for disposal of inert fill materials including soil, concrete, and brick. From 1980 to 1997, the NLL was used for disposal of coal ash from the Lansing Board of Water and Light (LBWL) electric and steam generating plants. The NLL has three disposal areas, two of which were used for coal ash disposal. Filling of Area I ceased in 1988 and a temporary cover was placed over the ash. Area III was the active disposal area from 1988 to January 1997. A temporary cover was placed over Area III in September 1998 and grass was planted on this cover. Area II was not actively used for disposal, although some ash has washed into this area. Since 1992, Area II has usually contained standing water from on- and off-site storm water runoff.

Among the damages that commenters alleged existed at this site were down-gradient selenium and arsenic exceeding their MCLs and down-gradient sulfate greater than "allowable water quality standards." The commenters also stated that an adjacent municipal well field is "threatened."

The site owner claimed that sulfate contamination is due to wastes other than fly ash in the landfill or else is due to off-site sources. The Michigan Department of Environmental Quality (MDEQ) confirmed in writing that ground water contamination had occurred at this historic landfill, which was constructed before current State regulations were in place. The site was eventually closed because the inadequate control of contamination violated current regulatory requirements. According to the letter, the NLL was forced to take remedial action to address the contamination.

This site was initially classified as indeterminate because (i) the documents and quantitative data supporting the alleged damages were not available; (ii) information was needed to positively identify the source of the contamination; and (iii) more information was needed to describe the extent of ground water contamination and to establish whether this contamination extends off-site.

In an effort to reassess this alleged damage case, EPA's contractor contacted MDEQ and found that this site was in the process of a Remedial Investigation (RI) and Feasibility Study (FS). The following information is based on the RI Report, published in May 1999 and revised in December 1999.

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[60] Ibid.

There are two aquifers beneath the NLL. The upper aquifer is highly permeable, but is not used for drinking water. The lower aquifer (the Saginaw), however, supplies the City of Lansing with drinking water. Fill underlying the ash has lower hydraulic conductivity than the underlying aquifer, but does not constitute a liner. The underlying fill has settled in places and the water table has risen, so that lower portions of the ash are now saturated in Areas I and III. The standing water in Area II has merged with ground water, forming a mound in the water table. According to the Lansing Board of Water and Light North Lansing Landfill Remedial Investigation Report (the RI Report), this mounding effect likely extends laterally into the ash, thereby increasing the saturated ash thickness, and consequently the volume of ash subject to leaching in Areas I and III. Because of the rise in the water table, the facility no longer meets the State's requirement for a 4-foot isolation distance between wastes and ground water. Moreover, in mid- to late-1993, abrupt increases were observed in sulfate and selenium concentrations in an on-site monitoring well. As a result, LBWL was required to perform a remedial investigation and feasibility study. The RI Report concluded that the timing of the increase in contamination indicated that leachate released from the saturated fly ash was the source of the contamination.

The objectives of the RI included characterization of site conditions, definition of the nature and extent of ground water impacts, and estimation of future migration. This analysis is complicated by the presence of other known or potential sources of ground water contamination both up-gradient and down-gradient of the NLL site. Therefore, the remedial investigation used statistical comparisons (i.e., tolerance intervals calculated from up-gradient and background monitoring data) to delineate ground water impacts from the NLL. Ground water concentrations were compared to Michigan's Part 201 criteria. The Part 201 standards for ground water identify contaminant concentrations that are safe for long-term, daily consumption. The investigation's statistical analysis, modeling results, and conclusions form the basis for the analysis of the NLL as a damage case.

For a variety of reasons, the RI Report concluded that boron, iron, pH, strontium, selenium, and sulfate are of little concern. The RI Report concluded that the constituents of the most concern are lithium, manganese, and potassium. Based on statistical analysis and consideration of site-specific factors, however, the following cannot be conclusively linked to the NLL: boron, iron, pH, and sulfate. Of the remaining contaminants of concern:

- Lithium appears to be attributable to the NLL and concentrations are above health-based standards off-site;
- Manganese contamination on-site appears to be attributable to the NLL and concentrations are above non-health based-standards. (Note that off-site concentrations of manganese also are above non-health-based standards, but do not appear to be attributable to the NLL);
- Potassium appears to be attributable to the NLL, but has no regulatory standard;
- Selenium appears to be attributable to the NLL and concentrations are above health-based standards on-site, but not off-site;
- Strontium appears, based on statistics, to be attributable to the NLL, but concentrations are below health based standards.

<u>Basis for Consideration as a Proven Damage Case</u>: This site was classified as a proven damage case based on a scientific observation of off-site exceedances of the State's health-based standard

for lithium. The exceedance was caused by the fact that the site is an unlined former gravel quarry with an elevated ground water table leading to ground water contact.

19. Northern Indiana Public Service Corp. (NIPSCO) Yard 520 Landfill Site (Brown's Landfill) Township of Pines, Porter County, IN[61]

History: NIPSCO's Bailly and Michigan City power plants have deposited an estimated 1 million tons of fly ash in the Town of Pines since 1983. Fly ash was buried in the landfill and used as construction fill in the town. The ash is pervasive on site, visible in roads and driveways[62].

Pines is located near the Indiana Dunes National Lakeshore, about 2 miles south of Lake Michigan. This is a region of sand dune ridges which separate low-lying, poorly drained wetland areas. The soil is very sandy, unconsolidated, highly-acidic, and with a high organic content. These sands overlie a less permeable clay-rich unit. The ground water flows in a northerly direction from the Yard 520 landfill toward the town[63].

In April 2000, Indiana DEM received a complaint from a Pines resident that water from her private well tasted foul. IDEM conducted sampling and found residential wells contaminated with elevated levels of benzene, arsenic, manganese, and VOCs including benzene. In 2001, EPA's Superfund program conducted a preliminary assessment and site investigation, and found elevated levels of MTBE, boron, manganese, and molybdenum. In January 2002, IDEM recommended the site for EPA's National Priorities List[64].

Additional site investigations indicate that the Pines Yard 520 Landfill site is the likely source of contamination of residential water wells, caused by leaching of heavy metals (manganese, boron, molybdenum, arsenic, lead) from fly ash that was buried in the landfill and used as construction fill. The presence of elevated levels of contaminants that are not associated with coal ash, such as volatile organic compounds (VOCs) and MTBE, indicate that there are additional sources of contamination that are not related to coal ash[65].

EPA and the responsible parties signed an Administrative Order of Consent effective January 2003 to cover costs of connecting the affected areas to Michigan City's water system (USEPA 2003a). In April 2004, EPA and IDEM negotiated an Administrative Order of Consent with the

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[61] Compendium of nineteen alleged coal combustion wastes damage cases, May 3, 2007.

[62] Tim Drexler, Remedial Project Manager, telephone communications with Bonnie Robinson, USEPA. June 5, 2003.

[63] Final Site Investigation Report on Ground water Contamination, Township of Pines, Porter County, Indiana. December 2002.

[64] EPA Announces Investigation Results at Pines Site (Fact Sheet). January 2003.

[65] Final Site Investigation Report on Ground water Contamination, Township of Pines, Porter County, Indiana. December 2002.

responsible parties for continued work at the site[66]. . In January 2004, the Hoosier Environmental Council, Inc. filed a complaint for declaratory and injunctive relief against NISOURCE, the parent company of NIPSCO (U.S. District Court).

Basis for Consideration as a Proven Damage Case: This site was classified as a proven damage case based on (1) Scientific evidence for boron, molybdenum, arsenic and lead exceeding health-based standards in water wells away from the Pines Yard 520 Landfill site, and (2) Administrative Orders of consent signed between the EPA and IDEM with responsible parties for continued work at the site.

20. Brandy Branch Reservoir, Texas[67]

History: This case was originally identified by a public interest group in a table alleging selenium and chromium contamination, and a selenium fish consumption advisory[68].

The Brandy Branch Reservoir is a power plant cooling reservoir built in 1983 for Southwestern Electric Power Company's Pirkey Power Plant. The cooling reservoir received discharges from ash ponds containing elevated levels of selenium, resulting in increased selenium concentrations in fish from the reservoir. From 1986 to 1989, the Texas Parks and Wildlife Department reported that average selenium concentrations in fish from the Brandy Branch Reservoir increased from 0.81 to 2.29ppm[69]. In 1992, the Texas Department of Health (TDH) issued a fish consumption advisory for the reservoir[70].

The advisory recommended that adults consume no more than eight ounces of fish from the reservoir per week; children seven years and older - no more than four ounces/week; and children under six and pregnant women or women who may become pregnant should not consume any fish from the reservoir. In 1996 and 1997, TDH collected 17 fish from the reservoir. Selenium concentrations in these fish ranged between 0.46 and 1.79ppm, with an average concentration of 0.87ppm (ATSDR 1998).

A total maximum daily load (TMDL) project has been initiated by the Texas Commission on Environmental Quality (TCEQ) to determine the necessary steps to improve water quality in Brandy Branch reservoir. The project involved a fish sampling and analysis program and a

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[66] http://www.epa.gov/region5/sites/pines/

[67] Compendium of nineteen alleged coal combustion wastes damage cases, May 3, 2007.

[68] Letter from the Hoosier Environmental Council to the RCRA Docket Information Center regarding comments on the May 2000 Regulatory Determination, September 19, 2000.

[69] Agency for Toxic Substances and Disease Registry (ATSDR), 1998. Health Consultation: Brandy Branch Reservoir, Marshall, Harrison County, Texas. September 1998. Available at http://www.atsdr.cdc.gov/HAC/PHA/marshall/mar_toc.html.

[70] Texas Bureau of Health (TBH). 1992. Fish Advisory: Brandy Branch Reservoir. May 1992.

human health risk assessment, and was completed in August 2003[71]. Based on its findings, The Texas Commissioner of Health fish advisory was lifted in March 2004[72].
Basis for Consideration as a Proven Damage Case: This case is categorized as a proven ecological damage case for the following reasons: (1) Observations of impacts on fish populations were confirmed by scientific study, based on which the State concluded that the impacts were attributable to the ash ponds; and (2) Administrative - The State issued a fish consumption advisory as a result of the contamination.

21. Southwestern Electric Power Company Welsh Reservoir, Texas[73]

History: This Lake was constructed in 1976 to serve as a cooling reservoir for a power plant and receives discharges from an open ash settling pond system. The Texas Parks and Wildlife Department's (TPWDs) monitoring program documents elevated levels of selenium and other metals in fish. In 1992 the Texas Commissioner of Health issued a fish consumption advisory for selenium similar to the one issued for the Brandy Branch Reservoir described above[74]. The TPWD's report concludes that "discharges from the open ash settling ponds may be a source for the elevated levels of selenium in fish." The Texas Commissioner of Health fish advisory was lifted in March 2004[75].

Basis for Consideration as a Proven Damage Case: EPA has categorized this case as a proven ecological damage case for the following reasons: (1) the State concluded that, based on scientific evidence, selenium accumulation in fish may be attributable to the ash settling ponds; and (2) Administrative - The State has issued a fish consumption advisory as a result of the contamination.

22. Texas Utilities Electric Martin Lake Reservoir, Texas[76]

History: This Lake was constructed in 1974 to serve as a cooling reservoir for a power plant and was the site of a series of major fish kills in 1978 and 1979. Investigations determined that unpermitted discharges from ash settling ponds resulted in elevated levels of selenium in the

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[71] Texas Commission on Environmental Quality (TCEQ). 2003. Improving Water Quality in Brandy Branch Reservoir; One TMDL for Selenium. February 2003.

[72] Assessing the Fish Consumption Use, Water Quality in Brandy Branch Reservoir, TCEQ, March 2004.

[73] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000. Memorandum from SAIC to Dennis Ruddy regarding Review of Causative Factors for Coal Combustion Waste Damage Cases, November 29, 2000.

[74] http://www.tceq.state.tx.us/implementation/water/tmdl/14-welshreservoir.html

[75] Assessing the Fish Consumption Use, Water Quality in Welsh Reservoir, TCEQ, March 2004.

[76] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000. Memorandum from SAIC to Dennis Ruddy regarding Review of Causative Factors for Coal Combustion Waste Damage Cases, November 29, 2000.

water and fish. The State's monitoring program continues to document elevated levels of selenium and other metals in fish at the Lake. The Texas Commissioner of Health issued a fish consumption advisory for this Lake similar to the one issued for the Brandy Branch Reservoir described above in 1992[77]. There also is evidence of elevated selenium concentrations in birds nesting near the Lake. The Texas Commissioner of Health fish advisory was lifted October 14, 2004[78].

Basis for Consideration as a Proven Damage Case: EPA has categorized this case as a proven ecological damage case for the following reasons: (1) Scientifically based evidence of adverse effects on wildlife - impacts on fish populations were observed, and the State concluded that the impacts were attributable to the ash setting ponds; and (2) Administrative - The State has issued a fish consumption advisory as a result of the contamination.

23. Basin Electric Power Cooperative W.J. Neal Station Surface Impoundment, North Dakota[79]

History: This site was an unlined, 44-acre surface impoundment that received fly ash and scrubber sludge from a coal-fired power plant, along with other wastes (including ash from the combustion of sunflower seed hulls), from the 1950's until the late 1980's. Sampling in 1982 found chromium at 8.15 parts per million in the pond sediment and in excess of the primary MCL in down-gradient ground water. The State issued a special use disposal permit to allow disposal to continue, but required a continuation of monitoring and began negotiations for closure of the site. The facility was closed between 1989 and 1990, when the impoundment sediments were consolidated to a 22-acre area and capped. Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the site underwent a preliminary assessment (PA) in 1990 and a site inspection (SI) in 1995. The PA found sediments in a marshy area adjacent to the closed facility with antimony, arsenic, chromium, manganese, selenium, and sodium elevated above background. The PA also found arsenic in excess of the primary MCL and aluminum in excess of the secondary MCL in down-gradient ground water. The SI found arsenic elevated above background in the marsh sediments and in surface water passing through the wetland. The SI also found cadmium and lead in excess of primary MCLs and zinc in excess of the secondary MCL in a public water supply well. The SI concluded that releases had occurred from the surface impoundment to ground water and surface water.

Soils underlying the facility are characterized by one source as relatively permeable (10^{-4} cm/sec). Regionally, the surficial aquifer varies in depth from 3 to 25 feet below the surface. While a precise mapping of the water table at the site is not available, the SI characterizes ground water beneath the closed, unlined impoundment as "very shallow." Other information in the literature confirms this and possibly suggests ground water may directly contact the disposed material, specifically:

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[77] http://www.tceq.state.tx.us/implementation/water/tmdl/12-martincreekreservoir.html

[78] Assessing the Fish Consumption Use, Water Quality in Martin Creek Reservoir, TCEQ, March 2004.

[79] Memorandum from SAIC to Dennis Ruddy regarding Review of Causative Factors for Coal Combustion Waste Damage Cases, November 29, 2000.

- Depth to water in the monitoring wells surrounding the facility ranges from 5.5 to 16 feet, while the depth of the ash fill is estimated at approximately 10 feet.
- According to the PA, regionally, "many lakes and potholes represent "windows" into the water table ..." and an on-site pond located directly up-gradient and adjacent to the disposal area may be "a surface expression of the ground water onsite."

Additionally, the site was operated without any control of surface waters from the impoundment. A tributary to the marsh and a nearby creek formerly flowed through the ash disposal areas. Even as late as 1989, surface water ran directly off the site from the surface impoundment dike into the marsh. This direct discharge was not documented as being permitted under State or Federal regulations.

Basis for Consideration as a Proven Damage Case: EPA has categorized this case as a proven damage case for the following reasons: (1) Scientific investigation - Several constituents have exceeded their (health-based) primary MCLs in down-gradient ground water, and the site inspection found documentation of releases to ground water and surface water from the site; and (2) Administrative - The State required closure of the facility.

24. Cooperative Power Association/United Power Coal Creek Station Surface Impoundments, North Dakota[80]

History: This site includes a number of evaporation ponds and ash storage/disposal ponds that were constructed in 1978 and 1979. The ponds were originally lined but developed severe leaks in the late 1970's. The ponds are operated as a zero discharge facility. While quantitative data on the depth to ground water are not available, documentation from the State agency indicates that the ponds were constructed "directly over and adjacent to" the Weller Slough Aquifer, suggesting the presence of shallow ground water. Ground water monitoring at the site showed arsenic in excess of the primary MCL in 1987 and selenium in excess of the primary MCL in 1992 and 1993. Down-gradient monitoring data also have shown sulfate and chloride above secondary MCLs and elevated levels of boron. In the facility's 1990 permit application, the State required relining of the ponds with a composite liner.

Basis for Consideration as a Proven Damage Case: EPA has categorized this case as a proven damage case for the following reasons: (1) Scientific evidence - Arsenic and selenium exceeded (health-based) primary MCLs, and (2) Administrative - The State required remedial action.

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[80] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000. Memorandum from SAIC to Dennis Ruddy regarding Review of Causative Factors for Coal Combustion Waste Damage Cases, November 29, 2000.

Potential Coal Combustion Waste Damage Cases

III. Potential Damage Cases

According to 65 FR 32224, "Potential damage cases were those with documented MCL exceedences that were measured in ground water beneath or close to the waste source. In these cases, the documented exceedences had not been demonstrated at a sufficient distance from the waste management unit to indicate that waste constituents had migrated to the extent that they could cause human health concerns. State regulations typically use a compliance procedure that relies on measurement at a receptor site or in ground water at a point beyond the waste boundary (e.g., 150 meters)." In addition, groundwater contamination would be considered as a potential damage case also where there are documented exceedances of secondary MCLs or other non-health based standards on-site or off-site.

25. K.R. Rezendes South Main Street Ash Landfill, Freetown, Massachusetts[81]

History: This case was originally identified through contacts with State regulators.

This site consists of an ash monofill located in a former sand and gravel quarry located in Freetown, Massachusetts. The landfill began operation in 1976 and has an area of approximately 35 acres. It was originally approved as a 14-acre monofill by the Freetown Board of Health and by permit from the MADEP. The Board of Health granted approval for the remaining 21 acres in 1990, and approved a request for expansion to within 250 feet of Assonet Bay in 1993. The final permit for the site was issued by MADEP in 1994.

The site accepted ash from PG&E's Salem Harbor (approximately 250,000 tons/year) and Brayton Point Plants (approximately 140,000 tons/year). According to PG&E estimates, a total of 2,500,000 tons of ash have been disposed at the K.R. Rezendes South Main Street Ash Landfill.

Ground water monitoring at the site has detected levels of selenium above the primary MCL. Elevated levels of sulfates, total dissolved solids, manganese, iron, and aluminum have also been detected at the site, although levels are below the relevant secondary MCLs. All of the monitoring wells at the site are located on-site. There are no down-gradient drinking water sources, because the landfill is adjacent to a down-gradient water body (Assonet Bay), which is not used as a drinking water source due to its brackish water.

In early 2001, MADEP required modifications to the ground water monitoring program, including:

- Increase in sampling from annual to semi-annual;
- Semi-annual surface water sampling;
- Evaluation of wells to ensure the wells yield representative samples;
- Installation of additional monitoring wells; and

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[81] Compendium of nineteen alleged coal combustion wastes damage cases, May 3, 2007.

- Evaluation of ground water discharge to the adjacent Assonet Bay.

Operations at the landfill ended in 2001 as the result of a bylaw passed by the Town of Freetown. The bylaw bans the disposal of coal combustion wastes within the town. It was appealed by the landfill operator and PG&E, but upheld by the State Attorney General.

Basis for Consideration as a Potential Damage Case: This case has been categorized as a potential damage case for the following reasons: (1) Scientific - Selenium exceeded its primary MCL in on-site monitoring wells; and (2) Administrative - The State required modification to the site's ground water monitoring program.

26. New England Power, Brayton Point, Massachusetts[82]

History: Associated with the largest coal- and oil- powered generating station in New England, this is one of nine sites managing oil combustion wastes that have ground water contamination identified for the 1999 Report to Congress. Seven of the nine, including this site, were documented in EPRI's oil ash report; the two other sites were found in the 1993 Regulatory Determination and in RCRA Corrective Action records. Most of the nine sites evaluated were solid settling basins, while one site had a landfill and a second site had a solids disposal pond. At each of the nine sites, the waste management unit was found to negatively impact ground water in one of the following ways: (1) at least one constituent was found in down-gradient ground water monitoring wells above its MCL, but was not present in up-gradient wells above its MCL, or (2) a constituent exceeded its MCL both up-gradient and down-gradient, but the down-gradient concentrations were noticeably higher than the up-gradient concentrations. These constituents most often include manganese and nickel. Other parameters (including arsenic, cadmium, chromium, selenium, silver, and zinc) exceeded their MCL in down-gradient wells at only one of the sites. Although vanadium does not have an MCL, the parameter was found in ground water down-gradient of waste management units.

At several of the sites reviewed, EPA found that the waste management unit very likely contributes to the contamination of constituents, such as manganese, nickel, and vanadium, into ground water. Many of these sites are located next to the ocean or other large bodies of water where such releases can be diluted and no drinking water wells would be located between the management unit and the surface water. EPA did not find any cases of drinking water contamination or other environmental damages resulting from these releases. Additionally, most or all unlined units are operated under state permit allowing exceedances of ground water standards close to the management unit, but which must be met outside the zone of discharge.

Basis for Consideration as a Potential Damage Case: This case has been categorized as a potential damage case for the following reasons: exceedance of one or more MCL standards

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[82] Technical Background Document for the Report to Congress on Remaining Wastes from Fossil Fuel Combustion: Potential Damage Cases, March 15, 1999 (http://www.epa.gov/epaoswer/other/fossil/ffc2_397.pdf). Status of Alleged Damage Cases Submitted by HEC, et. al., to Dennis Ruddy, February, 2002. Brayton Point Administrative Consent Order (ACO-BO-00-2002, undated), Brayton Point Administrative Consent Order Timetable, August 22, 2006.

down flow from the plant's unlined wastewater treatment basins that does not impact drinking water wells offsite.

27. AES Creative Resources Weber Ash Disposal Site, New York[83]

History: Monitoring data at this site from between 1991 and 1998 show levels of sulfate, total dissolved solids, manganese, iron, aluminum, and pH in down-gradient wells in excess of their secondary MCLs. There is no information available on the location of these wells relative to the waste management units.

Basis for Consideration as a Potential Damage Case: The exceedances found at this site: sulfate, total dissolved solids, manganese, iron, aluminum, and pH, are of non-health-based standards. Therefore, this case is a potential damage case.

28. Central Hudson Gas and Electric Corporation Danskammer Waste Management Facility, New York[84]

History: There were exceedances of State non-health-based standards for sulfate, sulfide, total dissolved solids, turbidity, iron, magnesium, manganese, sodium, boron, and pH attributable to CCW at the site. It is unclear whether the exceedances of health-based standards were attributable to CCW.

Basis for Consideration as a Potential Damage Case: The contamination at the site: sulfate, sulfide, total dissolved solids, turbidity, iron, magnesium, manganese, sodium, boron, and pH did not appear likely to threaten human health or the environment. Therefore, this case was determined to be a potential damage case.

29. C. R. Huntley Flyash Landfill, New York[85]

History: There were exceedances of State health-based standards for arsenic and non-health-based standards for iron, manganese, sulfate, and total dissolved solids at this site's down-gradient wells. While there also were exceedances in up-gradient wells, there was statistical evidence of significant increases over up-gradient concentrations for several of these constituents. In addition, the State regulatory agency and the site contractor identified some of these constituents as potential indicators of leachate.

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[83] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000.

[84] Memorandum from SAIC to Dennis Ruddy regarding Final Revised Report on Resolution of 18 Previously Indeterminate Candidate Damage Cases, March 5, 2003.

[85] Ibid.

Basis for Consideration as a Potential Damage Case: All of the exceedances were in wells located on-site, close to the waste management unit. Therefore, this case was determined to be a potential damage case.

30. Elrama Plant, Pennsylvania[86]

History: EPA identified this site in its original 1988 Report to Congress on Wastes from the Combustion of Fossil Fuels by Electric Utility Power Plants. It is described in detail in that document. In the 1988 Report, EPA found concentrations of cadmium in down-gradient wells above the primary MCL; the highest concentrations were found in the well closest to the landfill. EPA concluded that coal combustion wastes have been a source of contamination at the site, but also concluded that exceedances for many contaminants were probably due to concurrent contamination from acid mine drainage.

Basis for Consideration as a Potential Damage Case: While levels of cadmium exceed the primary MCL, the contamination appears to be at least partially attributable to sources other than coal combustion wastes. Therefore, this case is a potential damage case.

