

FINAL

**Clean Air Act Section 110(l) Noninterference
Demonstration to Remove Lee, Onslow, and
Rockingham Counties from North Carolina's
Motor Vehicle Emissions Inspection and
Maintenance (I&M) Program**



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Preface: This document contains the Clean Air Act Section 110(l) technical demonstration for the North Carolina Division of Air Quality's request to revise its Inspection and Maintenance State Implementation Plan to eliminate Lee, Onslow, and Rockingham Counties from North Carolina's motor vehicle emissions inspection and maintenance program in accordance with Session Law 2020-5 (House Bill 85) enacted by the 2019-2020 session of the North Carolina General Assembly.

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1.0 OVERVIEW

The 2019-2020 session of the North Carolina General Assembly enacted Session Law 2020-5, House Bill 85 (An Act to Remove Lee, Onslow, and Rockingham Counties From The Motor Vehicle Emissions Inspection Program). The Act amended North Carolina General Statute (NCGS) §143-215.107A(c) to remove three of 22 counties from North Carolina's emissions inspection and maintenance (I&M) program. Specifically, the Act requires the following changes to North Carolina's I&M program:

- Eliminate the following three counties from vehicle I&M requirements: Lee, Onslow, and Rockingham

Retain the vehicle I&M program in the following 19 counties: Alamance, Buncombe, Cabarrus, Cumberland, Davidson, Durham, Forsyth, Franklin, Gaston, Guilford, Iredell, Johnston, Lincoln, Mecklenburg, New Hanover, Randolph, Rowan, Union, and Wake.

- Implementation schedule: The Act requires the Department of Environmental Quality (DEQ) to prepare and submit to the United States (U.S.) Environmental Protection Agency (EPA) for approval by the agency a proposed North Carolina State Implementation Plan (SIP) amendment to remove Lee, Onslow, and Rockingham Counties from the I&M program. This proposed SIP amendment must be submitted to EPA by December 31, 2020.

In accordance with the Act, these revisions to the program become effective on the later of the following dates and applies to motor vehicles inspected, or due to be inspected, on or after that effective date:

(1) *January 1, 2021.*

(2) *The first day of a month that is 60 days after the Secretary of the Department of Environmental Quality certifies to the Revisor of Statutes that the United States Environmental Protection Agency has approved an amendment to the North Carolina State Implementation Plan submitted as required by Section 2 of this act. The Secretary shall provide this notice along with the effective date of this act on its Web site and by written or electronic notice to emissions inspection mechanic license holders, emissions inspection station licensees, and self-inspector licensees in the county where motor vehicle emissions inspection requirements are removed by this act.*

Figure 1 shows the 22 counties with an I&M program, the location of the counties that the Act removes from- and retains in the program, the 2017-2019 ozone design value (DV) data for counties that have monitors, and counties that are covered by a maintenance plan for ozone. The figure also shows the boundaries for the Charlotte area that is covered by a maintenance plan for the 1997 or 2008 8-hour ozone standards.¹

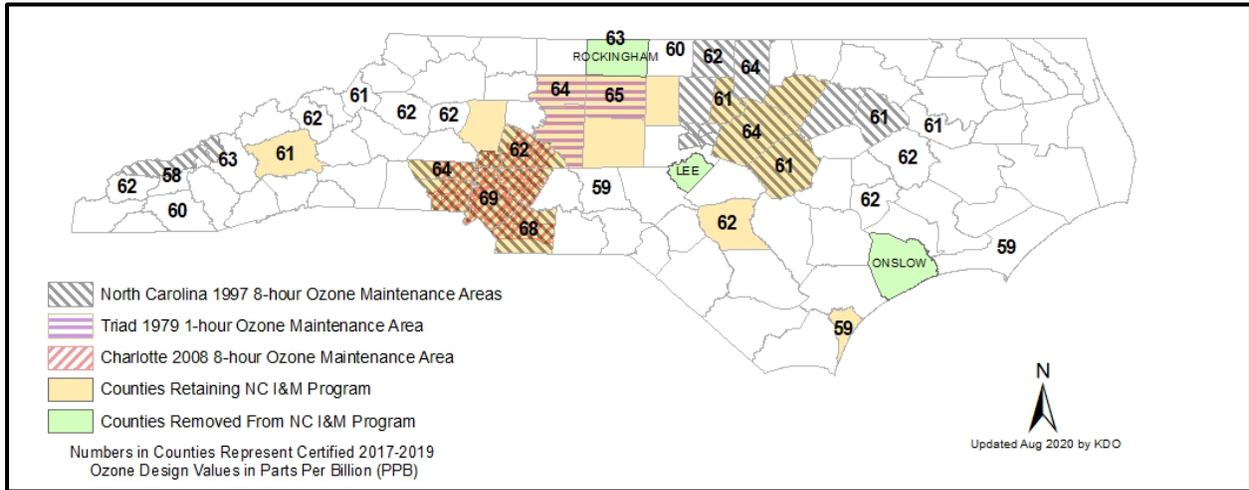


Figure 1. Counties Proposed to be Removed from and Retained in North Carolina’s I&M Program

Under the Clean Air Act (CAA), EPA has established National Ambient Air Quality Standards (NAAQS) for the following criteria pollutants: ozone, carbon monoxide (CO), lead, nitrogen dioxide (NO₂), fine and coarse particulate matter (PM_{2.5} or PM₁₀), and sulfur dioxide (SO₂). The EPA is required to review, and revise if necessary, the NAAQS every five years. Areas that violate a NAAQS are designated as “nonattainment” by EPA. Areas designated as “moderate nonattainment” or higher for ozone and CO are required to implement a vehicle I&M program (i.e., an emissions inspection program) in accordance with the CAA, Sections 187(a)(4) and 182(b)(4), respectively. The requirements of an I&M program were established in the Code of Federal Regulations (CFR) under Title 40 CFR Part 51.

¹ The Charlotte maintenance area for the 2008 8-hour standard includes all of Mecklenburg County and portions of Cabarrus, Gaston, Iredell, Lincoln, Rowan and Union Counties. For the 1997 8-hour standard, the Charlotte maintenance area includes all of Cabarrus, Gaston, Lincoln, Mecklenburg, Rowan and Union Counties and a portion of Iredell County. The portion of Cabarrus, Gaston, Lincoln, Rowan and Union Counties that was designated attainment with the 2008 ozone standard must continue to comply with the foundation control measures included in the maintenance plan for the 1997 ozone standard even though EPA revoked the 1997 standard effective one year after completing designations for the 2008 standard.

In accordance with Section 110(l) of the CAA, the Division of Air Quality (DAQ) is submitting this noninterference demonstration on behalf of the DEQ to request EPA’s approval to remove Lee, Onslow, and Rockingham Counties from North Carolina’s I&M SIP.

Section 110(l) states:

“Each revision to an implementation plan submitted by a State under this chapter shall be adopted by such State after reasonable notice and public hearing. The Administrator shall not approve a revision of a plan if the revision would interfere with any applicable requirement concerning attainment and reasonable further progress (as defined in section 171 of this title), or any other applicable requirement of this Act.”

This noninterference demonstration provides a comprehensive review of the current ambient air quality monitoring and emissions data available for the removal of Lee, Onslow, and Rockingham Counties from the I&M program. Section 2 of this noninterference demonstration provides background information on North Carolina’s I&M program. Section 3 presents the DAQ’s request for EPA’s approval to remove Lee, Onslow, and Rockingham Counties from the I&M program. Section 4 presents the noninterference demonstration by summarizing the current ambient air quality monitoring and emissions data available for Lee, Onslow, and Rockingham Counties to show why removing each county from the program will not interfere with maintaining compliance with the NAAQS in these or adjacent counties. Based on the technical analysis presented in this noninterference demonstration, Section 5 presents the DAQ’s conclusions supporting the removal of Lee, Onslow, and Rockingham Counties from North Carolina’s I&M SIP.

