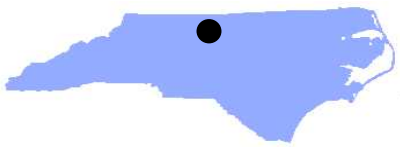
FACT SHEET FOR NPDES PERMIT DEVELOPMENT
Major Modification/Renewal
DEQ/DWR
NPDES No. NC0003468

Facility Information			
Applicant/Facility Name:	Duke Energy Carolinas, LLC – Dan River Combined Cycle Station		
Applicant Address:	Water Management, Duke Energy, P.O. Box 1006, Charlotte, NC 28201		
Facility Address:	864 South Edgewood Road; Eden, NC 27288		
Permitted Flow	Not Limited		
Type of Waste:	99.9% Industrial, 0.1% Domestic		
Facility/Permit Status:	Class I Physical/Chemical/Active; Major Modification/Renewal		
County:	Rockingham		
Miscellaneous			
Receiving Stream/Index	Dan River/ 22-(39)a	Regional Office:	Winston-Salem
Stream Classification:	C	State Grid/USGS Topo Quad:	B20NW / Southeast Eden, NC
303(d) Listed?:	Yes	Permit Writer:	Sergei Chernikov, Ph.D.
Subbasin:	03-02-03	Date:	June 1, 2016
Drainage Area (mi2):	1,706		
Summer 7Q10 (cfs)	314		
Winter 7Q10 (cfs):	580		
30Q2 (cfs):	706		
Average flow (cfs)	1,621		
IWC (%):	1.03		

PROPOSED PERMITTING ACTION

On February 2, 2014 a stormwater pipe under the ash basin collapsed and released 39,000 tons of coal ash into Dan River. In response to the release, on 02/24/2014 the DEQ issued a letter re-opening the NPDES wastewater permit. This permit is being modified and renewed to include the unpermitted seeps. The permit modification/renewal also establishes requirements for dewatering of the ash ponds, which is necessary to remove the coal ash from the ponds. In addition, the modification/renewal includes an update to the Clean Water Act Section 316(b) requirements.

SUMMARY

Duke Energy's Dan River Combined Cycle Station is a steam electric plant in Rockingham County. Previously, it utilized three coal fired steam generating units, but these units were retired in 2012 and the coal powerhouse demolished. The three combustion turbine units with a combined capacity of 85 MW for periods of high electrical demand have also been retired.

Duke Energy has installed a new natural gas fired combined cycle generating facility, which uses two combustion turbine generators, two heat recovery steam generators (boilers), and one steam turbine generator rated at 620 MW. This was approved by the North Carolina Utilities Commission in June 2008. This facility began commercial operation on December 10, 2012.

The combined cycle unit uses wet cooling towers for steam generator condenser cooling, which will minimize both the amount of water intake and discharge to the Dan River. The evaporative loss associated with these cooling towers is approximately 3.02 MGD. A new wastewater stream consisting of cooling tower blowdown (1.17 MGD), miscellaneous uses (0.16 MGD), and treated

sanitary wastewater (0.003 MGD) is combined and routed to Outfall 001. Water flow savings realized from the retirement of the coal-fired units result in no net increase in the water withdrawal rate from the Dan River. The plant is operated in such a manner to ensure that there are no increases in water withdrawal.

This segment of Dan River is impaired for turbidity and fecal coliform. A TMDL for fecal coliform was approved by the EPA in July 2009. This facility discharge does not impact fecal coliform because of the negligible amount of treated domestic waste in its effluent (0.003 MGD). Currently, there is no TMDL for turbidity on this segment of the Dan River. The primary source for turbidity is non-point source discharges.

The facility is subject to the Steam Electric Effluent Guidelines 40 CFR 423.

The permitted outfalls for the facility are summarized below.

Outfall 001: cooling water and cooling tower blowdown from combined cycle unit, intake screen backwash, plant collection sumps (low volume wastes), treated domestic waste.

