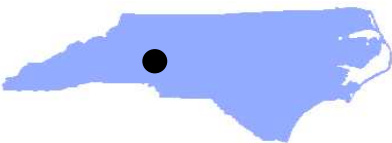


DEQ/DWR
FACT SHEET FOR NPDES PERMIT DEVELOPMENT
 NPDES No. NC0004987

Facility Information			
Applicant/Facility Name:	Duke Energy – Marshall Steam Station		
Applicant Address:	Water Management, Duke Energy, P.O. Box 1006, Charlotte, NC 28201		
Facility Address:	8320 E. NC Highway 150, Terrell, NC 28682		
Permitted Flow	Not Limited		
Type of Waste:	99.9% Industrial, 0.1% Domestic		
Facility/Permit Status:	Renewal		
County:	Catawba		
Miscellaneous			
Receiving Stream:	Lake Norman	Regional Office:	Mooreville
Stream Classification:	WS-IV & B CA	USGS Topo Quad:	Lake Norman North
303(d) Listed?:	No	Permit Writer:	Sergei Chernikov, Ph.D.
Subbasin:	03-08-32	Date:	March 16, 2016
Drainage Area (mi ²):	NA		
Summer 7Q10 (cfs)	Release (60 cfs)		
Winter 7Q10 (cfs):	NA		
1Q10 (cfs):			
IWC (%):	18		

SUMMARY

This revised draft permit incorporates changes made subsequent to a Public Hearing held on April 8, 2015 seeking comments to the original draft NPDES wastewater permit renewal for Marshall Steam Station.

Duke Energy operates Marshall Steam Station in Catawba County. The Station operates six outfalls. These outfalls are 001, 002, 002a, 002b, 003, and 004. The permitted outfalls are summarized below:

- Outfall 001 – Condenser Cooling Water (CCW) Units 1 – 4:

The CCW system is a once-through, non-contact cooling water system, which condenses steam from the condensers and other selected heat exchangers. When the station is operating at full power, it has a design capacity to pump 1463 MGD (1.016 MGPM) of cooling water through the network of tubes that runs through the condenser and selected heat exchangers. The raw cooling water is returned to the lake. No biocides or other chemicals are used in the condenser cooling water. Units 1 and 2 operate two CCW pumps each while units 3 and 4 operate three pumps.

- Outfall 002 – Ash Basin:

The station ash basin accommodates flows from two yard-drain sumps, an ash removal system, low volume wastes and non-point source stormwater. Low volume waste sources include, but are not limited to: wastewater from wet scrubber air pollution control systems, ion exchange water treatment system, water treatment evaporator blowdown, laboratory and sampling streams, boiler blowdown, floor drains, and recirculating house service water systems. A sanitary waste treatment system consists of an aerated basin that provides treatment with a 30 – day retention time and has a total volume of 587,000 gallons. Effluent from the aerated basin is polished further through additional residence time in the ash basin. The new sanitary waste treatment system is designed for 6100 gpd (normal) and 13500 gpd (outage).

- Outfall 002a – Sump #1 Overflow:
This outfall discharges very infrequent overflows of yard sump number 1.
- Outfall 002b – Sump #2 Overflow:
This outfall discharges very infrequent overflows of yard sump number 2.
- Outfall 003 (internal outfall) – Unit 4 ID Fan Control House Cooling Water discharge into the intake for CCW:
Once-through, non-contact cooling water is supplied to the Unit 4 induced draft (ID) fan motor control-house equipment to remove excess heat. No chemicals are added to the once-through raw lake water
- Outfall 004 (internal outfall) – FGD system discharge into Ash Basin:
In association with Clean Smokestacks legislation, Duke Energy installed a flue-gas desulfurization (FGD) wet scrubber. This scrubber generates a wastewater needing treatment prior to discharge. An internal outfall (004) has been established for the effluent from the FGD treatment system. Internal outfall 004 discharges to the ash settling basin which is currently permitted as outfall 002. FGD treatment system includes physical/chemical treatment and wetlands.
- Proposed Outfalls 101 and 102 - Seeps.

