

**NORTH CAROLINA DIVISION OF  
AIR QUALITY**

**Air Permit Review**

**Permit Issue Date:**

**Region:** Mooresville Regional Office  
**County:** Rowan  
**NC Facility ID:** 8000004  
**Inspector's Name:** Jim Westmoreland  
**Date of Last Inspection:** 06/16/2009  
**Compliance Code:** 5 / Meeting SOC requirements

<b>Facility Data</b>			<b>Permit Applicability (this application only)</b>
<b>Applicant (Facility's Name):</b> Duke Power Company, LLC - Buck Steam Station  <b>Facility Address:</b> Duke Power Company, LLC - Buck Steam Station 1555 Dukeville Road Salisbury, NC 28145  <b>SIC:</b> 4911 / Electric Services <b>NAICS:</b> 221112 / Fossil Fuel Electric Power Generation  <b>Facility Classification: Before:</b> Title V <b>After:</b> Title V <b>Fee Classification: Before:</b> Title V <b>After:</b> Title V			<b>SIP:</b> 2D .2400 (CAIR), 2Q .0400 (Acid Rain), 2D .0614 (CAM), 2D .1407 (RACT), 2D .2500 (Hg) <b>NSPS:</b> <b>NESHAP:</b> <b>PSD:</b> <b>PSD Avoidance:</b> <b>NC Toxics:</b> <b>112(r):</b> <b>Other:</b> 40 CFR Parts 72 and 75
<b>Contact Data</b>			<b>Application Data</b>
<b>Facility Contact</b>	<b>Authorized Contact</b>	<b>Technical Contact</b>	<b>Application Number:</b> 8000004.08A <b>Date Received:</b> 01/17/2008 <b>Application Type:</b> Renewal <b>Application Schedule:</b> TV-Renewal <b>Existing Permit Data</b> <b>Existing Permit Number:</b> 03786/T23 <b>Existing Permit Issue Date:</b> 04/23/2009 <b>Existing Permit Expiration Date:</b> 03/31/2014
Norbert Zalme Environmental Coordinator (704) 645-2700 1555 Dukeville Road Salisbury, NC 28146	Stephen A. Townsend, Sr. General Manager II (704) 280-9354 1555 Dukeville Road Salisbury, NC 28145	William Horton Senior Environmental Specialist (980) 373-3226 526 South Church Street Charlotte, NC 28202	
<b>Review Engineer:</b> Ed Martin  <b>Review Engineer's Signature:</b> _____ <b>Date:</b> _____  <b>DRAFT FOR PUBLIC NOTICE</b>		<b>Comments / Recommendations:</b> Issue 03786/T24 <b>Permit Issue Date:</b> <b>Permit Expiration Date:</b>	

**I. Purpose of Application**

The purpose of this permit modification is to make the following changes:

1. Application 8000004.08A  
Renewal of the Title V permit.
2. Application 8000004.08B (consolidated with Application 8000004.08A)  
Add acid rain requirements for the new combustion turbines (ID Nos. ES-11 and ES-12) permitted in Permit No. 03786T22 issued October 15, 2008.
3. Application 8000004.09A (consolidated with Application 8000004.08B)  
Incorporate the Clean Air Interstate Rule (CAIR) requirements into the permit. This rule is state-only until such time as it is approved by EPA into the SIP.
4. Application 8000004.09E (consolidated with Application 8000004.08A)  
Add RACT requirements for the auxiliary boiler ES-9(Aux).

This change is a significant permit modification being made in accordance with 15A NCAC 2Q .0501(d)(1). Public notice of the draft permit is required at this time.

## II. Permit Changes

The following changes were made to the Duke Energy Carolinas LLC Buck Steam Station Air Permit No. 03786T23:

Page	Section	Description of Changes
Cover	--	Amended permit numbers and dates.
TOC	--	Added Section 2.5 - Clean Air Interstate Rule (CAIR) Permit Requirements.
		Revised Acid Rain Permit Application date.
		Added CAIR Application as an attachment.
4-5	1, table of permitted emission sources	Added "RACT" designation for source ES-9(Aux).
		Added "State-Only BACT" designation for sources ES-11 and ES-12.
		Corrected to remove "MACT" designation for source ES-14.
		Revised rating from 105 hp to 174 hp for source ES-18(Trommel).
		Removed footnote 3 since the SNCR control systems installed on Boiler Nos. 8 & 9 (ID Nos. CD-7c(B8SNCR) & CD-8c(B9SNCR)) will now be shielded via the public notice process of this permit.
		Removed footnote 4 since the SOFA control systems installed on Boiler Nos. 5, 6, & 7 (ID Nos. CD-11(B5SOFA), CD-12(B6SOFA), & CD-13(B7SOFA)) will now be shielded via the public notice process of this permit.
		Removed footnote 5 since the emission source(s) and/or control device(s) (ID Nos. ES-11, CD-11A, CD-11B, ES-12, CD-12A, CD-12B, ES-13, ES-14, ES-15 and ES-16) will now be shielded via the public notice process of this permit.
		Added explanatory note memorializing RACT review is complete for the facility located in Moderate area designation.
6-7	2.1 A, regulation table	Added 15A NCAC 2D .2404 CAIR permit requirements as an applicable regulation for sulfur dioxide and 15A NCAC 2D .2403 and .2405 CAIR permit requirements as applicable regulations for nitrogen oxides.
		Removed 15A NCAC 2D .1416 as this NOx rule has been superseded by the CAIR permit requirements added in Section 2.5.
		Added 15A NCAC 2D .0614 as an applicable regulation for CAM.
		Added 15A NCAC 2D .2500 as an applicable requirement.
10	2.1 A.4.f (old section)	Removed requirement to use COMS for monitoring of particulate emissions since this monitoring is now under CAM in Section 2.1 A.12.
12	2.1 A.7	Added footnote to 40 CFR 52 Subpart II.
12	2.1 A.8 (old section)	Removed this section as this 15A NCAC 2D .1416 NOx rule has been superseded by the CAIR permit requirements added in Section 2.5. Renumbered remaining sections.

