Errata to the
Redesignation Demonstration and Maintenance Plan
for the
Hickory (Catawba County) and
Greensboro/Winston-Salem/High Point
(Davidson and Guilford Counties)
Fine Particulate Matter Nonattainment Areas

Prepared by

North Carolina Department of Environment and Natural Resources

Division of Air Quality

December 22, 2010

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INTRODUCTION

This document is intended to make minor corrections or changes, at the request of the United States Environmental Protection Agency's (USEPA's), to the December 18, 2009, Redesignation Demonstration and Maintenance Plan for the Hickory (Catawba County) and Greensboro/Winston-Salem/High Point (Davidson and Guilford Counties) Fine Particulate Matter Nonattainment Areas. The corrections and changes are described below.

CORRECTIONS OR CHANGES

Narrative Corrections or Changes

Page 2-6, last paragraph: The USEPA requested we change the reference to the USEPA's acid rain database to the USEPA's Clean Air Markets database to better reflect the data used.

Page 2-6, last paragraph: The amount of nitrogen dioxide (NOx) emissions reduced since 2002 is incorrectly listed as over 54,000 tons per year. The correct value should be over 84,000 tons per year.

Page 3-7, under Clean Smokestacks Act: The percent reduction of annual NOx emissions by 2009 was corrected from 78% to 77%, and the percent reduction of annual sulfur dioxide (SO_2) emissions by 2013 was corrected from 74% to 73%.

Page 3-11, Table 3-4 Point Source NOx Emissions: The USEPA, Region 4 requested that the 2008 emissions for Marshall Steam Station in Catawba County be corrected to reflect the actual emissions instead of the projected emissions. The 2008 emissions for Marshall Steam Station were updated to reflect the actual emissions. The future year NOx emissions for all units except Unit 3 were kept constant at the 2008 emission level since their controls were installed prior to 2008 and the emissions are not expected to change significantly from year to year. For Unit 3, selective catalytic reduction was install during 2008, therefore the future year emissions were adjusted to reflect this control.

Page 3-12, Table 3-5 Point Source SO_2 Emissions: The USEPA, Region 4 requested that the 2008 emissions for Marshall Steam Station in Catawba County be corrected to reflect the actual emissions instead of the projected emissions. The 2008 emissions for Marshall Steam Station were updated to reflect the actual emissions. The future year SO_2 emissions for all units were kept constant at the 2008 emission level since their controls were installed prior to 2008 and the emissions are not expected to change significantly from year to year.

Page 3-12, Table 3-6 Point Source $PM_{2.5}$ Emissions: The USEPA, Region 4 requested that the 2008 emissions for Marshall Steam Station in Catawba County be corrected to reflect the actual emissions instead of the projected emissions. The 2008 emissions for Marshall Steam Station were updated to reflect the actual emissions. The future year $PM_{2.5}$ emissions for all units were kept constant at the 2008 emission level since their controls were installed prior to 2008 and the emissions are not expected to change significantly from year to year.

Page 3-15, Tables 3-16 and 3-17: These tables were updated to reflect the changed point source emissions for Catawba County.

Page 3-16, Tables 3-18 and 3-19: These tables were updated to reflect the changed point source emissions for Catawba County.

Page 3-17, Table 3-21: This table was updated to reflect the changed point source emissions for Catawba County.

Page 4-10, Table 4-6: This table was updated to reflect the changed point source emissions for Catawba County.

Appendix C.1 Point Source Emissions Inventory Documentation Changes

Appendix C.1, page 7: The second paragraph was changed to reflect the USEPA's request that the Marshall Steam Station 2008 emissions be updated to reflect actual emissions instead of the projected emissions.

Appendix C.1, page 7, Table 4.1: The USEPA, Region 4 requested that the 2008 emissions for Marshall Steam Station in Catawba County be corrected to reflect the actual emissions instead of the projected emissions. The 2008 emissions for Marshall Steam Station were updated to reflect the actual emissions. The future year NOx emissions for all units except Unit 3 were kept constant at the 2008 emission level since their controls were installed prior to 2008 and the emissions are not expected to change significantly from year to year. For Unit 3, selective catalytic reduction was install during 2008, therefore the future year emissions were adjusted to reflect this control.

Appendix C.1, page 8, Table 4.2: The USEPA, Region 4 requested that the 2008 emissions for Marshall Steam Station in Catawba County be corrected to reflect the actual emissions instead of the projected emissions. The 2008 emissions for Marshall Steam Station were updated to reflect

the actual emissions. The future year SO_2 emissions for all units were kept constant at the 2008 emission level since their controls were installed prior to 2008 and the emissions are not expected to change significantly from year to year.

Appendix C.1, page 8, Table 4.3: The USEPA, Region 4 requested that the 2008 emissions for Marshall Steam Station in Catawba County be corrected to reflect the actual emissions instead of the projected emissions. The 2008 emissions for Marshall Steam Station were updated to reflect the actual emissions. The future year $PM_{2.5}$ emissions for all units were kept constant at the 2008 emission level since their controls were installed prior to 2008 and the emissions are not expected to change significantly from year to year.

Appendix C.1, pages 10,11,and 15, Table 5.1: The emissions for Marshall Steam Station were updated to reflect the requested changes by the USEPA.

REVISED SECTIONS

Attached are the revised sections to the Redesignation Demonstration and Maintenance Plan for the Hickory and Greensboro/Winston-Salem/High Point Fine Particulate Matter Nonattainment Areas. To appropriately revise the original package, replace the pages as outlined below:

Narrative Replacements

Replace December 18, 2009 page 2-6 with the attached December 22, 2010 page 2-6. (Note that December 18, 2009 page 2-5 has been included for ease of substitution.)

