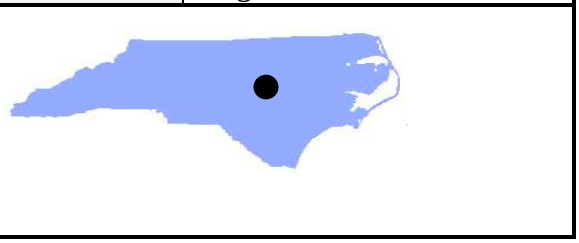
DEQ/DWR
FACT SHEET FOR NPDES PERMIT DEVELOPMENT
NPDES PERMIT NC0003433

Facility Information	
Applicant/Facility Name:	Duke Energy Progress LLC– Cape Fear Steam Electric Plant (decommissioned)
Applicant Address:	500 CP&L Road, Moncure, NC 27599
Facility Address:	500 CP&L Road, Moncure, NC 27599
Permitted Flow:	Outfall 007 – 0.73 MGD Daily Maximum Outfall 008 – 0.72 MGD Daily Maximum Outfall 009 – 0.005 MGD Daily Maximum
Type of Waste:	100% Industrial (Ash basin clean up, remediation)
Facility/Permit Status:	Class I/Renewal and Major Modification SIC 4911
County:	Chatham

Miscellaneous					
Receiving Stream			Index	7Q10s (cfs)	QA (cfs)	IWC (7Q10s)
Outfall 007 – Unnamed tributary to Cape Fear River			18-(1)	0	0	100%
Outfalls 008 – Cape Fear River			18-(1)	65	3,170	1.7%
Outfall 009 – Cape Fear River			18-(1)	65	3,170	0.012%
Outfall 008A – Cape Fear River						
Outfalls 001 & 005– Internal Outfalls						
Stream Classification:	WS-IV	Regional Office:	Raleigh		
303(d) Listed?:	No	USGS Topo Quad:	E22SE Moncure, NC		
HUC No.:	03030002	Permit Writer:	Bing Bai		
Subbasin:	03-06-07	Date:	August 22, 2018		
Cape Fear River Stream Statistics – 2016					
Drainage (mi^2):	-				
Summer – 7Q10 (cfs):	65 [1]				
Winter – 7Q10 (cfs):	89 [1]				
30Q2 (cfs):	150 [1]				
QA (cfs):	3,170 [1]				



1. Based on USGS recommendation and data

Current Status

Duke Energy's ceased operation of its combined 400 megawatts, coal-fire and combustion turbine, Cape Fear Steam Electric Plant in 2011. The plant was dismantled and no longer withdraws water from the Cape Fear River nor discharges wastewater as defined for an active operation of a steam electric generation facility. Historically, there were five ash basins, some of which contain a visible water level. As part of the current active NPDES issued in 2011, storm water was separated and is covered under its own permit.

In July 2014 Duke Energy submitted a modification application to amend permit conditions to address operation changes and update identified seeps. Duke Energy requested in February 2016 the current modification application under review be accepted as the required permit renewal application. As part of the required data to develop the permit, Duke provided documents and data associated with identified seeps, ash basin bulk water decanting/dewatering analyses, and landfill leachate analyses. Additional groundwater monitoring well analyses were obtained from the

Division's ground water unit. Based on the application amendments and data submitted through August 2016, and applicable Division guidance for this type facility, the initial draft permit was issued October 5, 2016 with a public hearing held November 28, 20016. The hearing officer extended the deadline for receiving public comments to December 5, 2016. The hearing officer's final report was delayed pending resolution of compliance boundary issues and changes in seep permitting requirements, and was issued March 2018.

The following recommendations from the hearing officer report will be implemented in this draft:

1) There will be only a single treatment system for decanting, dewatering, and groundwater remediation with a rated capacity of 0.72 MGD.
2) All required sampling types will be grab.
3) There will be no monitoring requirements for iron or magnesium.
4) Will revise the instream monitoring special condition to allow sampling to be done by the Middle Cape Fear Basin Association provided it is conducted at the locations specified in this permit.
5) Will apply USGS based flow information for this segment of the Cape Fear River to establish 7Q10, 30Q2, and QA based IWC values for Outfall 008.
6) Will re-evaluate limit requirements as determined by an RPA applying the new implemented IWC values for Outfall 008.
7) Will decrease Chronic Toxicity monitoring frequency when decanting to quarterly.
8) Revised flow measurement type to include pump logs when applicable but must use other methods defined in permit when discharge occurs and no pump are running.

The facility began a Division approved ash basin decanting as discussed and defined in the Division's December 2015 and July 2016 letters. Discharge of treated decanting wastewater was allowed through existing Outfalls 001, 005, and 007 with weekly monitoring for arsenic, selenium, mercury, chromium, lead, cadmium, copper zinc, and total dissolved solids. The decanting-based discharge cannot contravene NC Water Quality Standards (WQS) or EPA criteria.

Based on additional changes the Division determined a second draft for public comment was necessary. These changes include using USGS combined upstream flow criteria for this segment of the Cape Fear River to define instream waste concentration, adding a new outfall for proposed beneficiation facility miscellaneous wastewater discharge, removing landfill leachate wastewater criteria from outfall wastewater characterization as no landfill was to be built, limiting treated ash basin wastewater discharge to decanting only for Outfall 007, adding a ground water boundary compliance map, and implementing permit conditions for the Division updated seep strategy. The following is a summary of the final revisions from the active permit reflected in this second draft, the majority of which were originally proposed in the first draft;

- Activation of the former 1963/1970 ash basin stormwater Outfall 008 as an NPDES outfall for discharging treated ash basins decanting/dewatering/groundwater remediation wastewater from a treatment facility with a stated maximum design capacity of 0.72 MGD to the Cape Fear River.
- Approval to discharge treated ash basin's decanting wastewater from a treatment facility with a stated maximum design capacity of 0.72 MGD, defined engineering seeps, and the episodic emergency discharge from internal Outfalls 001 and 005, to the existing facility's effluent channel Outfall 007.

- Approval to discharge 0.005 MGD of beneficiation miscellaneous wastewater from a new Outfall 009 to the Cape Fear River.
- Approval to relocate Outfall 005 to a different location on the effluent channel.
- Provisions to allow for the discharge of treated decanting wastewater to Outfall 008.
- Provisions to allow for the discharge of treated dewatering wastewater to Outfall 008.
- Provisions to allow for the discharge of combined treated dewatering and treated groundwater remediation wastewater to Outfall 008.
- Provisions to allow for the discharge of treated groundwater remediation wastewater to Outfall 008, once all dewatering activity is completed.
- Provisions for repurposing existing Internal Outfalls 001 and 005 as emergency only overflow discharges for 1985 (East) and 1978 (West) Ash Basins decanting wastewater to the existing facility's effluent channel Outfall 007.
- Provisions for a new emergency only overflow Outfall 008A for 1963/1970 Ash Basin for discharging decanting wastewater to the Cape Fear River.
- Determination of constructed seep (French Drain) status, location, and entry point into effluent channel.
- Removal of all permit conditions associated with the operation of an Electric Generation Steam Plant that are no longer applicable.

The modified facility will have permitted discharges to two stream locations and an unnamed tributary to the Cape Fear River and directly to the Cape Fear River. All streams are classified as WS-IV and are not listed as impaired on the 2014 303(d) impairment list. Based on review of USGS 2016 recommendation, Outfall 007 receiving stream, the unnamed tributary to the Cape Fear River, has a 7Q10 summer flow considered to be "zero". USGS recommended using 65 cfs flow to approximate the 7Q10 summer and 95 cfs flow to approximate the 7Q10 winter for this portion of the Cape Fear River that are the receiving stream for Outfalls 008 and 009. Additional stream data was used from other nearby NPDES facilities and USGS gauge stations to determine 30Q2 and QA flows for this segment of the Cape Fear River. This facility is subject to NC Senate Bill 729 (Coal Ash Management Act).

Outfall Description for Proposed Permit

Internal Outfall 001 – 1978 (West) Ash Basin

This existing outfall will be re-designated as requested by the Permittee as an emergency overflow discharge only. This will be limited to discharging excess 1978 ash basin decanting wastewater above the available treatment plant capacity during an eminent threat of 1978 (West) Ash Basin overflow to the facility's effluent channel. The channel discharges through Outfall 007.

Internal Outfall 005 – 1985 (East) Ash Basin

This existing outfall will be relocated and re-designated as requested by the Permittee as an emergency overflow discharge only. This will be limited to discharging excess 1985 ash basin decanting wastewater above the available treatment plant capacity during an eminent threat of 1985 (East) Ash Basin overflow to the facility's effluent channel. The channel will continue to discharge through Outfall 007.

Outfall 007 - Combined Wastewater

This existing outfall will be re-designated as a comingled wastewater discharge as requested by the Permittee consisting of treated decanting wastewater from the 0.72 MGD capacity treatment

facility, area storm water, approved constructed seep, and episodic emergency discharge from Internal Outfalls 001 and 005. Outfall 007 discharges is to an unnamed tributary to the Cape Fear River. Treatment system will be added, if necessary, to assure state Water Quality Standards are not contravened in the receiving stream.

Outfall 008 - Combined Wastewater
This outfall was a previous retired 1963/1970 Ash Basin storm water outfall and as requested by the Permittee will be re-activated as a NPDES discharge. It will be designated for comingled wastewater discharge consisting of treated wastewater from the 0.72 MGD capacity treatment facility for either decanting/dewatering/groundwater remediation. Outfall 008 discharges to the Cape Fear River. Treatment system will be added, if necessary, to assure state Water Quality Standards are not contravened in the receiving stream.

Outfall 008A - 1963/1970 Ash Basin
This will be a new outfall requested by the Permittee and will be designated as an emergency discharge only. This will be limited to discharging excess 1963/1970 ash basin decanting wastewater above the available treatment plant capacity during an eminent threat of 1963/1970 Ash Basin overflow to the Cape Fear River.

Outfall 009 – Beneficiation Area Miscellaneous Wastewater
This will be a new outfall requested by the Permittee to address 0.005 MGD of potential miscellaneous wastewater that may occur in the Beneficiation process consisting of ash pile runoff, dust, and spills. Outfall 009 will discharge to the Cape Fear River.

Internal Outfall S-05 – Constructed Seep (French Drain)
This internal outfall is for discharge of combined French Drain to effluent channel of Outfall 007.

Compliance Review
During this permit cycle while operating as a steam electric generating facility up to shutting down in May 2014, the facility had two TSS limit violations on Internal Outfall 005 and some monitoring frequency violations. No fines were assessed.

A total of 11 chronic toxicity tests at 90% effluent concentration using *Ceriodaphnia dubia* were performed and passed.

During this permit cycle samples were taken from 13 monitoring wells for 22 parameters 3/ Year. Groundwater violations were noted for Total Manganese, Total Iron, Total Boron, Total Vanadium, TSS, Total Cobalt, Sulfates, Total Selenium, Total Cadmium, Total Chromium, and Total Thallium. As required the Permittee is preparing an Action Plan to address groundwater remediation and a compliance boundary map that will be submitted to the Groundwater Protection Branch for final approval. The map will be attached to the final NPDES permit.

Instream Monitoring
As part of the required site seep investigation and reporting, instream samples were taken in July 2014 in the Haw River at the mouth of Shaddox Creek, upstream in Shaddox Creek, in the Cape Fear River just upstream of the mouth of the unnamed tributary that receives flow from Outfall 007, and in the Cape Fear River approximately 1.9 miles downstream from the mouth of the unnamed tributary. There was a notable reduction in impact to the concentration of the measured

constituents that entered Haw River from Shaddox Creek most likely from dilution. The Cape Fear River samples did not show any significant differences. There were no reported values that violated NC water quality standards or EPA criteria.

Fish Tissue Study Near Ash Basins

As required a fish tissue study was conducted in the Cape Fear River in May 2014 to evaluate the uptake of arsenic, mercury, and selenium by fish near the ash basin discharge. There were four fish tissue samples out of the thirty-six sample taken, three upstream and one downstream, that were ≥ the Mercury 2006 NC Health Directors Action Advisory Level of 0.4 µg/g fresh weight. The fish tissue samples Mercury levels ranged from < 0.04 to 0.68 µg/g fresh weight. There was no exceedance of the arsenic or the selenium fish tissue fresh weight criteria for any fish tissue sampled.

Proposed Permitting Action

In accordance with the 2014 Coal Ash Management Act and additional Division approval, the facility began decanting of the ash basins using a 0.72 MGD capacity treatment system. To comply with the remainder of the act, ash basin dewatering and final disposal of the ash must be completed. As part of this renewal and modified permit, requirement will be developed for treated decanting wastewater, treated dewatering wastewater, and in this case a proposed ash disposal Beneficiation process 0.005 MGD waste sources. In addition, the Permittee has requested as part of the permit modification to include groundwater remediation as part of the dewatering activities to be continued once dewatering activities are completed. Under current Division seep strategy only the constructed seep, S-05, that discharges to the effluent channel will be covered under this permit.

Outfall 007

This outfall discharges at the end of the effluent channel and to an unnamed tributary with a "zero" 7Q10 summer flow, thus, has an IWC=100%. Based on evaluation of all the contributing wastewater characteristics associated with this outfall, the ash basin decanting waste water source was the most dominant. A reasonable potential analysis was conducted using 0.73 MGD as the estimated flow and using the ash basin bulk water concentration data collected in October 2014. Based on this analysis, the following permitting actions are proposed for this permit:

- Effluent Limit with Monitoring. The following parameters will receive a water quality-based effluent limit (WQBEL) since they demonstrated a reasonable potential to exceed applicable water quality standards/criteria: Arsenic, Antimony, Molybdenum, Nickel, Selenium, Zinc

- 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: Cadmium, Copper, Fluoride, Sulfates, TDS, Thallium, Lead

- 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: Chlorides, Aluminum, Chromium III, Chromium VI, Total Chromium, Barium

To comply with mercury TMDL requirements and minimum ash basin decanting monitoring requirements, monthly monitoring using test method 1631E will be required, with an annual average limit of 12 ng/L.

Additional decanting monitoring parameters and conditions and other general permit requirements are summarized in Table 1: Outfall 007 – Ash Basin Decanting.

Table 1: Outfall 007 - Ash Basin Decanting

Parameter	Monitoring Requirements	DMR Monitoring Frequency	Basis
Flow	0.73 MGD DM	Daily	Decanting strategy, 15A NCAC 2B .0505
pH	6.0 ≤ pH ≤ 9.0 S.U. Continuous monitoring/auto shutoff	Monthly	Decanting strategy, 15A NCAC 2B .0200
TSS	30.0 mg/L MA 100 mg/L DM Continuous monitoring/auto shutoff	Monthly	Decanting strategy, EPA requirement, 40 CFR 423
Oil & Grease	15.0 mg/L MA 20.0 mg/L DM	Monthly	Decanting strategy, 40 CFR 423
Total Antimony	5.6 µg/L MA 5.6 µg/L DM	Monthly	RP to exceed NC WQS and EPA criteria
Total Arsenic	10.0 µg/L MA 340.0 µg/L DM	Weekly	RP to exceed NC WQS and EPA criteria
Total Molybdenum	160 µg/L MA 160 µg/L DM	Monthly	RP to exceed NC WQS and EPA criteria
Total Lead	Monitor & Report, µg/L	Monthly	Pollutant of concern
Total Nickel	25.0 µg/L MA 335.2 µg/L DM	Monthly	RP to exceed NC WQS and EPA criteria
Total Selenium	5.0 µg/L MA 56.0 µg/L DM	Weekly	RP to exceed NC WQS and EPA criteria
Total Zinc	125.7 µg/L MA 125.7 µg/L DM	Monthly	RP to exceed NC WQS and EPA criteria
Total Mercury	12 ng/L, annual average	Weekly	Mercury TMDL
Total Cadmium	Monitor & Report, µg/L	Monthly	No RP, predicted value ≥ 50% of the Allowable Cw
Total Copper	Monitor & Report, µg/L	Monthly	No RP, predicted value ≥ 50% of the Allowable Cw
Fluoride	Monitor & Report, mg/L	Monthly	No RP, predicted value ≥ 50% of the Allowable Cw
Sulfates	Monitor & Report, mg/L	Monthly	No RP, predicted value ≥ 50% of the Allowable Cw
Total Dissolved Solids	Monitor & Report, mg/L	Monthly	No RP, predicted value ≥ 50% of the Allowable Cw
Total Thallium	Monitor & Report, µg/L	Monthly	No RP, predicted value ≥ 50% of the Allowable Cw
Turbidity	Net Turbidity ≤ 50 NTU	Monthly	Decanting strategy, EPA requirement
Effluent Hardness	Monitor & Report, mg/L	Quarterly	Required to assess dissolved metal limitations
Chronic Toxicity	90% concentration, P/F	Quarterly	Decanting strategy, DEQ Toxicity Policy
Nitrate/Nitrite as N	Monitor & Report, mg/L	Quarterly	Needed to calculate TN
Total Kjeldahl Nitrogen	Monitor & Report, mg/L	Quarterly	Needed to calculate TN

Total Nitrogen	Monitor & Report, mg/L	Quarterly	15A NCAC 02B .0500
Total Phosphorus	Monitor & Report, mg/L	Quarterly	15A NCAC 02B .0500

MGD – Million gallons per day, MA – Monthly Average, DM – Daily Max

Outfall 008 - Decanting

As requested by the Permittee this new outfall will discharge to a segment of the Cape Fear River and based on stream flow data has a 7Q10 summer-based IWC = 1.7%. A reasonable potential analysis was conducted using the 0.72 MGD capacity of the treatment as the estimated flow and using the highest bulk water concentration data collected in October 2014. Based on this analysis, the following permitting actions are proposed for this permit:

- Effluent Limit with Monitoring. The following parameters will receive a water quality-based effluent limit (WQBEL) since they demonstrated a reasonable potential to exceed applicable water quality standards/criteria: NA

- 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, Lead, Nickel
  NOTE: Arsenic and Selenium are major decanting pollutants of concern, weekly monitoring is required. Lead and Nickel are pollutants of concern, monthly monitoring is required.

- 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: TDS, Cadmium, Chlorides, Aluminum, Chromium III, Chromium VI, Total Chromium, Copper, Fluoride, Molybdenum, Zinc, Antimony, Barium, Sulfates, Thallium.

To comply with mercury TMDL requirements and minimum ash basin decanting monitoring requirements, monthly monitoring using test method 1631E, or equivalent, will be required, with an annual average limit of 47 ng/L.

Additional decanting monitoring parameters and conditions and other general permit requirements are summarized in Table 2: Outfall 008 – Ash Basin Decanting.

Table 2: Outfall 008 -Ash Basin Decanting

Parameter	Monitoring Requirements	DMR Monitoring Frequency	Basis
Flow	0.72 MGD DM	Daily	Decanting strategy, 15A NCAC 2B .0505
pH	6.0 ≤ pH ≤ 9.0 S.U. Continuous monitoring/auto shutoff	Monthly	Decanting strategy, 15A NCAC 2B .0200
TSS	30.0 mg/L MA 100 mg/L DM Continuous monitoring/auto shutoff	Monthly	Decanting strategy, EPA requirement, 40 CFR 423
Oil & Grease	15.0 mg/L MA 20.0 mg/L DM	Monthly	Decanting strategy, 40 CFR 423
Total Mercury	47 ng/L, annual average	Weekly	Mercury TMDL

Total Arsenic	Monitor & Report, µg/L	Weekly	Decanting strategy, EPA requirement
Total Selenium	Monitor & Report, µg/L	Weekly	Decanting strategy, EPA requirement
Total Lead	Monitor & Report, µg/L	Monthly	Pollutant of concern
Total Nickel	Monitor & Report, µg/L	Monthly	Pollutant of concern
Turbidity	Net Turbidity ≤ 50 NTU	Monthly	Decanting strategy, EPA requirement
Effluent Hardness	Monitor & Report, mg/L	Quarterly	Required to assess dissolved metal limitations
Chronic Toxicity	1.7% concentration, P/F	Quarterly	Decanting strategy, DEQ Toxicity Policy
Nitrate/Nitrite as N	Monitor & Report, mg/L	Quarterly	Needed to calculate TN
Total Kjeldahl Nitrogen	Monitor & Report, mg/L	Quarterly	Needed to calculate TN
Total Nitrogen	Monitor & Report, mg/L	Quarterly	15A NCAC 02B .0500
Total Phosphorus	Monitor & Report, mg/L	Quarterly	15A NCAC 02B .0500

MGD – Million gallons per day, MA – Monthly Average, DM – Daily Max

Outfall 008 - Dewatering

As requested by the Permittee this new outfall will discharge to a segment of the Cape Fear River and based on stream flow data has a 7Q10 summer-based IWC = 1.7%. A reasonable potential analysis was conducted using the 0.72 MGD capacity of the treatment system as the estimated flow and using the highest 1985 (East) and 1978 (West) Ash Basins interstitial water concentration data collected in January 2015. Based on this analysis, the following permitting actions are proposed for this permit:

- Effluent Limit with Monitoring. The following parameters will receive a water quality-based effluent limit (WQBEL) since they demonstrated a reasonable potential to exceed applicable water quality standards/criteria: Selenium
  NOTE: Arsenic is a major dewatering pollutant of concern, weekly monitoring is required.

- 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: Aluminum, Arsenic, Cadmium, Copper, Lead, Nickel

- 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: TDS, Chlorides, Chromium III, Chromium VI, Total Chromium, Fluoride, Molybdenum, Barium, Sulfates, Antimony, Zinc, Thallium

To comply with mercury TMDL requirements and minimum ash basin dewatering monitoring requirements, weekly monitoring using test method 1631E, or equivalent, will be required, with an annual average limit of 47 ng/L.

The Permittee shall notify the Raleigh Regional Office and the Division seven (7) calendar days prior to commencing ash basin dewatering operation.

Additional dewatering monitoring parameters and conditions and other general permit requirements are summarized in Table 3: Outfall 008 – Ash Basin Dewatering.

