FINAL

Revision to the North Carolina State Implementation Plan

Demonstration that North Carolina Complies with the "Good Neighbor" Requirements of Clean Air Act Section 110(a)(2)(D)(i)(I) for the 2010 1-Hour Sulfur Dioxide National Ambient Air Quality Standard

Prepared by

North Carolina Department of Environmental Quality

Division of Air Quality

June 16, 2016

Preface: This revision to the North Carolina State Implementation Plan (SIP) for the 2010 1-Hour Sulfur Dioxide standard provides information related to infrastructure requirements for interstate transport or the "good neighbor" provision of Clean Air Act Section 110(a)(2)(D)(i)(I).

Table of Contents

List of Tables

List of Figures

(This page intentionally left blank)

1.0 Interstate Pollution Transport (Good Neighbor) Provision

Sections 110(a)(1) and (2) of the Clean Air Act (CAA) require all states to adopt and submit to the U. S. Environmental Protection Agency (EPA) any revisions to their infrastructure State Implementation Plans (SIP) which provide for the implementation, maintenance and enforcement of a new or revised national ambient air quality standard (NAAQS). The EPA revised the sulfur dioxide (SO_2) primary (health-based) NAAQS on June 22, 2010 by adopting a new 1-hour standard of 75 parts per billion (ppb), measured as a three-year average of the annual 99th percentile of 1-hour daily maximum concentrations (40 CFR 50.17).[1] The EPA also revoked the previous primary annual and 24-hour SO_2 NAAQS.

The North Carolina Department of Environmental Quality, Division of Air Quality (DAQ) submitted North Carolina's infrastructure SIP certification on March 18, 2014. This document serves as a revision to the North Carolina infrastructure SIP to certify compliance with Section 110(a)(2)(D)(i)(I) of the CAA. Section 110(a)(2)(D)(i)(I) of the CAA requires that North Carolina's SIP for the 2010 SO_2 NAAQS shall-

> *"(D) contain adequate provisions –*
>
> *(i) prohibiting, consistent with the provisions of this subchapter, any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will -*
>
> *(I) contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any such national primary or secondary ambient air quality standard*

Section 110(a)(2)(D)(i)(I) of the CAA requires each state to prohibit emissions that will significantly contribute to nonattainment of a NAAQS, or interfere with maintenance of a NAAQS, in a downwind state. North Carolina's March 18, 2014 infrastructure certification was based on the information available to the states and guidance given by the EPA. Specifically, it relied on the August 21, 2012 decision by the U.S. Court of Appeals for the District of Columbia Circuit that vacated the 2011 Cross-State Air Pollution Rule (CSAPR) and clarified that only the EPA can determine "significant contribution" and that "a SIP cannot be deemed to lack a required submission or be deemed deficient for failing to implement the good neighbor obligation until after the EPA has defined the state's good neighbor obligation."[2] In addition, the November 19, 2012 EPA memo from Gina McCarthy, Assistant Administrator, cited the court decision that "a SIP cannot be deemed deficient for failing to meet the good neighbor obligation before EPA quantifies the obligation."

However, on April 29, 2014 the U.S. Supreme Court reversed the D.C. Circuit Court ruling, and held that (i) the plain text of the CAA allowed the states in the first instance to determine whether and to what extent their interstate emissions were unlawful and, where a state failed to do so, EPA could impose a Federal Implementation Plan, (ii) EPA's calculation of the states'

[1] The EPA finalized its decision to not revise the existing secondary (welfare-based) NAAQS set in 1971 in a separate regulatory action (see 77 FR 20218, April 3, 2012).
[2] EME Homer City Generation, L.P. b. USEPA, No. 11-1302 (2012).

interstate contributions to downwind nonattainment was a permissible construction of the CAA, and (iii) the CAA did not prohibit EPA from considering the cost of emission controls when determining the appropriate level of reductions. The Supreme Court further clarified CAA Section 110(a)(2)(D)(i)(I) and held that despite the lack of EPA guidance, states are required to meet their good neighbor requirements in a timely manner.[3]

1.1 SO_2 Designations

On August 5, 2013, the EPA promulgated nonattainment area designations for 29 areas in 16 states where existing monitoring data from 2009-2011 indicated violations of the 1-hour SO_2 standard (78 FR 47191). All five air quality monitors in North Carolina were measuring attainment; but the EPA indicated in its letter, dated February 6, 2013, that it was deferring designations for North Carolina to a later date.

