DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER RESOURCES
FACT SHEET FOR NPDES PERMIT DEVELOPMENT
NPDES No. NC0003417

Facility Information			
Applicant/Facility	Duke Energy Progress, LLC / H.F. Lee Energy Complex		
Applicant Address:	1199 Black Jack Church Road, Goldsboro, NC 27530		
Facility Address:	1199 Black Jack Church Road, Goldsboro, NC 27530		
Permitted Flow (MGD):	Outfall 001 - 2.16 MGD All other Outfalls are not limited		
Type of Waste:	Industrial & domestic		
Facility Classification:	NA		
Permit Status:	Renewal and Modification		
County:	Wayne		
Miscellaneous			
Receiving Stream:	Neuse River	State Grid:	F26NE
Stream Classification:	WS-IV; NSW	USGS Quad:	NW Goldsboro
Drainage Area (mi^2):	~ 2,000	303(d) Listed?	No, TMDL is in effect for TN
Summer 7Q10 (cfs)	263	Sub-basin/HUC:	030412/03050105
Winter 7Q10 (cfs):	260	Regional Office:	Washington
30Q2 (cfs)	NA	Permit Writer:	Julie Grzyb
Average Flow (cfs):	1,100	Date:	11/14/2016
IWC (%):	Outfall 001 - 1.3%	SIC/NAICS code	4911 / 2211

SUMMARY

This is a renewal and modification of the Duke Energy permit for the H. F. Lee Energy Complex in Wayne County. There are three NPDES permitted outfalls (001,002, 003), none of which are flow-limited in the existing permit. The Lee Combined Cycle Plant consists of 3 combined cycle combustion turbines brought online in 2012. Also, located on the site is the Wayne County Combustion Turbine Plant/Site which consists of 5 simple cycle combustion turbines, four of them brought online in 2000 and the fifth in 2009. Altogether, the five simple cycle combustion turbines and the three combined cycle combustion turbines generate a total electric capacity of over 1800 Megawatts. All units are capable of firing oil and natural gas.

Previously, the H.F. Lee Energy Complex had a Steam Electric Plant with three coal-fired units and four oil-fueled combustion turbine units. These were retired in September and October of 2012. The coal-fired generating units and the four oil-fueled combustion turbines have been demolished and the coal pile was recently removed.

The H.F. Lee Combined Cycle Power Plant has more than twice the capacity of the retired coal plant with significant emissions reductions of carbon dioxide, sulfur dioxides, nitrogen oxides, and mercury.

TN BACKGROUND:

While in operation, the coal-fired Steam Electric Plant installed a Rotamix selective catalytic reduction (SCR) system in 2007, in response to air pollution control requirements. This incurred a total nitrogen discharge, and the facility joined the Neuse River Compliance Association (NRCA). The Rotamix selective catalytic reduction (SCR) system used to remove a majority of nitrogen oxides in the Steam Electric Plant was retired in 2012. Even though the facility is currently classified as "non-nutrient bearing", Duke Energy remains a member of the NRCA and its nitrogen discharge is governed by the Compliance Association's permit NCC000001.

RECEIVING WATERS:

Receiving waters are the Neuse River and unnamed tributaries that drain to the Neuse. The Neuse River is a class WS-IV; NSW waterbody in the Neuse River Basin. The facility outfalls are located approximately 8-10 miles upstream of Goldsboro's potable water supply intake.

TECHNOLOGY BASED EFFLUENT GUIDELINES:

H.F. Lee is subject to EPA effluent guideline limits per 40 CFR 423 - Steam Electric Power Generating Point Source Category as amended November 3, 2015. The facility is also subject to the Cooling Water Intake Structures Rules (40 CFR 125) effective October 14, 2014 and to the North Carolina Senate Bill 729 - Coal Ash Management Act.

OUTFALL DESCRIPTIONS:

Discharges to Outfall 001 Active Ash basin

No process wastewater flows are being sent to the active ash basin. The active ash basin is actually not active but is named that on all the maps in the application and sometimes referred to as the 1982 ash basin. Fly ash and bottom ash wastewaters were sent to this basin when the plant used coal-fired units. Ash transport wastewaters and additional wash waters from the precipitator and air pre-heater that were typically sent to the ash basin have all ceased. Wastewaters from the Filter Plant (water treatment), the Wayne County Combustion Turbine Site, low volume wastes, and other miscellaneous wastes that were once directed to the ash basin have all been redirected to Outfall 002 since 2012.

Duke Energy wants to maintain Outfall 001 for decanting the ash basin which would later be followed by dewatering. Within the next year or two after permit issuance, Duke Energy expects to start groundwater remediation on the eastern side of the ash basin. Extracted groundwater would be treated in the same wastewater treatment system (WTS) as the decant/dewatering wastewaters and discharged through Outfall 001.

In the future, Duke Energy proposes to convert the active ash basin into a lined coal ash landfill. Landfill leachate from the lined landfill will be collected in two 500,000 gallon tanks and routed to the groundwater remediation wastewater treatment system for additional treatment prior to being discharged through Outfall 001 to the Neuse River. This landfill has yet to be approved by Solid Waste Management but the leachate wastestream was included in the permit renewal.

No other wastewaters are to be discharged through Outfall 001 to the Neuse River except those treated in the WTS.

Background on previous IWC used for Outfall 001: The historical average flow of the Ash Pond wastewaters discharged to Outfall 001 is 2.5 MGD. Outfall 001 did not have a flow limit, and flows varied. The permit issued in 2010 used an Instream Wastewater Concentration (IWC) of 2.1%, which was determined using a discharge flow of 3.58 MGD. This flow value was the 95'th percentile of the maximum daily effluent flow data collected between 2006 and September 2008. In 2010, the Whole Effluent Toxicity Testing concentration was changed to 2.1% from 1.41% used in the 2004 permit.

Ash Basin Seeps
The facility identified 9 unpermitted seeps (all non-engineered). All nine seeps are located around the active ash basin.

Discharges to Outfall 002 Cooling Pond
The facility uses an existing 545 acre closed-cycle cooling pond with baffled dikes to treat recirculating condenser cooling and process water. Approximately 369 MGD of condenser cooling water is re-circulated in the pond each day. Eleven MGD are lost to evaporation and seepage. The applications states that 3-5 MGD are lost to natural evaporation during times the units are in full operation. Up to 12.7 MGD can be withdrawn from the Neuse as make-up water. Until recently, the Cooling Pond has not had a direct discharge to the Neuse since 1998 and a discharge is only expected during an extremely heavy rainfall event or a hurricane.

Hurricane Matthew hit North Carolina starting on Oct. 8, 2016 and the Neuse River rose above the berm surrounding the H.F. Lee cooling pond. In an article published by the Charlotte Observer on Oct. 12, 2016, USGS said, the Neuse near Goldsboro peaked at 29.7 feet, breaking the record of 28.8 feet set after Hurricane Floyd in 1999. As the Neuse receded, a 50-foot crack developed in the berm surrounding the cooling pond which holds 1.2 billion gallons. Wastewater flowing through the cracked berm discharged to the Neuse River, there has been no estimate on the total volume discharged at this point.

In addition to the recirculating condenser cooling and process water, other wastewaters sent to the cooling pond include: cooling tower blowdown from the Wet Surface Air Cooler and the combined cycle Heat Recovery Steam Generator (HRSG), Wayne County Combustion Turbine Site wastewaters which pass through a sump lift station, reverse osmosis reject wastewaters from the water treatment plant, and Lee Combined Cycle Plant Site wastewaters which are initially treated with an oil/water separator. Sanitary wastewaters, treated in a septic tank followed by sand bed filtration, are discharged to the cooling pond. Storm water from containment areas and miscellaneous wastewaters as described in the updated permit renewal application submitted on August 31, 2016 are discharged to the cooling pond, as well. On occasion wastewaters from the clarifier in the water treatment plant are sent to the cooling pond. Coal pile runoff, which has ceased, and low volume wastewaters regulated under 40 CFR 423, are discharged to the cooling pond.

Cooling Pond Seeps
The facility identified 15 unpermitted seeps (all non-engineered). All 15 seeps are located around the cooling pond.