The summer 7Q10 flow (60 cfs) is based on the minimum release from the dam that regulates the receiving water body.

The federal rule 40 CFR 423 states that “there shall be no discharge of pollutants” in fly ash transport water and in bottom ash transport water. It also states that “dischargers must meet the discharge limitation in this paragraph by a date determined by the permitting authority that is as soon as possible beginning November 1, 2018, but no later than December 31, 2023”. Therefore, the facility must comply with the following requirements:

1. By November 1, 2018 there shall be no discharge of pollutants in fly ash transport water.
2. By January 31, 2021 there shall be no discharge of pollutants in bottom ash transport water. This time period beyond November 1, 2018 is provided in order for the facility to budget, design, and construct the treatment system. Duke provided the justification for the proposed deadline and the DWR concurred with the compliance date.

Duke Energy submitted application dated October 9, 2014. The current permit expired April 30, 2015.

SEEPS- OUTFALLS 101 AND 102

Existing Discharges from Seepage

The facility identified 2 non-engineered discharges from seepage from the ash settling basin. 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	35°36'71"	80°57'62"	101
S-2	35°42'56"	80°21'56"	102

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. (29.), that the water quality standards in the receiving stream are not contravened.

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 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. 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 are not permitted until the permit is modified and the new seep included in the permit and the new outfall established for the seep.

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)-OUTFALL 002, OUTFALLS 101 AND 102

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 detection 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.

Calculations included: As, Be, Cd, Chlorides, Cr, Cu, CN, Pb, Hg, Mo, Ni, Se, Ag, Zn, Al, and B (please see attached). The renewal application listed 8.3 MGD (the water flow diagram) as a current flow. However, 11.44 MGD was used in the RPA as the highest reported flow during the last permit cycle. The analysis indicates no reasonable potential to violate the surface water quality standards or EPA criteria. The water-quality based limits for selenium were removed from the permit (Outfall 002) based on the results of Reasonable Potential Analysis.

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 an applicable state standards or EPA criteria for Class WS-IV stream: phenols. This parameter was well below the state standard.

An RPA was also conducted for the combined flow from the seeps (Outfalls 101 and 102). The analysis was based on the dilution in the receiving stream since the effluent channels were delineated for both seeps. Although one seep was not flowing at the time of the sampling, it was assumed that it might discharge during the wet season. Calculations included: As, Cd, Chlorides, Cr, Cu, F, Pb, Hg, Mo, Ni, Se Zn, SO₄, Al, Ba, B, Sb, and Tl (please see attached). The analysis indicates no reasonable potential to violate the water quality standards or EPA criteria. The flow volume for the first seep was measured at 0.0019 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.

In conclusion, the RPA analysis indicates that existing discharges from the facility outfalls and seeps 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 the ash pond by removing the interstitial water from ash pond to meet the requirements of the NC Coal Ash Management Act. 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, 10 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 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, Mo, Hg, Ni, Se, Zn, SO₄, Al, Ba, B, Sb, and Tl (please see attached).

Based on the results of the RPA, a WQBEL for Total Arsenic will be added to the dewatering effluent sheet A. (3).

FGD TECHNOLOGY BASED EFFLUENT LIMITS-INTERNAL OUTFALL 004

The new federal 40 CFR 423 Technology Based Effluent Limits (TBELs) have been added to the permit:

Total Arsenic – 8.0 µg/L (Monthly Average); 11.0 µg/L (Daily Maximum)

Total Selenium – 12.0 µg/L (Monthly Average); 23.0 µg/L (Daily Maximum)

Total Mercury – 356.0 ng/L (Monthly Average); 788.0 ng/L (Daily Maximum)

Nitrate/nitrite as N – 4.4 mg/L (Monthly Average); 17.0 mg/L (Daily Maximum)

The federal rule 40 CFR 423 states that “dischargers must meet the effluent limitations for FGD wastewater in this paragraph by a date determined by the permitting authority that is as soon as possible beginning November 1, 2018, but no later than December 31, 2023”. The DWR established the date of compliance as January 31, 2021. This time period beyond November 1, 2018 is provided in order for the facility to budget, design, and construct the treatment system. Duke provided the justification for the proposed deadline and the DWR concurred with the compliance date.