On March 2, 2015, the U.S. District Court for the Northern District of California accepted a consent decree between the EPA and Sierra Club and Natural Resources Defense Council that specified a schedule for the EPA to complete the remaining designations for the rest of the country.[4] On August 21, 2015, the EPA promulgated the Data Requirements Rule (DRR) for the 2010 1-hour SO_2 NAAQS (effective September 21, 2015) directing state and tribal air agencies to provide data to characterize current air quality in areas with large sources of SO_2 emissions to identify maximum 1-hour SO_2 concentrations in ambient air using either air quality monitoring data or modeling analyses.[5] The DRR requires the EPA to complete the designation of areas as attainment, unclassifiable, or nonattainment with the standard for all remaining areas in the country by the following dates:

- By July 2, 2016, the EPA must designate two groups of areas:
  - Areas that have violations of the standard based on 2013-2015 air monitoring data; or
  - Areas that contain any stationary source not announced for retirement (as of March 2, 2015) that according to EPA's Air Markets Database emitted in 2012 either (a) more than 16,000 tons of SO_2, or (b) more than 2,600 tons of SO_2 and had an average emission rate of at least 0.45 pound per million British thermal unit (lb SO_2/MMBtu).
- By December 31, 2017, the EPA must designate areas where the state has not installed and begun operating a new SO_2 monitoring network.
- By December 31, 2020, the EPA must designate all remaining areas based on monitoring data.

For the 2016 deadline, the EPA identified the potentially affected areas and emissions sources for the states to address based on the March 2, 2015 consent decree. The DRR requires air agencies to submit to the EPA by January 15, 2016, a list identifying all sources within its jurisdiction with SO_2 emissions that exceeded the 2,000 ton per year (tpy) threshold based on the

[3] EPA v. EME Homer City Generation, L.P. 134 S.Ct 1584, 1600-01 (2014).
[4] Sierra Club, et al. v. McCarthy, Case No. 13–cv–03953–SI (N.D. Cal., March 2, 2015).
[5] *Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard (NAAQS)*, USEPA, Final Rule, 80 FR 51052, August 21, 2015.

most recent emissions data available. The rule also requires air agencies to identify any additional sources and their associated areas that may warrant air quality characterization. The DAQ submitted this list to the EPA on January 15, 2016.[6] The DRR gives states the option of using either monitoring or modeling to support designation decisions for facilities identified in this list, or developing a federal-enforceable source-specific emissions limit to limit emissions to less than 2,000 tpy.

[6] Letter from Ms. Sheila Holman, Director, DAQ, NCDEQ to Ms. Heather McTeer Toney, Regional Administrator, USEPA Region 4, List of Facilities Subject to Data Requirements Rule, January 15, 2016, https://ncdenr.s3.amazonaws.com/s3fs-public/Air%20Quality/planning/attainment/SO2_Nonattainment_Areas/2016%2001%2015%20Facilities%20subject%20to%20SO2%20Data%20Rule.pdf.

2.0 North Carolina's Good Neighbor SIP Demonstration

In accordance with the U.S. Supreme Court's decision and to meet its "Good Neighbor" obligation under Section 110(a)(2)(D)(i)(I) of the CAA, the DAQ reviewed the most recent three years of monitoring data for North Carolina and its neighboring states as well as statewide trends in SO_2 emissions. The DAQ is also complying with the DRR, and, as a part of the DRR process, has not identified any transport-related issues. The results of the DAQ's review and compliance with the DRR is presented in this SIP revision which demonstrates that North Carolina does not contribute significantly to downwind SO_2 air quality problems in another state.

2.1 Control Measures, Means, and Techniques

The following rules address additional control measures, means, and techniques that ensure that North Carolina is not interfering with attainment or maintenance of the 1-hour SO_2 NAAQS in a downwind state:

- 15A NCAC 2D .0400 *"Ambient Air Quality Standards"*
- 15A NCAC 2D .0500 *"Emission Control Standards"*
- 15A NCAC 2D .0600 "*Monitoring: Recordkeeping: Reporting"*
- 15A NCAC 2D .1000 "*Motor Vehicle Emission Control Standards*"
- 15A NCAC 2D .1200 "*Control of Emissions from Incinerators*"
- 15A NCAC 2D .2300 "*Banking Emission Reduction Credits*"
- 15A NCAC 2D .2600 "*Source Testing*"
- 15A NCAC 2Q .0500 "*Title V Procedures"*

- 2002 North Carolina Clean Smoke Stacks Act (CSA), Session Law 2002-4 (NCGS 143-215.107d)
  - On September 26, 2011, the SO_2 and nitrogen oxide (NOx) emissions caps in the CSA became federally enforceable as part of North Carolina's SIP (76 FR 59250)
- Federal Implementation Plan - Cross State Air Pollution Rule (CSAPR)

