DEPARTEMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER RESOURCES
FACT SHEET FOR NPDES PERMIT DEVELOPMENT
NPDES No. NC0003425

Facility Information			
Applicant/Facility Name:	Duke Energy Progress/Roxboro Steam Electric Generating Plant		
Applicant Address:	1700 Dunnaway Rd., Semora, NC 27343		
Facility Address:	1700 Dunnaway Rd., Semora, NC 27343		
Permitted Flow	Not limited		
Type of Waste:	99.8 % Industrial, 0.2% - domestic		
Facility/Permit Status:	Existing/Renewal		
County:	Person		
Miscellaneous			
Receiving Stream:	Hyco Reservoir	Stream Classification:	WS-V, B
Subbasin:	03-02-05	303(d) Listed?:	No
Drainage Area (mi2):	N/A	Primary SIC Code:	4911
Summer 7Q10 (cfs)	0	Regional Office:	RRO
30Q2 (cfs):	0	Quad	Olive Hill
Average Flow (cfs):	0	Permit Writer:	Sergei Chernikov, Ph.D.
IWC (%):	100%	Date:	04/11/2019

Summary
The Roxboro Steam Electric Plant is an electric generating facility that uses steam turbine generation via four coal-fired units with a with a combined electric generating output of 2558 MW: Unit No. 1 (385 MWe), Unit No. 2 (670 MWe), Unit No. 3 (707MWe) and Unit No. 4 (700 MWe).

The facility discharges to subbasin 030205 in the Roanoke River Basin. The facility operates five internal outfalls and two outfalls to Hyco Reservoir. Discharges are mostly industrial, with a very small domestic flow (internal Outfall 008) piped to the on-site ash pond. Discharges from the ash pond (internal Outfall 002), once-through cooling water and FGD treatment system (internal outfall 010) are discharged to the Heated Water Discharge Pond (outfall 003). The Heated Water Discharge Pond and Coal Pile Runoff (outfall 006) both discharge to Hyco Reservoir. The Hyco Reservoir is a 17.6 km^2 waterbody constructed in 1963 by CP&L to serve as a cooling water source. The receiving waterbody is class WS-V; B. The facility is located in the Lower Piedmont area of the state, the applicable state water quality temperature standard is 32˚C (89.6˚ F).

This facility is subject to EPA effluent guideline limits per 40 CFR 423 - Steam Electric Power Generating Point Source Category which were amended November 3, 2015. The facility is also subject to the Cooling Water Intake Structures Rules (40 CFR 125) effective October 14, 2014. The intake flow is > 125 MGD.

Duke requested the addition of three new outfalls on the permit; two to reflect the future treatment systems for the low volume wastes as the ash basin will be closed and one for the overflow from the east ash basin extension and stormwater runoff.

Description of existing outfalls:

Outfall 003 – Heated Water Discharge Pond to Hyco Reservoir. This pond combines all internal outfalls (002, 005, 008, 009, 010) before discharging to Hyco Reservoir. In addition, once-through cooling water from condensers for units 1, 2, and 3, once-through cooling water from heat exchangers, seepage from ash pond, and stormwater runoff from plant drainage areas are discharged to the discharge pond.

Outfall 006 – Coal Pile Runoff discharges directly to Hyco Reservoir. Coal pile runoff wastewaters include runoff from the coal pile, limestone pile and gypsum pile, truck wheel wash area and coal handling areas. Treatment is accomplished by neutralization, sedimentation and equalization. This is an episodic discharge.

Internal Outfall 002 – Ash Pond discharging to the heated water discharge pond. The ash pond receives wastewater from the following source:

- Bottom ash transport waters
- Silo wash water
- Ash landfill leachate and runoff (this landfill receives CCR from Mayo and Roxboro plants)
- Dry-ash handling system wash water
- Blowdown from Unit 4 cooling tower
- Coal mill rejects and pyrites
- Sewage treatment plant effluent
- Low volume waste consisting of boiler blowdown, equipment maintenance cleaning wastewaters, RO reject wastewater and floor drains. Low volume wastes are treated by neutralization.
- Emergency overflow from FGD system blowdown.

Internal Outfall 005 – Cooling tower blowdown from Unit 4.

Internal Outfall 008 – Treated domestic wastewater. The treatment system consists of a screen, communitor, surge tank, aeration tank, clarifier, chlorine contact chamber and sludge holding tank. A new package plant will be installed to replace the existing plant.

Internal Outfall 009 - Chemical metal cleaning waste. Wastewaters from cleaning of the boilers is generated every five to eight years. Every three to five years wastewaters are generated from cleaning the heat exchangers. The wastewaters generated can be treated by evaporation or by neutralization and precipitation.

Internal Outfall 010 – Flue Gas Desulfurization (FGD) treatment system discharging to the discharge canal. The scrubber system removes SOx by mixing flue gas with a limestone slurry. The blowdown from the scrubber is discharged to a gypsum settling pond system then to a bioreactor which utilizes microorganisms to reduce soluble contaminants to insoluble forms (under anaerobic conditions) that then precipitate from solution. Wastewater is discharged to the ash pond effluent channel. An emergency overflow from the FGD system blowdown discharges to the ash pond.