Page	Section	Description of Changes
15	2.1 A.11.a	Revised maximum amount of wood allowed during trial burn from 3000 tons to 3100 tons.
16-18	2.1 A.12	Added this section for 15A NCAC 2D .0614 CAM requirements.
18-19	2.1 A.13	Added this section for 15A NCAC 2D .2500 mercury requirements.
19	2.1 B, regulation table	Added 15A NCAC 2D .2404 CAIR permit requirements as an applicable regulation for sulfur dioxide and 15A NCAC 2D .2403 and .2405 CAIR permit requirements as applicable regulations for nitrogen oxides.
		Removed 15A NCAC 2D .1416/.1417 as these NOx rules have been superseded by the CAIR permit requirements added in Section 2.5.
20	2.1 B.3	Added footnote to 40 CFR 52 Subpart II.
20	2.1 B.4 (old section)	Removed this section as these 15A NCAC 2D .1416/.1417 NOx rules have been superseded by the CAIR permit requirements added in Section 2.5.
21	2.1 C, regulation table	Added 15A NCAC 2D .1407(b) RACT rule as an applicable regulation.
22-23	2.1 C.5	Added applicable RACT requirements for 15A NCAC 2D .1407(b).
26-27	2.1 E, regulation table	Added 15A NCAC 2D .2404 CAIR permit requirements as an applicable regulation for sulfur dioxide and 15A NCAC 2D .2403 and .2405 CAIR permit requirements as applicable regulations for nitrogen oxides.
		Removed 15A NCAC 2D .1418 as this NOx rule has been superseded by the CAIR permit requirements added in Section 2.5.
29	2.1 E.3.n.ii	Clarified definition of monitor downtime for turbines using CEMS to remove unnecessary language.
35	2.1 E.8	Added footnote to 40 CFR 52 Subpart II.
35	2.1 E.9 (old section)	Removed this section as this 15A NCAC 2D .1418 NOx rule has been superseded by the CAIR permit requirements added in Section 2.5.
35	2.1 E.11 (old section)	Removed this 15A NCAC 2Q .0402 condition since the acid rain application for these sources has been submitted.
39	2.1 G.6.b	Corrected sulfur content of the natural gas from 20 grains of sulfur per 100 standard cubic feet to 2.0 grains of sulfur per 100 standard cubic feet.
46	2.2 A.1	Removed asterisk with note for 2D .0317 (2D .0530 PSD avoidance condition) since this condition will now be shielded via the public notice process of this permit.
47	2.2 B.1	Removed asterisk with note for 2D .0317 (2D .0531 NSR avoidance condition) since this condition will now be shielded via the public notice process of this permit.
54	2.4	Added acid rain requirements for new combustion turbines ES-11 and ES-12.
55	2.4.D	Revised Acid Rain Permit Application date.
55-57	2.5	Added Section 2.5 - CAIR Permit Requirements.

### III. Changes to Permit Since Initial Title V Was Issued

Permit No.	Type of Modification	Reason for Permit	Issue Date
03786T16	Initial Title V permit	-	11-12-03
03786T17	2Q .0515 Minor Mod	Add the 2D .1400 NOx SIP Call regulations for the combustion turbines.	4-22-04
03786T18	2Q .0517 Reopen for Cause	Removes stay to make the monitoring and reporting for the federal opacity fully applicable and revises notification general condition I.A	6-10-05
03786T19	2Q .0515 Minor Mod	Add SNCR low-NOx controls to Boilers 8 and 9	5-16-06
03786T20	2Q .0501(c)(2) Significant Mod PSD	Add SOFA low-NOx controls to Boilers 5, 6 and 7	2-14-07
03786T21	2Q .0501(d)(1) Significant Mod	Acid Rain averaging plan and Acid Rain renewal	5-2-08
03786T22	2Q .0501(c)(2) Significant Mod	Add new combustion turbines and associated equipment	10-15-08
03786T23	2Q .0501(c)(2) Significant Mod	Add wood test burn	4-23-09
03786T24	Renewal	-	-

### IV. Facility Description

Duke Energy's Buck Steam Station is an electric utility that generates electrical power using boilers and combustion turbines. Emission sources consist of five coal/No. 2 fuel oil-fired electric utility boilers (ES-1 (Boiler 5), ES-2 (Boiler 6), ES-3 (Boiler 7), ES-4 (Boiler 8) and ES-5 (Boiler 9)), three No. 2 fuel oil/natural gas-fired simple-cycle internal combustion turbines (ES-6, ES-7 and ES-8), one No. 2 fuel oil-fired auxiliary boiler (ES-9), and one rail-car unloading system (ES-10). In addition the following sources were permitted in 03786T22 issued October 15, 2008, but are not yet in operation: two nominal 170 MW natural gas-fired simple-cycle/combined-cycle combustion turbines, one multi-cell cooling tower, one natural gas-fired auxiliary boiler, one No. 2 fuel oil-fired emergency generator, and one No. 2 fuel oil-fired emergency firewater pump. Also, two temporary sources were permitted in 03786T23 issued April 23, 2009, with the permit modification to allow a trial co-firing of unadulterated wood in the Unit 6 boiler: one No. 2 fuel oil-fired temporary diesel wood chipper and one No. 2 fuel oil-fired temporary diesel trommel screen with conveyor.

### V. Summary of Changes to Emission Sources and Control Devices

There are no changes to emission sources or control devices.

