

Air Permit Review

Permit Issue Date:

Region: Winston-Salem Regional Office
County: Rockingham
NC Facility ID: 7900015
Inspector's Name: Eric Hudson
Date of Last Inspection: 06/23/2009
Compliance Code: W / Violation - procedures

Facility Data			Permit Applicability (this application only)		
Applicant (Facility's Name): Duke Energy Carolinas, LLC - Dan River Steam Station Facility Address: Duke Energy Carolinas, LLC - Dan River Steam Station 900 South Edgewood Road Eden, NC 27288 SIC: 4911 / Electric Services NAICS: 221112 / Fossil Fuel Electric Power Generation Facility Classification: Before: Title V After: Title V Fee Classification: Before: Title V After: Title V			SIP: 2D .2400 (CAIR), 2Q .0400 (Acid Rain), 2D .0614 (CAM), 2D .2500 (Hg) NSPS: NESHAP: PSD: PSD Avoidance: NC Toxics: 112(r): Other: 40 CFR Parts 72 and 75		
Contact Data			Application Data		
Facility Contact	Authorized Contact	Technical Contact	Application Number: 7900015.08A Date Received: 01/18/2008 Application Type: Renewal Application Schedule: TV-Renewal Existing Permit Data Existing Permit Number: 03455/T27 Existing Permit Issue Date: 08/24/2009 Existing Permit Expiration Date: 01/31/2014		
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Review Engineer: Ed Martin Review Engineer's Signature: _____ Date: _____ DRAFT FOR PUBLIC NOTICE		Comments / Recommendations: Issue 03455/T28 Permit Issue Date: Permit Expiration Date:			

I. Purpose of Application

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

1. Application 7900015.08A
Renewal of the Title V permit.
2. Application 7900015.09A (consolidated with Application 7900015.08A)
Incorporate the Clean Air Interstate Rule (CAIR) requirements into the permit.
3. Application 7900015.09C (consolidated with Application 7900015.08A)
Add acid rain requirements for the new combustion turbines (ID Nos. ES-11 and ES-12) permitted in Permit No. 03455T27 issued August 24, 2009.

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

II. Permit Changes

The following changes were made to the Duke Energy Carolinas LLC Dan River Steam Station Air Permit No. 03455T27:

Page	Section	Description of Changes
--	Insignificant Activity List	Added I-66: 20kw/33hp propane-fired standby emergency generator, microwave building
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.
3	--	Removed the two paragraphs prior to Section 1.
3-4	1, table of permitted emission sources	Removed footnote "*" since control devices ID Nos. CD-(U3FGTa), CD-(U3FGTb), CD-3(U3ESPnew), and separated overfire air low-NOx burners on ES-1, ES-2 and ES-3 will now be shielded via the public notice process of this permit.
5	2.1 A, equipment description	Removed start up notification requirement for control devices ID Nos. CD-(U3FGTa), CD-(U3FGTb), CD-3(U3ESPnew), and separated overfire air low-NOx burners on ES-1, ES-2 and ES-3, since this notification has been made.
5-6	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 40 CFR 52 Subpart II and 15A NCAC 2D .1416 as these NOx rules have 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.
		Removed footnote "*" since control devices ID Nos. CD-(U3FGTa), CD-(U3FGTb), CD-3(U3ESPnew), and separated overfire air low-NOx burners on ES-1, ES-2 and ES-3 will now be shielded via the public notice process of this permit.
10	2.1 A.5.e (old section)	Removed requirement to use COMS for monitoring of particulate emissions since this monitoring is now under CAM in Section 2.1 A.14.
11	2.1 A.8 (old section)	Removed this section as this 40 CFR 52 Subpart II rule has been superseded by the CAIR permit requirements added in Section 2.5.
11	2.1 A.9 (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.
14-16	2.1 A.13	Added this section for 15A NCAC 2D .0614 CAM requirements.
16-17	2.1 A.14	Added this section for 15A NCAC 2D .2500 mercury requirements.
17	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 40 CFR 52 Subpart II and 15A NCAC 2D .1416/.1417 as these NOx rules have been superseded by the CAIR permit requirements added in Section 2.5.
18	2.1 B.3 (old section)	Removed this section as this 40 CFR 52 Subpart II rule has been superseded by the CAIR permit requirements added in Section 2.5.

