

DENR/DWR
FACT SHEET FOR NPDES PERMIT DEVELOPMENT
PERMIT RENEWAL
NPDES No. NC0004961

Facility Information			
Applicant/Facility Name:	Duke Energy Carolinas, LLC – Riverbend Steam Station		
Applicant Address:	P.O. Box 1006, Charlotte, North Carolina 28201		
Facility Address:	175 Steam Plant Road; Mount Holly, North Carolina 28120		
Permitted Flow	No limit		
Type of Waste:	100% industrial Prim.SIC Code: 4911 – Electric Services		
Facility/Permit Status:	Class I/Active; Renewal		
County:	Gaston County		
Miscellaneous			
Receiving Stream:	Catawba River (Mt. Island Lake)	Regional Office:	Mooreville
Stream Classification:	WS-IV and B-CA	State Grid / USGS Quad:	F15Sw
303(d) Listed?	No	Permit Writer:	Sergei Chernikov, Ph.D.
Subbasin:	03-08-33	Date:	May 21, 2014
Drainage Area (mi ²):	1800		
Summer 7Q10 (cfs)	80		
Winter 7Q10 (cfs):			
30Q2 (cfs)			
Average Flow (cfs):	2700		
IWC (%) for Outfall 002:	0.4 – discharge 2.7 – dewatering		

SUMMARY

Duke Energy's Riverbend Steam Station was a coal fired steam electric plant in Gaston County, the electricity generation was discontinued on 04/1/2013. The facility has 5 permitted outfalls in the current NPDES discharge permit. The sources of wastewater for these outfalls include non-contact cooling water, ash basin discharge, sanitary waste, stormwater from process areas, sump overflows, and potentially contaminated groundwater seeps. The facility has no FGD scrubber. Currently, discharge of cooling water has discontinued (only plant chiller system is discharging) and discharge from the ash pond significantly decreased.

In addition to NPDES Permit NC0004961, the facility also holds 0388R20 (air permit) and NCD024717423 (Hazardous wastes). The facility is subject to 40 CFR 423 – Steam Electric Power Generation.

The following descriptions of the wastes at each outfall are offered:

001 –Water from the plant chiller system.

002 – Ash basin discharge consisting of stormwater from roof drains and paving, treated groundwater, track hopper sump (groundwater), coal pile runoff, general plant/trailer

sanitary wastewater, turbine and boiler rooms sumps, vehicle rinse water, and stormwater from pond areas, upgradient watershed, and miscellaneous stormwater flows.

002A- Yard drain sump overflow, discharge occurs rarely.

101-112 –Flow from seeps.

011 – Former stormwater Outfall 1. Contains stormwater and groundwater flow, also includes wastewater from 10,000 gallon oil separator tank #3. The drainage basin includes a 2.7 acre portion of the main switchyard and 8,700 ft² of the plant yard between power house and combustion turbine area. The powerhouse covers about 1.5 acres of the drainage basin. 100% of the drainage basin is paved or roofed.

This facility discharges to the Mountain Island Lake (Catawba River) in sub-basin 03-08-33. The receiving stream is not listed as impaired.

Duke Energy Submitted Application dated May 15, 2014. The current permit expires February 28, 2015.

Duke Energy is required by the Coal Ash Management Act to remove all ash from the site by August 1, 2019.

The discharge pipe for NPDES outfall 002 from the secondary ash basin discharge tower at Riverbend Steam Station will be slip lined to ensure integrity. While this pipe is being slip lined, an alternative arrangement to convey wastewater to the permitted NPDES outfall 002 will be utilized. Temporary piping will be positioned in the secondary ash basin and the treated wastewater will be pumped to the NPDES outfall 002 discharge flow weir, located before the concrete flume that discharges into Mountain Island Lake. Once the slip line repairs are completed, the system will be returned to its original configuration. NPDES monitoring requirements will continue to be collected during the slip line project at the NPDES outfall 002 discharge flow weir.

SEEPS

The facility identified 12 unpermitted seeps (all non-engineered) from the ash settling basin, 10 of the seeps has been classified as “jurisdictional waters” by the United States Army Corps of Engineers.