Discharges to Outfall 002 Cooling Pond or Outfall 003
Outfall 003 was permitted in 2010 in order to prepare for the retirement of the 3 coal-fired units in 2012 and the construction of the natural gas-fired combined cycle generation facility. However, in early 2013 the discharge to Outfall 003 was discontinued after one month due to operational concerns with total suspended solids. Wastewaters were re-routed to the cooling pond from Outfall 003 to accommodate modifications needed to be made to the outfall structure. These modifications were to be conducted after the permit from the US Army Corps of Engineers was secured. Currently no wastewaters are being sent to Outfall 003 which discharges to the Neuse River.

Duke Energy would like the option to send certain waste streams, currently discharged to the Cooling Pond (Outfall 002), to Outfall 003 in emergency conditions only. These waste streams include: cooling tower blowdown from the Wet Surface Air Cooler and the combined cycle Heat Recovery Steam Generator (HRSG), Wayne County Combustion Turbine Site wastewaters which pass through a sump lift station, reverse osmosis reject wastewaters from the water treatment plant, Lee Combined Cycle Plant Site wastewaters which are initially treated with an oil/water separator, low volume wastewaters, and equipment and containment drain wastewaters. The Aug. 31, 2016 application estimated the total average flow to Outfall 003 at 0.5 MGD.

Discharge to proposed Outfall 002A – additional outfall in cooling pond
The heavy rains from Hurricane Matthew caused the Neuse River to rise high enough to enter the cooling pond at H.F. Lee through Outfall 002 and by over topping the cooling pond dike. As a result of the severe weather conditions, the dike of the cooling pond breached in the southeast corner of the pond. Duke Energy is proposing to add a new emergency outfall at the site of the breach. The addition of the new emergency outfall would avoid a scenario where the pond breaches because of the influx of water from the river. The new Outfall, identified as Outfall 002A in the permit, would only be used in the event of severe weather or required maintenance.

COMPLIANCE REVIEW/PROPOSED ACTIONS

Outfall 001 – Active Ash Basin
This outfall is subject to the Effluent Limitations Guidelines (ELG) in Table 1.
Table 1. ELG Outfall 001 (BPT Low volume waste sources)

Pollutant	Daily Maximum (DM)	Monthly Average (MA)	ELG
TSS	100 mg/l	30 mg/l	40 CFR 423.12 (b) (3) and (4)
Oil & Grease	20 mg/l	15 mg/l	40 CFR 423.12 (b) (3) and (4)
pH	6 to 9 SU		40 CFR 423.12 (b) (1)
PCB's	No discharge of PCB's		40 CFR 423.12 (b) (2)

The facility normally incinerates chemical metal cleaning waste and stated no such wastes have been sent to the 1982 ash basin for disposal.

These Effluent Guidelines are in effect in the current permit and will be maintained for Outfall 001 in the renewal. In 2016, Duke Energy started to decant some wastewaters from the active ash basin but after 3 months, decanting ceased. Upon permit renewal, Duke Energy is planning

to begin the Ash Pond decommissioning which will start with decanting followed by dewatering of the active ash basin.

Phase 1. Ash Basin Decanting/Normal Operations at Outfall 001:

To begin decommissioning bulk and interstitial ash basin water will be decanted from the active ash pond through Outfall 001. Wastewater treatment will be brought onsite to assist in the process. All decant wastewaters will pass through the Wastewater Treatment System (WTS) prior to being discharged through Outfall 001. The WTS will be designed to handle a minimum flow of 500 gpm and a maximum flow of 1500 gpm (2.16 MGD). As stated in the permit renewal, the level of water in the ash pond should not be lowered more than 1 ft/week during the decanting phase.

- DMR review:

Except for the decanting of the active ash basin for 3 months in 2016, there has been no discharge from Outfall 001 since October 2012. The historical average flow from Outfall 001 is 2.5 MGD. DMR data from 2016, 2C data submitted with the November 2012 renewal application, and data from samples of free water located above the settled layer of ash taken on Feb. 15, 2015, were all reviewed. There were no violations of permit limits.

Table 2. 2016 DMR Summary Outfall 001 - Ash Basin Decanting

Parameter	Average	Maximum	Minimum
Flow (MGD)	0.52	0.81	0.026
TSS (mg/L)	<5	7.6	< 5
O & G (mg/L)	< 5	< 5	< 5
Nitrite plus Nitrate (mg/L)	0.012	0.02	0.01
Arsenic (µg/L)	12.9	18.4	5.95
Selenium (µg/L)	10.7	15.4	10.7
Total Nitrogen (mg/L)	0.25	0.35	0.17
Total Phosphorus (mg/L)	0.012	0.015	0.01
pH (S.U.)	7.8	8.7	7.1

Passed 2 of 2 toxicity tests during three months of decant discharge.

- RPA Outfall 001- Ash Basin Decanting:

The need for toxicant limits is based upon a demonstration of reasonable potential to exceed water quality standards, a statistical evaluation that is conducted during every permit renewal utilizing the most recent effluent data for each outfall. The Reasonable Potential Analysis (RPA) is conducted in accordance with 40 CFR 122.44 (d) (i). The NC RPA procedure utilizes the following: 1) 95% Confidence Level/95% Probability; 2) assumption of zero background; 3) use of ½ detection limit for "less than" values; and 4) streamflows used for dilution consideration based on 15A NCAC 2B.0206. Effective April 6, 2016, NC began implementation of dissolved metals criteria in the RPA process in accordance with guidance titled *NPDES Implementation of Instream Dissolved Metals Standards*, dated June 10, 2016. This guidance is attached to the fact sheet.

A reasonable potential analysis was performed for arsenic, antimony, barium, cadmium, chlorides, chromium, copper, fluoride, lead, mercury, molybdenum, nickel, phenols, selenium,

sulfate, thallium, and zinc. A reasonable potential analysis was conducted using the maximum effluent value reported from one of the following sources: 2016 DMR data, Nov. 2012 2C application form, and the Ash basin free water samples submitted to DWR on March 11, 2015. Pollutants of concern for the decant wastewater included toxicants with positive detections and associated water quality standards/criteria. The maximum wastewater treatment plant design flow of 2.16 MGD was used in the RPA along with historical 7Q10 and average flow statistics for the Neuse River. Upstream drainage statistics from the Neuse River near Clayton, provided by USGS on May 15, 2009, supported the use of the historical values.

Based on this analysis, the following permitting actions are proposed for this permit:

- Effluent Limit with Monitoring. The following parameters will receive a water quality-based effluent limit (WQBEL) since they demonstrated a reasonable potential to exceed applicable water quality standards/criteria: None.
- Monitoring Only. The following parameters will receive a monitor-only requirement since they did not demonstrate reasonable potential to exceed applicable water quality standards/criteria, but the maximum predicted concentration was >50% of the allowable concentration: total selenium.
- No Limit or Monitoring: The following parameters will not receive a limit or monitoring, since they did not demonstrate reasonable potential to exceed applicable water quality standards/criteria and the maximum predicted concentration was <50% of the allowable concentration: antimony, barium, cadmium, chlorides, chromium, copper, fluoride, lead, molybdenum, nickel, sulfate, thallium, and zinc. Mercury and arsenic did not demonstrate reasonable potential to exceed applicable water quality standards/criteria and the maximum predicted concentration was <50% of the allowable concentration; however, they continue to be pollutants of concern and monitoring for these parameters was maintained in Outfall 001 as discussed below.
- Summary of new limits added based on RPA: none.
- Summary of existing limits deleted based on RPA: none.

- Toxicity Testing:

Current Requirement: Outfall 001 – Chronic P/F @ 2.1% using Ceriodaphnia, Quarterly
Recommended Requirement: Outfall 001– Chronic P/F @ 1.3% using Ceriodaphnia, Monthly
The new Instream Waste Concentration (IWC) of 1.257%, rounded to 1.3 %, is based on the maximum design flow of 2.16 MGD for the Wastewater Treatment System and the historical summer 7Q10 flow of 263 cfs.