Although North Carolina is not relying on CSAPR to meet SO_2 compliance obligations, CSAPR is a federally enforceable program that once fully implemented may yield residual SO_2 and NOx emissions reduction benefits. On April 29, 2014, the U.S. Supreme Court reversed the D.C. Circuit Court of Appeals' decision to vacate CSAPR. Following this ruling, on October 23, 2014 the D.C. Circuit granted the EPA's request to lift the CSAPR stay and toll the CSAPR compliance dates by three years. Beginning on January 1, 2015, NOx and SO_2 emissions levels under Phase I took effect. On July 28, 2015, the D.C. Circuit Court of Appeals released a decision invalidating the EPA's 2014 ozone-season NOx budgets for North Carolina and 10 other states.[7] The Court remanded without vacatur to the EPA to reconsider the Phase II NOx budgets that may be too restrictive, but did not sustain other challenges to the rule. The EPA is also reconsidering Phase II annual SO_2 emission budgets for Texas, Alabama, Georgia, and

[7] EPA v. EME Homer City Generation, L.P. U.S. Court of Appeals for the D.C. Circuit, No. 11-1302 (July 28, 2015), http://www.epa.gov/airtransport/CSAPR/index.html.

South Carolina, but not North Carolina's SO_2 Phase II budget. North Carolina is on track to comply with the Phase I CSAPR requirements which are federally enforceable.

NCGS 143-215.107(a)(5), *Air quality standards and classifications*, provides the North Carolina Environmental Management Commission (EMC) with the statutory authority, "To develop and adopt emission control standards as in the judgment of the Commission may be necessary to prohibit, abate, or control air pollution commensurate with established air quality standards."

2.2 Review of Current SO_2 Monitoring Data

For the purpose of evaluating compliance with the good neighbor provision, the DAQ examined the 1-hour SO_2 design values calculated from EPA-validated monitoring data collected from 2012 through 2014. For North Carolina, the highest design value recorded by a monitor in the state is 32 ppb representing 43 percent below the 75 ppb 1-hour SO_2 standard (see Table 2-1).

The DAQ reviewed the data for monitors located in geographically adjacent states and identified one monitor in Sullivan County, TN that has recorded violations of the 2010 1-hour SO_2 standard. The DAQ reviewed the data for the Sullivan County, TN monitor and supporting documentation to determine if North Carolina may have a significant contribution to the monitor readings. Based on Tennessee's recommendation, the EPA designated as nonattainment a portion of Sullivan County which consists of a 3-kilometer radius circle that includes an Eastman Chemical Company facility and the one violating monitor in the County.[8] Part of the evidence used in the designation process was a wind rose from a nearby airport, which showed the vast majority of hours in which an exceedance occurred had surface winds coming from the west and southwest. The evidence given by the EPA for supporting Tennessee's nonattainment boundary recommendation are clear that North Carolina did not contribute to this monitor's violation of the 2010 1-hour SO_2 NAAQS.

[8] EPA 2013, *Technical Support Document (TSD). Tennessee Area Designations For the 2010 SO2 Primary National Ambient Air Quality Standard*. Available from URL: https://www.epa.gov/sites/production/files/2016-03/documents/tn-tsd.pdf.

Table 2-1. Monitored 2010 1-Hour SO_2 NAAQS Design Values (ppb)

State	Location	2012-2014 Monitoring Data	
		Design Value	Percent of NAAQS (75 ppb)
NC	New Hanover County	32	43
NC	Beaufort County	23	31
NC	Forsyth County	10	13
NC	Wake County	9	12
NC	Mecklenburg County	7	9
GA	Chatham County	78[1]	104
GA	Floyd County	46	61
GA	Bibb County	15	20
GA	DeKalb County	8	11
GA	Fulton County	8	11
SC	Lexington County	42	56
SC	Charleston County	14	19
SC	Richland County	12	16
SC	Greenville County	5	7
SC	Oconee County	3	4
TN	Sullivan County	**136**	181
TN	McMinn County	49	65
TN	Montgomery County	39	52
TN	Bradley County	31	41
TN	Davidson County	11	15
TN	Shelby County	9	12
VA	Norfolk City	48	64
VA	Hampton City	37	49
VA	Charles City	27	36
VA	Henrico County	7	9
VA	Rockingham County	5	7

Source: EPA-validated design values in this table are taken from the EPA Air Trends/Design Values website; File "http://www3.epa.gov/airtrends/pdfs/SO2_DesignValues_20122014_FINAL_8_3_15.xlsx"; Tab "Table 4c. County-Level Design Values for Sulfur Dioxide 1-Hour NAAQS" located at: http://www3.epa.gov/airtrends/values.html.

[1] The EPA notes that the State of Georgia early certified their 2015 1-hour SO_2 ambient air quality data resulting in a 2013-2015 design value measuring attainment of the 1-hour SO_2 NAAQS at the Chatham County monitor. Therefore, this area is no longer before EPA for consideration for designation for the SO_2 NAAQS for the court-ordered July 2, 2016 designation deadline. Consistent with the conditions in the March 2, 2015 court-ordered consent decree, EPA will evaluate and designate all remaining areas throughout the country by either December 31, 2017 or December 31, 2020.