2.0 VEHICLE I&M PROGRAM BACKGROUND

The Environmental Management Commission (EMC) has the authority to *“adopt motor vehicle emissions standards; to adopt, when necessary and practicable, a motor vehicle emissions inspection and maintenance program to improve ambient air quality;”* pursuant to NCGS §143-215.107(a)(6), *Air quality standards and classifications*. The EMC has adopted rules for a basic I&M program pursuant to Title 15A North Carolina Administrative Code (NCAC) Subchapter 02D, Section .1000, *Motor Vehicle Emissions Control Standards*, that are federally enforceable by EPA pursuant to Title 40 Code of Federal Regulations (CFR) Part 51. The I&M program is implemented by the Commissioner of the North Carolina Division of Motor Vehicles (DMV) through the use of licensed safety/emission inspection stations, NCGS Article 3 – Motor Vehicle Act of 1937 §20-128.2(a), *Motor vehicle emission standards*.

The DMV's License and Theft Bureau has operational responsibility for the I&M program, and has created rules for implementing and monitoring the program under 19A NCAC 03D .0500, *General Information Regarding Safety Inspection of Motor Vehicles*. The DEQ provides technical support to DMV's implementation of North Carolina's I&M program. In addition, the DEQ develops specifications for the program and certifies the emissions testing equipment used in the program. The DEQ also prepares revisions to the SIP based on changes made by the North Carolina General Assembly and the EMC. In the past, implementation of this program has been an integral part of North Carolina's SIP(s) to support attainment and maintenance of the NAAQS for ozone and CO.

The North Carolina vehicle I&M program started in 1982 with Mecklenburg County being required to have an I&M program to address violations of the CO NAAQS. In 1984, Wake County was added to the program for CO NAAQS violations. With the passage of the CAA Amendments of 1990, Cabarrus, Davidson, Durham, Forsyth, Gaston, Granville, Guilford, and Union Counties were added to the I&M program to address violations of the ozone and/or CO standards as described in 40 CFR 51.350(a). The I&M program was also implemented in Orange County although it was not designated as nonattainment for the ozone or CO NAAQS. Under the 1997 8-hour ozone standard, the Charlotte/Gastonia/Rock Hill area was designated as a moderate nonattainment area, which required Iredell, Lincoln and Rowan Counties to be included in the I&M program.

Senate Bill 953 (Session Law 1999-328, Section 3.1(d)) required an additional 36 counties to have the vehicle emissions program in order to improve air quality in North Carolina. Counties were added to the program based on population, vehicle miles traveled, and the likely contribution by motor vehicles to high ozone levels in these counties and adjacent counties. This expanded the program to a total of 48 counties.

In 1999, the North Carolina General Assembly passed legislation to require an On-Board Diagnostic II (OBD) I&M program in not only the counties required to have an I&M program under 40 CFR 51.350(a), but also in other counties in the State that may need the additional emission reductions to achieve the 1997 8-hour ozone standard. The NCGS §143-215.107A(c), *Motor vehicle emissions testing and maintenance program*, specifies the counties that are required to have OBD I&M. The State regulations at 15A NCAC Subchapter 02D, Section .1000, *Motor Vehicle Emission Control Standards*, references the NCGS.

The I&M program for the initial nine counties subject to the program was based on a "tail-pipe" test. Starting in October 2002, the original nine counties converted from tailpipe testing to the

new OBD emissions testing for all model year 1996 and newer light-duty gasoline vehicles and continued tailpipe testing of model year 1995 and older vehicles. The program was expanded from nine counties starting July 1, 2003, to a total of 48 counties on January 1, 2006. At the time of full implementation of the OBD program, inspection stations were performing the OBD emissions test on model year 1996 and newer vehicles, and tailpipe testing for model year 1995 and older vehicles was discontinued.

In 2002, North Carolina inspection stations performed over 2.5 million vehicle emission inspections. As the new I&M counties were added, the number of inspections was expected to rise to a high of about 3.5 million inspections but then dip to a lower figure when all tailpipe testing ended on December 31, 2005. The actual number of OBD inspections has varied from 3.6 to about 5.4 million since 2006, due to a program change to align registration and inspection dates in 2008 and higher than expected fleet turnover and population growth. In 2019, 3.86 million emissions inspections were performed.

On November 1, 2008, the State ended the use of paper inspection stickers and began the process of aligning vehicle inspection expiration and registration renewal dates by using electronic inspection authorizations. Session Law 2011-95 enacted by the North Carolina General Assembly exempted plug-in electric vehicles from the I&M requirement.

In 2012, the North Carolina General Assembly enacted Session Law 2012-199 which required DEQ and DMV to change the I&M program to exempt the three newest model year vehicles with less than 70,000 miles, and secure EPA approval. The DEQ prepared and submitted to EPA an amendment to the North Carolina I&M SIP to incorporate these changes to the I&M program. The EPA approved the amendment on February 5, 2015.²

The 2017 session of the North Carolina General Assembly enacted Session Law 2017-10, Senate Bill 131. Section 3.5.(a) of the Act amended NCGS §143-215.107A(c) to remove 26 of 48 counties from North Carolina's emissions inspection and maintenance (I&M) program. For the 22 counties remaining in the I&M program, Section 3.5.(b) of the Act also amended NCGS §20-183.2(b) by changing the vehicle model year coverage to: (i) a vehicle with a model year within 20 years of the current year and older than the three most recent model years; or (ii) a vehicle with a model year within 20 years of the current year and has 70,000 miles or more on its odometer.

² 80 FR 6455-6458 (Vol. 80, No. 24)

On November 17, 2017, the DAQ submitted to EPA an amendment to the North Carolina I&M SIP to remove the 26 counties specified in Section 3.5.(a) of Session Law 2017-10 from North Carolina's I&M program. This submittal included proposed revisions to North Carolina's (1) I&M SIP and (2) a CAA Section 110(l) noninterference demonstration supporting the proposed revisions to the I&M program. The EPA subsequently approved the amendment on September 11, 2018.³ The counties were subsequently removed from the program effective December 1, 2018.

On July 25, 2018, the DAQ submitted to EPA an amendment to the North Carolina I&M SIP to adjust the vehicle model year coverage for the 22 counties remaining in the I&M program per Section 3.5.(b) of Session Law 2017-10. This submittal included proposed revisions to North Carolina's (1) motor vehicle I&M air quality rules in 15A NCAC Subchapter 02D, Section .1000, *Motor Vehicle Emission Control Standards*, (2) I&M SIP, (3) Maintenance Plan for the Charlotte-Gastonia-Salisbury, North Carolina 2008 8-Hour Ozone Marginal Nonattainment Area for changing the vehicle model year coverage for 22 counties subject to North Carolina's I&M program; and (4) a CAA Section 110(l) noninterference demonstration supporting the proposed revisions to the I&M program. The EPA subsequently approved the amendment on August 28, 2019.⁴ The revised vehicle model year coverage for the 22 counties was effective December 1, 2019. Note that submittal of the amendment to the I&M SIP to revise the vehicle model year coverage for the 22 counties remaining in the I&M program was placed on a different schedule than that for removing the 26 counties from the program to complete the process for revising rule 15A NCAC Subchapter 02D, Section .1000.

3.0 REQUEST FOR EPA'S APPROVAL OF REVISIONS TO NORTH CAROLINA'S I&M SIP TO REMOVE LEE, ONSLOW, AND ROCKINGHAM COUNTIES FROM THE PROGRAM

The purpose of this noninterference demonstration is to request EPA's approval for North Carolina to revise its I&M SIP to implement the following changes to North Carolina's I&M program as specified in Session Law 2020-5 (House Bill 85):

- Eliminate Lee, Onslow, and Rockingham Counties from the vehicle I&M requirements, effective per the Act.

³ 83 FR 48383-48384 (Vol. 83, No. 186). The final rule was published in the *Federal Register* and was effective on September 25, 2018.

