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):	Lake	Primary SIC Code:	4911
Summer 7Q10 (cfs)	0	Regional Office:	RRO
30Q2 (cfs):	0	Quad	Olive Hill
Average Flow (cfs):	0	Permit Writer:	Teresa Rodriguez
IWC (%):	100%	Date:	1/5/2017

Summary
The Roxboro Steam Electric Plant is an electric generating facility that uses steam turbine generation (via four coal-fired units with a total net capacity of 2558 MW). Units No. 1 and 2 (385 MWe and 670 MWe, respectively) use condensers as cooling devices. Units No. 3 and 4 (707MWe and 700 MWe, respectively) use cooling towers as cooling devices.

The facility has three existing cooling water intake structures (CWISs). The source water for CWISs No. 1 and 2 is the Hyco Reservoir. The source water for CWIS no. 4 is the site's cooling canal. The facility total intake is approximately 1,114 MGD. The facility discharges to subbasin 030205 in the Roanoke River Basin. 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 Discharge Canal (outfall 003). The Discharge Canal and Coal Pile Runoff (outfall 006) both discharge to Hyco Reservoir. The Hyco Reservoir is a 17.6 km² 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.

The facility operates five internal outfalls and two outfalls to Hyco Reservoir. 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 seeps and stormwater.

Description of existing outfalls:

- **Outfall 003** – Heated Discharge Canal to Hyco Reservoir. The discharge canal 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 canal.

- **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.

- **Internal Outfall 002** – Ash Pond discharging to the discharge canal. 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 (Seeps) – Stormwater and four seeps from the ash landfill flow to the intake canal through a common outfall. This outfall was at one time permitted in a previous permit as outfall 001 and will be reinstated to monitor the seeps.
- Internal Outfalls 012A and 012B - Low volume waste and other wastewaters. Duke will build two basin treatment systems to treat wastewaters that now go to the ash basin.

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 with the next renewal application.

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.

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, 2018, 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 and copper.

Ash Pond Dams:
Seepage through earthen dams is common and is an expected consequence of impounding water with an earthen embankment. Even the tightest, best-compacted clays cannot prevent some water from seeping through them. Seepage is not necessarily an indication that a dam has structural problems, but should be kept in check through various engineering controls and regularly monitored for changes in quantity or quality which, over time, may result in dam failure.

Outfall 003 – Discharge Canal (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.
- Limit: The following parameter will receive a limit since it demonstrated reasonable potential to exceed the applicable water quality standards/criteria: thallium.

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	0.24 µg/l Daily max limit 0.24 µg/l Monthly Max	Based on results from RPA.
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
pH	6 to 9 SU		40 CFR 423.12 (b) (1)
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 permit doesn't allow the discharge of the cooling tower blowdown to the discharge canal, 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 canal. 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 canal.

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.

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	Added Monthly average limit of 30 mg/l	40 CFR 423.12(b)(9), 40 CFR 122.45
pH	6 to 9 SU	No changes	40 CFR 423.12 (b) (1)
Total selenium	No requirement	5.0 µg/l Monthly Average 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	Add effluent page for 0.025 MGD	WWTP will be upgraded during this permit cycle
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, 2018 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 and design 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, 2023. 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:

Seeps:
The facility identified 16 unpermitted seeps. The following seeps from the ash landfill discharge through a common outfall to Hyco Reservoir at the intake canal: S-09, S-10, S-11, and S-12. The outfall used to be the authorized outfall for the effluent from the old ash basin. The seep flow into a concrete culvert and channel that leads to the intake canal. An effluent channel determination was conducted by the Raleigh Regional Office staff on December 15, 2016.

Seeps S-01, S-02, S-03, S-04, S-05, S-06, S-07, S-08, S-14, S-18, and S-19 are internal to outfall 003. Seeps 1 through 7 are chimney drains from the ash basin dam. The flow from the combined seeps account for less than 0.0005 % of the total discharge. These are considered de-minimum discharges and will be included in the authorized wastewaters discharging through outfall 003.
Outfall 001
Four seeps discharge to the intake canal at Hyco Reservoir where former Outfall 001 used to discharged. The Division will reinstate outfall 001 to monitor the discharge from the seeps and stormwater. The following seeps discharge through outfall 001: S-09, S-10, S-11, and S-12.

RPA
A 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: fluoride, arsenic, sulfate and selenium.

Mercury
Mercury data was collected for the seeps 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.

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, and limits as described in Table 18.

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 copper, total antimony, total lead, total zinc, total barium, total iron, total manganese, total nickel, total mercury, chlorides	Monitor	Coal ash parameters of concern.
Fluoride	Limit – 1.8 mg/l	RPA
Total Arsenic	Limit – 10 µg/l	RPA
Total Selenium	Limits 5 µg/l Monthly Average 56 µg/l Daily Max	RPA
Sulfates	Limit – 250 mg/l (Monthly average & 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 Systems:

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 leachate, silo wash water, contact and non-contact storm water and discharging to the discharge canal.

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)

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 – The basin discharging through 012B will have an emergency overflow
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	Monitor	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 is being published 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 the first draft 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).

Public Notice schedule:
Draft permit to Public Notice: January 22, 2017
Permit Scheduled to issue: March 10, 2017

STATE CONTACT
If you have any questions on any of the above information or on the attached permit, please contact Teresa Rodriguez at (919) 807-6387.

NAME: _____ DATE: 1/18/17

Duke Energy
NC0003425

Freshwater RPA - 95% Probability/95% Confidence Using Metal Translators

MAXIMUM DATA POINTS = 58

Outfall Seeps 9 -13
Qw = 2.3 MGD

Qw (MGD) = **2.30**
1Q10S (cfs) = **0.00**
7Q10S (cfs) = **0.00**
7Q10W (cfs) = **0.00**
30Q2 (cfs) = **0.00**
Avg. Stream Flow, QA (cfs) = **0.00**
Receiving Stream: **NO HUC NUMBER**

WWTP/WTP Class: **Roxboro**
IWC% @ 1Q10S = **100**
IWC% @ 7Q10S = **100**
IWC% @ 7Q10W = **100**
IWC% @ 30Q2 = **100**
IW%C @ QA = **100**
Stream Class: **WS**

COMBINED HARDNESS (mg/L)
Acute = 99 mg/L
Chromic = 99 mg/L
YOU HAVE DESIGNATED THIS RECEIVING STREAM AS WATER SUPPLY
Effluent Hard:3 val > 100 mg/L 1 val < 25 mg/L default 99 mg/L (Effluent Hard Med = 100 mg/L)

