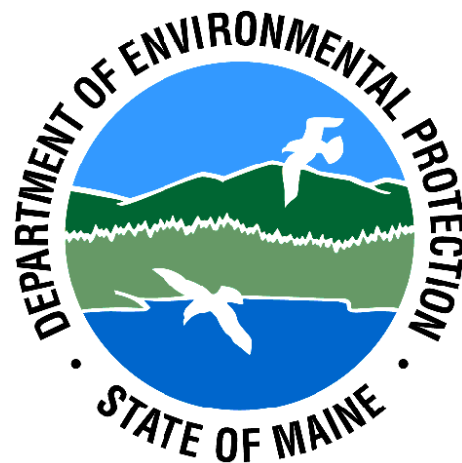


# **Revision to the State Implementation Plan for Air Quality**

## **Demonstration that Maine Complies 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**

**Prepared by the  
Bureau of Air Quality**



## **Summary**

Sections 110(a)(1) and (2) of the Clean Air Act (CAA) require all states to summarize any necessary revisions to their State Implementation Plans (SIP) to implement, maintain and enforce any revised or new national ambient air quality standard (NAAQS). These SIP revisions are commonly referred to as “infrastructure SIPs.” In March 2015, the U.S. Environmental Protection Agency (EPA) revised the ozone NAAQS, and in July 2018, completed the designation process for nonattainment areas.

This SIP revision addresses the CAA §110(a)(2)(D)(i)(I) (“good neighbor”) requirements to demonstrate that emissions from sources in Maine do not significantly contribute to nonattainment in, or interfere with maintenance by, any other state with respect to the 2015 ozone NAAQS. DEP’s analysis of recent EPA’s and Ozone Transport Commission’s (OTC) 2023 modeling demonstrates that Maine meets its good neighbor requirements for the 2015 NAAQS.

## **Background and Introduction**

On October 1, 2015, EPA revised the primary and secondary ozone NAAQS.<sup>1</sup> Specifically, EPA established both the primary and secondary 8-hour standards at 70 parts per billion, based on the 3-year average of the fourth-highest value of the yearly distribution of 8-hour daily maximum concentrations. EPA promulgated initial ‘Round 1’ designations of only attainment/unclassifiable areas on November 6, 2017 including designating Maine as unclassifiable/attainment.<sup>2</sup> EPA promulgated initial ‘Round 2’ designations on April 30, 2018 including most of the nonattainment areas<sup>3</sup> and promulgated the initial ‘final Round 3’ designations on July 17, 2018 for the San Antonio, Texas metropolitan area.<sup>4</sup>

Pursuant to CAA §110(a)(1) and (2), all states must submit necessary revisions to their SIP to provide for the implementation, maintenance and enforcement of revised or new NAAQS. States must maintain a comprehensive air quality management program, including enforceable emission limitations, an ambient monitoring program, an enforcement program, air quality modeling, and adequate personnel, resources, and legal authority. The “good neighbor” provisions of the CAA require each SIP to prohibit its emissions from significantly contributing to nonattainment or maintenance of the ozone NAAQS in other states or interfering with programs to prevent significant deterioration of air quality or to achieve reasonable progress toward the national visibility goal for Federal class I areas (national parks and wilderness areas). Based on timing requirements in the CAA, states were required to submit ozone infrastructure SIP revisions by October 2018.

In March 2018, EPA issued guidance<sup>5</sup> to assist states in preparing SIP revisions to address compliance with CAA §110(a)(2)(D)(i)(I) for the 2015 ozone NAAQS. EPA also issued supplemental guidance memos in August 2018<sup>6</sup> and October 2018<sup>7</sup>. Guidance included EPA’s 2023 ozone modeling results identifying 2023 potential nonattainment and maintenance sites and contributions from each state to those sites. The guidance also discusses the following four-step process to address interstate transport:

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<sup>1</sup> The NAAQS revisions were published in the [10/26/15 Federal Register](#) and became effective on 12/28/2015.

<sup>2</sup> Round 1 area designations rulemaking was published in the [11/26/17 Federal Register](#) and became effective on 1/16/2018.

<sup>3</sup> ‘Round 2’ area designations rulemaking was published in the [6/4/2018 Federal Register](#) and became effective on 8/3/2018.

<sup>4</sup> ‘Final Round 3’ area designations rulemaking was published in the [7/25/2018 Federal Register](#) and became effective on 9/24/2018.

