DENR/DWR
FACT SHEET FOR NPDES PERMIT DEVELOPMENT
Major Modification
NPDES No. NC0001422

Facility Information			
Applicant/Facility Name:	Duke Energy Progress/ L.V. Sutton Energy Complex		
Applicant Address:	801 Sutton Steam Plant Road, Wilmington, NC 28401		
Facility Address:	(same)		
Permitted Flow	N/A		
Type of Waste:	100 % Industrial		
Facility/Permit Status:	Major Modification (WWTP Class I)		
County:	New Hanover		
Miscellaneous			
Receiving Stream:	Cape Fear River (001), Sutton Lake (002, 004, 008)	Regional Office:	WiRO
Stream Classification:	C Sw (001) C (002, 004, 008) SI: 18-(63)	Quad	J27SW Castle Hayne
303(d) Listed?:	Yes Impaired for D.O. (Cape Fear River)	Permit Writer:	Sergei Chernikov, Ph.D.
Subbasin:	030617 (CPF)	Date:	February 18, 2015
Drainage Area (mi2):			
Summer 7Q10 (cfs)	Tidally influenced (Outfall 001); Lake (Outfalls 002, 004, and 008)		
30Q2 (cfs):	See above		
Average Flow (cfs):	See above		
IWC (%):	100 (all outfalls)		
Primary SIC Code:			

PROPOSED PERMITTING ACTION

This is a request for a Major Modification to the NPDES wastewater permit. On November 5, 2014 the Duke Energy Progress was notified of the DENR decision to reclassify Sutton Lake (1100 acres) to the "waters of the State". The reclassification necessitates the need to make modifications to the existing NPDES permit. This Major Modification is being made to incorporate the required changes to the permit.

SUMMARY

Duke Energy Progress Sutton Plant is a natural gas-fired 620 MW combined cycle generation facility. The power block consists of two combustion turbine generators (each with a HRSG – heat recovery steam generator) and one steam turbine generator. Historically, the facility operated 3 coal-fired units. The coal-fired units were shut-down in the fourth quarter of 2013

The facility is regulated by federal effluent guidelines (40 CFR Part 423 – Steam Electric Power Generating Point Source Category) – BPT/BAT.

On February 11, 2015 the Wilmington Regional Office delineated the Effluent Channel at the Sutton Energy Complex in accordance with the requirements of 15A NCAC 02B .0228. The new Outfall 008 was established to accommodate discharge from this outfall.

Wastewater outfalls:
Outfall 001 – cooling pond discharge, recirculated cooling water, non-contact cooling water, and treated wastewater from Outfall 004 (new ash pond). The new ash pond can discharge directly to Sutton Lake through Outfall 004 or to Cape Fear River through Outfall 001. The Outfall 001 is discharging through the mixing box that was set-up to concurrently discharge ash pond wastewater and water from Sutton Lake.

Outfall 002 – wastewater associated with the old ash pond, which discharges to Sutton Lake. May consist of low volume waste, yard drains, oily waste treatment, ash sluice, and coal pile runoff.

Outfall 004 – wastewater associated with the new ash pond. May consist of low volume waste, yard drains, oily waste treatment, ash sluice, and coal pile runoff. Wastewater can be discharged to Sutton Lake or to Cape Fear River through Outfall 001.

Outfall 008- Primarily consists of recirculating cooling water from the Combined Cycle generation unit, contains flows from internal outfalls 005, 006, 007, 009, and stormwater outfalls.

Internal Outfall 005 – wastewater from the Combined Cycle generation unit.

Internal Outfall 006 - wastewater from the Combined Cycle generation unit.

Internal Outfall 007 – stormwater flows from the closure activities for coal-fired units.

Internal Outfall 009 – low volume wastes from a new simple cycle combustion turbine expected to be online in 2017.

Stormwater outfalls discharging to the effluent channel and then to Sutton Lake via Outfall 008:
Internal Outfall SW001 – Runoff from the temporary laydown area and the parking lot.

Internal Outfall SW002 – Runoff from the parking lot and Peaker Combustion Turbine are.

