Oklahoma Demonstration of Compliance with the Good Neighbor Requirements of Clean Air Act Section 110(a)(2)(D)(i)(I) for the 2015 Ozone National Ambient Air Quality Standard

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Table of Contents

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1.0. Introduction

Sections 110(a)(1) and (2) of the Clean Air Act (CAA) require all states to adopt and submit to the Environmental Protection Agency (EPA) any necessary revisions to its State Implementation Plans (SIP) which provide for the implementation, maintenance, and enforcement of a new or revised National Ambient Air Quality Standard (NAAQS). Such revisions are commonly referred to as "infrastructure SIPs." The EPA revised the ozone NAAQS in October 2015 and completed the designation process to identify most nonattainment areas in April 2018, and finalized designations on July 25, 2018. The Oklahoma Department of Environmental Quality (DEQ) is submitting this document to satisfy the transport SIP requirements of CAA Section 110(a)(2)(D)(i)(I), which is commonly referred to as the "Good Neighbor" provision.

2.0. Request

CAA section 110(a)(2)(D)(i)(I) prohibits emissions from states that will contribute significantly to nonattainment or interfere with maintenance in any other state with respect to any primary or secondary NAAQS. However, EPA stated in the notice for the Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS ("2016 CSAPR Update"), that "… EPA does not view the obligation under the good neighbor provision as a requirement for upwind states to bear all of the burden for resolving downwind air quality problems. Rather, it is an obligation that upwind and downwind states share responsibility for addressing air quality problems. If, after implementation of reasonable emissions reductions by an upwind state, a downwind air quality problem persists, whether due to international emissions or emissions originating within the downwind state, the EPA can relieve the upwind state of the obligation to make additional reductions to address that air quality problem. But the statue does not absolve the upwind state of the obligation to make reasonable reductions in the first instance." [81 Fed. Reg. 74536, 26 Oct 2016]

The State of Oklahoma, through DEQ, is requesting the EPA to approve the *Oklahoma Demonstration of Compliance with the Good Neighbor Requirements of Clean Air Act Section 110(a)(2)(D)(i)(I) for the 2015 Ozone National Ambient Air Quality Standard* as a revision to the SIP. This revision supplements EPA's *Determination Regarding Good Neighbor Obligations for the 2008 Ozone National Ambient Air Quality Standard* proposal [83 Fed. Reg. 31915, 10 July 2018], in which EPA finds that the 2016 CSAPR Update fully addresses CAA section 110(a)(2)(D)(i)(I) (i.e., "Good Neighbor") requirements for Oklahoma.

3.0. Background

On October 26, 2015, EPA promulgated a revised NAAQS for ozone based on 8-hour average concentrations [80 Fed. Reg. 65292]. EPA revised the level of the 8-hour ozone NAAQS to 0.070 parts per million (ppm). EPA completed the designation process to identify nonattainment areas in April 2018; all areas of Oklahoma were designated as attainment/unclassifiable [83 Fed. Reg. 25825, 4 June 2018].

Pursuant to section 110(a) of the CAA, states are required to submit SIPs to provide for the implementation, maintenance, and enforcement of a new or revised NAAQS within three (3) years following the promulgation of such NAAQS, or within a shorter period as EPA may prescribe. More specifically, section 110(a)(1) provides the procedural and timing requirements for SIPs. Section

110(a)(2) lists specific elements that states must meet for ‘‘infrastructure’’ SIP requirements related to a newly established or revised NAAQS. These requirements include basic SIP elements such as requirements for monitoring, basic program requirements, and legal authority that are designed to assure attainment and maintenance of the NAAQS.