⁴ 84 FR 47889-47893 (Vol. 84, No. 176). The final rule was published in the *Federal Register* on September 11, 2019 and was effective on October 11, 2019.

- Retain the I&M program in the following 19 counties: Alamance, Buncombe, Cabarrus, Cumberland, Davidson, Durham, Forsyth, Franklin, Gaston, Guilford, Iredell, Johnston, Lincoln, Mecklenburg, New Hanover, Randolph, Rowan, Union, and Wake.

The EPA's approval of this request would provide significant economic relief to North Carolina vehicle owners exempted from annual emissions inspections in Lee, Onslow, and Rockingham Counties.

The following sections provide a summary of the air quality standards and implementation requirements with which this CAA Section 110(l) noninterference demonstration must comply in order for EPA to approve the revisions requested.

3.1 Current National Ambient Air Quality Standards (NAAQS) and Designation Status

Table 1 shows the most current air quality standards for the six criteria air pollutants and North Carolina's designation status with respect to each standard. North Carolina adopts the NAAQS into its air quality rules as authorized under Article 21B of Chapter 143-215.107 of the NCGS.

The pollutants that need to be reviewed are NO₂, CO, NO_x, and VOCs. Nitrogen oxides refer to nitric oxide (NO) and NO₂. Since NO_x includes NO₂, NO₂ does not need to be reviewed separately. Pollution control systems for light-duty gasoline vehicles subject to the I&M program are not designed to reduce emissions of PM_{2.5}, SO₂, or lead; therefore, removing counties from the program is not expected to have any impact on ambient concentrations of these pollutants.

North Carolina's I&M program has been approved into the SIP to attain and maintain the ozone and CO NAAQS. In order to remove a county from the I&M program, North Carolina must submit to EPA for approval a demonstration that any emissions increases associated with removing such county would not hinder any area from attaining and/or maintaining compliance with all the NAAQS. For counties that are in attainment with all the NAAQS, the noninterference demonstration would rely on ambient air quality monitoring data and emissions data to show that changing the program for the counties will not interfere with continued attainment of the NAAQS. For any area that is designated as not attaining the NAAQS, the SIP would have to be revised to include compensating or equivalent emissions reductions to offset increased emissions due to the I&M program change for the nonattainment area. However, since

North Carolina is attaining the NAAQS for all of the criteria air pollutants, this requirement does not apply.

Table 1. Current National Ambient Air Quality Standards and Designation Status

Pollutant	Year Adopted by EPA	Primary / Secondary NAAQS	Averaging Time	Level ¹	Designation Status
Ozone	2008	Primary and secondary	8-hour	75 ppb	Attainment Statewide
Ozone	2015	Primary and secondary	8-hour	70 ppb	Attainment Statewide
CO	2011	Primary	1-hour 8-hour	35 ppm 9 ppm	Attainment Statewide
Lead	2008	Primary and secondary	Rolling 3 month average	0.15 µg/m ³	Attainment Statewide
NO ₂	2010	Primary	1-hour	100 ppb	Attainment Statewide
		Primary and secondary	Annual	53 ppb	Attainment Statewide
PM _{2.5}	2012	Primary	Annual	12 µg/m ³	Attainment Statewide
		Secondary		15 µg/m ³	
		Primary and secondary	24-hour	35 µg/m ³	Attainment Statewide
PM ₁₀	2012	Primary and secondary	24-hour	150 µg/m ³	Attainment Statewide
SO ₂	2010	Primary	1-hour	75 ppb	Attainment/Unclassifiable ²
		Secondary	3-hour	0.5 ppm	Attainment Statewide

¹ ppm = parts per million, ppb = parts per billion, µg/m³ = micrograms per cubic meter.

² On Dec. 21, 2017, EPA designated the vast majority of North Carolina as “attainment/unclassifiable” (83 FR 1098, January 9, 2018) as a part of its Round 3 designation action under the Data Requirements Rule. Brunswick County was designated “Unclassifiable” on July 12, 2016 as part of EPA’s Round 2 action (81 FR 45039). For calendar years 2017 through 2019, North Carolina completed source-oriented monitoring for three facilities (one each in Limestone Township in Buncombe County, Cunningham Township in Person County, and Beaverdam Township in Haywood County). The EPA will use the monitoring results along with emissions and other data to complete its final Round 4 designations by December 31, 2020, for each of the three remaining Townships.

3.2 Ozone Sensitivity in North Carolina

It is important to note that North Carolina is considered “NOx limited” with respect to ozone formation. A study published in the *Journal of Environmental Management* concluded that the sensitivity of ozone to anthropogenic VOC emissions in the Southeastern United States is 2-3 orders of magnitude smaller than the sensitivity of ozone to NOx emissions, primarily due to the abundance of biogenic VOC emissions in this region.⁵ The study also evaluates the change in ozone concentrations resulting from decreases in anthropogenic VOC emissions and indicates

⁵ Odman, M Talat et al., *Quantifying the sources of ozone, fine particulate matter, and regional haze in the Southeastern United States*, 90 *Journal of Environmental Management* 3155-3168 (2009).

that the change in ozone concentrations resulting from a 30 percent decrease in anthropogenic VOC emissions is virtually zero in most cases. The study concludes that controlling anthropogenic VOC emissions in the Southeast is far less effective than controlling NO_x emissions for purposes of reducing ozone levels. In North Carolina, approximately 81 percent of statewide VOC emissions come from biogenic or natural sources, which cannot be controlled.⁶ Based on over 20 years of experience and scientific research, North Carolina's approach to controlling anthropogenic NO_x instead of anthropogenic VOC emissions has proven to be the most cost-effective method for reducing ozone even in the most highly urbanized areas of the State.

4.0 NONINTERFERENCE DEMONSTRATION FOR ELIMINATING LEE, ONSLOW, AND ROCKINGHAM COUNTIES FROM THE I&M PROGRAM

In the following sections, the DAQ presents the ambient monitoring and emissions data necessary to show that removing Lee, Onslow, and Rockingham Counties from the I&M program will not interfere with continued maintenance with all of the NAAQS. Section 4.1 presents the noninterference demonstration for the current 2015 8-hour ozone NAAQS. Section 4.2 presents the noninterference demonstration for the NO₂, CO, PM_{2.5}, SO₂, and lead NAAQS.

4.1 Noninterference with Ozone NAAQS

For each of the three counties, the study approach for ozone involved an analysis of daily NO_x and VOC emissions reductions associated with the program and the available ambient air quality monitoring data for ozone. The emissions data were used in conjunction with ambient monitoring data to evaluate whether removing the three counties from the I&M program would possibly interfere with continued maintenance with the NAAQS.

4.1.1 Compliance with the Current 8-Hour Ozone NAAQS

Attainment of the ozone NAAQS is demonstrated by monitoring ambient air ozone concentrations in areas required to be monitored by EPA (typically in and near large metropolitan areas). A monitoring location is considered in attainment if its DV is less than 71

⁶ Based on EPA's 2016v1 modeling platform, biogenic VOC emissions were 81 percent of total statewide VOC emissions in 2016. Reference: "all_2011v63_2014v71_2016v1_state_summary_21-Feb-2020.csv" downloaded on September 14, 2020, from EPA's FTP server at: <ftp://newftp.epa.gov/Air/emismod/2016/v1/reports/>.

ppb.⁷ On November 16, 2017, EPA designated the entire State of North Carolina “attainment/unclassifiable” for the 2015 8-hour ozone NAAQS (based on certified monitoring data for 2014-2016).⁸ North Carolina has continued to maintain compliance with the 2015 ozone standard through October 31, 2019.