PARAMETER	TYPE (1)	STANDARDS & CRITERIA (2)			PQL	UNITS	REASONABLE POTENTIAL RESULTS				RECOMMENDED ACTION
		NC WQS / Chronic	Applied Standard	½ FAV / Acute			n	# Det.	Max Pred Cw	Allowable Cw	
Arsenic	C	150	FW	340		ug/L	8	7	48.3 Default C.V.	Acute (FW): 340.0 Chronic (FW): 150.0 No value > Allowable Cw	Limit
Arsenic	C	10	HH/WS			ug/L	Note: n ≤ 9 Limited data set			Chronic (HH): 10.0 2 value(s) > Allowable Cw	
Beryllium	NC	6.5	FW	65		ug/L	0	0	N/A	Acute: 65.00 Chronic: 6.50	
Cadmium	NC	1.6678	TR	6.6897		ug/L	8 Note: n ≤ 9 Limited data set	0	*NO DETECTS*	Acute: 6.690 Chronic: 1.668 Max MDL = 1	
Chlorides	NC	250	WS			mg/L	0	0	N/A	Acute: NO WQS Chronic: 250.0	
Chromium III	NC	363.4201	FW	2793.8313		µg/L	0	0	N/A	Acute: 2,793.8 Chronic: 363.4	
Chromium VI	NC	11	FW	16		µg/L	0	0	N/A	Acute: 16.0 Chronic: 11.0	
Chromium, Total	NC					µg/L	8 Note: n ≤ 9 Limited data set	1	4.9 Default C.V.		Monitor
Copper	NC	25.5442	FW	38.2981		ug/L	8 Note: n ≤ 9 Limited data set	6	8.36 Default C.V.	Acute: 38.30 Chronic: 25.54 No value > Allowable Cw	Monitor
Cyanide	NC	5	FW	22	10	ug/L	0	0	N/A	Acute: 22.0 Chronic: 5.0	

Fluoride	NC	1800	FW			ug/L	6 4 Note: n ≤ 9 Limited data set	2,140.0 Default C.V.	Acute: NO WQS Chronic: 1,800.0 No value > Allowable Cw	limit
Lead	NC	13.5358	FW	347.3518		ug/L	8 1 Note: n ≤ 9 Limited data set	3.971 Default C.V.	Acute: 347.352 Chronic: 13.536 No value > Allowable Cw	Monitor
Mercury	NC	12	FW		0.5	ng/L	8 3 Note: n ≤ 9 Limited data set	950.0 Default C.V.	Acute: NO WQS Chronic: 12.0 5 value(s) > Allowable Cw	
Molybdenum	NC	2000	HH			ug/L	8 7 Note: n ≤ 9 Limited data set	209.0 Default C.V.	Acute: NO WQS Chronic: 2,000.0 No value > Allowable Cw	
Nickel	NC	119.2776	FW	1073.9039		µg/L	8 8 Note: n ≤ 9 Limited data set	6.8 Default C.V.	Acute (FW): 1,073.9 Chronic (FW): 119.3 No value > Allowable Cw	
Nickel	NC	25.0000	WS			µg/L			Chronic (WS): 25.0 No value > Allowable Cw	
Selenium	NC	5	FW	56		ug/L	8 3 Note: n ≤ 9 Limited data set	119.5 Default C.V.	Acute: 56.0 Chronic: 5.0 1 value(s) > Allowable Cw	Limit
Silver	NC	0.06	FW	3.1616		ug/L	0 0	N/A	Acute: 3.162 Chronic: 0.060	
Zinc	NC	406.7415	FW	403.4414		ug/L	8 1 Note: n ≤ 9 Limited data set	9.5 Default C.V.	Acute: 403.4 Chronic: 406.7 No value > Allowable Cw	Monitor
Sulfates	NC	250	WS			mg/L	8 8 Note: n ≤ 9 Limited data set	1,349.00000 Default C.V.	Acute: NO WQS Chronic: 250.00000 2 value(s) > Allowable Cw	Limit
							0 0	N/A	Acute: Chronic:	
							0 0	N/A	Acute: Chronic:	
							0 0	N/A	Acute: Chronic:	

Freshwater RPA - 95% Probability/95% Confidence Using Metal Translators

MAXIMUM DATA POINTS = 58

REQUIRED DATA ENTRY

CHECK WQS

Table 1. Project Information

	☐ CHECK IF HQW OR ORW WQS
Facility Name	Duke Energy
WWTP/WTP Class	Roxboro
NPDES Permit	NC0003425
Outfall	Seeps 9 -13
Flow, Qw (MGD)	2.300
Receiving Stream	Hyco Reservoir
HUC Number	
Stream Class	WS
☑ Apply WS Hardness WQC	
7Q10s (cfs)	0.00
7Q10w (cfs)	0.00
30Q2 (cfs)	0.00
QA (cfs)	0.00
1Q10s (cfs)	0.00
Effluent Hardness (Median)	default 99 mg/L (Effluent Hard Med = 100 mg/L)
Upstream Hardness	99 mg/L (Average)
Combined Hardness Chronic	99 mg/L
Combined Hardness Acute	99 mg/L
Data Source(s)	
☐ CHECK TO APPLY MODEL	

Table 2. Parameters of Concern

	Name	WQS	Type	Chronic	Modifier	Acute	PQL	Units
Par01	Arsenic	Aquactic Life	C	150	FW	340		ug/L
Par02	Arsenic	Human Health Water Supply	C	10	HH/WS	N/A		ug/L
Par03	Beryllium	Aquatic Life	NC	6.5	FW	65		ug/L
Par04	Cadmium	Trout	NC	1.6678	TR	6.6897		ug/L
Par05	Chlorides	Water Supply	NC	250	WS			mg/L
Par06	Chlorinated Phenolic Compounds	Water Supply	NC	1	A			ug/L
Par07	Total Phenolic Compounds	Aquatic Life	NC	300	A			ug/L
Par08	Chromium III	Aquatic Life	NC	363.4201	FW	2793.8313		ug/L
Par09	Chromium VI	Aquatic Life	NC	11	FW	16		µg/L
Par10	Chromium, Total	Aquatic Life	NC	N/A	FW	N/A		µg/L
Par11	Copper	Aquatic Life	NC	25.5442	FW	38.2981		ug/L
Par12	Cyanide	Aquatic Life	NC	5	FW	22	10	ug/L
Par13	Fluoride	Aquatic Life	NC	1,800	FW			ug/L
Par14	Lead	Aquatic Life	NC	13.5358	FW	347.3518		ug/L
Par15	Mercury	Aquatic Life	NC	12	FW		0.5	ng/L
Par16	Molybdenum	Human Health	NC	2000	HH			ug/L
Par17	Nickel	Aquatic Life	NC	119.2776	FW	1073.9039		µg/L
Par18	Nickel	Water Supply	NC	25.0000	WS	N/A		µg/L
Par19	Selenium	Aquatic Life	NC	5	FW	56		ug/L
Par20	Silver	Aquatic Life	NC	0.06	FW	3.1616		ug/L
Par21	Zinc	Aquatic Life	NC	406.7415	FW	403.4414		ug/L
Par22	Sulfates	Water Supply	NC	250	WS			mg/L
Par23								
Par24								

REASONABLE POTENTIAL ANALYSIS

Effluent Hardness (monthly average)

Use "PASTE SPECIAL-Values" then "COPY". Maximum data points = 58

Date	Data	BDL=1/2DL	Results	
	100	100	Std Dev.	317.2953
8/26/2014	21	21	Mean	254.6000
	799	799	C.V. (default)	0.6000
	265	265	n	5
	88	88	10th Per value	47.80 mg/L
			Median Value =	99.00 mg/L
			Max. Value	799.00 mg/L