Proposed Outfalls:

Outfall 001 – Stormwater and the oveflow from the east ash basin extension. The east ash basin was closed and subsequently a landfill was built over the old basin. A portion of the basin remained as an open pond. It has come to the attention of the Division that there are some coal combustion residuals within the pond. The Division has requested that Duke removes the residuals. In addition to the pond overflow this outfall discharges stormwater runoff.

Internal Outfalls 012A, 012B and 012C - Low volume waste and other wastewaters. Duke will build two basin treatment systems to treat wastewaters that now go to the ash basin. The basins will discharge to the heated discharge pond and an emergency overflow from one of the basins will discharge to Hyco Lake (012C).

CWA 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 by May 31, 2023. This is an accelerated schedule that includes: 1 year for the development of the sampling plan and obtaining approval from the Division, 2 years of sampling to adequately characterize seasonal variation, and 1 year for the report development. Based on the results of the studies, the Division may require an implementation of the additional measures to reduce impingement and entrainment of the aquatic organisms.

The facility's total intake is designed for approximately 1,114 MGD. Units No. 1 and 2 use condensers as cooling devices. Units No. 3 and 4 use cooling towers as cooling devices. Units 1 and 2 operate in a once-through cooling mode year round. Unit 3 operates in a once-through cooling mode part of the year (October 15th – April 30th) and during summer months (May 1st – October 14th) condenser cooling water is routed to once-though mechanical draft cooling tower. Unit 4 is equipped with closed-cycle evaporative cooling towers that operate year-round. The CWIS for Unit 4 (CWIS 4) is located on the north bank of the heated water discharge pond, adjacent to the Unit 4 closed-cycle cooling tower. As a result, there is no net increase in cooling water withdrawal for the Unit 4 cooling tower make-up water.

The CWIS for Units 1-3 (CWIS 1) is located at the intake forebay immediately east of the Unit 1 turbine-generator. Cooling water for Units 1-3 is withdrawn through eight bays in CWIS 1 via a 1.7-mile intake canal located east north-east of the plant. The intake canal directs water to an intake pond which is connected to the CWIS 1 intake forebay area via a submerged culvert. Unit 1 consists of two intake bays equipped with one circulating water pump per bay. Units 2 and 3 each consist of three intake bays equipped with one circulating water pump per bay. Each of the eight intake bays for CWIS 1 is equipped with trash racks and coarse-mesh (3/8-inch mesh size) vertical traveling screens with a debris spray wash system and debris collection trough.

Duke Energy provided the following justification as Basis for Designation Belews Station as a Closed Cycle Recirculation System:

A "closed-cycle recirculating system" is defined at 40 CFR 125.92 (c). The definition addresses facilities with CCRS that withdraw from waters of the United States where the impoundment was constructed for the purpose of providing cooling water for the facility:

> "Closed-cycle recirculating system also includes a system with impoundments of waters of the U.S. where the impoundment was constructed prior to October 14, 2014 and created for the purpose of serving as part of the cooling water system as documented in the project purpose statement for any required Clean Water Act section 404 permit obtained to construct the impoundment. In the case of an impoundment whose construction pre-dated the CWA requirement to obtain a section 404 permit, documentation of the project's purpose must be demonstrated to the satisfaction of the Director. This documentation could be some other license or permit obtained to lawfully construct the impoundment for the purposes of a cooling water system, or other such evidence as the Director finds necessary." 40 CFR 125.92 (c)(2).

Impoundments are further defined and discussed as a closed-cycle cooling system in the rule's preamble, stating that:

> "Impoundments are surface waterbodies that serve as both a source of cooling water and a heat sink. As with cooling towers, impoundments rely on evaporative cooling to dissipate the waste heat; a facility withdraws water from one part of the impoundment and then discharges the heated effluent back to the impoundment,

> usually in another location to allow the heated water time to cool. Depending on local hydrology, impoundments may also require makeup water from another waterbody. Impoundments can be man-made or natural, and can be offset from other water bodies or as part of a ''run of the river'' system (the latter are sometimes referred to as cooling lakes).” 79 Fed. Reg. 48,334 (August 15, 2014)

The system at Roxboro meets the criteria for classification as a CCRS. Roxboro withdraws cooling water from Hyco Lake which was constructed in a water of the United States for the purpose of providing cooling water for the Carolina Power & Light Company (now Duke Progress, LLC) Roxboro Steam Electric Plant prior to the Clean Water Act 404 permitting program. The Carolina Power & Light Company received authorization for the creation of Hyco Lake in April 1964 for the Roxboro facility. Numerous documents issued by the State contain several statements and commensurate justification that the purpose of Hyco Lake was to be “operated…to reduce pollution [via condenser cooling water recirculation] in the Hyco River” and is a “cooling pond”:

- State of North Carolina Department of Water and Air Resources Permit 522 issued May 4, 1964
- Carolina Power & Light Company, North Carolina State Stream Sanitation Committee “Application for Approval of Plans” dated April 13, 1964
- North Carolina Board of Water and Air Resources Permit 522 Certification dated October 1, 1971
- North Carolina Environmental Management Commission Permit 2523 issued July 22, 1974

The permit issued by the State of North Carolina Department of Water and Air Resources (the predecessor Agency to the North Carolina Department of Environmental Quality) authorized “…operation of a 3,800 acre cooling lake for a design flow of 2,400,000,000 G.P.D., and the discharge of the effluent into the Hyco River, a tributary in the Roanoke River Basin”. The dam was completed in 1964 and Hyco Lake reached full pool elevation in 1965.

