**FACT SHEET FOR NPDES PERMIT DEVELOPMENT**

**Renewal DEQ/DWR**

NPDES No. NC0003468

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| 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: | 100 % Industrial | | |
| Facility/Permit Status: | Class I Physical/Chemical/Active; 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: | April 8, 2022 |
| Drainage Area (mi2): | 1,706 |  | |
| Summer 7Q10 (cfs) | 314 |
| Winter 7Q10 (cfs): | 580 |
| 30Q2 (cfs): | 706 |
| Average flow (cfs) | 1,621 |
| IWC (%): | 0.74 |  | |

##### 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 wastewater stream consisting of cooling tower blowdown, intake screen backwash and low volume wastes 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 it does not discharge any domestic waste, it is utilized in the on-site non-discharge system. 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.

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

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| 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. |

Historically, the facility had 4 unpermitted seeps (all non-engineered) from the ash settling basin. Seep 1, seep 2, and seep 3 discharged to Railroad Branch. Seep 4 discharged to Dan River. The previous permit included seep discharges as outfalls. However, the seep discharges ceased in 2019 after the coal ash basin was dewatered and excavated. Therefore, seep outfalls will be eliminated in the renewed permit.

REASONABLE POTENTIAL ANALYSIS(RPA)-Outfall 001The 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 CaCO3 for hardness-dependent metals. The RPA spreadsheets are attached to this Fact Sheet.

The RPA was conducted for Outfall 001, the calculations included: As, Be, Cd, Total Phenolic Compounds, Cr, Cu, CN, F, Pb, Hg, Mo, Ni, Se, Ag, Zn, and Sb (please see attached). The renewal application listed average flow of 1.11 MGD as a current flow. To introduce margin of safety, the flow of 1.5 MGD was used in the analysis. The discharge data on the EPA Form 2C was used for the RPA. The analysis indicates no reasonable potential to violate the surface water quality standards or EPA criteria.

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.

CWA SECTION 316(a) TEMPERATURE VARIANCE – Outfall 001

The facility had a temperature variance when coal-fired units were operational. The new combined-cycle gas operated unit uses cooling tower instead of once-through cooling system. The facility requested removal of the 316a variance since it is no longer necessary. Instead, the facility provided a temperature model that justified thermal mixing zone of 43 ft. At the end of the mixing zone the facility will meet the state temperature standard of 320C.

The proposed mixing zone was reviewed by the DWR biologists who concluded that impact on the aquatic organisms to be negligible.

The Draft Permit will incorporate instream temperature monitoring 85 ft downstream of Outfall 001 to confirm compliance with the state temperature standard. Monitoring closer to Outfall is not possible due to the dangerous conditions created by the low head dam.

CWA SECTION 316(b)

The rule requires the Director to establish BTA requirements in the permit on a site-specific basis based on the Director’s best professional judgment in accordance with §125.90(b) and 40 CFR 401.14.

The facility uses mechanical draft cooling tower to provide cooling water which is consistent with a closed-cycle recirculating system defined at §125.92(c) and meets the BTA standards for Impingement Mortality at §125.94(c)(1).

The facility also employs cylindrical wedgewire screens with 3.2 mm slots designed to have a maximum design through-slot velocity of less than 0.5 fps. The wedgewire screens are used for pumping makeup water and meet the BTA standard for Impingement Mortality at §125.94(c)(2).

The design flow for Dan River Station is 11.88 MGD. During the 2016-2020 period the average withdrawal at the facility was 3.5 MGD, which is substantially less than the rule applicability threshold of 125 MGD (for entrainment). It is necessary to note that EPA considered closed-cycle cooling system as a pre-approved BTA for entrainment, but excluded it from the rule due to the cost concerns. Due to the use of cooling tower, the flow reduction achieved at the station is calculated to be 98.8% as compared with once-through cooling.

Based on evaluation of the 316(b) study reports, the DWR concludes that the existing configuration at this facility represents BTA for meeting the impingement and entrainment requirements of the Rule. The permittee shall continue to comply with the Cooling Water Intake Structure Rule per 40 CFR §125.95.