H2 — Upstream Hardness

Use "PASTE SPECIAL-Values" then "COPY". Maximum data points = 58

	Date	Data	BDL=1/2DL	Results	
1		100	100	Std Dev.	N/A
2				Mean	100.0000
3				C.V.	0.0000
4				n	1
5				10th Per value	100.00 mg/L
6				Average Value	99.00 mg/L
7				Max. Value	100.00 mg/L
8					
9					
10					
11					
12					
13					

Par01 & Par02 — Arsenic

Use "PASTE SPECIAL-Values" then "COPY". Maximum data points = 58

	Date	Data	BDL=1/2DL	Results	
1		2.06	2.06	Std Dev.	8.7912
2		1.31	1.31	Mean	7.4150
3		< 1	0.5	C.V. (default)	0.6000
4		25.4	25.4	n	8
5		1.7	1.7		
6		15.7	15.7	Mult Factor =	1.90
7		6.54	6.54	Max. Value	25.4 ug/L
8		6.11	6.11	Max. Pred Cw	48.3 ug/L
9					
10					
11					
12					
13					

REASONABLE POTENTIAL ANALYSIS

Par04

Cadmium

Use "PASTE SPECIAL" Values" then "COPY" . Maximum data points = 58

	Date	Data		BDL=1/2DL	Results	
1		<	1	0.5	Std Dev.	0.0000
2		<	1	0.5	Mean	0.5000
3		<	1	0.5	C.V.	0.0000
4		<	1	0.5	n	8
5		<	1	0.5		
6		<	1	0.5	Mult Factor =	1.00
7		<	1	0.5	Max. Value	0.500 ug/L
8		<	1	0.5	Max. Pred Cw	O DETECTS ug/L
9						
10						
11						
12						
13						

Par10

Chromium, Total

Use "PASTE SPECIAL" Values" then "COPY" . Maximum data points = 58

	Date	Data		BDL=1/2DL	Results	
1		<	1	0.5	Std Dev.	0.7319
2		<	1	0.5	Mean	0.7588
3		<	1	0.5	C.V. (default)	0.6000
4			2.57	2.57	n	8
5		<	1	0.5		
6		<	1	0.5	Mult Factor =	1.90
7		<	1	0.5	Max. Value	2.6 µg/L
8		<	1	0.5	Max. Pred Cw	4.9 µg/L
9						
10						
11						
12						
13						

Pa11

Copper

Use "PASTE SF" Values" then "' . Maximum points = 5

	Date	Data		BDL=1/2DL	Results	
1			1.44	1.44	Std Dev.	1.2379
2			1.69	1.69	Mean	1.5538
3		<	1	0.5	C.V. (default)	0.6000
4			4.4	4.4	n	8
5			1.3	1.3		
6		<	1	0.5	Mult Factor =	1.90
7			1.6	1.6	Max. Value	4.40
8			1	1	Max. Pred Cw	8.36
9						
10						
11						
12						
13						

REASONABLE POTENTIAL ANALYSIS

ECIAL COPY" ata		Par13				Use "PASTE SPECIAL Values" then "COPY" . Maximum data points = 58	Par14					Use "PASTE SPECIAL Values" then "COPY" . Maximum data points = 58	Par15				
		Fluoride					Lead						Mercury				
		Date	Data	BDL=1/2DL	Results			Date	Data	BDL=1/2DL	Results			Date	Data	BDL=1/2DL	Results
	1		230	230	Std Dev.	333.6265	1		< 1	0.5	Std Dev.	0.5621	1		< 0.5	0.25	Std Dev.
	2		100	100	Mean	376.6667	2		< 1	0.5	Mean	0.6988	2		0.632	0.632	Mean
	3				C.V. (default)	0.6000	3		< 1	0.5	C.V. (default)	0.6000	3		< 1000	500	C.V. (default)
	4		1000	1000	n	6	4		2.09	2.09	n	8	4		< 1000	500	n
	5		< 500	250			5		< 1	0.5			5		< 1000	500	
	6		180	180	Mult Factor =	2.14	6		< 1	0.5	Mult Factor =	1.90	6		< 1000	500	Mult Factor =
ug/L	7		< 1000	500	Max. Value	1000.0 ug/L	7		< 1	0.5	Max. Value	2.090 ug/L	7		13.8	13.8	Max. Value
ug/L	8				Max. Pred Cw	2140.0 ug/L	8		< 1	0.5	Max. Pred Cw	3.971 ug/L	8		6.15	6.15	Max. Pred Cw
	9						9						9				
	10						10						10				
	11						11						11				
	12						12						12				
	13						13						13				

REASONABLE POTENTIAL ANALYSIS

Use "PASTE SPECIAL-Values" then "COPY". Maximum data points = 58

264.5099
252.6040
0.6000
8

1.90
500.0 ng/L
950.0 ng/L

Par16

Molybdenum

	Date	Data	BDL=1/2DL	Results
1		54.6	54.6	Std Dev.
2		35.6	35.6	Mean
3		< 1	0.5	C.V. (default)
4		106	106	n
5		38	38	
6		110	110	Mult Factor =
7		14.3	14.3	Max. Value
8		87	87	Max. Pred Cw
9				
10				
11				
12				
13				

Use "PASTE SPECIAL-Values" then "COPY". Maximum data points = 58

41.2964
55.7500
0.6000
8

1.90
110.0 ug/L
209.0 ug/L

Par17 & Par18

Nickel

	Date	Data	BDL=1/2DL	Results
1		< 1.0	0.5	Std Dev.
2		< 1.0	0.5	Mean
3		< 1.0	0.5	C.V. (default)
4		3.6	3.6	n
5		< 1.0	0.5	
6		< 1	0.5	Mult Factor =
7		1.1	1.1	Max. Value
8		< 1	0.5	Max. Pred Cw
9				
10				
11				
12				
13				

Use "PASTE SPECIAL-Values" then "COPY". Maximum data points = 58

1.0862
0.9625
0.6000
8

1.90
3.6 µg/L
6.8 µg/L

Par19

Selenium

	Date	Data	BDL=1/2DL
1		2.18	2.18
2		< 1	0.5
3		< 1	0.5
4		62.9	62.9
5		< 1	0.5
6		1.86	1.86
7		< 1	0.5
8		< 1	0.5
9			
10			
11			
12			
13			

REASONABLE POTENTIAL ANALYSIS

	Use "PASTE SPECIAL Values" then "COPY" . Maximum data points = 58
Results	
Std Dev.	21.9191
Mean	8.6800
C.V. (default)	0.6000
n	8
Mult Factor =	1.90
Max. Value	62.9 ug/L
Max. Pred Cw	119.5 ug/L

Par21

Zinc

	Date	Data		BDL=1/2DL
1		<	5	2.5
2		<	5	2.5
3		<	5	2.5
4		<	5	2.5
5		<	5	2.5
6		<	5	2.5
7			5	5
8		<	5	2.5
9				
10				
11				
12				
13				

	Use "PASTE SPECIAL Values" then "COPY" . Maximum data points = 58
Results	
Std Dev.	0.8839
Mean	2.8125
C.V. (default)	0.6000
n	8
Mult Factor =	1.90
Max. Value	5.0 ug/L
Max. Pred Cw	9.5 ug/L

Par22

sulfates

	Date	Data	BDL=1/2DL
1		210	210
2		150	150
3		1.6	1.6
4		710	710
5		190	190
6		66	66
7		290	290
8		220	220
9			
10			
11			
12			
13			