As also required by the definition, make-up water withdrawals attributable to the cooling portion of the Roxboro cooling system have been minimized. The source of all makeup water is the approximately 300 square mile Hyco Lake watershed. No other sources of makeup water are currently available and none are planned.

In addition to minimizing withdrawals for make up water to Hyco Lake, Roxboro also minimizes cooling water withdrawals from Hyco Lake in multiple ways. First, Unit 4 operates on recirculating cooling towers that require only small volumes of makeup waters. Those make up waters are taken from internal process areas consisting of Unit 1-3 cooling water discharge and the ash basin discharge flows. Second, the cooling water system for Units 1-3 has several design features that increase their efficiency, including (a) directing deeper, cooler water to the intake as needed to maintain efficiency by using cooler water from deeper in the reservoir; (b) routing of cooling water discharges as far as possible upstream from the cooling water intake (subject to constraints imposed by the Department for thermal impact reasons); and (c) utilization on Unit 3 of a helper cooling tower seasonally which reduces the thermal discharge load to the lake and allows for more efficient cooling during the summer months. Third, as reflected in the company’s Integrated Resources Plans, filed with the North Carolina Utilities Commission, Roxboro has operated since 2016 as an “Intermediate” rather than “Baseload” generation source. The reduction in operating time has resulted in a reduction of average daily withdrawals from greater than 800 MGD when the plant operated as Baseload to 592 MGD in 2018, as reported in the station’s annual water withdrawal reports.

The Division concurs with the justification provided by Duke on a provisional basis. Based on 40 CFR 125.92 (c) the Director has determined that operating and maintaining the existing closed-cycle recirculating system meets the requirements for a provisional BTA. The final determination will be made upon review of the materials submitted by the permittee. This determination is consistent with the EPA Region IV decision regarding Robinson station and Belews station, and the EPA Region III decision regarding North Anna station.

Temperature Mixing Zone – Outfall 003

The facility is located in the Lower Piedmont area of the state, the applicable state water quality temperature standard is 32˚C (89.6˚ F). The authorized temperature mixing zone for outfall 003 includes the North Hyco Arm downstream of NC Hwy 57, the main body of Hyco Reservoir downstream of the confluence of the Cobbs Creek Arm and the North Hyco Arm and the entire after bay lake. USGS data at the after bay monitoring station (USGS Station 02077303) was reviewed for the period of January 2011 to April 2016. Data shows that the temperature water quality standard was not exceeded for this period. Maximum temperature recorded was 30.5˚C.

Instream Monitoring

The permit requires monitoring of Hyco Reservoir in accordance to the Biological Monitoring Program as approved by the Division. Based on the Division's review of the reports the fish community is comparable to other piedmont reservoirs and no problems were noted. The draft permit includes instream monitoring for total arsenic, total selenium, total mercury, total chromium, dissolved lead, dissolved cadmium, dissolved copper, dissolved zinc, total bromide, total hardness (as $CaCO_3$), turbidity, and total dissolved solids (TDS). The draft permit also includes annual fish tissue monitoring.

DATA REVIEW/PERMIT REQUIREMENTS

Internal Outfall 002 – Ash Pond

This outfall is subject to the Effluent Limitations Guidelines (ELG) in Table 1.

Table 1. ELG Outfall 002 (Prior to November 1, 2018)

Pollutant	Daily Maximum	Monthly Average	ELG
TSS	100 mg/L	30 mg/L	40 CFR 423.12 (b) (4)
Oil & Grease	20 mg/ L	15 mg/L	40 CFR 423.12 (b) (4)

The current permit requires monitoring for flow and total selenium, limits for Oil & Grease and TSS. A summary of DMR data for the period of January 2011 to January 2016 is included in Table 2. There have been no violations of permit limits or conditions.

Table 2. DMR Summary Outfall 002

Parameter	Average	Maximum	Minimum
Flow	10.8 MGD	48.3 MGD	3.1 MGD
TSS	5 mg/L	21 mg/L	< 2.5 mg/L
Total Selenium	14.6 µg/L	68.8 µg/L	< 10 µg/L
O & G	< 5 mg/L	13.5 mg/l	< 5 mg/L

Table 3. Monitoring Requirements/Proposed Changes Outfall 002

Parameter	Monitoring requirements	Changes	Basis
Flow	Monitor	No changes	15A NCAC 2B.0505
TSS	30 mg/L monthly aver 100 mg/L daily max	No changes	40 CFR 423.12(b)(4)

Oil & Grease	15 mg/L monthly aver 20 mg/L daily max	No Changes	40 CFR 423.12(b)(4)
Total Selenium	Monthly monitoring	No changes	Pollutant of concern
Turbidity, pH	No requirement	Monitor	Pollutant of concern for dewatering/decanting

Schedule of Compliance Fly Ash/Bottom Ash:
As per 40 CFR 423.13 (k) (1) (i) bottom ash transport water shall not be discharged, compliance with this section shall be as soon as possible beginning on November 1, 2020, but no later than December 31, 2023. Duke utilizes wet bottom ash transport system. Duke is proposing to install a remote mechanical drag chain system. Design of the system is expected to be completed in 8 months, followed by procurement in 12 months. Construction is expected to be completed in 13 months. Duke proposes a 16 month window to optimize the system at full load and additional 6 months for potential permitting delays. Consideration was given to the fact that Duke will be undertaking design, procurement and installation activities in multiple facilities simultaneously. Duke will meet the no discharge of bottom ash requirement by April 30, 2021.