For Lee, Onslow, and Rockingham Counties, Table 2 shows the attainment status with respect to the current and previous ozone NAAQS, available ozone monitoring data, total number of vehicle inspections conducted in 2019, and the total number of vehicles subject to the program as a percentage of all registered vehicles. The counties have not had a violation of the current and any of the previous 8-hour or 1-hour ozone NAAQS. For Rockingham County, the ozone DV for 2017-2019 is 63 ppb which is well below the 2015 standard of 70 ppb. Although Lee and Onslow Counties do not currently have an ambient ozone monitor, EPA has determined that there is sufficient evidence to demonstrate compliance with the ozone NAAQS. The 2015-2017 ozone DV for Lee County was 61 ppb. As shown in Figure 1, Rockingham, Lee, and Onslow Counties are surrounded by counties with ozone measurement data well below the 70 ppb ozone NAAQS. This is in sharp contrast to the ambient air quality data when the vehicle I&M program was expanded to 48 counties pursuant to Session Law 1999-328. At that time, two-thirds of the state’s ozone monitors were violating the federal ozone standard.

Table 2. Counties to Remove from North Carolina’s I&M Program

County	Ozone NAAQS	Previous Designation Status	Ozone DV, ppb (2017-2019)	Total No. Vehicle Inspections in 2019**	Total I&M Vehicles (Model Years 2001-2017) as a Percentage of All Registered Vehicles***
Lee	1997, 2008, and 2015 8-hour and 1979 1-hour	Attainment / Unclassifiable	61*	43,959	90
Onslow			Not available	102,844	76
Rockingham			63	62,824	80

* Design value is from 2015-2017, which is the last valid DV available for Lee County before the Blackstone monitor was shut down in 2018 as approved by EPA in the DAQ’s 2018-2019 Monitoring Network Plan. This monitoring site was established to acquire background air quality before the start of shale gas extraction in the Sanford area. As of May 2017, the US Energy Information Administration did not list an oil or natural gas reserves in North Carolina. Without oil or natural gas reserves, there was no indication that shale gas extraction would occur in the area. Since the monitor had fulfilled its purpose of measuring background air quality, the monitor was shut down in July 2018.

** 2019 is the most recent year for which vehicle registration data were available at the time this Section 110(l) was prepared.

*** In 2020, the model years subject to the I&M program are 2001-2017. The total number of vehicles subject to the I&M program was divided by the total number of registered vehicles as of January 2020.

⁷ An ozone design value is the average of the 4th highest ozone measurements for each year of a three consecutive year period.

⁸ *Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards (NAAQS)*, Final Rule, 82 FR 54232, November 16, 2017. This final rule was effective on January 16, 2018.

4.1.2 Emissions Inventory

The EPA requires that the year of the inventory for this noninterference demonstration be prepared for a year that is plus or minus one year of the year in which the SIP revision is implemented by North Carolina after EPA approval. The DAQ selected 2022 for the inventory year to provide flexibility in case the SIP revision cannot be implemented until 2022.

For Lee, Onslow, and Rockingham Counties, ozone season day NO_x and VOC emissions were estimated for mobile (on-road and nonroad) and stationary (point and nonpoint) emissions sources. Emissions were estimated for all sectors to understand each sector's contribution to total emissions as well as the relative increase in total county-level emissions associated with removing each county from the I&M program. The DAQ utilized currently available EPA datasets from regional and national modeling efforts and the state's best understanding of 2022 emissions levels to examine emission trends and their impact on ozone formation.

For Lee, Onslow, and Rockingham Counties, Tables 3 and 4 display ozone season day anthropogenic NO_x and VOC emissions, respectively, for all sectors for 2022. As expected, the results show that removing each county from the I&M program increases emissions for only on-road vehicles. As shown in Table 3, Motor Vehicle Emission Simulator (MOVES2014b) emissions modeling results for 2022 show only slight increases in anthropogenic NO_x emissions for each county, ranging from 0.04 tons/day to 0.08 tons/day. The percent increase in total NO_x emissions for a county range from 0.9 percent to 1.7 percent. The total increase in NO_x emissions associated with removing all three counties from the I&M program in 2022 is about 0.18 tons/day or 1.3 percent of total manmade emissions (14.27 tons/day) for all three counties combined.

As shown in Table 4, in 2022, MOVES2014b emissions modeling results also show only slight increases in anthropogenic VOC emissions for each county, ranging from 0.05 tons/day to 0.10 tons/day. The percent increase in total VOC emissions for a county ranges from 0.7 percent to 1.2 percent. The total increase in VOC emissions associated with removing each county from the I&M program in 2022 is about 0.21 tons/day or 1.0 percent of total manmade emissions (21.16 tons/day). When biogenic VOC emissions from natural sources (average of 277.48 tons/day in July 2022 as estimated in the 2016v1 modeling platform) are added to the man-made emissions (21.16 tons/day), the actual VOC emissions increase is only about 0.07 percent

(0.21/298.64 tons/day x 100).⁹ The DAQ does not believe that the very small changes to VOC emissions will translate into measurable ground-level ozone concentrations changes in North Carolina. Consequently, maintenance of all the NAAQS is expected to be preserved.

Table 3. Total Anthropogenic NOx Emissions for 2022 for Lee, Onslow, and Rockingham Counties (tons/day)

County	On-road			Nonroad		Point		Area		Totals			
	I&M	No I&M	Emissions Increase	I&M	No I&M	I&M	No I&M	I&M	No I&M	I&M	No I&M	Emissions Increase	Percent Increase
Lee	1.40	1.44	0.04	0.54	0.54	0.12	0.12	0.46	0.46	2.52	2.56	0.04	1.6
Onslow	2.27	2.35	0.08	1.64	1.64	0.75	0.75	0.17	0.17	4.83	4.91	0.08	1.7
Rockingham	2.43	2.49	0.06	0.90	0.90	3.23	3.23	0.36	0.36	6.92	6.98	0.06	0.9
Totals	6.10	6.28	0.18	3.08	3.08	4.10	4.10	0.99	0.99	14.27	14.45	0.18	1.3

Table 4. Total Anthropogenic VOC Emissions for 2022 for Lee, Onslow, and Rockingham Counties (tons/day)

County	On-road			Nonroad		Point		Area		Totals			
	I&M	No I&M	Emissions Increase	I&M	No I&M	I&M	No I&M	I&M	No I&M	I&M	No I&M	Emissions Increase	Percent Increase
Lee	1.01	1.06	0.05	0.35	0.35	0.74	0.74	2.82	2.82	4.93	4.97	0.05	1.0
Onslow	1.92	2.02	0.10	1.32	1.32	0.49	0.49	4.36	4.36	8.09	8.19	0.10	1.2
Rockingham	1.86	1.92	0.06	0.54	0.54	1.47	1.47	4.27	4.27	8.14	8.20	0.06	0.7
Totals	4.79	5.00	0.21	2.21	2.21	2.70	2.70	11.45	11.45	21.16	21.36	0.21	1.0

The remainder of this section provides a summary of the methodologies applied to develop the emission inventories for each sector for 2022.

On-road Vehicles

The on-road mobile source inventory contains emissions from motor vehicles that are licensed to use public roads. On-road vehicles include passenger cars, motorcycles, and various classes of trucks and buses categorized according to vehicle weight and drive-cycle characteristics.

County-level July weekday NOx and VOC emissions were modeled using MOVES2014b. For Lee, Onslow, and Rockingham Counties, modeling was performed to generate emissions data; both with and without the program parameters in place for 2022 to quantify emissions increases

⁹ Biogenic VOC emissions were obtained from the 2016v1 Emissions Modeling Platform (downloaded from EPA's FTP site: ftp://newftp.epa.gov/Air/emismod/2016/v1/reports/county_monthly/; file name: "2016fh_county_monthly_report_CAPs_PEC_POC_06jan2020.xlsx"). The July 2023 VOC emissions for the Lee, Onslow, and Rockingham Counties were summed and divided by 31 days to estimate average July day emissions.

expected if the county is not subject to the program. The following summarizes key aspects of the on-road modeling framework; a detailed explanation is provided in Appendix A.