Replace December 18, 2009 page 3-7 with the attached December 22, 2010 page 3-7. (Note that December 18, 2009 page 3-6 has been included for ease of substitution.)

Replace December 18, 2009 pages 3-11 through 3-12 with the attached December 22, 2010 pages 3-11 through 3-12. (Note that December 18, 2009 pages 3-10 and 3-13 have been included for ease of substitution.)

Replace December 18, 2009 pages 3-15 through 3-17 with the attached December 22, 2010 pages 3-15 through 3-17. (Note that December 18, 2009 page 3-14 has been included for ease of substitution.)

Replace December 18, 2009 page 4-10 with the attached December 22, 2010 pages 4-10. (Note that December 18, 2009 page 4-11 has been included for ease of substitution.)

Appendix C.1 Replacements

Replace December 18, 2009 Appendix C.1 "Point Source Emission Inventory Documentation" pages 7 and 8 with the attached December 22, 2010 Appendix C.1 pages 7 and 8.

Replace December 18, 2009 Appendix C.1 page 10 with the attached December 22, 2010 Appendix C.1 page 10. (Note that December 18, 2009 Appendix C.1 page 9 has been included for ease of substitution.)

Replace December 18, 2009 Appendix C.1 page 11 with the attached December 22, 2010 Appendix C.1 page 11. (Note that December 18, 2009 Appendix C.1 page 12 has been included for ease of substitution.)

Replace December 18, 2009 Appendix C.1 page 15 with the attached December 22, 2010 Appendix C.1 page 15. (Note that December 18, 2009 Appendix C.1 page 16 has been included for ease of substitution.)

- program is expected to achieve a 90% reduction in particulate matter (PM) emissions. These emission reductions are federally enforceable.

- Nonroad spark-ignition engines and recreational engines standards: Tier 1 of this standard was implemented in 2004 and Tier 2 started in 2007, and will reduce particulate matter emissions. These emission reductions are federally enforceable.

- Large nonroad diesel engine standards: Promulgated in 2004, this rule is being phased in between 2008 and 2014. This rule will also reduce sulfur content in nonroad diesel fuel. When fully implemented, this rule will reduce NO_x and direct $PM_{2.5}$ emissions by over 90%. These emission reductions are federally enforceable.

The state measures that have been implemented include:

- Clean Air Bill: This State legislation expanded the inspection and maintenance (I/M) program from 9 counties to 48. It was phased-in in the Hickory and Triad nonattainment areas from July 1, 2002 through July 1, 2003. This program will reduce NO_x and Volatile Organic Compound (VOCs), and Carbon Monoxide (CO). These emission reductions are state enforceable.

- Open burning: This regulation prohibits the burning of man-made materials throughout the State. Additionally, this regulation prohibits open burning of yard waste in areas that the NCDAQ forecasts an air quality action day. The open burning regulation will reduce fine particulate matter emissions, as well as NO_x, VOCs and CO emissions. These emission reductions are state enforceable.

- Heavy duty diesel engine gap filling rule: This rule requires engine manufacturers to perform the supplemental testing requirements for heavy duty diesel engines for model years 2005 and 2006 due to delays in the USEPA's rule and will reduce PM emissions. These emission reductions are state enforceable.

- Clean Smokestack Act: This rule requires coal-fired power plants to reduce annual NO_x emissions by 77% by 2009 and to reduce annual sulfur dioxide emissions by 49% by 2009 and 73% by 2013. This legislation sets a cap on NO_x and SO_2 emissions, which the public utilities cannot meet by purchasing emission credits. These emission reductions are state enforceable.

- NO_x State Implementation Plan (SIP) Call rule: This rule was predicted to reduce summertime NO_x emissions from power plants and other industries by 68%. These emission reductions are state and federally enforceable.

- Diesel Retrofits: As part of the North Carolina Mobile Source Emission Reduction Grants program, a number of cities, counties and school districts have installed Diesel Oxidation Catalysts (DOCs) or Diesel Particulate Filters (DPFs) on their diesel equipment. The vehicles that have been retrofitted include schools buses, as well as county fleet trucks for solid waste pickup. These types of filters are designed to remove particulate matter, and when used with ultra low sulfur diesel fuel, NO_x and VOC emissions are also reduced. Even though these emission reductions are voluntary and not enforceable, they are still considered permanent reductions.

- Diesel Emissions Reduction Act (DERA): DERA provides new diesel emissions reduction grant authority for the USEPA. This funding is used to achieve significant reductions in diesel emissions that improve air quality and protect public health. The DERA funds that the NCDAQ have received have been used to retrofit, repower, or replace existing diesel engines from on-road and nonroad mobile source vehicles/equipment. This program will reduce PM, NOx, and VOC emissions. Even though these emission reductions are voluntary and not enforceable, they are still considered permanent reductions.

One of the largest components of $PM_{2.5}$ in the southeastern United States is sulfate. This is formed through various chemical reactions from the precursor SO_2. Another component of $PM_{2.5}$ is nitrate, which is formed from the precursor NO_x. Controls installed on coal-fired power plants over the past few years have significantly reduced these two precursor pollutants. Table 2-4 presents the annual emissions for the North Carolina sources that are in the USEPA's Clean Air Markets database. Since 2002, when the NO_x controls started coming on-line to meet the NO_x SIP Call and later to meet the North Carolina Clean Smokestacks Act (NCCSA), the NO_x emissions from subject sources have decreased over 84,000 tons per year. To meet the SO_2 emission caps in the NCCSA, the North Carolina public utilities started installing SO_2 controls late in 2005. Since then, the SO_2 emissions from the utilities in North Carolina have decreased nearly 274,000 tons. The decline in SO_2 emissions has coincided with the decline in annual $PM_{2.5}$ concentrations across North Carolina.

