

## **Assessment of Rules in Section 15A NCAC 02D .2511, Mercury Rules for Electric Generators**

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In the early 2000s, coal-fired electric generating units (EGUs) were identified as the largest source of mercury emissions in North Carolina. The U.S. Environmental Protection Agency (EPA) finalized the Clean Air Mercury Rule (CAMR) to control electric generating units (EGUs) emissions with cap-and-trade and emission allowance provisions in 2005, and the Environmental Management Commission (EMC) adopted rules incorporating CAMR in 2006. While CAMR required effective control, it did not require *maximum* achievable control technology (MACT) control for mercury emissions and it allowed mercury emission trading. Among other state-only provisions, the EMC adopted two rule provisions focused on long-term mercury control. CAMR was vacated by the U.S. Court of Appeals for the D.C. Circuit in 2008.

The purpose of this report is to address the two remaining requirements of the Mercury Rules for Electric Generators in Section 15A NCAC 02D .2511. The two provisions in question are:

- 02D .2511(b), submittal of mercury control plans by each utility company to identify the mercury controls at each coal-fired unit, the schedule for startup, and the units without mercury controls to be shut down by 2018; and
- 02D .2511(c), review of said plans by the EMC and approval only if key conditions are met dealing with the *maximum* emission control level feasibility without mercury *emission trading*.

Background information on the federal rules for EGU mercury control, on the extent of mercury control and on the impact of mercury deposition in North Carolina is provided below. This information, plus information specific to the points raised by each of the two rule provisions in question, is provided as the basis for how to address the two rule provisions.

### **Background**

In the early 1990s North Carolina government agency studies discovered unsafe mercury levels in Lumber River basin fish. Additionally a finding of high mercury levels in hair from local subsistence fisherman prompted local fish advisories. Subsequent studies that found high mercury-in-fish tissue levels leading to statewide fish advisories. Coal-fired electric generating units (EGUs) were identified as the largest source of mercury emissions in North Carolina. A summary of further background on the development of rules and the progress of emission reductions pertaining to EGU mercury control in North Carolina follows.

- In 2002, when the North Carolina Clean Smokestacks Act (CSA) was finalized, the science on mercury emission control from coal-fired EGUs was limited as was the science on atmospheric mercury deposition and bioaccumulation into fish. Given this uncertainty, the only mercury-related CSA mandates were for the Division of Air Quality (DAQ) to issue three annual reports in 2003-2005 on the status and progress of the above sciences to the Environmental Management Commission (EMC).
- In 2005, the EPA finalized CAMR to control EGU emissions with cap-and-trade and emission allowance provisions.
- In 2006 the EMC adopted state rules for controlling mercury from coal-fired EGUs in the 15 NCAC 02D .2500 Mercury Rules for EGUs. Subsequent vacatur of the federal CAMR

rule nullified most of the state-only rules in 02D .2500 Rules except two provisions in 02D .2511. These two state-only rules required efforts by the utility industry and DAQ beyond the federal rules.