On January 28, 2015, DEQ submitted a plan to satisfy the requirements of section 110(a)(2) of the CAA for the 2008 ozone NAAQS. This submittal addressed the following infrastructure elements, or portions thereof: section 110(a)(2)(A), (B), (C), (D), (E), (F), (G), (H), (I), (J), (K), (L), and (M) of the CAA. On December 9, 2016, EPA approved the submittal [81 Fed. Reg. 89008]. DEQ did not make a submittal to address the transport portion, (§110(a)(2)(D)(i)(I)) of the Infrastructure SIP, and on July 13, 2015, [80 Fed. Reg. 39961], EPA made a *Finding of Failure To Submit a Section 110 State Implementation Plan for Interstate Transport for the 2008 National Ambient Air Quality Standards for Ozone* for 24 states, which included Oklahoma. This finding of failure to submit establish a 2-year deadline for EPA to promulgate a Federal Implementation Plan (FIP) to address the interstate transport SIP requirements pertaining to significant contribution to nonattainment and interference with maintenance unless, prior to EPA promulgating a FIP, the state submits, and the EPA approves, a SIP that meets these requirements.

On June 29, 2018, the EPA proposed [83 Fed. Reg. 31915, July 10, 2018] that the 2016 CSAPR Update [81 Fed. Reg. 74504, October 26, 2016] fully addresses 20 states’ interstate pollution transport obligations for the 2008 ozone NAAQS. The proposal relies on EPA’s latest data and modeling to assess air quality nonattainment and maintenance for the 2008 ozone NAAQS. This analysis found that there are projected to be no remaining nonattainment or maintenance receptors in the eastern United States by 2023. In accordance with this finding, EPA is proposing to determine that the 20 states covered by this proposal would not need to submit SIPs establishing additional control requirements beyond the 2016 CSAPR Update to address transported ozone and ozone precursors with respect to the 2008 ozone NAAQS. Also, EPA would have no obligation to establish additional control requirements for sources in these states.

4.0. Ozone

4.1. Formation

Ground-level ozone (O_3) is a gas that is not usually emitted directly into the air, but is a secondary pollutant formed by the reaction of oxides of nitrogen (NOx) and volatile organic compounds (VOCs) in the presence of sunlight. Many types of sources emit these precursor pollutants, including power plants and industrial facilities, on-road and off-road motor vehicles, engines, and small sources collectively referred to as area sources. Ozone is predominately a summertime pollutant; however, high ozone concentrations have been observed in cold months when snow on the ground reflects ultraviolet light so it makes a double pass through the atmosphere and provides more energy for the ozone formation reaction. Ozone and ozone precursors (NOx and VOCs) can be transported hundreds of miles.

4.2. Ozone Precursors – NOx and VOCs

The Good Neighbor provision of the CAA "provides both the states and the EPA with the flexibility to develop a remedy targeted at a particular air quality problem, including the flexibility to tailor the remedy to address the particular precursor pollutants and sources that would most effectively address the downwind air quality problem."[1] "In order to address the regional transport of ozone…., the EPA

[1] Response to December 9, 2013, Clean Air Act Section 176A Petition From Connecticut, Delaware, Maryland, Massachusetts, New Hampshire, New York, Pennsylvania, Rhode Island and Vermont, 82 Fed. Reg. 6516, 19 Jan 2017.

has promulgated four (4) regional interstate transport rules focusing on the reduction of NOx emissions, as the primary meaningful precursor to address regional ozone, from certain sources located in states in the eastern half of the U.S.[2]" The Ozone Transport Assessment Group's (OTAG) Regional and Urban Scale Modeling, and Air Quality Analysis Work Groups concluded, with which EPA agreed, "Regional NOx emissions reductions are effective in producing ozone benefits; the more NOx emissions reduced, the greater the benefit to air quality; and VOC controls are effective in reducing ozone locally and are most advantageous to urban nonattainment areas." The EPA concluded, "a regional strategy focusing on NOx reductions across a broad portion of the region will help mitigate the ozone problem in many areas of the East" [82 Fed. Reg. 6517, 19 Jan 2017].