	Use "PASTE SPECIAL Values" then "COPY" . Maximum data points = 58
Results	
Std Dev.	214.3301
Mean	229.7000
C.V. (default)	0.6000
n	8
Mult Factor =	1.90
Max. Value	710.000000 mg/L
Max. Pred Cw	########## mg/L

Roxboro Steam Electric Plant
NC0003425

Freshwater RPA - 95% Probability/95% Confidence Using Metal Translators

MAXIMUM DATA POINTS = 58

Outfall 003
Qw = 1109 MGD

Qw (MGD) = **1109.00**
1Q10S (cfs) = **0.00**
7Q10S (cfs) = **0.00**
7Q10W (cfs) = **0.00**
30Q2 (cfs) = **0.00**
Avg. Stream Flow, QA (cfs) = **0.00**
Receiving Stream: **NO HUC NUMBER**

WWTP/WTP Class:
IWC% @ 1Q10S = **100**
IWC% @ 7Q10S = **100**
IWC% @ 7Q10W = **100**
IWC% @ 30Q2 = **100**
IW%C @ QA = **100**
Stream Class: **WS**

COMBINED HARDNESS (mg/L)
Acute = 25 mg/L
Chromic = 25 mg/L
YOU HAVE DESIGNATED THIS RECEIVING STREAM AS WATER SUPPLY
Effluent Hard:0 val > 100 mg/L 0 val < 25 mg/L
Effluent Hard Med = 25 mg/L

USE MENU BUTTON TO SELECT POSSIBLE "RECOMMENDED ACTION"

PAR #	PARAMETER	TYPE (1)	STANDARDS & CRITERIA (2)			PQL	UNITS	REASONABLE POTENTIAL RESULTS				RECOMMENDED ACTION
			NC WQS / Chronic	Applied Standard	½ FAV / Acute			n	# Det.	Max Pred Cw	Allowable Cw	
1	Arsenic	C	150	FW	340		ug/L	58	6	5.0	Acute (FW): 340.0 Chronic (FW): 150.0 No value > Allowable Cw	No RP, > 50% of allowable. Monitor Quarterly
2	Arsenic	C	10	HH/WS			ug/L				Chronic (HH): 10.0 No value > Allowable Cw	
3	Beryllium	NC	6.5	FW	65		ug/L	0	0	N/A	Acute: 65.00 Chronic: 6.50	
4	Cadmium	NC	0.5899	FW	3.2396		ug/L	0	0	N/A	Acute: 3.240 Chronic: 0.590	
5	Chlorides	NC	250	WS			mg/L	36	35	134.1	Acute: NO WQS Chronic: 250.0 No value > Allowable Cw	No RP, > 50% of allowable. Monitor Quarterly
6	Chlorinated Phenolic Compounds	NC	1	A			ug/L	0	0	N/A	Acute: NO WQS Chronic: 1.0	
7	Total Phenolic Compounds	NC	300	A			ug/L	0	0	N/A	Acute: NO WQS Chronic: 300.0	
8	Chromium III	NC	117.7325	FW	905.0818		µg/L	0	0	N/A	Acute: 905.1 Chronic: 117.7	
9	Chromium VI	NC	11	FW	16		µg/L	0	0	N/A	Acute: 16.0 Chronic: 11.0	
10	Chromium, Total	NC					µg/L	0	0	N/A		
11	Copper	NC	7.8806	FW	10.4720		ug/L	36	0	*NO DETECTS*	Acute: 10.47 Chronic: 7.88	No RP

Roxboro Steam Electric Plant
NC0003425

Freshwater RPA - 95% Probability/95% Confidence Using Metal Translators

Outfall 003
Qw = 1109 MGD

											Max MDL = 5	
17	Nickel	NC	37.2313	FW	335.2087		µg/L	36	36	1.5	Acute (FW): 335.2 Chronic (FW): 37.2 No value > Allowable Cw	No RP
18	Nickel	NC	25.0000	WS			µg/L				Chronic (WS): 25.0 No value > Allowable Cw	
19	Selenium	NC	5	FW	56		ug/L	36	36	4.1	Acute: 56.0 Chronic: 5.0 No value > Allowable Cw	No RP, > 50% of allowable. Monitor Quarterly
21	Zinc	NC	126.7335	FW	125.7052		ug/L	36	7	113.4	Acute: 125.7 Chronic: 126.7 No value > Allowable Cw	No RP
22	thallium	NC	0.24	WS			µg/L	37	1	0.28250	Acute: NO WQS Chronic: 0.24000 1 value(s) > Allowable Cw	RP, limit
23	Strontium	NC	14000	WS			µg/L	36	36	271.36000	Acute: NO WQS Chronic: 14000.00000 No value > Allowable Cw	No RP
24								0	0	N/A	Acute: Chronic:	
25								0	0	N/A	Acute: Chronic:	

Freshwater RPA - 95% Probability/95% Confidence Using Metal Translators

MAXIMUM DATA POINTS = 58

C *REQUIRED DATA ENTRY*

Table 1. Project Information

	☐ CHECK IF HQW OR ORW WQS
Facility Name	Roxboro Steam Electric Plant
WWTP/WTP Class	
NPDES Permit	NC0003425
Outfall	003
Flow, Qw (MGD)	1109.000
Receiving Stream	Hyco Reservoir
HUC Number	
Stream Class	WS
☑ Apply WS Hardness WQC	
7Q10s (cfs)	0.00
7Q10w (cfs)	0.00
30Q2 (cfs)	0.00
QA (cfs)	0.00
1Q10s (cfs)	0.00
Effluent Hardness (Median)	25 mg/L
Upstream Hardness	99 mg/L (Average)
Combined Hardness Chronic	25 mg/L
Combined Hardness Acute	25 mg/L
Data Source(s)	
☐ CHECK TO APPLY MODEL	

Table 2. Parameters of Concern

	Name	WQS	Type	Chronic	Modifier	Acute	PQL	Units
Par01	Arsenic	Aquactic Life	C	150	FW	340		ug/L
Par02	Arsenic	Human Health Water Supply	C	10	HH/WS	N/A		ug/L
Par03	Beryllium	Aquatic Life	NC	6.5	FW	65		ug/L
Par04	Cadmium	Aquatic Life	NC	0.5899	FW	3.2396		ug/L
Par05	Chlorides	Water Supply	NC	250	WS			mg/L
Par06	Chlorinated Phenolic Compounds	Water Supply	NC	1	A			ug/L
Par07	Total Phenolic Compounds	Aquatic Life	NC	300	A			ug/L
Par08	Chromium III	Aquatic Life	NC	117.7325	FW	905.0818		ug/L
Par09	Chromium VI	Aquatic Life	NC	11	FW	16		µg/L
Par10	Chromium, Total	Aquatic Life	NC	N/A	FW	N/A		µg/L
Par11	Copper	Aquatic Life	NC	7.8806	FW	10.4720		ug/L
Par12	Cyanide	Aquatic Life	NC	5	FW	22	10	ug/L
Par13	Fluoride	Aquatic Life	NC	1,800	FW			ug/L
Par14	Lead	Aquatic Life	NC	2.9416	FW	75.4871		ug/L
Par15	Mercury	Aquatic Life	NC	12	FW		0.5	ng/L
Par16	Molybdenum	Water Supply	NC	160	WS			ug/L
Par17	Nickel	Aquatic Life	NC	37.2313	FW	335.2087		µg/L
Par18	Nickel	Water Supply	NC	25.0000	WS	N/A		µg/L
Par19	Selenium	Aquatic Life	NC	5	FW	56		ug/L
Par20	Silver	Aquatic Life	NC	0.06	FW	0.2964		ug/L
Par21	Zinc	Aquatic Life	NC	126.7335	FW	125.7052		ug/L
Par22	thallium	Water Supply	NC	0.24	WS			µg/L
Par23	Strontium	Water Supply	NC	14000	WS			µg/L
Par24								