Internal Outfall 001A: an internal outfall consisting of low volume waste sources including wash down water and laboratory wastes. This internal outfall discharges to Outfall 001.

Outfall 002: ash basin discharge consisting of low volume wastes, boiler cleaning wastewater, legacy ash disposal, stormwater, boiler blowdown, and metal washing wastewater.

Outfall 002A: Coal yard sump overflow - primarily stormwater, and some legacy coal pile runoff.

Proposed Outfalls 102, 103, and 104: Seeps
In addition to seepage from the ash pond, Outfall 104 also contains stormwater discharge from the switchyard.

SEEPS- OUTFALLS 102, 103, 104

Existing Discharges from Seepage
The facility identified 4 unpermitted seeps (all non-engineered) from the ash settling basin. Seep 1, seep 2, and seep 3 discharge to Railroad Branch. Seep 4 discharges to Dan River. The locations of the seeps are identified below and are depicted on the map attached to the permit.

Table 1. Discharge Coordinates and Assigned Outfall Numbers

Discharge ID	Latitude	Longitude	Outfall number
S-1	36.493	-79.711	Not assigned
S-2	36.493	-79.711	102
S-3	36.493	-79.711	103
S-4	36.486	-79.719	104

The outfall for these discharges is through an effluent channel meeting the requirements in 15A NCAC 2B .0228. Within 180 days of the effective date of this permit, the permittee shall demonstrate, through in-stream sampling meeting the requirements of condition A. (19.), that the water quality standards in the receiving stream are not contravened.

Seep 1 is located at the stream bottom, steam bank is very steep approximately 8 ft. down the stream bottom where seep exists, and Winston-Salem Regional Office concluded that: "Representative discharge point monitoring is not feasible as well a potential safety hazard". Therefore, the outfall number will not be assigned to Seep 1 and its discharge can be characterized by Seep 2 because it is located approximately 120 ft. downstream of Seep1.

Discharges from Seepage Identified After Permit Issuance

The facility shall comply with the "Plan for Identification of New Discharges" as contained in Attachment 2. For any discharge identified pursuant to this Plan, the facility shall, within 90 days of the seep discovery, determine if the discharge seep meets the state water quality standards established in 15A NCAC 2B .0200 and submit the results of this determination to the Division. If the standards are not contravened, the facility shall conduct monitoring for the parameters specified in A. (8.).

If any of the water quality standards are exceeded, the facility shall be considered in violation until one of the options below is fully implemented:

1) Submit a complete application for 404 Permit (within 30 days after determining that a water quality standards is exceeded) to pump the seep discharge to one of the existing outfalls, install a pipe to discharge the seep to the Dan River/Railroad Branch, or install an *in-situ* treatment system. After the 404 Permit is obtained, the facility shall complete the installation of the pump, pipe, or treatment system within 180 days from the date of the 404 permit receipt and begin pumping/discharging or treatment.
2) Demonstrate through modeling that the decanting and dewatering of the ash basin will result in the elimination of the seep. The modeling results shall be submitted to the Division within 120 days from the date of the seep discovery. Within 180 days from the completion of the dewatering the facility shall confirm that the seep flow ceased. If the seep flow continues, the facility shall choose one of the other options in this Special Condition.
3) Demonstrate that the seep is discharging through the designated "Effluent Channel" and the water quality standards in the receiving stream are not contravened. This demonstration should be submitted to the Division no later than 180 days from the date of the seep discovery. The "Effluent Channel" designation should be established by the DEQ Regional Office personnel prior to the issuance of the permit. This permit shall be reopened for cause to include the "Effluent Channel" in a revised permit.

All effluent limits, including water quality-based effluent limits, remain applicable notwithstanding any action by the Permittee to address the violation through one of the identified options, so that any discharge in exceedance of an applicable effluent limit is a violation of the Permit as long as the seep remains flowing.