2.3 Trends in Sulfur Dioxide (SO_2) Emissions

As shown in Figure 2-1 and Table 2-2, North Carolina's statewide annual SO_2 emissions have significantly declined since 1996 due to state and federal programs. From 1996 through 2011, SO_2 emissions have declined by about 80 percent. Figure 2-2 illustrates the sector-level contribution to annual SO_2 emissions inventory for 2002 and 2011. The dramatic decline in statewide emissions occurred across all sectors but the most significant decline occurred in the electricity generating unit (EGU) sector where total SO_2 emissions dropped by over 401,800 tons (84 percent) from 2002 to 2011. The large decrease in EGU emissions changed each sector's contribution to total statewide emissions in 2011 relative to 2002. However, EPA also moved aircraft and railyard emissions from the nonroad to the other point sector in 2011 which also affected the contribution of these two sector's emissions to statewide emissions. Based on the EPA's triennial emissions inventory data and emissions projections, from 2011 through 2017, SO_2 emissions are estimated to decline by an additional 50 percent statewide, primarily due to continuing changes in the EGU sector.

The SO_2 emissions values shown in Figures 2-1 and 2-2 and Table 2-2 for 1990 through 2011 and 2017 are based on EPA datasets. For 2013, emissions were estimated by the DAQ because EPA estimates were not readily available for 2013. For the EGU and non-EGU facilities in the 97 counties that report directly to the DAQ, annual emissions are based on the 2013 emissions reported by the facilities. For three local programs (Buncombe, Forsyth, and Mecklenburg), 2011 National Emissions Inventory (NEI) emissions were adjusted to 2013 using the 2013-to-2011 SO_2 ratio of statewide EGU and statewide non-EGU annual emissions reported by facilities in the 97 counties. For the onroad, nonroad, and area source categories, 2013 emissions were estimated by interpolating between the EPA's 2011 and 2017 emissions modeling platform (EMP, version 2) emissions. The 2013 estimates were checked for reasonableness against the EPA's 2017 EMP, version 2 emissions estimates.

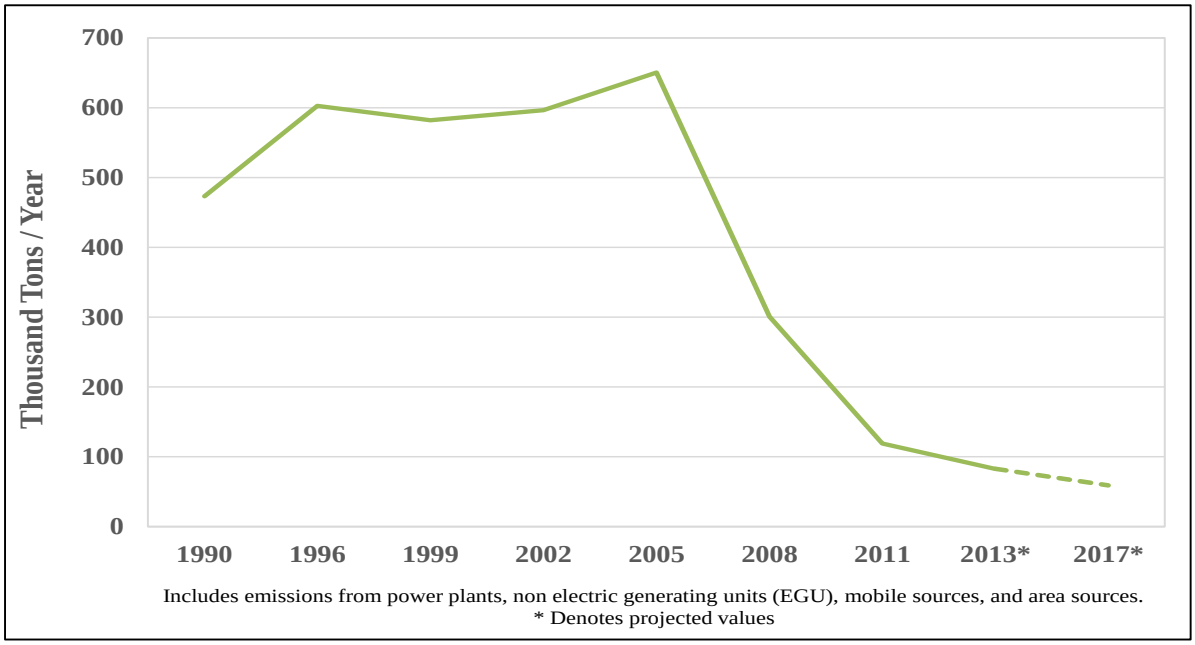

Figure 2-1. Trends in North Carolina's Statewide SO_2 Emissions.