REASONABLE POTENTIAL ANALYSIS

H1

Effluent Hardness (monthly average)

Use "PASTE SPECIAL-Values" then "COPY". Maximum data points = 58

	Date	Data	BDL=1/2DL
1		25	25
2			
3			
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Results	
Std Dev.	N/A
Mean	25.0000
C.V.	0.0000
n	1
10th Per value	25.00 mg/L
Median Value =	25.00 mg/L
Max. Value	25.00 mg/L

H2

Upstream Hardness

Use "PASTE SPECIAL-Values" then "COPY". Maximum data points = 58

	Date	Data	BDL=1/2DL
1		100	100
2			
3			
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Results	
Std Dev.	N/A
Mean	100.0000
C.V.	0.0000
n	1
10th Per value	100.00 mg/L
Average Value	99.00 mg/L
Max. Value	100.00 mg/L

Par01 & Par02

Arsenic

	Date	Data		BDL=1/2DL
1	6/7/2011		0.9	0.9
2	7/6/2011		1.4	1.4
3	8/2/2011		1.7	1.7
4	9/20/2011	<	5	2.5
5	10/4/2011	<	5	2.5
6	11/2/2011	<	5	2.5
7	12/6/2011	<	5	2.5
8	1/4/2012	<	5	2.5
9	2/7/2012	<	5	2.5
10	3/7/2012	<	5	2.5
11	4/3/2012	<	5	2.5
12	5/1/2012	<	5	2.5
13	6/5/2012	<	5	2.5
14	7/3/2012	<	5	2.5
15	8/1/2012	<	5	2.5
16	9/5/2012	<	5	2.5
17	10/3/2012	<	5	2.5
18	11/7/2012	<	5	2.5
19	12/5/2012	<	10	5
20	1/2/2013	<	10	5
21	2/12/2013	<	10	5
22	3/13/2013	<	10	5
23	4/3/2013	<	10	5
24	5/1/2013	<	10	5
25	6/6/2013	<	10	5
26	7/2/2013	<	10	5
27	8/7/2013	<	10	5
28	9/5/2013	<	10	5
29	10/3/2013	<	10	5
30	11/6/2013	<	10	5
31	12/4/2013	<	10	5
32	1/8/2014	<	10	5
33	2/5/2014	<	10	5
34	3/5/2014	<	10	5
35	3/14/2014		1.18	1.18
36	4/1/2014	<	10	5
37	5/7/2014	<	10	5
38	6/4/2014	<	10	5
39	7/2/2014	<	10	5
40	8/6/2014	<	10	5
41	9/3/2014	<	10	5
42	10/1/2014	<	10	5
43	11/5/2014	<	10	5
44	12/3/2014	<	10	5
45	1/7/2015	<	10	5
46	2/5/2015	<	10	5
47	3/4/2015	<	10	5
48	4/1/2015	<	10	5

REASONABLE POTENTIAL ANALYSIS

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49	5/6/2015	<	10	5
50	6/3/2015	<	10	5
51	7/8/2015	<	10	5
52	8/5/2015	<	10	5
53	9/2/2015	<	10	5
54	10/7/2015	<	10	5
55	11/4/2015	<	10	5
56	12/2/2015	<	10	5
57	1/5/2016		1.16	1.16
58	2/2/2016		1.02	1.02

REASONABLE POTENTIAL ANALYSIS

	Use "PASTE SPECIAL-Values" then "COPY". Maximum data points = 58	
Results		
Std Dev.	1.4341	
Mean	3.9631	
C.V.	0.3619	
n	58	
Mult Factor =	1.00	
Max. Value	5.0	ug/L
Max. Pred Cw	5.0	ug/L

REASONABLE POTENTIAL ANALYSIS

REASONABLE POTENTIAL ANALYSIS

Par05

Chlorides

Use "PASTE SPECIAL-Values" then "COPY". Maximum data points = 58

	Date	Data		BDL=1/2DL
1	3/2/2010	<	100	50
2	3/16/2010		33	33
3	4/6/2010		31.1	31.1
4	4/20/2010		3.03	3.03
5	5/4/2010		38.5	38.5
6	5/18/2010		31.6	31.6
7	6/3/2010		32.5	32.5
8	6/15/2010		38.2	38.2
9	7/6/2010		42.8	42.8
10	7/20/2010		41.4	41.4
11	8/3/2010		44.8	44.8
12	8/17/2010		56.7	56.7
13	9/7/2010		57.7	57.7
14	9/21/2010		64.4	64.4
15	10/5/2010		66.6	66.6
16	10/21/2010		69.4	69.4
17	11/2/2010		70.6	70.6
18	11/16/2010		59.6	59.6
19	12/7/2010		67.7	67.7
20	12/21/2010		77.2	77.2
21	1/4/2011		83.6	83.6
22	1/18/2011		82.7	82.7
23	2/2/2011		84.7	84.7
24	2/15/2011		90.3	90.3
25	3/1/2011		91.9	91.9
26	3/14/2011		90	90
27	4/5/2011		78.8	78.8
28	4/19/2011		73.2	73.2
29	5/3/2011		66	66
30	5/17/2011		71	71
31	6/7/2011		58.4	58.4
32	6/21/2011		67.4	67.4
33	7/6/2011		69.4	69.4
34	7/19/2011		74.4	74.4
35	8/2/2011		66.6	66.6
36	8/16/2011		123	123
37				
38				
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48				

Results	
Std Dev.	22.8474
Mean	62.5
C.V.	0.3658
n	36
Mult Factor =	1.1
Max. Value	123.0 mg/L
Max. Pred Cw	134.1 mg/L