Table 3: Outfall 008 -Ash Basin Dewatering

Parameter	Monitoring Requirements	DMR Monitoring Frequency	Basis
Flow	0.72 MGD DM	Daily	Dewatering strategy, 15A NCAC 2B .0505
pH	6.0 ≤ pH ≤ 9.0 S.U. Continuous monitoring/auto shutoff	Weekly	Dewatering strategy, 15A NCAC 2B .0200
TSS	30.0 mg/L MA 100 mg/L DM Continuous monitoring/auto shutoff	Weekly	Dewatering strategy, EPA requirement, 40 CFR 423
Oil & Grease	15.0 mg/L MA 20.0 mg/L DM	Weekly	Dewatering strategy, 40 CFR 423
Total Aluminum	Monitor & Report, mg/L	Weekly	No RP, predicted Cw ≥ 50% of Allowable Cw
Total Arsenic	Monitor & Report, µg/L	Weekly	Dewatering strategy, EPA requirement
Total Cadmium	Monitor & Report, µg/L	Weekly	No RP, predicted Cw ≥ 50% of Allowable Cw
Total Copper	466.9 µg/L MA 509.9 µg/L DM	Weekly	RP to exceed NC WQS and EPA criteria
Total Lead	0.17 mg/L MA 3.68 mg/L DM	Weekly	RP to exceed NC WQS and EPA criteria
Total Mercury	47 ng/L, annual average	Weekly	Mercury TMDL
Total Nickel	Monitor & Report, µg/L	Weekly	Pollutant of concern
Total Selenium	0.30 mg/L MA 2.73 mg/L DM	Weekly	RP to exceed NC WQS and EPA criteria
Turbidity	Net Turbidity ≤ 50 NTU	Weekly	Decanting strategy, EPA requirement
Effluent Hardness	Monitor & Report, mg/L	Quarterly	Required to assess dissolved metal limitations
Chronic Toxicity	1.7% concentration, P/F	Monthly	Dewatering strategy, DEQ Toxicity Policy
Nitrate/Nitrite as N	Monitor & Report, mg/L	Quarterly	Needed to calculate TN
Total Kjeldahl Nitrogen	Monitor & Report, mg/L	Quarterly	Needed to calculate TN
Total Nitrogen	Monitor & Report, mg/L	Quarterly	15A NCAC 02B .0500
Total Phosphorus	Monitor & Report, mg/L	Quarterly	15A NCAC 02B .0500

MGD – Million gallons per day, MA – Monthly Average, DM – Daily Max

Outfall 008 – Dewatering/Ground Water Remediation

As requested by the Permittee this new outfall will discharge to a segment of the Cape Fear River, and based on stream flow data and a maximum 0.72 MGD treatment system capacity has a 7Q10 summer-based IWC = 1.7%. A reasonable potential analysis was conducted using the 1.7% and using two source data points if available, one data point from the highest 1985 (East) and 1978 (West) Ash Basins interstitial water concentration data collected in January 2015 and a second data point from the highest ground water monitoring wells data collected in 2015 and 2016. Based on this analysis, the following permitting actions are proposed for this permit:

- Effluent Limit with Monitoring. The following parameters will receive a water quality-based effluent limit (WQBEL) since they demonstrated a reasonable potential to exceed applicable

water quality standards/criteria: TDS, Aluminum, Copper, Lead, Nickel, Selenium, Silver, Sulfates, Zinc
NOTE: Arsenic is a major dewatering pollutant of concern, weekly monitoring is required.

- 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: Beryllium, Copper, Cadmium, NOTE: Molybdenum is a major pollutant of interest, will be monitored weekly.

- No Limit or Monitoring: The following parameters will not receive a limit or monitoring, since they did not demonstrate reasonable potential to exceed applicable water quality standards/criteria and the maximum predicted concentration was <50% of the allowable concentration: Antimony, Chlorides, Chromium III, Chromium VI, Total Chromium, Fluoride, Barium, Thallium

To comply with mercury TMDL requirements and minimum ash basin dewatering monitoring requirements, weekly monitoring using test method 1631E, or equivalent, will be required, with an annual average limit of 47 ng/L.

The Permittee shall notify the Raleigh Regional Office and the Division seven (7) calendar days prior to the introduction of remediation ground water with the dewatering wastewater.

Additional dewatering monitoring parameters and ground water remediation monitoring parameters and other general permit requirements are summarized in Table 4: Outfall 008 – Ash Basin Dewatering/Ground Water Remediation.

Table 4: Outfall 008 - Ash Basin Dewatering/Ground Water Remediation

Parameter	Monitoring Requirements	DMR Monitoring Frequency	Basis
Flow	0.72 MGD DM	Daily	Dewatering strategy, 15A NCAC 2B .0505
Temperature, °C	Monitor & Report	Weekly	Ground Water Remediation NCG510000
pH	6.0 ≤ pH ≤ 9.0 S.U. Continuous monitoring/auto shutoff	Weekly	Dewatering strategy, 15A NCAC 2B .0200
TSS	30.0 mg/L MA 100 mg/L DM Continuous monitoring/auto shutoff	Weekly	Dewatering strategy, EPA requirement, 40 CFR 423
Oil & Grease	15.0 mg/L MA 20.0 mg/L DM	Weekly	Dewatering strategy, 40 CFR 423
Total Aluminum	385.1 mg/L MA 385.1 mg/L DM	Weekly	RP to exceed NC WQS and EPA criteria
Total Arsenic	Monitor & Report, µg/L	Weekly	Dewatering strategy, EPA requirement
Total Beryllium	Monitor & Report, µg/L	Weekly	No RP, predicted Cw ≥ 50% of Allowable Cw

Total Cadmium	Monitor & Report, µg/L	Weekly	No RP, predicted Cw ≥ 50% of Allowable Cw
Total Copper	Monitor & Report, µg/L	Weekly	No RP, predicted Cw ≥ 50% of Allowable Cw
Total Lead	Monitor & Report, µg/L	Weekly	No RP, predicted Cw ≥ 50% of Allowable Cw
Total Mercury	47 ng/L, annual average	Weekly	Mercury TMDL
Total Nickel	1.48 mg/L MA 16.3 mg/L DM	Weekly	RP to exceed NC WQS and EPA criteria
Total Selenium	0.30 mg/L MA 2.73 mg/L DM	Weekly	RP to exceed NC WQS and EPA criteria
Total Silver	Monitor & Report, µg/L	Weekly	No RP, predicted Cw ≥ 50% of Allowable Cw
Total Zinc	Monitor & Report, µg/L	Weekly	No RP, predicted Cw ≥ 50% of Allowable Cw
TDS	Monitor & Report, mg/L	Weekly	No RP, predicted Cw ≥ 50% of Allowable Cw
Sulfates	Monitor & Report, mg/L	Weekly	No RP, predicted Cw ≥ 50% of Allowable Cw
Turbidity	Net Turbidity ≤ 50 NTU	Weekly	Dewatering strategy, EPA requirement
Effluent Hardness	Monitor & Report, mg/L	Quarterly	Required to assess dissolved metal limitations
Chronic Toxicity	1.7% concentration, P/F	Monthly	Dewatering strategy, DEQ Toxicity Policy
Conductivity, µmhos/cm	Monitor and Report	Quarterly	Ground Water Remediation, NCG510000
Nitrate/Nitrite as N	Monitor & Report, mg/L	Quarterly	Needed to calculate TN
Total Kjeldahl Nitrogen	Monitor & Report, mg/L	Quarterly	Needed to calculate TN
Total Nitrogen	Monitor & Report, mg/L	Quarterly	15A NCAC 02B .0500
Total Phosphorus	Monitor & Report, mg/L	Quarterly	15A NCAC 02B .0500

MGD – Million gallons per day, MA – Monthly Average, DM – Daily Max

In addition, a special condition will be added to require the Permittee to submit EPA Form 2C to update the ground water remediation characterization 180 days after its initial introduction to the treatment system. The Division may reopen the permit to assign additional limits or conditions.

Outfall 008 – Ground Water Remediation

As requested by the Permittee this new outfall will discharge to a segment of the Cape Fear River, and based on stream flow data and a maximum 0.72 MGD treatment system capacity has a 7Q10 summer-based IWC = 1.7%. The reasonable potential analysis was conducted using only the highest ground water monitoring wells data toxicant concentration collected in 2015 and 2016 yielded the same results as the reasonable potential analysis conducted for comingled dewatering and groundwater remediation waste sources. Therefore, the only changes will be the removal of conditions related to dewatering activity, and a reduction in various parameters monitoring frequency and TSS limits to comply with Division ground water remediation permitting strategy.

To comply with mercury TMDL requirements, quarterly monitoring using test method 1631E, or equivalent, will be required, with an annual average limit of 47 ng/L.

The Permittee shall notify the Raleigh Regional Office and the Division seven (7) calendar days prior to the completion of dewatering activities and the continuation of remediation ground water treatment.

Ground Water Remediation requirements and conditions are summarized in Table 5: Outfall 008 – Ground Water Remediation.

Table 5: Outfall 008 - Ground Water Remediation

Parameter	Monitoring Requirements	DMR Monitoring Frequency	Basis
Flow	0.72 MGD DM	Weekly	15A NCAC 2B .0400 et seq., 02B .0500 et seq.
Temperature, °C	Monitor & Report	Weekly	Ground Water Remediation, NCG510000
pH	6.0 ≤ pH ≤ 9.0 S.U.	Weekly	15A NCAC 2B .0200
TSS	30.0 mg/L MA 45.0 mg/L DM	Weekly	Ground Water Remediation, NCG510000
Oil & Grease	15.0 mg/L MA 20.0 mg/L DM	Weekly	40 CFR 423
Total Aluminum	385.1 mg/L MA 385.1 mg/L DM	2/Month	RP to exceed NC WQS and EPA criteria
Total Arsenic	Monitor & Report, µg/L	2/Month	No RP, predicted Cw ≥ 50% of Allowable Cw
Total Beryllium	Monitor & Report, µg/L	2/Month	No RP, predicted Cw ≥ 50% of Allowable Cw
Total Lead	Monitor & Report, µg/L	2/Month	No RP, predicted Cw ≥ 50% of Allowable Cw
Total Nickel	1.48 mg/L MA 16.3 mg/L DM	2/Month	RP to exceed NC WQS and EPA criteria
Total Selenium	Monitor & Report, µg/L	2/Month	No RP, predicted Cw ≥ 50% of Allowable Cw
Total Silver	Monitor & Report, µg/L	2/Month	No RP, predicted Cw ≥ 50% of Allowable Cw
Total Zinc	Monitor & Report, µg/L	2/Month	No RP, predicted Cw ≥ 50% of Allowable Cw
TDS	Monitor & Report, mg/L	2/Month	No RP, predicted Cw ≥ 50% of Allowable Cw
Sulfates	14,811 mg/L MA 14,811mg/L DM	2/Month	RP to exceed NC WQS and EPA criteria
Turbidity	Net Turbidity ≤ 50 NTU	2/Month	15 NCAC 2B .0500
Effluent Hardness	Monitor & Report, mg/L	Quarterly	Required to assess dissolved metal limitations
Chronic Toxicity	1.7% concentration, P/F	Quarterly	Dewatering strategy, DEQ Toxicity Policy
Conductivity, µmhos/cm	Monitor and Report	Quarterly	Ground Water Remediation, NCG510000

Nitrate/Nitrite as N	Monitor & Report, mg/L	Quarterly	Needed to calculate TN
Total Kjeldahl Nitrogen	Monitor & Report, mg/L	Quarterly	Needed to calculate TN
Total Nitrogen	Monitor & Report, mg/L	Quarterly	15A NCAC 02B .0500
Total Phosphorus	Monitor & Report, mg/L	Quarterly	15A NCAC 02B .0500

MGD – Million gallons per day, MA – Monthly Average, DM – Daily Max

Outfall 008A – 1963/1970 Ash Basins Emergency Outfall

This new outfall is designated as an emergency discharge only and will consist of ash basin decanting wastewater. This is limited to discharging excess wastewater above the available treatment plant capacity during an eminent treat of 1963/1970 Ash Basin overflow.

Outfall 008A requirements and conditions are summarized in Table 6: Outfall 008A – 1963/1970 Ash Basins Emergency.

Table 6: Outfall 008A - 1963/1970 Ash Basins Emergency

Parameter	Monitoring Requirements	DMR Monitoring Frequency	Basis
Flow	Monitor and report	Daily during Episodic Event	15A NCAC 2B .0400 et seq., 02B .0500 et seq.
pH	$6.0 \leq pH \leq 9.0$ S.U.	Daily during Episodic Event	15A NCAC 2B .0200
TSS	30.0 mg/L MA 100.0 mg/L DM	Daily during Episodic Event	Ground Water Remediation, NCG510000
Oil & Grease	15.0 mg/L MA 20.0 mg/L DM	Daily during Episodic Event	40 CFR 423

Outfall 009 – Beneficiation Miscellaneous Wastewater

As requested by the Permittee this new outfall will discharge to a segment of the Cape Fear River, and based on stream flow data and a maximum 0.005 MGD discharge has a 7Q10 summer-based IWC = 0.012%. The expected sources of wastewater from the Beneficiation process area are ash pile run off, truck washing and ash dust spills. Data from an existing similar operation which included 21 toxicants was provided to characterize the proposed Beneficiation waste stream, and used to conducted a reasonable potential analysis.

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: Aluminum, Antimony, Cadmium, Chlorides, Barium, Beryllium, Total Chromium, Copper, Fluoride, Lead, Molybdenum, Nickel, Silver, Thallium, Zinc, Sulfates, TDS

NOTE: Monthly monitoring for Arsenic and Selenium will be required as they are toxicants of concern.

Beneficiation Miscellaneous requirements and conditions are summarized in Table 7: Outfall 009 – Ground Water Remediation.

Table 7: Outfall 009 – Beneficiation Miscellaneous Wastewater

Parameter	Monitoring Requirements	DMR Monitoring Frequency	Basis
Flow	0.005 MGD DM	Weekly	15A NCAC 2B .0400 et seq., 02B .0500 et seq.
Temperature, °C	Monitor & Report	Monthly	BPJ (untreated waste stream)
pH	6.0 ≤ pH ≤ 9.0 S.U.	Monthly	15A NCAC 2B .0200
TSS	30.0 mg/L MA 30.0 mg/L DM	Monthly	BPJ (untreated waste stream)
Oil & Grease	15.0 mg/L MA 20.0 mg/L DM	Monthly	40 CFR 423
Total Mercury	47 ng/L, annual average	Monthly	Mercury TMDL
Total Arsenic	Monitor & Report	Monthly	Toxicant of concern, BPJ (coal ash source)
Total Selenium	Monitor & Report	Monthly	Toxicant of concern, BPJ (coal ash source)
Turbidity	Net Turbidity ≤ 50 NTU	Monthly	15 NCAC 2B .0500

MGD – Million gallons per day, MA – Monthly Average, DM – Daily Max

Internal Outfalls 001 and 005- Ash Basins Emergency Overflow Discharge

As requested by the Permittee internal outfalls will be permitted for the three ash basins to address potential emergency overflow only events. Outfall 005, an existing 1985 (East) Ash Basin internal outfall, will be relocate to a different section of the effluent channel and be repurposed as an episodic emergency overflow. Outfall 001, an existing 1968 (West) Ash Basin internal outfall, will be repurposed as an episodic emergency overflow and continue to discharge to the effluent channel.

An emergency discharge is defined as the ash basin decanting wastewater that is in excess of the facility 0.72 MGD treatment capacity that will overflow. Table 8 lists the notification [1] and monitoring requirement in the event of ash basin emergency overflow from internal outfalls:

Table 8: Ash Basin Emergency Overflow Outfalls 001 and 005

Parameter	Monitoring Requirements [2]	Sample Type
Flow	Monitor & Report, MGD	Estimate
Outfall 001(Internal)	Monitor & Report Outfall 007 per A. (3.) [3]	
Outfall 005 (Internal)	Monitor & Report Outfall 007 per A. (3.) [3]	

Notes

1. The Permittee shall notify the Raleigh Regional Office (919) 791 – 4200 no later than the end of the next business day of the occurrence of an emergency discharge event including time of occurrence, duration, and cause.
2. During the duration of a discharge event, the flow shall be reported daily.
3. Effluent monitoring shall commence immediately at the impacted external outfall (Outfalls 007 or 008) for the limited parameters except for Mercury and Chronic Toxicity. Monitoring parameters and continue weekly during the emergency discharge event. Any external outfall's monitoring requirements in effect prior to an emergency discharge shall remain in effect.

Instream Monitoring

The facility shall conduct representative monthly in-stream 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) at locations list in Table 9. For the purpose of this requirement, "semi-annual" means that samples are collected twice per year with at least 120 calendar days between sampling events. The monitoring results shall be reported on the facility's Discharge Monitoring Reports and included with the NPDES permit renewal application.

Instream monitoring is provisionally waived considering the permittee's participation in the Middle Cape Fear River Basin Association provided the Association agrees to sample for all the parameters listed in this condition and at the specified locations. Instream monitoring shall be conducted as stated in this permit should the permittee end its participation in the Association.

Table 9: Instream Monitoring Locations

Instream Sample Description	Location
Upstream Outfall 008	0.9 miles upstream from Outfall 008 in Cape Fear River
Downstream Outfall 008	Approximately 250 meters downstream from Outfall 008 in Cape Fear River

Fish Tissue Monitoring

The current permit's Fish Tissue Monitoring Near Ash Pond Discharge special condition will be modified to show the submittal of the proposed plan for approval by the Division shall be no later than180 days after the effective date of this permit, and to provide the addresses for submittal of the proposed plan and the subsequent required report. Once the plan is approved it will become an enforceable part of the permit.

Removal of Special Conditions No Longer Valid

As a result of the decommissioning and removing of the steam and turbine components, removing of the domestic WWTP, and eliminating of other related on-site sources, the following current permit Special Conditions are no longer applicable and will be removed from this permit renewal:

- A. (2.) Internal Outfall 003
- A. (6) Intake Screen Backwashing
- A. (7.) Biocide Condition
- A. (8.) Domestic Wastewater Treatment Plant
- A. (10.) Section 316 (b) of CWA

Constructed Seep (French Drain)

As part of the required effluent channel evaluation completed by the Division on September 2, 2016 and subsequent updates to confirm status of constructed seep, Outfall S-05 is the recognized combined flow of the two French Drain sources that collect in the effluent channel. Table 10 lists the details related to S-05. The effluent channel flows go to Outfall 007, which discharges to an unnamed tributary to the Cape Fear River.

Table 10: Coordinates and Assigned Outfall

Discharge ID	Latitude	Longitude
S-05	35° 35' 25.62" N	79° 2' 46.96" W

Summary of Proposed Changes

1. Eliminated the current permit Internal Outfall 003 and its limitation page A. (2.); Special Conditions A. (6.) Intake Screen Backwash, A. (7.) Biocide Condition, A. (8.) Domestic Wastewater Treatment Plant, A. (10.) Section 316(b) of CWA; as they are no longer applicable.
2. Modified Supplement to Permit Cover Sheet to show the new outfalls' configuration.
3. Modified Internal Outfalls 001 and 005 limitation pages [new permit A. (1.) and A. (2.)] to repurpose their monitoring, narrative, and limit requirements for episodic emergency overflow of decanting wastewater from the West and East Ash Basins. Outfall 005 was relocated to different segment of the effluent channel.
4. Modified Outfall 007 limitation page [new permit A. (3.)], discharge to unnamed tributary to the Cape Fear River, to repurpose its monitoring, narrative, and limit requirements for comingled ash basin treated decanting wastewater and any other collected wastewater in the effluent channel approved by the Division.
5. Added new Outfall 008 limitation pages [new permit A. (4.), A. (5.), A. (6.), A. (7.)], discharge to the Cape Fear River, for monitoring and limit requirements, and applicable narrative conditions, for combination of treated wastewater sources starting with ash basin decanting, followed by ash basin dewatering, followed by the introduction of groundwater remediation in combination with ash basin dewatering, and ending with groundwater remediation only.
6. Added new Outfall 008A limitation page [new permit A. (8.)] for monitoring, narrative, and limit requirements for the episodic emergency overflow of decanting wastewater from the 1963/1970 Ash Basin.
7. Added new Outfall 009 limitation page [new permit A. (9.)], discharge to the Cape Fear River, for monitoring, narrative, and limit requirements for miscellaneous Beneficiation area wastewater.
8. Modified Special Condition A. (10.) Chronic Toxicity Limit (Quarterly) for Outfalls 007 and 008.
9. Added Special Condition A. (11.) Chronic Toxicity Limit (Monthly) for Outfall 008.
10. Added Special Condition A. (12.) Additional Conditions and Definitions for other applicable conditions associated with this permit.
11. Added Special Condition A. (13.) Instream Monitoring to implement monthly instream monitoring for Arsenic, Bromide, Cadmium, Chromium, Copper, Hardness, Lead, Mercury, Selenium, Zinc, TDS, Temperature and Turbidity at instream locations on the Cape Fear River.
12. Revised Special Condition A. (14.) Structural Integrity Inspections of Ash Basin Dam.
13. Modified Special Condition A. (15.) Fish Tissue Monitoring Near Ash Basin Discharge to redefine submittal and approval requirements for the required fish tissue monitoring plan, and to define the approved monitoring plan enforceable.
14. Added Special Condition A. (16.) Compliance Boundary. Boundary map will be attached to permit.
15. Added Special Condition A. (17.) Applicable State Law narrative to meet requirements of Senate Bill 729 (Coal Ash Management Act).
16. Added Special Condition A. (18.) Addition of Other Wastewater to Ash Basin Treatment System to require the submittal of EPA Form 2C upon addition of groundwater remediation wastewater to treatment system.
17. Added Special Condition A. (19.) Electronic Reporting of Discharge Monitoring Reports for electronic reporting of DMRs. Federal regulations require electronic submittal of all discharge monitoring reports (DMRs) and specify that, if a state does not establish a system

to receive such submittals, then permittees must submit DMRs electronically to the Environmental Protection Agency (EPA).

Proposed Schedule

Draft Permit to Public Notice: June 27, 2018
Permit Scheduled to Issue: August 30, 2018

Fact Sheet Addendum (if applicable):

Were there any changes made since the Draft Permit was public noticed (Yes/No): **Yes**
If Yes, list changes and their basis below:

- Facility class was corrected to Grade I Physical Chemical WPCS in the cover letter;
- Flow limit for Outfall 008 (groundwater remediation) has been changed from a Monthly Average to a Daily Maximum limitation in Section A. (7.) as requested by Permittee;
- Limits and monitoring for pH, TSS and Oil & Grease have been added to Outfall 008A in Section A. (8.) as requested by SELC. Additionally, paragraph (b) has been removed from the permit since Outfall 008A is no longer an internal outfall;
- Division has revised the wording in the requirement for Duck Energy to discontinue discharge of wastewater and report to the Regional Office if one of the pollutants reaches 85% of the allowable level during decanting and dewatering [See Section A. (3.) Paragraph c and Section A. (6.) Paragraph d];
- Paragraph c has been added to Section A. (9.) for Outfall 009 to require Permittee to submit completed EPA Form 2C for the addition of beneficiation wastewtaers no later than 180 days after the introduction of the beneficiation wastewaters to the treatment system.
- Special Condition A. (11.) Chronic Toxicity Limit (Monthly) has been revised to exclude Outfall 007 since the monthly chronic toxicity limit is not applicable for Outfall 007. Quarterly chronic toxicity test remains for Outfall 007 [See Special Condition A. (10.) Chronic Toxicity Limit (Quarterly)].