Table 3-1 OBDII Phase-in Effective Dates

County	Date
Catawba	July 1, 2003
Davidson	July 1, 2003
Guildford	July 1, 2002

These emission reductions are state enforceable. The expected NO_x benefits for the maintenance years are listed in Table 3-2 below.

Table 3-2 I/M NO_x Benefits by County

NO_x I/M Benefit (Tons/year)	**2008**	**2011**	**2014**	**2017**	**2021**
Total NO_x for Catawba County	202	272	335	393	469
Total NO_x for Davidson County	207	273	329	382	452
Total NO_x for Guilford County	660	865	1,055	1,225	1,426

NO_x SIP Call Rule/CAIR

In response to the USEPA's NO_x SIP call, North Carolina adopted rules to control the emissions of NO_x from large stationary combustion sources. These rules cover (1) fossil fuel-fired stationary boilers, combustion turbines, and combined cycle systems serving a generator with a nameplate capacity greater than 25 MW and selling any amount of electricity, (2) fossil fuel-fired stationary boilers, combustion turbines, and combined cycle systems having a maximum design heat input greater than 250 million British thermal units per hour, and (3) reciprocating stationary internal combustion engines rated at equal to or greater than 2400 brake horsepower (3000 brake horsepower for diesel engines and 4400 brake horsepower for dual fuel engines). As part of the NO_x SIP Call, the USEPA rules established a NO_x budget for sources in North Carolina and other states. North Carolina has a Phase II budget (i.e., emission allowance) of 165,022 tons NO_x per ozone season.

Besides amending existing NO_x rules and adopting new NO_x rules specifically to address the USEPA NO_x SIP Call, the North Carolina rules also require new sources to control emissions of NO_x. The objective of this requirement is (1) to aid in meeting the NO_x budget for North Carolina for minor sources and (2) to aid in attaining and maintaining the ambient air quality standard for ozone in North Carolina. North Carolina's NO_x SIP Call rule was predicted to reduce summertime NO_x emissions from power plants and other industries by 68% by 2006. In October 2000, the North Carolina Environmental Management Commission (EMC) adopted rules requiring the reductions.

In 2009, the NO_x SIP Call program was replaced with the CAIR, a cap-and-trade program that will achieve reductions of emissions of SO_2 and NO_x in the eastern United States. NO_x sources that were regulated under the NO_x SIP Call are now regulated under the CAIR program. North Carolina adopted the CAIR rules in 2006 (amended in 2008). North Carolina's CAIR rules set annual SO_2 allowances as well as both ozone season and annual NO_x allowances for coal-fired electric generating units and other large combustion sources. These regulations are due to a Federal program and thus are both State and Federally enforceable.

Due to the Court challenges of CAIR in 2008, the USEPA will be making changes to this program soon. However, the existing CAIR rules will remain in place until the USEPA promulgates changes to the program.

Clean Smokestacks Act

In June 2002, the North Carolina General Assembly enacted the NCCSA, which requires coal-fired power plants in North Carolina to reduce annual NO_x emissions by 77% by 2009. These power plants must also reduce annual SO_2 emissions by 49% by 2009 and 73% by 2013. It is significant to note that this law sets a cap on NO_x and SO_2 emissions for the State which the North Carolina public utilities cannot meet by purchasing credits from sources outside of North Carolina. With requiring year-round NO_x controls and not allowing the purchase of NO_x credits to meet the caps, the NCCSA reduces NO_x emissions beyond the requirements of the NO_x SIP Call Rule. One of the first state laws of its kind in the nation, this legislation provides a model for other states in controlling multiple air pollutants from older coal-fired power plants. These emissions reductions are state enforceable.

Prevention of Significant Deterioration

All new major sources of SO_2 and NO_x will be evaluated under the prevention of significant deterioration program and are required to use best available control technology. These emissions reductions are state enforceable.

Open Burning

The North Carolina open burning regulation prohibits the burning of man-made materials statewide. In June 2004, the EMC approved revisions to the open burning regulation banning open burning of yard waste and land clearing debris on forecasted Code Orange or higher "air quality action days," for those counties that the NCDAQ or local air programs forecast ozone or fine particulate matter. The following counties in the Hickory area are subject to this rule**:** Alexander**,** Catawba**,** southeastern Burke and southeastern Caldwell. The following counties in

SAFETY-LU (the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users) as well as any updated transportation legislation and the CAA as amended.

Mobile Source Emission Reduction Grants

- Diesel Retrofits: As part of the North Carolina Mobile Source Emission Reduction Grants program, a number of cities, counties and school districts have installed Diesel Oxidation Catalysts (DOCs) or Diesel Particulate Filters (DPFs) on their diesel equipment. The vehicles that have been retrofitted include schools buses, as well as county fleet trucks for solid waste pickup. Although these types of filters are designed to remove fine particulate matter, when used with ultra low sulfur diesel fuel, NO_x and VOC emissions are also reduced.

- Diesel Emissions Reduction Act (DERA): DERA provides new diesel emissions reduction grant authority for the USEPA. This funding is used to achieve significant reductions in diesel emissions that improve air quality and protect public health. In response to DERA, the USEPA created grant and funding programs under the National Clean Diesel Campaign to build on the success of its regulatory and voluntary efforts to reduce emissions from diesel engines. The DERA funds that the NCDAQ have received have been used to retrofit, repower, or replace existing diesel engines from on-road and nonroad mobile source vehicles/equipment.