Pa11

Copper

Use "PASTE SPECIAL-Values" then "COPY". Maximum data points = 58

	Date	Data		BDL=1/2DL
1	3/2/2010	<	5	2.5
2	3/16/2010	<	5	2.5
3	4/6/2010	<	5	2.5
4	4/20/2010	<	5	2.5
5	5/4/2010	<	5	2.5
6	5/18/2010	<	5	2.5
7	6/3/2010	<	5	2.5
8	6/15/2010	<	5	2.5
9	7/6/2010	<	5	2.5
10	7/20/2010	<	5	2.5
11	8/3/2010	<	5	2.5
12	8/17/2010	<	5	2.5
13	9/7/2010	<	5	2.5
14	9/21/2010	<	5	2.5
15	10/5/2010	<	5	2.5
16	10/21/2010	<	5	2.5
17	11/2/2010	<	5	2.5
18	11/16/2010	<	5	2.5
19	12/7/2010	<	5	2.5
20	12/21/2010	<	5	2.5
21	1/4/2011	<	5	2.5
22	1/18/2011	<	5	2.5
23	2/2/2011	<	5	2.5
24	2/15/2011	<	5	2.5
25	3/1/2011	<	5	2.5
26	3/14/2011	<	5	2.5
27	4/5/2011	<	5	2.5
28	4/19/2011	<	5	2.5
29	5/3/2011	<	5	2.5
30	5/17/2011	<	5	2.5
31	6/7/2011	<	5	2.5
32	6/21/2011	<	5	2.5
33	7/6/2011	<	5	2.5
34	7/19/2011	<	5	2.5
35	8/2/2011	<	5	2.5
36	8/16/2011	<	5	2.5
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Results	
Std Dev.	0.0000
Mean	2.5000
C.V.	0.0000
n	36
Mult Factor =	1.00
Max. Value	2.50 ug/L
Max. Pred Cw	O DETECTS ug/L

Par17 & Par18

Nickel

	Date	Data	BDL=1/2DL
1	3/2/2010	1.1	1.1
2	3/16/2010	1.3	1.3
3	4/6/2010	0.86	0.86
4	4/20/2010	< 0.5	0.25
5	5/4/2010	0.78	0.78
6	5/18/2010	< 0.5	0.25
7	6/3/2010	< 0.5	0.25
8	6/15/2010	< 0.5	0.25
9	7/6/2010	0.84	0.84
10	7/20/2010	0.66	0.66
11	8/3/2010	< 0.5	0.25
12	8/17/2010	< 0.5	0.25
13	9/7/2010	0.56	0.56
14	9/21/2010	< 0.5	0.25
15	10/5/2010	< 0.5	0.25
16	10/21/2010	1.1	1.1
17	11/2/2010	0.5	0.5
18	11/16/2010	0.54	0.54
19	12/7/2010	0.69	0.69
20	12/21/2010	0.71	0.71
21	1/4/2011	0.78	0.78
22	1/18/2011	0.76	0.76
23	2/2/2011	1	1
24	2/15/2011	0.89	0.89
25	3/1/2011	1	1
26	3/14/2011	0.8	0.8
27	4/5/2011	0.7	0.7
28	4/19/2011	0.65	0.65
29	5/3/2011	0.59	0.59
30	5/17/2011	0.69	0.69
31	6/7/2011	< 0.5	0.25
32	6/21/2011	0.54	0.54
33	7/6/2011	0.69	0.69
34	7/19/2011	< 2.5	1.25
35	8/2/2011	< 1	0.5
36	8/16/2011	< 0.5	0.25
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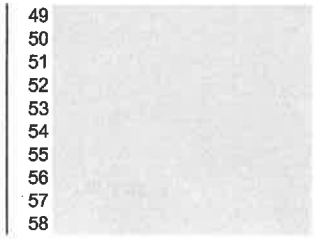
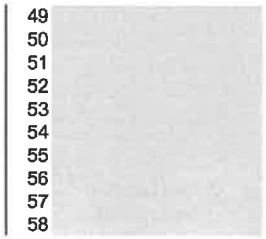
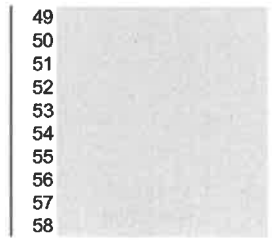
REASONABLE POTENTIAL ANALYSIS







REASONABLE POTENTIAL ANALYSIS

Use "PASTE SPECIAL-Values" then "COPY". Maximum data points = 58

Par19

Selenium

Results	
Std Dev.	0.3083
Mean	0.6383
C.V.	0.4829
n	36
Mult Factor =	1.12
Max. Value	1.3 µg/L
Max. Pred Cw	1.5 µg/L

	Date	Data	BDL=1/2DL
1	3/1/2010	1.5	1.5
2	3/16/2010	1.4	1.4
3	4/6/2010	1.5	1.5
4	4/20/2010	1.5	1.5
5	5/4/2010	1.8	1.8
6	5/18/2010	1.5	1.5
7	6/3/2010	1.5	1.5
8	6/15/2010	1.6	1.6
9	7/6/2010	1.6	1.6
10	7/20/2010	1.5	1.5
11	8/3/2010	1.8	1.8
12	8/17/2010	1.8	1.8
13	9/7/2010	1.8	1.8
14	9/21/2010	1.7	1.7
15	10/5/2010	2	2
16	10/21/2010	2.1	2.1
17	11/2/2010	2.5	2.5
18	11/16/2010	1.9	1.9
19	12/7/2010	1.8	1.8
20	12/21/2010	1.7	1.7
21	1/4/2011	1.7	1.7
22	1/18/2011	2.2	2.2
23	2/2/2011	2.3	2.3
24	2/15/2011	2.7	2.7
25	3/1/2011	2.6	2.6
26	3/14/2011	2.7	2.7
27	4/5/2011	2.4	2.4
28	4/19/2011	2.1	2.1
29	5/3/2011	2.2	2.2
30	5/17/2011	1.9	1.9
31	6/7/2011	1.9	1.9
32	6/21/2011	3.9	3.9
33	7/6/2011	1.9	1.9
34	7/19/2011	2.5	2.5
35	8/2/2011	1.9	1.9
36	8/16/2011	1.9	1.9
37			
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48			

Use "PASTE SPECIAL-Values" then "COPY". Maximum data points = 58

Par21

Zinc

Results	
Std Dev.	0.4927
Mean	1.9806
C.V.	0.2488
n	36
Mult Factor =	1.06
Max. Value	3.9 ug/L
Max. Pred Cw	4.1 ug/L

	Date	Data	BDL=1/2DL
1	3/2/2010 <	5	2.5
2	3/16/2010 <	5	2.5
3	4/6/2010 <	5	2.5
4	4/20/2010 <	5	2.5
5	5/4/2010	7.9	7.9
6	5/18/2010 <	5	2.5
7	6/3/2010 <	5	2.5
8	6/15/2010	82.8	82.8
9	7/6/2010 <	5	2.5
10	7/20/2010 <	5	2.5
11	8/3/2010 <	5	2.5
12	8/17/2010 <	5	2.5
13	9/7/2010 <	5	2.5
14	9/21/2010 <	5	2.5
15	10/5/2010 <	5	2.5
16	10/21/2010	10.1	10.1
17	11/2/2010 <	5	2.5
18	11/16/2010 <	5	2.5
19	12/7/2010 <	5	2.5
20	12/21/2010 <	5	2.5
21	1/4/2011 <	5	2.5
22	1/18/2011 <	5	2.5
23	2/2/2011	5.6	5.6
24	2/15/2011 <	5	2.5
25	3/1/2011 <	5	2.5
26	3/14/2011 <	5	2.5
27	4/5/2011 <	5	2.5
28	4/19/2011 <	5	2.5
29	5/3/2011 <	5	2.5
30	5/17/2011 <	5	2.5
31	6/7/2011	7.2	7.2
32	6/21/2011	17.5	17.5
33	7/6/2011	12	12
34	7/19/2011 <	25	12.5
35	8/2/2011 <	10	5
36	8/16/2011 <	5	2.5
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48			