4.3. EPA's Designation Process

On October 1, 2015, the EPA revised both the primary and secondary NAAQS for ozone to a level of 0.070 ppm; annual fourth-highest daily maximum 8-hour average concentration, averaged over 3 years [80 Fed. Reg. 65292, 26 Oct. 2015]. On November 6, 2017, EPA designated approximately 85% of the counties in the United States as attainment/unclassifiable with the 2015 ozone standard based on 2014 – 2016 design values [82 Fed. Reg. 54232]. EPA completed additional area designations for most of the remaining portions of the United States in accordance with the requirements of CAA section 107(d) on April 30, 2018, [83 Fed. Reg. 25825] and designated eight counties in the San Antonio area on July 25, 2018 [83 Fed. Reg. 35136]. All counties in Oklahoma were designated "unclassifiable/attainment" for the 2015 8-hour ozone NAAQS [82 Fed. Reg. 54232 and 83 Fed. Reg. 25825].

4.4. Transport Modeling

[2] Ibid

4.4.a. EPA

EPA has provided air quality modeling using a 2011-base platform to help states address the requirements of CAA section 110(a)(2)(D)(i)(I) for the 2015 ozone NAAQS. This modeling was provided in its *Notice of Availability of the Environmental Protection Agency's Preliminary Interstate Ozone Transport Modeling Data for the 2015 Ozone National Ambient Air Quality Standard* [82 Fed. Reg. 1733, 6 Jan. 2017].

4.4.b. Texas Commission on Environmental Quality (TCEQ)

TCEQ has developed modeling specifically to address the 2015 ozone standard Good Neighbor SIP requirements. The modeling results and reports can be found at http://www.deq.state.ok.us/aqdnew/rulesandplanning/o3isip2015/17039SIP_2015OzoneTransport_ado_backup.pdf.

One major way the TCEQ modeling differs from the EPA modeling is that TCEQ uses a 2012 base year instead of a 2011 base year. DEQ and TCEQ have both submitted comments on the unsuitability of meteorological data from the May through September 2011 episode for ozone modeling in response to several EPA ozone model updates. DEQ specifically submitted comments in response to the *Notice of Availability of the Environmental Protection Agency's Preliminary Interstate Ozone Transport Modeling Data for the 2015 Ozone National Ambient Air Quality Standard* [82 Fed. Reg. 1733, 6 Jan. 2017]. 2011 was a meteorologically anomalous year for Oklahoma and Texas. 2011 was the hottest year on record, and the single-worst drought year recorded in Texas since 1895. In Oklahoma, the 2011 ozone season was the warmest on record, with the five-month period from May to September showing a positive temperature departure from the 20th century mean of 5.3 ℉, and was the third driest period on record.

4.5 New Information and Analytical Approaches

On March 27, 2018, EPA issued a Memorandum from Peter Tsirigotis, EPA OAQPS, to Regional Air Division Directors, Regions 1-10, entitled *Information on the Interstate Transport State Implementation Plan Submission for the 2015 Ozone National Ambient Air Quality Standards under Clean Air Act Section 110(a)(2)(D)(i)(I)* ("Tsirigotis March 2018 Memo"). The Tsirigotis March 2018 Memo provided newly-available contribution modeling results, which are still based on the year 2011, along with a list of potential flexibilities in analytical approaches for developing good neighbor SIPs for the 2015 Ozone NAAQS.