Internal Outfall SW003 – Runoff from the parking lot.

Internal Outfall SW004 – Pumped stormwater from the 115 Electrical Switchyard area.

Internal Outfall SW005 – Discharge from the south wet detention basin.

Internal Outfall SW006 – Discharge from the rip rap armored emergency spillway for the north infiltration basin that treats stormwater from a parking lot and surrounding areas.

Internal Outfall SW007 – Runoff from the potential rail loading yard, rail spur, and truck roads installed to transport coal ash from the site.

ASH POND DAMS
Seepage through earthen dams is common and is an expected consequence of impounding water with an earthen embankment. Even the tightest, best-compacted clays cannot prevent some water from seeping through them. Seepage is not necessarily an indication that a dam has structural problems, but should be kept in check through various engineering controls and regularly monitored for changes in quantity or quality which, over time, may result in dam failure.
Currently, no seeps have been detected at the site.

REASONABLE POTENTIAL ANALYSIS(RPA)-OUTFALL 001, OUTFALL 002, OUTFALL 004, OUTFALL 008

The Division conducted EPA-recommended analyses to determine the reasonable potential for toxicants to be discharged at levels exceeding water quality standards/EPA criteria by this facility from outfalls 001, 002, 004 (Ash Ponds discharges). For the purposes of the RPA, the background concentrations for all parameters were assumed to be below detections level. The RPA uses 95% probability level and 95% confidence basis in accordance with the EPA Guidance entitled "Technical Support Document for Water Quality-based Toxics Control."

The long term discharge data on the EPA Form 2C was used, it was supplemented by the analysis of the free standing water in both ash ponds. Since the highest available values for each parameter was used, it is assumed that this RPA is applicable to all discharges that represent coal ash contaminated water (outfalls 001, 002, 004). Calculations included: As, Be, Cd, Chlorides, F, Total Phenolic Compounds, Cr, Cu, CN, Pb, Hg, Mo, Ni, Se, Ag, Zn, Fe, Al, Ba, Sb and Tl (please see attached). The historic flow of 12.84 MGD was used in the analysis.

The RPA analysis for Outfall 008 (effluent channel discharge) was not conducted due to the absence of the monitoring data. Most of the water in the effluent channel is cooling water and low volume wastewater from the combined cycle facility.

The proposed permit requires that EPA methods 200.7 or 200.8 (or the most current versions) shall be used for analyses of all metals except for total mercury.

TECHNOLOGY BASED EFFLUENT LIMITS-OUTFALL 001, OUTFALL 002, AND OUTFALL 004

The existing federal regulations require development of Technology Based Effluent Limits (TBELs) for the parameters of concern. Since the EPA has not promulgated any new Effluent Guidelines for Power Plants since 1982, the Division has reviewed the performance of the existing coal-fired power plants to establish TBELs: Marshall Steam Station, Belews Steam Station, and Allen Steam Station. Two of these facilities (Belews and Allen) were used by EPA to establish the proposed Effluent Guidelines for Power Plants. The Division focused on the following parameters: Total Arsenic, Total Mercury, Total Selenium, and Nitrate/nitrite as N. These parameters are consistent with the parameters selected by EPA in the proposed Effluent Guidelines. The Division agrees with the EPA statement from the proposed Effluent Guidelines that justifies TBEL limitations for only four pollutants of concern: "Effluent limits and monitoring for all pollutants of concern is not necessary to ensure that the pollutants are adequately controlled because many of the pollutants originate from similar sources, have similar treatabilities, and are removed by similar mechanisms. Because of this, it may be sufficient to establish effluent limits for one pollutant as a surrogate or indicator pollutant that ensures the removal of other pollutants of concern."

Based on the review of the effluent data for the past 5 years the Division established the following TBELs for the coal-fired power plants in North Carolina. The monthly average limits for Total Arsenic and Total Selenium are based on 95th percentile of the effluent data, which is consistent with the EPA methodology, and daily maximum limits for these constituents are based on the 99.9th percentile of the effluent data. The Total Mercury limit is based on the Statewide Mercury TMDL implementation strategy and was established by the Division previously. A statewide mercury TMDL was developed to estimate the proportions of mercury contributions to water and fish from wastewater discharges, in-state air sources, and out-of-state air sources, and to calculate appropriate reductions needed. The TMDL was approved by EPA on 10/12/2012.