New Identified Seeps

If new seeps are identified, the facility shall follow the procedures outlined above. The deadlines for new seeps shall be calculated from the date of the seep discovery. The new identified seep is not permitted until the permit is modified and the new seep included in the permit and the new outfall established for the seep.

The monitoring frequency for seeps is sufficient to determine the compliance with the effluent guidelines during the dry periods when stormwater does not provide additional dilution.

ASH POND DAMS

Seepage through earthen dams is common and is an expected consequence of impounding water with an earthen embankment. Even the tightest, best-compacted clays cannot prevent some water from seeping through them. Seepage is not necessarily an indication that a dam has structural problems,

but should be kept in check through various engineering controls and regularly monitored for changes in quantity or quality which, over time, may result in dam failure.

REASONABLE POTENTIAL ANALYSIS(RPA)-ASH POND AND SEEPS

The Division conducted EPA-recommended analyses to determine the reasonable potential for toxicants to be discharged at levels exceeding water quality standards/EPA criteria by this facility. For the purposes of the RPA, the background concentrations for all parameters were assumed to be below detections level. The RPA uses 95% probability level and 95% confidence basis in accordance with the EPA Guidance entitled "Technical Support Document for Water Quality-based Toxics Control." The RPA included evaluation of dissolved metals' standards, utilizing a default hardness value of 25 mg/L $CaCO_3$ for hardness-dependent metals. The RPA spreadsheets are attached to this Fact Sheet.

a) RPA for Decanting of Ash Pond (Outfall 002).
The RPA was conducted for decanting of Ash Pond, the calculations included: As, Be, Cd, Chlorides, Total Phenolic Compounds, Cr, Cu, CN, F, Pb, Hg, Mo, Ni, Se, Zn, Ba, Sb, and Tl (please see attached). The renewal application listed average flow of 2.1 MGD (the water flow diagram) as a current flow. The discharge data on the EPA Form 2C was used for the RPA, it was supplemented by the analysis of the free standing water in the ash pond. The analysis indicates no reasonable potential to violate the surface water quality standards or EPA criteria.

b) RPA for Dewatering of Ash pond (Outfall 002).
To meet the requirements of the Coal Ash Management Act of 2014, the facility needs to dewater two ash ponds by removing the interstitial water and excavate the ash to deposit it in landfills. The facility's highest discharge rate from the dewatering process will be 1.5 MGD. The facility submitted data for the standing surface water in the ash ponds, interstitial water in the ash, and interstitial ash water that was treated by filters of various sizes. To evaluate the impact of the dewatering on the receiving stream the RPA was conducted for the wastewater that will be generated by the dewatering process. To introduce a margin of safety, the highest measured concentration for a particular parameter was used. The RPA was conducted for As, Cd, Chlorides, Cr, Cu, F, Pb, Hg, Ni, Se Zn, Ba, Sb, and Tl. The RPA analysis indicates that dewatering activity will not cause contravention of the state water quality standards/ EPA criteria.

c) RPA for Seeps (Outfalls 102, 103, 104)
Two separate RPA calculations were conducted for 4 seeps. Seeps 1, 2, and 3 discharge into Railroad Branch, Seep 4 discharges into Dan River. The analysis was based on the dilution in the receiving stream (Dan River and Railroad Branch) since the effluent channels were delineated for 3 seeps. Calculations included: As, Cd, Chlorides, Cr, Cu, F, Pb, Hg, Ni, Se Zn, Al, Ba, Sb, and Tl. The flow volume for all seeps was measured at 0.004 MGD. However, the flow of 0.01 MGD was used for both RPA calculations to incorporate a safety factor, account for potential new seeps that might emerge in the future or increase in flow volume at the existing seeps. The analysis indicates no reasonable potential to violate the water quality standards or EPA criteria for Dan River Seep. The RPA for Railroad Branch Seeps concludes that limits for As, Pb, and Al are necessary to protect the receiving stream.

d) RPA for Outfall 001.
Renewal application submitted on July 15 indicate presence of the following pollutant in the discharge (concentrations are above detection level): F, Ba, Mo, Sb, Hg, and Zn. The Division evaluated these parameters and determined that they are below water quality standards, with an exception of Hg. The Hg evaluation will be conducted separately.