Since EPA developed CSAPR, the original rule and subsequent update were based on EPA's modeling that used a screening threshold of one percent (1%) of the NAAQS to identify contributing upwind states warranting further review and analysis. EPA has acknowledged this threshold represents a policy choice, rather than a health-based threshold grounded in risk assessment. In essence, this threshold represents a compromise that allowed the responsibilities for upwind reductions to be spread over a sufficiently-large number of states so that no state would be unduly burdened (individually) with requirements for NOx reductions. Further, in the 2015 transport NODA,[3] the EPA acknowledged that a contribution of 1% of the NAAQS from an upwind state alone does not determine whether the upwind state significantly contributes to nonattainment or interferes with maintenance of a NAAQS to a downwind state. The 1% threshold represents a screening level and the magnitude of the reductions required were determined by a cost-effectiveness

[3] Notice of Availability of the Environmental Protection Agency's Preliminary Interstate Ozone Transport Modeling Data for the 2015 Ozone National Ambient Air Quality Standard (NAAQS), 82 Fed. Reg. 1740 (January 6, 2017).

analysis with modeling performed to confirm that the cost-effective reductions would have the desired result (attainment of the ozone NAAQS in all but a handful of downwind monitoring sites). It is entirely possible that estimated emissions reductions resulting from emission controls selected based on the cost-effectiveness analysis would be greater than that required to bring an upwind state below the 1% significance threshold and it is also possible that, after achieving the cost-effective reductions, a state's contributions could remain above the threshold. For the original CSAPR and 2016 CSAPR Update, the 1% threshold represented an effective policy choice that balanced the need to achieve reductions with cost and distributional concerns. This approach was especially well-suited to these rules, because the targeted sector (fossil-fueled Electricity Generating Units – EGUs) represented an especially target-rich environment for cost-effective NOx emission reductions. Many facilities (older coal-fired boilers, natural gas-fired turbines, etc.) were decades old and had not been equipped with simple, cost-effective technologies like low-NOx burners. In addition, the distribution of NOx allowances tipped the economic calculus in favor of dispatching newer, less-polluting units (e.g., combined-cycle turbines with selective catalytic reduction). Because the electric market is regional, it made sense to bring in a larger pool of upwind states to participate in the program to mitigate the possibility that power generation would switch to states left out of the program, yielding increased NOx emissions from nonparticipating facilities that would negate the reductions achieved by participating states.

DEQ concurs with this approach for the original CSAPR and 2016 CSAPR Update, but DEQ believes that transport issues that need to be addressed in response to the adoption of the 2015 ozone NAAQS are more granular and would benefit from a more focused approach. And the possibility of using a different significance threshold was one of the areas of flexibility addressed in the Tsirigotis

March 2018 Memo[4]. For the 2015 ozone NAAQS, DEQ believes that 1.0 ppb would be a more appropriate significant impact level for ozone transport. If EPA recommends a Significant Impact Level (SIL) for ozone of 1.0 ppb for Prevention of Significant Deterioration (PSD) determinations,[5] then the significant impact level for ozone transport should be at least 1.0 ppb. It is illogical to allow a new single source to have a higher impact before requiring additional controls than what is required for an entire state. DEQ believes this is especially relevant for this transport evaluation, because the previous rulemakings have harvested most of the low-hanging fruit represented by available controls on EGUs, most of which were already equipped with continuous emissions monitoring systems (CEMS) and whose emissions were already reported to the Clean Air Markets Division (CAMD). Attainment of the 2015 ozone NAAQS will likely require more targeted reductions on smaller sources and enhanced compliance verification on facilities already covered by New Source Performance Standards (NSPS). For example, states with recalcitrant ozone attainment problems which are experiencing a boom in oil and gas development would do well to address control of NOx and VOC emissions in counties not currently classified nonattainment. These efforts require a more granular approach, including the adoption of presumptive best available control technologies (BACT) for new installations. With additional focus on New Source Review (NSR), it is important to use a similar metric to evaluate potential impacts. Adoption of a 1.0 ppb significance threshold to assess interstate transport would represent a step toward achieving that goal.

4.6 Ozone Transport Assessment for Good Neighbor SIPs 4-step framework

[4] Memorandum from Peter Tsirigotis, EPA OAQPS, to EPA Regional Air Division Directors, Regions 1-10, "Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program," April 17, 2018.
[5] Also from the Tsirigotis memo.