MERCURY EVALUATION- OUTFALL 002

The State of North Carolina has a state-wide mercury impairment. A 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	2010	2011	2012	2013	2014
Annual average concentration (ng/L)	1.73	2.19	1.55	0.82	0.89
Maximum sampling result (ng/L)	3.25	3.51	3.13	1.01	1.28
Number of samples	4	4	5	5	2

The allowable mercury concentration for this facility is 68.0 ng/L. All annual average mercury concentrations are below the allowable level. All maximum sampling results are below the TBEL of 47.0 ng/L. Based on the Permitting Guidelines for Statewide Mercury TMDL, the limits are not required.

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 October of 2014. The DWR has reviewed the report and concluded that Lake Norman near Marshall 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.

INSTREAM MONITORING-OUTFALL 002

The permit required semi-annual upstream and downstream monitoring near the ash pond discharge. The upstream site (Station 15.9) is approximately 1 mile upstream of the discharge and downstream location (Station 14) is approximately 1 mile downstream of the discharge. These monitoring stations have been established through the BIP monitoring program, which was required to maintain the 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 (Hg, As, Cd, Cr, Pb, Se),

the rest of the results are below water quality standards (Cu, Zn, TDS). Most parameters did not demonstrate any increase in the concentration at the monitoring stations below the discharge. The exceptions are Zn, Cu, and TDS.

It is required that the monitoring of the instream stations will continue during the next permit cycle. It is also required that the facility uses low level method 1631E for all Hg analysis.

FISH TISSUE MONITORING-NEAR 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: Outfall 002 – Chronic P/F @ 12% using Ceriodaphnia

Recommended Requirement: Outfall 002 – Chronic P/F @ 23% using Ceriodaphnia

This facility has passed all toxicity tests during the previous permit cycle, please see attached (23 out of 23).

The Division will increase the Instream Waste Concentration from 12% to 23% due to the increased wastewater flow, reported as 11.44 MGD. For the purposes of the permitting, the highest monthly average flow reported during the last 3 years in conjunction with the 7Q10 summer flow was used to calculate the percent effluent concentration 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 temperature limits (Outfall 001) are based on the North Carolina water quality standards (15A NCAC 2B .0200) and 316(a) Thermal Variance. Summer and winter thermal limits have been established in support of the 316(A) temperature variance issued by EPA in May of 1975
- Free Available Chlorine Limits (Outfall 001 and Outfall 003) were established in accordance with 40 CFR 423.
- The limits for Oil and Grease and Total Suspended Solids (Outfall 002) are based on Best Professional Judgment and are more stringent than prescribed in the 40 CFR 423.
- The pH limits (Outfall 002, 002A, 002B, and 003) in the permit are based on the North Carolina water quality standards (15A NCAC 2B .0200).
- The pH limits (Outfall 004) in the permit are based on the BPJ.
- The limits for Total Copper and Total Iron (Outfall 002) were established in accordance with 40 CFR 423.
- The turbidity limit in the permit (Outfall 002) is based on the North Carolina water quality standards (15A NCAC 2B .0200).
- The Technology Based Effluent Limits for Total Arsenic, Total Mercury, Total Selenium, and Nitrate/nitrite as N (Outfall 004) are based on the requirements of 40 CFR 423.
- The Whole Effluent Toxicity limit (Outfall 002) is based on the requirements of 15A NCAC 2B .0500.

- The Total Arsenic limits (Outfall 002 dewatering) in the permit are based on the results of the Reasonable Potential Analysis (RPA) of the interstitial water data. The calculations are conducted in accordance with the EPA Guidance entitled “Technical Support Document for Water Quality-based Toxics Control.” The water quality chronic dissolved standard of 150.0 µg/L for Freshwater Aquatic Life and water quality acute dissolved standard of 340.0 were used in the calculations of the limits. Please see attached RPA for details.
- The limits for seep Outfalls 101 and 102 (Oil and Grease and TSS) in the permit are based on the requirements of 40 CFR 423.