Use "PASTE SPECIAL-Values" then "COPY". Maximum data points = 58

Par22

Results	
Std Dev.	13.5841
Mean	6.3361
C.V.	2.1439
n	36
Mult Factor =	1.37
Max. Value	82.8 ug/L
Max. Pred Cw	113.4 ug/L

	Date
1	3/2/2010
2	3/16/2010
3	4/6/2010
4	4/20/2010
5	5/4/2010
6	5/18/2010
7	6/3/2010
8	6/15/2010
9	7/6/2010
10	7/20/2010
11	8/3/2010
12	8/17/2010
13	9/7/2010
14	9/21/2010
15	10/5/2010
16	10/21/2010
17	11/2/2010
18	11/16/2010
19	12/7/2010
20	12/21/2010
21	1/4/2011
22	1/18/2011
23	2/2/2011
24	2/15/2011
25	3/1/2011
26	3/14/2011
27	4/5/2011
28	4/19/2011
29	5/3/2011
30	5/17/2011
31	6/7/2011
32	6/21/2011
33	7/6/2011
34	7/19/2011
35	8/2/2011
36	8/16/2011
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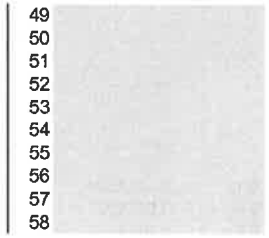
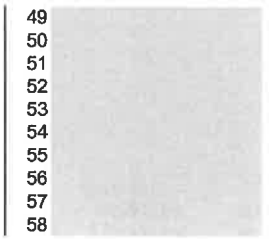
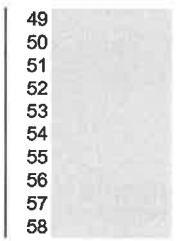
REASONABLE POTENTIAL ANALYSIS







REASONABLE POTENTIAL ANALYSIS

thallium

Use "PASTE SPECIAL Values" then "COPY" . Maximum data points = 58

Data		BDL=1/2DL	Results	
<	0.1	0.05	Std Dev.	0.0354
<	0.1	0.05	Mean	0.0597
<	0.1	0.05	C.V.	0.5926
<	0.1	0.05	n	37
<	0.1	0.05		
<	0.1	0.05	Mult Factor =	1.13
<	0.1	0.05	Max. Value	0.250000 µg/L
<	0.1	0.05	Max. Pred Cw	0.282500 µg/L
<	0.1	0.05		
<	0.1	0.05		
	0.11	0.11		
<	0.1	0.05		
<	0.1	0.05		
<	0.1	0.05		
<	0.1	0.05		
<	0.1	0.05		
<	0.1	0.05		
<	0.1	0.05		
<	0.1	0.05		
<	0.1	0.05		
<	0.1	0.05		
<	0.1	0.05		
<	0.1	0.05		
<	0.1	0.05		
<	0.1	0.05		
<	0.1	0.05		
<	0.1	0.05		
<	0.1	0.05		
<	0.1	0.05		
<	0.1	0.05		
<	0.1	0.05		
<	0.1	0.05		
<	0.1	0.05		
<	0.5	0.25		
<	0.2	0.1		
<	0.1	0.05		
<	0.2	0.1		

Par23

Strontium

Use "PASTE SPECIAL Values" then "COPY" . Maximum data points = 58

	Date	Data	BDL=1/2DL	Results	
1	3/2/2010	103	103	Std Dev.	47.6474
2	3/16/2010	110	110	Mean	188.8056
3	4/6/2010	109	109	C.V.	0.2524
4	4/20/2010	115	115	n	36
5	5/4/2010	129	129		
6	5/18/2010	118	118	Mult Factor =	1.06
7	6/3/2010	116	116	Max. Value	256.000000 µg/L
8	6/15/2010	127	127	Max. Pred Cw	271.360000 µg/L
9	7/6/2010	137	137		
10	7/20/2010	153	153		
11	8/3/2010	154	154		
12	8/17/2010	168	168		
13	9/7/2010	191	191		
14	9/21/2010	206	206		
15	10/5/2010	196	196		
16	10/21/2010	195	195		
17	11/2/2010	218	218		
18	11/16/2010	225	225		
19	12/7/2010	227	227		
20	12/21/2010	220	220		
21	1/4/2011	215	215		
22	1/18/2011	245	245		
23	2/2/2011	256	256		
24	2/15/2011	252	252		
25	3/1/2011	256	256		
26	3/14/2011	244	244		
27	4/5/2011	226	226		
28	4/19/2011	219	219		
29	5/3/2011	210	210		
30	5/17/2011	211	211		
31	6/7/2011	195	195		
32	6/21/2011	218	218		
33	7/6/2011	211	211		
34	7/19/2011	197	197		
35	8/2/2011	217	217		
36	8/16/2011	208	208		
37					
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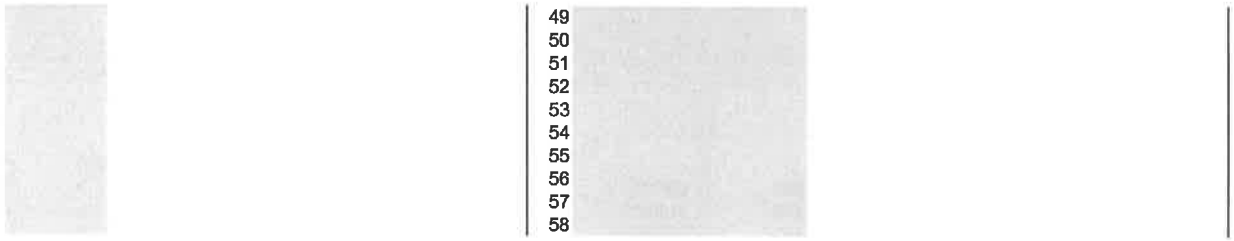
REASONABLE POTENTIAL ANALYSIS



Freshwater RPA - 95% Probability/95% Confidence Using Metal Translators

MAXIMUM DATA POINTS = 58

REQUIRED DATA ENTRY

CHECK WQS

Table 1. Project Information

☐ CHECK IF HQW OR ORW WQS

Facility Name	Roxboro
WWTP/WTP Class	
NPDES Permit	NC0003425
Outfall	006
Flow, Qw (MGD)	1.810
Receiving Stream	Hyco Lake
HUC Number	
Stream Class	WS
☑ Apply WS Hardness WQC	
7Q10s (cfs)	0.00
7Q10w (cfs)	0.00
30Q2 (cfs)	0.00
QA (cfs)	0.00
1Q10s (cfs)	0.00
Effluent Hardness (Median)	25 mg/L
Upstream Hardness	99 mg/L (Average)
Combined Hardness Chronic	25 mg/L
Combined Hardness Acute	25 mg/L
Data Source(s)	
☐ CHECK TO APPLY MODEL	
	0