### VI. Regulatory Evaluation

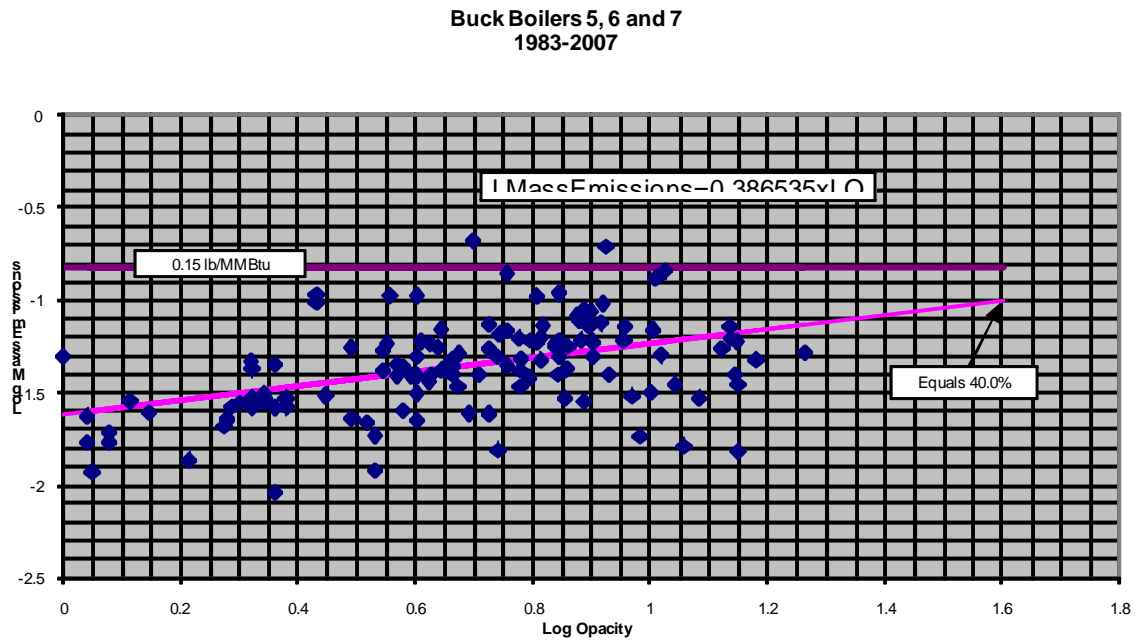
The following new regulations were added:

1. 2D .0614: COMPLIANCE ASSURANCE MONITORING (40 CFR 64)  
This facility is subject to a CAM analysis as required for renewal of a Title V permit. CAM applies to Boilers 5, 6, 7, 8 and 9 (ES-1, ES-2, ES-3, ES-4 and ES-5) since these sources have an electrostatic precipitator (ESP) for control of PM-10 emissions and have potential pre-control device emissions for the applicable regulated air pollutant of more than 100 tons per year each source (ie: the amount to be classified as a major source). As stated in §64.3(d)(1) of 40 CFR 64, if a continuous opacity monitoring system (COMS) is required pursuant to other authority under the Act or state or local law, the owner or operator shall use such system to satisfy the requirements of Part 64.

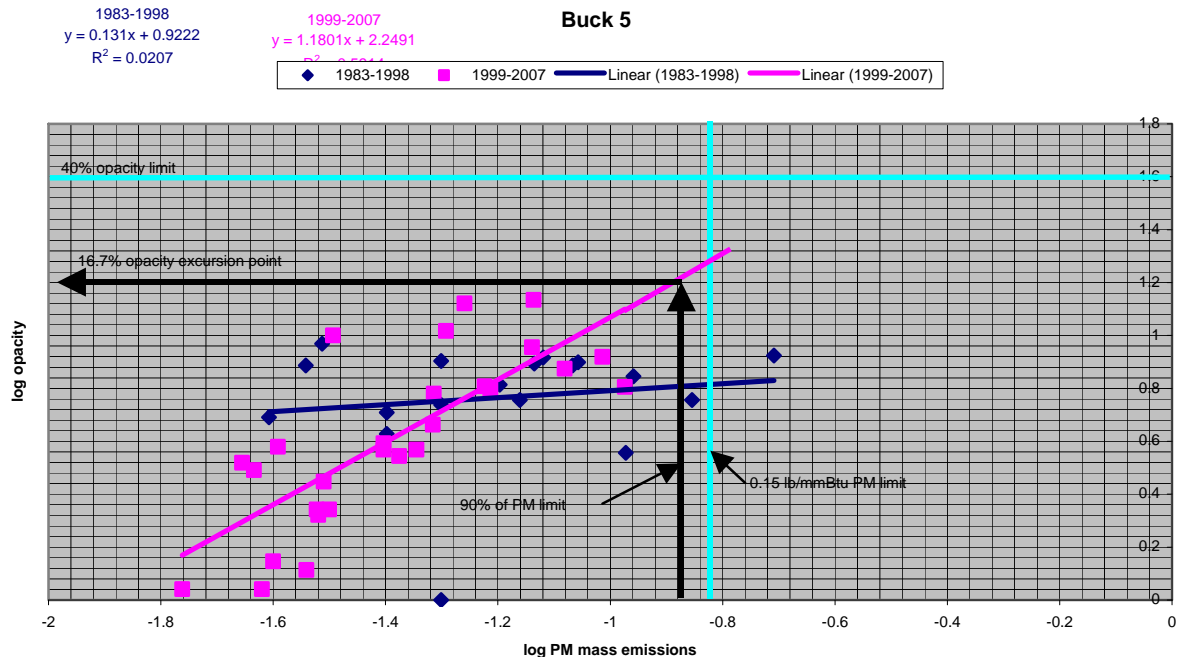
To determine the CAM excursion point for each boiler, a combination of historical (approximately last 10 years) opacity vs. PM emission data from annual stack tests as submitted with the application was used along with the most recent 2-year period of 3-hour block COM data as follows.

Using historical opacity vs. PM emission data

Duke originally proposed an opacity excursion level of 35% for each of the five boilers based on a plot of historical PM mass emissions vs. opacity using data points from annual stack tests (going back as far as 1983) performed to show compliance with the PM limits in 2D .0536. A linear regression of the data was plotted on a log-log scale, which Duke states is most representative of the relationship between PM emissions and opacity for the data, to arrive at a CAM opacity trigger level (excursion point). The point at which the line crosses the PM limit is Duke's proposed trigger level. Duke plotted Boilers 5, 6 and 7 together to provide more data points since these are identical boilers and the same for Boilers 8 and 9 (for example see plot below for Buck Boilers 5, 6 and 7). Duke's method of plotting the data, with PM emissions as the dependent variable on the vertical axis, shows the 40% 2D .0521 opacity limit is reached before the line crosses the 0.15 lb/mmBtu PM limit, meaning at any opacity up to the limit, the PM emission limit will not be exceeded. Therefore Duke selects a maximum of 35% (a 5% margin below the 40% limit) as the excursion point for each boiler (Table 1, column 1).



However, when plotted correctly with opacity as the dependent variable on the vertical axis, the line crosses the PM limit at much lower opacity values (for example see plot below for Buck 5).