31. Tennessee Valley Authority - Bull Run Steam Plant, Oak Ridge, Tennessee[87]

Basis for Consideration as a Potential Damage Case: This case was categorized as a potential damage case for the following reasons: (1) exceedances of the secondary MCLs for aluminum, calcium, iron, and sulfate were detected in on-site surface water; (2) a toxicity study indicates the potential for ecological impacts; and (3) these impacts appear to be directly attributable to CCW management.

32. Tennessee Valley Authority Widows Creek Fossil Fuel Plant, Alabama[88]

History: Monitoring data at this site show lead in excess of the primary MCL Action Level. This exceedance, however, occurred in an on-site well that appears to be opposite the direction of ground water flow. Still, in a 1993 memorandum, the Alabama Department of Environmental Management (ADEM) expressed concern with this exceedance and elevated levels of cadmium and chromium (which did not exceed their primary MCLs) in this well and recommended that corrective action measures be established.

Basis for Consideration as a Potential Damage Case: While the ADEM has expressed concern with on-site contamination and recommended that corrective action measures be established,

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[86] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000. Compendium of nineteen alleged coal combustion wastes damage cases, May 3, 2007.

[87] Compendium of nineteen alleged coal combustion wastes damage cases, May 3, 2007.

[88] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000.

there is no evidence available of off-site migration of contaminants. Therefore, this case is a potential damage case.

33. Tennessee Valley Authority Colbert Fossil Fuel Plant, Alabama[89]

History: Only limited information on this site was available from the commenters. The commenters' summary of monitoring data shows no exceedances of primary MCLs in ground water at the site. The only primary MCL exceedances (for sulfate, chromium and selenium) reported by the commenters are found in a well installed within the saturated ash of the surface impoundment. A 1998 letter from the facility owner to the ADEM, however, does indicate some exceedances of primary MCLs in on-site wells that the owner proposes to eliminate from its sampling program. The only constituent identified in this letter is cadmium. The commenters report that ADEM believes ground water contamination has resulted from the disposal of coal combustion wastes at this facility. An ADEM geologist also reported to the commenters that the disposal area has been subject to collapse into a karst sinkhole.

Basis for Consideration as a Potential Damage Case: While some primary MCL exceedances (for sulfate, chromium and selenium) appear to have occurred in on-site wells, there is no evidence available of off-site migration of contaminants. Therefore, this case is a potential damage case.

34. Duke Power Allen Steam Generating Plant, North Carolina[90]

History: The Allen Plant of Duke Power Company was included in a study of waste disposal at coal-fired power plants conducted by Arthur D. Little, Inc (ADL) in 1985. ADL conducted ground water sampling in 18 monitoring wells installed on-site, detecting exceedances of manganese and iron, both secondary water quality standards.

Contact was made with North Carolina Department of Environment and Natural Resources (DENR). According to those contacted, the State has only surface water discharge information for this facility. There is no record of ground water monitoring at the facility, and no indication that violations or enforcement actions occurred at the facility. A permit check determined that ground water monitoring at the site is not required by the facility permit. There is no indication that any ground water samples have been tested since the 1985 study.

Basis for Consideration as a Potential Damage Case: According to the 1985 data, there were documented exceedances of manganese and iron, non-health-based standards, in wells downstream from the waste management unit. Therefore, this site is categorized as a potential damage case.

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[89] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000. TVA Colbert ground water data, undated.

[90] Memorandum from SAIC to Dennis Ruddy regarding Final Revised Report on Resolution of 18 Previously Indeterminate Candidate Damage Cases, March 5, 2003. Compendium of nineteen alleged coal combustion wastes damage cases, May 3, 2007.

35. Cinergy East Bend Scrubber Sludge Landfill, Kentucky[91]

History: Commenters identified this site in a table that alleged an estimated 300 tons of sulfate per year is leaking into the Ohio River from this site. This site was initially classified as indeterminate because the commenters did not identify the source of the information and no quantitative data or further information about this site was available.

Subsequently, additional information was obtained through the Kentucky Department of Environmental Protection (DEP). According to the DEP, there were on-site exceedances of non-health-based standards for total dissolved solids, iron, and sulfate at this site. The State has taken regulatory action based on these exceedances.

Basis for Consideration as a Potential Damage Case: Based on the on-site exceedances of non-health-based standards for total dissolved solids, iron, and sulfate at this site, and subsequent State regulatory action based on these exceedances, this case is a potential damage case.

36. Florida Power and Light Lansing Smith Plant, Florida[92]

History: EPA initially identified this site in the supplemental analysis conducted for its 1993 Regulatory Determination[93]. As a result of this analysis, EPA rejected this site as a damage case because there was no evidence that coal combustion wastes were comanaged with low-volume wastes at this site. A subsequent evaluation of the information for this site indicates that there were documented exceedances of primary drinking water standards for cadmium, chromium and fluoride and secondary drinking water standards for sulfate, chloride, manganese and iron in on-site ground water attributable to CCW.

Basis for Consideration as a Potential Damage Case: This site has been reclassified as a potential damage case Based on documented exceedances of primary drinking water standards for cadmium, chromium and fluoride and secondary drinking water standards for sulfate, chloride, manganese and iron in on-site ground water attributable to CCW.

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[91] Memorandum from SAIC to Dennis Ruddy regarding Final Revised Report on Resolution of 18 Previously Indeterminate Candidate Damage Cases, March 5, 2003.

[92] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000. Status of Alleged Damage Cases Submitted by HEC, et. al., to Dennis Ruddy, February, 2002. Compendium of nineteen alleged coal combustion wastes damage cases, May 3, 2007.

[93] Supplemental Analysis of Potential Risks to Human Health and the Environment from Large-Volume Coal Combustion Waste. U.S. EPA. July 30, 1993. Available from the docket for the 1993 Regulatory Determination for Fossil Fuel Combustion (Part 1), EPA-HQ-RCRA-1993-0042-1642.

37. Florida Power and Light Port Everglades Plant, Florida[94]

History: This is one of nine sites managing oil combustion wastes that have ground water contamination identified for the 1999 Report to Congress. Seven of the nine, including this site, were documented in EPRI's oil ash report; the two other sites were found in the 1993 Regulatory Determination and in RCRA Corrective Action records. Most of the nine sites evaluated were solid settling basins, while one site had a landfill and a second site had a solids disposal pond. At each of the nine sites, the waste management unit was found to negatively impact ground water in one of the following ways: (1) at least one constituent was found in down-gradient ground water monitoring wells above its MCL, but was not present in up-gradient wells above its MCL, or (2) a constituent exceeded its MCL both up-gradient and down-gradient, but the down-gradient concentrations were noticeably higher than the up-gradient concentrations. These constituents most often include manganese and nickel. Other parameters (including arsenic, cadmium, chromium, selenium, silver, and zinc) exceeded their MCL in down-gradient wells at only one of the sites. Although vanadium does not have an MCL, the parameter was found in ground water down-gradient of waste management units.

At several of the sites reviewed, EPA found that the waste management unit very likely contributes to the contamination of constituents, such as manganese, nickel, and vanadium, into ground water. Many of these sites are located next to the ocean or other large bodies of water where such releases can be diluted and no drinking water wells would be located between the management unit and the surface water. EPA did not find any cases of drinking water contamination or other environmental damages resulting from these releases. Additionally, most or all unlined units are operated under state permit allowing exceedances of ground water standards close to the management unit, but which must be met outside the zone of discharge.

Basis for Consideration as a Potential Damage Case: This case has been categorized as a potential damage case for the following reasons: exceedance of one or more MCL standards down flow from the plant's disposal facility that does not impact drinking water wells offsite.

38. Florida Power and Light Riviera Plant[95]

See the preceding description for the Port Everglades Plant.

39. Florida Power and Light P.L. Bartow Plant[96]

See the preceding description for the Port Everglades Plant.

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[94] Technical Background Document for the Report to Congress on Remaining Wastes from Fossil Fuel Combustion: Potential Damage Cases, March 15, 1999 (http://www.epa.gov/epaoswer/other/fossil/ffc2_397.pdf).

[95] Ibid.

[96] Ibid.

40. Commonwealth Edison Powerton Plant - Mahoney Landfill, Pekin, Tazewell County, Illinois[97]

History: This case was originally identified during the review of candidate damage cases for the 1988 Report to Congress on Wastes from the Combustion of Coal by Electric Utility Power Plants. Although it was rejected as a proven damage case in EPA's 1993 Supplemental Analysis of Potential Risks to Human Health and the Environment from Large-Volume Coal Combustion Waste (EPA 1993), this case was re-examined in light of EPA's subsequently developed criteria for categorizing cases as "potential" damage cases.

There were exceedances of primary MCLs for cadmium, lead, and nitrate and secondary MCLs for iron, manganese, and sulfate in ground water and surface water at the site. The exceedances of secondary MCLs in ground water appear attributable to management of CCW.

Basis for Consideration as a Potential Damage Case: All the reported exceedances that are attributable to management of CCW are for constituents with non-health-based standards and are located in on-site wells. Therefore, this case was categorized as a potential damage case.

41. Xcel Energy/Southern Minnesota Municipal Power Agency - Sherburne County (Sherco) Generating Plant Becker, Minnesota[98]

History: This case was originally identified during the review of candidate damage cases for the 1988 Report to Congress on Wastes from the Combustion of Coal by Electric Utility Power Plants. Although it was rejected as a proven damage case in EPA's 1993 Supplemental Analysis of Potential Risks to Human Health and the Environment from Large-Volume Coal Combustion Waste (EPA 1993), this case was re-examined in light of EPA's subsequently developed criteria for categorizing cases as "potential" damage cases.

There were exceedances of primary MCLs for arsenic, cadmium, chromium, fluoride, lead, and nitrate and secondary MCLs for chloride, copper, iron, manganese, sulfate, and zinc at the site, at least some of which appear attributable to management of CCW. While a scientific study indicated the potential for future increases in contamination, more recent data were not available.

Basis for Consideration as a Potential Damage Case: The reported exceedances of both primary and secondary MCLs were located in on-site wells and the potential for off-site migration of contamination may be limited. Therefore, this case was categorized as a potential damage case.

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[97] Compendium of nineteen alleged coal combustion wastes damage cases, May 3, 2007.

[98] Ibid.

42. Alliant Rock River Ash Disposal Facility, Wisconsin[99]

History: Monitoring data at this site show down-gradient levels of arsenic and mercury that would exceed the Wisconsin Department of Natural Resources (WDNRs) drinking water enforcement standard (ES) levels (equivalent to primary MCLs). The data also show down-gradient levels of sulfate and iron that would exceed their ES levels (equivalent to secondary MCLs for these constituents). According to information provided by WDNR, however, the site has no down-gradient ES points of standards application due to its proximity to the Rock River (i.e., all wells are within the design management zone of the landfill). Thus, the State considers the preventive action limit (PAL) exceedances, not ES exceedances. The preventive action limit represents a lesser concentration of the substance than the enforcement standard[100]. In 1996, as a result of the PAL exceedances for sulfate and iron, WDNR required the company to begin submitting biennial ground water reports evaluating causes and trends relating to the continued PAL exceedances. Ongoing monitoring at the site includes indicator parameters and iron.

Basis for Consideration as a Potential Damage Case: Whereas the levels of arsenic and mercury in down-gradient wells exceed health-based enforcement standards, these exceedances are within the design management zone of the landfill and there is no evidence available of off-site migration of contaminants. Therefore, this case was determined to be a potential damage case.

43. Michigan City Site, Michigan City, Indiana[101]

History: EPA identified this site in its original 1988 Report to Congress on Wastes from the Combustion of Fossil Fuels by Electric Utility Power Plants. It is described in detail in that document. In the 1988 Report, EPA concluded that ash ponds at the site are responsible for arsenic concentrations above the primary Maximum Contaminant Limit (MCL). EPA also concluded, however, that effects on ground water appeared to be limited to areas within the facility boundaries.

Basis for Consideration as a Potential Damage Case: While levels of arsenic found on-site exceed the primary MCL, there was no evidence available of off-site migration of contaminants. Therefore, this case is a potential damage case.

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[99] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000.

[100] The PAL is either 10%, 20%, or 50% of the enforcement standard as specified by statute based on the health-related characteristics of the particular substance. Ten percent is used for cancer-causing substances, 20% for substances with other health effects and 50% for substances having aesthetic or other public-welfare concerns.

[101] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000. Compendium of nineteen alleged coal combustion wastes damage cases, May 3, 2007.

44. Bailly Generating Station, Indiana[102]

History: EPA identified this site in its original 1988 Report to Congress on Wastes from the Combustion of Fossil Fuels by Electric Utility Power Plants. The site is identified as the "Bailly Site, Dune Acres, Indiana" and described in detail in that document. In the 1988 Report, EPA concluded that leachate from ash disposal ponds was the most probable contributor to concentrations of arsenic and lead that were found above the primary MCL and primary MCL Action Level, respectively, in on-site, down-gradient wells. EPA also observed, however, that cadmium was the only constituent whose down-gradient off-site concentration exceeded the primary MCL. Elevated cadmium concentrations also were found in samples taken from the background well, leading EPA to conclude that the elevated down-gradient concentrations of cadmium may not have been caused by leachate from the coal ash.

Basis for Consideration as a Potential Damage Case: While levels of arsenic and lead found on-site exceed health-based standards, the only off-site exceedances of health-based standards (for cadmium) are not shown to be attributable to coal combustion waste. Therefore, this case is a potential damage case.

45. Alliant Edgewater 1-4 Ash Disposal Site, Wisconsin[103]

History: Monitoring data at the site show down-gradient levels of boron that exceed WDNR's health-based ES level[104]. Additional data shows that private water supply wells have shown ES exceedances for sulfate and iron (equivalent to secondary MCLs for these contaminants) and PAL exceedances for chloride. As a result of these exceedances, WDNR required a series of investigations from 1988 to 1997. The investigations found that cessation of ash sluicing and capping of the landfill had effectively controlled the contamination of ground water and no additional remedial actions were required. Ongoing monitoring at the site (including monitoring of the private wells) includes boron, sulfate, and arsenic. Previous monitoring included selenium, iron, fluoride, and chloride.

Basis for Consideration as a Potential Damage Case: The level of boron found down-gradient exceeds a health-based standard. It is unclear, however, whether this exceedance is in an off-site monitoring location. The exceedances found in off-site private wells are for constituents without health-based standards. Therefore, this case is a potential damage case.

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[102] Ibid.

[103] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000.

[104] As of January 1, 2000, Wisconsin elevated boron to the status of a human health-related parameter.

46. Wisconsin Power Supply Co. (WPSC) Pulliam Ash Disposal Site, Wisconsin[105]

History: Monitoring data at this site showed down-gradient levels of sulfate and manganese that would exceed WDNR's ES levels (equivalent to secondary MCLs for these constituents) and levels of iron that exceed WDNR's PAL. According to information provided, however, the site had no down-gradient ES points of standards application (i.e., all wells are within the design management zone of the landfill). Thus, the State would consider the sulfate and manganese exceedances to be PAL, not ES, exceedances. Further review by WDNR found an inadequate monitoring network at the facility. Therefore, in 1994, WDNR required an investigation of the ground water contamination and an upgrade of the monitoring network. Ongoing monitoring at the site includes indicator parameters plus boron, selenium, manganese, and iron.

Basis for Consideration as a Potential Damage Case: The exceedances found at this site, sulfate, manganese and iron, are within the design management zone of the landfill and are for constituents without health-based standards. Therefore, this case is a potential damage case.

47. Central Illinois Light Co. Duck Creek Station, Illinois[106]

History: Monitoring data at this site from April 1999 showed levels of sulfate, total dissolved solids, chloride, manganese, and iron in excess of their secondary MCLs. There is no clear indication of down-gradient wells or whether these wells are on-site or off-site.

Basis for Consideration as a Potential Damage Case: The exceedances found at this site, sulfate, total dissolved solids, chloride, manganese and iron, are of non-health-based standards. Therefore, this case is a potential damage case.

48. Illinois Power Co. Hennepin Power Station, Illinois[107]

History: Monitoring data at this site from between 1997 and 1999 showed levels of sulfate and total dissolved solids in down-gradient wells in excess of their secondary MCLs. There is no information available on the location of these wells relative to the waste management units. There is no monitoring data for metals at this site.

Basis for Consideration as a Potential Damage Case: The exceedances found at this site, sulfate and total dissolved solids, are of non-health-based standards. Therefore, this case is a potential damage case.

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[105] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000.

[106] Ibid.

[107] Ibid.

49. Illinois Power Co. Havanna Power Plant, Illinois[108]

History: Monitoring data at this site between 1997 and 1999 showed levels of manganese down-gradient of the south ash impoundment in excess of the secondary MCL. The data also show levels of sulfate down-gradient of the east ash impoundment greater than up-gradient levels, but within the secondary MCL. There is no information available on the location of the monitoring wells relative to the waste management units.

Basis for Consideration as a Potential Damage Case: The exceedances found at this site, manganese and sulfate, are of non-health-based standards. Therefore, this case is a potential damage case.

50. Dairyland Power Alma On-site Fly Ash Landfill, Wisconsin[109]

History: EPA initially identified this site in the supplemental analysis conducted for its 1993 Regulatory Determination[110]. This analysis, along with additional information submitted by commenters, shows down-gradient levels of sulfate and manganese that would exceed WDNR's ES levels (equivalent to secondary MCLs for these constituents). According to information provided by WDNR, however, there are no ES points of standards application at the site (i.e., all wells are within the design management zone of the landfill). Thus, the State considers these exceedances PAL, not ES exceedances. In 1975, WDNR issued an administrative order as a result of an inspection that disclosed a number of operational and locational problems at the facility. Among other things, the order required submission of a closure plan and an in-field conditions report. The closure plan was approved in 1981 and included ground water monitoring. In 1986, the Department required the company to install additional monitoring wells and to monitor seven private water supply wells for two rounds of monitoring. Ongoing monitoring at the site includes indicator parameters plus manganese and boron.

Basis for Consideration as a Potential Damage Case: While the State has taken regulatory action at this site, the action appears to be based on operational and locational problems, not evidence of contamination. The exceedances found at the site, sulfate and manganese, are of non-health-based standards. Therefore, this case is a potential damage case.

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[108] Ibid.

[109] Ibid.

[110] Supplemental Analysis of Potential Risks to Human Health and the Environment from Large-Volume Coal Combustion Waste. U.S. EPA. July 30, 1993. Available from the docket for the 1993 Regulatory Determination for Fossil Fuel Combustion (Part 1), EPA-HQ-RCRA-1993-0042-1642.

51. Dairyland Power Alma Off-site Fly Ash Landfill, Wisconsin[111]

History: EPA initially identified this site in the supplemental analysis conducted for its 1993 Regulatory Determination[112]. This analysis, along with additional information submitted by commenters, shows down-gradient levels of sulfate and manganese that would be in excess of WDNR's ES levels (equivalent to secondary MCLs for these constituents). The monitoring data also show levels of boron that exceed WDNR's PAL. According to information provided by WDNR, however, the sulfate and manganese exceedances were not found at ES points of application; they were found in an on-site well within the design management zone of the landfill. Thus, the State considers the exceedances PAL, not ES, exceedances. None of the ES wells for the site have shown exceedances. Because of the PAL exceedances and a proposal by the owner to expand the ash disposal area, WDNR required an analysis of the performance of the existing landfill along with an upgraded liner system and other design improvements for the new facility on the site. Ongoing monitoring at the site includes indicator parameters plus iron and boron, although the company has monitored some wells for a list of metals as part of the siting for the expansion.

Basis for Consideration as a Potential Damage Case: While the State has taken regulatory action at the site, the exceedances found at this site, sulfate and manganese, are within the design management zone of the landfill and are for constituents without health-based standards. Therefore, this case is a potential damage case.

52. Illinois Power Vermillion Power Station, Illinois[113]

History: Monitoring data at this site showed levels of sulfate and total dissolved solids in down-gradient wells in excess of their secondary MCLs. No monitoring data for metals, trace elements, or organics were available.

Basis for Consideration as a Potential Damage Case: The exceedances found at this site, sulfate and total dissolved solids, are of non-health-based standards. Therefore, this case is a potential damage case.

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[111] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000.

[112] Supplemental Analysis of Potential Risks to Human Health and the Environment from Large-Volume Coal Combustion Waste. U.S. EPA. July 30, 1993. Available from the docket for the 1993 Regulatory Determination for Fossil Fuel Combustion (Part 1), EPA-HQ-RCRA-1993-0042-1642.

[113] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000.

53. Central Illinois Public Service Company Hutsonville Power Station, Illinois[114]

History: Monitoring data at this site showed levels of sulfate, total dissolved solids, and manganese in excess of their secondary MCLs. These exceedances were in wells that were presumed by the commenters to be down-gradient. There is no clear indication of down-gradient wells or whether these wells are on-site or off-site. No monitoring data for metals, trace elements, or organics were available.

Basis for Consideration as a Potential Damage Case: The exceedances found at this site, sulfate, total dissolved solids and manganese, are of non-health-based standards. Therefore, this case is a potential damage case.

54. Illinois Power Company Wood River Power Station, Illinois[115]

History: Monitoring data at this site showed levels of sulfate, total dissolved solids, chloride, manganese, and iron in excess of their secondary MCLs. It is unclear from the information provided whether these exceedances were observed in wells close to the waste management unit boundaries or in more distant wells. All of the monitoring wells, however, appear to be within the property boundary. There is insufficient information to designate wells at this site as up-gradient or down-gradient.

Basis for Consideration as a Potential Damage Case: The exceedances found at this site, sulfate, total dissolved solids, chloride, manganese and iron, are of non-health-based standards. Therefore, this case is a potential damage case.

55. R.M. Schahfer Generating Station, IN[116]

History: EPA initially identified this site in the supplemental analysis conducted for its 1993 Regulatory Determination[117]. This analysis, along with additional information submitted by commenters, showed down-gradient levels of sulfate in excess of its secondary MCL. EPA concluded in the supplemental analysis that other pollutant exceedances at the site appeared to be outliers or were for up-gradient wells only.

Basis for Consideration as a Potential Damage Case: The sulfate exceedances found at this site are of non-health-based standards. Therefore, this case is a potential damage case.

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[114] Ibid.

[115] Ibid.

[116] Ibid.

[117] Supplemental Analysis of Potential Risks to Human Health and the Environment from Large-Volume Coal Combustion Waste. U.S. EPA. July 30, 1993. Available from the docket for the 1993 Regulatory Determination for Fossil Fuel Combustion (Part 1), EPA-HQ-RCRA-1993-0042-1642.

56. Coffeen/White & Brewer Trucking Fly Ash Landfill, Illinois[118]

History: Monitoring data at this site showed levels of sulfate, total dissolved solids, and manganese in down-gradient wells in excess of their secondary MCLs. Two of the three wells for which the commenters provided data appear to be located directly underneath the landfill area. A May 18, 1995 memorandum from the Illinois Environmental Protection Agency (IEPA) documents areas of dead or distressed grass on-site, apparently due to ground water seepage.

Basis for Consideration as a Potential Damage Case: The exceedances found at this site, sulfate, total dissolved solids and manganese, are of non-health-based standards. Therefore, this case is a potential damage case.

57. Southern Indiana Gas and Electric Company (SIGECO) A.B Brown Generating Station, Indiana[119]

History: EPA initially identified this site in the supplemental analysis conducted for its 1993 Regulatory Determination[120]. This analysis, along with additional information submitted by commenters, shows down-gradient levels of sulfate, total dissolved solids, chloride, and pH in excess of their secondary MCLs.

Basis for Consideration as a Potential Damage Case: The exceedances found at this site, sulfate, total dissolved solids, chloride and pH, are of non-health-based standards. Therefore, this case is a potential damage case.

58. Cincinnati Gas & Electric Co. Miamiview Landfill, Ohio[121]

History: Monitoring data at this site from 1994 show levels of sulfate in excess of its secondary MCL. This exceedance was identified in a well near the boundary of the landfill. An investigation of the site estimates that the sulfate plume extends to an area approximately 400 feet south of the site[122]. No data are available for other constituents for the site.

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[118] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000.

[119] Ibid.

[120] Supplemental Analysis of Potential Risks to Human Health and the Environment from Large-Volume Coal Combustion Waste. U.S. EPA. July 30, 1993. Available from the docket for the 1993 Regulatory Determination for Fossil Fuel Combustion (Part 1), EPA-HQ-RCRA-1993-0042-1642.

[121] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000.

[122] Report: Sulfate Investigation, Miamiview Landfill, Hamilton County, Ohio. Prepared for the Cincinnati Gas & Electric Company by Dames & Moore. December 13, 1994. Available in the docket titled Availability of Report to Congress on Fossil Fuel Combustion; Request for Comments and Announcement of Public Hearing, EPA-HQ-RCRA-1999-0022-0632.