- Mercury Evaluation:

Four samples were provided on mercury as follows:
November 2C application 2C data - < 200 ng/L
March 2015 active ash basin free water samples: <0.5 ng/L, 1.35 ng/L, <0.5 ng/L
Annual average discharge limitations for mercury at Outfall 001 are based on a Technology Based Effluent Limitation (TBEL) of 47 ng/L and a Water Quality Based Effluent Limitation (WQBEL) of 955 ng/L. The TBEL was established in the 2012 NPDES Mercury TMDL Implementation Strategy and the WQBEL is based on the Water Quality Standard of 12 ng/L divided by the IWC. Data shows Duke Energy can comply with the TBEL during Ash Basin decanting, however, mercury monitoring will be added to the permit since it is a pollutant of concern. No limits are required for mercury.

Table 3. Monitoring Requirements/Proposed Changes Outfall 001 – Ash Basin Decanting

Parameter	Existing Effluent Limit / Monitoring requirements	Changes	Basis
Flow	Monitor	Added flow limit: 2.16 MGD	15A NCAC 2B.0505 and WTS max design
TSS	30 mg/L MA 100 mg/L DM	No changes	40 CFR 423.12(b)(3) and (4)
Oil & Grease	15 mg/L MA 20 mg/L DM	No changes	40 CFR 423.12(b)(3) and (4)
Total Selenium and Total Arsenic	Monitor quarterly	Monitor monthly	Pollutant of concern for ash. Selenium based on RPA.
Total Mercury	No requirement	Monthly Monitoring	Pollutant of concern for ash.
Total Hardness	No requirement	Monthly Monitoring	Collect data for RPA
Turbidity	No requirement	Monthly Monitoring	Required by EPA per letter dated Feb. 25, 2009.
Total Nitrogen Total Phosphorus	Weekly Monitoring	Monthly Monitoring	15A NCAC 2B .0500, Neuse Nutrient Management Strategy, NRCA membership
Nitrate/nitrite as N	Weekly Monitoring	Monthly Monitoring	Pollutant of Concern for WS waters
pH	6 to 9 SU	No changes	State WQ standards, 15A NCAC 2B .0200 and 40 CFR 423.12 (b) (1)

Phase II. Ash Basin Dewatering and Groundwater Remediation at Outfall 001:

Secondly, to meet the requirements of the Coal Ash Management Act of 2014, the facility will dewater the ash pond by removing the interstitial water in the ash and then excavate the ash to deposit it in approved landfills. After decanting is completed and when water in the ash settling basin is lowered to within three feet of the ash deposits, the Permittee will begin dewatering. As with decanting, wastewater treatment will be provided. Ash Basin dewatering flows, as well as storm water from the WTS pad area, will be treated at the WTS prior to being discharged through Outfall 001. The facility's discharge rate from the dewatering process is estimated to be 500 gpm to 1500 gpm (2.16 MGD).

Within the first two years after permit issuance, Duke Energy will design an extraction well system to treat contaminated groundwater on the eastern side of the active ash basin. The groundwater will be extracted, pumped to a sump, and treated in the same WTS as the bulk and interstitial ash basin water. The wastewaters will discharge through Outfall 001 to the Neuse River.

The facility submitted data for the standing surface water in the active ash pond, interstitial water in the ash, and interstitial ash water that was treated by filters of various sizes. The facility's

estimated discharge rate for the groundwater extraction is 0.9-1.8 MGD. Groundwater monitoring data from wells on the eastern and southeastern side of the active ash basin were reviewed. To introduce a margin of safety the highest measured concentration of a parameter from the active ash basin or the groundwater wells was used in the reasonable potential analysis. The maximum Wastewater Treatment System design flow of 2.16 MGD was used as the permitted flow.

- RPA Outfall 001- Ash Basin Dewatering:

A reasonable potential analysis was performed for arsenic, antimony, barium, cadmium, chlorides, chromium, cobalt, copper, fluoride, lead, mercury, molybdenum, nickel, selenium, sulfate, thallium, total dissolved solids and zinc.
Based on this analysis, the following permitting actions are proposed for the dewatering phase:

- Effluent Limit with Monitoring. The following parameters will receive a water quality-based effluent limit (WQBEL) since they demonstrated a reasonable potential to exceed applicable water quality standards/criteria: arsenic.
- Monitoring Only. The following parameters will receive a monitor-only requirement since they did not demonstrate reasonable potential to exceed applicable water quality standards/criteria, but the maximum predicted concentration was >50% of the allowable concentration: none
- No Limit or Monitoring: The following parameters will not receive a limit or monitoring, since they did not demonstrate reasonable potential to exceed applicable water quality standards/criteria and the maximum predicted concentration was <50% of the allowable concentration: antimony, barium, cadmium, chlorides, chromium, cobalt, copper, fluoride, lead, molybdenum, nickel, sulfate, thallium, total dissolved solids and zinc. Mercury and selenium did not demonstrate reasonable potential to exceed applicable water quality standards/criteria and the maximum predicted concentration was <50% of the allowable concentration; however, they continue to be pollutants of concern and monitoring for these parameters was maintained in Outfall 001.

Monitoring requirements for Outfall 001 – Ash Pond Dewatering and Groundwater Extraction are the same as Table 3 for most parameters. Arsenic limitations have been added and sampling frequencies were increased to weekly for all parameters except nutrients and toxicity.

Phase III. Groundwater Remediation and Landfill Leachate:

Thirdly, approximately three to four years after permit issuance, Duke Energy plans to convert the active ash basin to a lined, onsite coal ash landfill. Landfill leachate will be collected in two 500,000 gallon tanks and routed to the WTS for additional treatment prior to discharge from Outfall 001. At that time, there will no longer be any decant or dewatering wastewaters from the ash basin; however, groundwater remediation may still be occurring. Both the groundwater remediation and landfill leachate wastewaters will be treated in the WTS prior to being discharged through Outfall 001.

Groundwater extraction will continue at an estimated rate of 0.9-1.8 MGD and landfill leachate flow is estimated to be 0.01-0.1 MGD. Data from the landfill leachate discharged at the Mayo Steam Electric Plant was used in the evaluation and represents the likely contaminants to be contained in the leachate at H.F. Lee. To introduce a margin of safety the highest measured

concentration of a parameter from the Mayo Landfill leachate and the groundwater monitoring wells was used in the reasonable potential analysis. The maximum Wastewater Treatment System design flow of 2.16 MGD was used as the permitted flow.

- RPA Outfall 001- Groundwater Remediation and Landfill Leachate:

A reasonable potential analysis was performed for arsenic, antimony, barium, cadmium, chlorides, chromium, cobalt, copper, fluoride, lead, mercury, molybdenum, nickel, selenium, sulfate, thallium, total dissolved solids and zinc.
Based on this analysis, the following permitting actions are proposed for the dewatering phase:

- Effluent Limit with Monitoring. The following parameters will receive a water quality-based effluent limit (WQBEL) since they demonstrated a reasonable potential to exceed applicable water quality standards/criteria: total arsenic, total cadmium, total lead, total selenium, and barium.
- Monitoring Only. The following parameters will receive a monitor-only requirement since they did not demonstrate reasonable potential to exceed applicable water quality standards/criteria, but the maximum predicted concentration was >50% of the allowable concentration: total copper,
- No Limit or Monitoring: The following parameters will not receive a limit or monitoring, since they did not demonstrate reasonable potential to exceed applicable water quality standards/criteria and the maximum predicted concentration was <50% of the allowable concentration: antimony, chlorides, chromium, cobalt, fluoride, molybdenum, nickel, sulfate, thallium, total dissolved solids and zinc. Mercury did not demonstrate reasonable potential to exceed applicable water quality standards/criteria and the maximum predicted concentration was <50% of the allowable concentration; however, it continues to be pollutant of concern and monitoring for this parameter was maintained in Outfall 001.

Effluent Limits & Monitoring requirements for Outfall 001 – Groundwater Extraction and Landfill Leachate are listed below in Table 4.

Table 4. Effluent Limits & Monitoring Requirements - Proposed discharge to Outfall 001 - Groundwater Remediation and Landfill Leachate:

Parameter	Effluent Limits	Monitoring requirements	Basis
Flow	2.16 MGD	Weekly	15A NCAC 2B.0505 and WTS max design
TSS	30 mg/L MA 100 mg/L DM	2/Month	40 CFR 423.12(b)(3) and (4)
Oil & Grease	15 mg/L MA 20 mg/L DM	2/Month	40 CFR 423.12(b)(3) and (4)
Total arsenic	3295 µg/L MA 21994 µg/L DM	Monthly	Reasonable potential to exceed EPA Water quality criteria.
Total cadmium	46.9 µg/L MA 209.6 µg/L DM	Monthly monitoring	Reasonable potential to exceed EPA Water quality criteria.