3.3 EMISSIONS INVENTORIES AND MAINTENANCE DEMONSTRATION

3.3.1 Theory of Approach

There are two basic approaches used to demonstrate continued maintenance. The first is the comparison of a projected emissions inventory with a baseline emissions inventory. The second approach involves complex analysis using gridded photochemical modeling. The approach used by the NCDAQ is the comparison of emissions inventories for the years 2008 and 2021.

For the maintenance demonstration, the base year of 2008 was chosen since it is a year that falls within the attaining design value period of 2006-2008 and some emissions inventory data was in the process of being developed for this year. The maintenance demonstration is made by comparing the 2008 baseline emissions inventory to the 2021 projected emissions inventory. The baseline emissions inventory represents an emission level for a period when the ambient air quality standard was not violated, 2006-2008. If the projected emissions remain at or below the baseline emissions, continued maintenance is demonstrated and it then follows, if the projected emissions remain at or below the baseline emissions, then the ambient air quality standard shoul

not be violated in the future. In addition to comparing the final year of the plan, all of the interim years are compared to the 2008 baseline to demonstrate that these years are also expected to show continued maintenance of the annual fine particulate matter standard.

The emissions inventories are comprised of four major types of sources: point, area, on-road mobile and nonroad mobile. The projected emissions inventories have been estimated using projected rates of growth in population, traffic, economic activity, expected control programs, and other parameters. Naturally occurring, or biogenic, emissions are not included in the emissions inventory comparison, as these emissions are outside the State's span of control.

3.3.2 Emission Inventories

There are four different man-made emission inventory source classifications: (1) stationary point, (2) area, (3) on-road mobile and (4) nonroad mobile sources.

Point sources are those stationary sources that require an Air Permit to operate. In general, these sources have a potential to emit more than 5 tons per year of CO, NO_x, PM, SO_2 and/or VOC from a single facility. The source emissions are tabulated from data collected by direct on-site measurements of emissions or mass balance calculations utilizing emission factors from the USEPA's AP-42. There are usually several emission sources for each facility. Emission data is collected for each point source at a facility and the data is entered into an in-house database system. For the projected year's inventory, point sources are adjusted by growth factors based on Standard Industrial Classification codes. The growth factors are generated using the USEPA's Economic Growth Analysis System version 5.0 (E-GAS 5.0) program or using growth patterns obtained from County Business Patterns. For detailed discussion on how the point sources emission inventory was developed, see Appendix C.1. A summary of the point source emissions are presented in Tables 3-4 to 3-6.

Table 3-4. Point Source NO_x Emissions (tons per year)

County	2008	2011	2014	2017	2021
Catawba	13,310	10,549	10,548	10,548	10,548
Davidson	841	865	892	920	961
Guilford	231	231	232	233	237
Triad Total	1,072	1,096	1,124	1,153	1,198

Table 3-5 Point Source SO_2 Emissions (tons per year)

County	2008	2011	2014	2017	2021
Catawba	6,189	6,187	6,186	6,184	6,183
Davidson	286	289	292	295	299
Guilford	449	451	453	455	458
Triad Total	735	740	745	750	757

Table 3-6. Point Source $PM_{2.5}$ Emissions (tons per year)

County	2008	2011	2014	2017	2021
Catawba	6,976	6,975	6,975	6,973	6,971
Davidson	179	178	177	176	175
Guilford	62	62	62	63	63
Triad Total	241	240	239	239	238

Area sources are those stationary sources whose emissions are relatively small but due to the large number of these sources, the collective emissions could be significant (i.e., dry cleaners, service stations, etc.). For area sources, emissions are estimated by multiplying an emission factor by some known indicator of collective activity such as production, number of employees, or population. These types of emissions are estimated on the county level. For the projected year's inventory, area source emissions are changed by population growth, projected production growth, or when applicable, by E-GAS 5.0 growth factors. For detailed discussion on how the area source emission inventory was developed, see Appendix C.2. A summary of the area source emissions are presented in Tables 3-7 to 3-9.

Table 3-7. Area Source NO_x Emissions (tons per year)

County	2008	2011	2014	2017	2021
Catawba	662	614	566	520	454
Davidson	583	551	516	486	438
Guilford	1,243	1,210	1,177	1,146	1,099
Triad Total	1,826	1,816	1,693	1,632	1,537

Table 3-8. Area Source SO_2 Emissions (tons per year)

County	2008	2011	2014	2017	2021
Catawba	2,263	2,037	1,808	1,580	1,277
Davidson	983	838	692	548	353
Guilford	4,129	3,905	3,683	3,460	3,164
Triad Total	5,112	4,743	4,375	4,008	3,517

Table 3-9. Area Source $PM_{2.5}$ Emissions (tons per year)

County	2008	2011	2014	2017	2021
Catawba	682	658	629	606	559
Davidson	1,071	1,028	979	937	857
Guilford	697	663	623	590	524
Triad Total	1,768	1,691	1,602	1,527	1,381

For mobile sources, the USEPA's MOBILE6.2 mobile model is run to generate the twelve functional road class (i.e. urban interstate, rural interstate, rural local, etc.) emission factors. The emissions are calculated by multiplying the road class vehicle miles traveled (VMT) by the road class emission factor and summed to the county level. For the projected years' inventories, the on-road mobile sources emissions are calculated by running the MOBILE6.2 mobile model for the future year to generate emission factors that take into consideration expected Federal tailpipe standards, fleet turnover and new fuels. The new emission factors are multiplied by the projected VMT. For detailed discussion on how the on-road mobile emission inventory was developed, see Appendix C.3. A summary of the on-road mobile source emissions are presented in Tables 3-10 to 3-12.