<sup>5</sup> [https://www.epa.gov/sites/production/files/2018-03/documents/transport\\_memo\\_03\\_27\\_18\\_1.pdf](https://www.epa.gov/sites/production/files/2018-03/documents/transport_memo_03_27_18_1.pdf)

<sup>6</sup> <https://www.epa.gov/airmarkets/analysis-contribution-thresholds-memo>

<sup>7</sup> <https://www.epa.gov/airmarkets/considerations-identifying-maintenance-receptors-memo#Consideration-for-Identifying-Maintenance-Receptors-Memo>

- 1) Identify downwind air quality problems;
- 2) Identify upwind states that contribute enough to those downwind air quality problems to warrant further review and analysis;
- 3) Identify air quality, cost, and emission reduction factors to be evaluated in a multifactor test to identify emissions that significantly contribute to nonattainment or interfere with maintenance of the NAAQS downwind, if any; and
- 4) Adoption of permanent and enforceable measures needed to achieve those emission reductions (translating the control levels identified in Step 3 into enforceable emissions limits).

Maine's good neighbor SIP revision is consistent with this four-step process.

Through this SIP submittal, DEP analyzed both EPA modeling results and OTC modeling results to demonstrate that Maine's existing control programs ensure that emissions from Maine do not significantly contribute to nonattainment or maintenance issues in any other state with respect to the 2015 ozone NAAQS. Therefore, Maine complies with the requirements of CAA §110(a)(2)(D)(i)(I).

### **Methodology**

The "good neighbor" provisions of CAA §110(a)(2)(D)(i)(I) require each state's SIP to prohibit emissions that significantly contribute to nonattainment in, or interfere with maintenance by, any other state with respect to any NAAQS. DEP used the following methodology to implement the four-step process outlined in EPA's guidance to identify and address Maine's good neighbor obligation.

DEP examined the results of OTC's modeling and EPA's modeling set out in the guidance to:

- Identify monitors outside of Maine that are projected to have nonattainment or maintenance issues in 2023; and
- Determine if the modeled impacts associated with emissions from Maine sources are projected to exceed the screening threshold at any of the nonattainment/maintenance monitors in 2023.

EPA's and OTC's modeling did not identify any significant impacts (1% threshold) by Maine emissions to downwind air quality problems in 2023. Therefore, DEP determined it was unnecessary to undertake further analysis regarding the effectiveness of current control techniques.

The following sections will document the application of the above methodology with the four-step process and DEP's findings regarding Maine's compliance with CAA §110(a)(2)(D)(i)(I) for the 2015 ozone NAAQS.

### **Step 1: Identify downwind air quality problems**

In the March 2018 guidance, EPA identified potential 2023 nonattainment (an average design value greater than or equal to 71 ppb) and maintenance sites (an average design value less than 71 ppb but with a maximum design value greater than or equal to 71 ppb) with respect to the 2015 NAAQS using the Comprehensive Air Quality Model with Extensions (CAMx v6.40) to model emissions in 2011 and 2023 (case name 2023en) based on updates provided to EPA from states and other stakeholders. Design values were calculated using the "3 x 3" approach used for previous NAAQS and a modified approach for coastal monitoring sites in which "overwater" modeling data were not included in the calculation of 2023 design values. Table 1 lists the 14 potential nonattainment monitoring sites outside of California and 12 potential maintenance monitoring sites outside of California conservatively using both approaches where impacts from Maine's emissions were evaluated.

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**Table 1: Maine Contributions to Monitors Projected by EPA Modeling to Have 2023 Nonattainment or Maintenance Issues**

Monitoring Site	State	County	“3x3 approach”		“No Water” approach		2023 Status
			2023 Avg. Design Value (ppb)	2023 Max Design Value (ppb)	2023 Avg. Design Value (ppb)	2023 Max Design Value (ppb)	
04-013-0019	AZ	Maricopa	69.3	71.4	69.3	71.4	Maintenance
04-013-1004	AZ	Maricopa	69.8	71.0	69.8	71.0	Maintenance
08-005-0002	CO	Arapahoe	69.3	71.3	69.3	71.3	Maintenance
08-035-0004	CO	Douglas	71.1	73.2	71.1	73.2	Nonattainment
08-059-0006	CO	Jefferson	71.3	73.7	71.3	73.7	Nonattainment
08-059-0011	CO	Jefferson	70.9	73.9	70.9	73.9	Maintenance
08-069-0011	CO	Larimer	71.2	73.0	71.2	73.0	Nonattainment
08-123-0009	CO	Weld	70.2	71.4	70.2	71.4	Maintenance
09-001-0017	CT	Fairfield	69.8	72.1	69.8	71.2	Maintenance
09-001-3007	CT	Fairfield	71.2	75.2	71.0	75.0	Nonattainment
09-001-9003	CT	Fairfield	72.7	75.6	73.0	75.9	Nonattainment
09-009-9002	CT	New Haven	71.2	73.9	69.9	72.6	Nonattainment
24-025-1001	MD	Harford	71.4	73.8	70.9	73.3	Nonattainment
26-005-0003	MI	Allegan	69.0	71.8	69.0	71.7	Maintenance
26-163-0019	MI	Wayne	69.0	71.0	69.0	71.0	Maintenance
36-081-0124	NY	Queens	70.1	71.9	70.2	72.0	Maintenance
36-085-0067	NY	Richmond	71.9	73.4	67.1	68.5	Nonattainment
36-103-0002	NY	Suffolk	72.5	74.0	74.0	75.5	Nonattainment
48-039-1004	TX	Brazoria	74.0	74.9	74.0	74.9	Nonattainment
48-121-0034	TX	Denton	69.7	72.0	69.7	72.0	Maintenance
48-201-0024	TX	Harris	70.4	72.8	70.4	72.8	Maintenance
48-201-1034	TX	Harris	70.8	71.6	70.8	71.6	Maintenance
48-201-1039	TX	Harris	71.8	73.6	71.8	73.5	Nonattainment
48-439-2003	TX	Tarrant	72.5	74.8	72.5	74.8	Nonattainment
55-079-0085	WI	Milwaukee	65.4	67.0	71.2	73.0	Nonattainment
55-117-0006	WI	Sheboygan	70.8	73.1	72.8	75.1	Nonattainment