Fact Sheet Attachments

RPA Spreadsheet Summary for Outfalls 007, 008 and 009
DWR Public Water Supply Memo

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

MAXIMUM DATA POINTS = 58

REQUIRED DATA ENTRY

Table 1. Project Information

☐ CHECK IF HQW OR ORW WQS

Facility Name	Cape Fear Steam Electric Plant
WWTP/WTP Class	Class II
NPDES Permit	NC0003433
Outfall	007 base + decanting
Flow, Qw (MGD)	0.730
Receiving Stream	UT to Cape Faer River
HUC Number	03030002
Stream Class	WS-IV
☑ 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	25 mg/L (Avg)
Upstream Hardness	25 mg/L (Avg)
Combined Hardness Chronic	25 mg/L
Combined Hardness Acute	25 mg/L
Data Source(s)	Applying highest decanting value, default hardness values, based on Raleigh Regional Office AOW evaluation, BPJ flow (500 gpm treated + base flow)
☐ 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	Aluminum	Water Supply	NC	6.5	WS			mg/l
Par07	Total Dissolved Solids	Water Supply	NC	500	WS			mg/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	Antimony	Water Supply	NC	5.6	WS			µg/L
Par23	Barium	Water Supply	NC	1	WS			mg/L
Par24	Sulfates	Water Supply	NC	250	WS			mg/L

Cape Fear Steam Electric Plant
NC0003433

≥

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

MAXIMUM DATA POINTS = 58

Outfall 007 base + decanting
Qw = 0.73 MGD

Qw (MGD) = **0.7300**
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: **UT to Cape Faer River HUC 03030002**

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

COMBINED HARDNESS (mg/L)
Acute = 25 mg/L
Chronic = 25 mg/L
YOU HAVE DESIGNATED THIS RECEIVING STREAM AS WATER SUPPLY
Effluent Hard: 0 value > 100 mg/L
Effluent Hard Avg = 25 mg/L

PARAMETER	TYPE	NC STANDARDS OR EPA CRITERIA			PQL	UNITS	REASONABLE POTENTIAL RESULTS				RECOMMENDED ACTION
		Chronic	Applied Standard	Acute			n	# Det.	Max Pred Cw	Allowable Cw	
Arsenic	**C**	150	FW	340		ug/L	7	7	79.0 C.V. (default)	Acute (FW): 340.0 Chronic (FW): 150.0 No value > Allowable Cw	
Arsenic	**C**	10	HH/WS			ug/L	**Note: n ≤ 9 Limited data set**			Chronic (HH): 10.0 4 value(s) > Allowable Cw	RP shown - apply Weekly Monitoring with Limit
Cadmium	**NC**	0.5899	FW	3.2396		ug/L	7	0	1.005 C.V. (default)	Acute: 3.240 Chronic: 0.590	Permittee shall sample to POL at 0.5 ug/L
							Note: n ≤ 9 Limited data set		*NO DETECTS*	Max MDL = 1	RP for Limited Dataset (n<8 samples) - apply Monthly Monitoring
Chlorides	**NC**	250	WS			mg/L	7	7	64.3 C.V. (default)	Acute: NO WQS Chronic: 250.0	
							Note: n ≤ 9 Limited data set			No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Aluminum	**NC**	6.5	WS			mg/l	7	7	0.4 C.V. (default)	Acute: NO WQS Chronic: 6.50000	
							Note: n ≤ 9 Limited data set			No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Total Dissolved Solids	**NC**	500	WS			mg/L	7	7	482.4 C.V. (default)	Acute: NO WQS Chronic: 500.00000	
							Note: n ≤ 9 Limited data set			No value > Allowable Cw	No RP , Predicted Max ≥ 50% of Allowable Cw - apply Monthly Monitoring
Chromium III	**NC**	117.7325	FW	905.0818		µg/L	0	0	N/A	Acute: 905.1 Chronic: 117.7	
Chromium VI	**NC**	11	FW	16		µg/L	0	0	N/A	Acute: 16.0 Chronic: 11.0	
Chromium, Total	**NC**					µg/L	7	0	1.0 C.V. (default)	Max reported value = 0.5	a: No monitoring required if all Total Chromium samples are < 5 µg/L or Pred. max for Total Cr is < allowable Cw for Cr VI.
							Note: n ≤ 9 Limited data set		*NO DETECTS*	Max MDL = 1	
Copper	**NC**	7.8806	FW	10.4720		ug/L	7	3	7.01 C.V. (default)	Acute: 10.47 Chronic: 7.88	
							Note: n ≤ 9 Limited data set			No value > Allowable Cw	No RP , Predicted Max ≥ 50% of Allowable Cw - apply Monthly Monitoring

Fluoride	**NC**	1800	FW			ug/L	7 7 **Note: n ≤ 9** **Limited data set**	1,547.7 C.V. (default)	Acute: NO WQS Chronic: 1,800.0 No value > Allowable Cw	No RP , Predicted Max ≥ 50% of Allowable Cw - apply Monthly Monitoring
Lead	**NC**	2.9416	FW	75.4871		ug/L	7 0 **Note: n ≤ 9** **Limited data set**	1.005 C.V. (default) *NO DETECTS*	Acute: 75.487 Chronic: 2.942 Max MDL = 1	Pollutant of concern, apply monthly monitoring
Mercury	**NC**	12	FW		0.5	ng/L	7 4 **Note: n ≤ 9** **Limited data set**	2,070,300.0 C.V. (default)	Acute: NO WQS Chronic: 12.0 7 value(s) > Allowable Cw	Mercury TMDL applied, 12 ng/L Limit as annual average with weeky monitoring
Molybdenum	**NC**	160	WS			ug/L	7 7 **Note: n ≤ 9** **Limited data set**	357.8 C.V. (default)	Acute: NO WQS Chronic: 160.0 4 value(s) > Allowable Cw	RP shown - apply Monthly Monitoring with Limit
Nickel	**NC**	37.2313	FW	335.2087		µg/L	7 4 **Note: n ≤ 9** **Limited data set**	87.4 C.V. (default)	Acute (FW): 335.2 Chronic (FW): 37.2 3 value(s) > Allowable Cw	
Nickel	**NC**	25.0000	WS			µg/L			Chronic (WS): 25.0 3 value(s) > Allowable Cw	RP shown - apply Monthly Monitoring with Limit
Selenium	**NC**	5	FW	56		ug/L	7 7 **Note: n ≤ 9** **Limited data set**	97.7 C.V. (default)	Acute: 56.0 Chronic: 5.0 4 value(s) > Allowable Cw	RP shown - apply Weekly Monitoring with Limit
Zinc	**NC**	126.7335	FW	125.7052		ug/L	7 4 **Note: n ≤ 9** **Limited data set**	552.8 C.V. (default)	Acute: 125.7 Chronic: 126.7 3 value(s) > Allowable Cw	RP shown - apply Monthly Monitoring with Limit
Antimony	**NC**	5.6	WS			µg/L	7 4 **Note: n ≤ 9** **Limited data set**	21.90900 C.V. (default)	Acute: NO WQS Chronic: 5.60000 4 value(s) > Allowable Cw	RP shown - apply Monthly Monitoring with Limit
Barium	**NC**	1	WS			mg/L	7 7 **Note: n ≤ 9** **Limited data set**	0.32361 C.V. (default)	Acute: NO WQS Chronic: 1.00000 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Sulfates	**NC**	250	WS			mg/L	7 7 **Note: n ≤ 9** **Limited data set**	221.10000 C.V. (default)	Acute: NO WQS Chronic: 250.00000 No value > Allowable Cw	No RP , Predicted Max ≥ 50% of Allowable Cw - apply Monthly Monitoring
Thallium	**NC**	2	WS			µg/L	7 7 **Note: n ≤ 9** **Limited data set**	2.65320 C.V. (default)	Acute: NO WQS Chronic: 2.00000 No value > Allowable Cw	RP for Limited Dataset (n<8 samples) - apply Monthly Monitoring

REASONABLE POTENTIAL ANALYSIS

H1

Effluent Hardness

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

	Date	Data	BDL=1/2DL	Results	
1	default	25	25	Std Dev.	N/A
2				Mean	25.0000
3				C.V.	0.0000
4				n	1
5				10th Per value	25.00 mg/L
6				Average Value	25.00 mg/L
7				Max. Value	25.00 mg/L
8					
9					

H2

Upstream Hardness

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

	Date	Data	BDL=1/2DL	Results	
1	default	25	25	Std Dev.	N/A
2				Mean	25.0000
3				C.V.	0.0000
4				n	1
5				10th Per value	25.00 mg/L
6				Average Value	25.00 mg/L
7				Max. Value	25.00 mg/L
8					
9					

Par01 & Par02

Arsenic

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	39.3	39.3	Std Dev.	18.9711
2	10/10/2014	3.32	3.32	Mean	23.4929
3		3.05	3.05	C.V. (default)	0.6000
4		3.28	3.28	n	7
5		38	38		
6		38.5	38.5	Mult Factor =	2.01
7		39	39	Max. Value	39.3 ug/L
8				Max. Pred Cw	79.0 ug/L
9					

Par04

Cadmium

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

	Date	Data		BDL=1/2DL	Results	
1	10/10/2014	<	1	0.5	Std Dev.	0.0000
2	10/10/2014	<	1	0.5	Mean	0.5000
3	10/10/2014	<	1	0.5	C.V. (default)	0.6000
4	10/10/2014	<	1	0.5	n	7
5	10/10/2014	<	1	0.5		
6	10/10/2014	<	1	0.5	Mult Factor =	2.01
7	10/10/2014	<	1	0.5	Max. Value	0.500 ug/L
8					Max. Pred Cw	1.005 ug/L
9						

Par05

Chlorides

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	32	32	Std Dev.	8.5524
2	10/10/2014	16	16	Mean	22.9
3		32	32	C.V. (default)	0.6000
4		32	32	n	7
5		16	16		
6		16	16	Mult Factor =	2.0
7		16	16	Max. Value	32.0 mg/L
8				Max. Pred Cw	64.3 mg/L
9					

Par06

Aluminum

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	0.222	0.222	Std Dev.	0.0625
2	10/10/2014	0.101	0.101	Mean	0.1674
3		0.213	0.213	C.V. (default)	0.6000
4		0.218	0.218	n	7
5		0.217	0.217		
6		0.1	0.1	Mult Factor =	2.01
7		0.101	0.101	Max. Value	0.2 mg/l
8				Max. Pred Cw	0.4 mg/l
9					

Par07

Total Dissolved Solids

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	240	240	Std Dev.	6.9007
2	10/10/2014	230	230	Mean	231.4286
3		230	230	C.V. (default)	0.6000
4		240	240	n	7
5		220	220		
6		230	230	Mult Factor =	2.01
7		230	230	Max. Value	240.0 mg/L
8				Max. Pred Cw	482.4 mg/L
9					

Par10

Chromium, Total

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

	Date	Data		BDL=1/2DL	Results	
1	10/10/2014	<	1	0.5	Std Dev.	0.0000
2	10/10/2014	<	1	0.5	Mean	0.5000
3	10/10/2014	<	1	0.5	C.V. (default)	0.6000
4	10/10/2014	<	1	0.5	n	7
5	10/10/2014	<	1	0.5		
6	10/10/2014	<	1	0.5	Mult Factor =	2.01
7	10/10/2014	<	1	0.5	Max. Value	0.5 µg/L
8					Max. Pred Cw	1.0 µg/L
9						

Pa11

Copper

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

	Date	Data		BDL=1/2DL	Results	
1	10/10/2014		3.49	3.49	Std Dev.	1.5559
2	10/10/2014	<	1	0.5	Mean	1.7457
3			3.49	3.49	C.V. (default)	0.6000
4			3.24	3.24	n	7
5		<	1	0.5		
6		<	1	0.5	Mult Factor =	2.01
7		<	1	0.5	Max. Value	3.49 ug/L
8					Max. Pred Cw	7.01 ug/L
9						

Par13

Fluoride

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	770	770	Std Dev.	256.5708
2	10/10/2014	290	290	Mean	564.2857
3	10/10/2014	290	290	C.V. (default)	0.6000
4	10/10/2014	290	290	n	7
5	10/10/2014	770	770		
6	10/10/2014	770	770	Mult Factor =	2.01
7	10/10/2014	770	770	Max. Value	770.0 ug/L
8				Max. Pred Cw	1547.7 ug/L
9					

Par14

Lead

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

	Date			BDL=1/2DL	Results	
1	10/10/2014	<	1	0.5	Std Dev.	0.0000
2	10/10/2014	<	1	0.5	Mean	0.5000
3	10/10/2014	<	1	0.5	C.V. (default)	0.6000
4	10/10/2014	<	1	0.5	n	7
5	10/10/2014	<	1	0.5		
6	10/10/2014	<	1	0.5	Mult Factor =	2.01
7	10/10/2014	<	1	0.5	Max. Value	0.500 ug/L
8					Max. Pred Cw	1.005 ug/L
9						

Par16

Molybdenum

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	178	178	Std Dev.	93.6258
2	10/10/2014	1.18	1.18	Mean	101.1871
3		1.08	1.08	C.V. (default)	0.6000
4		1.05	1.05	n	7
5		175	175		
6		177	177	Mult Factor =	2.01
7		175	175	Max. Value	178.0 ug/L
8				Max. Pred Cw	357.8 ug/L
9					

Par17 & Par18

Nickel

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

	Date	Data		BDL=1/2DL	Results	
1	10/10/2014		43.5	43.5	Std Dev.	22.4413
2	10/10/2014		1.14	1.14	Mean	18.6486
3			42.4	42.4	C.V. (default)	0.6000
4			42	42	n	7
5		<	1	0.5		
6		<	1	0.5	Mult Factor =	2.01
7		<	1	0.5	Max. Value	43.5 µg/L
8					Max. Pred Cw	87.4 µg/L
9						

Par19

Selenium

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	48.6	48.6	Std Dev.	24.5698
2	10/10/2014	2.07	2.07	Mean	28.2057
3		1.96	1.96	C.V. (default)	0.6000
4		1.81	1.81	n	7
5		46.9	46.9		
6		47.6	47.6	Mult Factor =	2.01
7		48.5	48.5	Max. Value	48.6 ug/L
8				Max. Pred Cw	97.7 ug/L
9					

Par21

Zinc

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

	Date	Data		BDL=1/2DL	Results	
1	10/10/2014	275		275	Std Dev.	139.9367
2	10/10/2014	20		20	Mean	118.9286
3		267		267	C.V. (default)	0.6000
4		263		263	n	7
5			<	5	2.5	
6			<	5	2.5	Mult Factor = 2.01
7			<	5	2.5	Max. Value 275.0 ug/L
8						Max. Pred Cw 552.8 ug/L
9						

Par22

Antimony

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

	Date	Data		BDL=1/2DL	Results	
1	10/10/2014	10.9		10.9	Std Dev.	5.4668
2	10/10/2014	<	1	0.5	Mean	6.3429
3	10/10/2014	<	1	0.5	C.V. (default)	0.6000
4	10/10/2014	<	1	0.5	n	7
5		10.5		10.5		
6		10.8		10.8	Mult Factor =	2.01
7		10.7		10.7	Max. Value	10.900000 µg/L
8					Max. Pred Cw	21.909000 µg/L
9						

Par23

Barium

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	0.161	0.161	Std Dev.	0.0301
2	10/10/2014	0.104	0.104	Mean	0.1351
3		0.103	0.103	C.V. (default)	0.6000
4		0.102	0.102	n	7
5		0.159	0.159		
6		0.16	0.16	Mult Factor =	2.01
7		0.157	0.157	Max. Value	0.161000 mg/L
8				Max. Pred Cw	0.323610 mg/L
9					

Par24

Sulfates

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	110	110	Std Dev.	10.7060
2	10/10/2014	91	91	Mean	98.5714
3		110	110	C.V. (default)	0.6000
4		110	110	n	7
5		90	90		
6		90	90	Mult Factor =	2.01
7		89	89	Max. Value	110.000 mg/L
8				Max. Pred Cw	221.100 mg/L
9					

Par25

Thallium

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	1.32	1.32	Std Dev.	0.1718
2	10/10/2014	0.978	0.978	Mean	1.1011
3		1.25	1.25	C.V. (default)	0.6000
4		1.28	1.28	n	7
5		0.967	0.967		
6		0.962	0.962	Mult Factor =	2.01
7		0.951	0.951	Max. Value	1.320000 µg/L
8				Max. Pred Cw	2.653200 µg/L
9					

Par26

Mercury

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

	Date	Data		BDL=1/2DL	Results	
1	10/10/2014	1E+06		1030000	Std Dev.	#########
2	10/10/2014	9E+05		941000	Mean	#########
3		1E+06		987000	C.V. (default)	0.6000
4		8E+05		761000	n	7
5		<	5E+05	250000		
6		<	5E+05	250000	Mult Factor =	2.01
7		<	5E+05	250000	Max. Value	1030000.0 ng/L
8					Max. Pred Cw	2070300.0 ng/L
9						

Date: 6/4/2018

FACILITY: Cape Fear Steam Electric Plant Outfall 007 base + d
NPDES PERMIT: NC0003433

Dissolved to Total Metal Calculator

In accordance with Federal Regulations, permit limitations must be written as Total Metals per 40 CFR 122.45(c)

Receiving Stream summer 7Q10 (CFS)	Receiving Stream summer 7Q10 (MGD)	Rec. Stream 1Q10 [MGD]	NPDES Flow Limit [MGD]	Total Suspended Solids -Fixed Value- (mg/L)	Combined Hardness chronic (mg/L)	Combined Hardness Acute (mg/L)	Instream Wastewater Concentration (Chronic)	Instream Wastewater Concentration (Acute)	Upstream Hardness Average (mg/L)	Effluent Hardness Average (mg/L)
0.0000	0.0000	0.0000	0.7300	10	25.000	25.000	100.0000	100.0000	25	25

Upstream Hard Avg (mg/L) = 25
EFF Hard Avg (mg/L) = 25

PARAMETER	Dissolved Metals Criteria after applying hardness equation		US EPA **Translators**- using Default Partition Coefficients (streams)	Total Metal Criteria Total Metal = Dissolved Metal ÷ Translator	
	Chronic [ug/l]	Acute [ug/l]		Chronic [ug/l]	Acute [ug/l]
Cadmium (d)	0.15	0.82	0.252	0.59	3.24
Cd -Trout streams	0.15	0.51	0.252	0.59	2.01
Chromium III (d)(h)	24	183	0.202	117.73	905.08
Chromium VI (d)	11	16	1.000	11.00	16.00
Chromium, Total (t)				N/A	N/A
Copper (d)(h)	2.7	3.6	0.348	7.88	10.47
Lead (d)(h)	0.54	14	0.184	2.94	75.49
Nickel (d)(h)	16	145	0.432	37.23	335.21
Ni - WS streams (t)				25	N/A
Silver (d)(h,acute)	0.06	0.30	1.000	0.06	0.30
Zinc (d)(h)	36	36	0.288	126.73	125.71
Beryllium	6.5	65	1.000	6.5	65
Arsenic (d)	150	340	1.000	150	340

COMMENTS (identify parameters to PERCS Branch to maintain in facility's LTMP/STMP):

(d) = dissolved metal standard. See 15A NCAC 02B .0211 for more information.
(h) = hardness-dependent dissolved metal standard. See 15A NCAC 02B .0211 for more information.
(t) = based upon measurement of total recoveable metal. See 15A NCAC 02B .0211 for more information.
The Human Health standard for Nickel in Water Supply Streams is 25 mg/L which is Total Recoverable metal standard.
The Human Health standard for Arsenic is 10 µg/L which is Total Recoverable metal standard.

001 1978 005 1985

Table 1

Cape Fear Plant Ash Basin Water Characterization Water Samples Collected October 10, 2014 (Page 1 of 2)

Parameter	Units	Sample Description (WEST / EAST)						
		Bulk Water 1978-1'	Bulk Water 1978-4'	Bulk Water 1978-8'	Bulk Water 1985-1'	Bulk Water 1985-4'	Bulk Water 1985-8'	Bulk Water 1985-12'
NO2 +NO3	mg/l	<0.01	0.028	0.018	<0.01	1.1	0.01	<0.01
Total Kjeldahl Nitrogen	mg/l	0.28	0.28	0.28	0.19	0.22	<0.15	0.19
Bromide	mg/l	1.2	1.5	1.4	0.47	0.48	0.47	0.47
Chloride	mg/l	32	32	32	16	16	16	16
Fluoride	mg/l	0.29	0.29	0.29	0.77	0.77	0.77	0.77
Sulfate	~~ug/l~~ mg/L	110	110	110	91	90	90	89
Aluminum (Al)	mg/l	0.101	0.101	0.098	0.217	0.218	0.222	0.213
Barium (Ba)	mg/l	0.104	0.103	0.102	0.161	0.159	0.16	0.157
Boron (B)	mg/l	0.221	0.222	0.215	1.27	1.26	1.27	1.24
Calcium (Ca)	mg/l	19.8	20	19.5	37	36.7	37	36.2
Iron (Fe)	mg/l	0.016	0.014	0.013	<0.01	0.018	<0.01	<0.01
Magnesium (Mg)	mg/l	7	7.06	6.95	5.14	5.13	5.12	5.02
Manganese (Mn)	mg/l	0.648	0.649	0.641	0.007	0.01	0.007	0.007
Phosphorus (P)	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Zinc (Zn)	mg/l	0.267	0.275	0.263	<0.005	0.02	<0.005	<0.005
Antimony (Sb)	µg/l	<1	<1	<1	10.5	10.9	10.8	10.7
Arsenic (As)	µg/l	3.05	3.28	3.32	38	39.3	38.5	39
Cadmium (Cd)	µg/l	<1	<1	<1	<1	<1	<1	<1
Chromium (Cr)	µg/l	<1	<1	<1	<1	<1	<1	<1
Copper (Cu)	µg/l	3.49	3.46	3.24	<1	<1	<1	<1
Lead (Pb)	µg/l	<1	<1	<1	<1	<1	<1	<1
Molybdenum (Mo)	µg/l	1.18	1.08	1.05	175	177	175	178
Nickel (Ni)	µg/l	42.4	43.5	42	<1	1.14	<1	<1
Selenium (Se)	µg/l	1.96	2.07	1.81	46.9	47.6	48.6	48.5
Thallium (Tl)	µg/l	1.25	1.32	1.28	0.967	0.962	0.978	0.951
Mercury (CVAFS)	mg/l	<0.500	<0.500	<0.500	0.941	1.03	0.987	0.761
TDS	mg/l	230	240	240	220	230	230	230
TSS	mg/l	<5	<5	<5	<5	<5	<5	<5

Outfall 007 Decanting

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

MAXIMUM DATA POINTS = 58

REQUIRED DATA ENTRY

Table 1. Project Information

	☐ CHECK IF HQW OR ORW WQS
Facility Name	Cape Fear Steam Electric Plant
WWTP/WTP Class	Class II
NPDES Permit	NC0003433
Outfall	008 Ash Basin Decanting
Flow, Qw (MGD)	0.720
Receiving Stream	Cape Fear River
HUC Number	03030002
Stream Class	WS-IV
☑ Apply WS Hardness WQC	
7Q10s (cfs)	65.00
7Q10w (cfs)	89.00
30Q2 (cfs)	150.00
QA (cfs)	3170.00
1Q10s (cfs)	53.22
Effluent Hardness	25 mg/L (Avg)
Upstream Hardness	25 mg/L (Avg)
Combined Hardness Chronic	25 mg/L
Combined Hardness Acute	25 mg/L
Data Source(s)	Ash Basins 2014 - higest bulk water pollutan bulk concentrations from basins; 500 GPM treatment flow; USGS suggested flows and data, default hardness
☐ CHECK TO APPLY MODEL	
	Follow directions for data entry. In some cases a comment menu list the available choices or a dropdown menu will provide a list you may select from. Error message occur if data entry does not meet input criteria.