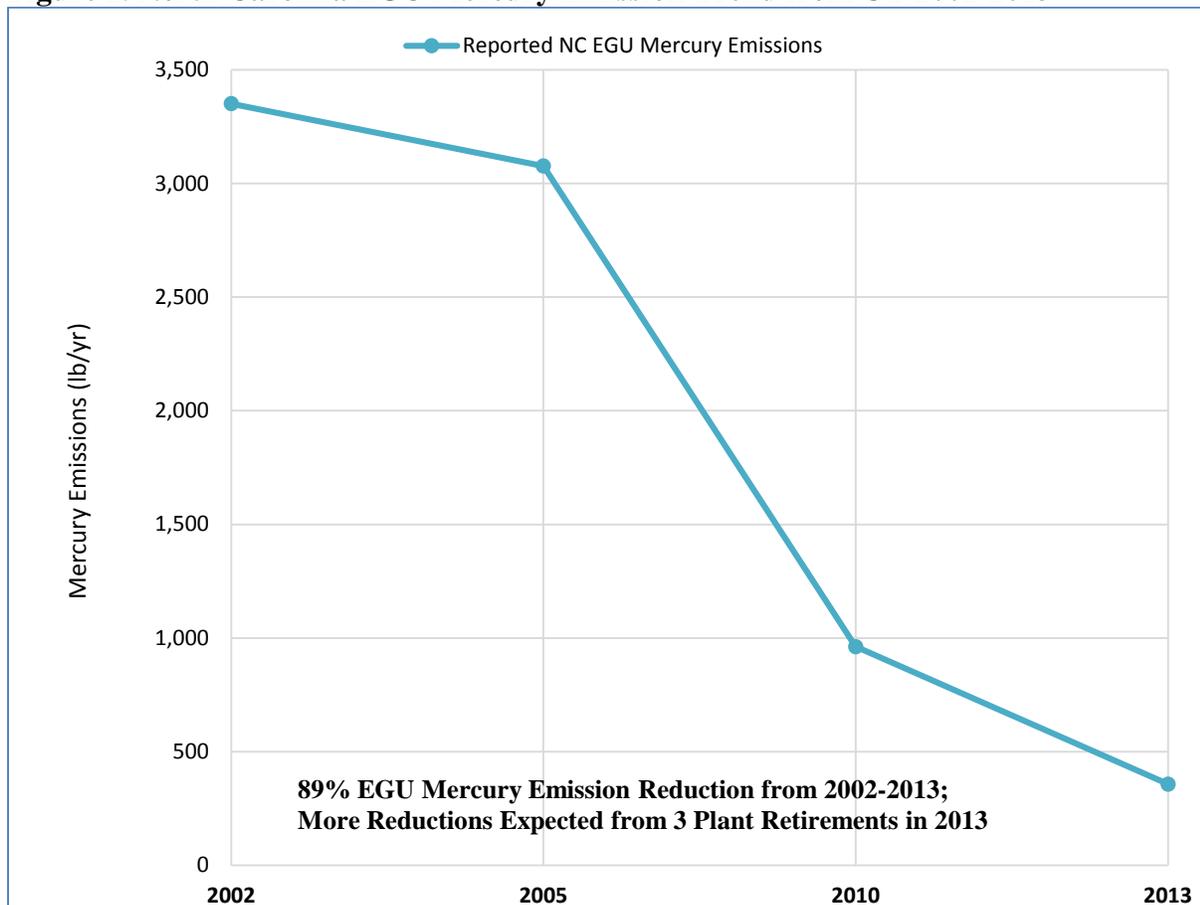
- In 2008 the U.S. Court of Appeals for the D.C. Circuit vacated CAMR and required EPA to develop a new rule due in large part to the emission allowance and trading provisions.
- In 2012 EPA finalized its new rule, the Mercury and Air Toxics Standards (MATS), requiring 90 percent mercury emission control from coal EGUs based on maximum achievable control technology (MACT) performance while prohibiting emission trading.
- On June 29, 2015, the U.S. Supreme Court ruled against the EGU MATS Rule finding that EPA failed to consider compliance costs in the initial “appropriate and necessary” step of its rulemaking process. The Court’s decision does not strike down the rule, but it means that the EPA will have to address the Court’s concerns. Until then the rule remains in effect.

Highlights of the 2012 DAQ Mercury Report<sup>1</sup> on the status, progress and impact of mercury emission control in North Carolina include the following:

- More than 70% EGU mercury emission reduction achieved between 2002 and 2010.
- Modeling shows 16% of mercury deposition in NC came from NC sources in 2005, down to 3% by 2016.
- 70% of mercury deposition in NC came from outside the U.S. in 2005, up to 90% by 2016.
- Given the above findings, DAQ concluded that additional controls beyond those required by the CSA and the EPA MATS rule offer limited opportunity and benefit to further reduce mercury emissions from coal-fired EGUs.

Figure 1 contains up-to-date information showing the actual mercury emissions for NC EGUs in 2013, with reductions near 90 percent between 2002 and 2013.

<sup>1</sup> CSA Reports for mercury and other related mercury documents: <http://daq.state.nc.us/news/leg/hg/>

**Figure 1. North Carolina EGU Mercury Emission Trend from CY 2002-2013**

### **Applicable State Rules for Mercury in 15A NCAC 02D .2511**

The EMC approved Section 15A NCAC 02D .2500, *Mercury Rules for Electric Generator*, which became effective on January 1, 2007. Two paragraphs are state-only rule provisions not included as a part of N.C.'s "Mercury Plan" submitted to the EPA for compliance with CAMR. CAMR is now null and void, so these two are the only remaining state-only rules to be addressed. The two remaining state rules are in Section 02D .2511, *Mercury Emission Limits*. Following is a description of the requirements in each rule along with the basis to address the decision to approve, disapprove, or conditionally approve the Mercury Control Plans.

For 02D .2511, the following requirements remain:

- Requirements under .2511(b). Duke Energy and Progress Energy were each to submit separate Mercury Control Plans to the DAQ Director by January 1, 2013. Controls for NO<sub>x</sub> (*i.e.*, selective catalytic reactors [SCRs]/ selective non-catalytic reactors [SNCRs]) and for SO<sub>2</sub> (*i.e.*, wet flue gas desulfurization [FGDs]) installed are considered to be mercury controls for purposes of this rule. Each plan must identify the mercury control technologies in use at each unit, the schedule for installation and operation of controls at

each unit at the earliest date that is technically and economically feasible, and the identity of all the remaining units not equipped with mercury controls that must be shut down by December 31, 2017.