Total barium	80 mg/L MA 80 mg/L DM	Monthly monitoring	Reasonable potential to exceed EPA Water quality criteria.
Total lead	234 µg/L MA 4,883 µg/L DM	Monthly monitoring	Reasonable potential to exceed EPA Water quality criteria.
Total selenium	398 µg/L MA 3623 µg/L DM	Monthly monitoring	Reasonable potential to exceed EPA Water quality criteria.
Total copper	No limit	Monthly monitoring	Maximum predicted concentration greater than 50% of the allowable
Total Mercury	No limit	Monthly monitoring	Pollutant of concern for ash.
Total Hardness	No limit	Monthly monitoring	Collect data for RPA
Turbidity	No limit	Monthly monitoring	Required by EPA letter dated Feb. 25, 2009
Total Nitrogen Total Phosphorus	No limits	Monthly monitoring	15A NCAC 2B .0500, Neuse Nutrient Management Strategy, NRCA membership
Nitrate/nitrite as N	No limit	Monthly monitoring	Pollutant of Concern for WS waters
pH	6 to 9 SU	2/Month	State WQ standards, 15A NCAC 2B .0200 and 40 CFR 423.12 (b) (1)

Outfall 002 and 002A Cooling Pond

These outfalls are subject to the Effluent Limitations Guidelines (ELG) in Table 5.

Table 5. ELG Outfall 001 (BPT/BAT for Low volume waste sources, cooling tower blowdown, and coal pile runoff apply)

Pollutant	**Daily Maximum (DM)**	**Monthly Average (MA)**	**ELG**
TSS	50 mg/l	30 mg/L	40 CFR 423.12 (b) (3) and (9)
Oil & Grease	20 mg/l	15 mg/L	40 CFR 423.12 (b) (3)
pH	6 to 9 SU		40 CFR 423.12 (b) (1)
PCB's	No discharge of PCB's		40 CFR 423.12 (b) (2)
Free available chlorine	0.5 mg/L	0.2 mg/L	40 CFR 423.13 (d) (1)
126 priority pollutants	No detectable amount (engineering. calc. allowed)		40 CFR 423.13 (d) (1)
Total Chromium	0.2 mg/L	0.2 mg/L	40 CFR 423.13 (d) (1)
Total Zinc	1.0 mg/L	1.0 mg/L	40 CFR 423.13 (d) (1)
Add footnotes for free chlorine, TRC, and 126 priority pollutants			40 CFR 423.13 (d) (1)

The facility normally incinerates chemical metal cleaning waste and stated no such wastes have been sent to the Cooling Pond for disposal.

There has been no discharge from Outfall 002 since 1998. In October of 2016 heavy rain from Hurricane Matthew caused river water to over-top the cooling pond dike and enter the pond through Outfall 002 structure. The cooing pond breached in the southeast corner and Duke Energy is proposing to add a new emergency outfall at the site of the breach. The new Outfall, identified as Outfall 002A in the permit, will only be used in the event of severe weather or required maintenance.

Some of these Effluent Guidelines are in effect in the current permit.

- DMR review:

Results of a process control sample from the sites cooling pond taken in close proximity to Outfall 002 was submitted with an updated 2C form on March 11, 2015. To introduce a margin of safety the maximum reported concentration of a parameter from the 2C application was used in the reasonable potential analysis. There were no violations of permit limits for Outfall 002 during the last five years.

- RPA Outfall 002- Cooling Pond:

A reasonable potential analysis was performed for arsenic, antimony, barium, cadmium, chromium, copper, fluoride, lead, mercury, molybdenum, nickel, selenium, sulfate, thallium, and zinc.
Based on this analysis, the following permitting actions are proposed for the cooling pond:

- Effluent Limit with Monitoring. The following parameters will receive a water quality-based effluent limit (WQBEL) since they demonstrated a reasonable potential to exceed applicable water quality standards/criteria: total molybdenum
- Monitoring Only. The following parameters will receive a monitor-only requirement since they did not demonstrate reasonable potential to exceed applicable water quality standards/criteria, but the maximum predicted concentration was >50% of the allowable concentration: none
- No Limit or Monitoring: The following parameters will not receive a limit or monitoring, since they did not demonstrate reasonable potential to exceed applicable water quality standards/criteria and the maximum predicted concentration was <50% of the allowable concentration: antimony, barium, cadmium, chlorides, chromium, copper, fluoride, lead, nickel, sulfate, thallium, and zinc. Mercury and arsenic did not demonstrate reasonable potential to exceed applicable water quality standards/criteria and the maximum predicted concentration was <50% of the allowable concentration; however, they continue to be pollutants of concern and monitoring for these parameters was included in Outfall 002 and 002A.

Effluent Limitations and Monitoring requirements for Outfall 002 – Cooling Pond are listed below in Table 6.

- Toxicity Testing:

Current Requirement: Outfall 002 – Acute Episodic Toxicity using Fathead Minnow, 24 hr static test, first five discrete discharge events than annually
Recommended Requirement: Outfall 002 – Acute Episodic Toxicity using Fathead Minnow, 24 hr static test, first five discrete discharge events than annually

In addition to a review of the 2C data for Outfall 002, discharge data from cooling pond seeps was evaluated to assess if other parameters should be monitored at Outfall 002. A review of the cooling pond seep data showed significant levels of arsenic, lead, mercury and fluoride. However, antimony, cadmium, and selenium were tested at levels below detection for all cooling pond seeps. Based on the RPA evaluation of the cooling pond seep data and since the effluent data on Outfall 002 is limited, monitoring for arsenic, lead, mercury and fluoride were added to Outfall 002.

Table 6. Monitoring Requirements/ Proposed Changes Outfall 002 – Cooling Pond

Parameter	Existing Effluent limits/Monitoring requirements	Changes	Basis
Flow	Monitor each event	No changes	15A NCAC 2B.0505
TSS	30 mg/L MA 100 mg/L DM	Daily maximum for TSS changed to 50 mg/L	MA - 40 CFR 423.12(b)(4) DM - 40 CFR 423 (b) (9) coal pile runoff was discharged to the cooling pond until recently.l
Oil & Grease	15 mg/L MA 20 mg/L DM	No changes	40 CFR 423.12(b)(4)
Temperature	32.0 °C	No changes	State WQ standards, 15A NCAC 2B .0200
Total chromium	No requirement	Added limits and monitoring 0.2 mg/L MA 0.2 mg/L DM	40 CFR 423.13 (d)(1)
Total zinc	No requirement	Added limits and monitoring 1.0 mg/L MA 1.0 mg/L DM	40 CFR 423.13 (d)(1)
Total iron	Monitor	Eliminate monitoring	State standard removed
Total molybdenum	No requirement	Added event monitoring	Reasonable potential to exceed EPA Water quality criteria.
Total arsenic	Monitor	No changes	Pollutant of concern for ash and cooling pond seep discharge
Total lead, mercury, and fluoride.	No requirement	Added event monitoring	Pollutants of concern for ash and cooling pond seep discharge
Total Hardness	No requirement	Added event monitoring	Collect data for RPA
BOD5	No requirement	Added limits and monitoring 30 mg/L MA 45 mg/L DM	Outfall discharges treated domestic wastes

Fecal Coliform	No requirement	Added limits and monitoring 200/100 mL MA 400/100 mL DM	Outfall discharges treated domestic wastes 15A NCAC 2B .0400
Total Residual Chlorine	No requirement	Added limit and monitoring 28.0 µg/L DM	State WQ standards, 15A NCAC 2B .0200
Free Chlorine	No requirement	Added limits and monitoring 0.2 mg/L MA 0.5 mg/L DM	40 CFR 423.13 (d) (1) and footnotes 40 CFR 423.13 (d) (2) and (3)
pH	6 to 9 SU	No changes	State WQ standards, 15A NCAC 2B .0200

Outfall 002A was given the same Effluent Limitations and Monitoring Requirements as Outfall 002. Duke Energy submitted three analytical test analysis (full effluent pollutant scans) from the discharge at the cooling pond breach. The analysis reported most parameters as non-detectable and detected samples were all less than water quality standards/criteria without even accounting for dilution.