Fly ash transport water is no longer discharged therefore Duke meets the compliance date of November 1, 2018.

Internal Outfall 002 – Dewatering

To meet the requirements of the Coal Ash Management Act of 2014, the facility needs to dewater two ash ponds by removing the interstitial water and excavate the ash to deposit it in landfills. The facility's highest discharge rate from the dewatering process will be 2 MGD. The facility submitted data for the standing surface water in the ash ponds, interstitial water in the ash, and interstitial ash water that was treated by filters of various sizes. The following pollutants were detected at concentrations higher than the water quality standards: selenium, arsenic and molybdenum. A new effluent and monitoring sheet is included in the permit for the ash pond dewatering phase. As this is an internal outfall the water quality standards are not applied. Monitoring will be required for selenium, arsenic, molybdenum, antimony, mercury and copper.

Outfall 003 – Heated Water Discharge Pond (Combined outfalls)

DMR/Compliance Review
Data were reviewed for the period of January 2011 to March 2016. There have been no violations of permit limits or conditions.

Table 4. DMR Summary Outfall 003

Parameter	Average	Maximum	Minimum
Flow (MGD)	840	1130	6.9
TRC	Not discharged		
TP (mg/L)	< 0.036	< 0.05	< 0.05
TN (mg/L)	0.68	1.08	0.44
Temperature (°C)	29	41	13°C
Total Arsenic (µg/L)	6.2	17.1	< 2.8
pH (SU)	7.34	8	6.38

Toxicity Testing (003):
Current Requirement: Acute P/F at 90%, February, May, August, November.
Proposed Requirement: Acute P/F at 90%, February, May, August, November.
The facility passed 21 tests out of 21 tests performed for the period of January 2011 to January 2016.

Reasonable Potential Analysis Outfall 003:
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 003. 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." With the approval of the Triennial Review (2007-2014) of the NC Water Quality Standards by the Environmental Management Commission (EMC) in 2014 and US-EPA (with some exceptions) on April 6, 2016, the NPDES Permitting Unit is required to implement the new dissolved metal standards in all permits public noticed after April 6, 2016. The RPA included evaluation of dissolved metals' standards, utilizing measured hardness value of 100 mg/L $CaCO_3$ for hardness-dependent metals.

A reasonable potential analysis was conducted for arsenic, copper, nickel, selenium, strontium, thallium, chlorides and zinc. Arsenic data used for the RPA was collected between 2011 and 2016. Data for the remaining parameters was from a special study for the period of March 2010 to August 2011. Based on this analysis, the following permitting actions are proposed for this permit:

- 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: Arsenic, selenium, chloride.
- 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: copper, nickel, strontium, and zinc.

Mercury Evaluation Outfall 003**:**
A mercury evaluation was conducted in accordance with the permitting guidance developed for the implementation of the statewide Mercury TMDL to determine the need for a limit and Mercury Minimization Plan (MMP). Monitoring for mercury is not required for outfall 003 but mercury data was collected during a special study during the period of March 2010 to August 2011. The water quality based effluent limitation (WQBEL) for mercury is 12 ng/l. The technology based effluent limit (TBEL) is 47 ng/l. None of the annual averages exceeds the WQBEL or TBEL, no limit is required. See the attached mercury evaluation spreadsheet.

Table 5. Mercury Evaluation

	2010	2011
# of Samples	20	16
Annual Average, ng/L	3.6	4.4
Maximum Value, ng/L	7.63	6.92
TBEL, ng/L	47	
WQBEL, ng/L	12.0	

Table 6. Monitoring Requirements/Proposed Changes Outfall 003

Parameter	Monitoring requirements/Limits	Changes	Basis
Flow	Monitor	No changes	15A NCAC 2B.0505

TRC	200 µg/L instantaneous max	Modified limit to 28 µg/L daily max	State WQ standards, 15A NCAC 2B .0200. The water quality standard is more stringent than the effluent guidelines limit.
TP	Monitor	No changes	15A NCAC 2B .0500
TN	Monitor	No changes	15A NCAC 2B .0500
Temperature	Monitor	No changes	Approved Mixing zone
Total Arsenic	Monitor	No changes	Based on results from RPA, Predicted concentration greater than 50% of allowable.
Total Selenium	No requirement	Quarterly monitoring	Based on results from RPA, Predicted concentration greater than 50% of allowable.
Total Thallium	No requirement	Quarterly monitoring	Pollutant of concern.
Chloride	No requirement	Quarterly monitoring	Based on results from RPA, Predicted concentration greater than 50% of allowable.
pH	6 to 9 SU	No changes	State WQ standards, 15A NCAC 2B .0200
Acute toxicity	P/F 90%	No changes	State WQ standards, 15A NCAC 2B .0200

Internal Outfall 005 – Cooling Tower Blowdown from Unit 4

This outfall is subject to the ELGs in Table 7.
Table 7. ELG Outfall 005

Pollutant	Daily Maximum	Monthly Average	ELG
Free Available Chlorine	0.5 mg/L	0.2 mg/L	40 CFR 423.12 (d) (1)
126 Pollutants	No detectable amounts		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)

The permit includes monitoring for flow and Total Residual Chlorine (TRC), limits for Free Available Chlorine, Total Chromium, Total Zinc and 126 priority pollutants.