DAQ has used the most recent approximately 10 years of data (1999-2007 in the Buck 5 plot above) to determine the opacity that provides a reasonable assurance of compliance with the emission limitation. An opacity value is selected based on EPA’s proposed CAM Technical Guidance: *CAM Protocol for an ESP Controlling PM from a Coal-Fired Boiler*. This guidance recommends that the indicator range for opacity be established at a level equal to or less than an opacity at which the source has demonstrated a margin of compliance with the PM emissions limit of at least 10%. Therefore, at equal to or less than the PM limit, DAQ determined the opacity for Buck 5 to be 16% with results for all boilers as shown in column 2 of Table 1.

Using 3-hour block opacity data

After the opacity excursion points determined above by DAQ from the log-log plots (Table 1, column 2), were given to Duke, in an effort to show that the excursion points were unreasonably low and would cause excessive operator corrective actions to be initiated (see corrective actions required under Monitoring/Recordkeeping below), they submitted approximately 4½ years of 3-hour block COM values for each unit to show how many times per quarter operator corrective action would be needed at a the opacities determined by DAQ. Using the 4½ years’ worth of 3-hour block data, Duke proposed the excursion points shown in column 3 of Table 1, based on an exceedance of CAM excursion points 2% of the time. Duke claimed a 2% exceedance was a reasonable amount of operator corrective action. DAQ then determined, using the 3-hour block COM data, the average quarterly opacity for the most recent 2-year period that would exceed the 5% CAM trigger that requires them to conduct a stack test (see Monitoring/Recordkeeping below). These are shown in column 4 of Table 1. The final excursion points (column 5 of Table 1) were selected based on the difference between Duke’s numbers and DAQ’s numbers and a review of the individual quarterly opacities for each unit typically for the last 2 years that were used to get the average quarterly values described above (column 4 of Table 1). Duke’s numbers were used for Boilers 5, 6 and 7, since DAQ’s numbers were not much different. For Boilers 8 and 9, because DAQ’s numbers were much lower than Duke’s, the final values were a compromise that, while it may require more corrective action, would only exceed the 5% trigger to conduct a stack test on average once every 2 years. However, in addition to requiring a stack test when there is an 5% or greater exceedance of the excursion points, for any 3-hour block excursion, certain corrective actions are required to reduce opacity (see Monitoring/Recordkeeping below).

**Table 1 – Opacity Excursion Determination**

	% Opacity				
	1	2	3	4	5
<b>Boiler</b>	<b>Originally Proposed by Duke</b>	<b>DAQ's analysis using 1999-2007 opacity-PM log-log plots</b>	<b>Duke's proposal using 4½ yrs of 3-hr at 2% of quarterly exceedance of CAM excursion</b>	<b>DAQ's analysis using last 2 yrs of 3-hr data at 5% quarterly exceedance of CAM excursion</b>	<b>Final CAM excursion point</b>
5	35	16	16	12.91	16.0
6	35	12	15.5	11.49	15.5
7	35	5	14.5	13.66	14.5
8	35	7	15	7.74	12.0
9	35	11	15.5	8.21	13.0

Monitoring/Recordkeeping

To provide a reasonable assurance of compliance with the particulate matter limit of 0.15 pounds per million Btu heat input for the ESP control devices on these sources, the Permittee shall determine and record opacity using a continuous opacity monitoring system (COMS) as included in the following Table:

<b>A. Indicator</b>  Measurement Approach	Opacity  Use of 40 CFR 75 certified COMS connected to a data logger
<b>B. Indicator Range</b>	An excursion is defined as an opacity value (based on a 3-hour block average greater than: <p style="text-align: center;"> <b>ES-1 (Unit 3, Boiler 5) - 16.0 Percent</b>  <b>ES-2 (Unit 3, Boiler 6) - 15.5 Percent</b>  <b>ES-3 (Unit 4, Boiler 7) - 14.5 Percent</b>  <b>ES-4 (Unit 5, Boiler 8) - 12.0 Percent</b>  <b>ES-5 (Unit 6, Boiler 9) - 13.0 Percent</b> </p> Excluding periods of startup, shutdown, off-line activities, malfunctions, and maintenance (e.g. soot blowing). Excursions trigger an inspection of the control system and corrective action.  If five (5) percent or greater of COMS data (averaged over a three hour block period and excluding startup, shutdown, and malfunction periods) recorded in a calendar quarter show opacity values higher than those listed above, a stack test shall be performed in the following calendar quarter to demonstrate compliance with the particulate standard. If the stack test exceeds 80 percent of the PM limit then retesting shall be conducted in accordance with 2.1 A.4.e. If a unit operates less than 2200 hours during any calendar quarter, the facility may evaluate three-hour opacity values using operating data from the current and preceding quarters until 2200 hours of data are obtained.  If no changes are being made to the most recently approved protocol as submitted in the latest annual particulate test it is not necessary for the facility to submit testing protocol 45 days prior to the scheduled test date as specified in General Condition JJ. Instead, the facility shall notify the Mooresville Regional Office by email, fax, or letter, within fifteen (15) business days of making the determination that stack testing is required. The most recently approved protocol and the anticipated date of testing shall be included with that communication. The facility shall conduct testing no less than fifteen calendar days from the date of this notification.
<b>C. Performance Criteria</b>  <b>1. Data Representativeness</b>  <b>2. Verification of Operational Status</b>  <b>3. QA/QC Practices and Criteria</b>  <b>4. Monitoring Frequency</b>  <b>5. Data Averaging Period</b>  <b>6. Data Collection</b>	The COMS location meets the specifications of 40 CFR Part 75 and 40 CFR 60, Appendix B.  Not applicable, use of monitoring equipment is proposed.  COMS are self-calibrated every 24 hours. Performance evaluations and calibration checks are carried out per 40 CFR 60, Appendix F. Documentation of performance evaluations, calibration checks, and maintenance logs are kept for a minimum of 5 years.  Continuous  3-hour block average of 6-minute averages starting at midnight each day. (total of eight 3-hour block periods)  Automated data acquisition system (DAHS). Real-time opacity values will be displayed to control room operators and alarms will be given to the operators when limits are exceeded.