Basis for Consideration as a Potential Damage Case: The sulfate exceedances found at this site are of non-health-based standards. Therefore, this case is a potential damage case.

59. Indiana Power & Light Petersburg Generating Station, Indiana[123]

History: Monitoring data at this site showed levels of sulfate and total dissolved solids in down-gradient wells in excess of their secondary MCLs. There is no information available on the location of these wells relative to the waste management units.

Basis for Consideration as a Potential Damage Case: The exceedances found at this site, sulfate and total dissolved solids, are of non-health-based standards. Therefore, this case is a potential damage case.

60. Hoosier Energy Mermon Generating Station Coal Combustion Waste Landfill, Indiana[124]

History: The historical exceedances of health-based standards (primary MCLs for barium, chromium, cadmium, and lead and secondary MCLs for sulfate and chloride) at this site are correlated with up-gradient exceedances and occur in on-site wells.

Basis for Consideration as a Potential Damage Case: The exceedances found at this site, primary MCLs for barium, chromium, cadmium, and lead and secondary MCLs for sulfate and chloride, are all confined to on-site wells. . Therefore, this case is a potential damage case.

61. Cinergy W.C. Beckjord Station, Ohio[125]

History: There were exceedances of non-health-based standards (secondary MCL for sulfate) and a single exceedance of a health-based standard (primary MCL for selenium) at this site. There was no evidence available of off-site migration. A public water supply well within the property boundary was shut down and can no longer be used as a drinking water supply as a direct or indirect result of the contamination due to exceedance of sulfate.

Basis for Consideration as a Potential Damage Case: While a public water supply well within the property boundary was shut down, the contaminant of concern (sulfate) in the water supply well does not have a health-based standard. Therefore, this case is a potential damage case.

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[123] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000.

[124] Memorandum from SAIC to Dennis Ruddy regarding Final Revised Report on Resolution of 18 Previously Indeterminate Candidate Damage Cases, March 5, 2003.

[125] Ibid.

62. Lemberger Landfill, Wisconsin[126]

History: The 21-acre Lemberger Landfill, Inc. site is located in Manitowoc County. The Township of Franklin used the site, an old gravel pit, as an open dump from 1940 to 1970. Lemberger Landfill, Inc. operated the site as a sanitary landfill under a license from the Wisconsin Department of Natural Resources (WDNR) from 1969 to 1976. From 1976 to 1977, the Wettencamp and Brunner Excavating Company transported fly ash from Manitowoc Public Utilities to the Lemberger facility. An estimated 1,750 to 2,500 cubic yards of fly ash were disposed of monthly. Past WDNR inspections showed that Lemberger used fly ash and bottom ash as cover, instead of burying them along with the refuse.

Damages at the site include the seepage of landfill leachate onto adjacent property. Ground water at the site is contaminated with volatile organic compound (VOC) and inorganic constituents including arsenic, barium, chromium, cadmium, and lead. VOCs were present in residential wells in the vicinity of the site, according to monitoring conducted by the State in 1984 and 1985; and a river near the site also is impacted by VOCs, cadmium and lead. A group of potentially responsible parties (PRPs) entered into a consent decree (CD) with U.S. EPA in 1992 to perform design and remedy implementation activities. Construction was completed in September 1996. The five-year review of September 2000 identified that the groundwater extraction system was not capturing the entire contaminant plume. In order to correct this problem, modifications to the groundwater extraction system were constructed in winter 2001.

On June 15, 2006, U.S. EPA and WDNR approved the PRP's workplan for the monitored natural attenuation pilot study and gave approval to shut down the groundwater pump and treat system. The pump and treat system was shut down on August 1, 2006[127].

Basis for Consideration as a Potential Damage Case: Because the available documentation does not clearly implicate, or rule out, coal combustion waste as a source of the contamination, this case is a potential damage case.

63. Conesville Fixed FGD Sludge Landfill, Ohio[128]

History: EPA identified this site in its original 1988 Report to Congress on Wastes from the Combustion of Fossil Fuels by Electric Utility Power Plants. Ground water monitoring data are described in detail in the report.

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[126] Memorandum from SAIC to Dennis Ruddy regarding Additional Information Regarding Fossil Fuel Combustion Waste Damage Cases, April 20, 2000. Memorandum from SAIC to Dennis Ruddy regarding Review of Causative Factors for Coal Combustion Waste Damage Cases, November 29, 2000.

[127] http://www.epa.gov/R5Super/npl/wisconsin/WID980901243.htm

[128] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000. Compendium of nineteen alleged coal combustion wastes damage cases, May 3, 2007.

Thirty-four monitoring wells were installed (two up-gradient) to monitor the effectiveness of a Poz-O-Tec fixation process (fluidized gas desulfurization (FGD) sludge mixed with fly ash and lime) to stabilize and thus immobilize potential contaminants. The stabilized FGD sludge was deposited next to the fly ash pond.

Two sets of samples were collected, one between February 27 and April 12, 1979 and the other between December 4, 1979 and July 10, 1980. Samples from the first set of data contained lead concentrations which exceeded the primary drinking water standard (PDWS) in two on-site wells and three off-site wells. Samples from on-site wells in the first set of data also showed increases above background levels in the secondary drinking water standards (SDWS) of calcium, magnesium, total dissolved solids (TDS), sulfate and iron.

In the second set of data, samples from on-site wells showed increases in calcium, magnesium, TDS and sulfate relative to the first set of data. Exceedances of the PDWS for arsenic, cadmium, chromium and selenium were found in on-site wells and exceedances of the PDWS for chromium were found in off-site wells. Lead was not detected in any of the second set of samples.

Elevated levels of selenium were detected in up-gradient wells in both the first and second sets of samples suggesting that selenium is originating from indigenous sediments rather than coal combustion wastes. The only constituents that appeared to be migrating off-site were lead in the first set of sampling and chromium in the second set of sampling.

Based on data collected, there appeared to be a temporal change in ground water quality at this site, and potential adverse impacts from constituents migrating off-site appeared to be limited. While the data indicated that lead and chromium appeared to be migrating off-site, EPA rejected this site as a damage case due to apparent limited potential adverse impacts. Subsequent to the March 2000 Regulatory Determination, this site was reevaluated and rejected as a damage case because there was no evidence that coal combustion wastes were comanaged with low-volume wastes at this site so the site was not covered by that Regulatory Determination[129]. Since then, the Agency has learned that the site receives various types of coal combustion wastes, including fly ash, and is covered by the March 2000 Regulatory Determination.

Basis for Consideration as a Potential Damage Case: Based on the on-site ground water contamination of the cited secondary drinking water standards (calcium, magnesium, total dissolved solids, sulfate and iron), and of primary drinking water standards (arsenic, cadmium, chromium and selenium) and the limited potential for the off-site migration of contaminants, this site has been reclassified as a potential damage case.

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[129] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000.

64. Muscatine County Landfill, Iowa[130]

History: It is not clear, based on the available data, if the currently active facility was constructed on the same site as the older, closed landfill. However, the issue of whether or not the sites are the same does not affect the analysis here, because the available data for the active site do not cover the constituents of concern (sulfate and selenium) for the older site. Further research is unlikely to find any additional information about the old facility. Therefore, conclusions about this site are based on the limited historical data.

Basis for Consideration as a Potential Damage Case: The exceedances of non-health-based standards (secondary MCL for sulfate) and possibly a single health-based standard (primary MCL for selenium) at this site are in wells located on-site, close to the waste management unit. Therefore, this case is a potential damage case.

65. Dave Johnston Power Plant, Wyoming[131]

History: Exceedances of the primary MCL for cadmium and the secondary MCLs for manganese and sulfate were observed in ground water up-gradient and down-gradient of the site. Interpretations of sampling results were difficult to make because other potential sources of contamination exist, such as other waste disposal areas at the site; contaminants naturally occurring in the soil which is highly mineralized around the Johnston site; and uncertainties with regard to what degree leachate from the two landfills had reached the down-gradient wells.

Basis for Consideration as a Potential Damage Case: Whereas exceedances of the primary MCL (cadmium) and the secondary MCLs (manganese and sulfate) were observed in ground water down-gradient of the site, the natural occurrence of mineralization products in the local soils and possible and other potential sources of contamination Therefore, this case is a potential damage case.

66. Montana-Dakota Utilities R.M. Heskett Station, North Dakota[132]

History: Monitoring data at this site from 1998 show levels of sulfate and boron immediately down-gradient of an old ash pile in excess of the secondary MCL. According to the NDDOH, the State required the company "... to install ground water monitoring wells and implement a closure plan. Since that time, the site has been effectively closed and is currently revegetated

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[130] Memorandum from SAIC to Dennis Ruddy regarding Final Revised Report on Resolution of 18 Previously Indeterminate Candidate Damage Cases, March 5, 2003.

[131] Compendium of nineteen alleged coal combustion wastes damage cases, May 3, 2007.

[132] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000.

with a good stand of growth. The ground water monitoring data indicate that impact to ground water has been reduced since closure of the site[133]."

Basis for Consideration as a Potential Damage Case: While the State has taken regulatory action at this site, the sulfate and boron exceedances found are of non-health-based standards. Therefore, this case is a potential damage case.

67. Arizona Public Service Co. Cholla Steam Electric Generating Station, Arizona[134]

History: Monitoring data at this site show levels of sulfate, total dissolved solids, chloride, and fluoride in excess of their secondary MCLs. These exceedances are found in a well located directly at the foot of the fly ash pond. The affected aquifer has "naturally poor water quality," but no background or up-gradient data are available. The commenters use a comparison to distant alluvial ground water to implicate pond leachate as a source of contamination. The commenters also allege that construction of the waste management units has caused naturally poor quality water from upper aquifers to contaminate the pristine lower aquifer, regardless of leachate contamination.

Basis for Consideration as a Potential Damage Case: The exceedances found at this site, sulfate, total dissolved solids, chloride and fluoride, are of non-health-based standards and are in a well directly at the foot of a waste management unit. Therefore, this case is a potential damage case.

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[133] Attachment B to the letter from the Hoosier Environmental Council to Dennis Ruddy regarding damage case sites, November 11, 1999, Document ID # EPA-HQ-RCRA-1999-0022-1235 in the docket titled Comments In Response To The April 28, 1999 Federal Register: Availability Of Report To Congress On Fossil Fuel Combustion: Request For Comments And Announcement Of Public Hearing, Attachment B: Report On R.M. Heskett Station. The Report On R.M. Heskett Station is accessible at: http://www.hecweb.org/ProgramsandInitatives/CCW/heskett.pdf

[134] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000.

I/A

Rejected Coal Combustion Waste Damage Cases (Excluding Minefills)

IV. Rejected Damage Cases

The following alleged damage cases were rejected due to either (1) lack of any evidence of damage or (2) lack of evidence that damages were uniquely associated with CCW.

68. American Coal Corporation #5 Landfill[135]

No information available

69. Cardinal PFBC Monofill[136]

According to Ohio EPA representatives, the Cardinal PFBC Monofill is used for the disposal of bed ash from the Ohio Power Cardinal Power Plant. The monofill was constructed on top of the closed Fly Ash Reservoir I Impoundment. The State has ground water monitoring data for the site, but the representatives could not confirm the presence of any suspected impacts. The data do not show any exceedences of primary or secondary MCLs. Furthermore, according to the State's hydrogeologists, interpretation of the data is occluded by mining impacts in the area. There are no exceedences of primary or secondary MCLs at this site. Therefore, this site is categorized as a case without documented evidence of proven or potential damage to human health or the environment.

70. Cardinal Fly Ash Reservoir II Impoundment[137]

According to Ohio EPA representatives, the Cardinal Fly Ash Reservoir II Impoundment is used for the disposal of fly ash from the Ohio Power Cardinal Power Plant. The State has ground water monitoring data for the site, but the representatives could not confirm the presence of any suspected impacts. The data do not show any exceedences of primary or secondary MCLs. Furthermore, according to the State's hydrogeologists, interpretation of the data is occluded by mining impacts in the area. There are no exceedences of primary or secondary MCLs at this site. Therefore, this site is categorized as a case without documented evidence of proven or potential damage to human health or the environment.

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[135] Memorandum from SAIC to Dennis Ruddy regarding Revised Identification of New Candidate Damage Cases, December 7, 2001.

[136] Ibid.

[137] Ibid.

71. Clinch River, Virginia[138]

EPA identified this site in its original 1988 Report to Congress on Wastes from the Combustion of Fossil Fuels by Electric Utility Power Plants. It is described in detail in that document. EPA concluded that this site represented a proven damage case for purposes of the 1993 Regulatory Determination. In conducting its analysis for the 1999 Report to Congress, however, EPA concluded that there was no evidence of comanagement at this site. EPA therefore rejected this site as a damage case for purposes of the 1999 Report to Congress.[139]

72. Copicut Road[140]

Monitoring results do not document any exceedances of federal or state standards (Ruddy 2001), except for pH. The ground water pH was below (more acidic than) its minimum secondary MCL both prior to and during placement (PG&E undated). Because acidic ground water was present prior to ash placement, this exceedance cannot be attributed to ash placement. Monitoring data for the site reveal no exceedances of primary or secondary MCLs attributable to coal combustion waste placement at the site. Therefore, this case is categorized as a case without documented evidence of proven or potential damage to human health or the environment.[141]

73. Dixie Caverns County Landfill, Virginia[142]

Dixie Caverns Landfill was operated by Roanoke County, Virginia, as a disposal site for municipal refuse, solvents, and fly ash. When the landfill was closed in 1976, it was not capped and an intermittent stream on the site flowed through a large drum pile and the fly ash pile and emptied into the Roanoke River, approximately two miles southeast of the landfill. There was also a sludge disposal pit on site. The contaminants identified on site include lead, cadmium, zinc, silver, iron, benzene, substituted benzene, chlorinated ethane, and polynuclear aromatic hydrocarbons (PAHs). Based on review of the materials provided by the commenters, it is apparent that the fly ash disposed at the site is emission control dust from an electric arc furnace,

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[138] Letter from the Hoosier Environmental Council to the RCRA Docket Information Center regarding the CCW RTC, June 11, 1999, Letter from the Hoosier Environmental Council and the Citizens Coal Council to the RCRA Docket Information Center regarding the CCW RTC, June 14, 1999 and Letter from the Hoosier Environmental Council, et. al., to Dennis Ruddy regarding the CCW RTC, September 24, 1999.

[139] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000. Memorandum from SAIC to Dennis Ruddy regarding Review of Causative Factors for Coal Combustion Waste Damage Cases, November 29, 2000.

[140] Letter from HEC, et. al., to Dennis Ruddy, February, 2002.

[141] Compendium of nineteen alleged coal combustion wastes damage cases, May 3, 2007.

[142] Letter from the Hoosier Environmental Council and the Citizens Coal Council to the RCRA Docket Information Center regarding the CCW RTC, June 14, 1999 and Letter from the Hoosier Environmental Council, et. al., to Dennis Ruddy regarding the CCW RTC, September 24, 1999.

not fossil fuel combustion waste. This site did not receive fossil fuel combustion waste and therefore is not applicable.[143]

74. Gavin Impoundments[144]

According to Ohio EPA representatives, the Gavin Plant ash ponds are used for the disposal of ash from the Ohio Power Gavin Plant. The fly ash pond is no longer receiving ash, but has not yet been closed. The facility has not conducted ground water monitoring, but has submitted a ground water monitoring plan and will be required to monitor as part of their closure activities for the fly ash pond. The bottom ash pond is still receiving wastes. There is no ground water monitoring for the bottom ash pond. The representatives could not confirm the presence of any suspected impacts and the State has not undertaken any regulatory action at the site. There is no evidence of damage at this site. Therefore, this site is categorized as a case without documented evidence of proven or potential damage to human health or the environment.

75. Kyger Creek Power Plant Impoundments[145]

According to Ohio EPA representatives, the Kyger Creek Plant surface impoundments are used for the disposal of ash from the Ohio Valley Electric Kyger Creek Power Plant. Bottom ash is disposed of in the bottom ash pond, although most of the facility's bottom ash is used by Black Beauty, an on-site company which sells products containing bottom ash. While there is no ground water monitoring around the bottom ash pond, Ohio EPA staff are unaware of any issues related to this pond.

76. Lake Erie, Ohio[146]

Commenters provided a study of trace element concentrations in sediments, surface water, and biota in proximity to an ash disposal basin along the shore of Lake Erie. The study noted that sediment concentrations in the proximity of the basin had the potential for adverse effects on benthos (*oligochatetes*) and fish in early life stages. In addition, the study observed changes in fish behavior (e.g., possibly due to avoidance) near the basins. The study findings, however, do not conclusively implicate coal combustion waste as the source of the observed behavioral changes. There is insufficient evidence to confirm that fossil fuel combustion wastes are the source of contamination in this case.

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[143] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000.

[144] Memorandum from SAIC to Dennis Ruddy regarding Revised Identification of New Candidate Damage Cases, December 7, 2001.

[145] Ibid.

[146] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000.

77. Muskingum River Power Plant Impoundments[147]

According to Ohio EPA representatives, the Ohio Power Muskingum River Power Plant disposes of bottom ash in ponds located next to the plant. The representatives confirmed that there are no monitoring wells at the site. They indicated, however, that elevated levels of iron and manganese have been detected in facility production wells. These observations have led the State's hydrogeologists to suspect that there might be some impacts from the bottom ash ponds. The representatives, however, stated that the levels of iron and manganese detected are below the relevant secondary MCLs. Because there are no exceedances of primary or secondary MCLs at this site, the evidence is not sufficient to categorize this case as a proven or potential damage case under EPA's definitions. Therefore, this site is categorized as a case without documented evidence of proven or potential damage to human health or the environment.

The fly ash pond originally consisted of two ponds in series. One of the ponds has recently been closed and capped, while the other continues to accept waste. At the time that the fly ash pond was closed, the facility installed ground water monitoring wells around the perimeter of the entire fly ash disposal area and five years of monitoring data now are available. According to the Ohio EPA representatives, monitoring has detected some statistically "out of range" values for iron, manganese, and TDS. These observations have led the State's hydrogeologists to suspect that there might be some impacts from the fly ash ponds. The representatives, however, stated that the levels detected are below the relevant secondary MCLs. Because there are no exceedances of primary or secondary MCLs at this site, the evidence is not sufficient to categorize this case as a proven or potential damage case under EPA's definitions. Therefore, this site is categorized as a case without documented evidence of proven or potential damage to human health or the environment.

78. Muskogee Environmental Fly Ash Disposal Site, Oklahoma[148]

Commenters provided a printout from the Superfund Archive identifying this site as a Superfund site. The information provided, however, does not identify the constituents of concern, the reason for inclusion of this site in the Superfund database, or otherwise indicate that any contamination at this site is associated with fossil fuel combustion wastes. There is insufficient information available to identify the extent and nature of damages present and attribute them to fossil fuel combustion wastes.[149]

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[147] Ibid.

[148] Letter from the Hoosier Environmental Council, et. al., to Dennis Ruddy regarding the CCW RTC, September 24, 1999.

[149] Memorandum from SAIC to Dennis Ruddy regarding Final Revised Report on Resolution of 18 Previously Indeterminate Candidate Damage Cases, March 5, 2003.

79. Public Service Co Fly Ash Disposal Site, Oklahoma[150]

Commenters provided a printout from the Superfund Archive identifying this site as a Superfund site. The information provided, however, does not identify the constituents of concern, the reason for inclusion of this site in the Superfund database, or otherwise indicate that any contamination at this site is associated with fossil fuel combustion wastes. There is insufficient information available to identify the extent and nature of damages present and attribute them to fossil fuel combustion wastes.[151]

80. Star Coal Company #6 Landfill[152]

No information available

81. Star Coal Company #14 Landfill[153]

No information available

82. Stuart Station Impoundments[154]

According to Ohio EPA representatives, the Stuart Station ash ponds are used for the disposal of ash from the Dayton Power & Light Stuart Station. The State has ground water monitoring data for wells near the ash ponds and older data from facility production wells. According to the State's hydrogeologists, the facility relocated their production wellfield due to ground water quality impacts of "undetermined origin." The monitoring data also show a statistical increase over background concentrations. The specific constituents showing increases were not identified, but there are no exceedances of primary or secondary MCLs at the site, according to the Ohio EPA representatives. The State's hydrogeologists also indicated that the impacts observed may be either from the ash ponds or from coal piles located in the area. Because there are no exceedances of primary or secondary MCLs at this site, the evidence is not sufficient to categorize this case as a proven or potential damage case under EPA's definitions. Therefore, this site is categorized as a case without documented evidence of proven or potential damage to human health or the environment.

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[150] Letter from the Hoosier Environmental Council, et. al., to Dennis Ruddy regarding the CCW RTC, September 24, 1999.

[151] Memorandum from SAIC to Dennis Ruddy regarding Final Revised Report on Resolution of 18 Previously Indeterminate Candidate Damage Cases, March 5, 2003.

[152] Memorandum from SAIC to Dennis Ruddy regarding Revised Identification of New Candidate Damage Cases, December 7, 2001.

[153] Ibid.

[154] Ibid.

83. Thompson Landfill, Michigan[155]

This site is an abandoned landfill. Commenters cited a MDEQ study that allegedly shows arsenic greater than Michigan "cleanup criteria" attributable to the landfill. This document and quantitative data supporting the alleged damages were not available. Recent information from the MDEQ, however, confirms that ground water contamination is present and that the site is being remediated. There is no information on whether wastes other than coal combustion wastes might be present that could contribute to the contamination. There is no information on whether the alleged contamination extends off-site. There is insufficient information available to identify the extent of ground water contamination, or to positively identify the source of the contamination.[156]

84. Turris Coal Company Elkhart Mine, Illinois[157]

This site is an underground mine that disposes of coal processing waste and coal combustion waste in a diked surface lagoon. Commenters provided monitoring data showing exceedances of the secondary MCLs for sulfate, chloride, and total dissolved solids in a single well at the site. The data for this well also show an increase in these concentrations since the placement of coal combustion waste began. The other wells at the site do not show similar exceedances or trends. There is no quantitative data on the presence of other constituents at the site. There is insufficient data on hydrogeology at the site, the location of coal combustion waste placement at the site, or on activities other than coal combustion waste placement at the site to conclude that the impacts identified are due to coal combustion waste placement. Although there is some quantitative evidence of contamination, the available data are limited to a small number of constituents. There also is insufficient information to identify the extent of the contamination or confirm the source of the contamination.[158]

85. Western Farmers Electrical Fly Ash Site, Oklahoma[159]

Commenters provided a printout from the Superfund Archive identifying this site as a Superfund site. The information provided, however, does not identify the constituents of concern, the reason for inclusion of this site in the Superfund database, or otherwise indicate that any

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[155] Letter from the Hoosier Environmental Council, et. al., to Dennis Ruddy regarding the CCW RTC, September 24, 1999.

[156] Memorandum from SAIC to Dennis Ruddy regarding Final Revised Report on Resolution of 18 Previously Indeterminate Candidate Damage Cases, March 5, 2003.

[157] Memorandum from SAIC to Dennis Ruddy regarding Rationale and Conclusions Regarding Commenter-Identified Fossil Fuel Combustion Waste Damage Cases, April 20, 2000.

[158] Memorandum from SAIC to Dennis Ruddy regarding Final Revised Report on Resolution of 18 Previously Indeterminate Candidate Damage Cases, March 5, 2003.

[159] Letter from the Hoosier Environmental Council, et. al., to Dennis Ruddy regarding the CCW RTC, September 24, 1999.

contamination at this site is associated with fossil fuel combustion wastes. There is insufficient information available to identify the extent and nature of damages present and attribute them to fossil fuel combustion wastes.[160]

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[160] Memorandum from SAIC to Dennis Ruddy regarding Final Revised Report on Resolution of 18 Previously Indeterminate Candidate Damage Cases, March 5, 2003.

I/A

Bednarcik Direct AGO Cross Ex. 21
Docket No. E-2, Sub 1219A

AGO Exhibit 18
Docket No. E-2, Sub 1219-A

DEQ Coal Combustion Residuals Surface Impoundment Closure Determination

Roxboro Steam Station

April 1, 2019

DEQ Coal Combustion Residuals Surface Impoundment Closure Determination

Roxboro Steam Station

Executive Summary

The Coal Ash Management Act (CAMA) establishes criteria for the closure of coal combustion residuals (CCR) surface impoundments. Pursuant to N.C. Gen. Stat. § 130A-309.213(d)(1), the CCR surface impoundments located at Duke Energy's Roxboro Steam Station (Roxboro) in Person County, NC received a low-risk classification. Therefore, according to N.C. Gen. Stat. § 130A-309.214(a)(3), the closure option for CCR surface impoundments is at the election of the North Carolina Department of Environmental Quality (DEQ or Department). CAMA provides three principal closure pathways: (a) closure in a manner allowed for a high-risk site, such as excavation and disposal in a lined landfill [CAMA Option A]; (b) closure with a cap-in-place system similar to the requirements for a municipal solid waste landfill [CAMA Option B]; or (c) closure in accordance with the federal CCR rule adopted by EPA [CAMA Option C].