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	Total Dissolved Solids	Water Supply	NC	500	WS			mg/L
Par04	Cadmium	Aquatic Life	NC	0.5899	FW	3.2396		ug/L
Par05	Chlorides	Water Supply	NC	250	WS			mg/L
Par06	Aluminum	Water Supply	NC	6.5	WS			mg/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	Antimony	Water Supply	NC	5.6	WS			µg/L
Par23	Barium	Water Supply	NC	1	WS			mg/L
Par24	Sulfates	Water Supply	NC	250	WS			mg/L
Par25	Thallium	Water Supply	NC	2	WS			µg/L

Cape Fear Steam Electric Plant ≥ **Outfall 008 Ash Basin Decanting**

NC0003433 **Freshwater RPA - 95% Probability/95% Confidence Using Metal Translators** **Qw = 0.72 MGD**

MAXIMUM DATA POINTS = 58

Qw (MGD) = **0.72**
1Q10S (cfs) = **53.22**
7Q10S (cfs) = **65.00**
7Q10W (cfs) = **89.00**
30Q2 (cfs) = **150.00**
Avg. Stream Flow, QA (cfs) = **3170.00**
Receiving Stream: **Cape Fear River HUC 03030002**

WWTP/WTP Class: **Class II**
IWC% @ 1Q10S = **2.053886926**
IWC% @ 7Q10S = **1.687942404**
IWC% @ 7Q10W = **1.238403835**
IWC% @ 30Q2 = **0.738505519**
IW%C @ QA = **0.035192658**
Stream Class: **WS-IV**

COMBINED HARDNESS (mg/L)
Acute = 25 mg/L
Chronic = 25 mg/L
YOU HAVE DESIGNATED THIS RECEIVING STREAM AS WATER SUPPLY
Effluent Hard: 0 value > 100 mg/L
Effluent Hard Avg = 25 mg/L

PARAMETER	TYPE (1)	NC STANDARDS OR EPA CRITERIA			PQL	UNITS	REASONABLE POTENTIAL RESULTS				RECOMMENDED ACTION
		Chronic	Applied Standard	Acute			n	# Det.	Max Pred Cw	Allowable Cw	
Arsenic	**C**	150	FW(7Q10s)	340		ug/L	7	7	79.0 Default C.V.	Acute (FW): 16,554.0 Chronic (FW): 8,886.6 No value > Allowable Cw	Major pollutant of concern apply weekly monitoring
Arsenic	**C**	10	HH/WS(Qavg)			ug/L	**Note: n ≤ 9 Limited data set**			Chronic (HH): 28,415.0 No value > Allowable Cw	Major pollutant of concern apply weekly monitoring
Total Dissolved Solids	**NC**	500	WS(7Q10s)			mg/L	7 **Note: n ≤ 9 Limited data set**	7	482.40 Default C.V.	Acute: NO WQS Chronic: 29,621.86 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Cadmium	**NC**	0.5899	FW(7Q10s)	3.2396		ug/L	7 **Note: n ≤ 9 Limited data set**	0	1.005 Default C.V. *NO DETECTS*	Acute: 157.731 Chronic: 34.947 Max MDL = 1	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Chlorides	**NC**	250	WS(7Q10s)			mg/L	7 **Note: n ≤ 9 Limited data set**	7	64.3 Default C.V.	Acute: NO WQS Chronic: 14,810.9 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Aluminum	**NC**	6.5	WS(7Q10s)			mg/L	7 **Note: n ≤ 9 Limited data set**	7	0.4 Default C.V.	Acute: NO WQS Chronic: 385.1 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Chromium III	**NC**	117.7325	FW(7Q10s)	905.0818		µg/L	0	0	N/A	Acute: 44,066.8 Chronic: 6,974.9	
Chromium VI	**NC**	11	FW(7Q10s)	16		µg/L	0	0	N/A	Acute: 779.0 Chronic: 651.7	
Chromium, Total	**NC**					µg/L	7 **Note: n ≤ 9 Limited data set**	0	1.0 Default C.V. *NO DETECTS*	Max reported value = 0.5 Max MDL = 1	No detects, MDL< Allowable Cw for Chromium III & VI - No Monitoring required
Copper	**NC**	7.8806	FW(7Q10s)	10.4720		ug/L	7 **Note: n ≤ 9 Limited data set**	3	7.01 Default C.V.	Acute: 509.86 Chronic: 466.88 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required

Fluoride	**NC**	1800	FW(7Q10s)			ug/L	7 7 **Note: n ≤ 9** **Limited data set**	1,547.7 Default C.V.	Acute: NO WQS Chronic: 106,638.7 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Lead	**NC**	2.9416	FW(7Q10s)	75.4871		ug/L	7 0 **Note: n ≤ 9** **Limited data set**	1.005 Default C.V. *NO DETECTS*	Acute: 3,675.329 Chronic: 174.273 Max MDL = 1	Pollutant of concern, apply monthly monitoring
Mercury	**NC**	12	FW(7Q10s)		0.5	ng/L	7 4 **Note: n ≤ 9** **Limited data set**	2,070,300.0 Default C.V.	Acute: NO WQS Chronic: 710.9 7 value(s) > Allowable Cw	Value > stringent TBEL - apply limit of 47 ng/L annual average with weekly monitoring
Molybdenum	**NC**	160	WS(7Q10s)			ug/L	7 7 **Note: n ≤ 9** **Limited data set**	357.8 Default C.V.	Acute: NO WQS Chronic: 9,479.0 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Nickel	**NC**	37.2313	FW(7Q10s)	335.2087		µg/L	7 4 **Note: n ≤ 9** **Limited data set**	87.4 Default C.V.	Acute (FW): 16,320.7 Chronic (FW): 2,205.7 No value > Allowable Cw	Pollutant of concern, apply monthly monitoring
Nickel	**NC**	25.0000	WS(7Q10s)			µg/L	**Limited data set**		Chronic (WS): 1,481.1 No value > Allowable Cw	Pollutant of concern, apply monthly monitoring
Selenium	**NC**	5	FW(7Q10s)	56		ug/L	7 7 **Note: n ≤ 9** **Limited data set**	97.7 Default C.V.	Acute: 2,726.5 Chronic: 296.2 No value > Allowable Cw	Major pollutant of concern apply weekly monitoring
Zinc	**NC**	126.7335	FW(7Q10s)	125.7052		ug/L	7 4 **Note: n ≤ 9** **Limited data set**	552.8 Default C.V.	Acute: 6,120.4 Chronic: 7,508.2 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Antimony	**NC**	5.6	WS(7Q10s)			µg/L	7 4 **Note: n ≤ 9** **Limited data set**	21.90900 Default C.V.	Acute: NO WQS Chronic: 331.76487 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Barium	**NC**	1	WS(7Q10s)			mg/L	7 7 **Note: n ≤ 9** **Limited data set**	0.32361 Default C.V.	Acute: NO WQS Chronic: 59.24373 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Sulfates	**NC**	250	WS(7Q10s)			mg/L	7 7 **Note: n ≤ 9** **Limited data set**	221.10000 Default C.V.	Acute: NO WQS Chronic: 14810.93190 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Thallium	**NC**	2	WS(7Q10s)			µg/L	7 7 **Note: n ≤ 9** **Limited data set**	2.65320 Default C.V.	Acute: NO WQS Chronic: 118.48746 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required

REASONABLE POTENTIAL ANALYSIS

H1

Effluent Hardness

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

	Date	Data	BDL=1/2DL	Results	
1	default	25	25	Std Dev.	N/A
2				Mean	25.0000
3				C.V. (default)	0.6000
4				n	1
5				10th Per value	25.00 mg/L
6				Average Value	25.00 mg/L
7				Max. Value	25.00 mg/L
8					
9					

H2

Upstream Hardness

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

	Date	Data	BDL=1/2DL	Results	
1	default	25	25	Std Dev.	N/A
2				Mean	25.0000
3				C.V. (default)	0.6000
4				n	1
5				10th Per value	25.00 mg/L
6				Average Value	25.00 mg/L
7				Max. Value	25.00 mg/L
8					
9					

Par01 & Par02

Arsenic

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	39.3	39.3	Std Dev.	18.9711
2	10/10/2014	3.32	3.32	Mean	23.4929
3		3.05	3.05	C.V. (default)	0.6000
4		3.28	3.28	n	7
5		38	38		
6		38.5	38.5	Mult Factor =	2.01
7		39	39	Max. Value	39.3 ug/L
8				Max. Pred Cw	79.0 ug/L
9					

Par03

Total Dissolved Solids

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	240	240	Std Dev.	6.9007
2	10/10/2014	230	230	Mean	231.4286
3		230	230	C.V. (default)	0.6000
4		240	240	n	7
5		220	220		
6		230	230	Mult Factor =	2.01
7		230	230	Max. Value	240.00 mg/L
8				Max. Pred Cw	482.40 mg/L
9					

Par04

Cadmium

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	< 1	0.5	Std Dev.	0.0000
2	10/10/2014	< 1	0.5	Mean	0.5000
3	10/10/2014	< 1	0.5	C.V. (default)	0.6000
4	10/10/2014	< 1	0.5	n	7
5	10/10/2014	< 1	0.5		
6	10/10/2014	< 1	0.5	Mult Factor =	2.01
7	10/10/2014	< 1	0.5	Max. Value	0.500 ug/L
8				Max. Pred Cw	1.005 ug/L
9					

Par05

Chlorides

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	32	32	Std Dev.	8.5524
2	10/10/2014	16	16	Mean	22.9
3		32	32	C.V. (default)	0.6000
4		32	32	n	7
5		16	16		
6		16	16	Mult Factor =	2.0
7		16	16	Max. Value	32.0 mg/L
8				Max. Pred Cw	64.3 mg/L
9					

Par06

Aluminum

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	0.222	0.222	Std Dev.	0.0625
2	10/10/2014	0.101	0.101	Mean	0.1674
3		0.213	0.213	C.V. (default)	0.6000
4		0.218	0.218	n	7
5		0.217	0.217		
6		0.1	0.1	Mult Factor =	2.01
7		0.101	0.101	Max. Value	0.2 mg/L
8				Max. Pred Cw	0.4 mg/L
9					

Par10

Chromium, Total

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	< 1	0.5	Std Dev.	0.0000
2	10/10/2014	< 1	0.5	Mean	0.5000
3	10/10/2014	< 1	0.5	C.V. (default)	0.6000
4	10/10/2014	< 1	0.5	n	7
5	10/10/2014	< 1	0.5		
6	10/10/2014	< 1	0.5	Mult Factor =	2.01
7	10/10/2014	< 1	0.5	Max. Value	0.5 µg/L
8				Max. Pred Cw	1.0 µg/L
9					

Pa11

Copper

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	3.49	3.49	Std Dev.	1.5559
2	10/10/2014	< 1	0.5	Mean	1.7457
3		3.49	3.49	C.V. (default)	0.6000
4		3.24	3.24	n	7
5		< 1	0.5		
6		< 1	0.5	Mult Factor =	2.01
7		< 1	0.5	Max. Value	3.49 ug/L
8				Max. Pred Cw	7.01 ug/L
9					

Par13

Fluoride

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	770	770	Std Dev.	256.5708
2	10/10/2014	290	290	Mean	564.2857
3	10/10/2014	290	290	C.V. (default)	0.6000
4	10/10/2014	290	290	n	7
5	10/10/2014	770	770		
6	10/10/2014	770	770	Mult Factor =	2.01
7	10/10/2014	770	770	Max. Value	770.0 ug/L
8				Max. Pred Cw	1547.7 ug/L
9					

Par14

Lead

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

	Date		BDL=1/2DL	Results	
1	10/10/2014	< 1	0.5	Std Dev.	0.0000
2	10/10/2014	< 1	0.5	Mean	0.5000
3	10/10/2014	< 1	0.5	C.V. (default)	0.6000
4	10/10/2014	< 1	0.5	n	7
5	10/10/2014	< 1	0.5		
6	10/10/2014	< 1	0.5	Mult Factor =	2.01
7	10/10/2014	< 1	0.5	Max. Value	0.500 ug/L
8				Max. Pred Cw	1.005 ug/L
9					

Par16

Molybdenum

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	178	178	Std Dev.	93.6258
2	10/10/2014	1.18	1.18	Mean	101.1871
3		1.08	1.08	C.V. (default)	0.6000
4		1.05	1.05	n	7
5		175	175		
6		177	177	Mult Factor =	2.01
7		175	175	Max. Value	178.0 ug/L
8				Max. Pred Cw	357.8 ug/L
9					

Par17 & Par18

Nickel

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	43.5	43.5	Std Dev.	22.4413
2	10/10/2014	1.14	1.14	Mean	18.6486
3		42.4	42.4	C.V. (default)	0.6000
4		42	42	n	7
5		< 1	0.5		
6		< 1	0.5	Mult Factor =	2.01
7		< 1	0.5	Max. Value	43.5 µg/L
8				Max. Pred Cw	87.4 µg/L
9					

Par19

Selenium

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	48.6	48.6	Std Dev.	24.5698
2	10/10/2014	2.07	2.07	Mean	28.2057
3		1.96	1.96	C.V. (default)	0.6000
4		1.81	1.81	n	7
5		46.9	46.9		
6		47.6	47.6	Mult Factor =	2.01
7		48.5	48.5	Max. Value	48.6 ug/L
8				Max. Pred Cw	97.7 ug/L
9					

Par21

Zinc

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

	Date		BDL=1/2DL	Results	
1	10/10/2014	275	275	Std Dev.	139.9367
2	10/10/2014	20	20	Mean	118.9286
3		267	267	C.V. (default)	0.6000
4		263	263	n	7
5		< 5	2.5		
6		< 5	2.5	Mult Factor =	2.01
7		< 5	2.5	Max. Value	275.0 ug/L
8				Max. Pred Cw	552.8 ug/L
9					

Par22

Antimony

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	10.9	10.9	Std Dev.	5.4668
2	10/10/2014	< 1	0.5	Mean	6.3429
3	10/10/2014	< 1	0.5	C.V. (default)	0.6000
4	10/10/2014	< 1	0.5	n	7
5		10.5	10.5		
6		10.8	10.8	Mult Factor =	2.01
7		10.7	10.7	Max. Value	10.900000 µg/L
8				Max. Pred Cw	21.909000 µg/L
9					

Par23

Barium

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	0.161	0.161	Std Dev.	0.0301
2	10/10/2014	0.104	0.104	Mean	0.1351
3		0.103	0.103	C.V. (default)	0.6000
4		0.102	0.102	n	7
5		0.159	0.159		
6		0.16	0.16	Mult Factor =	2.01
7		0.157	0.157	Max. Value	0.161000 mg/L
8				Max. Pred Cw	0.323610 mg/L
9					

Par24

Sulfates

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	110	110	Std Dev.	10.7060
2	10/10/2014	91	91	Mean	98.5714
3		110	110	C.V. (default)	0.6000
4		110	110	n	7
5		90	90		
6		90	90	Mult Factor =	2.01
7		89	89	Max. Value	110.000 mg/L
8				Max. Pred Cw	221.100 mg/L
9					

Par25

Thallium

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	1.32	1.32	Std Dev.	0.1718
2	10/10/2014	0.978	0.978	Mean	1.1011
3		1.25	1.25	C.V. (default)	0.6000
4		1.28	1.28	n	7
5		0.967	0.967		
6		0.962	0.962	Mult Factor =	2.01
7		0.951	0.951	Max. Value	1.320000 µg/L
8				Max. Pred Cw	2.653200 µg/L
9					

Par26

Mercury

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

	Date	Data	BDL=1/2DL	Results	
1	10/10/2014	1E+06	1030000	Std Dev.	372834.6
2	10/10/2014	9E+05	941000	Mean	638428.6
3		1E+06	987000	C.V. (default)	0.6
4		8E+05	761000	n	7.0
5		< 5E+05	250000		
6		< 5E+05	250000	Mult Factor =	2.0
7		< 5E+05	250000	Max. Value	1030000.0 ng/L
8				Max. Pred Cw	2070300.0 ng/L
9					

Date: 6/4/2018

FACILITY: Cape Fear Steam Electric Plant
NPDES PERMIT: NC0003433

Dissolved to Total Metal Calculator

In accordance with Federal Regulations, permit limitations must be written as Total Metals per 40 CFR 122.45(c)

Receiving Stream summer 7Q10 (CFS)	Receiving Stream summer 7Q10 (MGD)	Rec. Stream 1Q10 [MGD]	NPDES Flow Limit [MGD]	Total Suspended Solids -Fixed Value- (mg/L)	Combined Hardness chronic (mg/L)	Combined Hardness Acute (mg/L)	Instream Wastewater Concentration (Chronic)	Instream Wastewater Concentration (Acute)	Upstream Hardness Average (mg/L)	Effluent Hardness Average (mg/L)
65.0000	41.9355	34.3355	0.7200	10	25.000	25.000	1.6879	2.0539	25	25

Upstream Hard Avg (mg/L) = 25
EFF Hard Avg (mg/L) = 25

PARAMETER	Dissolved Metals Chronic [ug/l]	Dissolved Metals Acute [ug/l]	US EPA **Translators**- using Default Partition Coefficients (streams)	Maximum Allowable Effluent Concentration (MAEC) as a **Total Metal** =Dissolved Metal ÷ Translator Chronic [ug/l]	MAEC as a **Total Metal** =Dissolved Metal ÷ Translator Acute [ug/l]
Cadmium (d)	0.15	0.82	0.252	0.59	3.24
Cd -Trout streams	0.15	0.51	0.252	0.59	2.01
Chromium III (d)(h)	24	183	0.202	117.73	905.08
Chromium VI (d)	11	16	1.000	11.00	16.00
Chromium, Total (t)				N/A	N/A
Copper (d)(h)	2.7	3.6	0.348	7.88	10.47
Lead (d)(h)	0.54	14	0.184	2.94	75.49
Nickel (d)(h)	16	145	0.432	37.23	335.21
Ni - WS streams (t)				25	N/A
Silver (d)(h,acute)	0.06	0.30	1.000	0.06	0.30
Zinc (d)(h)	36	36	0.288	126.73	125.71
Beryllium	6.5	65	1.000	6.5	65
Arsenic (d)	150	340	1.000	150	340

COMMENTS (identify parameters to PERCS Branch to maintain in facility's LTMP/STMP):

(d) = dissolved metal standard. See 15A NCAC 02B .0211 for more information.
(h) = hardness-dependent dissolved metal standard. See 15A NCAC 02B .0211 for more information.
(t) = based upon measurement of total recoveable metal. See 15A NCAC 02B .0211 for more information.
The Human Health standard for Nickel in Water Supply Streams is 25 mg/L which is Total Recoverable metal standard.
The Human Health standard for Arsenic is 10 µg/L which is Total Recoverable metal standard.

001 1978 005 1985

Table 1

Cape Fear Plant Ash Basin Water Characterization Water Samples Collected October 10, 2014 (Page 1 of 2)

Parameter	Units	Sample Description (WEST / EAST)						
		Bulk Water 1978-1'	Bulk Water 1978-4'	Bulk Water 1978-8'	Bulk Water 1985-1'	Bulk Water 1985-4'	Bulk Water 1985-8'	Bulk Water 1985-12'
NO2 +NO3	mg/l	<0.01	0.028	0.018	<0.01	1.1	0.01	<0.01
Total Kjeldahl Nitrogen	mg/l	0.28	0.28	0.28	0.19	0.22	<0.15	0.19
Bromide	mg/l	1.2	1.5	1.4	0.47	0.48	0.47	0.47
Chloride	mg/l	32	32	32	16	16	16	16
Fluoride	mg/l	0.29	0.29	0.29	0.77	0.77	0.77	0.77
Sulfate	~~ug/l~~ mg/L	110	110	110	91	90	90	89
Aluminum (Al)	mg/l	0.101	0.101	0.098	0.217	0.218	0.222	0.213
Barium (Ba)	mg/l	0.104	0.103	0.102	0.161	0.159	0.16	0.157
Boron (B)	mg/l	0.221	0.222	0.215	1.27	1.26	1.27	1.24
Calcium (Ca)	mg/l	19.8	20	19.5	37	36.7	37	36.2
Iron (Fe)	mg/l	0.016	0.014	0.013	<0.01	0.018	<0.01	<0.01
Magnesium (Mg)	mg/l	7	7.06	6.95	5.14	5.13	5.12	5.02
Manganese (Mn)	mg/l	0.648	0.649	0.641	0.007	0.01	0.007	0.007
Phosphorus (P)	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Zinc (Zn)	mg/l	0.267	0.275	0.263	<0.005	0.02	<0.005	<0.005
Antimony (Sb)	µg/l	<1	<1	<1	10.5	10.9	10.8	10.7
Arsenic (As)	µg/l	3.05	3.28	3.32	38	39.3	38.5	39
Cadmium (Cd)	µg/l	<1	<1	<1	<1	<1	<1	<1
Chromium (Cr)	µg/l	<1	<1	<1	<1	<1	<1	<1
Copper (Cu)	µg/l	3.49	3.46	3.24	<1	<1	<1	<1
Lead (Pb)	µg/l	<1	<1	<1	<1	<1	<1	<1
Molybdenum (Mo)	µg/l	1.18	1.08	1.05	175	177	175	178
Nickel (Ni)	µg/l	42.4	43.5	42	<1	1.14	<1	<1
Selenium (Se)	µg/l	1.96	2.07	1.81	46.9	47.6	48.6	48.5
Thallium (Tl)	µg/l	1.25	1.32	1.28	0.967	0.962	0.978	0.951
Mercury (CVAFS)	mg/l	<0.500	<0.500	<0.500	0.941	1.03	0.987	0.761
TDS	mg/l	230	240	240	220	230	230	230
TSS	mg/l	<5	<5	<5	<5	<5	<5	<5

Outfall 008 Decanting

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

MAXIMUM DATA POINTS = 58

REQUIRED DATA ENTRY

Table 1. Project Information

	☐ CHECK IF HQW OR ORW WQS
Facility Name	Cape Fear Steam Electric Plant
WWTP/WTP Class	Class II
NPDES Permit	NC0003433
Outfall	008 - Ash Basin Dewatering
Flow, Qw (MGD)	0.720
Receiving Stream	Cape Fear River
HUC Number	03030002
Stream Class	WS-IV
☑ Apply WS Hardness WQC	
7Q10s (cfs)	65.00
7Q10w (cfs)	89.00
30Q2 (cfs)	150.00
QA (cfs)	3170.00
1Q10s (cfs)	53.22
Effluent Hardness	25 mg/L (Avg)
Upstream Hardness	25 mg/L (Avg)
Combined Hardness Chronic	25 mg/L
Combined Hardness Acute	25 mg/L
Data Source(s)	Ash Basins Interstitial Water Data 2014 - highest pollutant concentration, 500 GPM treatment flow; USGS suggested flow data, default hradness
☐ CHECK TO APPLY MODEL	
	Follow directions for data entry. In some cases a comment menu list the available choices or a dropdown menu will provide a list you may select from. Error message occur if data entry does not meet input criteria.