Page	Section	Description of Changes
18	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.
23	2.1 F, 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 40 CFR 52 Subpart II and 15A NCAC 2D .1418 as these NOx rules have been superseded by the CAIR permit requirements added in Section 2.5.
30	2.1 F.7 (old section)	Removed this section as this 40 CFR 52 Subpart II rule has been superseded by the CAIR permit requirements added in Section 2.5.
30	2.1 F.8 (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.
30	2.1 F.9 (old section)	Removed this 15A NCAC 2Q .0402 condition since the acid rain application for these sources has been submitted.
37	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.
43	2.4	Added acid rain requirements for new combustion turbines ES-11 and ES-12.
44	2.4.D	Revised Acid Rain Permit Application date.
44-46	2.5	Added Section 2.5 - CAIR Permit Requirements.
46-55	3	Updated General Conditions to the latest revision (version 3.0).

The required E5 form for removal of footnote “*” to shield control devices ID Nos. CD-(U3FGTa), CD-(U3FGTb), CD-3(U3ESPnew), and separated overfire air low-NOx burners on ES-1, ES-2 and ES-3 in the above table (page 3-4), was received (signed 1-14-08). Also, the start up notification requirement for these control devices as noted in the above table (page 5) can be removed since the CD-U3ESPnew startup notification was completed 2-1-07, the CD-(U3FGTa), CD-(U3FGTb) startup notification was made 5-26-07, and the separated overfire air low-NOx burners startup notices were made 11-16-06 (U3), 1-30-07 (U2), and 11-2-07 (U1).

III. Changes to Permit Since Initial Title V Was Issued

Permit No.	Type of Modification	Reason for Permit	Issue Date
03455T19	Initial Title V permit	-	11-12-03
03455T20	2Q .0515 Minor Mod	Add the 2D .1400 NOx SIP Call regulations for the combustion turbines.	4-26-04
03455T21	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
03455T22	2Q .0501(c)(2) Significant Mod	U3 ESP rebuild, U3 flue gas treatment systems	8-3-05
03455T23	2Q .0501(c)(2) Significant Mod	Reissue Permit No. 03455T22 with revised federal opacity language in accordance with the Settlement Agreement of October 20, 2005	12-1-05
03455T24	2Q .0501(c)(2) Significant Mod PSD	Add U1-3 SOFA low-NOx controls	9-11-06
03455T25	State-only Mod	Add burning of EDTA	2-21-08

03455T26	2Q .0501(c)(2) Significant Mod	Acid Rain averaging plan and Acid Rain renewal	2-3-09
03455T27	2Q .0501(c)(2) Significant Mod	Add new combustion turbines and associated equipment	8-24-09
03455T28	Renewal	-	-

IV. Facility Description

Duke Energy's Dan River Steam Station is an electric utility plant that generates electrical power using boilers and combustion turbines. The Dan River facility has three coal/No. 2 fuel oil-fired electric utility boilers (ID Nos. ES-1 (U-1 Boiler), ES-2 (U-2 Boiler) and ES-3 (U-3 Boiler)), three No. 2 fuel oil/natural gas-fired simple-cycle combustion turbines (ID Nos. ES-4 (CT4C), ES-5 (CT5C) and ES-6 (CT6C)), two No. 2 fuel oil-fired starting diesel engines (ID Nos. ES-7 (4CStEng) and ES-8 (6CStEng)), one No. 2 fuel oil-fired auxiliary boiler (ID No. ES-9 (Aux)), and one rail-car unloading system (ID No. ES-10 (RCU)). In addition the following sources were permitted in 03455T27 issued August 24, 2009, but are not yet in operation: two nominal 170 MW natural gas-fired 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.

V. Summary of Changes to Emission Sources and Control Devices

The only change to emission sources or control devices is to add insignificant activity I-66 (see Section II above).

VI. Regulatory Evaluation

The following new regulations were added:

1. 2D .0614: COMPLIANCE ASSURANCE MONITORING (40 CFR 64)