In preparing to make its election, DEQ requested information from Duke Energy related to closure options. By November 15, 2018, Duke Energy provided the following options for consideration: closure in place, full excavation, and a hybrid option that included some excavation with an engineered cap on a smaller footprint of the existing impoundments. DEQ held a public information session on January 24, 2019 in Roxboro, NC where the community had the opportunity to learn about options for closing CCR surface impoundments and to express their views about proposed criteria to guide DEQ's coal ash closure decision making process. To evaluate the closure options, the Department considered environmental data gathered as part of the site investigation, permit requirements, ambient monitoring, groundwater modeling provided by Duke Energy and other data relevant to the CAMA requirements.

DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the CCR surface impoundments at Roxboro in accord with N.C. Gen. Stat. § 130A-309-214(a)(3). In addition, DEQ is open to considering beneficiation projects where coal ash is used as an ingredient in an industrial process to make a product as an approvable closure option under CAMA Option A.

DEQ elects CAMA Option A because removing the coal ash from unlined impoundments at Roxboro is more protective than leaving the material in place. DEQ determines that CAMA Option A is the most appropriate closure method because removing the primary source of groundwater contamination will reduce uncertainty and allow for flexibility in the deployment of future remedial measures.

Duke Energy will be required to submit a final Closure Plan for the CCR surface impoundments at Roxboro by August 1, 2019. The Closure Plan must conform to this election by DEQ.

I. Introduction

DEQ has evaluated the closure options submitted by Duke Energy for the two CCR surface impoundments at Roxboro Steam Station. This document describes the CAMA requirements for closure of CCR surface impoundments, the DEQ evaluation process to make an election under CAMA for the subject impoundments at the Roxboro site, and the election by DEQ for the final closure option.

II. Site History

Duke Energy Progress, LLC (Duke Energy) owns and operates Roxboro Steam Station (Roxboro or Site), which is located at 1700 Dunnaway Road in Semora, Person County, North Carolina. The Site consists of approximately 6,095 acres situated between McGhees Mill Road to the east, Concord-Ceffo Road to the south, Semora Road to the west, and Hyco Lake to the north. Roxboro began operations in 1966 as a coal-fired electrical generating station with additional generating units added in 1968, 1973, and 1980. Roxboro has a combined electric generating capacity of 2,422 megawatts.

Roxboro has two CCR surface impoundments: the East Ash Basin (EAB), which was constructed in 1964, and the West Ash Basin (WAB), which was constructed in 1973. Duke Energy sluiced CCR into the EAB until the 1980s, at which time, Roxboro transitioned to dry fly ash handling. Duke Energy constructed an industrial landfill partially within the waste boundary of the EAB, which isolated part of the EAB and created the “EAB Eastern Extension Impoundment.” To add storage capacity, Duke Energy modified the WAB in 1986 by installing a filter dike, which created the “WAB Southern Extension Impoundment. In 2008, Duke Energy installed Flue gas desulfurization (FGD) technology to reduce SO_2 emissions for all the steam units. Duke Energy continues to sluice bottom ash into the WAB.

Collectively, the EAB and WAB at Roxboro contain approximately 20,045,000 tons of CCR. The two CCR surface impoundments at Roxboro are subject to the requirements of N.C. Gen. Stat. § 130A-309.214(a)(3) with the exception of CCR in the landfills above the East Ash Basin.

III. CAMA Closure Requirements

CAMA establishes closure requirements for CCR surface impoundments. The General Assembly has mandated that DEQ “shall review a proposed Coal Combustion Residuals Surface Impoundment Closure Plan for consistency with the minimum requirements set forth in subsection (a) of this section and whether the proposed Closure Plan is protective of public health, safety, and welfare; the environment; and natural resources and otherwise complies with the requirements of this Part.” N.C. Gen. Stat. § 130A-309.214(b). Similarly, the General Assembly has required that DEQ “shall disapprove a proposed Coal Combustion Residuals Surface Impoundment Closure Plan unless the Department finds that the Closure Plan is protective of public health, safety, and welfare; the environment; and natural resources and otherwise complies with the requirements of this Part.” N.C. Gen. Stat. § 130A-309.214(c).

CAMA requires DEQ to review any proposed Closure Plan for consistency with the requirements of N.C. Gen. Stat. § 130A-309.214(a). See N.C. Gen. Stat. § 130A-309.214(b). DEQ must disapprove any proposed Closure Plan that DEQ finds does not meet these requirements. See N.C. Gen. Stat. § 130A-309.214(c). Therefore, an approvable Closure Plan must, at a minimum, meet the requirements of N.C. Gen. Stat. § 130A-309.214(a).

Pursuant to N.C. Gen. Stat. § 130A-309.213(d)(1), DEQ has classified the CCR surface impoundments at Roxboro as low-risk. The relevant closure requirements for low-risk impoundments are in N.C. Gen. Stat. § 130A-309.214(a)(3), which states the following:

- Low-risk impoundments shall be closed as soon as practicable, but no later than December 31, 2029;
- A proposed closure plan for a low-risk impoundment must be submitted as soon as practicable, but no later than December 31, 2019; and
- At a minimum, impoundments located in whole above the seasonal high groundwater table shall be dewatered and impoundments located in whole or in part beneath the seasonal high groundwater table shall be dewatered to the maximum extent practicable.

In addition, N.C. Gen. Stat. § 130A-309.214(a)(3) requires compliance with specific closure criteria set forth verbatim below in Table 1. The statute provides three principal closure pathways: (a) closure in a manner allowed for a high-risk site, such as excavation and disposal in a lined landfill [CAMA Option A]; (b) closure with a cap-in-place system similar to the requirements for a municipal solid waste landfill [CAMA Option B]; or (c) closure in accordance with the federal CCR rule adopted by EPA [CAMA Option C]. For each low-risk impoundment, the choice of the closure pathway in CAMA is at the "election of the Department."

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Table 1: CAMA Closure Options for Low-Risk CCR Surface Impoundments
N.C. Gen. Stat. § 130A-309.214(a)(3)

At the election of the Department, the owner of an impoundment shall either:

a. Close in any manner allowed pursuant to subdivision (1) of this subsection; [CAMA Option A]

b. Comply with the closure and post-closure requirements established by Section .1627 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, except that such impoundments shall not be required to install and maintain a leachate collection system. Specifically, the owner of an impoundment shall Comply with the closure and post-closure requirements established by Section .1627 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, except that such impoundments shall not be required to install and maintain a leachate collection system. Specifically, the owner of an impoundment shall install and maintain a cap system that is designed to minimize infiltration and erosion in conformance with the requirements of Section .1624 of Subchapter B of Chapter 13 of Title 15A of the North Carolina Administrative Code, and, at a minimum, shall be designed and constructed to (i) have a permeability no greater than 1 x 10-5 centimeters per second; (ii) minimize infiltration by the use of a low-permeability barrier that contains a minimum 18 inches of earthen material; and (iii) minimize erosion of the cap system and protect the low-permeability barrier from root penetration by use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth. In addition, the owner of an impoundment shall (i) install and maintain a groundwater monitoring system; (ii) establish financial assurance that will ensure that sufficient funds are available for closure pursuant to this subdivision, post-closure maintenance and monitoring, any corrective action that the Department may require, and satisfy any potential liability for sudden and nonsudden accidental occurrences arising from the impoundment and subsequent costs incurred by the Department in response to an incident, even if the owner becomes insolvent or ceases to reside, be incorporated, do business, or maintain assets in the State; and (iii) conduct post-closure care for a period of 30 years, which period may be increased by the Department upon a determination that a longer period is necessary to protect public health, safety, welfare; the environment; and natural resources, or decreased upon a determination that a shorter period is sufficient to protect public health, safety, welfare; the environment; and natural resources. The Department may require implementation of any other measure it deems necessary to protect public health, safety, and welfare; the environment; and natural resources, including imposition of institutional controls that are sufficient to protect public health, safety, and welfare; the environment; and natural resources. The Department may not approve closure for an impoundment pursuant to sub-subdivision b. of subdivision (3) of this subsection unless the Department finds that the proposed closure plan includes design measures to prevent, upon the plan's full implementation, post-closure exceedances of groundwater quality standards beyond the compliance boundary that are attributable to constituents associated with the presence of the impoundment; [CAMA Option B] or

c. Comply with the closure requirements established by the United States Environmental Protection Agency as provided in 40 CFR Parts 257 and 261, "Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities." [CAMA Option C]

By referencing the closure options for *high-risk* impoundments in "subdivision (1)" or N.C. Gen. Stat. § 130A-309.214(a)(1), CAMA allows for closure of a *low-risk* CCR surface impoundment in N.C. Gen. Stat. § 130A-309.214(a)(3) through the same removal scenarios:

- "Convert the coal combustion residuals impoundment to an industrial landfill by removing all coal combustion residuals and contaminated soil from the impoundment temporarily, safely storing the residuals on-site, and complying with the requirements for such landfills . . . . " N.C. Gen. Stat. § 130A-309.214(a)(1)a.; or
- "Remove all coal combustion residuals from the impoundment, return the former impoundment to a nonerosive and stable condition and (i) transfer the coal combustion residuals for disposal in a coal combustion residuals landfill, industrial landfill, or municipal solid waste landfill or (ii) use the coal combustion products in a structural fill or other beneficial use as allowed by law. . . ." N.C. Gen. Stat. § 130A-309.214(a)(1)b.

IV. DEQ Election Process

Beginning with a letter to Duke Energy on October 8, 2018, DEQ began planning for a thorough evaluation of the closure options for low-risk impoundments before making an election as outlined in Table 1 above. DEQ's objectives were to receive input on closure options from Duke Energy and to engage with community members near low-risk sites. DEQ outlined the following schedule in the October 8, 2018 letter:

- November 15, 2018 – Duke Energy submittal of revised option analyses and related information
- January 24, 2019 – DEQ public meeting near Roxboro Steam Station
- April 1, 2019 – DEQ evaluation of closure options
- August 1, 2019 – Duke Energy submittal of closure plan
- December 1, 2019 – Duke Energy submittal of updated corrective action plan for all sources at Roxboro that are either CCR surface impoundments or hydrologically connected to CCR surface impoundments

DEQ received the requested information from Duke Energy by November 15, 2018: closure options analysis, groundwater modeling and net environmental benefits assessment. These materials are posted on the DEQ website. Duke Energy provided the following options for consideration: closure in place, full excavation with either an onsite or offsite landfill, and a hybrid option that included some excavation with an engineered cap on a smaller footprint of the existing CCR surface impoundment.

In preparing to make its election of the closure option, DEQ considered environmental data contained in the comprehensive site assessment, permit requirements, ambient monitoring, closure options analysis and groundwater modeling provided by Duke Energy and other data relevant to the CAMA requirements. The Roxboro site has extensive amounts of data that have been collected during the site assessment process, and these data were used as part of the evaluation of closure options. DEQ's evaluation of closure in place and hybrid option based on groundwater monitoring and modeling data is provided in Attachment A. That analysis demonstrates that the contaminated plume is already beyond the compliance boundary for the East Ash Basin. All of these references are part of the record supporting DEQ's determination.

DEQ conducted a public meeting in Roxboro, NC on January 24, 2019. Approximately 40 members of the public attended the meeting. Approximately 950 comments were received during the comment period, which closed on February 15, 2019. The majority of commenters requested that the coal ash be removed from the CCR surface impoundments and moved to dry lined storage away from waterways and groundwater. Only two commenters specifically requested closure-in-place. No commenters requested the hybrid option. A summary of and response to public comments are included in Attachment B.

V. DEQ Evaluation of Closure Options

DEQ has evaluated the closure options proposed by Duke Energy for the CCR surface impoundments at Roxboro. The purpose of this evaluation was to determine which closure option or options may be incorporated into an approvable Closure Plan under CAMA.

DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the East Ash Basin and the West Ash Basin at Roxboro in accord with N.C. Gen. Stat. § 130A-309.214(a)(3). For purposes of DEQ's closure determination, the term "East Ash Basin" includes the so called "EAB Eastern Extension Impoundment" and the term "West Ash Basin" includes the so called "WAB Southern Extension Impoundment." In addition, DEQ is open to considering beneficiation projects where coal ash is used as an ingredient in an industrial process to make a product as an approvable closure option under CAMA Option A.

DEQ elects CAMA Option A because removing the coal ash from unlined impoundments at Roxboro is more protective than leaving the material in place. DEQ determines that CAMA Option A is the most appropriate closure method because removing the primary source of groundwater contamination will reduce uncertainty and allow for flexibility in the deployment of future remedial measures.

For the East Ash Basin at Roxboro, DEQ does not elect CAMA Option B. In N.C. Gen. Stat. § 130A-309.214(a)(3)b, the General Assembly mandated that "[t]he Department may not approve closure for an impoundment pursuant to [this] sub-subdivision . . . unless the Department finds that the proposed closure plan includes design measures to prevent, upon the plan's full implementation, post-closure exceedances of groundwater quality standards beyond the compliance boundary that are attributable to constituents associated with the presence of the impoundment." N.C. Gen. Stat. § 130A-309.214(a)(3)b. In light of these requirements and based on DEQ's review of the information provided by Duke Energy as well as DEQ's independent analysis, DEQ does not believe that Duke Energy can incorporate CAMA Option B into an approvable Closure Plan for the East Ash Basin.

As DEQ considered the closure options presented by Duke Energy, DEQ evaluated whether the closure in place or the hybrid options met the requirement for CAMA Option B. Specifically, DEQ attempted to determine whether upon full implementation of the closure plan the design would prevent any post-closure exceedances of groundwater standards beyond the compliance boundary. To address this question, DEQ considered the current state of the groundwater contamination and reviewed the results of the groundwater modeling submitted by Duke Energy. The evaluation is provided in Attachment A. DEQ's overall conclusion is that based on the current geographic scope and vertical extent of the groundwater contamination plume, and the modeled extent of the plume in the future, DEQ does not believe these two closure options can meet the requirements of CAMA Option B for the East Ash Basin.

For the West Ash Basin at Roxboro, DEQ does not elect CAMA Option B. The footprint of the West Ash Basin at Roxboro is in Sargent's Creek, a natural drainage way. The NC floodplain map depicts a 100-year flood elevation to occur within the West Ash Basin. The basin is located in the arm of a reservoir, and currently holds approximately 7,310,000 tons of coal ash. The impoundment is directly adjacent to waters of the state. From a dam safety perspective, the embankment is 70 feet tall and has a volume of 5,567 acre feet; therefore, it is large in size with downstream hazards being environmental concerns. The off-site drainage area for the West Ash Basin is 345.6 acres. While there are limited exceedances of the 2L standard beyond the compliance boundary for this impoundment, DEQ believe CAMA Option A is the most appropriate closure method for this impoundment. Excavation of impoundments located in or near 100-year flood plains would be the consistent closure method. There are six other facilities in North Carolina with CCR surface impoundments that are in or immediately adjacent to the 100-year flood plain. Four of those sites are already excavating the coal ash from the impoundments. The remaining two sites are Roxboro and Marshall. DEQ is electing CAMA Option A for these two sites because it represents the more protective closure method.

DEQ does not elect CAMA Option C (i.e., closure under the federal CCR Rules found in 40 CFR Part 257) for the CCR surface impoundments at Roxboro. DEQ has determined that:

a. Under the facts and circumstances here, CAMA Option C is less stringent than CAMA Option A. Specifically, DEQ's election of Option A would also require Duke Energy to meet the requirements of the federal CCR Rule (i.e., CAMA Option C) but election of CAMA Option C would not require implementation of CAMA Option A.
b. Because CAMA Option A adds additional requirements or performance criteria beyond Option C, it advances DEQ's duty to protect the environment (see N.C. Gen. Stat. §§ 279B-2 & 143-211) and the General Assembly's mandate under CAMA that DEQ ensure that any Closure Plan, which must incorporate an approvable closure option, is protective of public health, safety, and welfare, the environment, and natural resources (see N.C. Gen. Stat. § 130A-309.214(b) & (c)).
c. For the CCR surface impoundments for which the closure option(s) must be determined, CAMA Option A provides a better CAMA mechanism for ensuring State regulatory oversight of the closure process than Option C, as well as greater transparency and accountability.
d. While the federal CCR Rule was written to provide national minimum criteria for CCR surface impoundments across the country, CAMA was written specifically to address the CCR surface impoundments in North Carolina.
e. While the federal CCR Rule allows CCR impoundment owners to select closure either by removal and decontamination (clean closure) or with a final cover system (cap in

place), EPA anticipates that most owners will select closure through the less protective method of cap in place.

f. There is considerable uncertainty regarding the status and proper interpretation of relevant provisions of the federal CCR Rule. For instance, EPA is reconsidering portions of the federal CCR Rule. Also, the performance standards in 40 CFR 257.102(d) for cap in place closure are the subject of conflicting interpretations (and possible litigation) among industry and state authorities.

VI. Conclusion

The final closure plan is due on August 1, 2019 in accordance with this determination. Based on DEQ's evaluation of the options submitted by Duke Energy, DEQ elects the provisions of CAMA Option A that require movement of coal ash to an existing or new CCR, industrial or municipal solid waste landfill located on-site or off-site for closure of the West Ash Basin and the East Ash Basin at Roxboro in accord with N.C. Gen. Stat. § 130A-309.214(a)(3). In addition, DEQ is open to considering beneficiation projects where coal ash is used as an ingredient in an industrial process to make a product as an approvable closure option under CAMA Option A.

While beneficiation is not a requirement of the closure plan, DEQ encourages Duke Energy to consider opportunities for beneficiation of coal ash that would convert coal combustion residuals into a useful and safe product.

ATTACHMENT A

DEQ EVALUATION OF CLOSURE IN PLACE AND HYBRID OPTIONS BASED ON GROUNDWATER MONITORING AND MODELING DATA

DEQ EVALUATION OF CLOSURE IN PLACE AND HYBRID OPTIONS BASED ON GROUNDWATER MONITORING AND MODELING DATA

I. Groundwater Monitoring Results

As DEQ considered the closure options presented by Duke Energy, DEQ evaluated whether the closure in place or the hybrid options met the requirement for CAMA Option B. Specifically, DEQ attempted to determine whether those closure options would prevent any post-closure exceedances of groundwater standards beyond the compliance boundary upon full implementation of the closure plan. The inferred general extent of groundwater impacts above applicable Background Threshold Values or 2L Standards are shown on Figure ES-1. Additional monitoring and hydrogeological data is available in the Roxboro October 2017 CSA Update Report (available on the DEQ website).

There are two CCR surface impoundments at Roxboro: the East Ash Basin (EAB) and the West Ash Basin (WAB). The vertical extent of constituents of interest (COIs) has been reasonably defined for both surface impoundments. However, each impoundment has unique groundwater conditions which are addressed below.

East Ash Basin (EAB)

Prior to the construction of the EAB, groundwater and surface water discharge from the area flowed into the Hyco River. The EAB was created by damming a stream segment in that area. Surficial flow for the EAB has been diverted where a portion of the discharge travels through the eastern discharge canal to the intake canal. Boron concentrations above 2L Standards approximates the leading edge of the CCR plume at the site. Almost all COIs are present in the shallow flow layer. The horizontal extent of those COIs is generally within the footprint of the boron plume.

Based on review of data submitted to date, both soil and groundwater have been impacted by CCR handling activities at the site. Groundwater within the area of the EAB generally flows north toward the cooling water intake canal and pond which eventually flow to Hyco Lake. Boron, sulfate, strontium and total dissolved solids (TDS) have been detected above the 2L Standards downgradient beyond the compliance boundary in the both transition zone and bedrock monitoring wells.

DEQ concludes that the contaminated groundwater plume above 2L standards has extended beyond the compliance boundary along the northern edge of the impoundment. Based on Figure ES-1, this plume extends along the majority of the length of the EAB.

West Ash Basin (WAB)

The West Ash Basin (WAB) was created by damming the flow path for Sargents Creek that discharged to Hyco River. The surficial flow now travels around the WAB by way of the western discharge canal which discharges to the heated water pond on the north side of the WAB. The CSA groundwater investigation appears to demonstrate that a portion of groundwater flow continues to migrate into Hyco Lake. Groundwater within the area of the WAB generally flows northeast toward the heating water discharge pond which eventually flows to Hyco Lake.

Boron, sulfate and TDS have been detected greater than the 2L Standards in bedrock monitoring wells underlying the WAB and downgradient in the transition zone. However, there have been limited exceedances of the 2L standards beyond the compliance boundary.

II. Groundwater Cross Section Modeling

DEQ evaluated cross-sections of the groundwater modeling results provided by Duke Energy to determine whether Duke Energy's final closure *Option 1: Closure-in-Place* and *Option 3: Hybrid* for the EAB would meet the criteria of CAMA Option B. DEQ considered whether the proposed closure option would prevent any post closure exceedances of the 2L groundwater quality standards at the compliance boundary upon full closure implementation. Cross sections A-A' and B-B' were evaluated and can be seen in the figures below. These cross sections represent where the boron concentration above the 2L standard of 700 µg/L has crossed the compliance boundary based on groundwater monitoring and modeling.

Next, the model results were evaluated based on the following model simulations:

- current conditions in 2017 when the model was calibrated based on raw field data
- upon completion of the final closure-in-place cover system at t=0 years
- closure-in-place option at t=100 years
- upon completion of the hybrid option at t=0 years
- hybrid option at t=100 years

The tables below summarize the results from the model simulations. The boron concentrations depicted in the table represent the maximum boron concentration in any layer (ash, saprolite, transition zone, and bedrock) of the model.

Roxboro Modeling Results for Cross-Section A-A’

Model Simulation	Maximum Concentration of Boron Above 2L Beyond Compliance Boundary (ug/L)	Depth of GW Contamination Above 2L Beyond Compliance Boundary (feet bgs)	Width of Contamination Plume Beyond Compliance Boundary (feet)
Current Conditions	700-4,000	105	660
Completion of Final Cover (t=0 yrs)	700-4,000	100	670
Final Cover (t=100 yrs)	700-4,000	105	300
Completion of Hybrid (t=0 yrs)	700-4,000	85	670
Hybrid (t=100 yrs)	700-4,000	105	400

bgs – below ground surface

Roxboro Modeling Results for Cross-Section B-B’

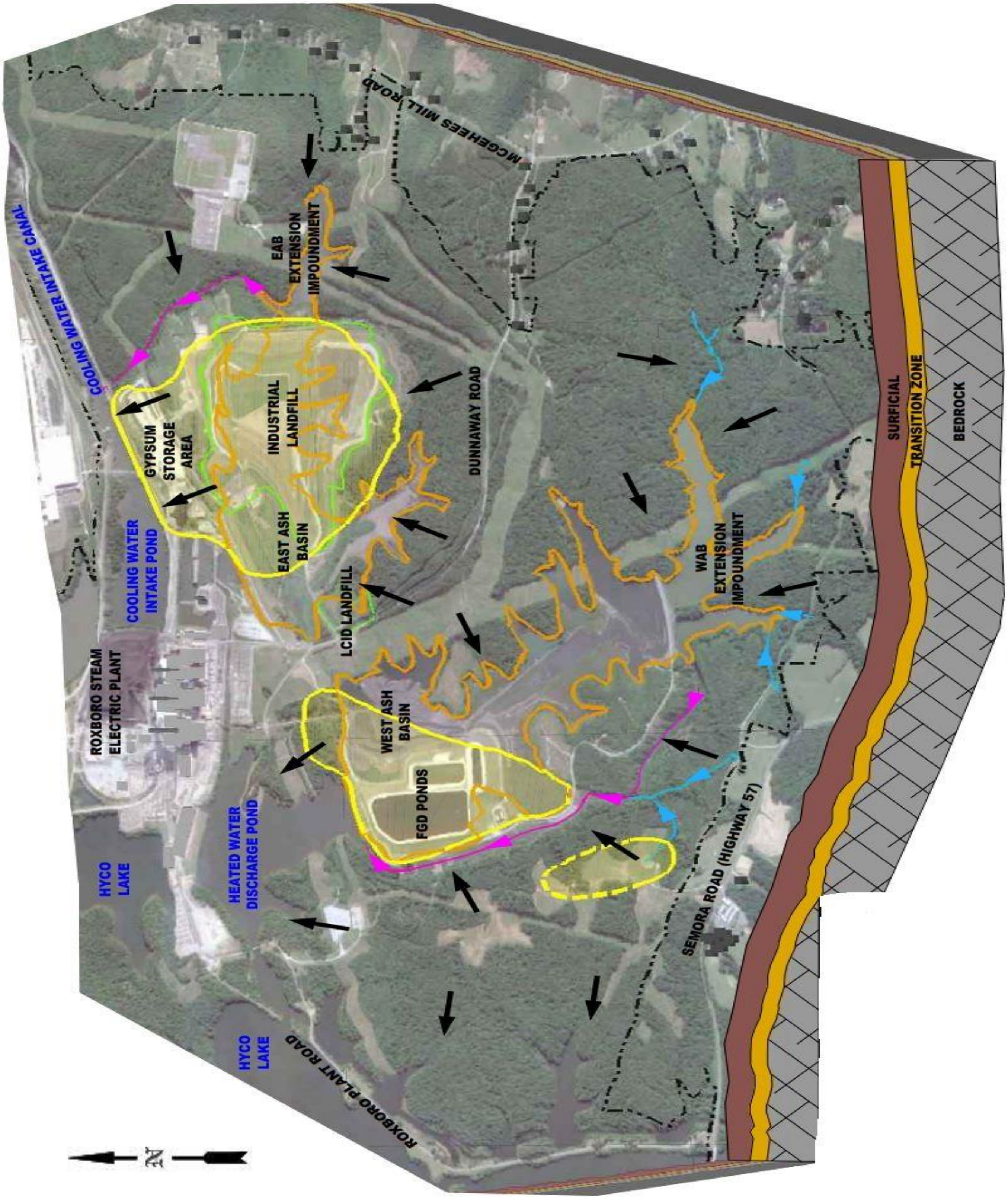
Model Simulation	Maximum Concentration of Boron Above 2L Beyond Compliance Boundary (ug/L)	Depth of GW Contamination Above 2L Beyond Compliance Boundary (feet bgs)	Width of Contamination Plume Beyond Compliance Boundary (feet)
Current Conditions	4,000-10,000	250	2260
Completion of Final Cover (t=0 yrs)	4,000-10,000	280	2290
Final Cover (t=100 yrs)	700-4,000	360	1200
Completion of Hybrid (t=0 yrs)	10,000-40,000	280	2260
Hybrid (t=100 yrs)	4,000-10,000	380	1270

These data illustrate that after completion of closure with the final cover or hybrid option, the groundwater plume still extends beyond the compliance boundary above the 2L groundwater standard and the area of the plume requiring remediation is immense. Even 100 years beyond completion of closure, the area of the plume requiring remediation remains extensive.