Total Arsenic – 10.5 μg/L (Monthly Average); 14.5 μg/L (Daily Maximum)

Total Selenium – 13.6 µg/L (Monthly Average); 25.5 µg/L (Daily Maximum)
Total Mercury – 47.0 ng/L (Monthly Average); 47.0 ng/L (Daily Maximum)

The Division does not have any long-term data for Nitrate/nitrite as N. Therefore, the limits for this parameter are based on the proposed EPA Effluent Guidelines.

Nitrate/nitrite as N – 0.13 mg/L (Monthly Average); 0.17 mg/L (Daily Maximum). This limit will not be implemented in the permit since the facility never operated Flue Gas Desulfurization Scrubber.

Facility is allowed 4.5 years from the effective date of the permit to comply with the TBELs (except for Hg). This time period is provided in order for the facility to budget, design, and construct the treatment system. The compliance schedule is consistent with the proposed EPA Effluent Guidelines that require compliance with the TBELs "as soon as possible within the next permit cycle beginning July 1, 2012". Since the permit cycle is 5 years, the Effluent Guidelines will allow the facility to comply with the TBELs by June 30, 2022. This permit has a more stringent requirements, the facility shall comply with the TBELs by the end of 2019.

The TBELs are compared with the Water Quality Based Effluent limits and the most stringent limit is implemented in the permit.

MERCURY EVALUATION

The State of North Carolina has a state-wide mercury impairment. The TMDL has been developed to address this issue in 2012. The TMDL included the implementation strategy, both documents were approved by EPA in 2012.

The mercury evaluation was conducted in accordance with the Permitting Guidelines for Statewide Mercury TMDL.

Year	2012	2013
Annual average concentration (ng/L)	2.11	1.79
Maximum sampling result (ng/L)	3.72	2.52

Allowable mercury concentration for this facility is 12.0 ng/L. All Annual average mercury concentrations are below allowable. All Maximum sampling results are below TBEL of 47.0 ng/L. Based on the Permitting Guidelines for Statewide Mercury TMDL, the effluent limits are not required.

DEWATERING – OUTFALL 001

To meet the requirements of the Coal Ash Management Act of 2014, the facility needs to dewater two ash ponds by removing the interstitial water and excavate the ash to deposit it in landfills. The facility's highest discharge rate from the dewatering process will be 2.1 MGD. The facility submitted data for the standing surface water in the ash ponds, interstitial water in the ash, and interstitial ash water that was treated by filters of various sizes. To evaluate the impact of the dewatering on the receiving stream the RPA was conducted for the wastewater that will be generated by the dewatering process. To introduce a margin of safety, the highest measured concentration for a particular parameter was used. The RPA was conducted for As, Cd, Chlorides, Cr, Cu, F, Pb, Mo, Hg, Ni, Se, Zn, Ba, Fe, Al, B, Sb, and Tl (please see attached).

TEMPERATURE LIMIT – OUTFALL 008

Since the Sutton Lake has been reclassified to the "waters of the State" on November 5, 2014, the facility has to develop a strategy to meet the state temperature standard in Sutton Lake. Potential solutions include but are not limited to: construction of a cooling tower, re-routing of the discharge to the Cape Fear River, or securing a 316(a) variance. The facility is provided 4 years compliance schedule to develop the strategy.

CWA SECTION 316(b)

The permittee shall comply with the Cooling Water Intake Structure Rule per 40 CFR 125.95. The Division approved the facility request for an alternative schedule in accordance with 40 CFR 125.95(a)(2). The permittee shall submit all the materials required by the Rule with the next renewal application.