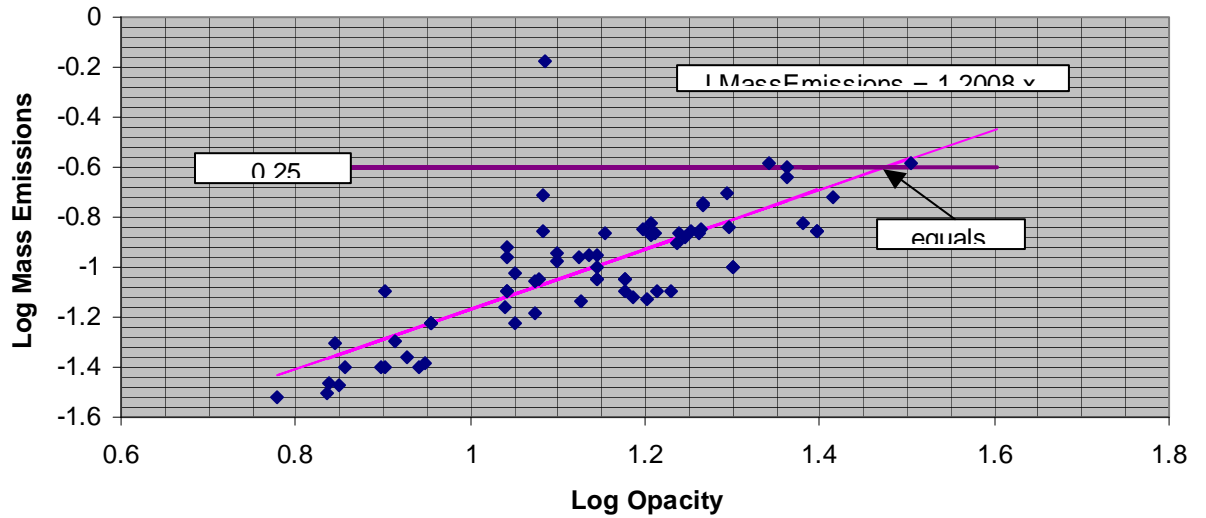
This facility is subject to a CAM analysis as required for renewal of a Title V permit. CAM applies to the Units 1, 2 and 3 boilers (ES-1, ES-2 and ES-3) since these sources have an electrostatic precipitator (ESP) for control of PM-10 emissions and have potential pre-control device emissions for the 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 recent 3-hour block COM data over the last several years as follows.

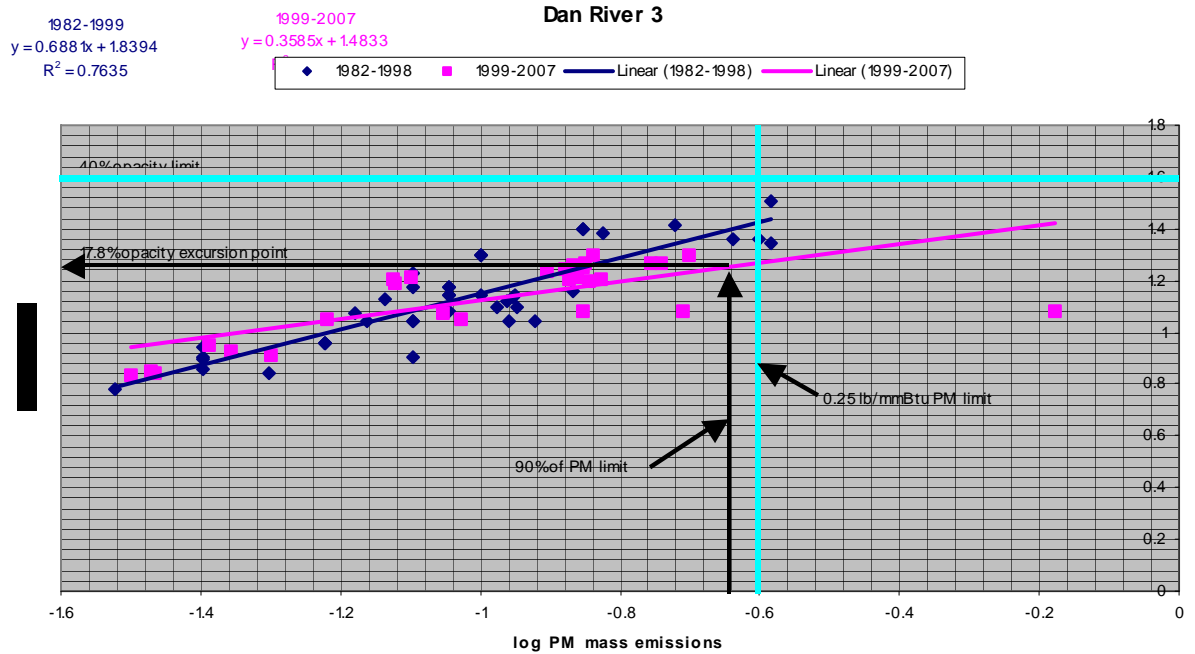
Using historical opacity vs. PM emission data

Duke originally proposed an opacity excursion level of 29% for each of the three boilers based on a plot of historical PM mass emissions vs. opacity using data points from annual stack tests (going back as far as 1982) 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 1 and 2 together to provide more data points since these are identical boilers and plotted Boiler 3 separately (for example see plot below for Dan River 3). Duke's method of plotting the data, with PM emissions as the dependent variable on the vertical axis, shows the line crosses the 0.25 lb/mmBtu PM limit at an opacity of 29% (see Table 1, column 1).