Response: Each utility company submitted their mercury control plan on December 13, 2012. Each plan identified the mercury controls in use at each unit, the schedule for installation and operation at each unit of the seven facilities with mercury controls, and all units not equipped with mercury controls that were scheduled at that time to be shut down by December 31, 2017 (see Mercury Control Plans from Duke Energy and Progress Energy in Attachment A). All units with emission controls for NO<sub>x</sub> and SO<sub>2</sub>, including mercury, are expected to operate the same controls in order to meet the ongoing NO<sub>x</sub> and SO<sub>2</sub> emissions caps established in the CSA under G.S. 143.215.107D. Since the submittal, all eight facilities with units not equipped with mercury controls were retired by the end of December 2013, thus exceeding the retirement schedule requirement by three years. See Table 1 for identification of the installed mercury controls and retirement dates for the 14 affected coal-fired EGUs facilities in North Carolina. In addition, the permits of the said eight facilities no longer contain provisions for operation of coal-fired boilers and the corresponding boiler and control equipment has been decommissioned and demolished. Consequently, all eight facilities with retired coal-fired boilers are no longer capable of operating with coal-firing due to legal and practical constraints.<sup>2</sup> DAQ recommends that the EMC finds that the 02D .2511(b) requirements are met.

- Requirements under .2511(c). The DAQ Director must review the submitted mercury control plans and make recommendations to the EMC. The EMC shall only approve a mercury control plan if it finds that the plan achieves the *maximum* level of reductions in mercury emissions at each unit that is technically and economically feasible *without reliance on mercury allowances* (e.g., emission trading).

Response: To the point of *maximum* control, five EGU facilities equipped with SCRs, electrostatic precipitators (ESPs) and wet FGDs were well positioned in 2012 to meet the EPA EGU MATS rule with maximum achievable control technology (MACT) standards for mercury emission limits in 2015 with typical collection efficiency requirements over 90 percent. The two other facilities (Allen and Marshall), similarly equipped with mercury emission controls except that most of their units have SNCRs instead of SCRs, were granted a one-year compliance extension to meet the MACT emission limits in 2016.

- To the point of no reliance on mercury allowances, the EPA EGU MATS rule does not include allowance provisions and specifically prohibits any mercury emissions trading. Given that these two conditions are satisfied, DAQ recommends that the EMC approve the mercury control plans in 02D .2511(c).

If the EMC approves the mercury control plans, then DAQ plans to repeal 02D .2511(b) and .2511(c) in the impending rule adoption process next year.

<sup>2</sup> For details on Duke Energy's coal plant decommissioning program, see <https://www.duke-energy.com/about-us/decommissioning-program.asp>

**Table 1. North Carolina Coal-Fired Electric Generating Unit Controls and Retirements**

Facility		Capacity MW (approx)	Unit	Installed Emission Control Technology	Retirement / Comment
<b>EGU Facilities with Mercury, SO<sub>2</sub>, and NO<sub>x</sub> Controls</b>					
1	G.G. Allen	1,140	1-5	SNCR/ESP/Wet FGD	
2	Asheville	380	1, 2	SCR/ESP/Wet FGD	
3	Belews Creek	2,240	1, 2	SCR/ESP/Wet FGD	
4	Cliffside	570	5	SCR/ESP/Wet FGD	
		825	6	SCR/SDA-FF/ Wet FGD	New, Started Dec 2012
5	Marshall	2,090	1, 2, 4	SNCR/ESP/Wet FGD	
			3	SCR/ESP/Wet FGD	
6	Mayo	730	1	SCR/ESP/Wet FGD	
7	Roxboro	2,400	1-4	SCR/ESP/Wet FGD	
Sub-Total MW		10,375			
<b>Retired EGU Facilities without Mercury, SO<sub>2</sub>, and NO<sub>x</sub> Controls</b>					
1	Cliffside	200	1-4	ESP	Retired as of Oct 1, 2011
2	Weatherspoon	170	1-3	ESP	Retired as of Jan 20, 2012
3	Cape Fear	320	5, 6	ESP	Retired as of Oct 1, 2012
4	Riverbend	455	4-7	ESP	Retired as of Apr 1, 2013
5	Buck	250	8, 9	ESP	Retired as of Apr 1, 2013
		120	5-7	ESP	Retired as of May 14, 2011, replaced with CTs Nov 2011
6	Dan River	470	1-3	ESP	Retired as of Apr 1, 2012, replaced with CTs Aug 2012
7	H.F. Lee	400	1-3	ESP	Retired as of Oct 1, 2012, replaced with CTs Jan 2013
8	L.V. Sutton	600	1-3	ESP	Retired as of Dec 1, 2013, replaced with CTs Jan 2014
Sub-Total MW		2,985			