Recent OTC CAMx modeling using the OTC Gamma modeling emissions platform<sup>8</sup> also identified potential 2023 nonattainment and maintenance monitor locations in the Eastern U.S. (all OTC states including the entire state of Virginia). Table 2 lists the 3 potential nonattainment monitoring sites and 4 potential maintenance monitoring sites where impacts from Maine’s emissions were evaluated.

<sup>8</sup> Jeff Underhill, “Modeling Committee Update” (OTC Spring Meeting, June 8, 2018).

**Table 2: Maine Contributions to Monitors Projected by OTC Modeling to Have 2023 Nonattainment or Maintenance Issues**

Monitoring Site	State	County	2023 Avg. Design Value (ppb)	2023 Max Design Value (ppb)	2023 Status
09-001-0017	CT	Fairfield	68.9	71.2	Maintenance
09-001-3007	CT	Fairfield	71.0	75.0	Nonattainment
09-001-9003	CT	Fairfield	73.0	75.9	Nonattainment
09-009-9002	CT	New Haven	69.9	72.6	Maintenance
24-025-1001	MD	Harford	70.9	73.3	Maintenance
36-081-0124	NY	Queens	70.2	72.0	Maintenance
36-103-0002	NY	Suffolk	74.0	75.5	Nonattainment

**Step 2: Identify Upwind States contributing**

Since there are not Maine monitoring sites identified in Tables 1 and 2, only contributions from Maine will be further analyzed. To determine Maine’s 2023 contribution impacts at the identified monitoring sites in Tables 1 and 2, EPA and OTC performed source apportionment modeling using the CAMx Anthropogenic Precursor Culpability Analysis (APCA) technique where ozone formed from reactions between biogenic and anthropogenic VOC and NO<sub>x</sub> are assigned to the anthropogenic emissions. Maine used the threshold of 1% of the NAAQS (0.7 ppb) to gauge if emissions from Maine were projected to contribute significantly to nonattainment or interfere with maintenance.

Table 3 summarizes EPA’s 2023 contribution modeling results, showing Maine’s impacts specifically at projected out-of-state nonattainment/maintenance monitors outside of California and at all monitoring sites modeling sites used in the modeling. Emissions from Maine are projected to have a maximum impact in 2018 of 0.01 ppb at projected nonattainment/maintenance monitors and a maximum impact of 0.13 ppb at any monitor outside of Maine, well below the 1% screening threshold of 0.7 ppb for the 2015 NAAQS. Therefore, in accordance with EPA’s January 2015 guidance, Maine complies with the CAA §110(a)(2)(D)(i)(I) good neighbor provisions for the 2008 ozone NAAQS.

Based on the EPA’s modeling described above, Maine’s emissions are not projected to have significant impacts at any monitor located at potential 2020 nonattainment or maintenance areas in other states.