For any excursion, the Permittee shall initiate an inspection of the control equipment and/or the COMS and initiate the necessary repairs as identified by the Malfunction Abatement Plan (MAP). In addition to implementing procedures outlined in the MAP, the following corrective actions shall be taken as soon as practical:

- i. Identify cause of excursion.
- ii. Initiate actions to correct the cause of any excursions identified in step i above. Repair equipment that is not operating properly. Isolate ESP fields if necessary in accordance with MAP.
- iii. Initiate work order for ESP inspection and repair as needed for any equipment that cannot be repaired during operation.
- iv. Document nature and cause of excursions in operations log.
- v. Improve preventative maintenance procedures as necessary in accordance with CAM QIP (if one exists) and MAP procedures.
- vi. Provide notification to DAQ in accordance with reporting requirements in the permit.

#### Reporting

The results of any stack test shall be reported within 30 days, and the test report shall be submitted within 60 days after the test. In addition, the Permittee shall submit quarterly reports as required under §64.9 of 40 CFR Part 64 including the following:

- i. The date, time, and duration of each excursion.
- ii. Summary information on the number, duration, and cause (including unknown cause, if applicable) of excursions or exceedances, as applicable, and the corrective actions taken.
- iii. The percent of operating time the PSEU has excursions.
- iv. Summary information on the number, duration, and cause (including unknown cause, if applicable) for monitor downtime incidents (other than downtime associated with zero and span or other daily calibration checks, if applicable).

#### 2. 2D .2500: MERCURY RULES FOR ELECTRIC GENERATORS

This rule became effective January 1, 2007 pursuant to a SIP requirement of the federal Clean Air Mercury Rule (CAMR). In accordance with the applicability requirements in 2D .2501, the rule applies to:

- (1) any stationary coal-fired boiler or any stationary coal-fired combustion turbine serving at any time, since the start-up of a unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe producing electricity for sale; or
- (2) any unit that qualifies as a cogeneration unit during the 12-month period starting on the date that the unit first produces electricity and continues to qualify as a cogeneration unit, or any cogeneration unit serving at any time a generator with nameplate capacity of more than 25 MWe and supplying in any calendar year more than one-third of the unit's potential electric output capacity or 219,000 MWh, whichever is greater, to any utility power distribution system for sale; or
- (3) any Hg budget unit identified in the table in Rule 2D .2503.

As stationary coal-fired boilers serving a generator with a nameplate capacity greater than 25 MWe and listed in the table in Rule 2D .2503, this rule applies to the five Buck boilers. As discussed in a memo from Keith Overcash dated September 15, 2009, CAMR was vacated by the DC Court of Appeals on February 8, 2008, making all but Sections 2D .2509 and .2511 of the 2D .2500 rule deficient and impractical. In accordance with the memo, until new federal rules are promulgated to replace CAMR, the state-only 2D .2500 rules will remain in the permit (if already in the permit), or newly placed into permits, with a footnote stating that Sections 15A NCAC 2D .2509 and .2511 are state-enforceable and that all other sections of 15A NCAC .2500 will not be enforced at this time.

#### 3. CAIR

This rule is state-only until such time as EPA approves it into NC's State Implementation Plan (SIP). EPA proposed approval of the CAIR rules into the SIP on August 7, 2009, and the public comment

period ended September 8, 2009. When the CAIR rules become part of the SIP, the rules will become both state and federally enforceable and the federal-only 40 CFR 52 Subpart II condition can be removed from the permit since it will be superseded by CAIR (see 2D .1416, .1417 and .1418 NOx SIP Call Rules below). If the CAIR rules are approved into the SIP before issuance of this permit, the permit will be revised to make the CAIR rules both state and federally enforceable, and the federal-only 40 CFR 52 Subpart II condition will be removed.

The applicable CAIR rules, as specified in the CAIR Permit Application attached to the permit, includes the emission and monitoring requirements shown below for the following affected CAIR sources:

<b>PERMITTED SOURCE ID No.</b>	<b>CAIR ID No.</b>
ES-1 (Unit 3, B5)	5
ES-2 (Unit 3, B6)	6
ES-3 (Unit 4, B7)	7
ES-4 (Unit 5, B8)	8
ES-5 (Unit 6, B9)	9
ES-6 (CT7C)	7C
ES-7 (CT8C)	8C
ES-8 (CT9C)	9C
ES-11	11C
ES-12	12C

15A NCAC 2D .2400 “Clean Air Interstate Rule” (STATE-ONLY REQUIREMENT)

This rule implements the federal Clean Air Interstate Rule under 40 CFR Part 96. The following 2D .2400 sections apply:

15A NCAC 2D .2403 “Nitrogen Oxide Emissions”

This section specifies the total annual NOx allocations and includes the compliance, emissions measurements recording and reporting, excess emissions and liability requirements.

15A NCAC 2D .2405 “Nitrogen Oxide Emissions During Ozone Season”

This section specifies the NOx allocations during the ozone season and includes the compliance, emissions measurements recording and reporting, excess emissions and liability requirements.

15A NCAC 2D .2404 “Sulfur Dioxide Emissions”

This section specifies the annual SO<sub>2</sub> allocations and includes the compliance, emissions measurements recording and reporting, excess emissions and liability requirements.

Changes were made to the following regulations:

1. Acid Rain

Acid Rain requirements are being added for the new combustion turbines (ID Nos. ES-11 and ES-12) permitted in Permit No. 03786T22 issued October 15, 2008. The applicable acid rain rules, as specified in the Acid Rain Permit Application attached to the permit, includes the following emission and monitoring requirements:

15A NCAC 2Q .0402 "Acid Rain Procedures" (40 CFR Part 72 “Permits Regulation”)

North Carolina air quality regulation 15A NCAC 2Q .0400 implements Phase II of the federal acid

rain program pursuant to Title IV of the CAA as provided in 40 CFR Part 72. Issuance or denial of acid rain permits shall follow the procedures under 40 CFR Part 70 (Title V) and Part 72. If the provisions or requirements of Part 72 conflict with or are not included in Part 70, the Part 72 provisions and requirements shall apply and take precedence. SO<sub>2</sub> allowances are not allocated by U.S. EPA for new units under 40 CFR Part 72; however, the sources must hold enough SO<sub>2</sub> allowances to cover their annual SO<sub>2</sub> emissions. There are no NO<sub>x</sub> emission limits for gas or oil-fired units; however, NO<sub>x</sub> emissions monitoring is required.

15A NCAC 2Q .0402 “Acid Rain Procedures” (40 CFR Part 75 “Continuous Emissions Monitoring”)

This regulation establishes requirements for the installation, certification, operation, and maintenance of continuous emissions or opacity monitoring systems.