Table 3-10. On-road Mobile Source NO_x Emissions (tons per year)

County	2008	2011	2014	2017	2021
Catawba	3,546	2,830	2,128	1,617	1,193
Davidson	3,954	3,060	2,243	1,679	1,216
Guilford	10,462	7,957	5,885	4,410	3,268
Triad Total	14,416	11,017	8,128	6,089	4,484

Table 3-11. On-road Mobile Source SO_2 Emissions (tons per year)

County	2008	2011	2014	2017	2021
Catawba	23	20	22	23	25
Davidson	24	20	21	22	24
Guilford	74	64	69	75	80
Triad Total	98	84	90	97	104

Table 3-12. On-road Mobile Source $PM_{2.5}$ Emissions (tons per year)

County	2008	2011	2014	2017	2021
Catawba	59	51	43	39	37
Davidson	64	53	43	38	36
Guilford	170	142	125	117	117
Triad Total	234	195	168	155	153

Nonroad mobile sources are equipment that can move but do not use the roadways, i.e., lawn mowers, construction equipment, railroad locomotives, aircraft, etc. The emissions from this category are calculated using the USEPA's NONROAD2008a nonroad mobile model, with the exception of the railroad locomotives and aircraft engine. The railroad locomotive and aircraft engine emissions are estimated by taking activity data, such as landings and takeoffs, and multiply by an emission factor. These emissions are also estimated at the county level. For the projected years' inventories, the emissions are estimated using the USEPA's NONROAD2008a nonroad mobile model, E-GAS 5.0 growth factors or projected landing and takeoff data for aircraft. For detailed discussion on how the nonroad mobile emission inventory was developed, see Appendix C.4. A summary of the nonroad mobile source emissions are presented in Tables 3-13 to 3-15.

Table 3-13. Nonroad Mobile Source NO_x Emissions (tons per year)

County	2008	2011	2014	2017	2021
Catawba	1,173	922	700	551	453
Davidson	1,831	1,632	1,467	1,275	1,115
Guilford	3,864	3,371	2,816	2,350	1,980
Triad Total	5,695	5,003	4,283	3,625	3,095

Table 3-14. Nonroad Mobile Source SO_2 Emissions (tons per year)

County	2008	2011	2014	2017	2021
Catawba	18	6	4	3	4
Davidson	25	17	2	2	2
Guilford	96	51	42	42	43
Triad Total	121	68	44	44	45

Table 3-15. Nonroad Mobile Source $PM_{2.5}$ Emissions (tons per year)

County	2008	2011	2014	2017	2021
Catawba	70	67	57	46	38
Davidson	71	67	58	46	40
Guilford	264	252	220	186	157
Triad Total	335	319	278	232	197

3.3.3 Summary of Emissions

The sum total of these man-made emissions for the $PM_{2.5}$ nonattainment areas is tabulated in Tables 3-16 though 3-18.

Table 3-16. Total Man-Made NO_x Emissions (tons per year)

County	2008	2011	2014	2017	2021
Catawba	18,691	14,915	13,942	13,236	12,648
Davidson	7,209	6,108	5,118	4,360	3,730
Guilford	15,800	12,769	10,110	8,139	6,584
Triad Total	23,009	18,877	15,228	12,499	10,314

Table 3-17. Total Man-Made SO_2 Emissions (tons per year)

County	2008	2011	2014	2017	2021
Catawba	8,493	8,250	8,020	7,790	7,489
Davidson	1,318	1,164	1,007	867	678
Guilford	4,748	4,471	4,247	4,032	3,745
Triad Total	6,066	5,635	5,254	4,899	4,423

Table 3-18. Total Man-Made $PM_{2.5}$ Emissions (tons per year)

County	2008	2011	2014	2017	2021
Catawba	7,787	7,751	7,704	7,664	7,605
Davidson	1,385	1,326	1,257	1,197	1,108
Guilford	1,193	1,119	1,030	956	861
Triad Total	2,578	2,445	2,287	2,153	1,969

3.3.4 Maintenance Demonstration

As discussed above, maintenance is demonstrated when the future years total man-made emissions are less than the 2008 baseline emissions. The following tables summarized the SO_2, NO_x, and primary $PM_{2.5}$ emissions for both the Hickory and Triad nonattainment areas. The difference between the base year and the final year of the plan illustrates that the continued maintenance of the annual fine particulate matter NAAQS is expected.

Table 3-19 Maintenance Demonstration for Hickory $PM_{2.5}$ Nonattainment Area

Year	NO_x (tons per year)	SO_2 (tons per year)	$PM_{2.5}$ (tons per year)
2008	18,691	8,493	7,787
2011	14,915	8,250	7,751
2014	13,942	8,020	7,704
2017	13,236	7,790	7,664
2021	12,648	7,489	7,605
Difference from 2008 to 2021	-6,043	-1,004	-182

Table 3-20 Maintenance Demonstration for Triad $PM_{2.5}$ Nonattainment Area

Year	NO_x (tons per year)	SO_2 (tons per year)	$PM_{2.5}$ (tons per year)
2008	23,009	6,066	2,578
2011	18,877	5,635	2,445
2014	15,228	5,254	2,287
2017	12,499	4,899	2,153
2021	10,314	4,423	1,969
Difference from 2008 to 2021	-12,695	-1,643	-609

The difference between the attainment level of emissions (2008) from all man-made sources and the projected level of emissions from all man-made sources in the nonattainment areas are considered the "safety margin". The safety margin for each projected year is listed below in Table 3-21 and 3-22.