The proposed permit requires that EPA methods 200.7 or 200.8 (or the most current versions) shall be used for analyses of all metals except for total mercury.

MERCURY EVALUATION- OUTFALL 002 (ASH POND) AND OUTFALL 001 (COOLING WATER AND DOMESTIC WASTEWATER)

The State of North Carolina has a state-wide mercury impairment. A TMDL was developed to address this issue in 2012. The TMDL included the implementation strategy, both documents were approved by EPA in 2012.

Outfall 002

The mercury evaluation was conducted in accordance with the Permitting Guidelines for Statewide Mercury TMDL. The facility did not have a permit requirement to monitor for mercury. The Major Modification/Renewal application contained 3 mercury sampling results: <50 ng/L, 852 ng/L, <50 ng/L, 939 ng/L.

Allowable mercury concentration for this Outfall is 1,169 ng/L. All submitted results are below allowable. However, there are values that exceed TBEL of 47.0 ng/L. Based on the Permitting Guidelines for Statewide Mercury TMDL, the TBEL limit of 47.0 ng/L will be added to the permit.

Outfall 001

The mercury evaluation was conducted in accordance with the Permitting Guidelines for Statewide Mercury TMDL. The facility did not have a permit requirement to monitor for mercury. The Renewal application contained 1 mercury sampling result – 478 µg/L.

Allowable mercury concentration for this Outfall is 929.3 ng/L. The submitted result is above allowable, it also exceeds TBEL of 47.0 ng/L. Based on the Permitting Guidelines for Statewide Mercury TMDL, the TBEL limit of 47.0 ng/L will be added to the permit.

CWA SECTION 316(a) TEMPERATURE VARIANCE – OUTFALL 001

The facility has a temperature variance. In order to maintain the variance the facility has to conduct annual biological and chemical monitoring of the receiving stream to demonstrate that it has a balanced and indigenous macroinvertebrate and fish community. The latest BIP (balanced and indigenous population) report was submitted to DWR in November of 2011. The DWR has reviewed the report and concluded that Dan River near Dan River Steam Station has a balanced and indigenous macroinvertebrate and fish community.

CWA SECTION 316(b)

The permittee shall comply with the Cooling Water Intake Structure Rule per 40 CFR 125.95. The Division approved the facility request for an alternative schedule in accordance with 40 CFR 125.95(a)(2). The permittee shall submit all the materials required by the Rule with the next renewal application. The extension is necessary since Duke is involved in a large scale decommissioning of ash ponds, excavation of coal ash, landfilling of coal ash, construction of new treatment systems for FGD wastewater and other wastes, and conversion to zero liquid discharge for bottom ash. Under these circumstances, Duke is unable to develop comprehensive documentation required by 316(b) rule during this renewal.

INSTREAM MONITORING– OUTFALL 002 (ASH POND)

The Major Modification/Renewal application submitted in 2014 provided instream sampling data for Oil & Grease, COD, Chlorides, Fluoride, Sulfate, Mercury, Aluminum, Barium, Boron, Calcium, Hardness, Iron, Magnesium, Manganese, Zinc, Antimony, Arsenic, Cadmium, Chromium, Copper, Lead, Molybdenum, Nickel, Selenium, Thallium, TDS, TSS, pH, Temperature, and Specific Conductance. The upstream monitoring station was located approximately 4,000 ft. upstream of

Outfall 002 and the downstream monitoring station was located approximately 10,000 ft. downstream of the Outfall 002.