DEQ recognizes that there are no groundwater remediation corrective actions included in the groundwater modeling simulations submitted to DEQ as part of Duke Energy’s closure options analysis documentation. However, based on the current geographic scope, vertical extent of the groundwater contamination plume, and future modeled extent of the plume, DEQ does not believe these two closure options for the EAB can meet the requirements of CAMA Option B.

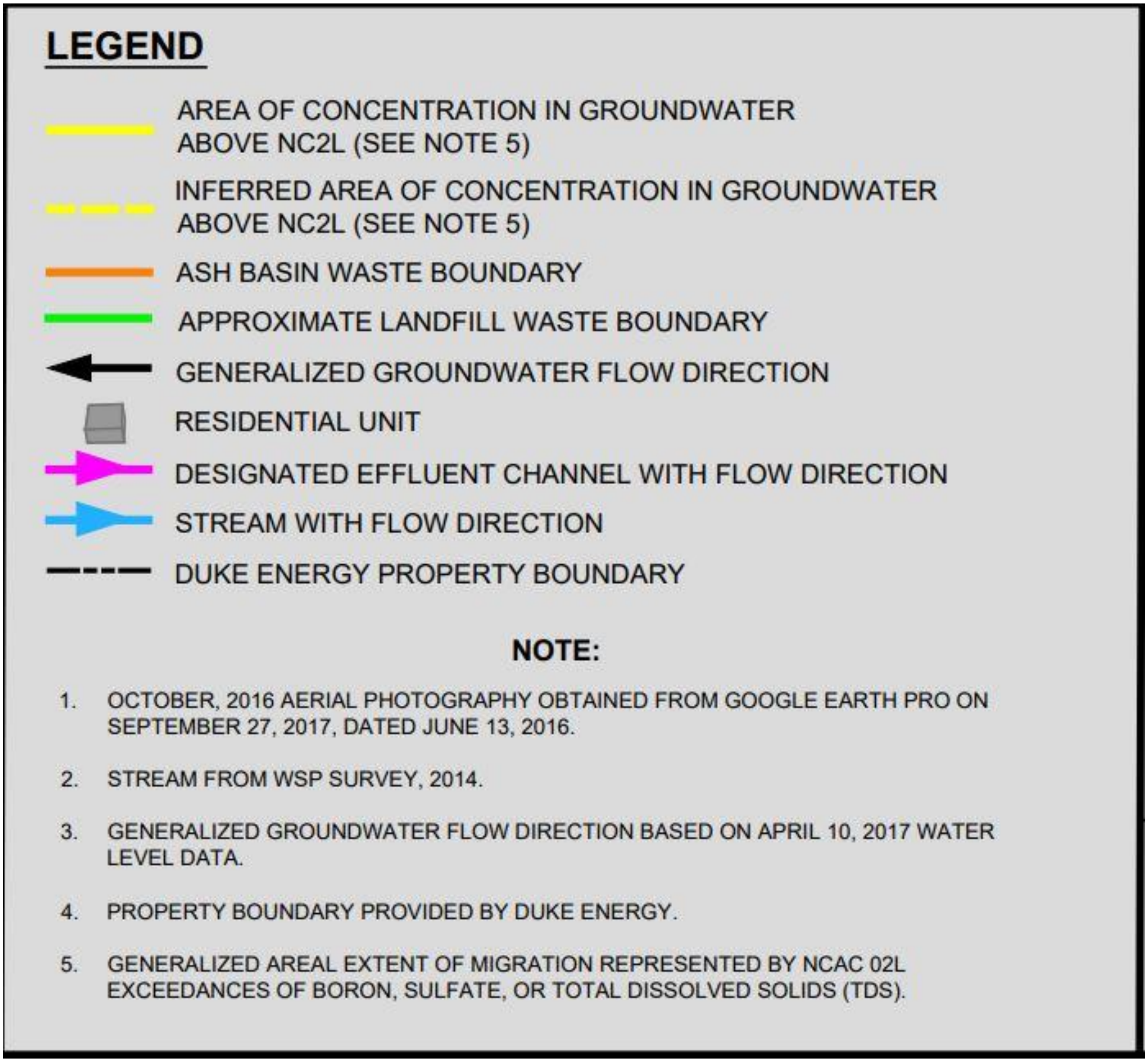
I/A

Figure ES-1: Roxboro Steam Station October 2017 CSA Update Report



I/A

Figure ES-1 Legend: Roxboro Steam Station October 2017 CSA Update Report



LEGEND

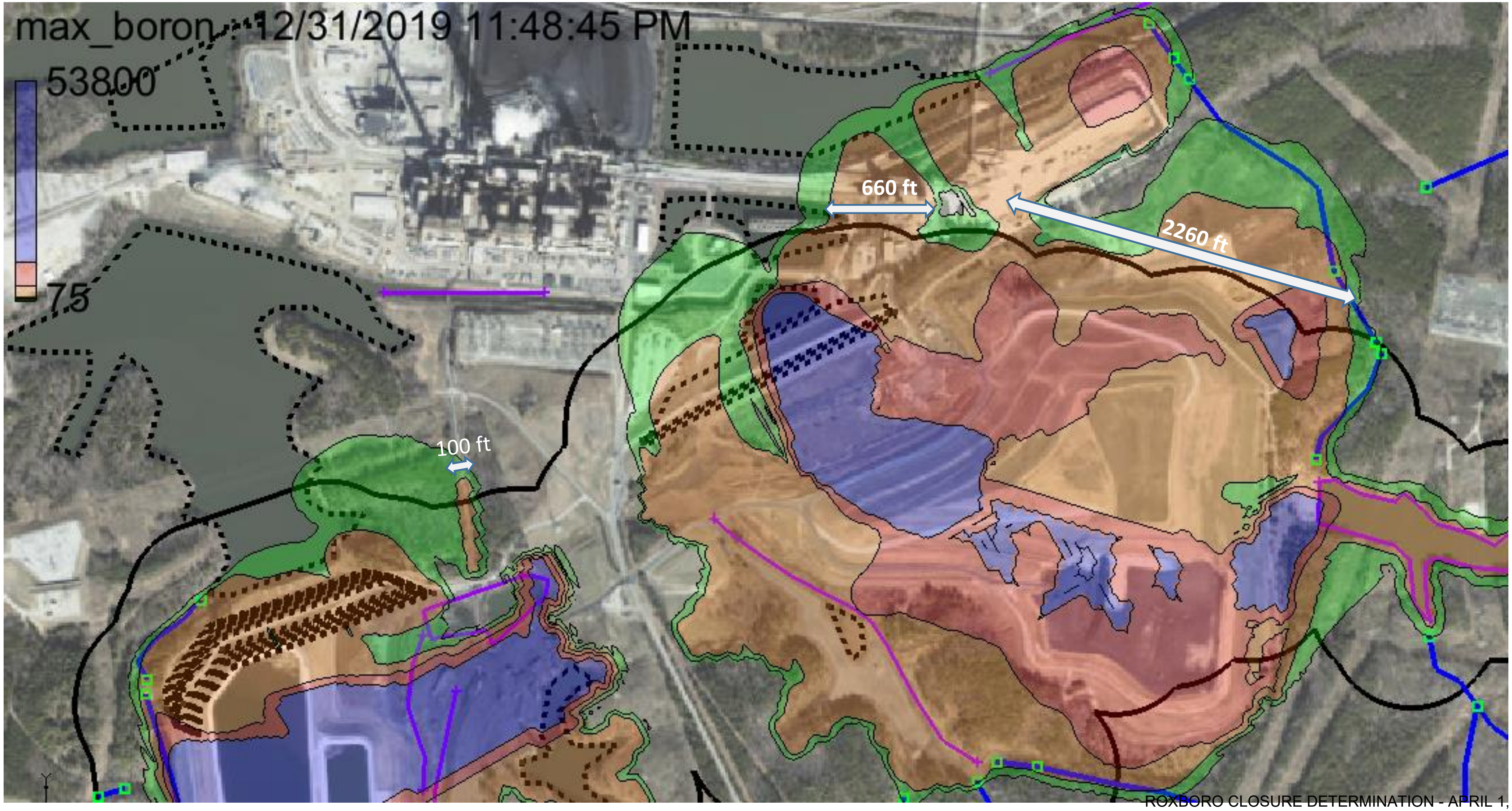
- ━━ AREA OF CONCENTRATION IN GROUNDWATER ABOVE NC2L (SEE NOTE 5)
- - - - INFERRED AREA OF CONCENTRATION IN GROUNDWATER ABOVE NC2L (SEE NOTE 5)
- ━━ ASH BASIN WASTE BOUNDARY
- ━━ APPROXIMATE LANDFILL WASTE BOUNDARY
- ← GENERALIZED GROUNDWATER FLOW DIRECTION
- ■ RESIDENTIAL UNIT
- → DESIGNATED EFFLUENT CHANNEL WITH FLOW DIRECTION
- → STREAM WITH FLOW DIRECTION
- — - - - DUKE ENERGY PROPERTY BOUNDARY

NOTE:

1. OCTOBER, 2016 AERIAL PHOTOGRAPHY OBTAINED FROM GOOGLE EARTH PRO ON SEPTEMBER 27, 2017, DATED JUNE 13, 2016.
2. STREAM FROM WSP SURVEY, 2014.
3. GENERALIZED GROUNDWATER FLOW DIRECTION BASED ON APRIL 10, 2017 WATER LEVEL DATA.
4. PROPERTY BOUNDARY PROVIDED BY DUKE ENERGY.
5. GENERALIZED AREAL EXTENT OF MIGRATION REPRESENTED BY NCAC 02L EXCEEDANCES OF BORON, SULFATE, OR TOTAL DISSOLVED SOLIDS (TDS).

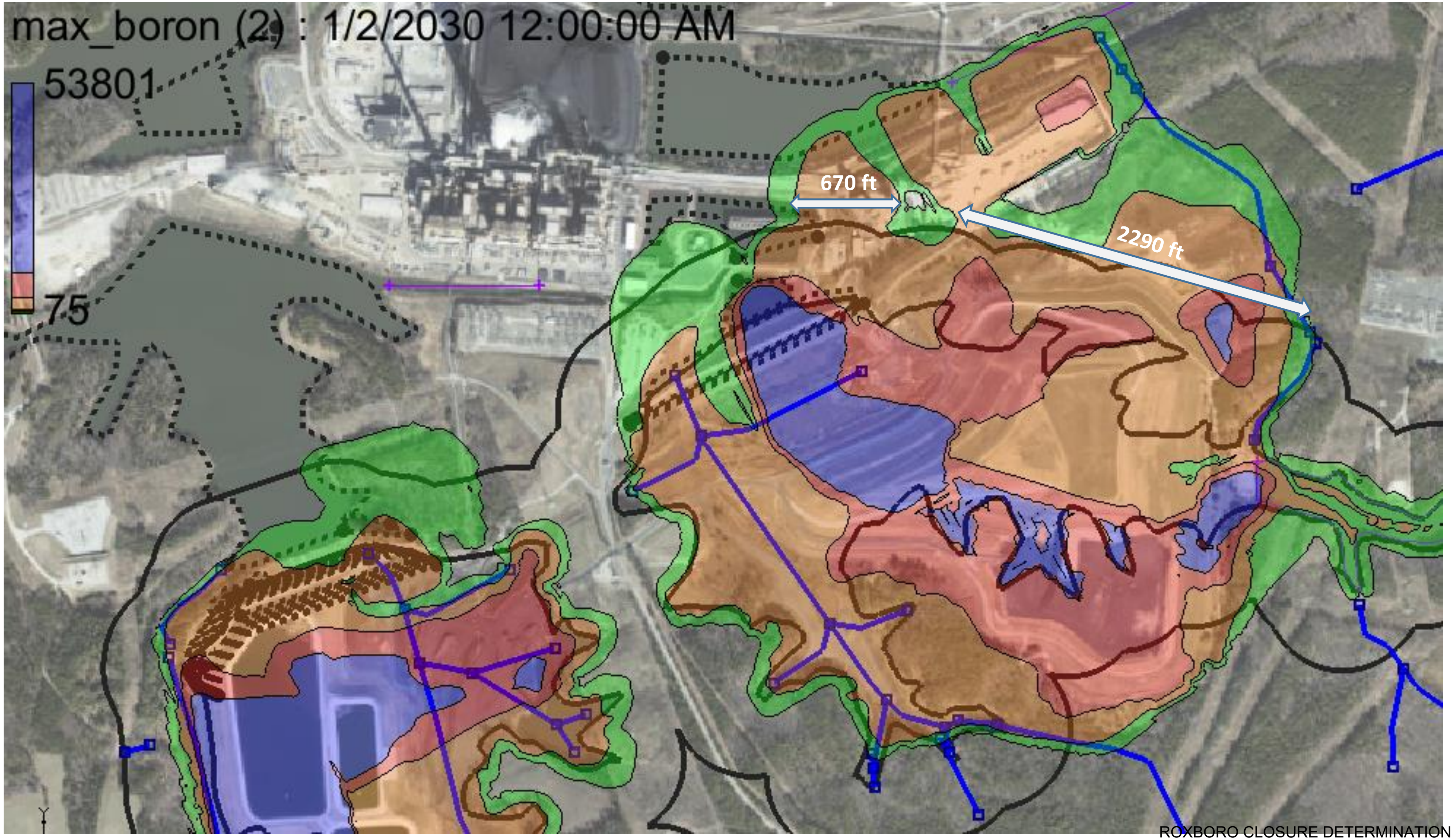
I/A ROXBORO **CURRENT CONDITIONS IN 2019**

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



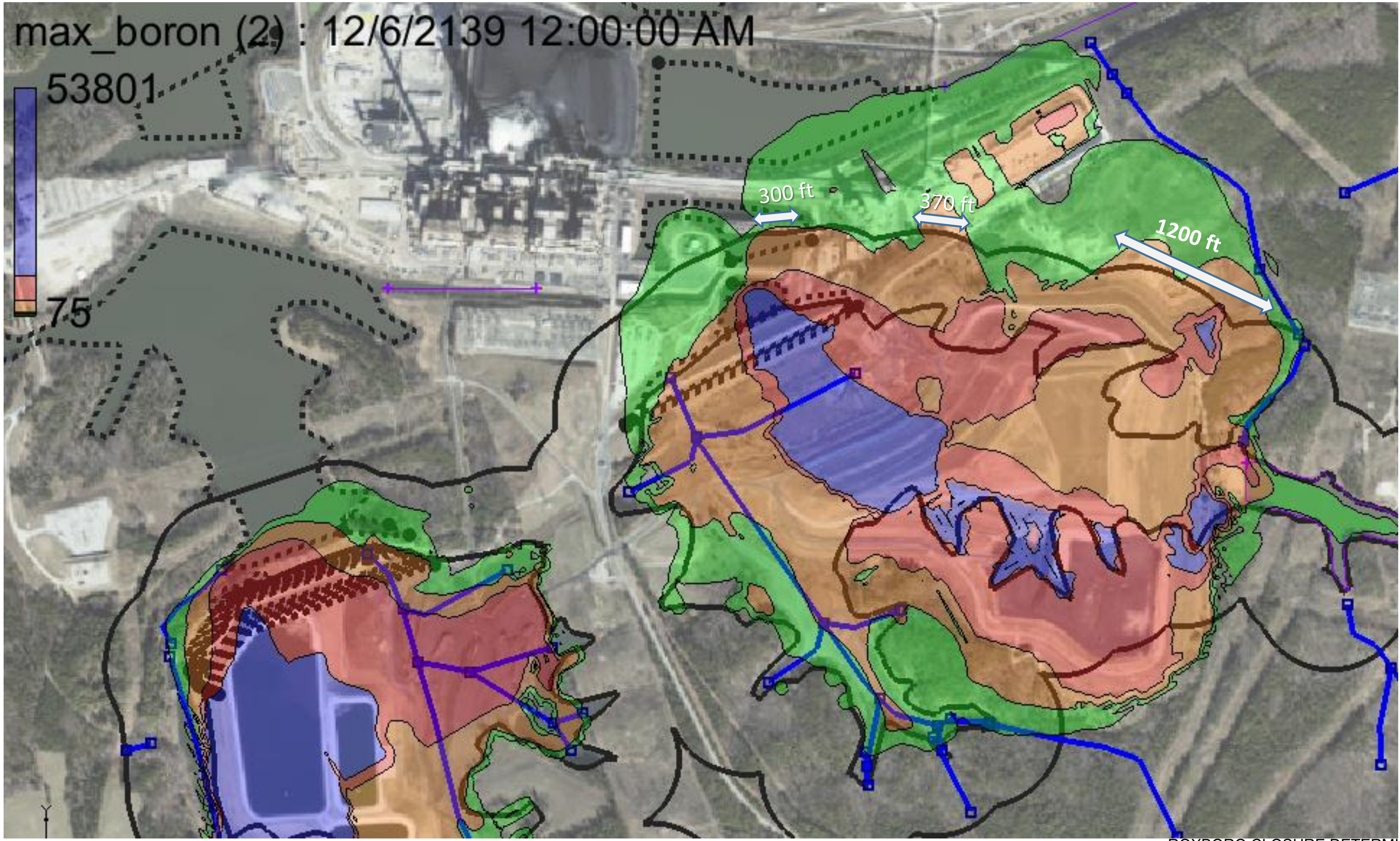
ROXBORO **UPON COMPLETION OF FINAL COVER IN 2030, t = 0**

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



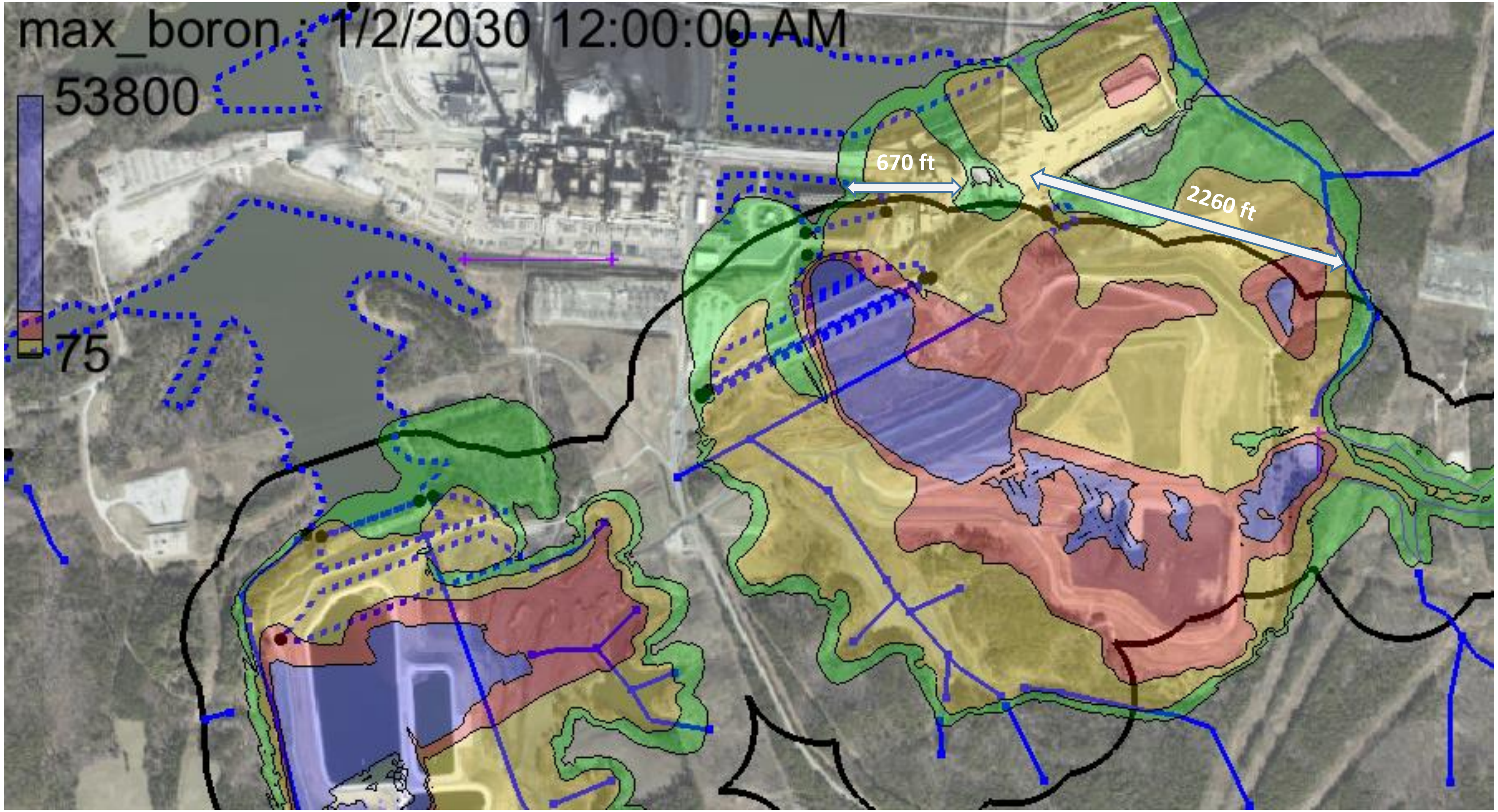
ROXBORO **FINAL COVER IN 2130, t = 100 years**