Table 3-21 Safety Margin for Hickory $PM_{2.5}$ Nonattainment Area

Year	NO_x (tons per year)	SO_2 (tons per year)	$PM_{2.5}$ (tons per year)
2011	-3,776	-243	-36
2014	-4,749	-473	-83
2017	-5,455	-703	-123
2021	-6,043	-1,004	-182

Table 3-22 Safety Margin for Triad $PM_{2.5}$ Nonattainment Area

Year	NO_x (tons per year)	SO_2 (tons per year)	$PM_{2.5}$ (tons per year)
2011	-4,132	-431	-133
2014	-7,781	-812	-291
2017	-10,510	-1,167	-425
2021	-12,695	-1,643	-609

For both nonattainment areas, there are significant safety margins from 2011 to 2021. In addition to the above safety margins within the $PM_{2.5}$ nonattainment areas, SO_2 emissions from nearby coal-fired power plants will be significantly reduced due to the NCCSA. This effectively gives the $PM_{2.5}$ nonattainment areas an even larger safety margin for SO_2. Table 2-5 shows the SO_2 reductions at nearby coal-fired power plants. These reductions will benefit both the Triad and Hickory nonattainment areas and will provide large safety margins through 2021.

3.4 CONTINGENCY PLAN

3.4.1 Overview

The two main elements of the North Carolina contingency plan are tracking and triggering mechanisms to determine when contingency measures are needed and a process of developing and adopting appropriate control measures. There will be three potential triggers for the contingency plan. The primary trigger of the contingency plan will be a violation of the annual $PM_{2.5}$ NAAQS at any of the monitors in either $PM_{2.5}$ nonattainment area. The secondary trigger

Table 4-5 Guilford County MVEB

	2011	2021
NO_x Emissions (kg/year)		
Base Emissions	7,218,360	2,964,834
Safety Margin Allocated to MVEB	721,836	592,967
NO_x Conformity MVEB	**7,940,196**	**3,557,801**
$PM_{2.5}$ Emissions (kg/year)		
Base Emissions	128,465	105,716
Safety Margin Allocated to MVEB	26,191	48,940
$PM_{2.5}$ Conformity MVEB	**154,656**	**154,656**

4.5 NEW SAFETY MARGINS

For the Hickory nonattainment area, a total of 256,756 kg/year (283 tons/year) and 216,442 kg/year (239 tons/year) of the 2011 and 2021 NO_x safety margins, respectively, were added to the NO_X MVEBs.

For the Triad nonattainment area, a total of 999,478 kg/year (1,102 tons/year) and 813,510 kg/year (897 tons/year) of the 2011 and 2021 NO_x safety margins, respectively, were added to the Triad NO_X MVEBs. For $PM_{2.5}$, a total of 36,552 kg/year (40 tons/year) and 74,572 kg/year (82 tons/year) of the 2011 and 2021 $PM_{2.5}$ safety margins, respectively, were added to the Triad $PM_{2.5}$ MVEBs.

Table 4-6 New Safety Margins for the Hickory $PM_{2.5}$ nonattainment area

Year	NO_x (tons/year)	$PM_{2.5}$ (tons/year)
2011	-3,493	-36
2014	-4,749	-83
2017	-5,455	-123
2021	-5,804	-182

Table 4-7 New Safety Margins for the Triad $PM_{2.5}$ nonattainment area

Year	NO_x (tons/year)	$PM_{2.5}$ (tons/year)
2011	-3,030	-93
2014	-7,781	-291
2017	-10,510	-425
2021	-11,798	-527

4.0 TOTAL POINT SOURCES EMISSIONS FOR HICKORY AND TRIAD NONATTAINMENT AREAS

In the following sections the emissions for the Hickory and Triad nonattainment areas are totaled, as well as, the estimated facility emissions for each county in the nonattainment area are identified for the base year (2008) and the future maintenance years (2011, 2014, 2017 and 2021).

In the original maintenance plan submitted December 18, 2009, the emissions for the one large utility facility located in Catawba County, Duke Power –Marshall Steam Station, the annual emissions were estimated by using North Carolina's 2009 Clean Smokestacks Act Compliance Plan. In December 2010, the USEPA requested that the estimated 2008 emissions be updated using the actual 2008 emissions. The 2008 emissions for Marshall Steam Station were updated to reflect the actual emissions. The future year SO_2 emissions for this facility were kept constant since the SO_2 controls at this facility were all installed prior to 2008 and the estimated emissions are expected to be relatively constant from year to year. The emission controls at Marshall Steam Station unit 3 were upgraded from selective non-catalytic reduction to selective catalytic reduction during 2008. Therefore, the future year NOx emissions for this unit were based upon the 2009 Clean Smokestacks Act Compliance Plan.