2. 2D .1416, .1417, .1418 and 40 CFR 52 Subpart II NO<sub>x</sub> SIP Call Rules

The NO<sub>x</sub> SIP Call rules in this permit included the 2D .1416, .1417 and .1418 rules which were state-only and a federal-only version under 40 CFR 52 Subpart II. These rules have been superseded by CAIR as far as being state enforceable (state-only); therefore, the state-only version of these rules were removed (as shown in Section II above) since the state-only CAIR rules are now being put in the permit. However, the federal version of these rules in the approved SIP under 40 CFR 52 Subpart II (where the SIP resides), must stay in the permit until the CAIR rules are approved by EPA into the SIP. When the CAIR rules become part of the SIP, the federal-only 40 CFR 52 Subpart II condition can be removed from the permit since the CAIR rules will apply, as both state and federally enforceable.

3. RACT

RACT requirements are being added for the aux boiler ES-9(Aux) in Section 2.1 C.5 of the permit. Duke has requested a permit shield for these provisions as indicated on Form E5, dated September 29, 2009, submitted with the RACT application. General condition R provides a shield for applicable requirements as long as the Permittee is in compliance with the terms and conditions of the permit. Therefore, nothing more is needed to put such a shield in effect. See attached review by Charlie Yirka for further information regarding this change.

**VII. Public Notice**

Pursuant to 15A NCAC 2Q .0521, a notice of the draft Title V Operating Permit will be published in a newspaper of general circulation in the area where the facility is located, to provide for a 30-day comment period, with an opportunity for a public hearing. Copies of the draft (proposed) permit, review and public notice will be sent to EPA for their 45-day review, to persons on the Title V mailing list, and to the Permittee for review.

**VIII. Other Requirements**

PE Seal

NA. No control devices are being added.

Zoning

There is no expansion of the facility, therefore Zoning consistency is not required.

Fee Classification

The facility fee classification before and after this modification will remain as “Title V”.

**IX. Recommendations**

later after public notice

**NORTH CAROLINA**  
**DIVISION OF AIR QUALITY**  
**Air Permit Review for RACT Requirements**  
(in conformance with Section 172(c) of the CAA)

**Region:** Mooresville Regional Office  
**County:** Rowan  
**NC Facility ID:** 8000004  
**Inspector's Name:** Jim Westmoreland  
**Date of Last Inspection:** 01/23/2008  
**Compliance Code:** 5/Meeting Compliance Schedule

**Permit Issue Date:** XX XX, 2009

<b>Facility Data</b>			<b>Permit Applicability (this application only)</b>	
<b>Applicant (Facility's Name):</b> Duke Power Company, LLC - Buck Steam Station  <b>Facility Address:</b> Duke Power Company, LLC - Buck Steam Station 1555 Dukeville Road Spencer, NC 28145  <b>SIC:</b> 4911 / Electric Services <b>NAICS:</b> 221112 / Fossil Fuel Electric Power Generation  <b>Facility Classification: Before:</b> Title V <b>After:</b> Title V <b>Fee Classification: Before:</b> Title V <b>After:</b> Title V			<b>SIP:</b> 2D .1407 <b>NSPS:</b> <b>NESHAP:</b> <b>PSD:</b> <b>PSD Avoidance: NC Toxics:</b> <b>112(r):</b> <b>Other:</b> RACT: .1407(b) RACT Review for NOx 100 tpy NOx source in Metrolina	
<b>Contact Data</b>			<b>Application Data</b>	
<b>Facility Contact</b>	<b>Authorized Contact</b>	<b>Technical Contact</b>	<b>Application Number:</b> 8000004.XXX <b>Date Received:</b> XX XX, 2009 <b>Application Type:</b> Modification <b>Application Schedule:</b> TV-Sign-501(c)(2) <b>Existing Permit Data</b> <b>Existing Permit Number:</b> 03786/T23 <b>Existing Permit Issue Date:</b> 04/23/2009 <b>Existing Permit Expiration Date:</b> 10/31/2008	
Norbert Zalme Environmental Coordinator (704) 645-2700 1555 Dukeville Road Salisbury NC, 28146	Gary Taylor Regional Manager  Buck Steam Station Salisbury NC, 28146	Kris Knudsen Senior Engineer (704) 373-3225 526 S. Church Street Charlotte NC, 28202		
<b>Review Engineer:</b> Charles F. Yirka  <b>Review Engineer's Signature:</b> _____ <b>Date:</b> XX/XX/2009			<b>Comments / Recommendations:</b> <b>Issue</b> 03786/T24 <b>Permit Issue Date:</b> XX/XX/2009 <b>Permit Expiration Date:</b> March 31, 2014**	

\*\* An application to renew this permit has been timely filed, so that an application shield pursuant to 15A NCAC 2Q .0512(b)(1) remains in effect. This Permit No. 03786T24 shall not expire until the earlier of the above expiration date or until the renewal permit has been issued or denied. All terms and conditions of the permit shall remain in effect until the renewal permit has been issued or denied pursuant to 15A NCAC 2Q .0513(c).

**I. Purpose of Application**

Buck Steam Station is located in the Metrolina non-attainment area. This area is currently classified as a Moderate non-attainment area. All facilities with potential emissions 100 tons per year or greater of NOx and/or VOC are required to undergo a RACT review. It was determined that Duke Buck was not major for VOC emissions. RACT can affect existing and new emissions units. The DAQ has conducted an evaluation for NOx RACT applicability under this permit reopening. The results of this evaluation are summarized below:

- A. three coal/No. 2 fuel oil-fired electric utility boilers (ID Nos. ES-1(B5), ES-2(B6) and ES-3(B7)) with**

separated overfire air (SOFA) low-NO<sub>x</sub> equipment (ID Nos. CD-11(B5SOFA), CD-12 (B6SOFA), and CD-13 (B7SOFA) and associated electrostatic precipitators (ID Nos. CD-1(B5ESP), CD-2(B6ESP) and CD-3(B7ESP)); and

two coal/No. 2 fuel oil-fired electric utility boilers (ID Nos. ES-4(B8) and ES-5(B9)) with separated overfire air (SOFA) low-NO<sub>x</sub> equipment (ID Nos. CD-7b(B8SOFA) and CD-8b(B9SOFA)), selective non-catalytic reduction (SNCR) NO<sub>x</sub> control systems (ID Nos. CD-7c (B8SNCR) and CD-8c(B9SNCR)), and associated electrostatic precipitators (ID Nos. CD-4(B8ESP) and CD-5(B9ESP))