Outfall 003- Primarily Combined Cycle Plant Site Wastewaters and Blowdown
This outfall is subject to the Effluent Limitations Guidelines (ELG) in Table 7.

Table 7. ELG Outfall 001 (BPT/BAT for Low volume waste sources and cooling tower blowdown)

Pollutant	**Daily Maximum (DM)**	**Monthly Average (MA)**	**ELG**
TSS	100 mg/L	30 mg/L	40 CFR 423.12 (b) (3)
Oil & Grease	20 mg/L	15 mg/L	40 CFR 423.12 (b) (3)
pH	6 to 9 SU		40 CFR 423.12 (b) (1)
PCB's	No discharge of PCB's		40 CFR 423.12 (b) (2)
Free available chlorine	0.5 mg/L	0.2 mg/L	40 CFR 423.13 (d) (1)
126 priority pollutants	No detectable amount (engineering. calc. allowed)		40 CFR 423.13 (d) (1) and (2)
Total Chromium	0.2 mg/L	0.2 mg/L	40 CFR 423.13 (d) (1)
Total Zinc	1.0 mg/L	1.0 mg/L	40 CFR 423.13 (d) (1)
Add paragraph on free chlorine and TRC			40 CFR 423.13 (d) (2)

The facility normally incinerates chemical metal cleaning waste and stated no such wastes have been sent to the Cooling Pond for disposal.

Outfall 003 first discharged in January 2013 but the discharge was discontinued after one month due to operational concerns. To introduce a margin of safety the maximum reported concentration of a parameter from the Nov. 2012 2C application was used in the reasonable potential analysis. There were no violations of permit limits for Outfall 003 during the last five years.

- RPA Outfall 003- Combined Cycle Plant Site Wastewaters and Blowdown:

A reasonable potential analysis was performed for arsenic, antimony, barium, cadmium, chromium, copper, fluoride, lead, mercury, molybdenum, nickel, selenium, sulfate, thallium, and zinc.

Based on this analysis, the following permitting actions are proposed for Outfall 003:

- Effluent Limit with Monitoring. The following parameters will receive a water quality-based effluent limit (WQBEL) since they demonstrated a reasonable potential to exceed applicable water quality standards/criteria: none
- Monitoring Only. The following parameters will receive a monitor-only requirement since they did not demonstrate reasonable potential to exceed applicable water quality standards/criteria, but the maximum predicted concentration was >50% of the allowable concentration: total selenium
- No Limit or Monitoring: The following parameters will not receive a limit or monitoring, since they did not demonstrate reasonable potential to exceed applicable water quality standards/criteria and the maximum predicted concentration was <50% of the allowable concentration: antimony, barium, cadmium, chromium, copper, fluoride, lead, nickel, sulfates, thallium, and zinc. Mercury, molybdenum, and arsenic did not demonstrate reasonable potential to exceed applicable water quality standards/criteria and the maximum predicted concentration was <50% of the allowable concentration; however, they continue to be pollutants of concern and monitoring for these parameters was included in Outfall 003 for reasons discussed in Table 8, below.

- Toxicity Testing:

Current Requirement: Outfall 003 – Acute Toxicity using Fathead Minnow, 24 hr static test, first five discrete discharge events than annually

Recommended Requirement: Outfall 003 – Acute Toxicity using Fathead Minnow, 24 hr static test, first five discrete discharge events than annually

Duke Energy proposed having the option to discharge the following waste streams, currently discharged to the Cooling Pond (Outfall 002), to Outfall 003 in emergency conditions only. These waste streams include: cooling tower blowdown from the Wet Surface Air Cooler and the combined cycle Heat Recovery Steam Generator (HRSG), Wayne County Combustion Turbine Site wastewaters which flow through the sump lift station, reverse osmosis reject wastewaters from the water treatment plant, Lee Combined Cycle Plant Site wastewaters which are initially treated with an oil/water separator, low volume wastewaters, and equipment and containment drain wastewaters. As a result, it is recommended that the same parameters regulated in Outfall 002 be regulated in Outfall 003 along with selenium which is based on the RPA evaluation, above. Parameters required for Sanitary discharges (BOD and fecal coliform) along with the lower TSS limitation for coal pile runoff can be removed since neither of these waste streams will discharge to Outfall 003.

Table 8. Monitoring Requirements/ Proposed discharge to Outfall 003 - Combined Cycle Plant Site Wastewaters and Blowdown

Parameter	Existing Limits/ Monitoring requirements	Changes	Basis
Flow	Monitor each event	No changes	15A NCAC 2B.0505
TSS	30 mg/L MA 100 mg/L DM	No changes	40 CFR 423.12 (b) (3)
Oil & Grease	15 mg/L MA 20 mg/L DM	No changes	40 CFR 423.12 (b) (3)
Total chromium	No requirement	Added limits and monitoring 0.2 mg/L MA 0.2 mg/L DM	Added monitoring and limits per 40 CFR 423.13 (d) (1)
Total zinc	Monthly Monitoring	Added limits 1.0 mg/L MA 1.0 mg/L DM	Maintained monitoring and added limits per 40 CFR 423.13 (d) (1)
Temperature	32.0 °C	No changes	State WQ standards, 15A NCAC 2B .0200
Total selenium	No requirement	Added monitoring	Maximum predicted concentration greater than 50% of the allowable
Total copper	Monthly monitoring	Eliminate monitoring	
Turbidity	No requirement	Monthly Monitoring	Required by EPA per letter dated Feb. 25, 2009.
Total arsenic, Total lead, total molybdenum, total mercury, and fluoride	No requirement	Added quarterly monitoring	Pollutants of concern or metals contained in cooling pond discharge that could be discharged to Outfall 003.
Total Hardness	No requirement	Added quarterly monitoring	Collect data for RPA
Total Residual Chlorine	No requirement	Limit and monitoring 28.0 µg/L DM	State WQ standards, 15A NCAC 2B .0200
Free Chlorine	No requirement	Limit and monitoring 0.2 mg/L MA 0.5 mg/L DM	40 CFR 423.13 (d) (1) and footnotes 40 CFR 423.13 (d) (2) and (3)
pH	6 to 9 SU	No changes	State WQ standards, 15A NCAC 2B .0200

Seep outfalls from the Active Ash Basin:

The facility identified 24 seeps in areas surrounding the active ash basin. Five of the seeps (S-01, S-05, S-19, S-20, and S-21) do not need coverage under the permit based on the low concentration of the constituents associated with coal ash and/or absence of a discharge to

"Waters of the State". These five seeps are not considered point-source wastewater discharges under the Clean Water Act. An effluent channel determination was completed by the Division on August 23, 2016. Outfalls 101A LOLA, 101B LOLA, 102, 109, 118, 125, and 126 discharge to the Neuse River. Outfalls 103A and 128 discharge to unnamed tributaries.

The Division identified 9 non-engineered discharges from 19 seeps located around the ash settling basins. The locations of the seeps are identified below and are depicted on the map attached to the permit.