PROPOSED CHANGES

- The Seep Outfalls 101 and 102 (Please see A. (8.) and A. (9.)) and Seep Pollutant Analysis Special Condition (Please see A. (30.)) were added to the permit.
- A separate effluent page for the dewatering of the ash ponds (Outfall 002) was added to the permit (Please see Special Condition A. (3.)).
- The Section 316(b) of CWA Special Condition was updated to reflect the new regulations.
- The turbidity limit was added to the permit (Outfall 002) to meet the state turbidity standard per 15A NCAC 2B .0211(3) (k).
- The Technology Based Effluent Limits for Total Arsenic, Total Mercury, Total Selenium, and Nitrate/nitrite as N were added to the permit (Outfall 004).
- The water-quality based limits for Total Selenium were removed from the permit (Outfall 002) based on the results of Reasonable Potential Analysis.
- Monitoring for Total Nickel was removed from the permit (Outfall 002) based on the results of Reasonable Potential Analysis.
- Monitoring for Chlorides was removed from the permit (Outfall 002) based on the results of Reasonable Potential Analysis.
- Monitoring for Total Zinc was removed from the permit (Outfall 002) based on the results of Reasonable Potential Analysis.
- Monitoring for Total Zinc was removed from the permit (Outfall 004) based on the results of Reasonable Potential Analysis.
- Monitoring for Total Arsenic was added to the permit (Outfall 004) due to the implementation of the TBEL limit for Total Arsenic.
- Monitoring for Total Mercury was added to the permit (Outfall 004) due to the implementation of the TBEL limit for Total Mercury.
- 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. (31.)) 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 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. (12.)).
- The Additional Conditions and Definitions Special Condition was added to the permit. Please see Special Condition A. (10.).
- Monitoring for Bromide was added to Outfall 002 and the Instream Monitoring Special Condition A. (29.) to address the comment from the Public Water Supply Section/DWR.
- The monitoring frequency for the Whole Effluent Toxicity was increased to Monthly (Outfall 002) to address the EPA comment.
- The monitoring frequency for the Total Arsenic, Total Selenium, and Total Mercury was increased to Weekly (Outfall 002) to address the EPA comment.
- The IWC for the Whole Effluent Toxicity Test was changed based on the highest reported flow data.
- Monitoring for Hardness was added to Outfall 002 and the Instream Monitoring Special Condition A. (29.) to address the EPA comment.
- The attachment 1 entitled ‘Groundwater Monitoring Plan’ was added to the permit.

PROPOSED SCHEDULE

Draft Permit to Public Notice: May 15, 2016
Permit Scheduled to Issue: August 26, 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 following modifications to the May Draft Permit were implemented based on public comments received during public hearing process, Division’s staff recommendations included in the Hearing Officer Report (July 28, 2016), EPA comments, and Duke Energy comments:

- A Special Condition entitled “Domestic Wastewater Treatment Plan” was added to the permit to address the EPA comment (Please see Special Condition A. (32.)).
- The Daily Maximum limit for TSS was reduced to 50.0 mg/L for Outfall 002 to meet the requirements of 40 CFR 423.
- The limits for TSS and Oil and Grease were added to Outfall 002A and 002B to meet the requirements of 40 CFR 423.
- A Special Condition A.30 was modified to address the EPA concern regarding the permitting of the newly identified seeps.
- The limits for BOD and Fecal Coliforms were added to Outfall 002 to address the EPA comment.
- The Plan for Identification of New Discharges was added to the permit to address the EPA comment.
- The Seep Pollutant Analysis Special Condition (Please see A. (30.)) was modified based on the discussion with the US Army Corps of Engineers.
- The additional decanting conditions for closing ash ponds were added to the permit to address the EPA comment.