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



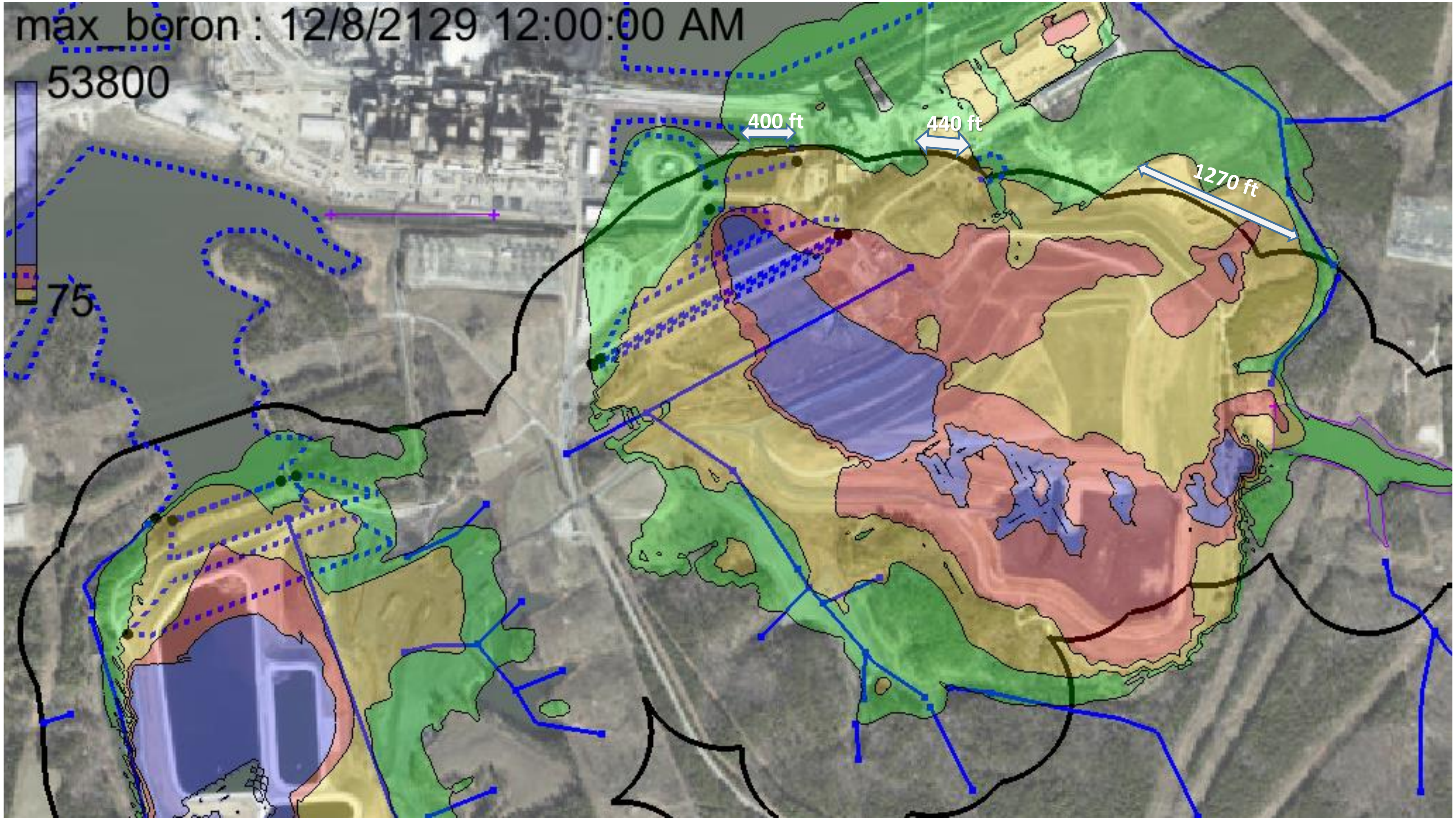
ROXBORO **UPON COMPLETION OF HYBRID IN 2030, t = 0**

MAX BORON ANY LAYER (ug/L) green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



ROXBORO **HYBRID IN 2130, t = 100 years**

MAX BORON ANY LAYER (ug/L)   green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000



ROXBORO I/A CURRENT CONDITIONS, 2019

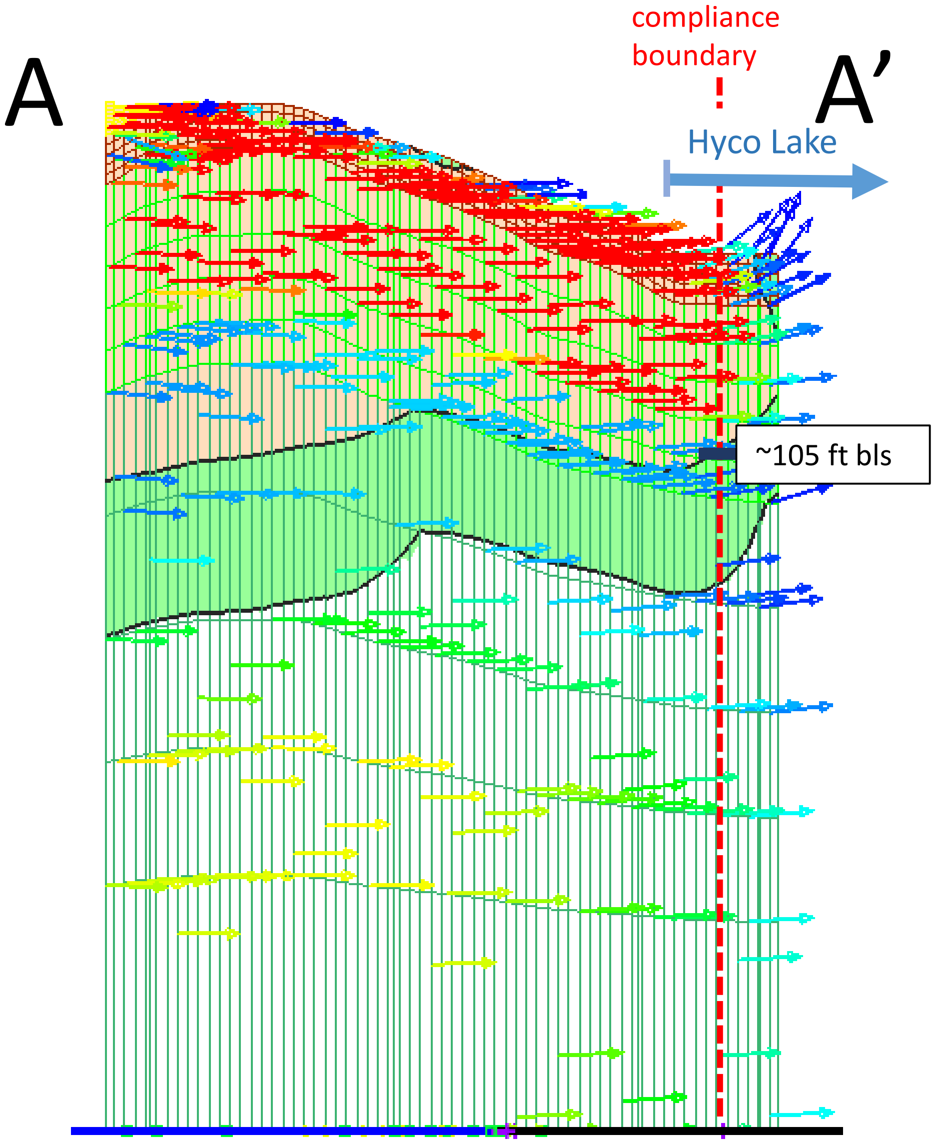
CROSS SECTION A-A' (VIEWED FROM NE SIDE OF CROSS SECTION LOOKING TO SW)

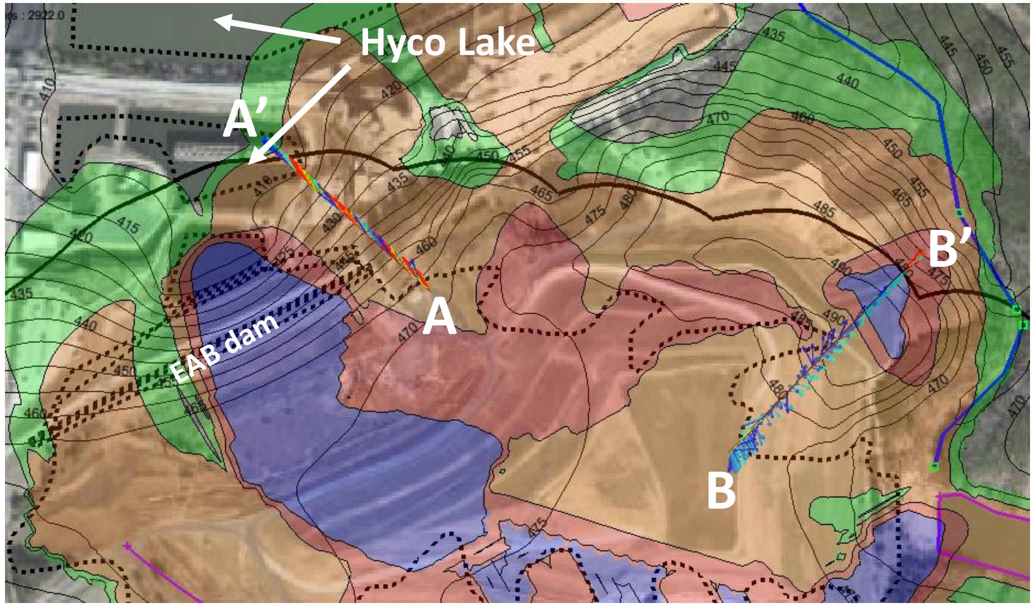
MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Roxboro model layers:

Ash	1-8
Saprolite	9-11
TZ	12-13
Bedrock	14-23

Vertical exaggeration X 3





A-A' ~950 ft

B-B' ~1200 ft

ROXBORO I/A **UPON COMPLETION OF FINAL COVER, 2030, t = 0**

CROSS SECTION A-A’ (VIEWED FROM NE SIDE OF CROSS SECTION LOOKING TO SW)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Roxboro model layers:

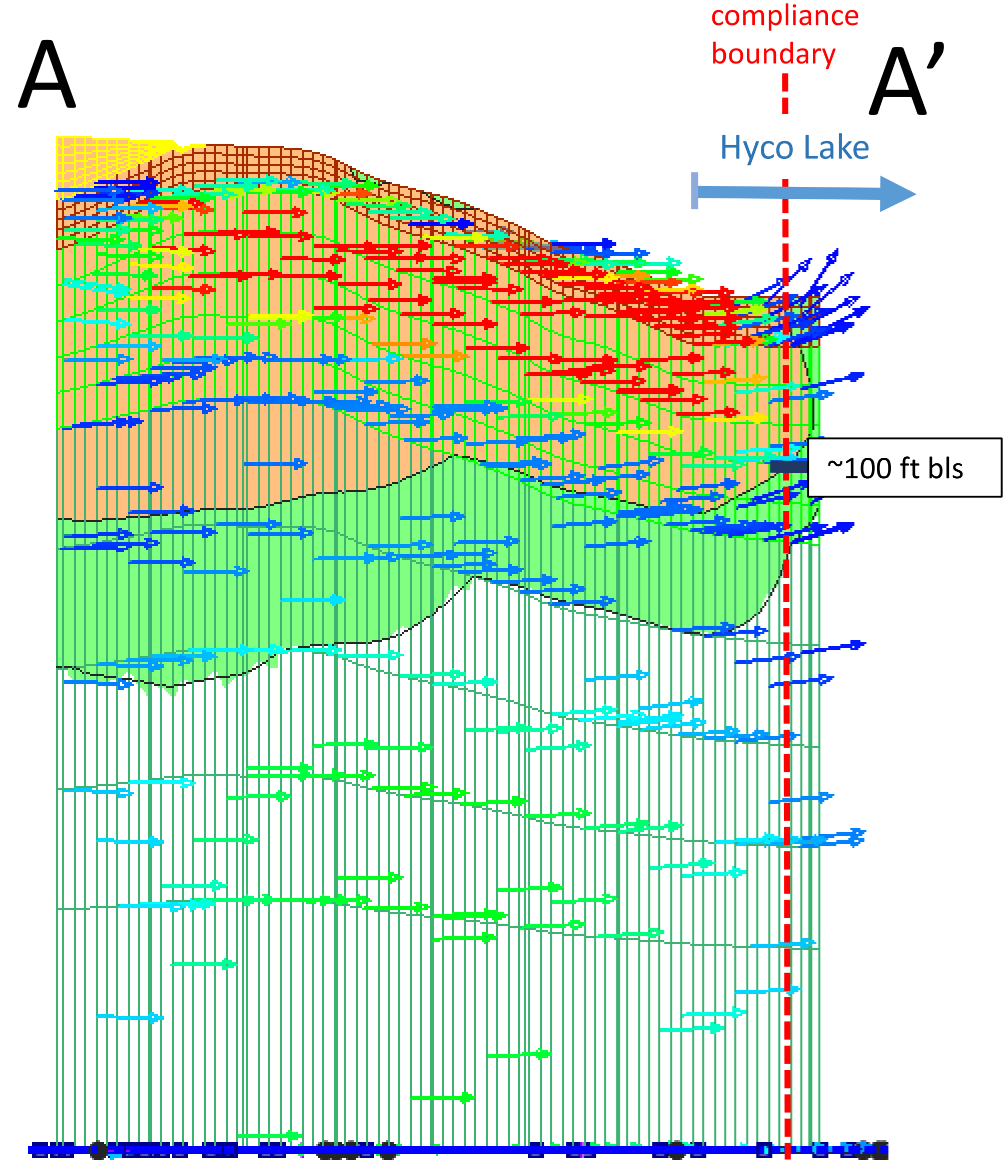
Ash 1-8

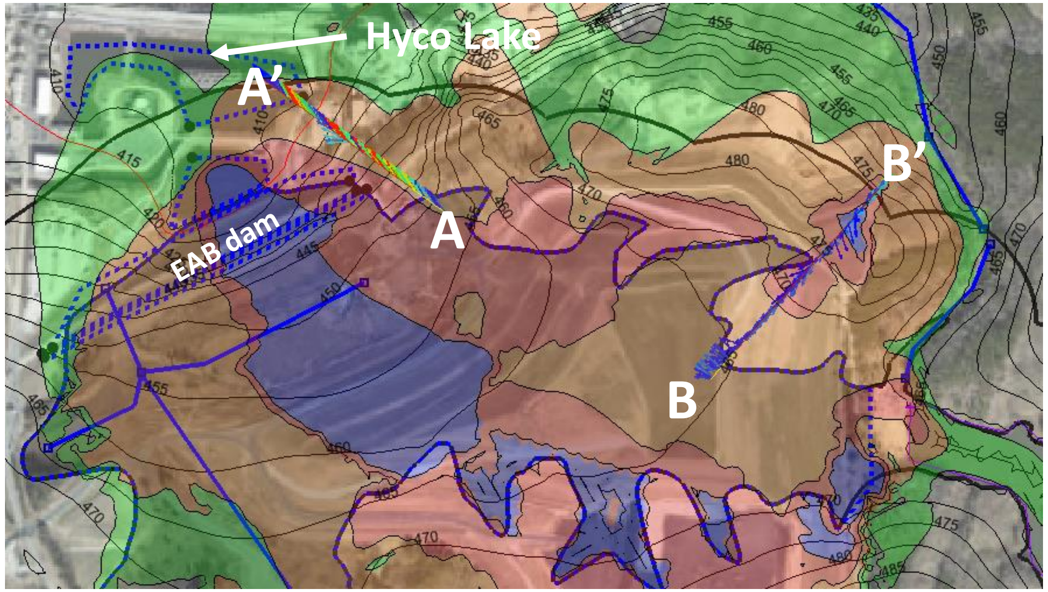
Saprolite 9-11

TZ 12-13

Bedrock 14-23

Vertical exaggeration X 3





A-A’ ~950 ft

B-B’ ~1200 ft

ROXBORO I/A **FINAL COVER, 2130, t = 100 years**

CROSS SECTION A-A’ (VIEWED FROM NE SIDE OF CROSS SECTION LOOKING TO SW)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

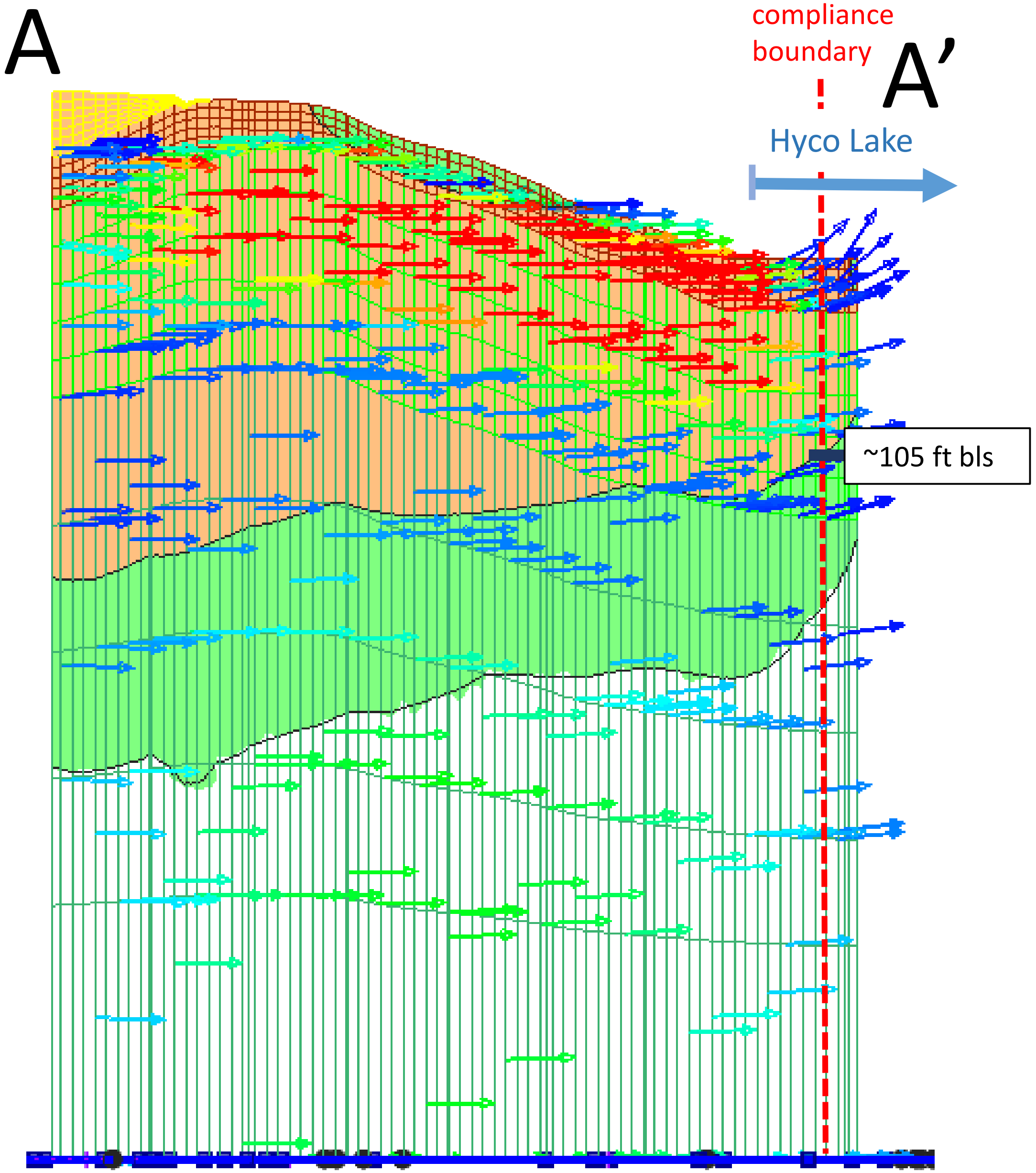
Roxboro model layers:

Ash 1-8

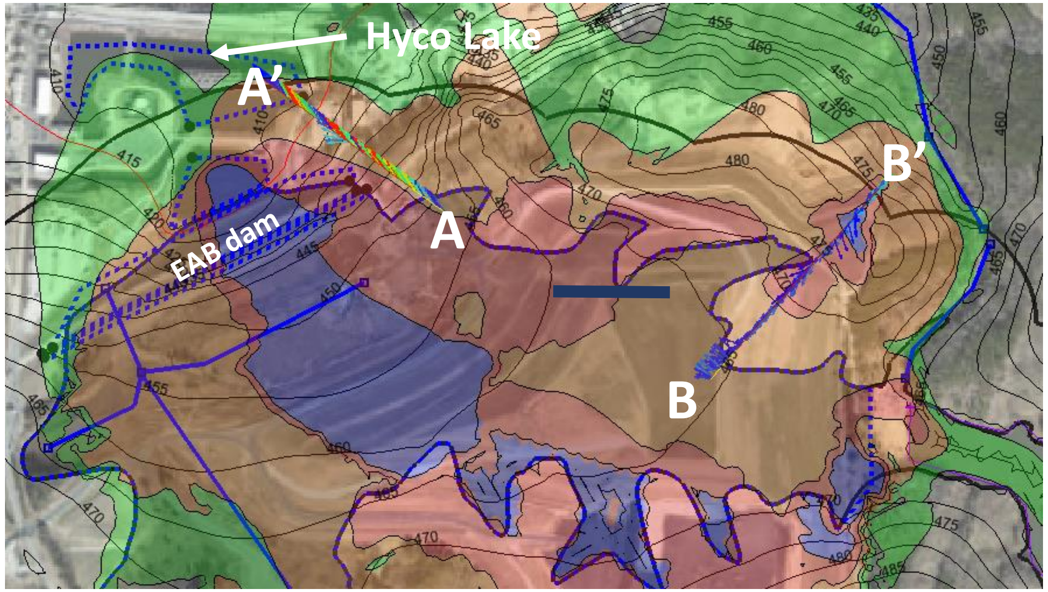
Saprolite 9-11

TZ 12-13

Bedrock 14-23



Vertical exaggeration X 3



A-A’ ~1000 ft

B-B’ ~1200 ft

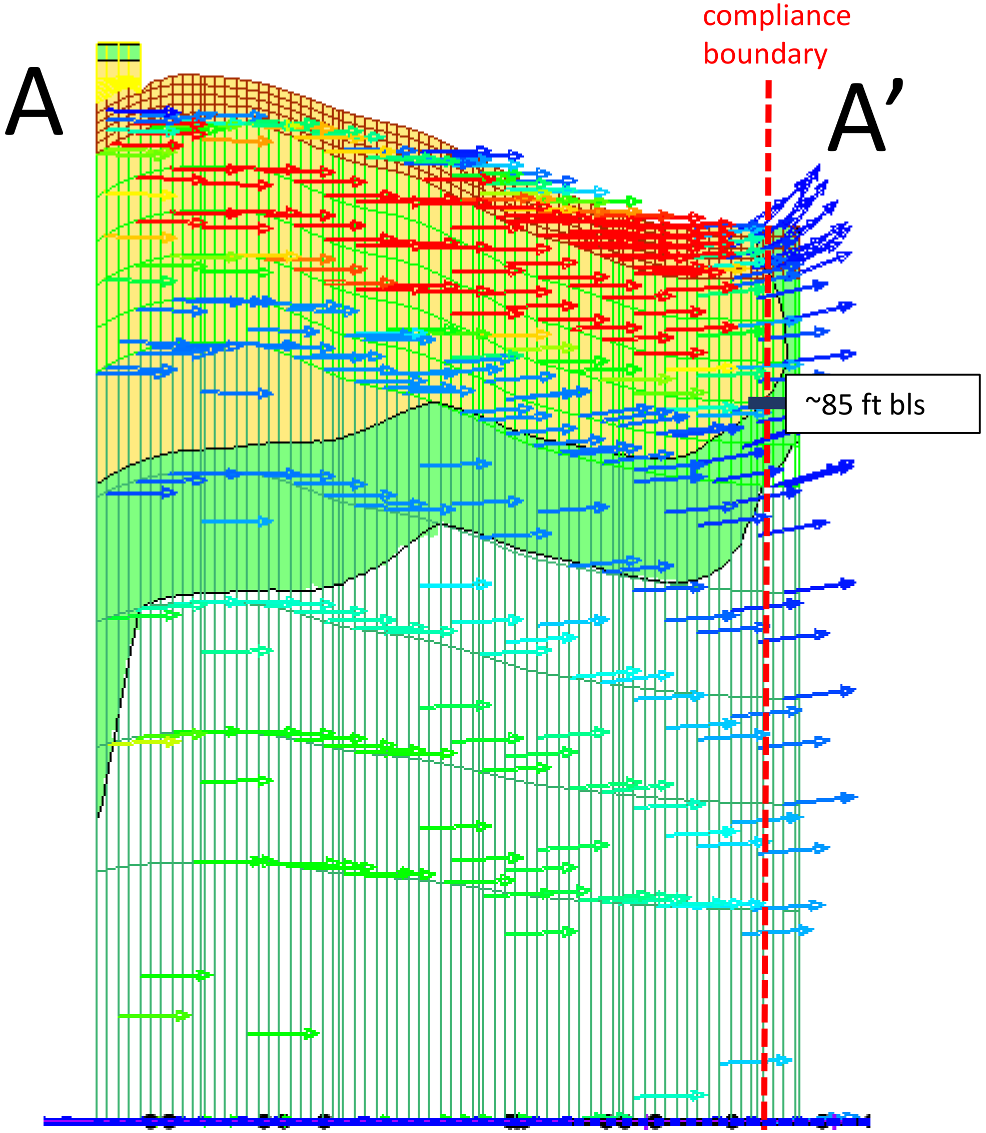
ROXBORO I/A UPON COMPLETION OF HYBRID, 2030, t = 0