Table 9. Seep Coordinates and Assigned Outfall Numbers

Seep ID	Latitude	Longitude	Outfall number
LOLA S-01	35.379568	-78.075043	101A LOLA
LOLA S-01A	35.379648	-78.074632	101A LOLA
LOLA S-01B	35.380846	-78.077697	101B LOLA
S-02	35.384001	-78.081383	102
S-03	35.382666	-78.084374	103A
S-03A	35.381806	-78.084052	103A
S-04	35.381993	-78.078784	126
S-06	35.386968	-78.071942	109
S-07	35.382767	-78.069655	109
S-08	35.380510	-78.068532	109
S-09	35.379492	-78.067718	109
S-18	35.379222	-78.101206	118
S-22	35.381466	-78.077819	125
S-23	35.381175	-78.077136	125
S-24	35.381063	-78.076431	125
S-25	35.380922	-78.076001	125
S-26	35.381640	-78.078322	126
S-27	35.385848	-78.075999	128
S-28	35.385133	-78.078197	128

- RPA Ash Basin Seeps

A RPA was conducted for seeps. The flow used for all the seeps discharging to the Neuse River RPA was 7.84 MGD which is the total measured flow of all the seeps discharge multiplied by a safety factor of 10. For all the seeps discharging to an unnamed tributary, no dilution was given and the discharge must meet Water Quality Standards at the point of discharge. RPAs were conducted for total arsenic, cadmium, chlorides, total chromium, total copper, fluoride, total lead, total mercury, total molybdenum, total nickel, selenium, total zinc, antimony, sulfate, barium and total thallium at each outfall. As a result of the RPAs, limits and monitoring are required for the following parameters/outfalls:

- Outfalls 101A LOLA, 101B LOLA, 102, 109, 118, 125, 126: limits for arsenic, monitoring for lead
- Outfalls 103A: limits for arsenic and mercury, monitoring for fluoride, molybdenum, barium, and sulfates
- Outfall 128: limits for arsenic and barium, monitoring for fluoride

In addition to the limits described above, all the seep outfalls will have monitoring requirements for fluoride, total mercury, total barium, total iron, total manganese, total zinc, total arsenic, total cadmium, total chromium, total copper, total lead, total nickel, and total selenium, sulfates, chlorides, and limits as described in Table 10.

Table 10. Monitoring Requirements Proposed Ash Basin Seep Outfalls Monitoring:

Parameter	*Limits/Monitoring requirements*	*Basis*
Flow	Monitor	15A NCAC 2B.0505
pH	6 to 9 S.U.	State WQ standards, 15A NCAC 2B .0200 and 40 CFR 423.12(b)(1)
TSS	30 mg/L MA 100 mg/L DM	40 CFR 423.12(b)(3)
Oil & Grease	15 mg/L MA 20 mg/L DM	40 CFR 423.12(b)(3)
Nitrate/nitrite, TDS, hardness, conductivity and temperature.	Monitor	Parameters of concern

Seep Outfalls from the Cooling Pond:

The facility identified 21 seeps in areas surrounding the cooling pond. Three of the seeps (CPS-10, CPS-11, and CPS-12) were disregarded as seeps upon an inspection by DWR Washington Regional staff on September 19, 2016. These three seeps are not considered point-source wastewater discharges under the Clean Water Act. An effluent channel determination was completed by the Division on September 19, 2016. Cooling Pond Seep Outfalls CPS-201, CPS-202, CPS-203, CPS-204, CPS-205, CPS-215, and CPS-216 discharge to the Neuse River. Cooling Pond Seep Outfalls CPS-207, CPS-208, CPS-209, CPS-217, CPS-218, CPS-219, CPS-220, and CPS-221 discharge to unnamed tributaries that flow to the Neuse River.

The facility identified 15 non-engineered discharges from 18 seeps located around the Cooling Pond. The locations of the seeps are identified below and are depicted on the map attached to the permit. It should be noted that additional seeps, with steady flows to the Neuse River, were found during the DWR inspection. These seeps were not assessed or evaluated since it was determined that at normal river flow the water table would cover the seeps and measurements would be impossible. These seeps do not appear to be a structural problem with the cooling pond berm but a result of groundwater recharge from cooling pond wastewater.

Table 11. Seep Coordinates and Assigned Outfall Numbers

Seep ID	Latitude	Longitude	Outfall number
CPS-01	35.3792364	-78.0737774	CPS-201
CPS-02	35.3790054	-78.0729841	CPS-202
CPS-03	35.3789480	-78.0672044	CPS-203
CPS-04	35.3790159	-78.0670749	CPS-204
CPS-05	35.3799795	-78.0657386	CPS-205
CPS-06	35.3717880	-78.0664208	CPS-207
CPS-07	35.3717706	-78.0666082	CPS-207
CPS-08	35.3711473	-78.0677987	CPS-208
CPS-09	35.3692168	-78.0787969	CPS-209

CPS-13	35.3797170	-78.0754000	CPS-215
CPS-14	35.3796330	-78.0752670	CPS-215
CPS-15	35.3796170	-78.0746000	CPS-215
CPS-16	35.3794170	-78.0742330	CPS-216
CPS-17	35.3746500	-78.0616500	CPS-217
CPS-18	35.3719500	-78.0660470	CPS-218
CPS-19	35.3719160	-78.0662490	CPS-219
CPS-20	35.3720230	-78.0663020	CPS-220
CPS-21	35.3698330	-78.0758000	CPS-221

- RPA Cooling Pond Seeps

A RPA was conducted for cooling pond seeps. The flow used for all the seeps discharging to the Neuse River RPA was 7.3 MGD. This value was based on an estimated cooling pond evaporation and seepage rate of 11.3 MGD minus the estimated cooling pond evaporation rate of 3-5 MGD. The total estimated flow of all the seeps discharge was multiplied by a safety factor of 10 for use in the RPA. For all the seeps discharging to an unnamed tributary, no dilution was given and the discharge must meet Water Quality Standards at the point of discharge. RPAs were conducted for total arsenic, cadmium, chlorides, total chromium, total copper, fluoride, total lead, total mercury, total molybdenum, total nickel, selenium, total zinc, antimony, sulfate, barium and total thallium at each outfall. As a result of the RPAs, limits and monitoring are required for the following parameters/outfalls:

- Outfalls CPS-201, CPS-202, CPS-203, CPS-204, CPS-205, CPS-215, and CPS-216: limits for lead and mercury, monitoring for copper and thallium
- Outfall CPS-207: limits for arsenic and lead, monitoring for copper and fluoride
- Outfalls CPS-208, CPS-209: limits for arsenic and fluoride, monitoring for chloride
- Outfalls CPS-217, CPS-218, CPS-220, CPS-221: limits for arsenic, monitoring for chloride and fluoride
- Outfall CPS-219: limits for arsenic and lead, monitoring for chloride, copper and fluoride

In addition to the limits described above all the seep outfalls will have monitoring requirements for fluoride, total mercury, total iron, total manganese, total arsenic, total copper, total lead, chlorides, and limits as described in Table 12.

Table 12.

Parameter	***Limits/Monitoring requirements***	***Basis***
Flow	Monitor	15A NCAC 2B.0505
pH	6 to 9 S.U.	State WQ standards, 15A NCAC 2B .0200 and 40 CFR 423.12(b)(1)
TSS	30 mg/L MA 100 mg/L DM	40 CFR 423.12(b)(3)
Oil & Grease	15 mg/L MA 20 mg/L DM	40 CFR 423.12(b)(3)
Total Chromium	0.2 mg/L MA 0.2 mg/L DM	40 CFR 423.13 (d) (1)
Total Zinc	1.0 mg/L MA 1.0 mg/L DM	40 CFR 423.13 (d) (1)

Nitrate/nitrite, Total hardness, conductivity and temperature.	Monitor	Parameters of concern

Within 180 days of the effective date of this permit, the permittee shall demonstrate, through in-stream sampling meeting the requirements of condition A. (44.), 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 or within 90 days of the effective date of this permit, 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 as specified in A. (7.)- A. (30).

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 standard is exceeded) to pump the seep discharge to one of the existing outfalls, install a pipe to discharge the seep to the Neuse 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 seeps are not permitted until the permit is modified and the new seep included in the permit and the new outfall established for the seep.

316(b) REQUIREMENTS:

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:

The current permit does not require instream monitoring. The proposed permit will require upstream and downstream, semi-annual instream monitoring (upstream of Outfall 002 - at the Railroad bridge, and downstream of Outfall 003 – at Stevens Mill Road bridge) for total arsenic, total selenium, total mercury (method 1631E), total chromium, dissolved lead, dissolved cadmium, dissolved copper, dissolved zinc, bromide, total hardness, and total dissolved solids (TDS).