For the jurisdictional waters seeps the facility shall determine within 90 days from the effective date of the permit if a 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 quarterly monitoring for the parameters specified in Table 1 for the duration of the permit. If any of the water quality standards are exceeded (with the exception of the Action Level standards), the facility shall be considered in violation of the Clean Water Act. The facility shall:

- 1) Submit a complete application for 404 Permit (within 30 days after determining that a water quality standards exceeded) to pump the seep discharge to one of the existing outfalls, install a pipe to discharge the seep to the Catawba River, 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 and submit the modeling results to the Division within 120 days from the effective date of the permit. 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 the Special Condition, OR
- 3) Demonstrate that the seep is discharging through the designated “Effluent Channel” and the water quality standards in the receiving stream are not contravened.

Until one of the options is fully implemented, the facility shall conduct monthly monitoring for the parameters specified in the Table 1. After one of the options is fully implemented the monitoring will be reduced to quarterly for the seeps that continue to flow.

If a jurisdictional water seep contravenes an Action Level Standard, the facility shall conduct a Whole Effluent Toxicity Test (WET test). If the WET result passes, the facility shall be considered in compliance with the state water quality standards. If the WET result fails and the Toxicity Identification Evaluation determines that the parameter contravening the water quality standard is responsible for the failure the facility shall be in considered in violation and shall implement one of the 3 options identified above.

For the non-jurisdictional water seeps the facility shall demonstrate that they will not violate water quality standards in the receiving stream or that the seep does not discharge to the jurisdictional water or that the seep does not carry pollutants indicating ash characteristics and submit this demonstration to the Division within 90 days from the effective date of the permit.

The facility shall conduct monthly sampling of the parameters in Table 1 during the first year from the effective date of the permit, the sampling frequency shall be reduced to quarterly for the remainder of the permit term. If such demonstration is not possible or not approved by the Division, the facility shall choose one of the 3 options identified above.

If new seeps emerge, the facility shall follow the procedures outlined above, the deadlines shall be calculated from the date of the seep discovery.

Table 1. Seep Monitoring Parameters

Parameter	Monitoring Frequency
Chlorides mg/L	Monthly/Quarterly
Fluoride, mg/L	Monthly/Quarterly
Total Mercury (Method 1631E) ng/L	Monthly/Quarterly
Total Barium, mg/L	Monthly/Quarterly
Total Iron*, mg/L	Monthly/Quarterly
Total Manganese*, mg/L	Monthly/Quarterly
Total Zinc, µg/L	Monthly/Quarterly
Total Arsenic, µg/L	Monthly/Quarterly
Total Cadmium, µg/L	Monthly/Quarterly
Total Chromium, µg/L	Monthly/Quarterly

Total Copper, µg/L	Monthly/Quarterly
Total Lead, µg/L	Monthly/Quarterly
Total Nickel, µg/L	Monthly/Quarterly
Total Selenium, µg/L	Monthly/Quarterly
Nitrate as N, mg/L	Monthly/Quarterly
Sulfates mg/L	Monthly/Quarterly
pH	Monthly/Quarterly
TDS, mg/L	Monthly/Quarterly
Total Hardness, mg/L	Monthly/Quarterly
TSS, mg/L	Monthly/Quarterly
Temperature, °C	Monthly/Quarterly
Specific Conductance, µmho/cm	Monthly/Quarterly

* **Federally enforceable only.**

If the facility is unable to obtain a seep sample due to the dry or low flow conditions preventing the facility from obtaining a representative sample, the “no flow” should be reported on the DMR. This requirement is established in the Section D of the Standard Conditions and 40 CFR 122.41 (j).

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)

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 **from outfall 002 (Ash Pond)**. 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.”

Calculations included: As, Be, Cd, Total Phenolic Compounds, Cr, Cu, CN, Pb, Hg, Mo, Ni, Se, Ag, Zn, and Fe (please see attached). The renewal application listed 0.19 MGD as a current flow. The analysis indicates no reasonable potential to violate the surface water quality standards or EPA criteria.