**Table 3: Maine Contributions to Monitors Projected by EPA Modeling to Have 2023 Nonattainment or Maintenance Issues**

Monitoring Site	State	County	2023 Status	Maine's 2023 Contribution (ppb (%))
04-013-0019	AZ	Maricopa	Maintenance	0
04-013-1004	AZ	Maricopa	Maintenance	0
08-005-0002	CO	Arapahoe	Maintenance	0
08-035-0004	CO	Douglas	Nonattainment	0
08-059-0006	CO	Jefferson	Nonattainment	0
08-059-0011	CO	Jefferson	Maintenance	0
08-069-0011	CO	Larimer	Nonattainment	0
08-123-0009	CO	Weld	Maintenance	0
09-001-0017	CT	Fairfield	Maintenance	0.01 (0.01%)
09-001-3007	CT	Fairfield	Nonattainment	0.01 (0.01%)
09-001-9003	CT	Fairfield	Nonattainment	0
09-009-9002	CT	New Haven	Nonattainment	0.01 (0.01%)
24-025-1001	MD	Harford	Nonattainment	0
26-005-0003	MI	Allegan	Maintenance	0
26-163-0019	MI	Wayne	Maintenance	0
36-081-0124	NY	Queens	Maintenance	0
36-085-0067	NY	Richmond	Nonattainment	0
36-103-0002	NY	Suffolk	Nonattainment	0.01 (0.01%)
48-039-1004	TX	Brazoria	Nonattainment	0
48-121-0034	TX	Denton	Maintenance	0
48-201-0024	TX	Harris	Maintenance	0
48-201-1034	TX	Harris	Maintenance	0
48-201-1039	TX	Harris	Nonattainment	0
48-439-2003	TX	Tarrant	Nonattainment	0
55-079-0085	WI	Milwaukee	Nonattainment	0
55-117-0006	WI	Sheboygan	Nonattainment	0
All modeled monitoring sites				0.13 (0.19%)

Table 4 summarizes OTC's 2023 contribution modeling results, showing Maine's impacts specifically at projected out-of-state nonattainment/maintenance monitors in the modeling domain and at all monitoring sites used in the modeling. Emissions from Maine are projected to have a maximum impact in 2018 of 0.01 ppb at projected nonattainment/maintenance monitors and a maximum impact of 0.10 ppb at any monitor outside of Maine, well below the 1% screening threshold of 0.7 ppb for the 2015 NAAQS.

Based on the OTC's and EPA's modeling described above, Maine's emissions are not projected to have significant impacts at any monitors located at potential 2023 nonattainment or maintenance areas in other states or at any other monitoring site outside of Maine in the U.S.

**Table 4: Maine Contributions to Monitors Projected by OTC Modeling to Have 2023 Nonattainment or Maintenance Issues**

Monitoring Site	State	County	2023 Status	Maine's 2023 Contribution (ppb (%))
09-001-0017	CT	Fairfield	Maintenance	0.01 (0.01%)
09-001-3007	CT	Fairfield	Nonattainment	0.01 (0.01%)
09-001-9003	CT	Fairfield	Nonattainment	0
09-009-9002	CT	New Haven	Maintenance	0.01 (0.01%)
24-025-1001	MD	Harford	Maintenance	0
36-081-0124	NY	Queens	Maintenance	0
36-103-0002	NY	Suffolk	Nonattainment	0.01 (0.01%)
All modeled monitoring sites				0.10 (0.14%)

**Step 3: Identify Necessary Emission Reductions**

No emissions reductions are necessary in Maine under CAA §110(a)(2)(D)(i)(I) because the modeling analyses in Step 2 did not show that Maine's emissions significantly contribute to nonattainment or interfere with maintenance at any monitoring site in the U.S outside of Maine. In addition, no emission reductions are necessary in Maine as the entire state of Maine has been designated attainment/unclassifiable and current monitoring design values in Maine (maximum 2016-18 design value in Maine is 70 ppb<sup>9</sup>) are all below the 2015 NAAQS.

**Step 4: Adoption of Needed Permanent and Enforceable Measures**

Step 3 found that Maine does not need to reduce emissions to satisfy the requirements under CAA §110(a)(2)(D)(i)(I). This indicates that it is not necessary for Maine to adopt any permanent and enforceable emission reductions in order to remedy a significant contribution to nonattainment or interfere with maintenance at any monitoring location outside of Maine.

Therefore, in accordance with EPA's March, August and October 2018 guidance, Maine complies with the CAA §110(a)(2)(D)(i)(I) good neighbor provisions for the 2008 ozone NAAQS.

**Summary and Conclusions**

This SIP revision addresses Maine's "good neighbor" obligations under CAA §110(a)(2)(D)(i)(I), evaluating whether Maine emissions contribute significantly to nonattainment in, or interfere with maintenance by, any other state regarding the 2015 ozone NAAQS. DEP's analyses included a review of EPA's March, August and October 2018 guidance memorandums including modeling results and a review of recent OTC modeling results.

As described earlier, DEP's analyses resulted in the following findings: The entire state of Maine is currently designated attainment/unclassifiable for the 2015 NAAQS, monitoring levels in Maine are currently attaining the 2015 NAAQS and EPA's plus OTC's transport modeling for 2023 show ozone contributions from Maine emissions are below the significant level at all out-of-state monitors modeled as having either potential nonattainment or maintenance concerns in 2023.

Based on the analyses described in this SIP revision, DEP concludes Maine complies, and will remain in compliance with the good neighbor provisions of CAA §110(a)(2)(D)(i)(I) for the 2015 ozone NAAQS.

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<sup>9</sup> <https://www.epa.gov/air-trends/air-quality-design-values>