SUMMARY OF PROPOSED CHANGES

- Effluent Limits and Monitoring Requirements were added for Outfall 001 (Phase II) for the dewatering and groundwater remediation wastewaters to be discharged after decanting of the active ash basin is completed. See condition A. (2).
- Effluent Limits and Monitoring Requirements were added for Outfall 001 for the groundwater remediation and landfill leachate wastewaters to be discharged after dewatering of the active ash basin is completed. This effluent page for Outfall 001 (Phase III) becomes effective with the commencement and discharge of landfill leachate. See condition A. (3).
- New Outfall effluent pages were added for ash basin seeps: 101A LOLA, 101B LOLA, 102, 109, 118, 125, 126, 103A, and 128. See conditions A. (7.) through A. (15.).
- New Outfall effluent pages were added for cooling pond seeps: CPS-201, CPS-202, CPS-203, CPS-204, CPS-205, CPS-215, CPS-216, CPS-207, CPS-208, CPS-209, CPS-217, CPS-218, CPS-219, CPS-220, and CPS-221. See conditions A. (16.) through A. (30.).
- Effluent Limits and Monitoring Requirements were revised for Outfall 002 as follows:
    - BOD and fecal coliform monitoring were added since sanitary wastewaters discharge to the cooling pond.
    - Monitoring and limitations were added for total chromium, total zinc, free available chlorine, total residual chlorine and no detectable amount of the 126 Priority Pollutants per Effluent Guidelines 40 CFR 423.13 (d)(1) for cooling tower blowdown discharges.
    - The Reasonable Potential Analysis based on limited data from outfall 002 effluent showed molybdenum as a pollutant of concern. Molybdenum monitoring was added to the monitoring requirements.
    - A review of the cooling pond seep data showed arsenic, lead, mercury and fluoride were pollutants of concern, therefore, monitoring for these parameters was added to Outfall 002.
    - The daily limitation for total suspended solids was reduced to 50 mg/L per Effluent Guidelines 40 CFR 423.12 (b)(9) since coal pile runoff has been discharged to the cooling pond for many years.

  See condition A.(4.).
- Effluent Limits and Monitoring Requirements were added for Duke Energy's proposed cooling pond Outfall to be constructed at the breach. See A. (5.) Effluent Limitations and

Monitoring requirements for Outfall 002A. The limitations and monitoring requirements are the same as Outfall 002 except a discharge shall only occur during severe weather events or required maintenance.

- Effluent Limits and Monitoring Requirements were revised for Outfall 003 as follows:
    - Monitoring and limitations were added for total chromium, total zinc, free available chlorine, total residual chlorine and no detectable amount of the 126 Priority Pollutants per Effluent Guidelines 40 CFR 423.13 (d)(1) for cooling tower blowdown discharges.
    - The Reasonable Potential Analysis based on limited data from Outfall 003 effluent showed the maximum predicted concentration for selenium was greater than 50% of the allowable discharge concentration. Selenium monitoring was maintained.
    - Pollutants of concern for Outfall 002 (total arsenic, total lead, total molybdenum, and fluoride) were added since Duke Energy has requested the option of discharging many of the same waste streams to Outfall 003.

  See condition A.(6.).
- Special Condition A. (10.) Total Nitrogen Reopener Clause, in the existing permit, was eliminated since this facility is now classified as "non-nutrient bearing".
- Special Condition A. (11.) Selenium Reopener Clause, in the existing permit, was eliminated since the closure of the coal-fired steam electric plant is complete.
- Special Condition A. (43) Ash Pond Closure was added to the permit to facilitate the decommissioning of the ash ponds.
- Special Condition A. (44) Instream Monitoring was added to the permit to monitor the impact of the discharges on the receiving stream.
- Special Condition A. (46) Applicable State Law was added to the permit to meet the requirements of Senate Bill 729 (Coal Ash Management Act).
- Special Condition A. (47) Domestic Wastewater Treatment Plant was added to the permit to assure compliance with the 40 CFR 133.102.
- Special Condition A. (49) Seep Pollutant Analysis was added to identify all seeps (ash pond seeps and cooling pond seeps) and to list actions to be taken by the Permittee.
- The NC Division of Water Resources NPDES Permitting Unit is required to implement the new dissolved metal standards in all permits public noticed after April 6, 2016. The new standards for most metals include acute standards. Further, the freshwater standards for several metals are expressed as the dissolved form of the metals, and seven metals have hardness-dependent equations. As a result, the permit includes the requirement to sample for hardness at all outfall and instream locations.
- Special Condition A. (40) was added to the permit regarding the submittal of all the required information under 40 CFR 125.95 with the next permit application
- Special Condition A. (48) Electronic Reporting was added to the permit describing requirements for electronic reporting of DMRs. 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 following special conditions were added to the permit to be consistent with other Duke Energy permits: A. (38) Biocides, A. (32) Additional Conditions and Definitions, A.

(50.) Chemical Discharges, A.(45.) Fish Tissue Monitoring Near Ash Pond Discharge, A. (42.) Structural Integrity Inspections of Ash Pond Dam.

PROPOSED SCHEDULE FOR PERMIT ISSUANCE

Draft Permit to Public Notice: November 10, 2016 (estimate)
Public Hearing: December 15, 2016
Permit Scheduled to Issue:

NPDES DIVISION CONTACT

If you have questions regarding any of the above information or on the attached permit, please contact Julie Grzyb at (919) 807-6389.

NAME: _____ DATE: _____

NPDES Implementation of Instream Dissolved Metals Standards – Freshwater Standards

The NC 2007-2015 Water Quality Standard (WQS) Triennial Review was approved by the NC Environmental Management Commission (EMC) on November 13, 2014. The US EPA subsequently approved the WQS revisions on April 6, 2016, with some exceptions. Therefore, metal limits in draft permits out to public notice after April 6, 2016 must be calculated to protect the new standards - as approved.

Table 1. NC Dissolved Metals Water Quality Standards/Aquatic Life Protection

Parameter	Acute FW, µg/l (Dissolved)	Chronic FW, µg/l (Dissolved)	Acute SW, µg/l (Dissolved)	Chronic SW, µg/l (Dissolved)
Arsenic	340	150	69	36
Beryllium	65	6.5	---	---
Cadmium	Calculation	Calculation	40	8.8
Chromium III	Calculation	Calculation	---	---
Chromium VI	16	11	1100	50
Copper	Calculation	Calculation	4.8	3.1
Lead	Calculation	Calculation	210	8.1
Nickel	Calculation	Calculation	74	8.2
Silver	Calculation	0.06	1.9	0.1
Zinc	Calculation	Calculation	90	81

Table 1 Notes:

1. FW= Freshwater, SW= Saltwater
2. Calculation = Hardness dependent standard
3. Only the aquatic life standards listed above are expressed in dissolved form. Aquatic life standards for Mercury and selenium are still expressed as Total Recoverable Metals due to bioaccumulative concerns (as are all human health standards for all metals). It is still necessary to evaluate total recoverable aquatic life and human health standards listed in 15A NCAC 2B.0200 (e.g., arsenic at 10 µg/l for human health protection; cyanide at 5 µg/L and fluoride at 1.8 mg/L for aquatic life protection).

Table 2. Dissolved Freshwater Standards for Hardness-Dependent Metals

The Water Effects Ratio (WER) is equal to one unless determined otherwise under 15A NCAC 02B .0211 Subparagraph (11)(d)

Metal	NC Dissolved Standard, µg/l
Cadmium, Acute	WER*{1.136672-[*ln* hardness](0.041838)} · *e*^{0.9151 [*ln* hardness]-3.1485}
Cadmium, Acute Trout waters	WER*{1.136672-[*ln* hardness](0.041838)} · *e*^{0.9151[*ln* hardness]-3.6236}
Cadmium, Chronic	WER*{1.101672-[*ln* hardness](0.041838)} · *e*^{0.7998[*ln* hardness]-4.4451}
Chromium III, Acute	WER*0.316 · *e*^{0.8190[*ln* hardness]+3.7256}
Chromium III, Chronic	WER*0.860 · *e*^{0.8190[*ln* hardness]+0.6848}
Copper, Acute	WER*0.960 · *e*^{0.9422[*ln* hardness]-1.700}
Copper, Chronic	WER*0.960 · *e*^{0.8545[*ln* hardness]-1.702}
Lead, Acute	WER*{1.46203-[*ln* hardness](0.145712)} · *e*^{1.273[*ln* hardness]-1.460}
Lead, Chronic	WER*{1.46203-[*ln* hardness](0.145712)} · *e*^{1.273[*ln* hardness]-4.705}
Nickel, Acute	WER*0.998 · *e*^{0.8460[*ln* hardness]+2.255}
Nickel, Chronic	WER*0.997 · *e*^{0.8460[*ln* hardness]+0.0584}

Silver, Acute	WER*0.85 · *e*^{1.72[*ln* hardness]-6.59}
Silver, Chronic	Not applicable
Zinc, Acute	WER*0.978 · *e*^{0.8473[*ln* hardness]+0.884}
Zinc, Chronic	WER*0.986 · *e*^{0.8473[*ln* hardness]+0.884}

General Information on the Reasonable Potential Analysis (RPA)

The RPA process itself did not change as the result of the new metals standards. However, application of the dissolved and hardness-dependent standards requires additional consideration in order to establish the numeric standard for each metal of concern of each individual discharge.