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	Total Dissolved Solids	Water Supply	NC	500	WS			mg/L
Par04	Cadmium	Aquatic Life	NC	0.5899	FW	3.2396		ug/L
Par05	Chlorides	Water Supply	NC	250	WS			mg/L
Par06	Aluminum	Water Supply	NC	6.5	WS			mg/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	Antimony	Water Supply	NC	5.6	WS			µg/L
Par23	Barium	Water Supply	NC	1	WS			mg/L
Par24	Sulfates	Water Supply	NC	250	WS			mg/L
Par25	Thallium	Water Supply	NC	2	WS			µg/L

Cape Fear Steam Electric Plant
NC0003433

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

Outfall 008 - Ash Basin Dewatering
Qw = 0.72 MGD

MAXIMUM DATA POINTS = 58

Qw (MGD) = **0.72**
1Q10S (cfs) = **53.22**
7Q10S (cfs) = **65.00**
7Q10W (cfs) = **89.00**
30Q2 (cfs) = **150.00**
Avg. Stream Flow, QA (cfs) = **3170.00**
Receiving Stream: **Cape Fear River HUC 03030002**

WWTP/WTP Class: **Class II**
IWC% @ 1Q10S = **2.053886926**
IWC% @ 7Q10S = **1.687942404**
IWC% @ 7Q10W = **1.238403835**
IWC% @ 30Q2 = **0.738505519**
IW%C @ QA = **0.035192658**
Stream Class: **WS-IV**

COMBINED HARDNESS (mg/L)
Acute = 25 mg/L
Chronic = 25 mg/L
YOU HAVE DESIGNATED THIS RECEIVING STREAM AS WATER SUPPLY
Effluent Hard: 0 value > 100 mg/L
Effluent Hard Avg = 25 mg/L

PARAMETER	TYPE (1)	NC STANDARDS OR EPA CRITERIA			PQL	UNITS	REASONABLE POTENTIAL RESULTS				RECOMMENDED ACTION
		Chronic	Applied Standard	Acute			n	# Det.	Max Pred Cw	Allowable Cw	
Arsenic	**C**	150	FW(7Q10s)	340		ug/L	2	2	2,486.2	Acute (FW): 16,554.0 Chronic (FW): 8,886.6 No value > Allowable Cw	Major pollutant of concern apply weekly monitoring
Arsenic	**C**	10	HH/WS(Qavg)			ug/L	**Note: n ≤ 9** **Limited data set**		Default C.V.	Chronic (HH): 28,415.0 No value > Allowable Cw	Major pollutant of concern apply weekly monitoring
Total Dissolved Solids	**NC**	500	WS(7Q10s)			mg/L	2 **Note: n ≤ 9** **Limited data set**	2	2,008.70 Default C.V.	Acute: NO WQS Chronic: 29,621.86 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Cadmium	**NC**	0.5899	FW(7Q10s)	3.2396		ug/L	2 **Note: n ≤ 9** **Limited data set**	0	18.950 Default C.V. *NO DETECTS*	Acute: 157.731 Chronic: 34.947 Max MDL = 10	No RP , Predicted Max ≥ 50% of Allowable Cw - apply weekly Monitoring
Chlorides	**NC**	250	WS(7Q10s)			mg/L	2 **Note: n ≤ 9** **Limited data set**	2	113.6 Default C.V.	Acute: NO WQS Chronic: 14,810.9 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Aluminum	**NC**	6.5	WS(7Q10s)			mg/L	2 **Note: n ≤ 9** **Limited data set**	2	362.7 Default C.V.	Acute: NO WQS Chronic: 385.1 No value > Allowable Cw	No RP , Predicted Max ≥ 50% of Allowable Cw - apply weekly Monitoring
Chromium III	**NC**	117.7325	FW(7Q10s)	905.0818		µg/L	0	0	N/A	Acute: 44,066.8 Chronic: 6,974.9	
Chromium VI	**NC**	11	FW(7Q10s)	16		µg/L	0	0	N/A	Acute: 779.0 Chronic: 651.7	
Chromium, Total	**NC**					µg/L	Tot Cr value(s) > 50 but < Cr VI Allowable Cw 2 **Note: n ≤ 9** **Limited data set**	2	587.5 Default C.V.	Max reported value = 155	a. No Monitoring required if all Total Chromium samples are < the Chromium VI Allowable Cw
Copper	**NC**	7.8806	FW(7Q10s)	10.4720		ug/L	2 **Note: n ≤ 9** **Limited data set**	2	1,546.32 Default C.V.	Acute: 509.86 Chronic: 466.88 No value > Allowable Cw	RP for Limited Dataset (n<8 samples) - apply weekly Monitoring

Fluoride	**NC**	1800	FW(7Q10s)			ug/L	2 1 **Note: n ≤ 9** **Limited data set**	8,368.3 Default C.V.	Acute: NO WQS Chronic: 106,638.7 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Lead	**NC**	2.9416	FW(7Q10s)	75.4871		ug/L	2 2 **Note: n ≤ 9** **Limited data set**	424.480 Default C.V.	Acute: 3,675.329 Chronic: 174.273 No value > Allowable Cw	RP for Limited Dataset (n<8 samples) - apply weekly Monitoring
Mercury	**NC**	12	FW(7Q10s)		0.5	ng/L	2 2 **Note: n ≤ 9** **Limited data set**	290,314,000.0 Default C.V.	Acute: NO WQS Chronic: 710.9 2 value(s) > Allowable Cw	Value > stringent TBEL - apply limit of 47 ng/L annual average with weekly monitoring
Molybdenum	**NC**	160	WS(7Q10s)			ug/L	2 2 **Note: n ≤ 9** **Limited data set**	1,197.6 Default C.V.	Acute: NO WQS Chronic: 9,479.0 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Nickel	**NC**	37.2313	FW(7Q10s)	335.2087		µg/L	2 2 **Note: n ≤ 9** **Limited data set**	462.4 Default C.V.	Acute (FW): 16,320.7 Chronic (FW): 2,205.7 No value > Allowable Cw	
Nickel	**NC**	25.0000	WS(7Q10s)			µg/L			Chronic (WS): 1,481.1 No value > Allowable Cw	Polluant of concern, apply weekly monitoring
Selenium	**NC**	5	FW(7Q10s)	56		ug/L	2 2 **Note: n ≤ 9** **Limited data set**	1,614.5 Default C.V.	Acute: 2,726.5 Chronic: 296.2 1 value(s) > Allowable Cw	RP shown - apply Weekly Monitoring with Limit
Zinc	**NC**	126.7335	FW(7Q10s)	125.7052		ug/L	2 2 **Note: n ≤ 9** **Limited data set**	2,039.0 Default C.V.	Acute: 6,120.4 Chronic: 7,508.2 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Antimony	**NC**	5.6	WS(7Q10s)			µg/L	2 0 **Note: n ≤ 9** **Limited data set**	18.95000 Default C.V. *NO DETECTS*	Acute: NO WQS Chronic: 331.76487 Max MDL = 10	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Barium	**NC**	1	WS(7Q10s)			mg/L	2 2 **Note: n ≤ 9** **Limited data set**	5.60920 Default C.V.	Acute: NO WQS Chronic: 59.24373 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Sulfates	**NC**	250	WS(7Q10s)			mg/L	2 2 **Note: n ≤ 9** **Limited data set**	1,671.39000 Default C.V.	Acute: NO WQS Chronic: 14810.93190 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Thallium	**NC**	2	WS(7Q10s)			µg/L	2 2 **Note: n ≤ 9** **Limited data set**	18.79840 Default C.V.	Acute: NO WQS Chronic: 118.48746 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required

REASONABLE POTENTIAL ANALYSIS

H1 — Effluent Hardness

	Date	Data	BDL=1/2DL	Results	
1	default	25	25	Std Dev.	0.0000
2				Mean	25.0000
3				C.V. (default)	0.6000
4				n	1
5				10th Per value	25.00 mg/L
6				Average Value	25.00 mg/L
7				Max. Value	25.00 mg/L
8					
9					

H2 — Upstream Hardness

	Date	Data	BDL=1/2DL	Results	
1	default	25	25	Std Dev.	0.0000
2				Mean	25.0000
3				C.V. (default)	0.6000
4				n	1
5				10th Per value	25.00 mg/L
6				Average Value	25.00 mg/L
7				Max. Value	25.00 mg/L
8					
9					

Par01 & Par02 — Arsenic

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	656	656	Std Dev.	413.6575
2		71	71	Mean	363.5000
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	656.0 ug/L
8				Max. Pred Cw	2486.2 ug/L
9					

Par03 — Total Dissolved Solids

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	530	530	Std Dev.	35.3553
2		480	480	Mean	505.0000
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	530.00 mg/L
8				Max. Pred Cw	2008.70 mg/L
9					

Par04 — Cadmium

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	< 10	5	Std Dev.	0.0000
2		< 10	5	Mean	5.0000
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	5.000 ug/L
8				Max. Pred Cw	18.950 ug/L
9					

Par05 — Chlorides

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	29.97	29.97	Std Dev.	2.3759
2		26.61	26.61	Mean	28.3
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.8
7				Max. Value	30.0 mg/L
8				Max. Pred Cw	113.6 mg/L
9					

Par06 — Aluminum

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	95.7	95.7	Std Dev.	16.7584
2		72	72	Mean	83.8500
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	95.7 mg/L
8				Max. Pred Cw	362.7 mg/L
9					

Par10 — Chromium, Total

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	155	155	Std Dev.	78.0646
2		44.6	44.6	Mean	99.8000
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	155.0 µg/L
8				Max. Pred Cw	587.5 µg/L
9					

Pa11 — Copper

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	408	408	Std Dev.	161.9275
2		179	179	Mean	293.5000
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	408.00 ug/L
8				Max. Pred Cw	1546.32 ug/L
9					

Par13 — Fluoride

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	2208	2208	Std Dev.	1560.9382
2		< 1	0.5	Mean	1104.2500
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	2208.0 ug/L
8				Max. Pred Cw	8368.3 ug/L
9					

Par14 — Lead

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	112	112	Std Dev.	14.2128
2		91.9	91.9	Mean	101.9500
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	112.000 ug/L
8				Max. Pred Cw	424.480 ug/L
9					

Par16 — Molybdenum

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	316	316	Std Dev.	207.4651
2		22.6	22.6	Mean	169.3000
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	316.0 ug/L
8				Max. Pred Cw	1197.6 ug/L
9					

Par17 & Par18 — Nickel

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	122	122	Std Dev.	19.7283
2		94.1	94.1	Mean	108.0500
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	122.0 µg/L
8				Max. Pred Cw	462.4 µg/L
9					

Par19 — Selenium

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	426	426	Std Dev.	261.8416
2		55.7	55.7	Mean	240.8500
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	426.0 ug/L
8				Max. Pred Cw	1614.5 ug/L
9					

Par21 — Zinc

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	538	538	Std Dev.	239.0021
2		200	200	Mean	369.0000
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	538.0 ug/L
8				Max. Pred Cw	2039.0 ug/L
9					

Par22 — Antimony

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	< 10	5	Std Dev.	0.0000
2		< 10	5	Mean	5.0000
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	5.000000 µg/L
8				Max. Pred Cw	18.950000 µg/L
9					

Par23 — Barium

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	1.48	1.48	Std Dev.	0.0849
2		1.36	1.36	Mean	1.4200
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	1.480000 mg/L
8				Max. Pred Cw	5.609200 mg/L
9					

Par24 — Sulfates

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	441	441	Std Dev.	191.8381
2		169.7	169.7	Mean	305.3500
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	441.000 mg/L
8				Max. Pred Cw	1671.390 mg/L
9					

Par25 — Thallium

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	4.96	4.96	Std Dev.	1.0677
2		3.45	3.45	Mean	4.2050
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	4.960000 µg/L
8				Max. Pred Cw	18.798400 µg/L
9					

Par26 — Mercury

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	4E+07	40600000	Std Dev.	25455844
2		8E+07	76600000	Mean	58600000
3				C.V. (default)	1
4				n	2
5					
6				Mult Factor =	4
7				Max. Value	76600000 µg/L
8				Max. Pred Cw	290314000 µg/L
9					

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

Date: 6/4/2018

FACILITY: Cape Fear Steam Electric Plant
NPDES PERMIT: NC0003433

Dissolved to Total Metal Calculator

In accordance with Federal Regulations, permit limitations must be written as Total Metals per 40 CFR 122.45(c)

Receiving Stream summer 7Q10 (CFS)	Receiving Stream summer 7Q10 (MGD)	Rec. Stream 1Q10 [MGD]	NPDES Flow Limit [MGD]	Total Suspended Solids -Fixed Value- (mg/L)	Combined Hardness chronic (mg/L)	Combined Hardness Acute (mg/L)	Instream Wastewater Concentration (Chronic)	Instream Wastewater Concentration (Acute)	Upstream Hardness Average (mg/L)	Effluent Hardness Average (mg/L)
65.0000	41.9355	34.3355	0.7200	10	25.000	25.000	1.6879	2.0539	25	25

Upstream Hard Avg (mg/L) = 25
EFF Hard Avg (mg/L) = 25

PARAMETER	Dissolved Metals Chronic [ug/l]	Dissolved Metals Acute [ug/l]	US EPA **Translators**- using Default Partition Coefficients (streams)	Maximum Allowable Effluent Concentration (MAEC) as a **Total Metal** =Dissolved Metal ÷ Translator Chronic [ug/l]	MAEC as a **Total Metal** =Dissolved Metal ÷ Translator Acute [ug/l]
Cadmium (d)	0.15	0.82	0.252	0.59	3.24
Cd -Trout streams	0.15	0.51	0.252	0.59	2.01
Chromium III (d)(h)	24	183	0.202	117.73	905.08
Chromium VI (d)	11	16	1.000	11.00	16.00
Chromium, Total (t)				N/A	N/A
Copper (d)(h)	2.7	3.6	0.348	7.88	10.47
Lead (d)(h)	0.54	14	0.184	2.94	75.49
Nickel (d)(h)	16	145	0.432	37.23	335.21
Ni - WS streams (t)				25	N/A
Silver (d)(h,acute)	0.06	0.30	1.000	0.06	0.30
Zinc (d)(h)	36	36	0.288	126.73	125.71
Beryllium	6.5	65	1.000	6.5	65
Arsenic (d)	150	340	1.000	150	340

COMMENTS (identify parameters to PERCS Branch to maintain in facility's LTMP/STMP):

(d) = dissolved metal standard. See 15A NCAC 02B .0211 for more information.
(h) = hardness-dependent dissolved metal standard. See 15A NCAC 02B .0211 for more information.
(t) = based upon measurement of total recoveable metal. See 15A NCAC 02B .0211 for more information.
The Human Health standard for Nickel in Water Supply Streams is 25 mg/L which is Total Recoverable metal standard.
The Human Health standard for Arsenic is 10 µg/L which is Total Recoverable metal standard.

EAST WEST

Cape Fear Plant Ash Basin Water Characterization Water Samples Collected January 15, 2015 (Page 2 of 2)

Parameter	Units	Sample Description						
		PZ-6	PZ-6 0.45 filter	PZ-6 10u filter	PZ-6 20u filter	PZ-9	PZ-9 10u filter	PZ-9 20u filter
NO2 +NO3	mg/l	<0.01	0.016	0.023	0.01	<0.01	0.317	0.333
Total Kjeldahl Nitrogen	mg/l	2.3	0.92	1	1.1	6	<0.15	0.53
Bromide	mg/l	2.313	1.947	2.026	2.168	<1	<1	<1
Chloride	mg/l	26.61	22.83	23.03	24.9	29.97	27.77	30.4
Fluoride	mg/l	2.208	1.952	1.965	2.118	<1	<1	<1
Sulfate	mg/L ~~ug/l~~	169.7	159.2	157.7	157.3	441.1	301.8	297.9
Aluminum (Al)	mg/l	72	0.034	0.323	2.86	95.7	0.615	4.39
Barium (Ba)	mg/l	1.48	0.215	0.215	0.261	1.36	0.051	0.077
Boron (B)	mg/l	3.91	3.9	3.81	3.84	0.246	0.25	0.259
Calcium (Ca)	mg/l	123	118	116	117	90.1	45.1	45.1
Iron (Fe)	mg/l	27	0.036	0.156	1.09	374	1.22	14.5
Magnesium (Mg)	mg/l	20.7	15.2	15	15.2	35.3	16.3	16.4
Manganese (Mn)	mg/l	0.746	0.558	0.548	0.559	3.52	0.982	1.04
Phosphorus (P)	mg/l	1.08	0.091	0.108	0.155	1.31	<0.02	0.065
Vanadium (V)	mg/l	0.334	0.022	0.023	0.035	0.324	<0.005	0.012
Zinc (Zn)	mg/l	0.2	<0.005	<0.005	0.013	0.538	0.133	0.149
Antimony (Sb)	µg/l	<10	3.56	3.64	4.06	<10	<1	<1
Arsenic (As)	µg/l	656	378	375	386	71	1.61	10.7
Cadmium (Cd)	µg/l	<10	<1	<1	<1	<10	<1	<1
Chromium (Cr)	µg/l	44.6	<1	<1	2.33	155	1.34	7.8
Copper (Cu)	µg/l	179	4.63	5.78	14.6	408	4.87	20.6
Lead (Pb)	µg/l	91.9	<1	<1	5.69	112	<1	5.46
Molybdenum (Mo)	µg/l	316	339	337	335	22.6	<1	3.58
Nickel (Ni)	µg/l	94.1	7.93	8.33	13.6	122	48.4	51
Selenium (Se)	µg/l	55.7	1.53	1.36	2.47	426	229	239
Thallium (Tl)	µg/l	3.45	0.603	0.576	0.717	4.96	1.34	1.43
Vanadium (V)	µg/l	232	21.5	23	31.6	233	1.11	9.39
Mercury (CVAFS)	mg/l	40.6	0.92	3.02	16.5	76.6	12.9	33.2
pH	SI Units	7.93	8.18	8.06	8.04	5.19	5.82	5.53
TDS	mg/l	530	530	540	530	480	490	470
TSS	mg/l	2000	<10	<10	96	5700	66	680

Outfall 008 Dewatering

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

MAXIMUM DATA POINTS = 58

REQUIRED DATA ENTRY

Table 1. Project Information

	☐ CHECK IF HQW OR ORW WQS
Facility Name	Cape Fear Steam Electric Plant
WWTP/WTP Class	Class II
NPDES Permit	NC0003433
Outfall	008 - Ash Basin Dewatering/GWR
Flow, Qw (MGD)	0.720
Receiving Stream	Cape Fear River
HUC Number	03030002
Stream Class	WS-IV
☑ Apply WS Hardness WQC	
7Q10s (cfs)	65.00
7Q10w (cfs)	89.00
30Q2 (cfs)	150.00
QA (cfs)	3170.00
1Q10s (cfs)	53.22
Effluent Hardness	25 mg/L (Avg)
Upstream Hardness	25 mg/L (Avg)
Combined Hardness Chronic	25 mg/L
Combined Hardness Acute	25 mg/L
Data Source(s)	Ash Basins Interstitial Water Data 2014 AND Higest GWR - highest pollutant concentration, 500 GPM treatment flow; USGS suggested flow and data NOTE: develope seprate limitaion page fro GWR only with reduces frequancy but same limits
☐ CHECK TO APPLY MODEL	
	Follow directions for data entry. In some cases a comment menu list the available choices or a dropdown menu will provide a list you may select from. Error message occur if data entry does not meet input criteria.