Special condition A. (14) in the current permit doesn't allow the discharge of the cooling tower blowdown to the discharge pond, it has to be discharged to the ash pond. With the modifications planned to the site and the future closure of the existing ash pond Duke will like to have the option to discharge the blowdown to the discharge pond. This will continue to be an internal outfall subject to the same limits under 40 CFR 423. The limits apply before it comingles with any other waste stream so there is no change in limits or other permit conditions by allowing the cooling tower blowdown to discharge into the discharge pond.

DMR/Compliance Review:
Data were reviewed for the period of January 2011 to January 2016. There have been no violations of permit limits or conditions. Flow was the only parameter monitored at this outfall since the facility did not chlorinate or added chromium or zinc for maintenance activities. Flow is reported as 7.2 MGD on a daily basis.

Table 8. Monitoring Requirements/Proposed Changes Outfall 005

Parameter	Monitoring Requirements/Limits	Changes	Basis
Flow	Monitor	No changes	15A NCAC 2B.0505
Free available chlorine	500 µg/L daily max 200 µg/L monthly average	No changes	40 CFR 423.13 (d)(1)
Total Residual Chlorine	Monitoring	No changes	40 CFR 423.13 (d)(2)
Total chromium	200 µg/L daily max 200 µg/L monthly average	No changes	40 CFR 423.13 (d)(1)
Total Zinc	1.0 mg/L daily max 1.0 mg/L monthly average	No changes	40 CFR 423.13 (d)(1)
The 126 priority pollutants	No detectable amount	No changes	40 CFR 423.13 (d)(1)

Outfall 006 – Coal Pile Runoff

This outfall is subject to the ELG in Table 9.

Table 9. ELG Outfall 006

Pollutant	Daily Maximum	Monthly Average	ELG
TSS	50 mg/L		40 CFR 423.12 (b) (9)
pH	6 to 9 SU		40 CFR 423.12 (b) (1)

DMR/Compliance Review:
Data were reviewed for the period of January 2008 to March 2013. There have been no violations of permit limits or conditions.

Table 10. DMR Summary Outfall 006

Parameter	Average	Maximum	Minimum
Flow (MGD)	0.23	0.05	0.002
TSS (mg/L)	2.6	76.6	< 2.5
pH (SU)	7.39	8.9	6.04

Priority Pollutant Scan:
The application included the results of one scan. Selenium was detected above the water quality standard.

This is an episodic discharge. The pond only discharges under heavy rain events, therefore limits will be applied as acute limits.

Table 11. Monitoring Requirements/Proposed Changes Outfall 006

Parameter	Monitoring requirements/Limits	Changes	Basis
Flow	Monitor	No changes	15A NCAC 2B .05
TSS	50 mg/L instantaneous max	No changes	40 CFR 423.12(b)(9)
pH	6 to 9 SU	No changes	40 CFR 423.12 (b) (1)
Total selenium	No requirement	56 µg/L Daily Max	RPA
Acute toxicity	P/F 90%	No changes	State WQ standards, 15A NCAC 2B .0200

Internal Outfall 008 – Domestic WWTP

Table 12. DMR Review Outfall 008

Parameter	Average	Maximum	Minimum
Flow (MGD)	0.007	0.01	0.002
TSS (mg/l)	14.7	30	5
pH (SU)	6.8	7.3	6.5
BOD (mg/L)	10.4	28	2.1
NH3N (mg/L)	0.8	1.6	< 0.1

Table 13. Monitoring Requirements/Proposed Changes Outfall 008

Parameter	Monitoring requirements/Limits	Changes	Basis
Flow	0.015 MGD	0.025 MGD	WWTP was upgraded
TSS	30 mg/L monthly aver 45 mg/L daily max	No changes	NPDES rules for secondary treatment of domestic wastewater, 15A 2B .0400
pH	6 to 9 SU	No changes	State WQ standards, 15A 2B .0200
BOD	30 mg/L monthly aver 45 mg/L daily max	No changes	NPDES rules for secondary treatment of domestic wastewater, 15A 2B .0400
Total ammonia	Monitor	No changes	DWQ Policy

Internal Outfall 009 – Chemical cleaning waste

Table 14. Monitoring Requirements/Proposed Changes Outfall 009

Parameter	Monitoring requirements/Limits	Changes	Basis
Flow	Monitor	No changes	15A NCAC 2B.0505
Total Copper	1.0 mg/L monthly aver 1.0 mg/L daily max	No changes	40 CFR 423.13 (e)
Total Iron	1.0 mg/L monthly aver 1.0 mg/L daily max	No changes	40 CFR 423.13 (e)
TSS	30 mg/L monthly aver 100 mg/L daily max	No changes	40 CFR 423.13 (e)
Oil & Grease	15 mg/L monthly aver 20 mg/L daily max	No changes	40 CFR 423.13 (e)

Internal Outfall 010 – FGD

This outfall is subject to the Effluent Limitations Guidelines (ELG) in Table 15. These are new limitations promulgated November 3, 2015.