TOXICITY TESTING-OUTFALL 001, OUTFALL 002, OUTFALL 004, AND OUTFALL 008

Current Requirement: Outfall 001 – Acute P/F @ 90% using *Pimephales promelas*
Recommended Requirement: Outfall 001 – Acute P/F @ 90% using *Pimephales promelas*

This facility has passed all toxicity tests during the previous permit cycle, please see attached.

New Requirement: Outfall 002/004/008 – Chronic P/F @ 90% using *Ceriodaphnia dubia*

For the purposes of the permitting, the long term average flow was used in conjunction with the 7Q10 summer flow to calculate the percent effluent concentrations to be used for WET.

COMPLIANCE SUMMARY

During the last 5 years, the facility has exceeded limit 1 time, please see attached. The limit violation was for pH (Outfall 001).

PERMIT LIMITS DEVELOPMENT

- The temperature limits (Outfall 001 and Outfall 008) are based on the North Carolina water quality standards (15A NCAC 2B .0200).
- The limits for Oil and Grease and Total Suspended Solids (Outfall 002, Outfall 004, Outfall 005, Outfall 006, Outfall 007, Outfall 008, and Outfall 009) are based on the requirements in 40 CFR 423.
- The pH limits (Outfall 001, Outfall 002, Outfall 004, Outfall 005, Outfall 006, Outfall 008, and Outfall 009) are based on the North Carolina water quality standards (15A NCAC 2B .0200).
- The Technology Based Effluent Limits for Total Arsenic, Total Mercury, Total Selenium, and Nitrate/nitrite as N (Outfall 001, Outfall 002 and Outfall 004) are based on the requirements of 40 CFR 125.3(a) , 40 CFR 122.44(a)(1); 40 CFR 125.3(c) and (d).
- The Whole Effluent Toxicity limit (Outfall 001, Outfall 002, Outfall 004 and Outfall 008) is based on the requirements of 15A NCAC 2B .0500.
- The Water Quality Based Effluent Limits for Total Iron, Total Aluminum, Total Arsenic and Total Selenium (Outfall 001, Outfall 002, and Outfall 004) are based on the results of the Reasonable Potential Analysis.

  The Total Iron Limits are based on the water quality standard/EPA criteria of 1.0 mg/L for Freshwater Aquatic Life. The Total Aluminum Limits are based on the water quality standard/EPA criteria of 87.0 µg/L for Freshwater Aquatic Life. The Total Arsenic Limits

are based on the water quality standard/EPA criteria of 50.0 µg/L for Freshwater Aquatic Life and on the water quality standard/EPA criteria of 10.0 µg/L for Human Health. The Total Selenium Limits are based on the water quality standard/EPA criteria of 5.0 µg/L for Freshwater Aquatic Life (chronic) and on the water quality standard/EPA criteria of 56.0 µg/L for Freshwater Aquatic Life (acute).

The calculations are conducted in accordance with the EPA Guidance entitled "Technical Support Document for Water Quality-based Toxics Control." Please see attached RPA for details.

- The Water Quality Based Effluent Limits for Total Cadmium and Total Lead (Outfall 001 Dewatering) are based on the results of the Reasonable Potential Analysis.

  The Total Cadmium Limits are based on the water quality standard/EPA criteria of 2.0 µg/L for Freshwater Aquatic Life (chronic) and on the water quality standard/EPA criteria of 15.0 µg/L for Freshwater Aquatic Life (acute). The Total Lead Limits are based on the water quality standard/EPA criteria of 25.0 µg/L for Freshwater Aquatic Life (chronic) and on the water quality standard/EPA criteria of 33.5 µg/L for Freshwater Aquatic Life (acute).

  The calculations are conducted in accordance with the EPA Guidance entitled "Technical Support Document for Water Quality-based Toxics Control." Please see attached RPA for details.

- The turbidity limit (Outfall 001) is based on North Carolina water quality standards (15A NCAC 2B .0200).