Pollutants Modeled:

- NO_x, VOC

Temporal Basis:

- MOVES2014b modeling runs were executed to model emissions for a typical ozone season workday (specifically a July weekday).

Temperature and Relative Humidity Year:

- 2022 average July 24-hour temperature and humidity profiles were modeled, based on data from the Automated Surface Observing System at the Fayetteville Regional Airport, Piedmont Triad International Airport, and Wilmington International Airport.

Inventory Year:

- 2022 was modeled (with and without the I&M program) for this study.
- For modeling runs that quantified the emissions reductions of the I&M program, the following I&M parameters were incorporated in the MOVES2014b model inputs, as per the latest approved North Carolina I&M SIP:
 - Compliance Rate: 96 percent
 - Waiver Rate: 5 percent
 - Inspection Frequency: Annual
 - Model years covered: 2003 – 2022
 - Exempted vehicles: 2020 – 2022 (latest 3 vehicle model years)

Nonroad Equipment and Vehicles

The nonroad mobile source inventory contains emissions from mobile equipment and vehicles that are not licensed to use public roads. Nonroad mobile source equipment covers a diverse set of items including lawn mowers, chain saws, tractors, all-terrain vehicles, forklifts, and construction equipment. Nonroad vehicles include freight and passenger railroads and commercial marine vessels (CMV). Appendix B documents the data sources, methods, and results used to develop ozone season day NO_x and VOC emission estimates for the nonroad mobile sources in 2022.

For nonroad equipment, ozone season day emissions of NO_x and VOC were estimated by running MOVES2014b in 2022. The EPA includes more than 80 different types of equipment in

the MOVES2014b Nonroad model that was used to estimate nonroad equipment emissions. To facilitate analysis and reporting, EPA groups the equipment types into the following categories:

Agricultural equipment	Lawn and garden equipment, commercial
Commercial equipment	Logging equipment
Construction and mining equipment	Pleasure craft (recreational marine)
Industrial equipment	Railroad maintenance equipment
Lawn and garden equipment, residential	Recreational equipment

Additionally, the model estimates emissions for five different engine types: 2-stroke and 4-stroke spark ignition engines, diesel engines, liquid propane gas, and compressed natural gas fueled engines. Model runs were performed for each county. The model runs were developed for a typical July weekday. Default data were used for the input files used in the MOVES2014b Nonroad model. The MOVES RunSpec file (MRS) (wherein all the modeling variables are set) used in the MOVES2014b Nonroad model were tailored to reflect North Carolina-specific information. The resulting emissions from the MOVES2014b Nonroad model were totaled for each equipment category by county.

For freight and passenger railroads and CMV, month of July 2023 emissions were obtained from the EPA's 2016 Emissions Modeling Platform (2016v1).¹⁰ The 2016v1 platform underwent extensive reviews and, for this reason, are considered to be the most comprehensive and accurate future year emission inventories for the railroad and CMV sectors available at the time that the inventory for this noninterference demonstration was prepared. July 2023 NOx and VOC emissions from the 2016v1 platform inventory were divided by 31 days to estimate average ozone season day emissions in 2022. The DAQ believes that dividing these July emissions by 31 days provides a reasonable estimate of typical ozone season day nonroad vehicle emissions in year 2022.

Stationary Point Sources

The point source inventory consists of emissions from individual facilities (point sources), airports, rail yards, wildfires, and prescribed fires. Industrial or commercial facilities with equipment that emits air pollutants are generally classified as point sources by air quality regulatory programs and are typically required to have permits issued by the DAQ and the three local programs located in Buncombe, Forsyth, and Mecklenburg Counties. A subcategory of

¹⁰ U.S. Environmental Protection Agency, "Air Emissions Modeling, 2016v1 Platform," available from <https://www.epa.gov/air-emissions-modeling/2016v1-platform>, accessed October 2019. Nonroad vehicle emissions were specifically obtained from the following EPA ftp weblink: ftp://newftp.epa.gov/Air/emismod/2016/v1/reports/all_2011v63_2014v71_2016v1_county_summary_09-Oct-2019.zip.

these permitted sources are combustion sources such as boilers and turbines that generate electricity for sale on the electric grid. Emissions for these electricity generating units (EGUs) are developed separately from the other point sources due to differences in how they operate compared to industrial and commercial sources. These two categories of point sources are referred to as “EGUs” and “non-EGU point.”

Airports or rail yards are not required to have air quality permits for construction and operations (although they could have equipment such as a boiler or generator that requires a permit). They have fixed and known locations and their emissions quantities can be comparable to industrial sources, therefore, EPA includes these sources in the point source inventory even though they are traditionally considered nonroad mobile sources. In addition, EPA includes wildfires and prescribed fires in the point source inventory because the extent of the fire-event activity is defined by geographic coordinates.

For all point source, the inventory approach was to use the most recent data available for representing 2022-year emissions. For all point sources except EGUs, 2023 was the closest year of emissions available from the 2016v1 National Emissions Inventory Collaborative platform.¹¹ The 2016v1 National Emissions Inventory Collaborative platform was created from a collaboration between more than 245 employees of state and regional air agencies, the EPA, and Federal Land Management agencies utilizing the most up-to-date modeling and data sources.¹² The platform is considered to provide the most comprehensive and accurate inventories available at the time that this noninterference demonstration was prepared.

For EGUs that combust fossil, biomass or mixed fuel, and are greater than 25 megawatts in generating capacity, the DAQ first compiled 2023 NO_x emissions projections from the Eastern Regional Technical Advisory Committee (ERTAC) EGU Emission Projection Tool Version v16.1 (based off of 2016 base year emissions). The DAQ then downloaded 2016 daily NO_x emissions for the month of July from EPA’s Air Markets Program Division (AMPD) and counted the number of days each unit operated in July 2016.¹³ The 2023 daily average NO_x emissions were calculated for each EGU by dividing the July 2023 ERTAC v16.1 projected emissions by the number of days the unit operated in July of 2016. The 2023 daily average VOC emissions were calculated for each EGU by dividing the total 2023 ERTAC v16.1 projected

¹¹ 2016 National Emissions Inventory Collaborative platform, version 1, which can be downloaded from <ftp://newftp.epa.gov/Air/emismod/2016/v1/>

¹² Inventory Collaborative 2016v1 Emissions Modeling Platform Wiki website: <http://views.cira.colostate.edu/wiki/wiki/10202>

¹³ EPA Air Markets Program Data, 2016 July Daily NO_x Emissions for North Carolina, <https://ampd.epa.gov/ampd/>.

annual emissions by 365 days. The DAQ believes that dividing annual VOC emissions by 365 days per year provides a reasonable estimate of typical ozone season day VOC emissions since the affected units operate consistently across the year. Appendix C details the data sources, methods, and results used to develop ozone season day NOx and VOC emission estimates for the point source categories for 2022.

Stationary Nonpoint (Area) Sources

Area sources represent a collection of many small, stationary sources of air pollution emissions within a specified geographical area that individually emit less than the minimum emission levels prescribed for point sources. Because these sources are too small and/or too numerous to be surveyed and characterized individually, all area source activities are collectively estimated. The county is the geographic area for which emissions from area sources are compiled, primarily because counties are the smallest areas for which data used for estimating emissions is readily available. The following sections explain the methodology for developing typical ozone season day emissions for area sources.

The 2022 area source emissions inventory is based on 2023 projected emissions from Version 1 of the EPA's 2016 2016v1 Emissions Modeling Platform.¹⁴ The 2023 emissions are deemed representative of 2022-year conditions given the uncertainties associated with projecting area source emissions. The 2016v1 modeling platform has undergone extensive reviews and, for this reason, is considered to be the most comprehensive and accurate emissions data available at the time that the inventory for this noninterference demonstration was prepared. The July NOx and VOC emissions from the 2016v1 modeling platform were divided by 31 days to estimate ozone season day emissions. The DAQ believes that average July day area source emissions provide a reasonable estimate of typical ozone season day area source emissions. Appendix D documents the methods and procedures applied to estimate emissions for the nonpoint (area) source categories.