CROSS SECTION A-A' (VIEWED FROM NE SIDE OF CROSS SECTION LOOKING TO SW)

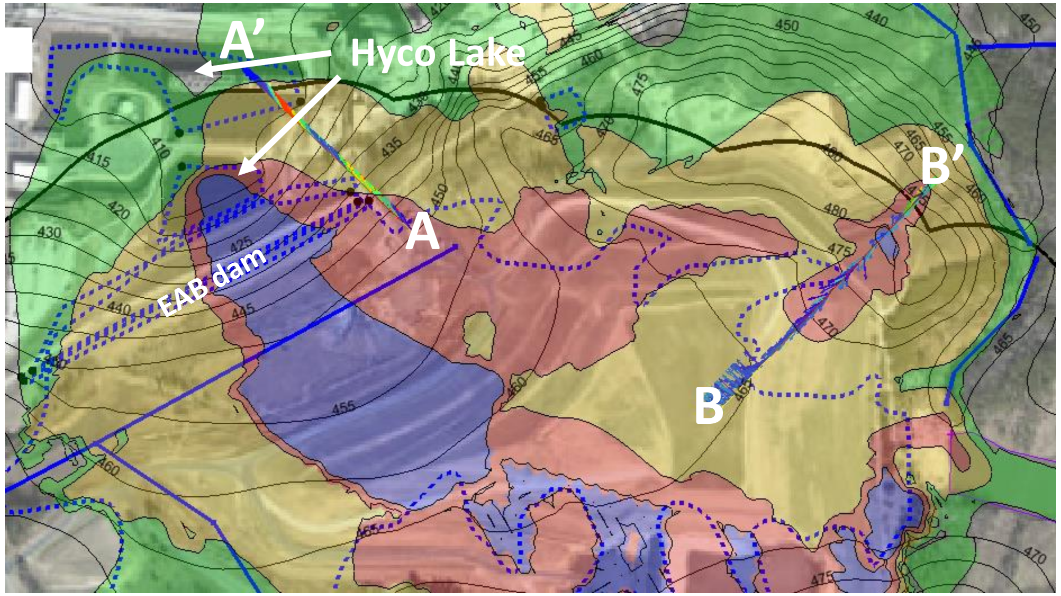
MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Roxboro model layers:

Ash 1-8
Saprolite 9-11
TZ 12-13
Bedrock 14-23



Vertical exaggeration X 3



A-A' ~950 ft
B-B' ~1200 ft

ROXBORO **HYBRID, 2130, t = 100 years**
I/A

CROSS SECTION A-A’ (VIEWED FROM NE SIDE OF CROSS SECTION LOOKING TO SW)

MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Roxboro model layers:

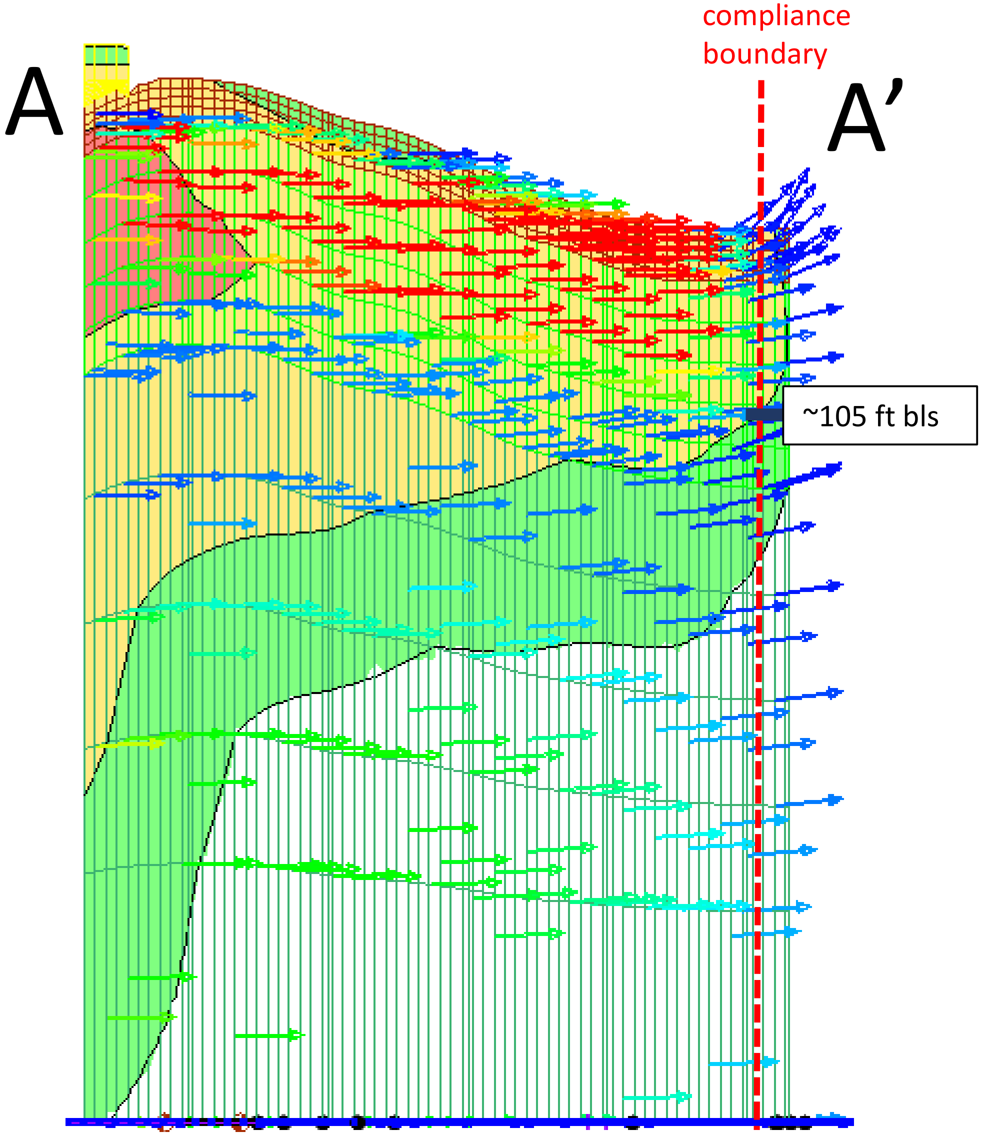
Ash 1-8

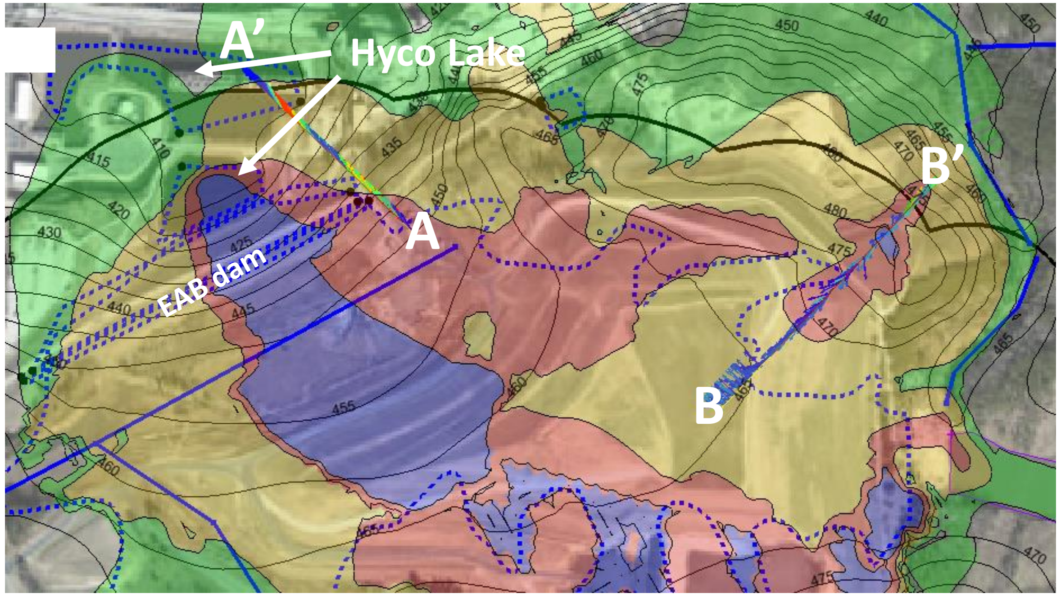
Saprolite 9-11

TZ 12-13

Bedrock 14-23

Vertical exaggeration X 3





A-A’ ~950 ft

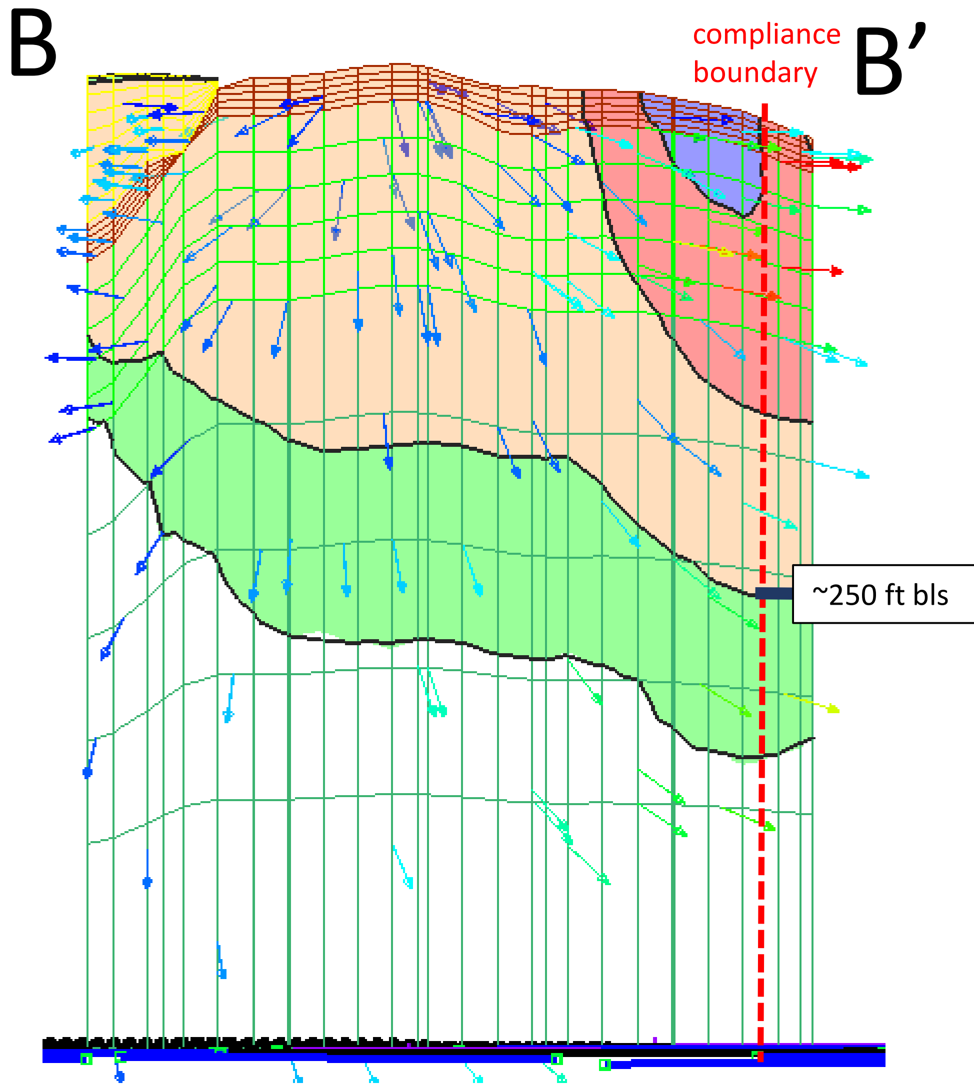
B-B’ ~1200 ft

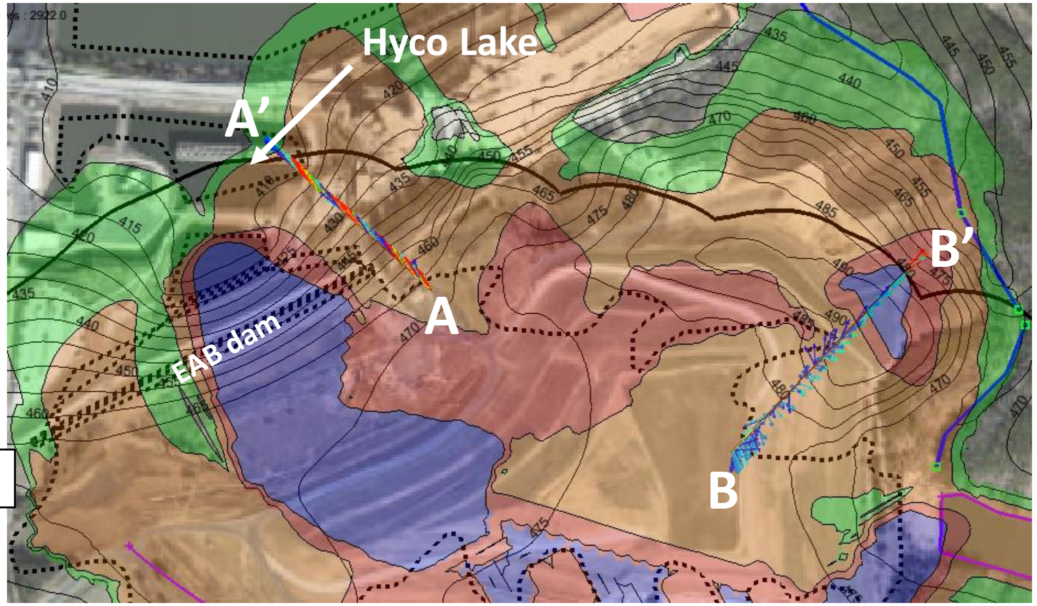
ROXBORO **CURRENT CONDITIONS, 2019**
I/A
CROSS SECTION B-B' (VIEWED FROM SE SIDE OF CROSS SECTION LOOKING TO NW)
MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Roxboro model layers:

Ash 1-8
Saprolite 9-11
TZ 12-13
Bedrock 14-23

Vertical exaggeration X 3





A-A' ~950 ft
B-B' ~1200 ft

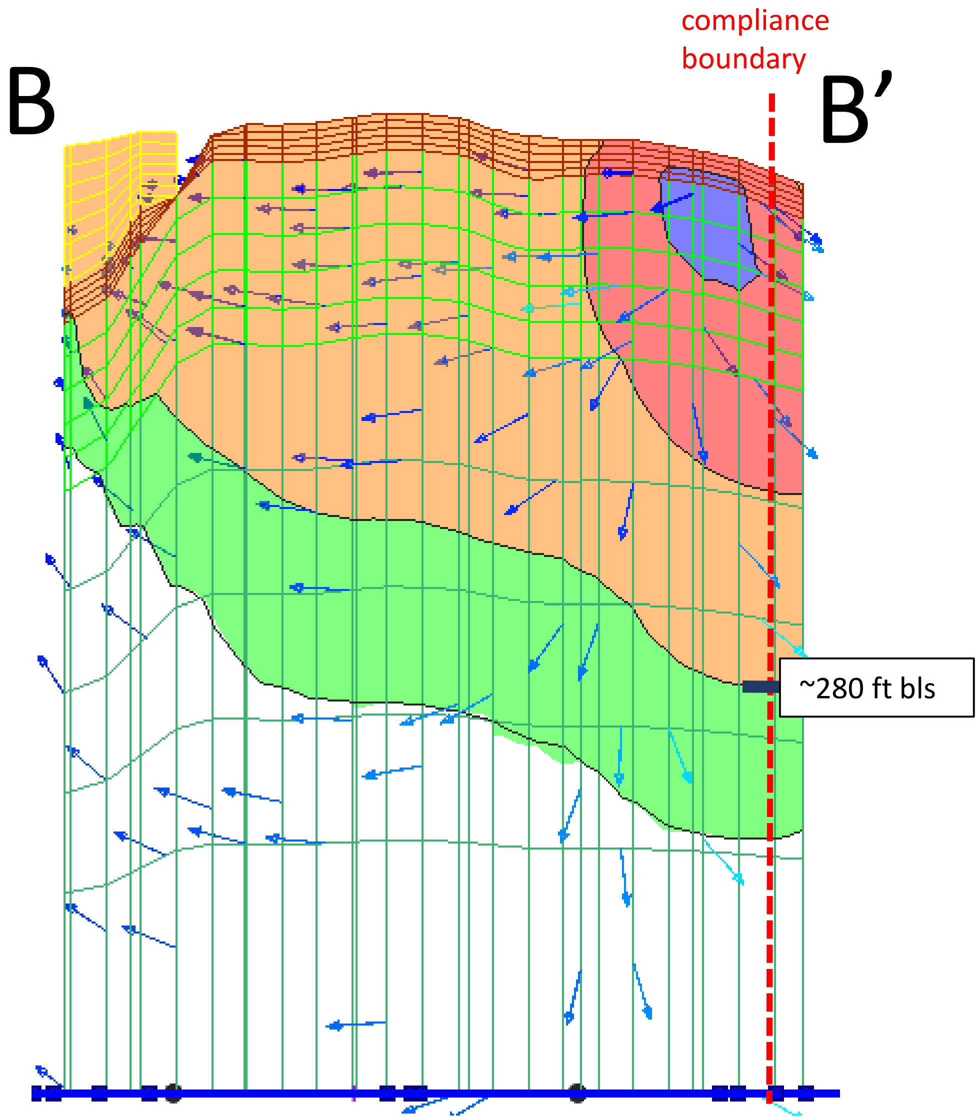
ROXBORO I/A **UPON COMPLETION OF FINAL COVER, 2030, t = 0**

CROSS SECTION B-B’ (VIEWED FROM SE SIDE OF CROSS SECTION LOOKING TO NW)

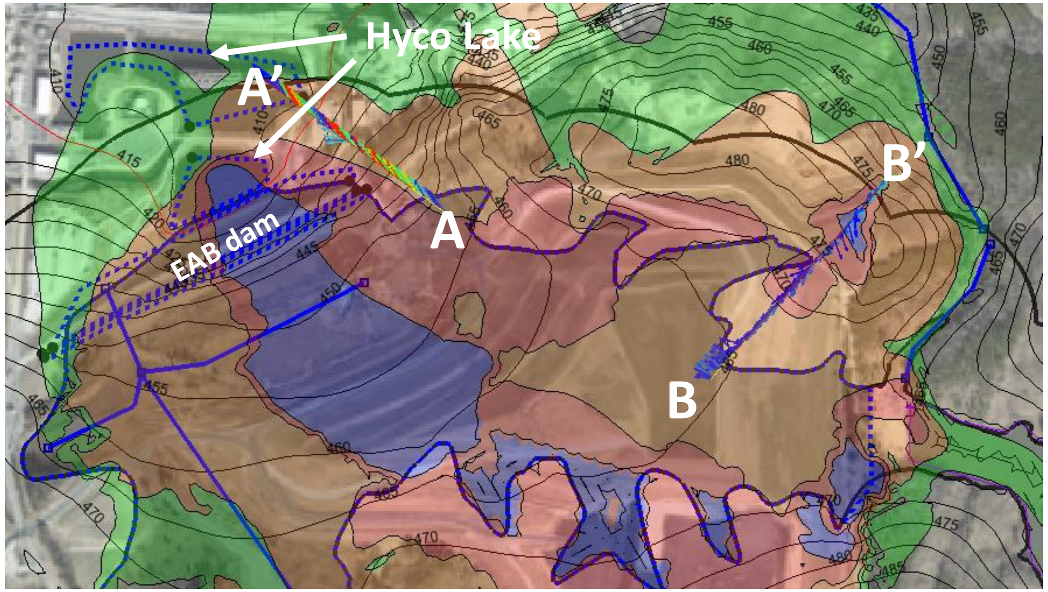
MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Roxboro model layers:

Ash 1-8
Saprolite 9-11
TZ 12-13
Bedrock 14-23



Vertical exaggeration X 3



A-A’ ~950 ft
B-B’ ~1200 ft

ROXBORO I/A **FINAL COVER, 2130, t = 100 years**

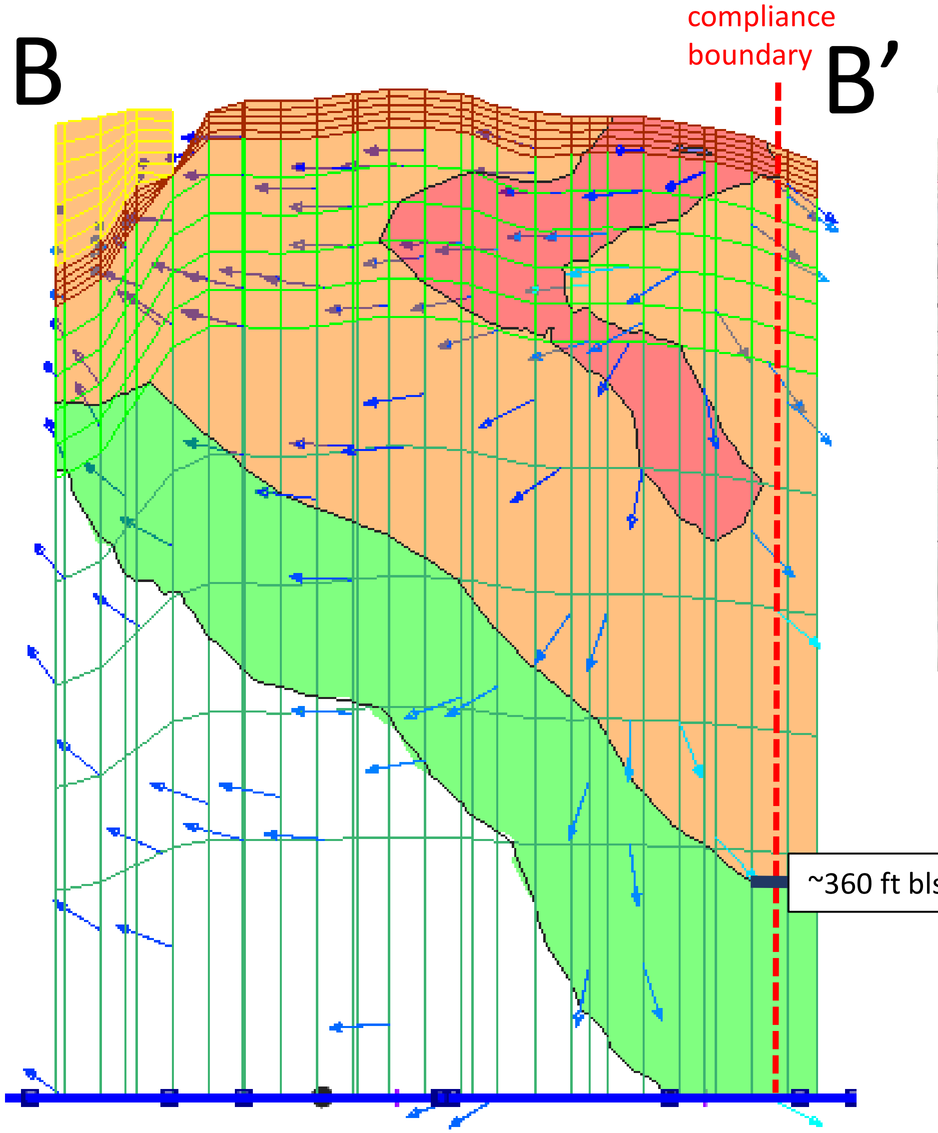
CROSS SECTION B-B' (VIEWED FROM SE SIDE OF CROSS SECTION LOOKING TO NW)