The following parameters were below detection level at both monitoring stations: Oil & Grease, COD, Fluoride, Mercury, Antimony, Arsenic, Cadmium, Lead, Molybdenum, Nickel, Selenium, and Thallium. The rest of the parameters did not indicate a significant difference between the upstream and the downstream monitoring locations except for Zinc, Chromium, and Temperature. All parameters were well below water quality standards/EPA criteria.

The proposed permit will require a semi-annual monitoring for total arsenic, total selenium, total mercury (method 1631E), total chromium, total lead, total cadmium, total copper, total hardness, and total zinc.

TOXICITY TESTING-OUTFALL 002 (ASH POND)

Current Requirement: Outfall 002 – Acute P/F @ 90% using *Pimephalis promelas*
Recommended Requirement: Outfall 002 – Chronic P/F @ 1.1% using *Ceriodaphnia dubia*

This facility has passed all toxicity tests (19 out of 19) during the previous permit cycle, please see attached.

For the purposes of the permitting, the long term average flow was used in conjunction with the 7Q10 summer flow to calculate the percent effluent concentrations to be used for WET.

COMPLIANCE SUMMARY

During the last 5 years, the facility had 8 violations of the Total Iron limit (Outfall 002), please see attached.

PERMIT LIMITS DEVELOPMENT

- The temperature limits (Outfall 001) are based on the North Carolina water quality standards (15A NCAC 2B .0200) and 316(a) Thermal Variance.
- The limits for Oil and Grease and Total Suspended Solids (Outfall 001, Outfall 001A, Outfall 002, Outfall 002A, Outfall 101, Outfall 102, Outfall 103, and Outfall 104 were established in accordance with the 40 CFR 423.
- The pH limits (Outfall 001, Outfall 001A, Outfall 002, Outfall 002A, Outfall 101, Outfall 102, Outfall 103, and Outfall 104 in the permit are based on the North Carolina water quality standards (15A NCAC 2B .0200).
- The TRC limit (Outfall 001) in the permit is based on the North Carolina water quality standards [15A NCAC 2B .0211].
- The turbidity limit in the permit (Outfall 002) is based on the North Carolina water quality standards (15A NCAC 2B .0200).
- The Whole Effluent Toxicity limit (Outfall 002) is based on the requirements of 15A NCAC 2B .0500.
- The BOD and Fecal Coliform limits (Outfall 001) were established in accordance with the 40 CFR 133.
- The limits for As, Pb, and Al in the permit (Outfall 102 and Outfall 103) are based on the North Carolina water quality standards (15A NCAC 2B .0200) and EPA water quality criteria.
- The limit for Hg in the permit (Outfall 001 and Outfall 002) is based on the Permitting Guidelines for Statewide Mercury TMDL.

PROPOSED CHANGES

- The Oil and Grease limits were added to the permit (Outfall 001) to meet the requirements of 40 CFR 423.
- The turbidity limit was added to the permit (Outfall 002) to meet the state turbidity standard per 15A NCAC 2B .0211(3) (k).
- A separate effluent page for the dewatering of the ash ponds (Outfall 002) was added to the permit. Please see Condition A. (4.).
- The Seep Outfalls 102, 103, and 104 (Please see A. (6.) through A. (8.)) and Seep Pollutant Analysis Special Condition (Please see A. (23.)) were added to the permit.
- The Acute Toxicity Limit was replaced with the Chronic Toxicity Limit to better address the current conditions at the facility. Please see Special Condition A. (11.).
- The Section 316(b) of CWA Special Condition was updated to reflect the new regulations. Please see Special Condition A. (15.).
- The Ash Pond Closure Special Condition was added to the permit to facilitate the decommissioning of the ash ponds. Please see Special Condition A. (18.).
- The Instream Monitoring Special Condition was added to the permit to monitor the impact of the facility on the receiving stream. Please see Special Condition A. (19.).
- The Applicable State Law Special Condition was added to the permit to meet the requirements of Senate Bill 729 (Coal Ash Management Act). Please see Special Condition A. (20.).
- The Domestic Wastewater Treatment Plant Special Condition was added to the permit to assure compliance with the 40 CFR 133.102. Please see Special Condition A. (21.).
- Starting December 21, 2016, federal regulations require electronic submittal of all discharge monitoring reports (DMRs) and specify that, if a state does not establish a system to receive such submittals, then permittees must submit DMRs electronically to the Environmental Protection Agency (EPA). The final NPDES Electronic Reporting Rule was adopted and became effective on December 21, 2015.