¹⁴ U.S. Environmental Protection Agency, "Air Emissions Modeling, 2016v1 Platform," available from <https://www.epa.gov/air-emissions-modeling/2016v1-platform>, accessed June 2020.

4.1.3 North Carolina’s Obligations under the NOx SIP Call Regarding the Proposed Changes to Remove Lee, Onslow, and Rockingham Counties from the State’s Vehicle Emissions I&M Program

On August 7, 2002, North Carolina submitted NC-104 to the EPA as a component of its response to the NOx SIP call requirements. The rule revisions expanded the I&M program from 9 to 48 counties pursuant to North Carolina Session Law 1999-328, Section 3.1(d) and incorporated the on-board diagnostics (OBD) testing procedure. The addition of 39 counties to the I&M program pursuant to Section 3.1(d) of the Session Law was initially ratified to satisfy the 1997 8-hour ozone NAAQS (80 FR 6455). However, the expanded I&M program coverage area was included in the SIP submittal alongside the newly-adopted OBD testing procedures to support the establishment of credits for North Carolina’s NOx budget and trading program. On October 30, 2002, the EPA approved the I&M rule revisions and North Carolina’s use of the I&M credits for the NOx SIP call budget and trading program (67 FR 66056). The ozone season I&M NOx emissions credits were 914 tons in 2004; 2,078 tons in 2006; and 4,385 tons in 2007 and beyond.¹⁵ These credits were used at the beginning of the program until the affected stationary sources could install and operate controls needed to meet their emissions allowances.

On November 19, 2008, North Carolina submitted NC-137 to repeal several NOx SIP call provisions as a component of its response to the Clean Air Interstate Rule (CAIR). This action was conducted by the state since the EPA no longer operated a separate banking and trading program for NOx SIP call sources when the CAIR program started on January 1, 2009. On May 9, 2013, the EPA approved North Carolina’s request to remove its NOx SIP banking and trading program rules from its SIP (78 FR 27065). Elements of the NOx SIP call that were not carried forward into the CAIR ozone season trading program, such as the I&M credits, remained in effect.

North Carolina’s obligations under the NOx SIP call are not affected by any emissions increases associated with the proposed changes to the vehicle I&M program pursuant to Session Law 2020-5. The DAQ considered the combined impacts of removing Lee, Onslow, and Rockingham Counties from North Carolina’s I&M program, as specified by the Session Law 2020-5. As a follow-up to its July 11, 2018, letter to the EPA, the DAQ concludes that the proposed changes

¹⁵ For 2004, the ozone season ran from June 1 through Sept. 30. For subsequent years, the ozone season ran from May 1 through Sept. 30.

to North Carolina’s I&M program do not impact NC’s obligations under the NOx SIP Call for the following reasons:¹⁶

- The NOx trading program that made use of the I&M allowances was repealed and replaced with the Clean Air Interstate Rule (CAIR). Therefore, the I&M credits were not used to meet North Carolina’s previous obligations under CAIR or current obligations under Phase I or II of the Cross-State Air Pollution Rule (CSAPR).
- The EGU sector has achieved actual ozone season emissions reductions in 2007 and 2019 that more than offset the increase in ozone season NOx emissions associated with the proposed changes to the I&M program, which eliminates the need for the I&M credits to comply with North Carolina’s obligations under the NOx SIP call.
- State legislation such as the Clean Smokestacks Act (CSA) and economic drivers such as natural gas prices and renewable energy investments have significantly reduced ozone season NOx emissions below the original NOx SIP call budgets for EGUs.¹⁷ This point is illustrated in Table 5, which compares the EGU NOx SIP call budget to actual emissions in 2007, 2017, 2018, and 2019. Actual EGU emissions in 2007, 2017, 2018 and 2019 were 23 percent, 60 percent, 59 percent, and 59 percent, respectively, below the NOx SIP call budget, respectively.

Table 5. Comparison of Ozone Season (May 1 through Sept. 30) NOx SIP Call Budget to Actual Emissions for EGUs

EGUs	2007	2017	2018	2019
NOx SIP Call Budget (tons/ozone season)	31,451	31,451	31,451	31,451
Actual Emissions (tons/ozone season)	24,177	12,545	13,046	12,989
Below Budget (tons/ozone season)	7,274	18,906	18,405	18,462
Below Budget (Percent)	23%	60%	59%	59%

¹⁶ July 11, 2018, letter from the DAQ to EPA titled, “North Carolina’s Obligations under the NOx SIP Call Regarding Proposed Changes to the State’s Vehicle Emissions I&M Program.” The purpose of this letter was to support why the DAQ believes that the state’s obligations under the NOx SIP call were not affected by any emissions increases associated with the proposed changes to the I&M program pursuant to Session Law 2017-10.

¹⁷ In June 2002, the North Carolina General Assembly enacted the CSA, which required that coal-fired power plants in North Carolina reduce annual NOx emissions by 77 percent by 2009. These power plants were also required to reduce annual SO₂ emissions by 49 percent by 2009 and 73 percent by 2013. The utilities have reduced NOx emissions by 89 percent and SO₂ emissions by 97 percent relative to 1998 emissions levels. With the requirement to meet annual emissions caps and disallowing the purchase of NOx credits to meet the caps, the CSA reduced NOx emissions beyond the requirements of the NOx SIP call even though the CSA did not limit emissions only during the ozone season. The CSA emissions caps were submitted to EPA for adoption into the SIP in August 2009 and were subsequently approved in September 2011 (76 FR 59250-59252; Vol. 76, No. 186). These regulations are both state and federally enforceable.

- Modeling results show that NOx emissions remain below the NOx SIP call budgets after emissions increases from this proposed I&M program revision and two prior revisions. The DAQ used the EPA MOVES2014b model to estimate the increases in on-road mobile source NOx emissions resulting from changes to the I&M program. The removal of 26 counties from the program in 2018 resulted in an estimated increase of 611 tons of NOx over the ozone season.¹⁸ The DAQ also estimated that the 2018 ozone season NOx emissions increases from the vehicle model year coverage SIP revision to be 311 tons in the 22 counties remaining in the I&M program.¹⁹ The DAQ estimates that NOx emissions increases from removing Lee, Onslow, and Rockingham Counties pursuant to Session Law 2020-5 will be 28 tons over the 2022 ozone season. Together, total ozone season NOx emissions are estimated to increase by 950 tons. In 2019, EGU emissions were 18,462 tons (59 percent) below the NOx SIP call budget for EGUs. As shown in Table 6, the proposed changes to the I&M program would lower the EGU reduction by 5.15 percent to 17,512 tons.

Table 6. Impact of NOx Emissions Increases due to Proposed Changes to the I&M Program on EGU Reductions and NOx SIP Call I&M Credits

Ozone Season NOx Emissions Increases from I&M Program Revisions	
Removed 26 Counties from Program (2018 tons/ozone season)	611
Revised Model Year Coverage for 22 Counties (2018 tons/ozone season)	311
Removed 3 Counties (2022 tons/ozone season)	28
Total I&M Increase (tons/ozone season)	950
EGU Emissions Reduction in 2019 (from Table 5) (tons/ozone season)	18,462
EGU Emissions Reduction in 2019 minus I&M Increase (tons/ozone season)	17,512

¹⁸ On November 17, 2017, (NC-204), the DAQ submitted a SIP revision to remove 26 counties from North Carolina's expanded I&M program, which was previously approved into the SIP for use as a component of the State's NOx Budget and Allowance Trading Program. The EPA published a Final Rule (83 FR 48383-48384; Vol. 83, No. 186) approving the SIP revision on September 25, 2018, with an effective date of September 25, 2018.