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	Total Dissolved Solids	Water Supply	NC	500	WS			mg/L
Par04	Cadmium	Aquatic Life	NC	0.5899	FW	3.2396		ug/L
Par05	Chlorides	Water Supply	NC	250	WS			mg/L
Par06	Aluminum	Water Supply	NC	6.5	WS			mg/L
Par07	Beryllium	Aquatic Life	NC	6.5	FW	65		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	Antimony	Water Supply	NC	5.6	WS			µg/L
Par23	Barium	Water Supply	NC	1	WS			mg/L
Par24	Sulfates	Water Supply	NC	250	WS			mg/L
Par25	Thallium	Water Supply	NC	2	WS			µg/L

Cape Fear Steam Electric Plant ≥ **Outfall 008 - Ash Basin Dewatering/GWR**

NC0003433 **Freshwater RPA - 95% Probability/95% Confidence Using Metal Translators** **Qw = 0.72 MGD**

MAXIMUM DATA POINTS = 58

Qw (MGD) = **0.72**
1Q10S (cfs) = **53.22**
7Q10S (cfs) = **65.00**
7Q10W (cfs) = **89.00**
30Q2 (cfs) = **150.00**
Avg. Stream Flow, QA (cfs) = **3170.00**
Receiving Stream: **Cape Fear River HUC 03030002**

WWTP/WTP Class: **Class II**
IWC% @ 1Q10S = **2.053886926**
IWC% @ 7Q10S = **1.687942404**
IWC% @ 7Q10W = **1.238403835**
IWC% @ 30Q2 = **0.738505519**
IW%C @ QA = **0.035192658**
Stream Class: **WS-IV**

COMBINED HARDNESS (mg/L)
Acute = 25 mg/L
Chronic = 25 mg/L
YOU HAVE DESIGNATED THIS RECEIVING STREAM AS WATER SUPPLY
Effluent Hard: 0 value > 100 mg/L
Effluent Hard Avg = 25 mg/L

PARAMETER	TYPE (1)	NC STANDARDS OR EPA CRITERIA			PQL	UNITS	REASONABLE POTENTIAL RESULTS				RECOMMENDED ACTION
		Chronic	Applied Standard	Acute			n	# Det.	Max Pred Cw	Allowable Cw	
Arsenic	C	150	FW(7Q10s)	340		ug/L	3	3	3,030.0 Default C.V.	Acute (FW): 16,554.0	
										Chronic (FW): 8,886.6 No value > Allowable Cw	Major pollutant of concern apply weekly monitoring
Arsenic	C	10	HH/WS(Qavg)			ug/L	**Note: n ≤ 9 Limited data set**			Chronic (HH): 28,415.0 No value > Allowable Cw	Major pollutant of concern apply weekly monitoring
Total Dissolved Solids	NC	500	WS(7Q10s)			mg/L	3	3	36,000.00 Default C.V.	Acute: NO WQS	
							Note: n ≤ 9 Limited data set			Chronic: 29,621.86 No value > Allowable Cw	RP for Limited Dataset (n<8 samples) - apply Weekly Monitoring
Cadmium	NC	0.5899	FW(7Q10s)	3.2396		ug/L	3	1	15.000 Default C.V.	Acute: 157.731	
							Note: n ≤ 9 Limited data set			Chronic: 34.947 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Chlorides	NC	250	WS(7Q10s)			mg/L	3	3	2,490.0 Default C.V.	Acute: NO WQS	
							Note: n ≤ 9 Limited data set			Chronic: 14,810.9 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Aluminum	NC	6.5	WS(7Q10s)			mg/L	6	6	1,836.1 Default C.V.	Acute: NO WQS	
							Note: n ≤ 9 Limited data set			Chronic: 385.1 4 value(s) > Allowable Cw	RP shown - apply Weekly Monitoring with Limit
Beryllium	NC	6.5	FW(7Q10s)	65.0000		ug/L	4	4	865.1 Default C.V.	Acute: 3,164.7	
							Note: n ≤ 9 Limited data set			Chronic: 880.2 No value > Allowable Cw	No RP , Predicted Max ≥ 50% of Allowable Cw - apply Weekly Monitoring
Chromium III	NC	117.7325	FW(7Q10s)	905.0818		µg/L	0	0	N/A	Acute: 44,066.8	
										Chronic: 6,974.9	
Chromium VI	NC	11	FW(7Q10s)	16		µg/L	1	1	91.8 Default C.V.	Acute: 779.0	
							Note: n ≤ 9 Limited data set			Chronic: 651.7 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Chromium, Total	NC					µg/L	Tot Cr value(s) > 50 but < Cr VI Allowable Cw 3	3	552.0 Default C.V.	Max reported value = 184	a. No Monitoring required if all Total Chromium samples are < the Chromium VI Allowable Cw
							Note: n ≤ 9 Limited data set				
Copper	NC	7.8806	FW(7Q10s)	10.4720		ug/L	3	3	1,224.00 Default C.V.	Acute: 509.86	
							Note: n ≤ 9 Limited data set			Chronic: 466.88 No value > Allowable Cw	RP for Limited Dataset (n<8 samples) - apply Weekly Monitoring

Cape Fear Steam Electric Plant ≥ **Outfall 008 - Ash Basin Dewatering/GWR**

NC0003433 **Freshwater RPA - 95% Probability/95% Confidence Using Metal Translators** **Qw = 0.72 MGD**

Fluoride	**NC**	1800	FW(7Q10s)			ug/L	2 1 **Note: n ≤ 9** **Limited data set**	8,368.3 Default C.V.	Acute: NO WQS Chronic: 106,638.7 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Lead	**NC**	2.9416	FW(7Q10s)	75.4871		ug/L	3 3 **Note: n ≤ 9** **Limited data set**	336.000 Default C.V.	Acute: 3,675.329 Chronic: 174.273 No value > Allowable Cw	RP for Limited Dataset (n<8 samples) - apply Weekly Monitoring
Mercury	**NC**	12	FW(7Q10s)		0.5	ng/L	8 2 **Note: n ≤ 9** **Limited data set**	145,540,000.0 Default C.V.	Acute: NO WQS Chronic: 710.9 2 value(s) > Allowable Cw	Value > stringent TBEL - apply limit of 47 ng/L annual average with weekly monitoring
Molybdenum	**NC**	160	WS(7Q10s)			ug/L	3 3 **Note: n ≤ 9** **Limited data set**	3,720.0 Default C.V.	Acute: NO WQS Chronic: 9,479.0 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Nickel	**NC**	37.2313	FW(7Q10s)	335.2087		µg/L	6 6 **Note: n ≤ 9** **Limited data set**	5,585.4 Default C.V.	Acute (FW): 16,320.7 Chronic (FW): 2,205.7 3 value(s) > Allowable Cw	RP shown - apply Weekly Monitoring with Limit
Nickel	**NC**	25.0000	WS(7Q10s)			µg/L			Chronic (WS): 1,481.1 4 value(s) > Allowable Cw	RP shown - apply Weekly Monitoring with Limit
Selenium	**NC**	5	FW(7Q10s)	56		ug/L	3 3 **Note: n ≤ 9** **Limited data set**	1,278.0 Default C.V.	Acute: 2,726.5 Chronic: 296.2 1 value(s) > Allowable Cw	RP shown - apply Weekly Monitoring with Limit
Silver	**NC**	0.06	FW(7Q10s)	0.29639789		ug/L	1 1 **Note: n ≤ 9** **Limited data set**	39.7 Default C.V.	Acute: 14.431 Chronic: 3.555 1 value(s) > Allowable Cw	RP for Limited Dataset (n<8 samples) - apply Weekly Monitoring
Zinc	**NC**	126.7335	FW(7Q10s)	125.7052		ug/L	6 6 **Note: n ≤ 9** **Limited data set**	9,779.8 Default C.V.	Acute: 6,120.4 Chronic: 7,508.2 No value > Allowable Cw	RP for Limited Dataset (n<8 samples) - apply Weekly Monitoring
Antimony	**NC**	5.6	WS(7Q10s)			µg/L	3 1 **Note: n ≤ 9** **Limited data set**	21.00000 Default C.V.	Acute: NO WQS Chronic: 331.76487 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Barium	**NC**	1	WS(7Q10s)			mg/L	3 3 **Note: n ≤ 9** **Limited data set**	4.44000 Default C.V.	Acute: NO WQS Chronic: 59.24373 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Sulfates	**NC**	250	WS(7Q10s)			mg/L	3 3 **Note: n ≤ 9** **Limited data set**	69,000.00000 Default C.V.	Acute: NO WQS Chronic: 14810.93190 1 value(s) > Allowable Cw	RP for Limited Dataset (n<8 samples) - apply Weekly Monitoring
Thallium	**NC**	2	WS(7Q10s)			µg/L	3 3 **Note: n ≤ 9** **Limited data set**	39.30000 Default C.V.	Acute: NO WQS Chronic: 118.48746 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required

REASONABLE POTENTIAL ANALYSIS

Effluent Hardness

	Date	Data	BDL=1/2DL	Results	
1	default	25	25	Std Dev.	0.0000
2				Mean	25.0000
3				C.V. (default)	0.6000
4				n	1
5				10th Per value	25.00 mg/L
6				Average Value	25.00 mg/L
7				Max. Value	25.00 mg/L
8					
9					

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

Upstream Hardness

	Date	Data	BDL=1/2DL	Results	
1	default	25	25	Std Dev.	0.0000
2				Mean	25.0000
3				C.V. (default)	0.6000
4				n	1
5				10th Per value	25.00 mg/L
6				Average Value	25.00 mg/L
7				Max. Value	25.00 mg/L
8					
9					

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

Arsenic

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	656	656	Std Dev.	474.2120
2		71	71	Mean	579.0000
3	gwr	1010	1010	C.V. (default)	0.6000
4				n	3
5					
6				Mult Factor =	3.00
7				Max. Value	1010.0 ug/L
8				Max. Pred Cw	3030.0 ug/L
9					

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

Total Dissolved Solids

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	530	530	Std Dev.	6636.6884
2		480	480	Mean	4336.6667
3	gwr	12000	12000	C.V. (default)	0.6000
4				n	3
5					
6				Mult Factor =	3.00
7				Max. Value	12000.00 mg/L
8				Max. Pred Cw	36000.00 mg/L
9					

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

Par04

Cadmium

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	< 10	5	Std Dev.	1.2471
2		< 10	5	Mean	4.2800
3	gwr	2.84	2.84	C.V. (default)	0.6000
4				n	3
5					
6				Mult Factor =	3.00
7				Max. Value	5.000 ug/L
8				Max. Pred Cw	15.000 ug/L
9					

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

Par05

Chlorides

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	29.97	29.97	Std Dev.	462.8705
2		26.61	26.61	Mean	295.5
3	gwr	830	830	C.V. (default)	0.6000
4				n	3
5					
6				Mult Factor =	3.0
7				Max. Value	830.0 mg/L
8				Max. Pred Cw	2,490.0 mg/L
9					

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

Par06

Aluminum

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	95.7	95.7	Std Dev.	314.09
2		72	72	Mean	450.28
3	gwr	858	858	C.V. (default)	0.6000
4		466	466	n	6
5		534	534		
6		676	676	Mult Factor =	2.14
7				Max. Value	858.0 mg/L
8				Max. Pred Cw	1836.1 mg/L
9					

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

Par07

Beryllium

	Date	Data	BDL=1/2DL	Results	
1	gwr	334	334	Std Dev.	25.3689
2		318	318	Mean	308.7500
3		309	309	C.V. (default)	0.6000
4		274	274	n	4
5					
6				Mult Factor =	2.59
7				Max. Value	334.0 ug/L
8				Max. Pred Cw	865.1 ug/L
9					

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

Par09

Chromium VI

	Date	Data	BDL=1/2DL	Results	
1	gwr	14.8	14.8	Std Dev.	0.0000
2				Mean	14.8000
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	14.8 µg/L
8				Max. Pred Cw	91.8 µg/L
9					

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

Par10

Chromium, Total

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	155	155	Std Dev.	73.5544
2		44.6	44.6	Mean	127.8667
3	gwr	184	184	C.V. (default)	0.6000
4				n	3
5					
6				Mult Factor =	3.00
7				Max. Value	184.0 µg/L
8				Max. Pred Cw	552.0 µg/L
9					

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

Pa11

Copper

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	408	408	Std Dev.	174.2479
2		179	179	Mean	217.6667
3	gwr	66	66	C.V. (default)	0.6000
4				n	3
5					
6				Mult Factor =	3.00
7				Max. Value	408.00 ug/L
8				Max. Pred Cw	1224.00 ug/L
9					

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

Par13

Fluoride

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	2208	2208	Std Dev.	1560.9382
2		< 1	0.5	Mean	1104.2500
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	2208.0 ug/L
8				Max. Pred Cw	8368.3 ug/L
9					

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

Par14

Lead

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	112	112	Std Dev.	29.9951
2		91.9	91.9	Mean	85.6333
3	gwr	53	53	C.V. (default)	0.6000
4				n	3
5					
6				Mult Factor =	3.00
7				Max. Value	112.000 ug/L
8				Max. Pred Cw	336.000 ug/L
9					

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

Par16

Molybdenum

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	316	316	Std Dev.	635.3375
2		22.6	22.6	Mean	526.2000
3	gwr	1240	1240	C.V. (default)	0.6000
4				n	3
5					
6				Mult Factor =	3.00
7				Max. Value	1240.0 ug/L
8				Max. Pred Cw	3720.0 ug/L
9					

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

Par17 & Par18

Nickel

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	122	122	Std Dev.	1200.0533
2		94.1	94.1	Mean	1634.3500
3	gwr	2610	2610	C.V. (default)	0.6000
4		2600	2600	n	6
5		2330	2330		
6		2050	2050	Mult Factor =	2.14
7				Max. Value	2610.0 µg/L
8				Max. Pred Cw	5585.4 µg/L
9					

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

Par19

Selenium

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	426	426	Std Dev.	203.1372
2		55.7	55.7	Mean	192.6000
3	gwr	96.1	96.1	C.V. (default)	0.6000
4				n	3
5					
6				Mult Factor =	3.00
7				Max. Value	426.0 ug/L
8				Max. Pred Cw	1278.0 ug/L
9					

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

Par20

Silver

	Date	Data	BDL=1/2DL	Results	
1	gwr	6.4	6.4	Std Dev.	0.0000
2				Mean	6.4000
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	6.400 ug/L
8				Max. Pred Cw	39.680 ug/L
9					

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

Par21

Zinc

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	538	538	Std Dev.	1885.5563
2		200	200	Mean	2754.6667
3	gwr	4570	4570	C.V. (default)	0.6000
4		3920	3920	n	6
5		3850	3850		
6		3450	3450	Mult Factor =	2.14
7				Max. Value	4570.0 ug/L
8				Max. Pred Cw	9779.8 ug/L
9					

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

Par22

Antimony

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	< 10	5	Std Dev.	1.15
2		< 10	5	Mean	5.67
3	gwr	7	7	C.V. (default)	0.6000
4				n	3
5					
6				Mult Factor =	3.00
7				Max. Value	7.00 µg/L
8				Max. Pred Cw	21.00 µg/L
9					

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

Par23

Barium

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	1.48	1.48	Std Dev.	0.34
2		1.36	1.36	Mean	1.23
3	gwr	0.842	0.842	C.V. (default)	0.6000
4				n	3
5					
6				Mult Factor =	3.00
7				Max. Value	1.48 mg/L
8				Max. Pred Cw	4.44 mg/L
9					

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

Par24

Sulfates

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	441	441	Std Dev.	12677.43
2		1697	1697	Mean	8379.33
3	gwr	23000	23000	C.V. (default)	0.6000
4				n	3
5					
6				Mult Factor =	3.00
7				Max. Value	23000.00 mg/L
8				Max. Pred Cw	69000.00 mg/L
9					

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

Par25

Thallium

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	4.96	4.96	Std Dev.	5.19
2		3.45	3.45	Mean	7.17
3	gwr	13.1	13.1	C.V. (default)	0.6000
4				n	3
5					
6				Mult Factor =	3.00
7				Max. Value	13.10 µg/L
8				Max. Pred Cw	39.30 µg/L
9					

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

Par26

Mercury

	Date	Data	BDL=1/2DL	Results	
1	1/15/2015	4E+07	40600000	Std Dev.	28782275
2		8E+07	76600000	Mean	14650019
3	gwr	< 50	25	C.V. (default)	1
4		< 50	25	n	8
5		< 50	25		
6		< 50	25	Mult Factor =	2
7		< 50	25	Max. Value	76600000 µg/L
8		< 50	25	Max. Pred Cw	145540000 µg/L
9					

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

Date: 6/4/2018

FACILITY: Cape Fear Steam Electric Plant
NPDES PERMIT: NC0003433

Dissolved to Total Metal Calculator

In accordance with Federal Regulations, permit limitations must be written as Total Metals per 40 CFR 122.45(c)

Receiving Stream summer 7Q10 (CFS)	Receiving Stream summer 7Q10 (MGD)	Rec. Stream 1Q10 [MGD]	NPDES Flow Limit [MGD]	Total Suspended Solids -Fixed Value- (mg/L)	Combined Hardness chronic (mg/L)	Combined Hardness Acute (mg/L)	Instream Wastewater Concentration (Chronic)	Instream Wastewater Concentration (Acute)	Upstream Hardness Average (mg/L)	Effluent Hardness Average (mg/L)
65.0000	41.9355	34.3355	0.7200	10	25.000	25.000	1.6879	2.0539	25	25

Upstream Hard Avg (mg/L) = 25
EFF Hard Avg (mg/L) = 25

PARAMETER	Dissolved Metals Chronic [ug/l]	Dissolved Metals Acute [ug/l]	US EPA **Translators**- using Default Partition Coefficients (streams)	Maximum Allowable Effluent Concentration (MAEC) as a **Total Metal** =Dissolved Metal ÷ Translator Chronic [ug/l]	MAEC as a **Total Metal** =Dissolved Metal ÷ Translator Acute [ug/l]
Cadmium (d)	0.15	0.82	0.252	0.59	3.24
Cd -Trout streams	0.15	0.51	0.252	0.59	2.01
Chromium III (d)(h)	24	183	0.202	117.73	905.08
Chromium VI (d)	11	16	1.000	11.00	16.00
Chromium, Total (t)				N/A	N/A
Copper (d)(h)	2.7	3.6	0.348	7.88	10.47
Lead (d)(h)	0.54	14	0.184	2.94	75.49
Nickel (d)(h)	16	145	0.432	37.23	335.21
Ni - WS streams (t)				25	N/A
Silver (d)(h,acute)	0.06	0.30	1.000	0.06	0.30
Zinc (d)(h)	36	36	0.288	126.73	125.71
Beryllium	6.5	65	1.000	6.5	65
Arsenic (d)	150	340	1.000	150	340

COMMENTS (identify parameters to PERCS Branch to maintain in facility's LTMP/STMP):

(d) = dissolved metal standard. See 15A NCAC 02B .0211 for more information.
(h) = hardness-dependent dissolved metal standard. See 15A NCAC 02B .0211 for more information.
(t) = based upon measurement of total recoveable metal. See 15A NCAC 02B .0211 for more information.
The Human Health standard for Nickel in Water Supply Streams is 25 mg/L which is Total Recoverable metal standard.
The Human Health standard for Arsenic is 10 µg/L which is Total Recoverable metal standard.

EAST WEST

Cape Fear Plant Ash Basin Water Characterization Water Samples Collected January 15, 2015 (Page 2 of 2)

Parameter	Units	Sample Description						
		PZ-6	PZ-6 0.45 filter	PZ-6 10u filter	PZ-6 20u filter	PZ-9	PZ-9 10u filter	PZ-9 20u filter
NO2 +NO3	mg/l	<0.01	0.016	0.023	0.01	<0.01	0.317	0.333
Total Kjeldahl Nitrogen	mg/l	2.3	0.92	1	1.1	6	<0.15	0.53
Bromide	mg/l	2.313	1.947	2.026	2.168	<1	<1	<1
Chloride	mg/l	26.61	22.83	23.03	24.9	29.97	27.77	30.4
Fluoride	mg/l	2.208	1.952	1.965	2.118	<1	<1	<1
Sulfate	mg/L ~~ug/l~~	169.7	159.2	157.7	157.3	441.1	301.8	297.9
Aluminum (Al)	mg/l	72	0.034	0.323	2.86	95.7	0.615	4.39
Barium (Ba)	mg/l	1.48	0.215	0.215	0.261	1.36	0.051	0.077
Boron (B)	mg/l	3.91	3.9	3.81	3.84	0.246	0.25	0.259
Calcium (Ca)	mg/l	123	118	116	117	90.1	45.1	45.1
Iron (Fe)	mg/l	27	0.036	0.156	1.09	374	1.22	14.5
Magnesium (Mg)	mg/l	20.7	15.2	15	15.2	35.3	16.3	16.4
Manganese (Mn)	mg/l	0.746	0.558	0.548	0.559	3.52	0.982	1.04
Phosphorus (P)	mg/l	1.08	0.091	0.108	0.155	1.31	<0.02	0.065
Vanadium (V)	mg/l	0.334	0.022	0.023	0.035	0.324	<0.005	0.012
Zinc (Zn)	mg/l	0.2	<0.005	<0.005	0.013	0.538	0.133	0.149
Antimony (Sb)	µg/l	<10	3.56	3.64	4.06	<10	<1	<1
Arsenic (As)	µg/l	656	378	375	386	71	1.61	10.7
Cadmium (Cd)	µg/l	<10	<1	<1	<1	<10	<1	<1
Chromium (Cr)	µg/l	44.6	<1	<1	2.33	155	1.34	7.8
Copper (Cu)	µg/l	179	4.63	5.78	14.6	408	4.87	20.6
Lead (Pb)	µg/l	91.9	<1	<1	5.69	112	<1	5.46
Molybdenum (Mo)	µg/l	316	339	337	335	22.6	<1	3.58
Nickel (Ni)	µg/l	94.1	7.93	8.33	13.6	122	48.4	51
Selenium (Se)	µg/l	55.7	1.53	1.36	2.47	426	229	239
Thallium (Tl)	µg/l	3.45	0.603	0.576	0.717	4.96	1.34	1.43
Vanadium (V)	µg/l	232	21.5	23	31.6	233	1.11	9.39
Mercury (CVAFS)	mg/l	40.6	0.92	3.02	16.5	76.6	12.9	33.2
pH	SI Units	7.93	8.18	8.06	8.04	5.19	5.82	5.53
TDS	mg/l	530	530	540	530	480	490	470
TSS	mg/l	2000	<10	<10	96	5700	66	680

Outfall 008 Dewatering

								INORGANIC PARAMETERS (TOTAL CONCENTRATION)																
Sample ID	Associated Basin	Latitude	Longitude	Sample Collection Date	Chloride	Sulfate	Total Dissolved Solids	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Chromium (VI)	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Zinc
					mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
ABMW-1S	1985 Basin	35.59027	-79.040531	05/08/2015	20	130	360	720	**1.85**	**27.7**	94	<1	<1	<1	NA	<1	<1	<0.05	1240	4.5	3.4	NA	<0.2	<5
ABMW-4	1963 Basin	35.58791	-79.049524	05/14/2015	37	120	500	30	<1	**1010**	258	<1	<1	<1	NA	<1	<1	<0.05	35.3	3.07	<1	NA	<0.2	<5
CHATH-79-P100	1985 Basin	35.58902	-79.041608	01/07/2016	**830**	**370**	**2500**	137	<1	7.18	183	<1	<1	<1	0.063	<1	<1	<0.05	2.25	5.94	1.05	NA	<0.2	<5
CMW-6	1985 Basin	35.58576	-79.037311	10/11/2011	31	14.9	396	<100	<0.5	<5	14.4	NA	<0.08	<5	NA	66	<5	<0.2	NA	<5	<10	NA	<0.1	40.2
MW-6BR	1985 Basin	35.58574	-79.037465	06/30/2015	250	42	**770**	10	<1	<1	**842**	<1	<1	<1	NA	<1	<1	<0.05	3.17	<1	<1	NA	<0.2	<5
MW-23S	1985 Basin	35.59023	-79.03708	07/12/2016	23	210	87	42	<1	<1	56	<1	<1	**19.5**	**14.8**	<1	<1	<0.05	15.5	2.8	1.27	NA	<0.2	<5
PZ-1	1985 Basin	35.59301	-79.045201	04/22/2010	21	**350**	360	NA	<10	<10	42	<4	<2	<5	NA	<5	14	<0.1	NA	<40	<10	6.4	<50	<20
PZ-5	1985 Basin	35.58885	-79.041899	03/07/2007	24	**280**	**570**	NA	<0.58	<2	**777**	0.9	<0.5	**101**	NA	48.9	**53**	0.3	NA	84.8	<2	<2	**0.478**	360
PZ-7	1970 Basin	35.58638	-79.048355	08/06/2015	13	**18000**	**12000**	466000	<10	**193**	<500	**318**	<10	**138**	NA	<10	10	<0.05	<10	**2050**	16.4	NA	**12.6**	**3450**
				09/02/2015	22	**23000**	**12000**	534000	<10	**195**	<250	**334**	<10	**161**	NA	<10	11	<0.05	<10	**2330**	<10	NA	**13.1**	**3850**
				12/03/2015	31	**12000**	**15000 N1**	676000	<10	**128**	<50	**309**	<10	**184**	<0.03	<10	13	<0.05	<10	**2600**	<10	NA	**11.6**	**3920**
				01/06/2016	42	**12000**	**12000**	858000	<1	**166**	<500	**274**	**2.84**	**177**	<0.06	7.99	12	<0.05	1.03	**2610**	<1	NA	**12.6**	**4570**
PZ-8	1963 Basin	35.58939	-79.049605	09/05/2013	32.8	192	**529**	6290	**7**	**61.7**	370	NA	0.49 j	7.1 j	NA	16.3	5.9	<0.06	NA	8.6 j	**26.1**	NA	**1.2**	11.3 j
PZ-9	1978 Basin	35.58789	-79.047978	08/06/2015	29	110	240	1110	<1	<1	44	<1	<1	1.91	NA	6.94	<1	<0.05	<1	41.9	**96.1**	NA	**0.574**	99

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

MAXIMUM DATA POINTS = 58

REQUIRED DATA ENTRY

Table 1. Project Information

☐ CHECK IF HQW OR ORW WQS

Facility Name	Cape Fear Steam Electric Plant
WWTP/WTP Class	Class II
NPDES Permit	NC0003433
Outfall	008 - GWR only
Flow, Qw (MGD)	0.720
Receiving Stream	Cape Fear River
HUC Number	03030002
Stream Class	WS-IV
☑ Apply WS Hardness WQC	
7Q10s (cfs)	65.00
7Q10w (cfs)	89.00
30Q2 (cfs)	150.00
QA (cfs)	3170.00
1Q10s (cfs)	53.22
Effluent Hardness	25 mg/L (Avg)
Upstream Hardness	25 mg/L (Avg)
Combined Hardness Chronic	25 mg/L
Combined Hardness Acute	25 mg/L
Data Source(s)	GWR - highest pollutant concentration, 500 GPM treatment flow; USGS suggested flow and data
☐ CHECK TO APPLY MODEL	

Follow directions for data entry. In some cases a comment menu list the available choices or a dropdown menu will provide a list you may select from. Error message occur if data entry does not meet input criteria.