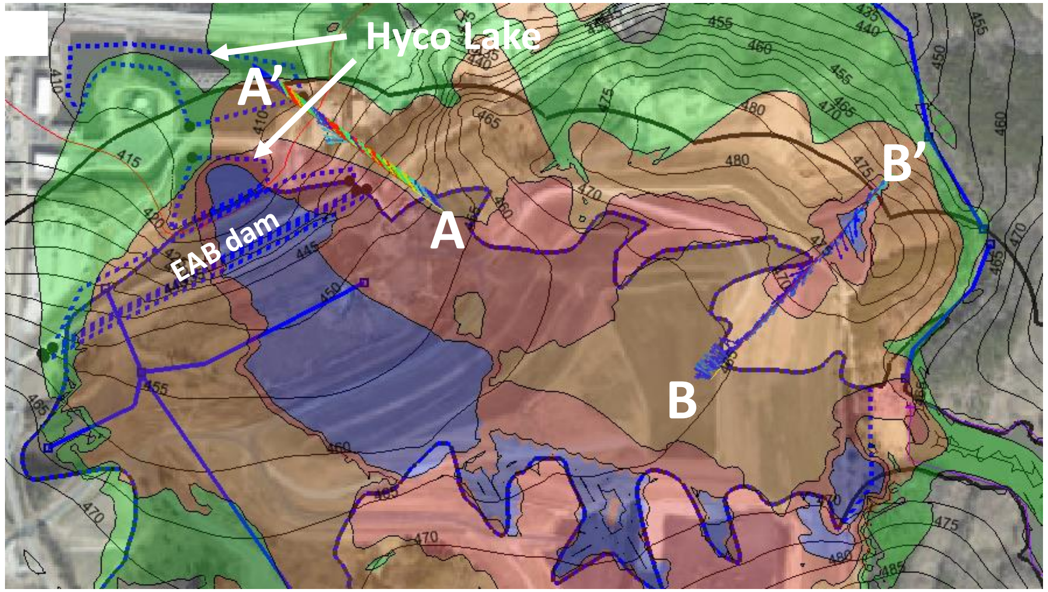
MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Roxboro model layers:

Ash 1-8
Saprolite 9-11
TZ 12-13
Bedrock 14-23

Vertical exaggeration X 3





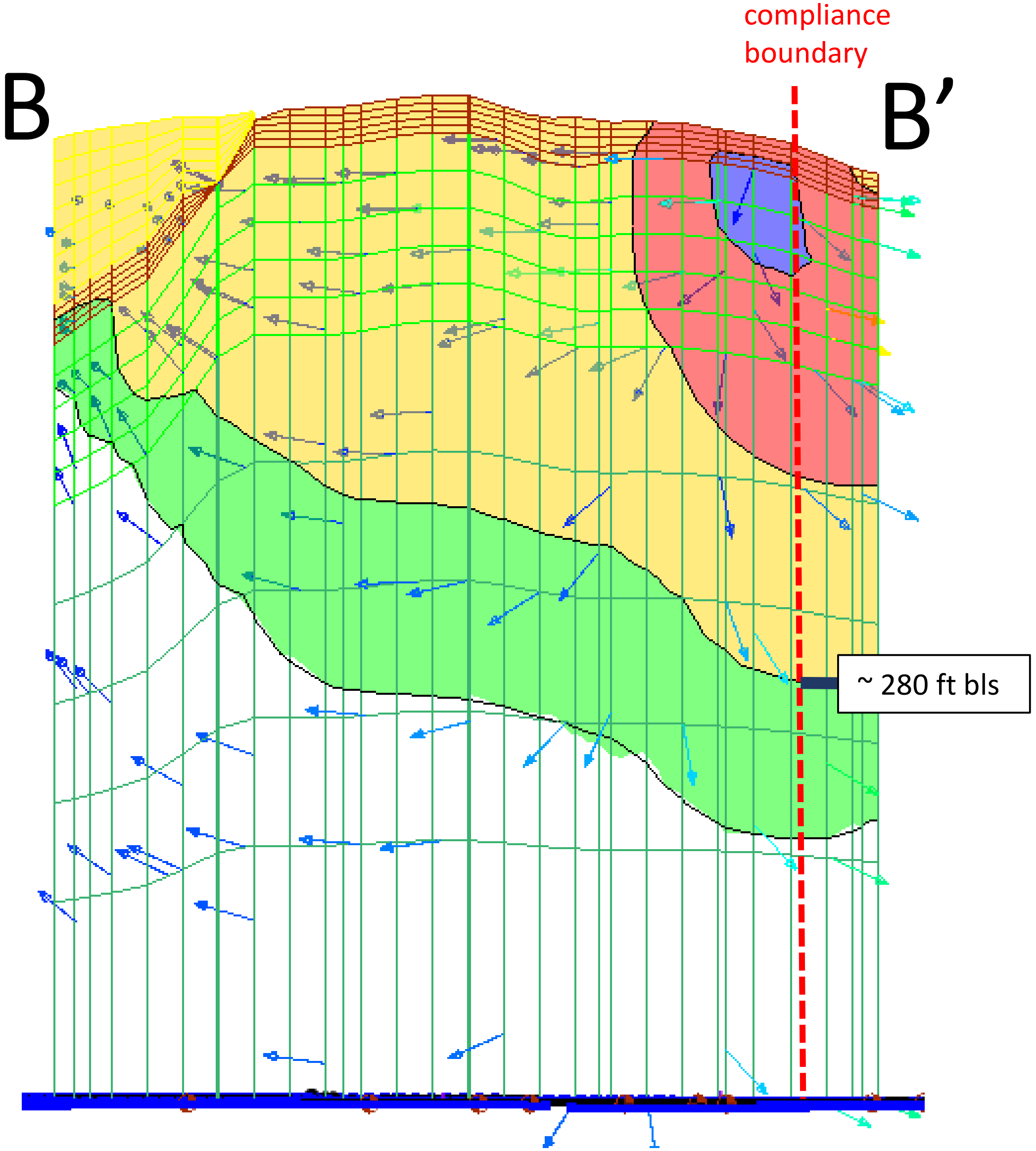
A-A' ~950 ft
B-B' ~1200 ft

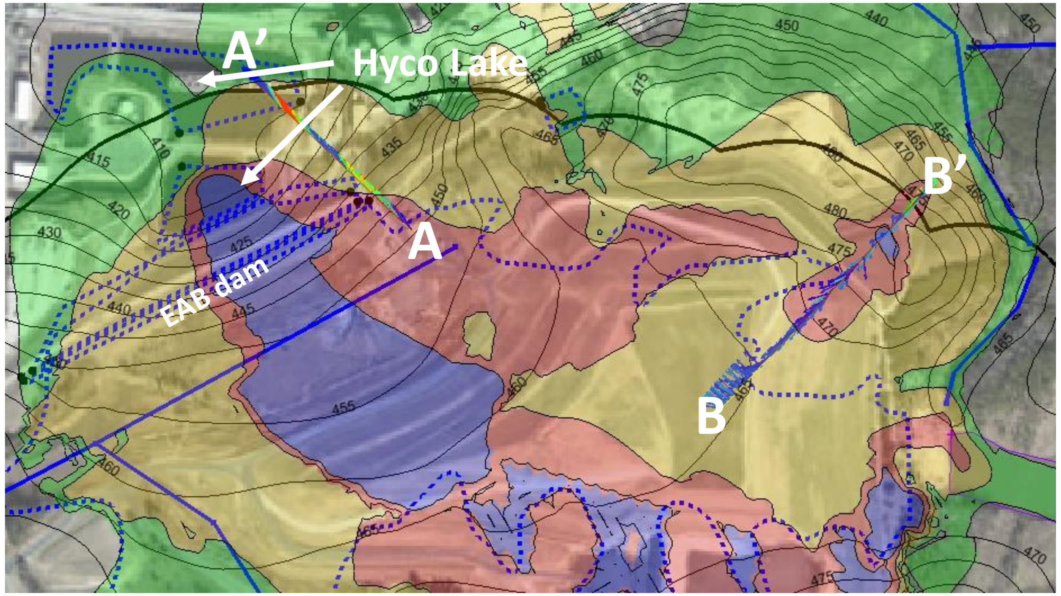
ROXBORO **UPON COMPLETION OF HYBRID, 2030, t = 0**
I/A
CROSS SECTION B-B’ (VIEWED FROM SE SIDE OF CROSS SECTION LOOKING TO NW)
MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Roxboro model layers:

- Ash 1-8
- Saprolite 9-11
- TZ 12-13
- Bedrock 14-23

Vertical exaggeration X 3





A-A’ ~950 ft
B-B’ ~1200 ft

ROXBORO I/A **HYBRID, 2130, t = 100 years**

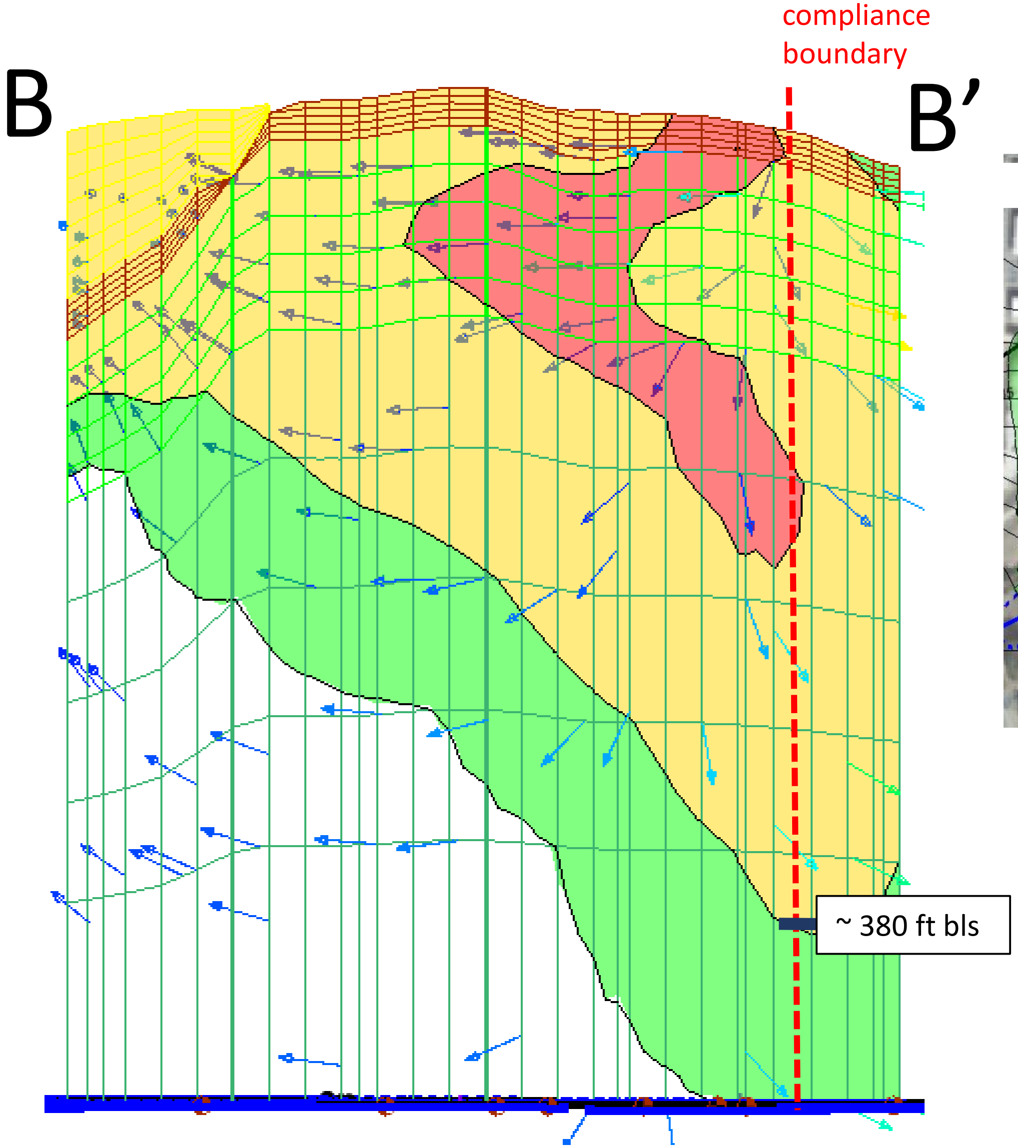
CROSS SECTION B-B' (VIEWED FROM SE SIDE OF CROSS SECTION LOOKING TO NW)

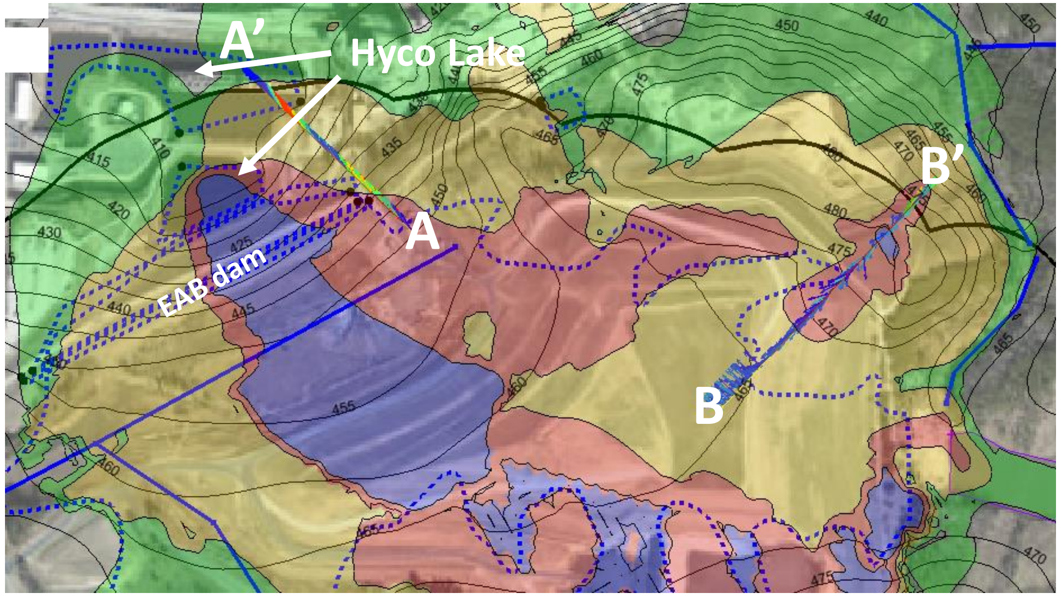
MAX BORON ANY LAYER green = 75-700, tan = 700-4000, red = 4000-10,000, blue = 10,000-40,000

Roxboro model layers:

Ash 1-8
Saprolite 9-11
TZ 12-13
Bedrock 14-23

Vertical exaggeration X 3





A-A' ~950 ft
B-B' ~1200 ft

I/A

ATTACHMENT B

RESPONSE TO COMMENTS

RESPONSE TO COMMENTS

I. Summary of Responses to Comments

The North Carolina Department of Environmental Quality (Department) received approximately 950 public comments regarding closure options for coal combustion residuals (CCR) surface impoundments at Duke Energy's Roxboro Steam Station (Roxboro), which is located in Person County, North Carolina. Almost all comments expressed concerns about coal ash's impact on groundwater and surface water and about leaving coal ash in unlined CCR surface impoundments where saturated ash remains in groundwater.

Almost all comments supported excavation of ash from the CCR surface impoundments at Roxboro. Approximately 850 comments were submitted using the following form email:

"The North Carolina Department of Environmental Quality (DEQ) should require Duke Energy to remove its coal ash from its leaking, unlined pits and move it to dry lined storage away from our waterways and out of our groundwater.

Duke Energy plans to leave its coal ash sitting in the groundwater at six sites in North Carolina, where it will keep polluting our groundwater, lakes, and rivers. Recent monitoring shows Duke Energy is polluting the groundwater at its coal ash ponds in North Carolina with toxic and radioactive materials. We need cleanup—not coverup!

The communities around the coal ash ponds have come out time after time over the last several years, making clear that we're concerned about pollution from Duke Energy's coal ash and want Duke Energy to get its coal ash out of its unlined, leaking pits. It is long past time for DEQ and Duke Energy to listen to the communities.

Duke Energy is already required to remove its coal ash at eight other sites in North Carolina and all of its sites in South Carolina—our families and our community deserve the same protections."

Like the form email above, many comments supported excavation without indicating a preference for where the ash should ultimately be disposed. Of those comments expressing a preference, most favored excavation to an onsite landfill.

A few comments encouraged beneficial reuse of excavated coal ash. Two comments supported capping in place. No comments indicated a preference for a hybrid closure option. The Department has determined that both CCR surface impoundments at Roxboro must be excavated. The Department appreciates the public's input and notes that public comments were near unanimous in supporting excavation of coal ash from the CCR surface impoundments at Roxboro.

The Department conducted an extensive technical review of Duke Energy's closure option submittal. In general, the Department shares concerns that capping in place, as proposed by Duke Energy, leaves coal ash saturated in groundwater to provide an ongoing source of groundwater and surface water pollution. For the East Ash Basin, the Department has elected excavation for several reasons, including the fact that Duke Energy's own groundwater modeling shows that capping in place would not prevent post closure exceedances of groundwater quality standards beyond the compliance boundary. For the West Ash Basin, the Department has elected excavation for several reasons, including the fact that a significant portion of the West Ash Basin sits within the 100-year floodplain.

As required by the Coal Ash Management Act (CAMA), Duke Energy must submit a closure plan. At that time, the public will have another opportunity to provide input on Duke Energy's closure plan for CCR surface impoundments at Roxboro.

II. Detailed Responses to Comments

A. Comments Supporting Excavation

Comment: As indicated above, almost all comments expressed a preference for excavating ash from the CCR surface impoundments to a lined landfill. For example, several comments stated: "DEQ should require Duke Energy to remove its coal ash from its leaking, unlined pits and move it to dry, lined storage — out of our groundwater and away from Hyco Lake, Sargents River, and the rivers and streams in the Dan River Basin and Roanoke River Basin."

Response: The Department determined that the CCR surface impoundments at Roxboro must be excavated.

Comment: Many comments expressed a preference for excavation to remove coal ash from floodplains. Some comments indicated that excavating ash from floodplains was especially important in light of recent flooding events, like Hurricane Florence, and global warming. Some comments suggested that ash should be excavated to a landfill that is outside of the 100 year floodplain and others suggested that the landfill should be at an elevation that would be above lake levels during the one day Potential Maximum Precipitation event.

Response: The Department will take these comments into consideration when it reviews Duke Energy's closure plans.

Comment: Several comments supported excavation due to a concern that capping in place leaves coal ash saturated in groundwater, where it will continue to be a source of groundwater pollution. Some comments stated that a cap may cut off vertical infiltration but fails to prevent coal ash constituents from migrating via horizontal groundwater flows.

Response: The Department shares this concern and has determined that the CCR surface impoundments at Roxboro must be excavated.

Comment: Several comments supported excavation because of concerns regarding the structural stability of capping in place. Several comments expressed concern that capping in place without eliminating pore water may lead to structural instability. Another comment indicated that capping in place has already failed at other locations and at Roxboro.

Response: The Department has determined that the CCR surface impoundments at Roxboro must be excavated.

Comment: Several comments indicated that the costs associated with closure options should not be a factor for the Department's consideration. Other comments expressed concern that Duke Energy overestimated the cost of excavation and underestimated the cost of capping in place. For example, some stated that prior excavations in South Carolina indicate that Duke Energy's cost estimates for excavation are too high. Another comment stated that Duke Energy underestimated the cost of capping in place because Duke Energy assumes they do not have to dewater pore water.

Response: The Department has determined that the CCR surface impoundments at Roxboro must be excavated. To the extent that this comment applies to the ultimate disposition of excavated ash, the Department will take these comments into consideration when it reviews Duke Energy's closure plan.

Comment: Several comments took issue with Duke Energy's groundwater modeling. Specific concerns included: modeling a cap in place scenario with a Kd approach; using boundary conditions that create unrealistic groundwater gradients, software compatibility issues, and using a different compliance boundary for each closure option.

Response: The Department conducted a thorough review of Duke Energy's groundwater modeling and agrees with some of the concerns raised. The Department expects its concerns to be addressed in Duke Energy's closure plans.

Comment: Many comments encouraged the Department to impose stricter requirements for landfills receiving excavated coal ash. Some encouraged the Department to require more separation between the bottom of ash and the groundwater table—one commenter suggested five feet of separation and another suggested ten to twelve feet of separation. Another comment encouraged the Department to require ground water and surface water monitoring for a minimum of 50 years. Other comments encouraged the Department to require redundant liners with leak detection systems.

Response: The Department will take these comments into consideration when it reviews Duke Energy's closure plans.

Comment: Several comments supported excavation because it is already required at eight other Duke Energy sites in North Carolina or is already required in South Carolina and Virginia.

Response: The Department has determined that the CCR surface impoundments at Roxboro must be excavated.

B. Comments Supporting Excavation to an Onsite Landfill

Comment: Several comments expressed a preference for excavation to an onsite landfill instead of excavating ash fifteen miles to an offsite landfill at the Mayo Plant because onsite disposal minimizes the impact of truck traffic and air pollution on neighboring communities.

Response: The Department will take these comments into consideration when it reviews Duke Energy's closure plans.

Comment: Several comments expressed a preference for excavation to an onsite landfill because it would be less expensive than excavating to an offsite landfill.

Response: The Department will take these comments into consideration when it reviews Duke Energy's closure plans.

C. Comment Supporting Excavation and Encouraging Beneficial Use

Comment: Several comments encouraged beneficial use of excavated coal ash. One comment encouraged Duke Energy to partner with North Carolina A & T State University to look at creative ways to reuse coal ash. Another comment suggested Duke Energy provide a million dollar prize incentive to engineering students for developing an environmentally safe way to recycle coal ash. Another comment suggested recycling and encasing coal ash into cement bricks and concrete.

Response: The Department will take these comments into consideration when it reviews Duke Energy's closure plans for Roxboro. CAMA requires Duke Energy to include in its closure plan any plans for beneficial use of coal ash. Duke Energy is already required to beneficiate (for cementitous products) coal ash from its Buck (Rowan County), Lee (Wayne County), and Cape Fear (Chatham County) facilities.

D. Comment Supporting Excavation to an Offsite Landfill

Comment: Two comments supported excavation of coal ash to a rural area outside of North Carolina.

Response: The Department does not have the legal authority to require Duke Energy to dispose of coal ash in a "rural area outside of North Carolina."

E. Comment Supporting Cap in Place

Comment: Two comments supported capping in place. One comment expressed support for capping in place because it is the least costly and the quickest way to address groundwater and other environmental issues. Another comment expressed doubt that coal ash was negatively impacting neighboring water supply wells and stated that excavation (to an offsite landfill) would be detrimental due to road damage, noise, congestion, and air pollution when there is no evidence that wells near ash ponds are any worse than other wells in the State.

Response: The Department disagrees with these comments. Duke Energy's own groundwater modeling for capping in place at the East Ash Basin shows-post closure exceedances of groundwater quality standards beyond the compliance boundary.

F. Other Comments

Comment: A couple of comments indicated that the federal CCR rule prohibits capping in place as proposed by Duke Energy.

Response: The Department has determined that the CCR surface impoundments at Roxboro must be excavated.

Comment: One comment stated that coal ash used as structural fill should be excavated to a lined landfill.

Response: CAMA requires closure of all CCR surface impoundments—not closure of coal ash structural fills.

Comment: Several comments encouraged the Department to perform independent analysis of the closure options.

Response: The Department has performed extensive technical analysis of Duke Energy's closure options submittal.

Comment: Several comments stated that Duke Energy should be held financially responsible for coal ash cleanup and should not be allowed to pass the cost to ratepayers.

Response: This issue is not within the purview of the Department. This issue rests with the North Carolina Utilities Commission.

Comment: Several comments stated that the Department should fine or penalize Duke Energy.

Response: CAMA requires the Department to elect the closure option for CCR surface impoundments at six Duke Energy sites, including Roxboro. Fining or penalizing Duke is not relevant to that statutory requirement or the Department's closure determination. In other contexts, the Department has taken enforcement actions against Duke Energy related to coal ash pollution.

Comment: One comment stated that Duke Energy should provide new water lines to all the homeowners and landowners impacted by coal ash.

Response: As required by CAMA, Duke Energy provided permanent replacement water supplies for each household that has a drinking water supply well located within a one-half mile radius from the established compliance boundary of the CCR surface impoundments at Roxboro.

Comment: Several comments expressed concern regarding worker safety in implementing closure. Specifically, a comment stated that protections should be in place to avoid the health issues faced by workers handling the Kingston, TN coal ash spill in 2008.

Response: The Department will take these comments into consideration when it reviews Duke Energy’s closure plans.

Comment: One comment stated that the Department’s reclassification of coal ash ponds as low risk indicated preferential treatment and improper application of administrative rules and procedures.

Response: Duke Energy satisfied the two statutory criteria set forth in NCGS §130A-309.213(d)(1); therefore, the Department was *required* to classify the CCR surface impoundments at Roxboro as “low risk.” However, the Department has determined that the CCR surface impoundments at Roxboro must be excavated.