EPA developed a 4-step framework for addressing the requirements of the "Good Neighbor" provision in the CSAPR for the 1997 ozone NAAQS and the 1997 and 2006 $PM_{2.5}$ (particulate matter less than 2.5 microns) NAAQS:

(1) identify downwind receptors that are expected to have problems attaining or maintaining the NAAQS;

(2) determine which upwind states significantly contribute (or are "linked") to the downwind air quality problems;

(3) for states that are "linked," quantify the level of upwind emissions that need to be addressed to satisfy the "Good Neighbor" provision; and,

(4) adoption of permanent and enforceable emission reductions in "linked" upwind states.

EPA has used this 4-step process for each successive ozone standard.

4.7 EPA Modeling Data

DEQ utilized the data provided by EPA[6] to perform step one and two above for Oklahoma. We eliminated all sites that had an Oklahoma contribution of less than 0.70 ppb, then eliminated all of the sites that did not have a 2023 average DV, or 2023 maximum DV greater than 70.9 ppb. The result was the six sites listed below:

Site ID	County	State	2023en[7] Average	2023en Maximum	Oklahoma Contribution
260050003	Allegan	MI	69.0	71.7	1.31

[6] The data EPA obtained from its modeling for the 2015 ozone transport, is located at https://www.epa.gov/sites/production/files/2018-05/updated_2023_modeling_dvs_collective_contributions.xlsx
[7] Note, 2023en is the scenario name for the updated EPA modeling.

481210034	Denton	TX	69.7	72.0	1.23
484392003	Tarrant	TX	72.5	74.8	1.71
480391004	Brazoria	TX	74.0	74.9	0.90
550790085	Milwaukee	WI	71.2	73.0	0.76
551170006	Sheboygan	WI	72.8	75.1	0.95

Next, the flexibility EPA has allowed – a modified step 2, using a Significant Impact Level of 1.0 ppb – would eliminate three sites from consideration, and leave only the three sites listed below that need further review and analysis of any Significant Impacts from Oklahoma emissions:

Site ID	**County**	**State**	**2023en Average**	**2023en Maximum**	**Oklahoma Contribution**
260050003	Allegan	MI	69.0	71.7	1.31
481210034	Denton	TX	69.7	72.0	1.23
484392003	Tarrant	TX	72.5	74.8	1.71

To address its responsibilities for the interstate transport of ozone, TCEQ performed ozone modeling using a 2012 base year. The TCEQ future year modeling used growth and control factors based on projected growth in the demand for goods and services, along with the reduction in emissions expected from state, local, and federal control programs. This modeling data can be found at: http://www.deq.state.ok.us/aqdnew/rulesandplanning/o3isip2015/texas_ot_2023_dvf_with_state_contributions.xlsx. In this spreadsheet, note that the 2023 design value for Denton County TX (481210034) is 68 ppb, and Tarrant County TX (484392003) is 66 ppb. The modeling performed by Texas demonstrates that both of these sites are in attainment in the year 2023, and therefore there is no need to assess the impact of interstate transport on these sites.

Data relating to the remaining site to examine, Allegan County Michigan, is listed below.

Site ID	County & State	2023en Average	2023en Maximum	Oklahoma Contribution	Canada & Mexico Contribution	Initial & Boundary
260050003	Allegan, MI	69.0	71.7	1.31	0.54	11.85

The 2023en Average value is below 71 ppb, which means this site is assumed to demonstrate attainment by 2023. Since the 2023en Maximum is above 71 ppb, it is assumed to be a maintenance area in 2023. DEQ believes that downwind states should not be held responsible for emissions from outside the United States, and that the boundary concentration of ozone and precursors will likely be reduced in the year 2023. Therefore, it is appropriate to apply the flexibility EPA provided in the Tsirigotis March 2018 Memo, which states "EPA recognizes that a number of non-U.S. and non-anthropogenic sources contribute to downwind nonattainment and maintenance receptors." DEQ notes that by subtracting 100% of the Canada-Mexico contribution, and 2% of the Initial and Boundary contribution, the Allegan county site demonstrates attainment.