The Division also considered data for other parameters of concern in the EPA Form 2C that the facility submitted for the renewal. The majority of the parameters were not detected in the discharge. The Division reviewed the following parameters that were detected in the discharge and have applicable state standards or EPA criteria for Class C WS-IV stream: fecal coliform, nitrate, Al, Ba, B, Co, Mn, Sb, and Tl. Most of these parameters were well below the state standards/EPA criteria. Only 1 parameter exceeded EPA criteria: Al (162 ug/L is above 87 ug/L). Considering the in-stream waste concentration of only 0.4%, even Al is not expected to violate applicable water quality criterion.

The RPA was also conducted for the combined flow from all the seeps. The highest concentration for each constituent was chosen from one of the 12 seeps and used for the RPA. The RPA was not considered for the parameters that don't have an applicable state water quality standard. Calculations included: As, Cd, Chlorides, Cr, Cu, F, Pb, Hg, Ni, Se, Zn, Ba, Fe, and Mn (please see attached). The analysis indicates no reasonable potential to violate the water quality standards or EPA criteria. The combined flow volume for all the seeps was measured at 0.14 MGD. However, the flow of 0.5 MGD was used for the RPA 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 RPA was also conducted for the Outfall 011. Calculations included: As, Cd, Chlorides, Cr, Cu, F, Pb, Hg, Ni, Se, Zn, Ba, Fe, and Mn (please see attached). The analysis indicates no reasonable potential to violate the water quality standards or EPA criteria. The flow volume for the Outfall 011 was measured at 0.00036 MGD. However, the flow of 0.001 MGD was used for the RPA to incorporate a safety factor and potential increase in flow.

The RPA analysis indicates that existing discharges from the facility outfalls will not cause contravention of the state water quality standards/ 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.

DEWATERING – 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 from ash ponds and excavate the ash to deposit it in the landfills. The facility highest discharge rate from the dewatering process will be 1.45 MGD. The facility submitted data for the surface water in the ash ponds, interstitial water in the ash, and interstitial ash water that was treated by 20 µm filter and 0.45 µm filter. 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 the 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, Mo, Hg, Ni, Se, Zn, Ba, Fe, and Mn, SO₄, Al, B, Sb, and Tl (please see attached).

Based on the results of the RPA, the limit for Total Aluminum will be added to the dewatering effluent page.

TECHNOLOGY BASED EFFLUENT LIMITS OUTFALL002 AND OUTFALL 010

The existing federal regulations require development of Technology Based Effluent Limits (TBELs) for the parameters of concern. Since the EPA has not promulgated any new Effluent Guidelines for Power Plants since 1982, the Division has reviewed the performance of the existing coal-fired power plants to establish TBELs: Marshall Steam Station, Belews Steam Station, and Allen Steam Station. Two of these facilities (Belews and Allen) were used by EPA to establish the proposed Effluent Guidelines for Power Plants. The Division focused on the following parameters: Total Arsenic, Total Mercury, Total Selenium, and Nitrate/nitrite as N. These parameters are consistent with the parameters selected by EPA in the proposed Effluent Guidelines. The Division agrees with the EPA statement from the proposed Effluent Guidelines that justifies TBEL limitations for only four pollutants of concern: "Effluent limits and monitoring for all pollutants of concern is not necessary to ensure that the pollutants are adequately controlled because many of the pollutants originate from similar sources, have similar

treatabilities, and are removed by similar mechanisms. Because of this, it may be sufficient to establish effluent limits for one pollutant as a surrogate or indicator pollutant that ensures the removal of other pollutants of concern.”

Based on the review of the effluent data for the past 5 years the Division established the following TBELs for the coal-fired power plants in North Carolina. The monthly average limits for Total Arsenic and Total Selenium are based on 95th percentile of the effluent data, which is consistent with the EPA methodology, and daily maximum limits for these constituents are based on the 99.9th percentile of the effluent data. The Total Mercury limit is based on the Statewide Mercury TMDL implementation strategy and was established by the Division previously.

Total Arsenic – 10.5 µg/L (Monthly Average); 14.5 µg/L (Daily Maximum)
Total Selenium – 13.6 µg/L (Monthly Average); 25.5 µg/L (Daily Maximum)
Total Mercury – 47.0 ng/L (Monthly Average); 47.0 ng/L (Daily Maximum)

The Division does not have any long-term data for Nitrate/nitrate as N. Therefore, the limits for this parameter are based on the proposed EPA Effluent Guidelines.