Table 2-2. North Carolina Annual Statewide SO2 Emissions (Thousand Tons per Year)

Pollutant	1990	1996	1999	2002	2005	2008	2011	2013	2017
SO_2	473	603	582	597	651	301	119	83	59

Sources: For 1990 through 2008, emissions are from the EPA's National Emissions Inventory located at http://www.epa.gov/air-emissions-inventories.
For 2011, emissions are from the EPA's 2011 v6.2 modeling platform emissions summary, located at: ftp://ftp.epa.gov/EmisInventory/2011v6/v2platform/reports/, file named "2011eh_state_fullSCC_summary.xlsx".
For 2017, emissions are from the EPA's 2017 v6.2 modeling platform emissions summary, located at: ftp://ftp.epa.gov/EmisInventory/2011v6/v2platform/reports/, file named "2017eh_cb6v2_v6_11g_state_sector_totals.xlsx".
Note that the "State Totals" tab in this file shows NC's total SO_2 emissions as 118,577 tons or 168 tons lower than the statewide total of 118,744 tons used in Table 2-2 and Figure 2-2. This is associated with the difference between the EGU emissions reported in the 2011 emissions inventory versus the SMOKE modeling file.

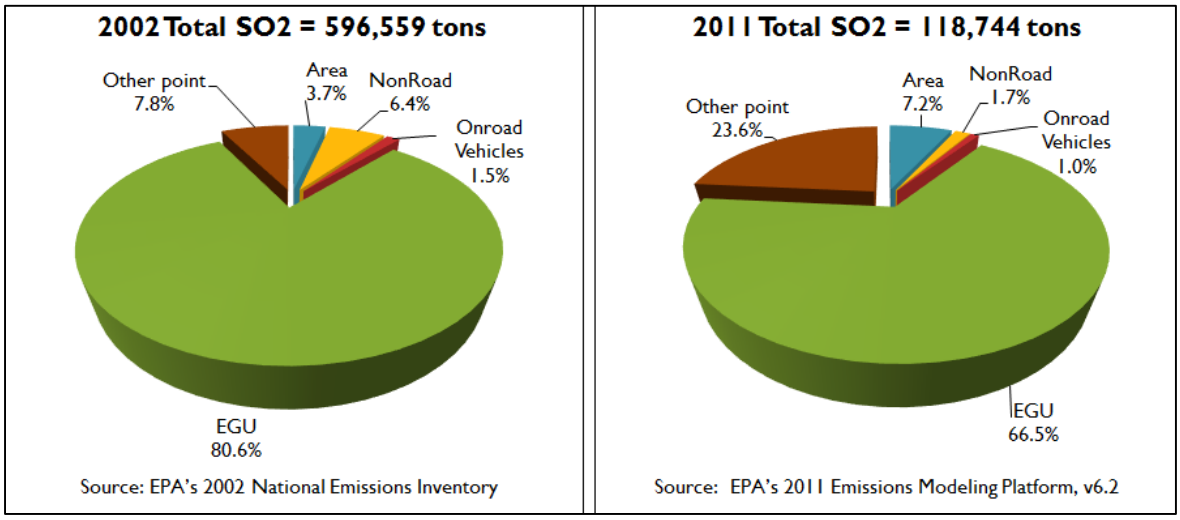

Figure 2-2. North Carolina SO_2 Emissions in 2002 and 2011.

Total SO_2 emissions from the EGU sector have declined dramatically primarily due to North Carolina's 2002 landmark legislation called the CSA which set entity-wide caps on the total annual emissions of SO_2 and NOx from investor-owned coal-fired EGUs.[9] The CSA emissions limits were set at 130,000 tons/year for SO_2 by 2013 and thereafter and 56,000 tons/year for NOx by 2009 and thereafter. This means that, relative to 1999 levels, coal-fired EGUs must achieve a 73 percent reduction in SO_2 emissions and a 77 percent reduction in NOx emissions by 2013. The annual emission limits have been adopted into the North Carolina SIP and are federally enforceable.

An important feature of the CSA is that North Carolina's two largest utility companies, Duke Energy and Progress Energy (recently merged to form Duke Energy Progress), must achieve these cuts through actual reductions at their 14 EGU facilities in the state. By 2014, seven coal plants remained operating while four plants were converted to natural gas and three smaller plants were retired. The seven remaining coal plants are retrofitted with flue-gas desulfurization

[9] Clean Smokestacks Act, 2002 N.C. Session Law 72 (codified as amended at N.C. General Statutes §§62-133.6 and in other sections of ch. 143, article 21B (2011).

(FGD) technologies for SO_2 control which is the most efficient technology available to control SO_2 emissions. Table 2-3 summarizes the current emission controls at each of the seven operating coal plants.