Table 15. ELG Outfall 010

Pollutant	Daily Maximum	Monthly Average	ELG
pH	6 to 9 SU		40 CFR 423.12 (b) (1)
TSS	100 mg/L	30 mg/L	40 CFR 423.12 (b) (11)
Oil and grease	20 mg/L	15 mg/L	40 CFR 423.12 (b) (11)
Total Arsenic	11 µg/L	8 µg/L	40 CFR 423.13 (g) (1) (i)
Total Mercury	788 ng/L	356 ng/L	40 CFR 423.13 (g) (1) (i)
Total Selenium	23 µg/L	12 µg/L	40 CFR 423.13 (g) (1) (i)
Nitrate/nitrite	17 mg/L	4.4 mg/L	40 CFR 423.13 (g) (1) (i)

The current permit includes monitoring for flow, total beryllium, total mercury, total antimony, total selenium, total silver and total vanadium. Table 16 includes a summary of DMR data for the period of January 2011 to January 2016. There have been no violations of permit limits or conditions.

Table 16. DMR Summary Outfall 010

Parameter	Average	Maximum	Minimum
Flow (MGD)	0.84	1.77	0.01
Total Beryllium (µg/L)	3.9	10	< 1
Total Mercury (µg/L)	1.08	9.6	< 1
Total Selenium (µg/L)	102	712	< 50
Total Silver (µg/L)	6	8.4	< 5
Total Antimony (µg/L)	31	70	< 25
Total Vanadium (µg/L)	< 25	< 25	< 5

Table 17. Monitoring Requirements/Proposed Changes Outfall 010

Parameter	Monitoring requirements/Limits	Changes	Basis
Flow	Monitor	No changes	15A NCAC 2B.0505
Total Beryllium	Monitor	Remove monitoring	Internal outfall, not a parameter of concern.
Total Vanadium	Monitor	Remove monitoring	Internal outfall, not a parameter of concern.
Total Antimony	Monitor	Remove monitoring	Internal outfall, not a parameter of concern.
Total Silver	Monitor	Remove monitoring	Internal outfall, not a parameter of concern.
Total Arsenic	No monitoring	11 µg/L daily max and 8 µg/L monthly average	40 CFR 423.13 (g) (1) (i)
Total Selenium	Monitor	23 µg/L daily max and 12 µg/L monthly average	40 CFR 423.13 (g) (1) (i)
Nitrate/Nitrite	No monitoring	17 mg/L daily max and 4.4 mg/L monthly average	40 CFR 423.13 (g) (1) (i)
Total Mercury	Monitoring	788 ng/L daily max and 356 ng/L monthly average.	40 CFR 423.13 (g) (1) (i)

Schedule of Compliance FGD:
40 CFR 423 establishes compliance dates for the new limitations. Permittee must meet limits as soon as possible beginning on November 1, 2020 but no later than December 31, 2023.
Duke utilizes a biological treatment system to treat FGD wastewaters. Duke anticipates that it will be required to install physical/chemical treatment followed by selenium reduction technology to meet the FGD guidelines. Evaluation of new technologies, design, and siting of the system is expected to take 30 months. The evaluation phase includes evaluation of existing treatment system, flow optimization, siting of the new system within the plant, selection of technology and permitting. Procurement is expected to be completed in 20 months, construction and tie-in expected to be completed in 16 months considering that tie-in has to be done during outages. Startup and optimization under all expected operating conditions is estimated for 15 months. An additional 6 months is included in the schedule for potential permitting delays. Duke will meet the FGD ELG by December 31, 2021. As the new treatment system will be placed

in operation and the old pond may still discharge until it is decommissioned a new outfall is included in the permit for the new system.

Proposed Outfalls Requirements:

Outfall 001

RPA: An RPA was conducted for proposed outfall 001. RPA was conducted for total arsenic, cadmium, chlorides, total chromium, total copper, total lead, total mercury, total molybdenum, total nickel, selenium, total zinc, antimony, sulfate and total thallium. As a result of the RPA limits are required for the following parameters: arsenic, fluoride, sulfides and selenium.

Mercury
Mercury data was collected during 2014 and 2015. 2014 data was collected using method 245 which has a higher detection limit that 1631. Data for 2015 was used to evaluate a need for a limit. The annual average was 5.2 ng/l, no limit will be implemented.