- B. three simple-cycle natural gas/No. 2 fuel oil-fired internal combustion turbines (ID Nos. ES-6(CT7C), ES-7(CT8C), and ES-8(CT9C))**

Duke Energy Carolinas (Duke) is currently permitted (Permit No. 03786T21) to operate the Buck Steam Station consisting of five coal-fired boilers (boilers No. 5, 6, 7, 8 and 9) rated at a total of 369 MW capacity and three simple cycle combustion turbines rated at 93 MW, for a total plant capacity of 462 MW. These units have been addressed for NO<sub>x</sub> RACT applicability. They are affected units as per 15A NCAC 2D .1416 – Emissions Allocations for Utility Companies. In addition these appear to be CAIR affected units at this time. RACT for the new and existing emissions units was addressed under permit 03786T22 issued October 15, 2008. See 2D .1402 – Applicability

- C. two nominal 170 MW (GE Model 7FA) natural gas-fired simple-cycle/combined-cycle combustion turbines (ID Nos. ES-11\* and ES-12\*) to operate as follows:**

**simple-cycle mode: equipped with dry low-NO<sub>x</sub> combustors**

**combined-cycle mode: each turbine equipped with a heat recovery steam generator (HRSG) with a natural gas-fired duct burner and steam turbine generator supplied by the two HRSGs; equipped with dry low-NO<sub>x</sub> combustors, associated selective catalytic reduction (SCR) (ID Nos. C11A\* and C12A\*), and associated CO oxidation catalyst (ID Nos. C11B\* and C12B\*)**

Duke plans to expand/modify the Buck Steam Station in a two-phase construction project by adding two combustion turbine generators (CTGs) to operate initially in simple-cycle mode for approximately one year, and then operate both CTGs in a 2x1 (2 CTGs and 1 steam turbine generator) combined-cycle mode thereafter upon completion of the second phase of construction. These units have been addressed for NO<sub>x</sub> RACT applicability. They are affected units as per 15A NCAC 2D .0530(h) – Prevention of Significant Deterioration and are subject to BACT. As BACT is considered superior to RACT the permit indicates that the BACT requirements satisfy RACT. Additionally, the units are subject to 15A NCAC 2D .1418 - New Electric Generating Units, Large Boilers and Large I/C Engines (NO<sub>x</sub> Allocations). RACT for the new emissions units was addressed under permit 03786T22 issued October 15, 2008. See 2D .1402 - Applicability.

The project included the following equipment:

- Two nominal 170 MW (General Electric Model 7FA (GE7FA)) natural gas-fired CTGs operating in simple-cycle mode initially and later in combined-cycle mode. (See above RACT was addressed).
- Two supplementary fired, HRSGs to achieve combined-cycle operation. (See above RACT was addressed).
- One reheat condensing steam turbine generator (STG) supplied with the two HRSGs. (See above RACT was addressed).
- One cooling tower (10 cells) to support the steam turbine. (RACT not applicable).

- auxiliary boiler (ID No. 14). (This 50 mmBtu/hr boiler was subject to 15A NCAC 2D .1407 and the annual tune-up requirements and was addressed).
- emergency generator. (RACT exempt).
- emergency firewater pump. (RACT exempt).
- chiller cooling tower (insignificant activity) to cool turbine inlet air during hot weather operation. (RACT not applicable).

All of the above emissions units were addressed for NOx RACT applicability with the exception of the existing auxiliary boiler (ID No. ES-9(Aux)). This 21 million Btu per hour heat input capacity boiler is subject to the boiler tune-up provisions. This is the last remaining emissions unit that appears to be subject to NOx RACT. The permit condition as it appears in the permit (T24) follows:

**one No. 2 fuel oil/propane-fired auxiliary boiler (ID No. ES-9(Aux))**

The following table provides a summary of limits and standards for the emission source(s) described above:

Regulated Pollutant	Limits/Standards	Applicable Regulation
Particulate matter	0.53 pound per million Btu heat input	15A NCAC 2D .0503
Sulfur dioxide	2.3 pounds per million Btu heat input	15A NCAC 2D .0516
Visible emissions	20 percent opacity	15A NCAC 2D .0521
None	Recordkeeping	15A NCAC 2D .0524 (40 CFR 60 Subpart Dc)
Nitrogen oxides	Annual Boiler Tune-ups Required	15A NCAC 2D .1407

**1. 15A NCAC 2D .1407 BOILERS AND INDIRECT PROCESS HEATERS**

- Facilities with boilers with maximum heat input rate of less than or equal to 50 million Btu per hour shall comply with the annual tune-up requirements of 2D .1414. The Permittee shall maintain records of all tune-ups performed for each source according to 2D .1404 [15A NCAC 2D .1407]
  - Compliance was achieved through a compliance demonstration without source modification [15 NCAC 2D .1403(c) (1) (C)]

**Testing** [15A NCAC 2D. 2601]

- If emission testing is required, the testing shall be performed in accordance with 15A NCAC 2D. 2601 and General Condition JJ.

**Monitoring** [15A NCAC 2Q .0508(f)]

- To assure compliance the Permittee shall conduct annual boiler tune-ups, any required recordkeeping and reporting requirements on or by December 31<sup>st</sup> of each calendar year. Boiler tune-ups shall be in accordance with the manufacturer’s recommendations including the following [15A NCAC 2D .1414(b):
  - inspect each burner and clean or replace any component of the burner as required;
  - inspect the flame pattern and make any adjustments to the burner, or burners, necessary to optimize the flame pattern to minimize total emissions of NOx and carbon monoxide;
  - inspect the combustion control system to ensure proper operation and correct calibration of components that control the air to fuel ratio and adjust components to meet the manufacturer’s established operating parameters; and
  - inspect any other component of the boilers and make adjustments or repairs as necessary to improve combustion efficiency. The Permittee shall perform the tune-up according to a unit specific protocol approved by the Director. The Director (or designee) shall approve the protocol if it meets the requirements of this Rule. The protocol shall be submitted to the Regional Office for approval.