Table 2-3. Current Air Pollution Controls at North Carolina's Coal Plants

Facility	Units	NOx Controls	SO2 Controls	PM2.5 Controls	Mercury Controls
GG Allen	1, 2, 3, 4, 5	SNCR	FGD	ESP/ Wet Scrubber	SCR/ESP/ Wet Scrubber
Asheville	1, 2	SCR			
Belews Creek	1, 2	SCR			
Cliffside	5	SCR			
	6			Fabric filter/ Wet scrubber	SCR/Spray dryer/ Fabric filter/Wet Scrubber
Marshall	1, 2, 3, 4	SCR/SNCR		ESP/ Wet Scrubber	SCR/ESP/ Wet Scrubber
Mayo	1A, 1B	SCR			
Roxboro	1, 2, 3, 4				
Total	21				

SCR: selective catalytic reduction
SNCR: selective non-catalytic reduction
FGD: flue gas desulfurization
ESP: electrostatic precipitation

The information in Table 2-3 does not reflect future actions that Duke Energy will be implementing at its GG Allen and Asheville plants that will significantly reduce SO_2 and NOx emissions. For the GG Allen plant, a consent decree agreement between the EPA and Duke Energy requires Duke Energy to meet a specified annual SO_2 emission rate for coal-fired units 1 and 2 and permanently shut down units 1, 2, and 3 by December 31, 2024.[10] In March 2016, the North Carolina Utilities Commission approved Duke Energy's application to invest approximately $1 billion in its Asheville plant to construct two 280-megawatt combined cycle natural gas-fired EGUs to replace, by 2020, two coal-fired EGUs with a combined generation capacity of 376 megawatts. The company plans to work with the City of Asheville, Buncombe County and surrounding communities to decrease energy use in the nine-county service area. Over the next seven years, Duke Energy plans to file an application with the North Carolina

[10] Consent decree between the United States of America on behalf of the US EPA and Duke Energy Corporation, Civil Action No.: 1:00 cv 1262, September 10, 2015, see http://www2.epa.gov/enforcement/duke-energy-corporation-clean-air-act-caa-settlement.

Utilities Commission for approval of a minimum of 15 megawatts of new solar generation and 5 megawatts of utility-scale electricity storage at its Asheville plant.[11]

As of calendar year 2014, statewide SO_2 emissions from the affected EGUs continue to be below the CSA limit. In 2014, annual SO_2 emissions were 36,328 tons, which is well below the 2013 annual limit of 130,000 tons. Furthermore, North Carolina is well positioned to comply with the Phase I CSAPR limit which took effect on January 1, 2015. Note that although North Carolina is not relying on CSAPR for maintaining compliance with the SO_2 NAAQS, CSAPR is a federally enforceable program that once fully implemented may yield residual SO_2 emissions reduction benefits.

In addition to the early installation of emission control technologies, North Carolina's power plants are ahead of the nation in transitioning from coal to natural gas and renewable resources. Between the period of 2002 and 2012, electricity generation from coal plants declined from 62 percent to 45 percent; while the generation from natural gas increased from 2 percent to 15 percent. Figure 2-3 illustrates the resulting change in SO_2 emission levels from all fuel types within the electric utility sector. This trend is expected to continue into the future, with further reduction in coal capacity utilization.