Table 18. Outfall 001 Proposed Limits/Monitoring:

Parameter	Monitoring requirements/Limits	Basis
Flow	Monitor	15A NCAC 2B.0505
pH	6 to 9 SU	State WQ standards, 15A 2B .0200
Total arsenic, total copper, total antimony, total lead, total zinc, total barium, total iron, total manganese, total nickel, total mercury, and chlorides	Monitor	Coal ash parameters of concern.
Total Selenium	5 µg/L Monthly Average 56 µg/L Daily Max	RPA
Total Arsenic	10 µg/L Monthly Average 340 µg/L Daily Max	RPA
Fluoride	1.8 mg/L Monthly Average 1.8 mg/L Daily Max	RPA
Sulfates	250 mg/L Monthly Average 250 mg/L Daily Max	RPA
TDS, Hardness, Conductivity	Monitor	Parameters of concern
Acute toxicity	Quarterly Limit	State WQ standards, 15A NCAC 2B .0200

Low Volume Waste Treatment System:

Two new treatment systems will be installed to treat wastewaters currently delivered to the ash basin. Low volume wastes, metal cleaning wastes, stormwater, and other miscellaneous wastes that are routed to the ash basin will be rerouted to new treatment systems. Duke proposes two separate treatment systems. The new outfalls will be designated as outfall 012A and outfall 012B. The overflow from the 012B basin will be designated as outfall 012C. Duke estimated that design, construction and start up of the new treatment system will be completed within 30 months of permit issuance.

Internal Outfall 012A - treatment system for the landfill stormwater, treated extracted groundwater, contact and non-contact storm water and discharging to the discharge pond.

Table 19. Outfall 012A Proposed Limits/Monitoring:

Parameter	Monitoring requirements/Limits	Basis
Flow	Monitor	15A NCAC 2B.0505
Total Suspended Solids	30 mg/L Monthly Average 100 mg/L Daily Max	40 CFR 423.12 (b)(3)
Oil & Grease	15 mg/L Monthly Average 20 mg/L Daily max	40 CFR 423.12 (b)(3)
Total arsenic, total selenium, total mercury, total molybdenum, total antimony, total copper	Monitor during ash basin closure	Parameters of concern

Internal Outfall 012B – treatment system for plant low volume wastes, FGD treatment system effluent, domestic waste treatment system, anhydrous ammonia emergency discharge, metal cleaning wastes, stormwater runoff, and cooling tower blowdown. The discharge from outfall 012B will go to the discharge canal.

Table 20. Outfall 012B Proposed Limits/Monitoring:

Parameter	Monitoring requirements/Limits	Basis
Flow	Monitor	15A NCAC 2B.0505
Total Suspended Solids	30 mg/L Monthly Average 100 mg/L Daily Max	40 CFR 423.12 (b)(3)
Oil & Grease	15 mg/L Monthly Average 20 mg/L Daily max	40 CFR 423.12 (b)(3)
Ammonia	Monitor	Monitor during emergency discharge of anhydrous ammonia

Emergency Outfall 012C – This is the emergency overflow from the low volume waste treatment system (Outfall 012B)

Table 21. Outfall 012C Proposed Limits/Monitoring:

Parameter	Monitoring requirements/Limits	Basis
Flow	Monitor	15A NCAC 2B.0505
Total Suspended Solids	30 mg/L Monthly Average 100 mg/L Daily Max	40 CFR 423.12 (b)(3)
Oil & Grease	15 mg/L Monthly Average 20 mg/L Daily max	40 CFR 423.12 (b)(3)
Ammonia	1.0 mg/L Monthly average 5.0 mg/L Daily max	Monitor during emergency discharge of anhydrous ammonia
Arsenic	Monitor	Parameter of concern
Mercury	Monitor	Parameter of concern
Selenium	Monitor	Parameter of concern
Nitrate/ nitrite	Monitor	Parameter of concern
Copper	Monitor	Parameter of concern
Iron	Monitor	Parameter of concern

Public Notice/Public Hearing

The first draft of this permit was public noticed on August 30, 2016. A public hearing was held on October 4, 2016. A second public notice was done on January 21, 2017 since the first notice went to a newspaper out of the area.

Summary of permit modifications:

- A separate effluent page for the dewatering of the ash ponds (Outfall 002) was added to the permit.
- Outfall 001 was reinstated to monitor discharge of seeps and stormwater.
- A new internal outfall (Outfall 011) was added to the permit to monitor the discharge from the proposed FGD treatment system.
- Special Condition A.(14) that prohibited the discharge of cooling tower blowdown from outfall 005 to the discharge canal was eliminated from the permit.
- A special condition was added to describe Section 316(b) requirements for submittal of applicable information.
- A special condition was added to the permit to require an Ash Pond Closure Plan.
- A Special Condition was added to the permit to require compliance with Senate Bill 729 (Coal Ash Management Act).
- Attachment 1 entitled "Groundwater Monitoring Plan" was added to the permit.
- Attachment 2 entitled "Plan for Identification of New Discharges" was added to the permit.