¹⁹ On July 25, 2018, (NC-214), the DAQ submitted a SIP revision to revise the model year coverage for counties subject to North Carolina's expanded I&M program pursuant to 2017-10, Section 3.5.(b). The EPA published a Final Rule (84 FR 47889-47893; Vol. 84, No. 176) approving the SIP revision on September 11, 2019, with an effective date of October 11, 2019.

4.2 Noninterference with the Nitrogen Dioxide, Carbon Monoxide, Particulate Matter, Sulfur Dioxide, and Lead NAAQS

This section summarizes North Carolina's status with respect to the NO₂, CO, PM_{2.5}, SO₂, and lead NAAQS and explains why removing Lee, Onslow, and Rockingham Counties from the I&M program will not interfere with maintaining compliance with the NAAQS in both counties or adjacent counties.

4.2.1 Nitrogen Dioxide (NO₂)

The 2010 1-hour NO₂ NAAQS is set at 100 ppb, based on the 3-year average of the 98th percentile of the yearly distribution of 1-hour daily maximum concentrations. The annual standard of 53 ppb is based on the annual mean concentration.

North Carolina has always been in compliance with the NO₂ standards. To date, two near-road NO₂ monitors have been established in North Carolina, one in the Raleigh/Durham area in January 2014 and the other in the Charlotte area in June 2014.²⁰ There are also two area-wide monitors in North Carolina, one in each of the two aforementioned areas, and one monitor representing susceptible and vulnerable populations in the Winston-Salem area. Currently, all NO₂ monitors in the state are measuring well below the annual and 1-hour standards. Table 7 summarizes the annual and 1-hour NO₂ DVs for the near-road and area-wide monitors in the Charlotte and Raleigh areas.

MOVES2014b emissions modeling results show only slight increases in NO_x emissions for each county, ranging from 0.04 ton/day (Lee County) to 0.08 ton/day (Onslow County) in 2022. Based upon these emissions estimates and the fact that North Carolina is well below the annual and 1-hour NO₂ standards statewide, the DAQ concludes that slight increase in NO₂ emissions will not interfere with continued attainment of the annual and 1-hour NO₂ standards.

²⁰ A second near-road monitor was required in 2019 for the Charlotte area since the population exceeds 2.5 million people. As soon as practical and after EPA funding becomes available, Mecklenburg County Air Quality will work to install and operate an additional near-road NO₂ monitoring station.

Table 7. Summary of Design Values (DVs) in the Charlotte, Winston-Salem and Raleigh Metropolitan Statistical Areas for the Annual and 1-Hour NO₂ NAAQS

Annual NO₂ NAAQS DVs (Based on Certified Monitoring Data for 2019)		
Location	Near-Road	Area-Wide
Charlotte	11 ppb (21% of the NAAQS)	7 ppb (13% of the NAAQS)
Raleigh	9 ppb (17% of the NAAQS)	5 ppb (9% of the NAAQS)
Winston-Salem	Not applicable	7 ppb (13% of the NAAQS)

1-Hour NO₂ NAAQS DVs (Based on Certified Monitoring Data for 2017 - 2019)		
Location	Near-Road	Area-Wide
Charlotte	37 ppb (37% of the NAAQS)	38 ppb (38% of the NAAQS)*
Raleigh	34 ppb (34% of the NAAQS)	35 ppb (35% of the NAAQS)
Winston-Salem	Not applicable	36 ppb (36% of the NAAQS)

* For 2018 and 2019, the area-wide monitor in the Charlotte metropolitan statistical area had a DV of 38 and 37 ppb, respectively; however, the monitoring data were incomplete since both years were missing a calendar quarter. As a result, the 2018 and 2019 DVs were deemed invalid. Therefore, certified 2017 data with a DV of 38 ppb is reflected for the area-wide monitor in the Charlotte metropolitan statistical area.

4.2.2 Carbon Monoxide (CO)

The primary NAAQS for CO include (1) an 8-hour standard of 9.0 parts per million (ppm), measured using the annual second-highest 8-hour concentration for two consecutive years as the DV; and (2) a 1-hour average of 35 ppm, using the second-highest 1-hour average within a given year. The EPA adopted these standards in 1971 and has retained the standards without any changes since its last review in 2011.²¹ Neither Lee, Onslow, nor Rockingham Counties have ever been designated nonattainment for the CO standards. Although four counties (Durham, Forsyth, Mecklenburg, and Wake) were designated nonattainment for the CO standards over 20 years ago, the EPA approved an attainment/maintenance SIP for Forsyth County on September 21, 1994, while also subsequently approving an attainment/maintenance SIP for Durham, Mecklenburg, and Wake Counties on August 2, 1995.^{22, 23}

The entire State of North Carolina has been in compliance with the CO standards for over 20 years and current ambient air quality levels for CO are less than 20 percent of the standard.

²¹ See EPA's "Table of Historical Carbon Monoxide (CO) National Ambient Air Quality Standards (NAAQS)," <https://www.epa.gov/co-pollution/table-historical-carbon-monoxide-co-national-ambient-air-quality-standards-naaqs>.

²² 59 FR 48399-48402 (Vol. 59, No. 182).

²³ 60 FR 39258-39263 (Vol. 60, No. 148).

Currently, EPA’s emphasis is on monitoring CO only at national core (NCore) and near-road monitoring stations in metropolitan statistical areas with over one million people. Thus, North Carolina currently monitors for CO only in the Charlotte and Raleigh metropolitan areas. Ambient monitoring data in 2019 for the counties with monitors (i.e., Mecklenburg and Wake) show an 8-hour DV of 1.4 ppm or less, or about 13 percent of the 9 ppm standard. Additionally, ambient monitoring data in 2019 for the two counties with monitors show a 1-hour DV of 1.7 ppm or less, or about 5 percent of the 35 ppm standard. To date, two near-road CO monitors have been established in North Carolina, one in the Raleigh area in December 2016 and the other in the Charlotte area in January 2017.

On-road mobile emissions are known to be a large component of overall CO emissions. However, MOVES2014b mobile emissions modeling results show only slight increases in CO emissions for the three counties (1.4 tons/day for Lee County, 2.7 tons/day for Onslow County, and 1.6 tons/day for Rockingham County) in 2022. This projected increase in CO emissions is comparatively minimal and it is expected that the effect on ambient CO concentrations will be correspondingly minimal as well. Therefore, there is no expectation or concern that this change in CO emissions will interfere with continued attainment with the CO NAAQS in any of the counties or adjacent counties.

4.2.3 Particulate Matter (PM_{2.5}), Sulfur Dioxide (SO₂), and Lead

The 2012 24-hour PM_{2.5} NAAQS is set at 35 micrograms per cubic meter (µg/m³) and annual PM_{2.5} NAAQS is set at 12 µg/m³. In 2014, EPA’s Administrator determined that, “no area within North Carolina violates the 2012 standard or contributes to a nearby violation of the standard.”²⁴

For large SO₂ sources subject to the SO₂ Data Requirements Rule, North Carolina is on track to demonstrate compliance through modeling or monitoring.²⁵ Brunswick County was designated “unclassifiable” on July 12, 2016, as part of the EPA’s Round 2 action. Subsequently, on December 31, 2017, EPA designated the vast majority of the state as “attainment/unclassifiable” as part of its Round 3 designation. North Carolina has conducted source-oriented monitoring for

²⁴ See EPA Administrator Gina McCarthy’s designation letter to Governor Patrick McCrory dated December 18, 2014: https://files.nc.gov/ncdeq/Air%20Quality/planning/attainment/PM25_Nonattainment_Areas/EPA_PM25_Designations_12182014.pdf.

²⁵ Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide (SO₂) Primary National Ambient Air Quality Standard (NAAQS), Final Rule, 80 FR 51052, August 21, 2015 (<https://www.govinfo.gov/content/pkg/FR-2015-08-21/pdf/2015-20367.pdf>).

three facilities in Buncombe, Haywood, and Person Counties, and EPA will use the monitoring data results (for 2017 – 2019) along with emissions and other data to complete its final Round 4 action by December 31, 2020. All of the remaining areas are recommended by the DAQ to be designated as “attainment/unclassifiable.”