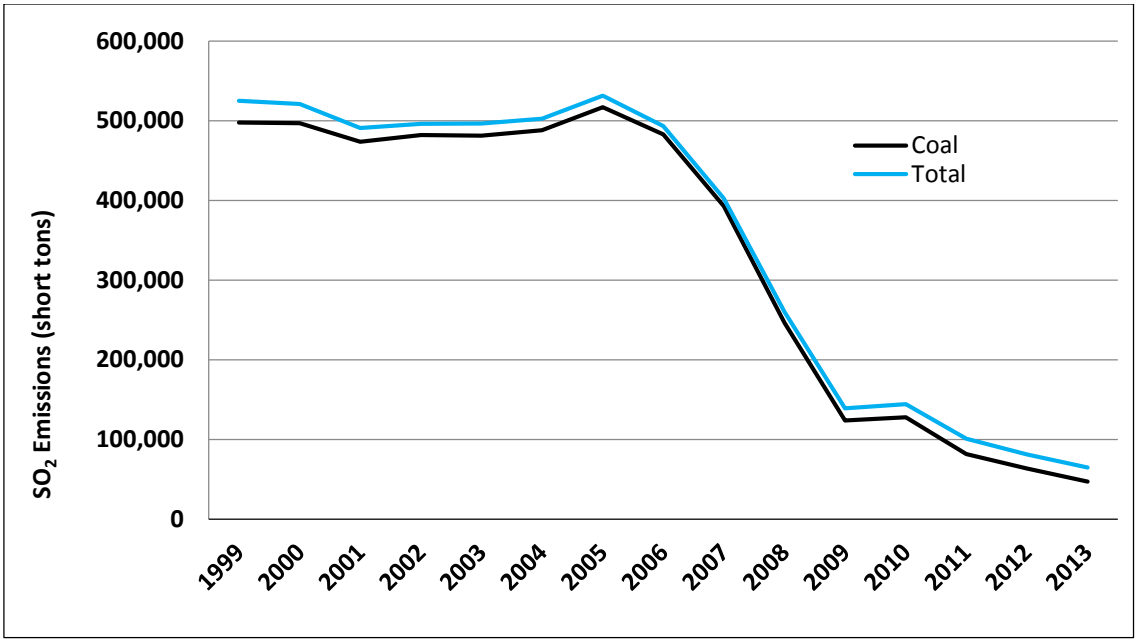

Figure 2-3. Power Plant Related SO_2 Emission Trends (1999-2013).[12]

[11] Duke Energy (http://www.duke-energy.com/western-carolinas-modernization/#C0R0) and Electric Energy Online (http://www.electricenergyonline.com/detail_news.php?ID=566833&cat=;87;59&niveauAQ=0).

[12] US Energy Information Administration, Energy Information Administration, State Electricity Profiles, See Table 7 (Electric power industry emissions estimates, 1990 through 2013) http://search.usa.gov/search?affiliate=eia.doe.gov&query=eia+electricity+state+north+carolina+xls+sept+07+il+xls, (accessed February 2015).

According to the EPA's emissions projections, emissions are expected to continue to decline through 2017 and beyond due to on-the-books national rules for stationary and mobile (onroad and nonroad) sources including the following:

Stationary Sector

- National Emissions Standards for Hazardous Air Pollutants (NESHAP) for industrial, commercial and institutional boilers and process heaters; and reciprocating internal combustion engines (RICE)

Onroad Sector

- Tier 3 Motor Vehicle Emission and Fuel Standards Program,
- Light-Duty Vehicle Tier 2 Rule,
- Heavy Duty Diesel Rule,
- Renewable Fuel Standard,
- Light-Duty Greenhouse Gas/Corporate Average Fuel Efficiency Standards for 2012-2016,
- Heavy-Duty Vehicle Greenhouse Gas Rule, and
- 2017 and the Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards Rule.

Nonroad Sector

- Clean Air Nonroad Diesel Final Rule - Tier 4

The DAQ believes that, in conjunction with the continued implementation of the state's ability to limit SO_2 emissions through North Carolina's CSA and federally enforceable emission limitations and other control measures, means, or techniques, low monitored values of SO_2 will continue in and around North Carolina. In other words, SO_2 emissions from North Carolina are not expected to cause or contribute to a violation or interfere with the maintenance of the 1-hour SO_2 NAAQS in another state.

2.4 Implementation of the Data Requirements Rule

North Carolina is on schedule with implementing the DRR. The EPA identified one area (CPI Southport, Brunswick County) as being subject to the Agency's next round of designations due July 2, 2016. On September 18, 2015, the DAQ submitted boundary recommendations to the EPA demonstrating that based on source-specific air quality modeling, the area currently meets the 1-hour SO_2 NAAQS, and no other sources cause or contribute to a NAAQS violation in the vicinity of CPI Southport facility. The EPA documented its response to this submittal in its 120-day letter (dated February 16, 2016).[13] On April 19, 2016, the DAQ responded to this 120-day letter and recommended the same boundary recommendations as those included in the September 18, 2015 letter.

[13] See https://deq.nc.gov/about/divisions/air-quality/air-quality-planning/attainment/designation-history/sulfur-dioxide-nonattainment-areas.

In addition, on January 15, 2016, the DAQ submitted to the EPA a list identifying all facilities within North Carolina with SO_2 emissions that exceeded the 2,000 tpy threshold based on the most recent emissions data. The DAQ's list also includes facilities for which the DAQ received third-party SO_2 modeling information even though the emissions for the facilities were below the 2,000 tpy threshold. By July 1, 2016, the DAQ will submit to the EPA documentation specifying the compliance path (modeling or monitoring) for each of the affected facilities. The DAQ is applying EPA protocols to model actual SO_2 emissions for each facility (or cluster of facilities and/or other emissions sources) that exceed the 2,000 tpy SO_2 emissions threshold specified in the rule. These modeling analyses are being used to identify the distance from the facility where maximum 1-hour SO_2 concentrations may occur. If the modeling indicates that a facility may exceed the 1-hour SO_2 standard, the DAQ expects to work with the facilities to establish ambient monitors following EPA protocols to collect the required three years of data to determine the final designation for the facility.