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	Total Dissolved Solids	Water Supply	NC	500	WS			mg/L
Par04	Cadmium	Aquatic Life	NC	0.5899	FW	3.2396		ug/L
Par05	Chlorides	Water Supply	NC	250	WS			mg/L
Par06	Aluminum	Water Supply	NC	6.5	WS			mg/L
Par07	Beryllium	Aquatic Life	NC	6.5	FW	65		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	Antimony	Water Supply	NC	5.6	WS			µg/L
Par23	Barium	Water Supply	NC	1	WS			mg/L
Par24	Sulfates	Water Supply	NC	250	WS			mg/L
Par25	Thallium	Water Supply	NC	2	WS			µg/L

Cape Fear Steam Electric Plant
NC0003433

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

Outfall 008 - GWR only
Qw = 0.72 MGD

MAXIMUM DATA POINTS = 58

Qw (MGD) = **0.72**
1Q10S (cfs) = **53.22**
7Q10S (cfs) = **65.00**
7Q10W (cfs) = **89.00**
30Q2 (cfs) = **150.00**
Avg. Stream Flow, QA (cfs) = **3170.00**
Receiving Stream: **Cape Fear River HUC 03030002**

WWTP/WTP Class: **Class II**
IWC% @ 1Q10S = **2.053886926**
IWC% @ 7Q10S = **1.687942404**
IWC% @ 7Q10W = **1.238403835**
IWC% @ 30Q2 = **0.738505519**
IW%C @ QA = **0.035192658**
Stream Class: **WS-IV**

COMBINED HARDNESS (mg/L)
Acute = 25 mg/L
Chronic = 25 mg/L
YOU HAVE DESIGNATED THIS RECEIVING STREAM AS WATER SUPPLY
Effluent Hard: 0 value > 100 mg/L
Effluent Hard Avg = 25 mg/L

PARAMETER	TYPE (1)	NC STANDARDS OR EPA CRITERIA			PQL	UNITS	REASONABLE POTENTIAL RESULTS				RECOMMENDED ACTION
		Chronic	Applied Standard	Acute			n	# Det.	Max Pred Cw	Allowable Cw	
Arsenic	**C**	150	FW(7Q10s)	340		ug/L	1	1	6,262.0 Default C.V.	Acute (FW): 16,554.0 Chronic (FW): 8,886.6 No value > Allowable Cw	Major pollutant of concern apply 2/month monitoring
Arsenic	**C**	10	HH/WS(Qavg)			ug/L	**Note: n ≤ 9** **Limited data set**			Chronic (HH): 28,415.0 No value > Allowable Cw	Major pollutant of concern apply 2/month monitoring
Total Dissolved Solids	**NC**	500	WS(7Q10s)			mg/L	3	3	36,000.00 Default C.V.	Acute: NO WQS Chronic: 29,621.86 No value > Allowable Cw	RP for Limited Dataset (n<8 samples) - apply 2/Month Monitoring
							Note: n ≤ 9 **Limited data set**				
Cadmium	**NC**	0.5899	FW(7Q10s)	3.2396		ug/L	4	1	12.950 Default C.V.	Acute: 157.731 Chronic: 34.947 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
							Note: n ≤ 9 **Limited data set**				
Chlorides	**NC**	250	WS(7Q10s)			mg/L	2	2	3,145.7 Default C.V.	Acute: NO WQS Chronic: 14,810.9 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
							Note: n ≤ 9 **Limited data set**				
Aluminum	**NC**	6.5	WS(7Q10s)			mg/L	7	7	1,724.6 Default C.V.	Acute: NO WQS Chronic: 385.1 4 value(s) > Allowable Cw	RP shown - apply 2/Month Monitoring with Limit
							Note: n ≤ 9 **Limited data set**				
Beryllium	**NC**	6.5	FW(7Q10s)	65.0000		ug/L	4	4	865.1 Default C.V.	Acute: 3,164.7 Chronic: 880.2 No value > Allowable Cw	No RP , Predicted Max ≥ 50% of Allowable Cw - apply 2/Month Monitoring
							Note: n ≤ 9 **Limited data set**				
Chromium III	**NC**	117.7325	FW(7Q10s)	905.0818		µg/L	0	0	N/A	Acute: 44,066.8 Chronic: 6,974.9	
Chromium VI	**NC**	11	FW(7Q10s)	16		µg/L	1	1	91.8 Default C.V.	Acute: 779.0 Chronic: 651.7 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
							Note: n ≤ 9 **Limited data set**				
Chromium, Total	**NC**					µg/L	Tot Cr value(s) > 50 but < Cr VI Allowable Cw 7	7	369.8 Default C.V.	Max reported value = 184	a. No Monitoring required if all Total Chromium samples are < the Chromium VI Allowable Cw
							Note: n ≤ 9 **Limited data set**				

Copper	**NC**	7.8806	FW(7Q10s)	10.4720		ug/L	5 5 **Note: n ≤ 9** **Limited data set**	153.12 Default C.V.	Acute: 509.86 Chronic: 466.88 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Lead	**NC**	2.9416	FW(7Q10s)	75.4871		ug/L	6 6 **Note: n ≤ 9** **Limited data set**	113.420 Default C.V.	Acute: 3,675.329 Chronic: 174.273 No value > Allowable Cw	No RP , Predicted Max ≥ 50% of Allowable Cw - apply 2/Monthy Monitoring
Mercury	**NC**	12	FW(7Q10s)		0.5	ng/L	6 0 **Note: n ≤ 9** **Limited data set**	*NO DETECTS*	Acute: NO WQS Chronic: 710.9 Max MDL = 50	Major pollutant of concern apply 2/month monitoring
Molybdenum	**NC**	160	WS(7Q10s)			ug/L	6 6 **Note: n ≤ 9** **Limited data set**	2,653.6 Default C.V.	Acute: NO WQS Chronic: 9,479.0 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Nickel	**NC**	37.2313	FW(7Q10s)	335.2087		µg/L	6 6 **Note: n ≤ 9** **Limited data set**	5,585.4 Default C.V.	Acute (FW): 16,320.7 Chronic (FW): 2,205.7 3 value(s) > Allowable Cw	RP shown - apply 2/Month Monitoring with Limit
Nickel	**NC**	25.0000	WS(7Q10s)			µg/L	**Limited data set**		Chronic (WS): 1,481.1 4 value(s) > Allowable Cw	RP shown - apply 2/Month Monitoring with Limit
Selenium	**NC**	5	FW(7Q10s)	56		ug/L	6 6 **Note: n ≤ 9** **Limited data set**	205.7 Default C.V.	Acute: 2,726.5 Chronic: 296.2 No value > Allowable Cw	No RP , Predicted Max ≥ 50% of Allowable Cw - apply 2/Month Monitoring
Silver	**NC**	0.06	FW(7Q10s)	0.29639789		ug/L	2 2 **Note: n ≤ 9** **Limited data set**	24.3 Default C.V.	Acute: 14.431 Chronic: 3.555 1 value(s) > Allowable Cw	RP for Limited Dataset (n<8 samples) - apply 2/Month Monitoring
Zinc	**NC**	126.7335	FW(7Q10s)	125.7052		ug/L	6 6 **Note: n ≤ 9** **Limited data set**	9,779.8 Default C.V.	Acute: 6,120.4 Chronic: 7,508.2 No value > Allowable Cw	RP for Limited Dataset (n<8 samples) - apply 2/Month Monitoring
Antimony	**NC**	5.6	WS(7Q10s)			µg/L	1 1 **Note: n ≤ 9** **Limited data set**	43.40000 Default C.V.	Acute: NO WQS Chronic: 331.76487 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Barium	**NC**	1	WS(7Q10s)			mg/L	1 1 **Note: n ≤ 9** **Limited data set**	5.22040 Default C.V.	Acute: NO WQS Chronic: 59.24373 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Sulfates	**NC**	250	WS(7Q10s)			mg/L	7 7 **Note: n ≤ 9** **Limited data set**	46,230.00000 Default C.V.	Acute: NO WQS Chronic: 14810.93190 2 value(s) > Allowable Cw	RP for Limited Dataset (n<8) but 2 values > Allowable Cw - apply 2/Month Monitoring with Limit
Thallium	**NC**	2	WS(7Q10s)			µg/L	7 7 **Note: n ≤ 9** **Limited data set**	26.33100 Default C.V.	Acute: NO WQS Chronic: 118.48746 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required

REASONABLE POTENTIAL ANALYSIS

Effluent Hardness

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

	Date	Data	BDL=1/2DL	Results	
1	default	25	25	Std Dev.	0.0000
2				Mean	25.0000
3				C.V. (default)	0.6000
4				n	1
5				10th Per value	25.00 mg/L
6				Average Value	25.00 mg/L
7				Max. Value	25.00 mg/L
8					
9					

Upstream Hardness

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

	Date	Data	BDL=1/2DL	Results	
1	default	25	25	Std Dev.	0.0000
2				Mean	25.0000
3				C.V. (default)	0.6000
4				n	1
5				10th Per value	25.00 mg/L
6				Average Value	25.00 mg/L
7				Max. Value	25.00 mg/L
8					
9					

Arsenic

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

	Date	Data	BDL=1/2DL	Results	
1	gwr	1010	1010	Std Dev.	0.0000
2				Mean	1010.0000
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	1010.0 ug/L
8				Max. Pred Cw	6262.0 ug/L
9					

Total Dissolved Solids

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

	Date	Data	BDL=1/2DL	Results	
1	gwr	12000	12000	Std Dev.	0.0000
2		12000	12000	Mean	12000.0000
3		12000	12000	C.V. (default)	0.6000
4				n	3
5					
6				Mult Factor =	3.00
7				Max. Value	12000.00 mg/L
8				Max. Pred Cw	36000.00 mg/L
9					

Par04 Cadmium

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

	Date	Data	BDL=1/2DL	Results	
1	gwr	2.84	2.84	Std Dev.	1.0800
2		< 10	5	Mean	4.4600
3		< 10	5	C.V. (default)	0.6000
4		< 10	5	n	4
5					
6				Mult Factor =	2.59
7				Max. Value	5.000 ug/L
8				Max. Pred Cw	12.950 ug/L
9					

Par05 Chlorides

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

	Date	Data	BDL=1/2DL	Results	
1	gwr	830	830	Std Dev.	410.1219
2		250	250	Mean	540.0
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.8
7				Max. Value	830.0 mg/L
8				Max. Pred Cw	3,145.7 mg/L
9					

Par06 Aluminum

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

	Date	Data	BDL=1/2DL	Results	
1	gwr	858	858	Std Dev.	358.7720
2		466	466	Mean	363.1586
3		534	534	C.V. (default)	0.6000
4		676	676	n	7
5		6.29	6.29		
6		1.1	1.1	Mult Factor =	2.01
7		0.72	0.72	Max. Value	858.0 mg/L
8				Max. Pred Cw	1724.6 mg/L
9					

Par07 Beryllium

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

	Date	Data	BDL=1/2DL	Results	
1	gwr	334	334	Std Dev.	25.3689
2		318	318	Mean	308.7500
3		309	309	C.V. (default)	0.6000
4		274	274	n	4
5					
6				Mult Factor =	2.59
7				Max. Value	334.0 ug/L
8				Max. Pred Cw	865.1 ug/L
9					

Par09 Chromium VI

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

	Date	Data	BDL=1/2DL	Results	
1	gwr	14.8	14.8	Std Dev.	0.0000
2				Mean	14.8000
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	14.8 µg/L
8				Max. Pred Cw	91.8 µg/L
9					

Par10 Chromium, Total

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

	Date	Data	BDL=1/2DL	Results	
1	gwr	184	184	Std Dev.	74.4790
2		177	177	Mean	111.7729
3		161	161	C.V. (default)	0.6000
4		138	138	n	7
5		101	101		
6		19.5	19.5	Mult Factor =	2.01
7		1.91	1.91	Max. Value	184.0 µg/L
8				Max. Pred Cw	369.8 µg/L
9					

Pa11 Copper

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

	Date	Data	BDL=1/2DL	Results	
1	gwr	66	66	Std Dev.	26.7119
2		48.9	48.9	Mean	29.2260
3		16.3	16.3	C.V. (default)	0.6000
4		7.99	7.99	n	5
5		6.94	6.94		
6				Mult Factor =	2.32
7				Max. Value	66.00 ug/L
8				Max. Pred Cw	153.12 ug/L
9					

Par14 Lead

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

	Date	Data	BDL=1/2DL	Results	
1	gwr	53	53	Std Dev.	16.7978
2		14	14	Mean	18.8333
3		10	10	C.V. (default)	0.6000
4		11	11	n	6
5		13	13		
6		12	12	Mult Factor =	2.14
7				Max. Value	53.000 ug/L
8				Max. Pred Cw	113.420 ug/L
9					

Par16 Molybdenum

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

	Date	Data	BDL=1/2DL	Results	
1	gwr	1240	1240	Std Dev.	501.4245
2		35.3	35.3	Mean	216.7867
3		15	15	C.V. (default)	0.6000
4		5	5	n	6
5		2.25	2.25		
6		3.17	3.17	Mult Factor =	2.14
7				Max. Value	1240.0 ug/L
8				Max. Pred Cw	2653.6 ug/L
9					

Par17 & Par18 Nickel

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

	Date	Data	BDL=1/2DL	Results	
1	gwr	2610	2610	Std Dev.	1222.8440
2		2600	2600	Mean	1619.4500
3		2330	2330	C.V. (default)	0.6000
4		2050	2050	n	6
5		84.8	84.8		
6		41.9	41.9	Mult Factor =	2.14
7				Max. Value	2610.0 µg/L
8				Max. Pred Cw	5585.4 µg/L
9					

Par19 Selenium

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

	Date	Data	BDL=1/2DL	Results	
1	gwr	96.1	96.1	Std Dev.	36.6832
2		26.1	26.1	Mean	24.0533
3		16.4	16.4	C.V. (default)	0.6000
4		3.4	3.4	n	6
5		1.05	1.05		
6		1.27	1.27	Mult Factor =	2.14
7				Max. Value	96.1 ug/L
8				Max. Pred Cw	205.7 ug/L
9					

Par20 Silver

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

	Date	Data	BDL=1/2DL	Results	
1	gwr	6.4	6.4	Std Dev.	3.8184
2		< 2	1	Mean	3.7000
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	6.400 ug/L
8				Max. Pred Cw	24.256 ug/L
9					

Par21 Zinc

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

	Date	Data	BDL=1/2DL	Results	
1	gwr	4570	4570	Std Dev.	1955.0295
2		3920	3920	Mean	2708.1667
3		3850	3850	C.V. (default)	0.6000
4		3450	3450	n	6
5		360	360		
6		99	99	Mult Factor =	2.14
7				Max. Value	4570.0 ug/L
8				Max. Pred Cw	9779.8 ug/L
9					

Par22 Antimony

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

	Date	Data	BDL=1/2DL	Results	
1	gwr	7	7	Std Dev.	0.0000
2				Mean	7.0000
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	7.000000 µg/L
8				Max. Pred Cw	43.400000 µg/L
9					

Par23 Barium

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

	Date	Data	BDL=1/2DL	Results	
1	gwr	0.842	0.842	Std Dev.	0.0000
2				Mean	0.8420
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	0.842000 mg/L
8				Max. Pred Cw	5.220400 mg/L
9					

Par24 Sulfates

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

	Date	Data	BDL=1/2DL	Results	
1	gwr	23000	23000	Std Dev.	9301.0043
2		18000	18000	Mean	9428.5714
3		12000	12000	C.V. (default)	0.6000
4		12000	12000	n	7
5		370	370		
6		350	350	Mult Factor =	2.01
7		280	280	Max. Value	########## mg/L
8				Max. Pred Cw	########## mg/L
9					

Par25 Thallium

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

	Date	Data	BDL=1/2DL	Results	
1	gwr	13.1	13.1	Std Dev.	6.2868
2		12.6	12.6	Mean	7.4503
3		11.6	11.6	C.V. (default)	0.6000
4		12.6	12.6	n	7
5		1.2	1.2		
6		0.574	0.574	Mult Factor =	2.01
7		0.478	0.478	Max. Value	13.100000 µg/L
8				Max. Pred Cw	26.331000 µg/L
9					

Par26 Mercury

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

	Date	Data	BDL=1/2DL	Results	
1	gwr	< 50	25	Std Dev.	0
2		< 50	25	Mean	25
3		< 50	25	C.V. (default)	1
4		< 50	25	n	6
5		< 50	25		
6		< 50	25	Mult Factor =	2
7				Max. Value	25 µg/L
8				Max. Pred Cw	O DETECTS µg/L
9					

Date: 6/4/2018

FACILITY: Cape Fear Steam Electric Plant
NPDES PERMIT: NC0003433

Dissolved to Total Metal Calculator

In accordance with Federal Regulations, permit limitations must be written as Total Metals per 40 CFR 122.45(c)

Receiving Stream summer 7Q10 (CFS)	Receiving Stream summer 7Q10 (MGD)	Rec. Stream 1Q10 [MGD]	NPDES Flow Limit [MGD]	Total Suspended Solids -Fixed Value- (mg/L)	Combined Hardness chronic (mg/L)	Combined Hardness Acute (mg/L)	Instream Wastewater Concentration (Chronic)	Instream Wastewater Concentration (Acute)	Upstream Hardness Average (mg/L)	Effluent Hardness Average (mg/L)
65.0000	41.9355	34.3355	0.7200	10	25.000	25.000	1.6879	2.0539	25	25

Upstream Hard Avg (mg/L) = 25
EFF Hard Avg (mg/L) = 25

PARAMETER	Dissolved Metals Chronic [ug/l]	Dissolved Metals Acute [ug/l]	US EPA **Translators**- using Default Partition Coefficients (streams)	Maximum Allowable Effluent Concentration (MAEC) as a **Total Metal** =Dissolved Metal ÷ Translator Chronic [ug/l]	MAEC as a **Total Metal** =Dissolved Metal ÷ Translator Acute [ug/l]
Cadmium (d)	0.15	0.82	0.252	0.59	3.24
Cd -Trout streams	0.15	0.51	0.252	0.59	2.01
Chromium III (d)(h)	24	183	0.202	117.73	905.08
Chromium VI (d)	11	16	1.000	11.00	16.00
Chromium, Total (t)				N/A	N/A
Copper (d)(h)	2.7	3.6	0.348	7.88	10.47
Lead (d)(h)	0.54	14	0.184	2.94	75.49
Nickel (d)(h)	16	145	0.432	37.23	335.21
Ni - WS streams (t)				25	N/A
Silver (d)(h,acute)	0.06	0.30	1.000	0.06	0.30
Zinc (d)(h)	36	36	0.288	126.73	125.71
Beryllium	6.5	65	1.000	6.5	65
Arsenic (d)	150	340	1.000	150	340

COMMENTS (identify parameters to PERCS Branch to maintain in facility's LTMP/STMP):

(d) = dissolved metal standard. See 15A NCAC 02B .0211 for more information.
(h) = hardness-dependent dissolved metal standard. See 15A NCAC 02B .0211 for more information.
(t) = based upon measurement of total recoveable metal. See 15A NCAC 02B .0211 for more information.
The Human Health standard for Nickel in Water Supply Streams is 25 mg/L which is Total Recoverable metal standard.
The Human Health standard for Arsenic is 10 µg/L which is Total Recoverable metal standard.