FISH TISSUE MONITORING-near Outfall 002

The permit required fish tissue monitoring for As, Se, and Hg near the ash pond discharge. Samples were taken at three different locations. Suckers and Sunfish tissues were analyzed for these trace elements. The As concentration in fish tissue ranged from 0.01 µg/g to 0.17 µg/g, Se concentration ranged from 0.27 µg/g to 0.92 µg/g, and Hg concentration ranged from 0.07 µg/g to 0.29 µg/g. All results were below action levels for Se and Hg (10.0 µg/g – Se; 0.40 µg/g – Hg; NC action levels) and screening value for As (1.20 – µg/g; EPA).

Since facility excavated all coal ash and there is no discharge from seeps and ash pond, the requirement for fish tissue monitoring will be eliminated in the new permit.

INSTREAM MONITORING– Outfall 002 (Ash Pond)

The facility provided instream sampling data (Dan River and Railroad Branch) with the renewal application for As, Se, Hg, Cr, Pb, Cd, Cu, and Zn. The Dan River 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 additional Railroad Branch upstream monitoring station was located approximately 50 ft. upstream of the first seep and the additional downstream monitoring station was located approximately 50 ft. downstream of the last seep.

All monitored parameters were either below detection level, or well below the water quality standards at upstream and downstream monitoring stations in Dan River and in Railroad Branch.

Since facility excavated all coal ash and there is no discharge from seeps and ash pond, the requirement for instream monitoring will be eliminated in the new permit.

TOXICITY TESTING-Outfall 002 (Ash pond)

Current Requirement: Outfall 002 – Chronic P/F @ 1.1% using *Ceriodaphnia dubia*

Recommended Requirement: No monitoring since ash pond no longer exists.

This facility has passed all toxicity tests during the previous permit cycle, please see attached.

COMPLIANCE SUMMARY

During the last 5 years, the facility had 28 violations of the Total Residual Chlorine limit and 6 violations of the Fecal Coliform limit (Outfall 001), please see attached. The facility will no longer discharge domestic waste, it should address issues associated with these limit violations.

##### PERMIT LIMITS DEVELOPMENT

* The temperature limits (Outfall 001) are based on the North Carolina water quality standards (15A NCAC 2B .0200).
* The limits for Oil and Grease and Total Suspended Solids (Outfall 001 and Outfall 001A) are based on the requirements codified in 40 CFR 423.
* The pH limits (Outfall 001) 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].

#### PROPOSED CHANGES

* Once through cooling water and treated domestic wastewater have been removed from the list of authorized discharges.
* The monitoring requirements for Mercury have been removed from the permit based on the results of the Reasonable Potential Analysis.
* The monitoring requirements for Iron have been removed from the permit based on the elimination of the state standards for Iron.
* The footnote associated with temperature requirement of once-through cooling system has been removed from the permit due to the conversion to the closed-cycle cooling system.
* The monitoring and limits for pH have been removed from internal Outfall 001A to be consistent with the requirements of 40 CFR 423.
* The 316(a) variance has been removed from the permit and substituted with the Thermal Mixing Zone based on the new modeling information and due to the conversion to the closed-cycle cooling system.
* The downstream sampling site was relocated closer to the discharge from 2 miles to 85 ft. based on the results of the thermal model.
* The effluent temperature limit has been increased to 37.20C from 350C and was changed from Monthly Average to Daily Maximum based on the results of the thermal model. This change will make the limit more stringent because it will not allow any excursions above 37.20C.
* The following permit conditions have been removed due to the elimination of the discharges associated with operations of the former coal ash ponds:

1. Effluent pages for Outfall 002.
2. Effluent pages for 3 seeps.
3. Chronic toxicity conditions for Outfall 002.
4. Special Condition for Structural Integrity of the Ash Pond Dam.
5. Special Condition for Instream Monitoring.
6. Special Condition for Applicable State Law – Senate Bill 729.
7. Special Condition for Discharge from Seepage.
8. Special Condition for Fish Tissue Monitoring Near Ash Pond Discharge (Outfall 002).

The Division is unable to grant a request for re-insertion of a footnote associated with TSS limit because it would violate anti-backsliding provision of the Clean Water Act.

#### PROPOSED SCHEDULE

Draft Permit to Public Notice: July 26, 2022

Permit Scheduled to Issue: September 22, 2022

### STATE CONTACT

If you have any questions on any of the above information or on the attached permit, please contact Sergei Chernikov at (919) 707-3606 or sergei.chernikov@ncdenr.gov.