Nitrate/nitrite as N – 0.13 mg/L (Monthly Average); 0.17 mg/L (Daily Maximum)

Facility is allowed 4.5 years from the effective date of the permit to comply with the TBELs (Outfall 002 only–Ash Pond Discharge). This time period is provided in order for the facility to budget, design, and construct the treatment system. The compliance schedule is consistent with the proposed EPA Effluent Guidelines that require compliance with the TBELs “as soon as possible within the next permit cycle beginning July 1, 2012”. Since the permit cycle is 5 years, the Effluent Guidelines will allow the facility to comply with the TBELs by June 30, 2022. This permit has a more stringent requirements, the facility shall comply with the TBELs by the end of 2019.

In the interim, the facility shall comply with the BPJ temporary limits that are derived by multiplying the proposed TBELs by 5, please see below:

Total Arsenic – 52.5 µg/L (Monthly Average); 72.5 µg/L (Daily Maximum)
Total Selenium – 68.0 µg/L (Monthly Average); 127.5 µg/L (Daily Maximum)
Nitrate/nitrite as N – 0.65 mg/L (Monthly Average); 0.85 mg/L (Daily Maximum)

Although these interim limits higher than the proposed TBELs, they are significantly lower than the allowable concentrations determined by the Reasonable Potential Analysis (RPA) and should be protective of the water quality in the receiving stream. The RPA allowable concentrations are listed below:

Total Arsenic – 13,632.3 µg/L (Monthly Average); 91,690.8 µg/L (Daily Maximum)
Total Selenium – 1,363.2 µg/L (Monthly Average); 12,492.0 µg/L (Daily Maximum)

MERCURY EVALUATION

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

The mercury evaluation was conducted in accordance with the Permitting Guidelines for Statewide Mercury TMDL.

Year	2011	2012	2013	2014
Annual average concentration (ng/L)	0.76	1.15	0.54	0.83
Maximum sampling result (ng/L)	1.25	1.56	0.62	1.15

Allowable mercury concentration for this facility is 439.1 ng/L. All Annual average mercury concentrations are below allowable. All maximum sampling results are below TBEL of 47.0 ng/L. Based on the Permitting Guidelines for Statewide Mercury TMDL, the limits are not required.

TEMPERATURE VARIANCE REMOVAL-OUTFALL 001

The facility historically had a temperature variance in accordance with CWA Section 316(a). In order to maintain the variance the facility had 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 DWQ in August of 2009. The ESS has reviewed the report and concluded that the Mountain Island Lake near Riverbend Station has a balanced and indigenous macroinvertebrate and fish community.

Since the facility discontinued electricity generation in 2013, *it does not wish to request continuation of the temperature variance*. Therefore, Effluent Sheet A. (1.) was modified to reflect temperature requirements without a variance.

CWA SECTION 316(B)

Since the facility discontinued electricity generation in 2013 and does not use cooling water, it will not be the subject to the Section 316(b) of Clean Water Act.

INSTREAM MONITORING-OUTFALL 002

The facility historically had 7 monitoring station, 2 located upstream and 5 located downstream. It is recommended that the monitoring will continue.

The permit also required semi-annual upstream and downstream monitoring of the ash pond discharge. Upstream site (Station B) is approximately 2 miles upstream of the discharge and downstream location (Station C) is approximately 0.5 miles downstream of the discharge. These monitoring stations have been established through the BIP monitoring program, which was required to maintain 316(a) temperature variance. The monitored parameters are: As, Cd, Cr, Cu, Hg, Pb, Se, Zn, and Total Dissolved Solids (TDS). The majority of the results are below detection level (As, Cd, Cr, Pb, Se, Hg, Zn) the rest of the results are below water quality standards (Cu and TDS). Only Cu demonstrated an increase at the downstream monitoring location. These results are consistent with the previous monitoring results.

It is required that the monitoring at the stations B and C will continue until discharges from the station are ceased. It is also required that the facility uses low level method 1631E for all Hg analysis.