The 2008 lead NAAQS is set at 0.15 µg/m³, measured as a 3-month rolling average. On November 8, 2011, EPA designated the entire State of North Carolina as “attainment/unclassifiable” with the standard. In October 2016, EPA completed its review of the 2008 standard and decided to retain the 2008 standard without any changes. North Carolina’s ambient lead levels since the 2008 standard was adopted have remained, and are expected to remain, well below the standard. As explained in *North Carolina’s 2020-2021 Annual Monitoring Network Plan*, the state no longer is required to monitor for lead under EPA monitoring criteria.²⁶

MOVES2014b modeling results indicate that removing Lee, Onslow, and Rockingham Counties from the I&M program would not increase direct PM_{2.5}, SO₂, and lead emissions. This is because pollution control systems for light-duty gasoline vehicles subject to the I&M program are not designed to reduce emissions for these pollutants; therefore, removing counties from the I&M program is not expected to have any impact on ambient concentrations of these pollutants.

5.0 CONCLUSIONS

The DAQ recommends removing Lee, Onslow, and Rockingham Counties from North Carolina I&M SIP for the reasons cited in Sections 5.1 and 5.2.

5.1 Emissions and Program Benefits Decline Over Time

In 2022, the DAQ estimates that removing Lee, Onslow, and Rockingham Counties from the I&M program will increase NO_x and VOC emissions ≤0.08 ton/day and ≤0.10 ton/day, respectively, in each county (see Table 3). As shown in Table 8, for all three counties combined, NO_x and VOC emissions would increase by 0.18 ton/day (0.19 percent) and 0.21 ton/day (0.27 percent), respectively, representing a small overall increase in emissions associated with the operation of light-duty gasoline vehicles currently subject to the I&M program in the three counties. The small increase in emissions is not expected to translate into measurable ground-level ozone concentration changes in North Carolina; therefore, maintaining the 2015 and 2008

²⁶ North Carolina's 2020-2021 Annual Monitoring Network Plan for the North Carolina Division of Air Quality, Volume 1, Network Descriptions, July 2, 2020.

8-hour ozone NAAQS as well as the NAAQS for all other pollutants in Lee, Onslow, and Rockingham Counties or their adjacent counties is expected to be preserved.

Table 8. Summary of On-Road NOx and VOC Emissions Increases Associated with Removing Lee, Onslow, and Rockingham Counties from the I&M Program

	NOx Emissions in 2022	VOC Emissions in 2022
Total On-road Emissions for 22 Counties in the Current I&M Program (tons/day)	97.07	77.43
Total On-road Emissions after Removing 3 of 22 Counties from I&M Program (tons/day)	97.25	77.64
On-road Emissions Increase (tons/day)	0.18	0.21
Percent Increase: On-road only	0.19%	0.27%

One important factor to note is that nationally, NOx emission benefits associated with the I&M program have declined over time. As illustrated in Table 9, the benefits of the I&M program decline from 2014 through 2022 for Lee, Onslow, and Rockingham Counties. In 2016, the program benefit for the counties was 0.66 tons/day or 6.7 percent. By 2018, the I&M program benefit declined to 0.47 tons/day or 6.6 percent since the fleet of gasoline vehicles subject to the I&M program becomes cleaner (newer low-emitting vehicles are replacing older higher-emitting vehicles), and the emissions controls on these vehicles are more technologically advanced - thus lasting longer and less prone to malfunctions or failures - the emissions reductions due to the inspections continues to diminish over time. Additionally, cars are becoming even cleaner as new federal fuel and engine standards (Tier 3) began in 2017. These federal Tier 3 standards will result in significant emissions reductions from these newer vehicles, thus lowering the potential benefits of an I&M program. With the proposed changes, the I&M program benefit declines to 0.18 tons/day or 2.9 percent in 2022.

Table 9. I&M Related Emissions Benefits for Lee, Onslow, and Rockingham Counties Under the Current and Proposed Program

	2014	2016	2018	2022
On-road NOx Emissions With I&M Program (tons/day)	11.43	9.23	6.67	6.10
On-road NOx Emissions Without I&M Program (tons/day)	-	9.89	7.14	6.28
Reduction in NOx Emissions Due to the I&M Program or Program Benefit (tons/day)	-	0.66	0.47	0.18
Percent NOx Reductions	-	6.7%	6.6%	2.9%

5.2 Air Quality has Improved – No Violating Ozone Monitors

Another important factor is current air quality levels in the I&M counties. Great improvements have been realized in North Carolina over the last decade in both ozone and fine particle concentrations. On November 6, 2017, EPA designated the entire State of North Carolina “attainment/unclassifiable” for the 2015 8-hour ozone NAAQS (based on certified monitoring data for 2014-2016).²⁷ Subsequently, through October 31, 2019, North Carolina has not had a single ozone air quality monitor violate the 2015 8-hour ozone standard. For the 22 counties currently with a vehicle I&M program, ozone DVs for 2017-2019 range from a low of 59 ppb for Carteret and New Hanover Counties to a high of 70 ppb for Mecklenburg County (see Figure 1). One of the three counties proposed for removal from the I&M program has an ambient ozone monitor (Rockingham County). The Rockingham County monitor shows an ozone DV at 63 ppb based on certified monitoring data for 2017 - 2019. There has never been a need to site an ozone monitor in Onslow County based on EPA monitoring requirements.²⁸ However, the adjacent counties (Carteret and New Hanover) have monitors showing ozone DVs at 59 ppb based on certified monitoring data for 2017 - 2019. Also, the State operated an ozone monitor in Lee County from November 1, 2013, until July 31, 2018. The 2015-2017 DV for this monitor was 61 ppb. (For comparison, the DV at the Rockingham monitor for the same time period was 65 ppb). This is in sharp contrast to the air quality conditions when the vehicle I&M program was expanded to 48 counties on January 1, 2006 (pursuant to Session Law 1999-328). At that time, two-thirds of the state’s monitors were violating the 2008 8-hour ozone standard (based on 2003 to 2005 design values). The DAQ estimates that removing Lee, Onslow, and Rockingham Counties from the I&M program will not interfere with the state’s ability to continue to attain and maintain all current air quality standards.

Modeling of on-road vehicle emissions using MOVES2014b shows that the I&M program only controls NO_x, VOC, and CO emissions; the program does not affect direct emissions of PM_{2.5}, SO₂, or lead. Based on the MOVES2014b modeling analyses, this review shows that although removing Lee, Onslow, and Rockingham Counties from the program will yield slight increases in total NO_x, VOC, and CO emissions for each county, the relatively small emissions reduction

²⁷ 82 FR 54232-54287 (Vol. 82, No. 220)

²⁸ The need for locating a monitor in a county is determined based on the monitoring objectives and general criteria listed in 40 CFR 58 Appendix D. These criteria include consideration of several factors including, but not limited to, the size of the geographic area and associated changes in population, emissions, meteorology, and air quality concerns; addition of a new or revisions to an existing NAAQS, and costs. The DAQ complies with these requirements on an on-going basis that are documented in its annual monitoring network plans that undergo public review and comment and subsequent approval by EPA and 5-year monitoring network assessments.

benefits of the program are no longer needed in the counties to maintain compliance with any of the NAAQS in North Carolina or its neighboring states.

For these reasons, the DAQ concludes that removing Lee, Onslow, and Rockingham Counties from North Carolina I&M SIP will not interfere with continued attainment or maintenance of any applicable NAAQS. With this submission, the North Carolina DAQ believes the requirements of Section 110(l) of the CAA relative to the proposed removal of Lee, Onslow, and Rockingham Counties from the I&M program have been met, and requests that EPA approve the proposed removal of Lee, Onslow, and Rockingham Counties from North Carolina's I&M SIP.