Emission summary tables for Hickory and Triad nonattainment counties are as follow:

Table 4.1. Hickory and Triad Point Source NOx Emissions (ton/year)

County	2008	2011	2014	2017	2021
Catawba	13,310	10,549	10,548	10,548	10,548
Davidson	841	865	892	920	961
Guilford	231	231	232	233	237
Triad Total	1,072	1,096	1,124	1,153	1,198

Table 4.2. Hickory and Triad Point Source SO_2 Emissions (ton/year)

County	2008	2011	2014	2017	2021
Catawba	6,189	6,187	6,186	6,184	6,183
Davidson	286	289	292	295	299
Guilford	449	451	453	455	458
Triad Total	735	740	745	750	757

Table 4.3. Hickory and Triad Point Source $PM_{2.5}$ Emissions (ton/year)

County	2008	2011	2014	2017	2021
Catawba	6,976	6,975	6,975	6,973	6,971
Davidson	179	178	177	176	175
Guilford	62	62	62	63	63
Triad Total	241	240	239	239	238

DISCUSSION OF POINT SOURCE CATEGORIES

Industrial processes in the inventory are identified with 8-digit numbers known as the Source Classification Codes (SCC). These are grouped numerically into a number of categories for convenience. The following is the inventories reported by SCC by county. In general, the first three digits of the SCC code describe the process and the last five digits give more detail as to the fuel used, size of source, etc.

It should be noted that the SCC in any particular instance was selected by an individual entering inventory data into a computer maintained record. It may be that in some cases, other individuals would have selected other codes. In some cases, there are two or three parallel codes that describe the same sort of equipment, the difference being size. In other cases, one is able to select a general code for an overall process or use several more specific codes that together would be covered by the more general one. If, upon consideration, it appears that a more appropriate code could have been selected, that does not mean that the reported emissions are inaccurate.

A listing of SCC with descriptions may be found in FIRE Version 5.0 Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants, EPA-454/R-95-012. Occasionally, new SCC is defined so it may be useful to search the EPA's website for new entries.

Table 5.1. Catawba County Point Sources –Annual Emission (tons/year)

Facility ID	Facility Name	Unit ID	SCC	2008			2011			2014			2017			2021		
				NOx	PM25-PRI	SO2	NOx	PM25-PRI	SO2	NOx	PM25-PRI	SO2	NOx	PM25-PRI	SO2	NOx	PM25-PRI	SO2
3703500009	Maymead Materials, Inc. - Hickory Plant	G-22	30500242	2	0	4	2	0	4	2	0	4	2	0	4	2	0	4
3703500009 Total				**2**	**0**	**4**	**2**	**0**	**4**	**2**	**0**	**4**	**2**	**0**	**4**	**2**	**0**	**4**
3703500025	Carolina Container Company	G-1	30703099	0	3	0	0	3	0	0	3	0	0	3	0	0	3	0
		G-25	10300602	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0
3703500025 Total				**2**	**3**	**0**	**2**	**3**	**0**	**2**	**3**	**0**	**2**	**3**	**0**	**2**	**3**	**0**
3703500031	Carpenter Company Conover	G-10	39000699	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-11	10500113	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-13	39000699	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-2	20100202	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-8	39000699	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		GR29	20100102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		GR32	40188805	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3703500031 Total				**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**
3703500043	Century Furniture Industries, Inc., Plant #3	G-15	30703099	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-51	40201901	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0
		G-53	10300601	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3703500043 Total				**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**
3703500044	Century Furniture Industries Plant #1	G-44	10300903	3	2	0	2	2	0	1	1	0	1	1	0	1	1	0
		G-45	10300903	3	2	0	2	2	0	1	1	0	1	1	0	1	1	0
		G-46	30702002	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-47	40201901	0	5	0	0	5	0	0	5	0	0	4	0	0	4	0
3703500044 Total				**6**	**9**	**0**	**4**	**8**	**0**	**3**	**8**	**0**	**2**	**7**	**0**	**1**	**6**	**0**
3703500073	Duke Energy Carolinas, LLC - Marshall Steam Station	G-1	10100501	2703	1511	1384	2703	1511	1384	2703	1511	1384	2703	1511	1384	2703	1511	1384
		G-127	20200301	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-128	20200301	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-129	20200301	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 5.1. Catawba County Point Sources –Annual Emission (tons/year) – Continued

Facility ID	Facility Name	Unit ID	SCC	2008			2011			2014			2017			2021		
				NOx	PM25-PRI	SO2	NOx	PM25-PRI	SO2	NOx	PM25-PRI	SO2	NOx	PM25-PRI	SO2	NOx	PM25-PRI	SO2
3703500073	Duke Energy Carolinas, LLC - Marshall Steam Station	G-130	20200301	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-131	20200301	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-133	20200102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-137	20200401	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-138	20200401	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-6	30531009	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0
		G-8	39999994	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0
		G-2	10100501	2003	1111	1026	2003	1111	1026	2003	1111	1026	2003	1111	1026	2003	1111	1026
		G-33	20300101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-4	10100501	4135	2034	1749	1376	2034	1749	1376	2034	1749	1376	2034	1749	1376	2034	1749
		G-49	20200401	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-5	10100501	4380	2287	2015	4380	2287	2015	4380	2287	2015	4380	2287	2015	4380	2287	2015
		G-50	20300101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		GR2	20300101	13	1	1	13	1	1	13	1	1	13	1	1	13	1	1
3703500073 Total				**13234**	**6946**	**6175**	**10475**	**6946**	**6175**	**10475**	**6946**	**6175**	**10475**	**6946**	**6175**	**10475**	**6946**	**6175**
3703500102	Hickory Chair Company	G-1	10300903	9	5	0	9	5	0	10	5	0	10	5	0	11	5	0
		G-27	10300404	2	0	6	2	0	5	2	0	4	2	0	3	2	0	2
3703500102 Total				**11**	**5**	**6**	**11**	**5**	**5**	**12**	**5**	**4**	**12**	**5**	**3**	**13**	**5**	**2**
3703500106	HWS Company Inc. dba Hickory White	G-1	10300903	12	0	1	12	0	1	13	0	1	13	0	0	13	0	0
		G-3	10300602	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0
		G-4	10300602	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3703500106 Total				**13**	**0**	**1**	**13**	**0**	**1**	**14**	**0**	**1**	**14**	**0**	**0**	**14**	**0**	**0**
3703500159	Newton Wood Carving Company, Inc.	G-1	30703002	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0
3703500159 Total				**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**
3703500180	Progressive Furniture Inc	G-38	30702099	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-39	10200602	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-44	40201901	0	1	0	0	1	0	0	1	0	0	1	0	0	0	0