MW = Megawatt

SNCR = Selective non-catalytic reactor

SCR = Selective catalytic reactor

ESP = Electrostatic precipitator

Wet FGD = Wet Flue gas desulfurization

SDA = Spray dryer absorber (dry FGD)

FF = Fabric filter

CTs = Combined cycle combustion turbines

**Attachment A**

**DUKE ENERGY CORPORATION**  
526 South Church Street  
Charlotte, NC 28202

Mailing Address:  
EC13K / P.O. Box 1006  
Charlotte, NC 28201-1006  
704 382 8451

December 13, 2012

Ms. Sheila Holman, Director  
Division of Air Quality  
1641 Mail Service Center  
Raleigh, North Carolina 27699-1641

Subject: Duke Energy Carolinas –  
Mercury Control Plan for Coal-Fired Generating Units

Dear Ms. Holman:

As required under 15A NCAC 2D.2511(b), Duke Energy Carolinas is submitting the attached Mercury Control Plan describing how each coal-fired generating unit will comply with the requirement to either install and operate mercury controls or shut down after December 31, 2018.

As noted in the plan, all of the units which are expected to remain in service after December 31, 2018 have already installed controls which meet the requirements of the regulation (specifically, each of these units has installed sulfur dioxide controls or sulfur dioxide and nitrogen oxides controls in compliance with G.S. 143-215.107D). All units which do not have mercury controls as defined by the regulation have been retired or are expected to retire prior to January 1, 2018.

Please advise us of your review and approval of this mercury control plan. If you require any further information, please contact Alan Madewell at 919-546-5797.

Sincerely,

A handwritten signature in black ink, appearing to read 'M C Griggs'.

Mitchell C. Griggs  
Vice President – Environmental Services

cc: Steve Schliesser, NC Division of Air Quality, Planning Section  
Paul Muller, Regional Supervisor - NC DAQ - Asheville Regional Office  
Ron Slack, Regional Supervisor - NC DAQ - Mooresville Regional Office  
Margaret Love, Regional Supervisor - NC DAQ - Winston-Salem Regional Office

## Mercury Control Plan

### Duke Energy Carolinas LLC

On February 8, 2008, the Court of Appeals for the District of Columbia Circuit vacated the Clean Air Mercury Rule (CAMR). The vacatur eliminated all mercury allowance trading and allocations under CAMR. However, the decision did not directly affect the North Carolina Mercury Rules which remain in effect unless changed by state action. The North Carolina Mercury Rules require submittal of emission control plan for each operating unit by January 1, 2013.

In accordance with 15A NCAC 02D .2511 "Mercury Emission Limits" Duke Energy Carolinas LLC respectfully submits the following Mercury Control Plan to the North Carolina Division of Air Quality (DAQ).

The reference rule requires the mercury control plan must address each of the following items:

- Identify the technology proposed for use at each unit owned or operated by the utility. Note: For purposes of this Rule, controls for nitrogen oxide and sulfur dioxide installed in compliance with G.S. 143-215.107D are considered to be mercury controls.
- The schedule for installation and operation of mercury controls at each unit.
- Identify any units that will be shutdown.

The following table presents all of the coal-fired units within the Duke Energy Carolinas generating fleet. Additionally, the table summarizes the control technologies installed on each unit and the proposed schedule for any unit retirements. At this time there are no plans for the installation of any additional controls on the units listed below.

Facility	Unit	Control Technology*	Control Installation Schedule	Retirement Date (As per Notification to EPA CAMD)
G G Allen	1	Scrubber	2009	
	2	Scrubber	2009	
	3	Scrubber	2009	
	4	Scrubber	2009	
	5	Scrubber	2009	
Belews Creek	1	Scrubber/SCR	2008/2004	
	2	Scrubber/SCR	2008/2004	
Buck	Boiler 5	N/A	N/A	Retired as of May 14, 2011
	Boiler 6	N/A	N/A	Retired as of May 14, 2011
	Boiler 7	N/A	N/A	Retired as of May 14, 2011
	Boiler 8	N/A	N/A	Retire prior to January 1, 2018**
	Boiler 9	N/A	N/A	Retire prior to January 1, 2018**
Cliffside	1	N/A	N/A	Retired as of October 1, 2011
	2	N/A	N/A	Retired as of October 1, 2011
	3	N/A	N/A	Retired as of October 1, 2011
	4	N/A	N/A	Retired as of October 1, 2011
	5	Scrubber/SCR	2010/2002	
	6	Scrubber/SCR/SDA-FF	2012	