In support of developing the DAQ's January 15, 2016 submittal, the DAQ also performed a cluster analysis by evaluating all point sources emitting SO_2 listed in the 2014 inventory. In order to conduct this analysis, the DAQ developed a tool to query a MySQL database that contained all of the emissions data. The query essentially contained two components in developing a cluster; first, it searched for all SO_2 point sources that emitted at least 100 tpy of SO_2 individually, and then it searched for other SO_2 sources in a 10 kilometer (km) circular radius around that facility.[14] Once the facility clusters were generated, the query located and summed all SO_2 emissions within it – including emissions from the original facility that the cluster was centered on -- and printed them to a table. The results of this query showed no clusters within a 10-km radius in which an individual facility's emissions below 2,000 tpy were collectively within a cluster above 2,000 tpy.

2.5 Interstate Transport Considerations

Because of the short-term form of the SO_2 standard, it is anticipated that a violation of the standard would be associated with local conditions near the emissions source(s) rather than caused by long-range transport of SO_2 emissions. This is supported by the EPA's draft SO_2 NAAQS Designations Modeling Technical Assistance Document that cites its March 1, 2011 NO_2 memorandum for guidance on the determination of significant concentration gradients and distance from the source.[15] On pages 15 and 16 of the EPA's March 1, 2011 modeling guidance for the 1-hour NO_2 standard, the EPA states the following:

> "A general "rule of thumb" for estimating the distance to maximum 1-hour impact and the region of significant concentration gradients that may apply in relatively flat terrain is approximately 10 times the source release height. For example, the maximum impact area and region of significant concentration gradients associated with a 100 meter stack in flat terrain would be approximately 1,000 meters downwind of the source, with some variation

[14] The 10 km distance was chosen based on the EPA's guidance for estimating the distance to maximum 1-hour impacts and the region of significant concentration gradients, excerpted from the March 1, 2011 Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard.

[15] U.S. EPA, Office of Air and Radiation, Office of Air Quality Planning and Standards, Air Quality Assessment Division, SO_2 NAAQS Designations Modeling Technical Assistance Document, Draft, February 2016, http://www3.epa.gov/airquality/sulfurdioxide/pdfs/SO2ModelingTAD.pdf.

depending on the source characteristics affecting plume rise. However, the potential influence of terrain on maximum 1-hour pollutant impacts may also significantly affect the location and magnitude of concentration gradients associated with a particular source. Even accounting for some terrain influences on the location and gradients of maximum 1-hour concentrations, these considerations suggest that the emphasis on determining which nearby sources to include in the modeling analysis should focus on the area within about 10 kilometers of the project location in most cases."[16]

Given the short-term nature of the standard, the DAQ anticipates that North Carolina will not significantly contribute to nonattainment or interfere with maintenance of the 2010 1-hour SO_2 NAAQS in a neighboring state. However, should the results of the DAQ's ongoing work indicate that a facility may have the potential to significantly contribute to 1-hour SO_2 issues in a neighboring state, the DAQ will coordinate with the potentially affected state and facility to address the issues.

2.6 Interstate Coordination

The DAQ enjoys a good, on-going working relationship with our counterparts in our border states (i.e., Virginia, South Carolina, Georgia and Tennessee). The DAQ also maintains good working relationships with other state, local and federal agencies by actively participating as a member of the Southeastern States Air Resource Managers (SESARM) and Mid-Atlantic Regional Air Management Association, Inc. (MARAMA) regional planning organizations. These relationships include sharing emissions data, modeling studies and other technical information to support multi-state air quality planning to ensure compliance and maintenance with the NAAQS. Should a state raise a concern with North Carolina emissions sources potentially affecting the state's ability to comply with the 1-hour SO_2 NAAQS, the DAQ would coordinate with the state to share information and technical analyses to determine the extent of contributions and to evaluate the need for emissions control measures, if required.

3.0 Concluding Remarks

Considering the monitoring data, downward trend in statewide SO_2 emissions, and the DAQ's success with implementing the DRR as previously discussed, we are concluding through this demonstration that North Carolina does not significantly contribute to 1-hour SO_2 issues in downwind states. This in large part is due to the significant strides North Carolina has achieved in reducing its SO_2 emissions over the past several years. Based on EPA's guidance contained in the January 22, 2015 memorandum, states shown to not contribute significantly to downwind air quality problems have no emission reduction obligation under the Good Neighbor Provision.[17] The DAQ concludes that North Carolina has met its Section 110(a)(2)(D)(i)(I) Good Neighbor requirements under the CAA with respect to the 2010 1-hour SO_2 standard.

---

[16] Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 ,National Ambient Air Quality Standard, EPA Air Quality Modeling Group to Regional Air Division Directors, March 1, 2011, http://www3.epa.gov/ttn/scram/guidance/clarification/Additional_Clarifications_AppendixW_Hourly-NO2-NAAQS_FINAL_03-01-2011.pdf.

[17] USEPA January 22, 2015 memorandum, "Information on the Interstate Transport "Good Neighbor" Provision for the 2008 Ozone National Ambient Air Quality Standards under Clean Air Act Section 110(a)(2)(D)(i)(I).