PROPOSED CHANGES

- The Clean Water Act Section 316(B) Special Condition was updated to reflect the new regulations.
- The turbidity limit was added to the permit (Outfall 001) to meet the state turbidity standard per 15A NCAC 2B .0211(3) (k).
- The TRC limit was removed from the permit due to shut-down of the coal-fired generation units (Outfall 001).
- The Ash Pond Closure Special Condition was updated (please see A. (19.)).
- The Outfall 003 (Chemical Metal Cleaning) was eliminated from the permit due to shut-down of the coal-fired generation units.
- The new Outfall 008 (discharge from the effluent channel) was added to the permit. This outfall includes discharge from 4 internal wastewater outfalls, and 7 internal stormwater outfalls.
- The monitoring for ammonia nitrogen was eliminated from the permit due to the discontinuation of the coal ash sluicing (Outfall 002 and Outfall 004).
- An internal Outfall 007 was added to the permit to accommodate discharge from the West Retention Basin. This discharge includes the wastewater from closure activities associated with the coal-fired units.
- An internal Outfall 009 was added to the permit to accommodate low level wastewater discharge from simple cycle turbine expected to be on line in 2017.
- Monitoring for Total Selenium and Total Arsenic was reduced to Quarterly (Outfall 001) based on the results of Reasonable Potential Analysis.

- The Technology Based Effluent Limits for Total Arsenic, Total Mercury, and Total Selenium were added to the permit (Outfall 001, Outfall 002, and Outfall 004) and are based on the requirements of 40 CFR 125.3(a) , 40 CFR 122.44(a)(1); 40 CFR 125.3(c) and (d).
- The Water Quality Based Effluent Limits for Total Arsenic and Total Selenium were added to the permit (Outfall 002 and Outfall 004) based on the results of Reasonable Potential Analysis.
- The Daily Maximum Water Quality Based Effluent Limit for Total Arsenic was corrected (Outfall 001).
- A separate effluent page for the dewatering of the ash ponds (Outfall 001) was added to the permit (Please see Special Condition A. (2.)).
- The limits for Total Iron and Total Aluminum were added to the permit based on the results of Reasonable Potential Analysis (Outfall 001, Outfall 002, and Outfall 004).
- Monitoring for Total Zinc was added to Outfall 001 based on the results of Reasonable Potential Analysis.
- Monitoring for Total Copper and Total Zinc was added to the permit (Outfall 002 and Outfall 004) based on the results of Reasonable Potential Analysis.
- The Chronic Toxicity Limit was added to the permit (Outfall 002 and Outfall 004) due to the re-classification of the Sutton Lake.
- New internal outfalls for stormwater were added to the permit (SW001 through SW007).
- The Special Condition Fish Tissue Monitoring near Ash Pond Discharge has been updated (please see A. (17.)).
- The Special Condition Instream Monitoring was added to the permit (please see A. (22.)).
- Proposed federal regulations require electronic submittal of all discharge monitoring reports (DMRs) and specify that, if a state does not establish a system to receive such submittals, then permittees must submit DMRs electronically to the Environmental Protection Agency (EPA). The Division anticipates that these regulations will be adopted and is beginning implementation.

  The requirement to begin reporting discharge monitoring data electronically using the NC DWR's Electronic Discharge Monitoring Report (eDMR) internet application has been added to the permit. (Please see Special Condition A. (23.)).
- The Applicable State Law Special Condition was added to the permit to meet the requirements of Senate Bill 729 (Coal Ash Management Act, Please see Special Condition A. (24.)).
- The Stormwater Pollution Prevention Plan Special Condition was added to the permit to accommodate the new internal stormwater outfalls (Please see Special Condition A. (25.)).
- The Temperature Limit Compliance Schedule Special Condition was added to the permit to meet the temperature requirements at the new Outfall 008 (Please see Special Condition A. (26.)).
- The Additional Conditions and Definitions Special Condition was added to the permit. Please see Special Condition A. (27.).

PROPOSED SCHEDULE

Draft Permit to Public Notice: July 1, 2015 (est.)
Permit Scheduled to Issue: September 25, 2015 (est.)

STATE CONTACT

If you have any questions on any of the above information or on the attached permit, please contact Sergei Chernikov at (919) 807-6386 or sergei.chernikov@ncdenr.gov.