Table 2. Parameters of Concern

	Name	WQS	Type	Chronic	Modifier	Acute	PQL	Units
Par01	Arsenic	Aquactic Life	C	150	FW	340		ug/L
Par02	Arsenic	Human Health Water Supply	C	10	HH/WS	N/A		ug/L
Par03	Beryllium	Aquatic Life	NC	6.5	FW	65		ug/L
Par04	Cadmium	Trout	NC	0.5899	TR	2.0145		ug/L
Par05	Chlorides	Water Supply	NC	250	WS			mg/L
Par06	Chlorinated Phenolic Compounds	Water Supply	NC	1	A			ug/L
Par07	Total Phenolic Compounds	Aquatic Life	NC	300	A			ug/L
Par08	Chromium III	Aquatic Life	NC	117.7325	FW	905.0818		ug/L
Par09	Chromium VI	Aquatic Life	NC	11	FW	16		µg/L
Par10	Chromium, Total	Aquatic Life	NC	N/A	FW	N/A		µg/L
Par11	Copper	Aquatic Life	NC	7.8806	FW	10.4720		ug/L
Par12	Cyanide	Aquatic Life	NC	5	FW	22	10	ug/L
Par13	Fluoride	Aquatic Life	NC	1,800	FW			ug/L
Par14	Lead	Aquatic Life	NC	2.9416	FW	75.4871		ug/L
Par15	Mercury	Aquatic Life	NC	12	FW		0.5	ng/L
Par16	Molybdenum	Human Health	NC	2000	HH			ug/L
Par17	Nickel	Aquatic Life	NC	37.2313	FW	335.2087		µg/L
Par18	Nickel	Water Supply	NC	25.0000	WS	N/A		µg/L
Par19	Selenium	Aquatic Life	NC	5	FW	56		ug/L
Par20	Silver	Aquatic Life	NC	0.06	FW	0.2964		ug/L
Par21	Zinc	Aquatic Life	NC	126.7335	FW	125.7052		ug/L
Par22								
Par23								
Par24								

Roxboro
NC0003425

Outfall 006
Qw = 1.81 MGD

Freshwater RPA - 95% Probability/95% Confidence Using Metal Translators

MAXIMUM DATA POINTS = 58

Qw (MGD) = **1.81**
1Q10S (cfs) = **0.00**
7Q10S (cfs) = **0.00**
7Q10W (cfs) = **0.00**
30Q2 (cfs) = **0.00**
Avg. Stream Flow, QA (cfs) = **0.00**
Receiving Stream: **NO HUC NUMBER**

WWTP/WTP Class:
IWC% @ 1Q10S = **100**
IWC% @ 7Q10S = **100**
IWC% @ 7Q10W = **100**
IWC% @ 30Q2 = **100**
IW%C @ QA = **100**
Stream Class: **WS**

COMBINED HARDNESS (mg/L)
Acute = 25 mg/L
Chromic = 25 mg/L
YOU HAVE DESIGNATED THIS RECEIVING STREAM AS WATER SUPPLY
Effluent Hard:0 val > 100 mg/L 0 val < 25 mg/L
Effluent Hard Med = 25 mg/L

PARAMETER	TYPE (1)	STANDARDS & CRITERIA (2)			PQL	UNITS	REASONABLE POTENTIAL RESULTS				RECOMMENDED ACTION
		NC WQS / Chronic	Applied Standard	½ FAV / Acute			n	# Det.	Max Pred Cw	Allowable Cw	
Selenium	NC	5	FW	56		ug/L	1 Note: n ≤ 9 Limited data set	1	5.4 Default C.V.	Acute: 56.0 Chronic: 5.0 1 value(s) > Allowable Cw	Add limit
Zinc	NC	126.7335	FW	125.7052		ug/L	1 Note: n ≤ 9 Limited data set	1	12.6 Default C.V.	Acute: 125.7 Chronic: 126.7 No value > Allowable Cw	No RP
							0	0	N/A	Acute: Chronic:	

REASONABLE POTENTIAL ANALYSIS

Par19

Selenium

Use "PASTE SPECIAL-Values" then "COPY". Maximum data points = 58

	Date	Data	BDL=1/2DL
1		5.4	5.4
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

Results	
Std Dev.	N/A
Mean	5.4000
C.V.	0.0000
n	1
Mult Factor =	1.00
Max. Value	5.4 ug/L
Max. Pred Cw	5.4 ug/L

Par21

Zinc

Use "PASTE SPECIAL-Values" then "COPY". Maximum data points = 58

	Date	Data	BDL=1/2DL
1		12.6	12.6
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

Results	
Std Dev.	N/A
Mean	12.6000
C.V.	0.0000
n	1
Mult Factor =	1.00
Max. Value	12.6 ug/L
Max. Pred Cw	12.6 ug/L

1/17/17 WQS = 12 ng/L MERCURY WQBEL/TBEL EVALUATION V:2013-5

Facility Name: Roxboro Outfall 001

Annual Limit 12 ng/L with Quarterly Monitoring

MMP Required

Total Mercury 1631E PQL = 0.5 ng/L

7Q10s = 0.000 cfs WQBEL = 12.00 ng/L

Permitted Flow = 2.300 47 ng/L

Date	Modifier	Data Entry	Value	
8/23/2014	<	1000	500	> TBEL
8/24/2014	<	1000	500	> TBEL
8/25/2014	<	1000	500	> TBEL
8/26/2014	<	1000	500	> TBEL
5/14/2015		13.8	13.8	
11/17/2015		6.15	6.15	
5/14/2015	<	0.5	0.5	
11/16/2015		0.632	0.632	

Annual Average - 5.2 ng/L < 12, no limit

1/18/17	WQS =	12	ng/L	MERCURY WQBEL/TBEL EVALUATION					V:2013-5
Facility Name:	Roxboro 003				No Limit Required				
					MMP Required				
Total Mercury 1631E PQL = 0.5 ng/L				7Q10s =	0.000	cfs	WQBEL =	12.00	ng/L
Date	Modifier	Data Entry	Value	Permitted Flow =	1109.000			47	ng/L
3/2/2010		5.96	5.96						
3/16/2010		4.97	4.97						
4/6/2010		4.19	4.19						
4/20/2010		3.61	3.61						
5/4/2010		3.8	3.8						
5/18/2010		3.36	3.36						
6/3/2010		7.63	7.63						
6/15/2010		3.67	3.67						
7/6/2010		2.75	2.75						
7/20/2010		1.7	1.7						
8/3/2010		1.32	1.32						
8/17/2010		2.33	2.33						
9/7/2010		1.52	1.52						
9/21/2010		1.99	1.99						
10/5/2010		2.28	2.28						
10/21/2010		6.42	6.42						
11/2/2010		5.14	5.14						
11/16/2010		3.51	3.51						
12/7/2010		2.05	2.05						
12/21/2010		3.18	3.18			3.6	ng/L - Annual Average for 2010		
1/4/2011		4.25	4.25						
1/18/2011		4.85	4.85						
2/2/2011		6.11	6.11						
2/15/2011		6.92	6.92						
3/1/2011		6.71	6.71						
3/14/2011		6.33	6.33						
4/5/2011		4.24	4.24						
4/19/2011		2.91	2.91						
5/3/2011		3.35	3.35						
5/17/2011		5.69	5.69						
6/7/2011		4.7	4.7						
6/21/2011		4.71	4.71						
7/6/2011		2.32	2.32						
7/19/2011		1.44	1.44						
8/2/2011		2.88	2.88						
8/16/2011		2.71	2.71			4.4	ng/L - Annual Average for 2011		