Dan River 3 1982 - 2007



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 Dan River 3).



DAQ has used the most recent approximately 10 years of data (1999-2007 in the Dan River 3 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 Dan River 3 to be 17.8% (results for all boilers 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 4 years of 3-hour block COM values for each unit to show how many times per quarter operator corrective action would be needed at the opacities determined by DAQ. Using the 4 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 last 4 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 a review of the individual quarterly opacities for each unit that were used to get the average quarterly values described above (column 4 of Table 1). 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 or twice every 3-4 years. In addition to requiring a stack test when there is a 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
Boiler	Originally Proposed by Duke	DAQ's analysis using 1999-2007 opacity-PM log-log plots	Duke's proposal using 4 yrs of 3-hr at 2% of quarterly exceedance of CAM excursion	DAQ's analysis using last 4 yrs of 3-hr data at 5% quarterly exceedance of CAM excursion	Final CAM excursion point
U-1	29	7.6	14.5	10.4	14
U-2	29	8.3	19	15.6	18
U-3	29	17.8	27	14.1	18

Monitoring/Recordkeeping

To provide a reasonable assurance of compliance with the particulate matter limit, the ESPs shall be properly operated and maintained to control PM emissions from each Boiler. The Permittee shall determine and record opacity using a continuous opacity monitoring system (COMS) as included in the following Table:

<p>A. Indicator</p> <p>Measurement Approach</p>	<p>Opacity</p> <p>Use of 40 CFR 75 certified COMS connected to a data logger</p>
<p>B. Indicator Range</p>	<p>An excursion is defined as an opacity value (based on a 3-hour block average greater than:</p> <p style="text-align: center;">ES-1 (U-1 Boiler) - 14.0 Percent ES-2 (U-2 Boiler) - 18.0 Percent ES-3 (U-3 Boiler) - 18.0 Percent</p> <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.</p> <p>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.5.d. 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.</p> <p>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 a 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 e-mail, 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.</p>
<p>C. Performance Criteria</p> <p>1. Data Representativeness</p> <p>2. Verification of Operational Status</p> <p>3. QA/QC Practices and Criteria</p> <p>4. Monitoring Frequency</p> <p>5. Data Averaging Period</p> <p>6. Data Collection</p>	<p>The COMS location meets the specifications of 40 CFR Part 75 and 40 CFR 60, Appendix B.</p> <p>Not applicable, use of monitoring equipment is proposed.</p> <p>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.</p> <p>Continuous</p> <p>3-hour block average of 6-minute averages starting at midnight each day. (total of eight 3-hour block periods)</p> <p>Automated data acquisition and handling 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.</p>

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 2D .0614 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 three Dan River 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

North Carolina's CAIR rules were approved into the SIP by EPA on November 17, 2009 and published in the Federal Register on November 30, 2009. This rule replaces the federal-only 40 CFR 52 Subpart II, and state-only 2D .1416, .1417 and .1418 NOx SIP Call rules previously in the permit.

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:

PERMITTED SOURCE ID No.	CAIR ID No.
ES-1 (U-1 Boiler)	1
ES-2 (U-2 Boiler)	2
ES-3 (U-3 Boiler)	3
ES-4 (CT4C)	4C
ES-5 (CT5C)	5C
ES-6 (CT6C)	6C
ES-11	8C
ES-12	9C

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 NO_x 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 NO_x 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 SO₂ allocations and includes the compliance, emissions measurements recording and reporting, excess emissions and liability requirements.

Changes were made to the following regulation:

Acid Rain

Acid Rain requirements are being added for the new combustion turbines (ID Nos. ES-11 and ES-12) permitted in Permit No. 03455T27 issued August 24, 2009. The applicable acid rain rules, as specified in the Acid Rain Permit Application attached to the permit, include 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. SO₂ allowances are not allocated by U.S. EPA for new units under 40 CFR Part 72; however, the sources must hold enough SO₂ allowances to cover their annual SO₂ emissions. There are no NO_x emission limits for gas or oil-fired units; however, NO_x 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.

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