FISH TISSUE MONITORING-OUTFALL 002

The permit required fish tissue monitoring for As, Se, and Hg near the ash pond discharge once every 5 years. This frequency is consistent with EPA guidance. Sunfish and bass tissues were analyzed for these trace elements. The results were below action levels for Se and Hg (10.0 µg/g – Se, 0.40 µg/g – Hg, NC) and screening value for As (1.20 – µg/g, EPA). These results are consistent with the previous monitoring results.

TOXICITY TESTING- Outfall 002:

Current Requirement: 24hr Chronic P/F @ 10%
Recommended Requirement: 24hr Chronic P/F @ 2.7% (flow during dewatering)
Monitoring Schedule: January, April, July, October

This facility has passed all chronic toxicity tests during the previous permit cycle, please see attached. The change in the instream waste concentration was made based on the significant decrease in the discharge volume.

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

Notwithstanding the civil lawsuit filed for unauthorized discharges and groundwater exceedances/violations, based on the monitoring required under the current version of the permit there were no violations of effluent standards contained in the permit.

PERMIT LIMITS DEVELOPMENT

- The pH limits (Outfalls 002, 002A, and 010) in the permit are based on the North Carolina water quality standards (15A NCAC 2B .0200).
- The limits for Oil and Grease and Total Suspended Solids (Outfall 002 and Outfall 002A) are based on the Best Professional Judgment and are lower than prescribed in the 40 CFR 423.
- The limits for Total Copper and Total Iron (Outfall 002 and Outfall 002A) were established in accordance with the 40 CFR 423.
- The temperature limits (Outfall 001) are based on the North Carolina water quality standards (15A NCAC 2B .0200).
- 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.

REQUESTED MODIFICATIONS

With the permit application for renewal, Duke Energy Carolinas, LLC has requested the following modifications:

Monitoring Frequencies (Outfall 002)

Parameter	Present	Proposed
Flow	Weekly	Monthly
Total Nitrogen	2/year	1/year
Total Phosphorus	2/year	1/year
Total Copper	Quarterly	none
Total Iron	Quarterly	none

These requests could not be granted because the Division needs these data to assure compliance with the water quality standards and criteria during the upcoming ash pond decanting/dewatering process.

- The Outfall 010 was eliminated and the Special Condition A. (16.) was updated to meet the requirements of The Final Clean Water Rule: Definition of “Waters of the United States” has become effective on August 28, 2015.
- Fish tissue monitoring was increased to annually from once every five years to address the EPA comment. Please see Special Condition A. (12.).
- The Additional Conditions and Definitions Special Condition was added to the permit to address the EPA comment. Please see Special Condition A. (20.).
- Measurement frequency was changed from “Episodic” to “Per discharge event” (Outfall 002A) to address the EPA comment.
- The Flow limit was added for Outfall 002 (dewatering phase) to address the EPA comment.
- The automatic pump shutoff requirements for TSS limit exceedance was added for Outfall 002 to address the EPA comment.
- The variance from Monthly Average TSS limit (Outfall 002 and Outfall 011) was eliminated to address the EPA comment.
- Monitoring frequency for all parameters was increased to Weekly for Outfall 002 to address the EPA comment.
- The specific date of December 31, 2019 replaced 4.5 years for Outfall 002. This change was made to address EPA comment. Please see Special Condition A. (2.).
- Clarifying language was added to define the discharge from the ash pond under normal operating conditions to address the Hearing Officer recommendation and the comment from the permittee. Please see Special Condition A. (2.).
- The definition of dewatering was added to Special Condition A. (3.). The definition was added to address the Hearing Office recommendation and the comment from the permittee.
- The effluent concentration for Whole Effluent Toxicity was changed to correct a typo, the correct concentration is 2.7%. Please see footnote to Special Conditions A. (2.) and A. (3.).
- The footnote describing conditions for monitoring Total Copper and Total Iron was removed (Outfall 011) to correct an error.
- Description of the wastewater sources for Outfall 001 and Outfall 002 was updated to reflect the current status of the facility.
- Clarifying language was added to the Outfall 002 to define the conditions under which the limits for Total Copper and Total Iron are applicable. This change was made to address the Hearing Officer recommendation.