					INORGANIC PARAMETERS (TOTAL CONCENTRATION)															
Longitude	Sample Collection Date	Chloride	Sulfate	Total Dissolved Solids	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Chromium (VI)	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Zinc
		mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
-79.040531	05/08/2015	20	130	360	720	**1.85**	**27.7**	94	<1	<1	<1	NA	<1	<1	<0.05	1240	4.5	3.4	NA	<0.2	<5
-79.049524	05/14/2015	37	120	500	30	<1	**1010**	258	<1	<1	<1	NA	<1	<1	<0.05	35.3	3.07	<1	NA	<0.2	<5
-79.041608	01/07/2016	**830**	**370**	**2500**	137	<1	7.18	183	<1	<1	<1	0.063	<1	<1	<0.05	2.25	5.94	1.05	NA	<0.2	<5
-79.037311	10/11/2011	31	14.9	396	<100	<0.5	<5	14.4	NA	<0.08	<5	NA	66	<5	<0.2	NA	<5	<10	NA	<0.1	40.2
-79.037465	06/30/2015	250	42	**770**	10	<1	<1	**842**	<1	<1	<1	NA	<1	<1	<0.05	3.17	<1	<1	NA	<0.2	<5
-79.03708	07/12/2016	23	210	87	42	<1	<1	56	<1	<1	**19.5**	**14.8**	<1	<1	<0.05	15.5	2.8	1.27	NA	<0.2	<5
-79.045201	04/22/2010	21	**350**	360	NA	<10	<10	42	<4	<2	<5	NA	<5	14	<0.1	NA	<40	<10	6.4	<50	<20
-79.041899	03/07/2007	24	**280**	**570**	NA	<0.58	<2	**777**	0.9	<0.5	**101**	NA	48.9	**53**	0.3	NA	84.8	<2	<2	**0.478**	360
-79.048355	08/06/2015	13	**18000**	**12000**	466000	<10	**193**	<500	**318**	<10	**138**	NA	<10	10	<0.05	<10	**2050**	16.4	NA	**12.6**	**3450**
	09/02/2015	22	**23000**	**12000**	534000	<10	**195**	<250	**334**	<10	**161**	NA	<10	11	<0.05	<10	**2330**	<10	NA	**13.1**	**3850**
	12/03/2015	31	**12000**	**15000 N1**	676000	<10	**128**	<50	**309**	<10	**184**	<0.03	<10	13	<0.05	<10	**2600**	<10	NA	**11.6**	**3920**
	01/06/2016	42	**12000**	**12000**	858000	<1	**166**	<500	**274**	**2.84**	**177**	<0.06	7.99	12	<0.05	1.03	**2610**	<1	NA	**12.6**	**4570**
-79.049605	09/05/2013	32.8	192	**529**	6290	**7**	**61.7**	370	NA	0.49 j	7.1 j	NA	16.3	5.9	<0.06	NA	8.6 j	**26.1**	NA	**1.2**	11.3 j
-79.047978	08/06/2015	29	110	240	1110	<1	<1	44	<1	<1	1.91	NA	6.94	<1	<0.05	<1	41.9	**96.1**	NA	**0.574**	99

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

MAXIMUM DATA POINTS = 58

REQUIRED DATA ENTRY

Table 1. Project Information

☐ CHECK IF HQW OR ORW WQS

Facility Name	Cape Fear Steam Electric Plant
WWTP/WTP Class	Class II
NPDES Permit	NC0003433
Outfall	New 009 - beneficiation
Flow, Qw (MGD)	0.005
Receiving Stream	Cape Fear River
HUC Number	03030002
Stream Class	WS-IV
☑ Apply WS Hardness WQC	
7Q10s (cfs)	65.00
7Q10w (cfs)	89.00
30Q2 (cfs)	150.00
QA (cfs)	3170.00
1Q10s (cfs)	53.22
Effluent Hardness	25 mg/L (Avg)
Upstream Hardness	25 mg/L (Avg)
Combined Hardness Chronic	25 mg/L
Combined Hardness Acute	25 mg/L
Data Source(s)	Duke beneficiation data, BPJ, flow (5.000 GPD), USGS stream flow data, default hardness
☐ 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	Total Dissolved Solids	Water Supply	NC	500	WS			mg/L
Par04	Cadmium	Aquatic Life	NC	0.5899	FW	3.2396		ug/L
Par05	Chlorides	Water Supply	NC	250	WS			mg/L
Par06	Aluminum	Water Supply	NC	6.5	WS			mg/L
Par07	Beryllium	Aquatic Life	NC	6.5	FW	65		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	Antimony	Water Supply	NC	5.6	WS			µg/L
Par23	Barium	Water Supply	NC	1	WS			mg/L
Par24	Sulfates	Water Supply	NC	250	WS			mg/L

Cape Fear Steam Electric Plant ≥ **Outfall New 009 - beneficiation**

NC0003433 **Freshwater RPA - 95% Probability/95% Confidence Using Metal Translators** **Qw = 0.005 MGD**

MAXIMUM DATA POINTS = 58

Qw (MGD) = **0.01**
1Q10S (cfs) = **53.22**
7Q10S (cfs) = **65.00**
7Q10W (cfs) = **89.00**
30Q2 (cfs) = **150.00**
Avg. Stream Flow, QA (cfs) = **3170.00**
Receiving Stream: **Cape Fear River HUC 03030002**

WWTP/WTP Class: **Class II**
IWC% @ 1Q10S = **0.014560074**
IWC% @ 7Q10S = **0.011921655**
IWC% @ 7Q10W = **0.008707107**
IWC% @ 30Q2 = **0.0051664**
IW%C @ QA = **0.000244479**
Stream Class: **WS-IV**

COMBINED HARDNESS (mg/L)
Acute = 25 mg/L
Chronic = 25 mg/L
YOU HAVE DESIGNATED THIS RECEIVING STREAM AS WATER SUPPLY
Effluent Hard: 0 value > 100 mg/L
Effluent Hard Avg = 25 mg/L

PARAMETER	TYPE (1)	NC STANDARDS OR EPA CRITERIA			PQL	UNITS	REASONABLE POTENTIAL RESULTS				RECOMMENDED ACTION
		Chronic	Applied Standard	Acute			n	# Det.	Max Pred Cw	Allowable Cw	
Arsenic	C	150	FW(7Q10s)	340		ug/L	1	1	496.0 Default C.V.	Acute (FW): 2,335,152.9 Chronic (FW): 1,258,214.5 No value > Allowable Cw	Major pollutant of concern apply monthly monitoring
Arsenic	C	10	HH/WS(Qavg)			ug/L	**Note: n ≤ 9 Limited data set**			Chronic (HH): 4,090,332.6 No value > Allowable Cw	Major pollutant of concern apply monthly monitoring
Total Dissolved Solids	NC	500	WS(7Q10s)			mg/L	1 **Note: n ≤ 9 Limited data set**	1	13,640.00 Default C.V.	Acute: NO WQS Chronic: 4,194,048.39 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Cadmium	NC	0.5899	FW(7Q10s)	3.2396		ug/L	1 **Note: n ≤ 9 Limited data set**	1	5.580 Default C.V.	Acute: 22,249.967 Chronic: 4,947.963 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Chlorides	NC	250	WS(7Q10s)			mg/L	1 **Note: n ≤ 9 Limited data set**	1	2,046.0 Default C.V.	Acute: NO WQS Chronic: 2,097,024.2 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Aluminum	NC	6.5	WS(7Q10s)			mg/L	1 **Note: n ≤ 9 Limited data set**	1	19.8 Default C.V.	Acute: NO WQS Chronic: 54,522.6 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Beryllium	NC	6.5	FW(7Q10s)	65.0000		ug/L	1 **Note: n ≤ 9 Limited data set**	0	15.5 Default C.V. *NO DETECTS*	Acute: 446,426.3 Chronic: 125,813.0 Max MDL = 5	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Chromium III	NC	117.7325	FW(7Q10s)	905.0818		µg/L	0	0	N/A	Acute: 6,216,189.3 Chronic: 987,552.0	
Chromium VI	NC	11	FW(7Q10s)	16		µg/L	0	0	N/A	Acute: 109,889.5 Chronic: 92,269.1	
Chromium, Total	NC					µg/L	Tot Cr value(s) < 50 and < Cr VI Allowable Cw 1 **Note: n ≤ 9 Limited data set**	1	39.7 Default C.V.	Max reported value = 6.4	a. No Monitoring required if all Total Chromium samples are < the Chromium VI Allowable Cw
Copper	NC	7.8806	FW(7Q10s)	10.4720		ug/L	1 **Note: n ≤ 9 Limited data set**	0	31.00 Default C.V. *NO DETECTS*	Acute: 71,922.67 Chronic: 66,103.56 Max MDL = 10	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required

Cape Fear Steam Electric Plant ≥ **Outfall New 009 - beneficiation**

NC0003433 **Freshwater RPA - 95% Probability/95% Confidence Using Metal Translators** **Qw = 0.005 MGD**

Fluoride	**NC**	1800	FW(7Q10s)			ug/L	2 1 **Note: n ≤ 9** **Limited data set**	8,368.3 Default C.V.	Acute: NO WQS Chronic: 15,098,574.2 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Lead	**NC**	2.9416	FW(7Q10s)	75.4871		ug/L	1 1 **Note: n ≤ 9** **Limited data set**	29.760 Default C.V.	Acute: 518,452.736 Chronic: 24,674.627 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Mercury	**NC**	12	FW(7Q10s)		0.5	ng/L	1 1 **Note: n ≤ 9** **Limited data set**	291.4 Default C.V.	Acute: NO WQS Chronic: MAX 47 No value > Allowable Cw	Apply TBEL - 47 ng/L annual average with Monthly Monitoring
Molybdenum	**NC**	160	WS(7Q10s)			ug/L	2 2 **Note: n ≤ 9** **Limited data set**	1,197.6 Default C.V.	Acute: NO WQS Chronic: 1,342,095.5 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Nickel	**NC**	37.2313	FW(7Q10s)	335.2087		µg/L	1 1 **Note: n ≤ 9** **Limited data set**	74.4 Default C.V.	Acute (FW): 2,302,245.8 Chronic (FW): 312,300.1 No value > Allowable Cw	
Nickel	**NC**	25.0000	WS(7Q10s)			µg/L			Chronic (WS): 209,702.4 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Selenium	**NC**	5	FW(7Q10s)	56		ug/L	1 1 **Note: n ≤ 9** **Limited data set**	1,550.0 Default C.V.	Acute: 384,613.4 Chronic: 41,940.5 No value > Allowable Cw	Major pollutant of concern apply monthly monitoring
Silver	**NC**	0.06	FW(7Q10s)	0.29639789		ug/L	1 1 **Note: n ≤ 9** **Limited data set**	31.0 Default C.V.	Acute: 2,035.689 Chronic: 503.286 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Zinc	**NC**	126.7335	FW(7Q10s)	125.7052		ug/L	1 1 **Note: n ≤ 9** **Limited data set**	223.2 Default C.V.	Acute: 863,355.6 Chronic: 1,063,052.7 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Antimony	**NC**	5.6	WS(7Q10s)			µg/L	1 1 **Note: n ≤ 9** **Limited data set**	48.98000 Default C.V.	Acute: NO WQS Chronic: 46973.34194 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Barium	**NC**	1	WS(7Q10s)			mg/L	1 1 **Note: n ≤ 9** **Limited data set**	1.05400 Default C.V.	Acute: NO WQS Chronic: 8388.09677 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Sulfates	**NC**	250	WS(7Q10s)			mg/L	2 2 **Note: n ≤ 9** **Limited data set**	1,671.39000 Default C.V.	Acute: NO WQS Chronic: 2097024.19 No value > Allowable Cw	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required
Thallium	**NC**	2	WS(7Q10s)			µg/L	1 0 **Note: n ≤ 9** **Limited data set**	155.00000 Default C.V. *NO DETECTS*	Acute: NO WQS Chronic: 16776.19355 Max MDL = 50	No RP, Predicted Max < 50% of Allowable Cw - No Monitoring required

REASONABLE POTENTIAL ANALYSIS

Effluent Hardness

	Date	Data	BDL=1/2DL	Results	
1	default	25	25	Std Dev.	0.0000
2				Mean	25.0000
3				C.V. (default)	0.6000
4				n	1
5				10th Per value	25.00 mg/L
6				Average Value	25.00 mg/L
7				Max. Value	25.00 mg/L
8					
9					

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

Upstream Hardness

	Date	Data	BDL=1/2DL	Results	
1	default	25	25	Std Dev.	0.0000
2				Mean	25.0000
3				C.V. (default)	0.6000
4				n	1
5				10th Per value	25.00 mg/L
6				Average Value	25.00 mg/L
7				Max. Value	25.00 mg/L
8					
9					

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

Arsenic

	Date	Data	BDL=1/2DL	Results	
1	ben data	80	80	Std Dev.	0.0000
2				Mean	80.0000
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	80.0 ug/L
8				Max. Pred Cw	496.0 ug/L
9					

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

Total Dissolved Solids

	Date	Data	BDL=1/2DL	Results	
1	ben data	2200	2200	Std Dev.	0.0000
2				Mean	2200.0000
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	2200.00 mg/L
8				Max. Pred Cw	13640.00 mg/L
9					

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

Par04 Cadmium

	Date	Data	BDL=1/2DL	Results	
1	ben data	0.9	0.9	Std Dev.	0.0000
2				Mean	0.9000
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	0.900 ug/L
8				Max. Pred Cw	5.580 ug/L
9					

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

Par05 Chlorides

	Date	Data	BDL=1/2DL	Results	
1	ben data	330	330	Std Dev.	0.0000
2				Mean	330.0
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.2
7				Max. Value	330.0 mg/L
8				Max. Pred Cw	2,046.0 mg/L
9					

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

Par06 Aluminum

	Date	Data	BDL=1/2DL	Results	
1	ben data	3.2	3.2	Std Dev.	0.00
2				Mean	3.20
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	3.2 mg/L
8				Max. Pred Cw	19.8 mg/L
9					

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

Par07 Beryllium

	Date	Data	BDL=1/2DL	Results	
1	ben data	< 5	2.5	Std Dev.	0.0000
2				Mean	2.5000
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	2.5 ug/L
8				Max. Pred Cw	15.5 ug/L
9					

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

Par10 Chromium, Total

	Date	Data	BDL=1/2DL	Results	
1	ben data	6.4	6.4	Std Dev.	0.0000
2				Mean	6.4000
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	6.4 µg/L
8				Max. Pred Cw	39.7 µg/L
9					

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

Pa11 Copper

	Date	Data	BDL=1/2DL	Results	
1	ben data	< 10	5	Std Dev.	0.0000
2				Mean	5.0000
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	5.00 ug/L
8				Max. Pred Cw	31.00 ug/L
9					

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

Par13 Fluoride

	Date	Data	BDL=1/2DL	Results	
1	dewatering	2208	2208	Std Dev.	1560.9382
2		< 1	0.5	Mean	1104.2500
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	2208.0 ug/L
8				Max. Pred Cw	8368.3 ug/L
9					

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

Par14 Lead

	Date	Data	BDL=1/2DL	Results	
1	ben data	4.8	4.8	Std Dev.	0.0000
2				Mean	4.8000
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	4.800 ug/L
8				Max. Pred Cw	29.760 ug/L
9					

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

Par16 Molybdenum

	Date	Data	BDL=1/2DL	Results	
1	dewatering	316	316	Std Dev.	207.4651
2	dewatering	22.6	22.6	Mean	169.3000
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	316.0 ug/L
8				Max. Pred Cw	1197.6 ug/L
9					

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

Par17 & Par18 Nickel

	Date	Data	BDL=1/2DL	Results	
1	ben data	12	12	Std Dev.	0.0000
2				Mean	12.0000
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	12.0 µg/L
8				Max. Pred Cw	74.4 µg/L
9					

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

Par19 Selenium

	Date	Data	BDL=1/2DL	Results	
1	ben data	250	250	Std Dev.	0.0000
2				Mean	250.0000
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	250.0 ug/L
8				Max. Pred Cw	1550.0 ug/L
9					

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

Par20 Silver

	Date	Data	BDL=1/2DL	Results	
1	ben data	< 10	5	Std Dev.	0.0000
2				Mean	5.0000
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	5.000 ug/L
8				Max. Pred Cw	31.000 ug/L
9					

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

Par21 Zinc

	Date	Data	BDL=1/2DL	Results	
1	ben data	36	36	Std Dev.	0.0000
2				Mean	36.0000
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	36.0 ug/L
8				Max. Pred Cw	223.2 ug/L
9					

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

Par22 Antimony

	Date	Data	BDL=1/2DL	Results	
1	ben data	7.9	7.9	Std Dev.	0.00
2				Mean	7.90
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	7.90 µg/L
8				Max. Pred Cw	48.98 µg/L
9					

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

Par23 Barium

	Date	Data	BDL=1/2DL	Results	
1	ben data	0.17	0.17	Std Dev.	0.00
2				Mean	0.17
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	0.17 mg/L
8				Max. Pred Cw	1.05 mg/L
9					

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

Par24 Sulfates

	Date	Data	BDL=1/2DL	Results	
1	dewatering	441	441	Std Dev.	191.84
2	dewatering	169.7	169.7	Mean	305.35
3				C.V. (default)	0.6000
4				n	2
5					
6				Mult Factor =	3.79
7				Max. Value	441.00 mg/L
8				Max. Pred Cw	1671.39 mg/L
9					

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

Par25 Thallium

	Date	Data	BDL=1/2DL	Results	
1	ben data	< 50	25	Std Dev.	0.00
2				Mean	25.00
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	25.00 µg/L
8				Max. Pred Cw	155.00 µg/L
9					

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

Par26 Mercury

	Date	Data	BDL=1/2DL	Results	
1	ben data	47	47	Std Dev.	0.00
2				Mean	47.00
3				C.V. (default)	0.6000
4				n	1
5					
6				Mult Factor =	6.20
7				Max. Value	47.00 µg/L
8				Max. Pred Cw	291.40 µg/L
9					

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

Date: 6/5/2018

FACILITY: Cape Fear Steam Electric Plant
NPDES PERMIT: NC0003433

Dissolved to Total Metal Calculator

In accordance with Federal Regulations, permit limitations must be written as Total Metals per 40 CFR 122.45(c)

Receiving Stream summer 7Q10 (CFS)	Receiving Stream summer 7Q10 (MGD)	Rec. Stream 1Q10 [MGD]	NPDES Flow Limit [MGD]	Total Suspended Solids -Fixed Value- (mg/L)	Combined Hardness chronic (mg/L)	Combined Hardness Acute (mg/L)	Instream Wastewater Concentration (Chronic)	Instream Wastewater Concentration (Acute)	Upstream Hardness Average (mg/L)	Effluent Hardness Average (mg/L)
65.0000	41.9355	34.3355	0.0050	10	25.000	25.000	0.0119	0.0146	25	25

Upstream Hard Avg (mg/L) = 25
EFF Hard Avg (mg/L) = 25

PARAMETER	Dissolved Metals Chronic [ug/l]	Dissolved Metals Acute [ug/l]	US EPA **Translators**- using Default Partition Coefficients (streams)	Maximum Allowable Effluent Concentration (MAEC) as a **Total Metal** =Dissolved Metal ÷ Translator Chronic [ug/l]	MAEC as a **Total Metal** =Dissolved Metal ÷ Translator Acute [ug/l]
Cadmium (d)	0.15	0.82	0.252	0.59	3.24
Cd -Trout streams	0.15	0.51	0.252	0.59	2.01
Chromium III (d)(h)	24	183	0.202	117.73	905.08
Chromium VI (d)	11	16	1.000	11.00	16.00
Chromium, Total (t)				N/A	N/A
Copper (d)(h)	2.7	3.6	0.348	7.88	10.47
Lead (d)(h)	0.54	14	0.184	2.94	75.49
Nickel (d)(h)	16	145	0.432	37.23	335.21
Ni - WS streams (t)				25	N/A
Silver (d)(h,acute)	0.06	0.30	1.000	0.06	0.30
Zinc (d)(h)	36	36	0.288	126.73	125.71
Beryllium	6.5	65	1.000	6.5	65
Arsenic (d)	150	340	1.000	150	340

COMMENTS (identify parameters to PERCS Branch to maintain in facility's LTMP/STMP):

(d) = dissolved metal standard. See 15A NCAC 02B .0211 for more information.
(h) = hardness-dependent dissolved metal standard. See 15A NCAC 02B .0211 for more information.
(t) = based upon measurement of total recoveable metal. See 15A NCAC 02B .0211 for more information.
The Human Health standard for Nickel in Water Supply Streams is 25 mg/L which is Total Recoverable metal standard.
The Human Health standard for Arsenic is 10 µg/L which is Total Recoverable metal standard.

Table 3. – Untreated Wash Water Data from another site

Parameter	CAS Number	Analytical Method	Result	PQL	MDL	Units
Alkalinity		SM 2320B-20	59	10	2	mg/L
Chloride		300	330	10	2	mg/L
COD		SM 5220D-20	23	10	8	mg/L
pH		9040C	7.16			su
Specific Conductance		SM 2510B-20	2610	10	0.717	umhos/cm
TDS		SM 2540C-20	2200	10	3.4	mg/L
TS		SM 2540B-20	2400	10	2.2	mg/L
TSS		SM 2540D-20	40	2	0.5	mg/L
Aluminum	7429-90-5	6010D	3.2	0.4	0.1	mg/L
Antimony	7440-36-0	6010D	0.0079	0.02	0.007	mg/L
Arsenic	7440-38-2	6010D	0.08	0.015	0.0025	mg/L
Barium	7440-39-3	6010D	0.17	0.025	0.0031	mg/L
Beryllium	7440-41-7	6010D	ND	0.005	0.0006	mg/L
Cadmium	7440-43-9	6010D	0.0009	0.005	0.0006	mg/L
Calcium	7440-70-2	6010D	440	5	0.63	mg/L
Chromium	7440-47-3	6010D	0.0064	0.01	0.0013	mg/L
Cobalt	7440-48-4	6010D	0.0035	0.025	0.0031	mg/L
Copper	7440-50-8	6010D	ND	0.01	0.002	mg/L
Iron	7439-89-6	6010D	1.5	0.1	0.04	mg/L
Lead	7439-92-1	6010D	0.0048	0.01	0.0047	mg/L
Magnesium	7439-95-4	6010D	60	5	0.63	mg/L
Manganese	7439-96-5	6010D	0.047	0.015	0.0019	mg/L
Mercury	7439-97-6	7470A	0.000047	0.0001	0.000028	mg/L
Nickel	7440-02-0	6010D	0.012	0.04	0.005	mg/L
Potassium	7440-09-7	6010D	17	5	0.63	mg/L
Selenium	7782-49-2	6010D	0.25	0.02	0.0085	mg/L
Silver	7440-22-4	6010D	ND	0.01	0.0021	mg/L
Sodium	7440-23-5	6010D	120	5	0.63	mg/L
Thallium	7440-28-0	6010D	ND	0.05	0.0063	mg/L
Vanadium	7440-62-2	6010D	0.056	0.05	0.0063	mg/L
Zinc	7440-66-6	6010D	0.036	0.02	0.0025	mg/L

Water Resources
Environmental Quality

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
LINDA CULPEPPER
Interim Director

July 27, 2018

MEMORANDUM

To: Allen Hardy
NC DEQ / DWR / PWS Regional Engineer
Raleigh Regional Office

From: Bing Bai
919-807-6389
NPDES Unit

Subject: **Review of Draft NPDES Permit NC0003433**
Duke Energy Cape Fear Steam Plant
Chatham County

Please indicate below your agency's position or viewpoint on the draft permit and return this form by **July 27, 2017**. If you have any questions on the draft permit, please feel free to contact me at the telephone number shown above.

RESPONSE: (Check one)

☑ Concur with the issuance of this permit provided the facility is operated and maintained properly, the stated effluent limits are met prior to discharge, and the discharge does not contravene the designated water quality standards.

☐ Concurs with issuance of the above permit, provided the following conditions are met:

_____

_____

_____

_____

☐ Opposes the issuance of the above permit, based on reasons stated below, or attached:

_____

_____

_____

_____

Signed W. Allen Hardy Date: 6/28/18