Facility	Unit	Control Technology*	Control Installation Schedule	Retirement Date (As per Notification to EPA CAMD)
Dan River	1	NA	N/A	Retired as of April 1, 2012
	2	NA	N/A	Retired as of April 1, 2012
	3	NA	N/A	Retired as of April 1, 2012
Marshall	1	Scrubber	2007	
	2	Scrubber	2007	
	3	Scrubber/SCR	2007/2008	
	4	Scrubber	2006	
Riverbend	Boiler 7	NA	N/A	Retire prior to January 1, 2018**
	Boiler 8	NA	N/A	Retire prior to January 1, 2018**
	Boiler 9	NA	N/A	Retire prior to January 1, 2018**
	Boiler 10	NA	N/A	Retire prior to January 1, 2018**

\*"Scrubber" is the installation of a wet flue gas desulfurization scrubber. "SCR" is the installation of a selective catalytic reduction system.

"SDA-FF" is the installation of a spray dryer absorber and fabric filter control system

\*\* Current system planning projections anticipate that these units will be retired prior to January 1, 2018 but the specific dates in advance of the deadline are subject to change.

## Mercury Control Plan

### Carolina Power and Light Company d/b/a Progress Energy Carolinas, Inc., an indirect subsidiary of Duke Energy Corporation

On February 8, 2008, the Court of Appeals for the District of Columbia Circuit vacated the Clean Air Mercury Rule (CAMR). The vacatur eliminated all mercury allowance trading and allocations under CAMR. However, the decision did not directly affect the North Carolina Mercury Rules which remain in effect unless changed by state action. The North Carolina Mercury Rules require submittal of emission control plan for each operating unit by January 1, 2013.

In accordance with 15A NCAC 02D .2511 "Mercury Emission Limits" Carolina Power and Light Company d/b/a Progress Energy Carolinas, Inc. an indirect subsidiary of Duke Energy Corporation (Progress Energy) respectfully submits the following Mercury Control Plan to the North Carolina Division of Air Quality (DAQ).

The reference rule requires the mercury control plan must address each of the following items:

- Identify the technology proposed for use at each unit owned or operated by the utility. Note: For purposes of this Rule, controls for nitrogen oxide and sulfur dioxide installed in compliance with G.S. 143-215.107D are considered to be mercury controls.
- The schedule for installation and operation of mercury controls at each unit.
- Identify any units that will be shutdown.

The following table presents all of the coal-fired units within the Progress Energy generating fleet. Additionally, the table summarizes the control technologies installed on each unit and the proposed schedule for any unit retirements. At this time there are no plans for the installation of any additional controls on the units listed below.

Facility	Control Technology*	Control Installation Schedule	Retirement Date (As per Notification to EPA CAMD)
Asheville Unit 1	Scrubber/SCR	Installed	N/A
Asheville Unit 2	Scrubber/SCR	Installed	N/A
Cape Fear Unit 5	N/A	N/A	Retired as of October 1, 2012
Cape Fear Unit 6	N/A	N/A	Retired as of October 1, 2012
H. F. Lee Unit 1	N/A	N/A	Retired as of October 1, 2012
H. F. Lee Unit 2	N/A	N/A	Retired as of October 1, 2012
H. F. Lee Unit 3	N/A	N/A	Retired as of October 1, 2012
Mayo Unit 1	Scrubber/SCR	Installed	N/A
Roxboro Unit 1	Scrubber/SCR	Installed	N/A
Roxboro Unit 2	Scrubber/SCR	Installed	N/A
Roxboro Unit 3	Scrubber/SCR	Installed	N/A
Roxboro Unit 4	Scrubber/SCR	Installed	N/A
L.V. Sutton Unit 1	N/A	N/A	Retirement by January 1, 2014
L.V. Sutton Unit 2	N/A	N/A	Retirement by January 1, 2014
L.V. Sutton Unit 3	N/A	N/A	Retirement by January 1, 2014
Weatherspoon Unit 1	N/A	N/A	Retired as of January 20, 2012
Weatherspoon Unit 2	N/A	N/A	Retired as of January 20, 2012
Weatherspoon Unit 3	N/A	N/A	Retired as of January 20, 2012

\*"Scrubber" is the installation of a wet flue gas desulfurization scrubber and "SCR" is the installation of a selective catalytic reduction system.