Canada & Mexico Contribution	2% of Initial & Boundary	Canada & Mexico plus Int'l & Bdy	2023en Maximum	Max minus Combined Contrib
0.54	11.85 X 2% = 0.24	0.54 + 0.24 = 0.78	71.7	71.7 - 0.78 = 70.92

Another flexibility provided by EPA in the Tsirigotis March 2018 Memo was to determine a state's share of the ozone in excess of the standard for the downwind monitor. For Allegan County, the modelled excess in year 2023 is 71.7 ppb minus 70.9 ppb, equaling 0.8 ppb. Oklahoma's contribution to Allegan County (1.31 ppb) divided by the Total Anthropogenic Contribution for Allegan County Michigan (46.22 ppb) equals 0.0283, or 2.83 percent. 2.83 percent of the 0.8 excess equals 0.02 ppb. The NOx reductions required of our electric generators starting in 2017 (11,054 tons) to comply with the 2016 CSAPR Update should be enough to obtain a 0.02 ppb reduction of ozone at the Allegan County Michigan monitor.

5.0 Weight of evidence

Due to the emission reductions required by rules like CSAPR, the 2016 CSAPR Update, and the regional haze requirements, the NOx emissions from electric generation in Oklahoma has dropped significantly during the ozone season in the last seven years. Oklahoma EGU Acid Rain Ozone Season Emissions are listed below:

Oklahoma EGU Acid Rain Ozone Season Emissions	
Year	**NOx Emissions TPY**
2011	38,285
2012	31,242
2013	23,462
2014	16,230
2015	12,997
2016	12,163
2017	10,435

The low-cost emission reductions have been obtained from the electric generation sector, and any additional reductions would require more costly emission controls.

Due to time and resource constraints, the modelling EPA performed for the states to use for Good Neighbor SIPs, used a 2011 base year (performing a 12 year projection to 2023), and therefore the Maintenance Monitor calculations were based on the Maximum design value for years 2009 through

2013. The value for the Allegan County monitor was 86 ppb (4 ppb higher than any other Michigan monitor). If the modelling were performed using a 2016 base year (performing a 7 year projection), the Maintenance monitor design value would have been 75 ppb. Assuming a constant rate of reduction, 86 ppb minus 71.7 ppb (future year modelled value) equals a 14.3 ppb difference. 14.3 divided by 12 (years) equals a 1.1917 ppb reduction per year from EPA's modeling. Applying the 1.1917 ppb per year reduction to the 2016 Allegan County Maximum design value of 75 ppb, results in a 66.66 ppb Design Value in the seventh year (2023) , easily demonstrating attainment.

Due to the NOx reductions from required State and Federal controls, Oklahoma annual anthropogenic emissions are expected to decrease by 40 percent from 2011 to 2023.

6.0 Conclusions

DEQ has control measures in place to address ozone precursor emissions and these measures have resulted in significant decreases in 8-hour ozone design values in Oklahoma. The average reduction in 8-hour ozone design values for the State of Oklahoma monitoring sites is 0.79 ppb per year for the last 15 years (2004 – 2017).

Also, DEQ has a robust, SIP-approved NSR permitting program and therefore has met the CAA infrastructure requirements relating to PSD. The DEQ has also determined that Oklahoma meets the visibility transport provisions for the 2015 ozone NAAQS, as the state is not contributing significantly to nonattainment or maintenance issues in any other state.

In conclusion, this SIP revision demonstrates that Oklahoma meets the interstate transport requirements of CAA section 110(a)(2)(D)(i)(I) as well as the requirements of section

110(a)(2)(D)(i)(II) for PSD and visibility protection, and the interstate pollution abatement and international air pollution requirements of section 110(a)(2)(D)(ii) without further reductions.