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Director

**PROPOSED REVISIONS TO  
STATE OF MICHIGAN  
STATE IMPLEMENTATION PLAN  
for  
Infrastructure Requirements for the  
2015 Ozone National Ambient Air Quality Standards**

**February 2019**

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## ATTACHMENTS

Attachment A	MDEQ Delegation Letter
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**State of Michigan**  
**Certification of the Adequacy of the**  
**Michigan State Implementation Plan Infrastructure**  
**Applicable to the 2015 Ozone National Ambient Air Quality Standard**

Prepared by the  
Michigan Department of Environmental Quality  
Air Quality Division  
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**Introduction**

The Michigan Department of Environmental Quality (MDEQ) is confirming that the State of Michigan retains the authorities necessary to evaluate ambient air quality, develop plans to attain and maintain new and existing air quality standards, meet the requirements of the New Source Review (NSR) Program, and effectively enforce all applicable requirements. The current Michigan State Implementation Plan (SIP) contains the resources and authority to implement and satisfactorily complete the requirements set forth in Section 110 of the federal Clean Air Act (CAA), commonly referred to as the “Infrastructure SIP” (ISIP) for the 2015 ozone National Ambient Air Quality Standards (NAAQS), with the following exceptions that will be addressed in a later SIP submittal:

1. Section 110(a)(2)(C) that deals with permit programs under CAA Part D;
2. Section 110(a)(2)(I) in its entirety; and
3. Section 110(a)(2)(J) visibility requirement only.

The SIP elements addressed in this document are required under Sections 110(a)(1) and (2). Section 110(a)(1) provides the procedural and timing requirements for SIPs. Section 110(a)(2) specifies the basic elements and sub-elements that all SIPs must contain.

**Part 1. Required Section 110 SIP Elements**

The SIP elements bulleted below are excerpts from the United States Environmental Protection Agency (USEPA) Guidance on Infrastructure SIP Elements under CAA Sections 110(a)(1) and 110(a)(2), September 13, 2013 (Guidance). The MDEQ response follows each requirement.

• **Section 110(a)(2)(A): Emission limits and other control measures**

*Each such plan shall [...] include enforceable emission limitations and other control measures, means, or techniques (including economic incentives such as fees, marketable permits, and auctions of emissions rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to meet the applicable requirements of this chapter.*

Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451), Michigan Compiled Laws (MCL) 324.5503 and MCL 324.5512 provides the MDEQ Director the authority to regulate the discharge of air pollutants and to promulgate rules to establish standards for ambient air quality and emissions.

To limit the emissions of ozone precursors, Michigan's Air Pollution Control Rules (APCR) R 336.1601 through R 336.1661 contain emission limits for volatile organic compounds (VOCs) from existing sources, APCR R 336.1701 through R 336.1710 contain emission limits for VOCs from new sources, and APCR R 336.1801 through R 336.1834 contain emission limits for oxides of nitrogen (NO<sub>x</sub>) from stationary sources.

The MDEQ also continues to monitor, update, and implement necessary and required revisions to the Michigan SIP in the form of emission limits and other control measures to meet the NAAQS, including the 2015 ozone standard.

Consistent with the Guidance, this ISIP submittal does not identify nonattainment area emission controls as those will be addressed in required Attainment SIPs, as necessary.

- **Section 110(a)(2)(B): Ambient air quality monitoring/data system**

*Each such plan shall [...] provide for establishment and operation of appropriate devices, methods, systems, and procedures necessary to:*

- (i) monitor, compile, and analyze data on ambient air quality; and*
- (ii) upon request, make such data available to the Administrator.*

In accordance with the Michigan SIP, the MDEQ maintains a comprehensive network of state air quality monitors at USEPA-approved locations throughout Michigan. Certain Tribal Nations located within the state of Michigan also maintain air quality monitors at USEPA-approved locations. The primary objective of these monitors is to determine compliance with the NAAQS. The MDEQ monitoring network is capable of monitoring ozone and ozone precursors at the revised NAAQS level.

The quality assured ambient air monitoring data is submitted to the USEPA Air Quality Subsystem as required by Title 40 of the Code of Federal Regulations (CFR), Subpart Q, Reports, Section 51.320. The MDEQ submits network reviews to the USEPA annually to ensure that Michigan's air monitoring operations comply with applicable federal requirements. The MDEQ most recently submitted a network review to the USEPA on June 27, 2018. In addition, the MDEQ coordinates with the USEPA to address any planned changes to monitoring sites.

- **Section 110(a)(2)(C): Programs for enforcement of control measures and for construction/modification of stationary sources**

*Each such plan shall [...] include a program to provide for the enforcement of the measures described in subparagraph (A), and regulation of the modification and construction of any stationary source within the areas covered by the plan as necessary to assure that national ambient air quality standards are achieved, including a permit program as required in parts C and D of this subchapter.*

MCL 324.5501 through MCL 324.5542 of Act 451 grants the MDEQ authority to enforce emission limitations and other control measures in the air quality rules, permits, and consent orders. The MDEQ is granted authority under MCL 324.5512 for rulemaking to control or prohibit air pollution, establish emission limits, and promulgate rules to implement the permit programs under MCL 324.5505 and MCL 324.5506. MCL 324.5528 grants the MDEQ the authority to enforce violations of Part 55 or rules promulgated thereunder. MCL 324.5526 gives the MDEQ authority to inspect facilities at reasonable times, upon the presentation of proper credentials. In addition, MCL 324.5530 authorizes the Michigan Attorney General to commence

a civil action against a person for appropriate relief, including injunctive relief and a civil fine for any violation of Act 451, its rules, or a permit issued under Act 451, among other things. Other enforcement provisions are set forth in MCL 324.5515, 324.5518, and 324.5526 through 324.5532.