If tune-ups and inspections are not conducted as per c.i. through iv. above, the Permittee shall be deemed to be in noncompliance with 15A NCAC 2D .1407.

**Recordkeeping** [15A NCAC 2Q .0508(f)]

- d. The owner or operator shall maintain records of tune-ups performed to comply with Rule .1404. The following information shall be included for each source:
- i. identification of the source;
  - ii. the date and time the tune-up started and ended;
  - iii. the person responsible for performing the tune-up; and
  - iv. for boilers the checklist for inspection of the burner, flame pattern, combustion control system, and all other components of the boiler identified in the protocol, noting any repairs or replacements made;
  - v. any stack gas analyses performed after the completion of all adjustments to show that the operating parameters of the boiler, have been optimized with respect to fuel consumption and output; at a minimum these parameters shall be within the range established by the equipment manufacturer to ensure that the emission limitation for nitrogen oxides has not been exceeded; and
  - vi. any other information requested by the Director (or designee) to show that the boiler is being operated and maintained in a manner to minimize the emissions of nitrogen oxides.
- The Permittee shall be deemed in noncompliance with 15A NCAC 2D .1407 if these records are not maintained.
- e. The results of the monitoring shall be maintained in a logbook (written or electronic format) on-site and made available to an authorized representative upon request. The logbook shall record the following:
- i. the date and time of each recorded action;
  - ii. the results of each annual tune-up and inspection along with any corrective actions taken; and
  - iii. the results of any corrective actions performed.
- The Permittee shall be deemed in noncompliance with 15A NCAC 2D .1407 if these records are not maintained.

**Reporting** [15A NCAC 2Q .0508(f)]

- f. The Permittee shall submit a summary report postmarked on or before January 30 of each calendar year for the preceding six-month period between July and December and July 30 of each calendar year for the preceding six-month period between January and June. All instances of deviations from the requirements of this permit must be clearly identified.

**D. one No. 2 fuel oil-fired temporary 500-700 hp diesel wood chipper (ID No. ES-17(ChprEng))**

This emissions unit was addressed under the previous permit for RACT applicability. The RACT rule 2D .1402(d) applies to any new source of nitrogen oxides not permitted before March 1, 2007 (as per 2D .1403(e)(2)), at a facility with the potential to emit 100 tons or more nitrogen oxides per year, located in the non-attainment areas identified in the rule. The Buck station is in Rowan County, one of the non-attainment areas listed in the rule and the facility has the potential to emit more than 100 tons per year of NOx. Duke states (see e-mail from Bill Horton to Ed Martin dated 4-14-09) that, since they plan to conduct the trial wood burn in a four-week period in June-July, 2009, they will comply with the RACT rule by limiting the hours of operation for this 700 hp diesel engine to a total of 672 hours; and therefore the source meets the exemption allowed by 2D .1402(h)(6)(A) by operating less than the number of hours calculated in accordance with the rule. RACT for this new emissions unit was addressed under permit 03786T23 issued April 23, 2009. See 2D .1402 - Applicability.

**E. one No. 2 fuel oil-fired temporary diesel trommel screen with conveyor (ID No. ES-18(Trommel))**

This emissions unit was addressed under the previous permit for RACT applicability. The RACT rule 2D .1402(d) applies to any new source of nitrogen oxides not permitted before March 1, 2007 (as per 2D .1403(e)(2)), at a facility with the potential to emit 100 tons or more nitrogen oxides per year, located in the non-attainment areas identified in the rule. The Buck station is in Rowan County, one of the non-attainment areas listed in the rule and the facility has the potential to emit more than 100 tons per year of NOx. Duke states (see e-mail from Bill Horton to Ed Martin dated 4-14-09) that, since they plan to conduct the trial wood burn in a four-week period in June-July, 2009, they will be exempt from RACT for this 105 hp diesel engine since, even if it were operated full time during the ozone season (ie: without permit limit), the number of hours of operation would not exceed the number of hours allowed by 2D

.1402(h)(6)(A) calculated in accordance with the rule. RACT for this new emissions unit was addressed under permit 03786T23 issued April 23, 2009. See 2D .1402 - Applicability.

**Conclusion - Purpose of Application**

This is a significant Title V permit modification pursuant to rule 15A NCAC 2Q .0501(d)(2), where the construction and operating permit will be issued at this time. The permit shield described in General Condition R does apply to these changes.

**II. Permit Changes**

The following changes were made to the Duke Energy Carolinas LLC Buck Steam Station Air Permit No. 03786T23:

Page(s)	Section	Description of Changes
Cover	--	Amended permit numbers and dates.
Through out permit	–	Update header to new permit number
4-5	Section 1, table of permitted emission sources	Added new sources RACT designation to Table (ID Nos. ES-9(Aux)).
		Added explanatory note memorializing RACT review is complete for the facility located in Moderate area designation
21	Section 2.1 C. regulation table	Added new RACT Rule requirement for boiler tune-up.
22-23	Section 2.1 C.4.	Added applicable RACT requirements for 15A NCAC 2D .1407.

**III. Statement of Compliance**

Jim Westmoreland of the Mooresville Regional Office last inspected the facility on June 4, 2008. Based on his report, the facility appeared to be in compliance with the applicable air quality regulations at the time of the inspection.

**IV. Facility Description**

Duke Energy’s Buck Steam Station is an electric utility that generates electrical power using boilers and combustion turbines. Emission sources consist of five coal/No. 2 fuel oil-fired electric utility boilers (ES-1 (Boiler 5), ES-2 (Boiler 6), ES-3 (Boiler 7), ES-4 (Boiler 8) and ES-5 (Boiler 9)), three No. 2 fuel oil/natural gas-fired simple-cycle internal combustion turbines (ES-6, ES-7 and ES-8), one No. 2 fuel oil-fired auxiliary boiler (ES-9), and one rail-car unloading system (ES-10).

**V. Public Notice**

Pursuant to the one-step significant modification process under 15A NCAC 2Q .0501(d)(2), public notice of the permit is required at this time.

**VI. Other Requirements**

PE Seal  
Not required.

Zoning  
Not required.

Fee Classification

The facility fee classification before and after this modification will remain as “Title V”. Additionally, the facility has been assessed the non-attainment annual added fee on the next title V annual anniversary date (see permit 03786T22).