  The requirement to begin reporting discharge monitoring data electronically using the NC DWR's Electronic Discharge Monitoring Report (eDMR) internet application has been added to your final NPDES permit. (Please see A. (22.)) For information on eDMR, registering for eDMR and obtaining an eDMR user account, please visit the following web page:

  http://deq.nc.gov/about/divisions/water-resources/edmr.

  For more information on EPA's final NPDES Electronic Reporting Rule, please visit the following web site:

  http://www2.epa.gov/compliance/final-national-pollutant-discharge-elimination-system-npdes-electronic-reporting-rule.
- The Fish Tissue Monitoring near Ash Pond Discharge Special Condition was added to the permit to facilitate the decommissioning of the ash ponds. Please see Special Condition A. (24.).
- Monitoring for Total Iron was removed from the permit (Outfall 002 and Outfall 002A) due to the shut-down of the coal fired units.
- The Metal Cleaning Wastes Special Condition was removed from the permit due to the shut-down of the coal fired units.
- Monitoring for Total Hardness was added to Outfall 002 to implement new dissolved metals standards.
- Monitoring frequency for pH, Total Arsenic, and Total Mercury were increased to Weekly (Outfall 002 – decanting).
- Monitoring frequency for Nitrate/nitrite nitrogen, Sulfate, Toxicity, TSS, and oil and Grease were increased to Monthly (Outfall 002 – decanting).

- The limits for BOD and Fecal Coliforms were added to Outfall 001 to address the EPA comment.
- The limits for Total Mercury were added to Outfall 001 and Outfall 002 in accordance with the Permitting Guidelines for Statewide Mercury TMDL.
- The attachment 1 entitled "Groundwater Monitoring Plan" was added to the permit.

PROPOSED SCHEDULE

Draft Permit to Public Notice: July 26, 2016
Permit Scheduled to Issue: September 30, 2016

STATE CONTACT

If you have any questions on any of the above information or on the attached permit, please contact Sergei Chernikov at (919) 807-6386 or sergei.chernikov@ncdenr.gov.

CHANGES IN THE FINAL PERMIT

- The Oil and Grease limits and TSS limits were reduced (Outfall 002) to be consistent with the previous permit. This change was made to meet the recommendation of the Hearing Officer.
- The Total Iron limits were added to the Outfall 002 to be consistent with the previous permit. This change was made to meet the recommendation of the Hearing Officer.
- The Special Condition A. (13.) was corrected to meet the recommendation of the Hearing Officer.
- The requirements for continuous pH and TSS monitoring with automatic pump shutoff under prescribed conditions were added to the permit to address the EPA comment (Outfall 002).
- The requirements to treat all the decanting and dewatering wastewater by physical-chemical treatment facilities were added to the permit to address the EPA comment (Outfall 002).
- The Special Condition A. (10.) was corrected to eliminate "overflow from the settling basin". This change was made to address the EPA comment.
- The clarification regarding the amount of asbestos fibers allowed in the discharge was added to the permit to address the EPA comment.
- The Plan for Identification of New Discharges was added to the permit to address the EPA comment.
- The Total Aluminum limits were removed from Outfall 102 and Outfall 103 since North Carolina does not have Al standard and approximately 89% of the surface water samples in the state exceeds the EPA recommended criteria of 87 μg/L.
- The weekly monitoring for total chromium, total lead, total cadmium, total copper, total zinc, and Total Dissolved Solids was added to Outfall 002 to address the EPA comment.