The hardness-based standards require some knowledge of the effluent and instream (upstream) hardness and so must be calculated case-by-case for each discharge.

Metals limits must be expressed as 'total recoverable' metals in accordance with 40 CFR 122.45(c). The discharge-specific standards must be converted to the equivalent total values for use in the RPA calculations. We will generally rely on default translator values developed for each metal (more on that below), but it is also possible to consider case-specific translators developed in accordance with established methodology.

RPA Permitting Guidance/WQBELs for Hardness-Dependent Metals - Freshwater

The RPA is designed to predict the maximum likely effluent concentrations for each metal of concern, based on recent effluent data, and calculate the allowable effluent concentrations, based on applicable standards and the critical low-flow values for the receiving stream.

If the maximum predicted value is greater than the maximum allowed value (chronic or acute), the discharge has reasonable potential to exceed the standard, which warrants a permit limit in most cases. If monitoring for a particular pollutant indicates that the pollutant is not present (i.e. consistently below detection level), then the Division may remove the monitoring requirement in the reissued permit.

1. To perform a RPA on the Freshwater hardness-dependent metals the Permit Writer compiles the following information:
    - Critical low flow of the receiving stream, 7Q10 (the spreadsheet automatically calculates the 1Q10 using the formula 1Q10 = 0.843 (s7Q10, cfs) $^{0.993}$
    - Effluent hardness and upstream hardness, site-specific data is preferred
    - Permitted flow
    - Receiving stream classification

2. In order to establish the numeric standard for each hardness-dependent metal of concern and for each individual discharge, the Permit Writer must first determine what effluent and instream (upstream) hardness values to use in the equations.

    The permit writer reviews DMR's, Effluent Pollutant Scans, and Toxicity Test results for any hardness data and contacts the Permittee to see if any additional data is available for instream hardness values, upstream of the discharge.

    If no hardness data is available, the permit writer may choose to do an initial evaluation using a default hardness of 25 mg/L (CaCO3 or (Ca + Mg)). Minimum and maximum limits on the hardness value used for water quality calculations are 25 mg/L and 400 mg/L, respectively.

    If the use of a default hardness value results in a hardness-dependent metal showing reasonable potential, the permit writer contacts the Permittee and requests 5 site-specific effluent and upstream hardness samples over a period of one week. The RPA is rerun using the new data.

The overall hardness value used in the water quality calculations is calculated as follows:
Combined Hardness (chronic)

$$= \frac{\text{(Permitted Flow, cfs *Avg. Effluent Hardness, mg/L) x (s7Q10, cfs *Avg. Upstream Hardness, mg/L)}}{\text{(Permitted Flow, cfs + s7Q10, cfs)}}$$

The Combined Hardness for acute is the same but the calculation uses the 1Q10 flow.

3. The permit writer converts the numeric standard for each metal of concern to a total recoverable metal, using the EPA Default Partition Coefficients (DPCs) or site-specific translators, if any have been developed using federally approved methodology.

> EPA default partition coefficients or the "Fraction Dissolved" converts the value for dissolved metal at laboratory conditions to total recoverable metal at in-stream ambient conditions. This factor is calculated using the linear partition coefficients found in *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion* (EPA 823-B-96-007, June 1996) and the equation:
>
> $$\frac{C_{diss}}{C_{total}} = \frac{1}{1 + \{ [K_{po}] [ss^{(1+a)}] [10^{-6}] \}}$$
>
> Where:
> ss = in-stream suspended solids concentration [mg/l], minimum of 10 mg/L used, and
> Kpo and *a* = constants that express the equilibrium relationship between dissolved and adsorbed forms of metals. A list of constants used for each hardness-dependent metal can also be found in the RPA program under a sheet labeled DPCs.

4. The numeric standard for each metal of concern is divided by the default partition coefficient (or site-specific translator) to obtain a Total Recoverable Metal at ambient conditions.

   In some cases, where an EPA default partition coefficient translator does not exist (ie. silver), the dissolved numeric standard for each metal of concern is divided by the EPA conversion factor to obtain a Total Recoverable Metal at ambient conditions. This method presumes that the metal is dissolved to the same extent as it was during EPA's criteria development for metals. For more information on conversion factors see the June, 1996 EPA Translator Guidance Document.

5. The RPA spreadsheet uses a mass balance equation to determine the total allowable concentration (permit limits) for each pollutant using the following equation:

$$Ca = \frac{(s7Q10 + Qw)(Cwqs) - (s7Q10)(Cb)}{Qw}$$

Where: Ca = allowable effluent concentration (µg/L or mg/L)
Cwqs = NC Water Quality Standard or federal criteria (µg/L or mg/L)
Cb = background concentration: assume zero for all toxicants except NH_3* (µg/L or mg/L)
Qw = permitted effluent flow (cfs, match s7Q10)
s7Q10 = summer low flow used to protect aquatic life from chronic toxicity and human health through the consumption of water, fish, and shellfish from noncarcinogens (cfs)
* Discussions are on-going with EPA on how best to address background concentrations

Flows other than s7Q10 may be incorporated as applicable:
1Q10 = used in the equation to protect aquatic life from acute toxicity

QA = used in the equation to protect human health through the consumption of water, fish, and shellfish from carcinogens
30Q2 = used in the equation to protect aesthetic quality

6. The permit writer enters the most recent 2-3 years of effluent data for each pollutant of concern. Data entered must have been taken within four and one-half years prior to the date of the permit application (40 CFR 122.21). The RPA spreadsheet estimates the 95th percentile upper concentration of each pollutant. The Predicted Max concentrations are compared to the Total allowable concentrations to determine if a permit limit is necessary. If the predicted max exceeds the acute or chronic Total allowable concentrations, the discharge is considered to show reasonable potential to violate the water quality standard, and a permit limit (Total allowable concentration) is included in the permit in accordance with the U.S. EPA Technical Support Document for Water Quality-Based Toxics Control published in 1991.

7. When appropriate, permit writers develop facility specific compliance schedules in accordance with the EPA Headquarters Memo dated May 10, 2007 from James Hanlon to Alexis Strauss on 40 CFR 122.47 Compliance Schedule Requirements.

8. The Total Chromium NC WQS was removed and replaced with trivalent chromium and hexavalent chromium Water Quality Standards. As a cost savings measure, total chromium data results may be used as a conservative surrogate in cases where there are no analytical results based on chromium III or VI. In these cases, the projected maximum concentration (95th %) for total chromium will be compared against water quality standards for chromium III and chromium VI.

9. Effluent hardness sampling and instream hardness sampling, upstream of the discharge, are inserted into all permits with facilities monitoring for hardness-dependent metals to ensure the accuracy of the permit limits and to build a more robust hardness dataset.

10. Hardness and flow values used in the Reasonable Potential Analysis for this permit included:

	Outfall 001		**Outfall 002 & 002A**		**Outfall 003**	
Parameter	**Value**	**Comments (Data Source)**	**Value**	**Comments (Data Source)**	**Value**	**Comments (Data Source)**
Average Effluent Hardness (mg/L) [Total as, $CaCO_3$ or (Ca+Mg)]	25	Used default value	25	Used default value	25	Used default value
Average Upstream Hardness (mg/L) [Total as, $CaCO_3$ or (Ca+Mg)]	25	Used default value	25	Used default value	25	Used default value
7Q10 summer (cfs)	263		263		263	
1Q10 (cfs)	213		213		213	
Permitted Flow (MGD)	2.16 MGD	Design flow-comments from Steve Cahoon 9-8-16	2 MGD	estimate	0.5 MGD	Aug. 31, 2016 application

Date: ____DRAFT_____

Permit Writer: _____JAG_____