Summary of modifications to October 2016 permit:

- Condition A. (1) Effluent Limitations and Monitoring Requirements for seeps – monitoring requirements were updated to include the same list of parameters monitored for seeps in other Duke permits.
- Condition A. (2) Effluent Limitations and Monitoring Requirements for the ash basin – monitoring was added for arsenic, molybdenum, and chromium. In addition, a statement was added with the requirement to use physical/chemical treatment during dewatering.
- Condition A. (2) & A. (3) Effluent Limitations and Monitoring Requirements for the ash basin– Statement regarding no discharge of fly ash was modified to read that no discharge of fly ash is allowed. The statement pertaining to the schedule of compliance with the ELG for zero discharge of bottom ash was corrected to read April 30, 2021 instead of November 1, 2018.
- Condition A. (10) & A. (11) Effluent Limitations and Monitoring Requirements for the FGD - footnote 3 was corrected to read December 31, 2023.
- Turbidity sampling was eliminated from internal outfall 002. Turbidity monitoring is included at outfall 003.
- Supplement to cover sheet was modified to include flows that were not listed and add proposed outfalls and outfalls.
- Condition A. (6) Effluent Limitations and Monitoring Requirements outfall 006:
    - Oil and Grease limits were added since it receives truck wash waters.
    - The RPA was revised and limits for total selenium were added.
- Condition A. (4) Effluent Limitations and Monitoring Requirements for outfall 003:
    - Footnote 4 was modified to include a statement regarding the addition of temperature limits if the facility is not in compliance with the temperature water quality standard.
    - Reporting of the temperature at the afterbay station was added to the monitoring requirements for outfall 003, reporting of temperature at 4C, 4D was eliminated.
    - The RPA was revised and limits for thallium were added.
- Condition A. (17)- temperature reporting requirements were modified.

- A. (8) Effluent Limitations and Monitoring Requirements for outfall 008 – monitoring requirements were modified to require quarterly monitoring for one year after the new plant start operations, annual monitoring is required after one year of quarterly monitoring.
- Two new internal outfalls (Outfall 012A and 012B) were added to the permit for the two proposed retention basins for the treatment of low volume wastes that are now sent to the ash basin. Duke will build two separate wastewater treatment systems to handle the wastes that go to the ash pond. These ponds will be in different locations in the site and will require each a separate outfall into the effluent channel.
- Outfall 012C was added to the permit for the emergency overflow of the proposed lined retention basin discharging through outfall 012B.
- A table including a list of all the seeps locations was added to Condition A. (14).

Modifications to January 2017 draft permit:

- Seeps special condition was eliminated. Seeps will be addresses through Special Order by Consent EMC SOC WQ S18-005.
- The groundwater monitoring well construction and sampling condition was eliminated from the permit.
- A footnote was added to outfalls 001 and 003 that requires that the discharge from the decanting/dewatering operations is discontinued if any of the identified pollutants reaches 85% of the allowable concentrations.
- Requirements for Outfall 001 were modified. The outfall location was established at the UT to Hyco Lake. Monitoring was increased to weekly during the removal of the ash from the east ash basin extension.
- RPA for outfall 003 was revised using updated thallium criteria. As a result of the RPA no limit for thallium is necessary.
- Monitoring frequency for arsenic, selenium and mercury at outfall 003 was increased to weekly during dewatering.
- The note for outfall 002 that contained the requirement to use physical-chemical treatment during decanting and dewatering was modified. The installation of physical/chemical treatment is not required unless necessary to meet the water quality standards.
- Outfall 006 requirements were modified to reflect the nature of the discharge. This pond discharge is episodic, it only discharges if there is a heavy rain event, therefore limits were implemented as daily maximums.
- pH limits were eliminated from internal outfalls.
- The flow page for 0.15 MGD for the domestic treatment system (outfall 008) was eliminated since the WWTP was upgraded to 0.25 MGD.
- Monitoring for arsenic, mercury, antimony, copper, molybdenum and selenium were added to Outfall 012A due to the contribution from ash basin closure flows and treated groundwater.
- The schedule of compliance to meet FGD ELG limits was modified to December 31, 2021.
- The Groundwater Monitoring Well Construction and Sampling condition was eliminated.
- Special condition A. (28) Compliance Boundary was added to the permit. Groundwater compliance boundary maps were added to the permit as Attachment A and B. Attachment A describes the current compliance boundary and Attachment B describes the compliance boundary once the ash is removed from the East Ash Basin Extension.
- Special condition for instream sampling was modified to require monthly sampling, to add sulfides to the list of monitored parameters and to specify the sampling location.
- Fish tissue monitoring special condition was modified to clarify requirements.
- For clarification the identification of outfall 003 was modified to heated water discharge pond.
- The special condition for 316(b) requirements was modified to include a schedule to submit the required information in 122.21(r) by May 31, 2022.

STATE CONTACT
If you have any questions on any of the above information or on the attached permit, please contact - Sergei Chernikov at (919) 707-3606.

Changes in the Final Permit:

- Monitoring for Fecal Coliforms and BOD were eliminated from Outfall 012B and Outfall 012C to correct an error, these parameters are monitored at Outfall 008 (domestic package plant).

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

4. The

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

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:

Parameter	**Value**	**Comments (Data Source)**
Average Effluent Hardness (mg/L) [Total as, $CaCO_3$ or (Ca+Mg)]	25.0	Default value
Average Upstream Hardness (mg/L) [Total as, $CaCO_3$ or (Ca+Mg)]	25.0	Default value
7Q10 summer (cfs)	0	Lake or Tidal
1Q10 (cfs)	0	Lake or Tidal
Permitted Flow (MGD)	2.1	For dewatering