Table 5.1. Catawba County Point Sources –Annual Emission (tons/year) – Continued

Facility ID	Facility Name	Unit ID	SCC	2008			2011			2014			2017			2021		
				NOx	PM25-PRI	SO2	NOx	PM25-PRI	SO2	NOx	PM25-PRI	SO2	NOx	PM25-PRI	SO2	NOx	PM25-PRI	SO2
3703500180	Progressive Furniture Inc	G-45	40201901	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-7	40201901	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		GR2	30702099	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		GR3	30702099	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		GR4	30702099	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		GR5	30702099	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3703500180 Total				**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**
3703500184	Plastic Packaging Inc	G-61	39000699	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0
3703500184 Total				**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**
3703500186	Quaker Furniture, Incorporated dba Studio Q Furniture	G-1	30703002	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		GR6	10300603	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0
3703500186 Total				**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**
3703500202	Sherrill Furniture Company, Inc.	G-10	10300603	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0
3703500202 Total				**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**
3703500206	Shurtape Technologies - Hickory/Highland Plt	G-100	10200603	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-16	10200602	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-167	40201301	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
			40299999	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		G-169	40201301	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3703500206	Shurtape Technologies - Hickory/Highland Plt	G-208	40201301	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-226	20100202	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-77	10200603	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-78	10200603	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-85	40201301	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-86	40201301	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		G-87	40201301	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		G-97	10200602	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0
3703500206	Shurtape Technologies -Hickory/Highland	G-98	10200602	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 5.1. Catawba County Point Sources –Annual Emission (tons/year) – Continued

Facility ID	Facility Name	Unit ID	SCC	2008			2011			2014			2017			2021		
				NOx	PM25-PRI	SO2	NOx	PM25-PRI	SO2	NOx	PM25-PRI	SO2	NOx	PM25-PRI	SO2	NOx	PM25-PRI	SO2
3703500533 Total				**0**	**1**	**1**	**0**	**1**	**1**	**0**	**1**	**1**	**0**	**1**	**1**	**0**	**1**	**1**
County Grand Total				**13310**	**6976**	**6189**	**10549**	**6975**	**6187**	**10548**	**6975**	**6186**	**10548**	**6973**	**6184**	**10548**	**6971**	**6183**

Table 5.2. Davidson County Point Sources –Annual Emission (tons/year)

Facility ID	Facility Name	Unit ID	SCC Code	2008			2011			2014			2017			2021		
				NOx	PM25-PRI	SO2	NOx	PM25-PRI	SO2	NOx	PM25-PRI	SO2	NOx	PM25-PRI	SO2	NOx	PM25-PRI	SO2
3705700023	Stanley Furniture Company - Lexington Mfg	G-36	10200906	15	0	0	15	0	0	15	0	0	15	0	0	15	0	0
			10201201	0	9	1	0	9	1	0	9	1	0	9	1	0	9	1
3705700023 Total				**15**	**9**	**1**	**15**	**9**	**1**	**15**	**9**	**1**	**15**	**9**	**1**	**15**	**9**	**1**
3705700048	Dimension Milling Company, Inc.	G-2	10200906	7	3	0	7	3	0	7	3	0	7	3	0	7	3	0
3705700048 Total				**7**	**3**	**0**	**7**	**3**	**0**	**7**	**3**	**0**	**7**	**3**	**0**	**7**	**3**	**0**
3705700049	Linwood Furniture, Inc.	G-48	10200906	2	1	0	2	1	0	2	1	0	2	1	0	2	1	0
		G-49	10200906	9	2	0	9	2	0	9	2	0	9	2	0	9	2	0
		G-67	40201901	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0
		G-68	30703099	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3705700049 Total				**11**	**4**	**1**	**11**	**4**	**1**	**11**	**4**	**1**	**11**	**4**	**1**	**11**	**4**	**1**
3705700076	T I Industries	G-3	10200906	3	1	0	3	1	0	2	1	0	2	1	0	2	0	0
		G-66	30703099	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-79	40201901	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-88	40201901	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3705700076 Total				**3**	**2**	**0**	**3**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**
3705700096	Leggett & Platt, Inc. - Metal Bed Rail	G-2	10300603	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0
		G-3	10300603	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-5	10300501	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		GR3	10300603	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0
		GR4	10300603	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0
3705700096 Total				**3**	**0**	**0**	**3**	**0**	**0**	**3**	**0**	**0**	**3**	**0**	**0**	**3**	**0**	**0**
3705700106	Owens-Brockway Glass Container Plt 6	G-19	31299999	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		G-26	30501402	105	14	43	109	14	42	114	14	42	119	14	41	125	14	40
		G-27	30501402	231	23	47	240	23	46	251	23	45	261	23	45	276	23	44
		G-28	30501402	292	37	69	304	37	68	317	37	67	331	37	67	349	36	65
		G-29	30501410	0	4	0	0	4	0	0	4	0	0	4	0	0	4	0
		G-32	30501416	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0