The MDEQ has sufficient permit programs to regulate minor sources and minor modifications. To address the preconstruction regulation of the modification and construction of minor stationary sources and minor modifications of major stationary sources, the USEPA approved Michigan's minor source NSR program on May 6, 1980 (45 FR 29790). The MDEQ is awaiting action by the USEPA on six sets of revisions to the minor NSR program SIP that were submitted to the USEPA from 1993 to 2009, which the MDEQ supplemented in 2017. The MDEQ has ensured that new and modified sources not captured by the minor source NSR permitting programs do not interfere with attainment and maintenance of the NAAQS through the permit evaluation process.

Michigan has a comprehensive Part C permit program to ensure all NAAQS, and their precursors, are maintained including ozone and ozone precursors. Sources that install equipment that will emit ozone precursors are subject to permit-to-install regulations under APCR R 336.1201 through R 336.1209. To comply with Part C, Michigan's prevention of significant deterioration (PSD) program regulations are found in APCR R 336.2801 through R 336.2823. These regulations identify NO<sub>x</sub> and VOCs as precursors of ozone and require any new major source or source with a major modification to obtain PSD review to ensure attainment of the ozone standard. Minor sources, unless exempt under APCR R 336.1278 through R 336.1290, are subject to the minor source NSR program, as required under Part D of the federal CAA. We also affirm that the MDEQ has both the legal and regulatory authority, as well as the resources, to permit greenhouse gas emitting sources, as confirmed in the July 27, 2010, correspondence to the USEPA. A copy of this correspondence is available upon request.

In accordance with the Guidance, the major source nonattainment NSR program required under CAA Part D for the 2015 ozone NAAQS will be addressed in our attainment plan submittal.

- **Section 110(a)(2)(D)(i): Interstate pollution transport**

*Each such plan shall [...] contain adequate provisions prohibiting, consistent with the provisions of this subchapter, any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will —*

- (i) contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any such national primary or secondary ambient air quality standard; or*
- (ii) interfere with measures required to be included in the applicable implementation plan for any other State under part C of this subchapter to prevent significant deterioration of air quality or to protect visibility.*

The USEPA divides interstate pollution transport requirements into four elements, commonly called prongs. Prongs 1 and 2 prohibit significant contribution to nonattainment and interference with maintenance of the NAAQS in any other state. These prongs are addressed in Section 2 of this document.

Prong 3 prohibits the interference with PSD in any other state. To satisfy prong 3, Michigan subjects new major sources and major modifications to a comprehensive USEPA-approved

PSD permitting program. The laws and rules applicable to this program are as stated above in Section 110(a)(2)(C). Michigan also issues permits in nonattainment areas pursuant to APCR R 336.2901 through R 336.2908.

Prong 4 prohibits interference with visibility in any other state. APCR R 336.1803 and R 336.1821 through R 336.1834 regulate the emissions of NO<sub>x</sub> in Michigan. The emissions of Sulphur dioxide are regulated under APCR R 336.1401 through R 336.1420. The MDEQ also has demonstrated compliance with the Regional Haze Program through the five-year progress report approved on June 1, 2018 (83 FR 25375).

- **Section 110(a)(2)(D)(ii): Interstate pollution abatement and international air pollution**

*Each such plan shall [...] contain adequate provisions insuring compliance with the applicable requirements of sections 126 and 115 of this title (relating to interstate and international pollution abatement).*

The MDEQ's approved PSD program, particularly R 336.2817, contains provisions required under Section 126(a) of the federal CAA to notify neighboring Tribal Nations and states of potential impacts from a new or modified major source. Michigan has no other obligations under any part of Section 126; i.e., no source within the state of Michigan is subject to an active finding under Section 126 with respect to the 2015 ozone NAAQS at this time.

Section 115 of the federal CAA relates to international pollution abatement. There are currently no findings under Section 115 for the State of Michigan with respect to the 2015 ozone NAAQS.

- **Section 110(a)(2)(E): Adequate resources and authority, conflict of interest, and oversight of local governments and regional agencies**

*Each such plan shall [...] provide:*

- (i) necessary assurances that the State (or, except where the Administrator deems inappropriate, the general purpose local government or governments, or a regional agency designated by the State or general purpose local governments for such purpose) will have adequate personnel, funding, and authority under State (and, as appropriate, local) law to carry out such implementation plan (and is not prohibited by any provision of Federal or State law from carrying out such implementation plan or portion thereof);*
- (ii) requirements that the State comply with the requirements respecting State boards under section 128 of this title; and*
- (iii) necessary assurances that, where the State has relied on a local or regional government, agency, or instrumentality for the implementation of any plan provision, the State has responsibility for ensuring adequate implementation of such plan provision.*

Section 110(a)(2)(E) contains three subsections: (i) relating to adequate resources; (ii) relating to conflicts of interest; and (iii) relating to oversight of local governments. Subsection (iii) does not apply to the MDEQ, as the MDEQ does not rely on a local or regional government, agency, or instrumentality for the implementation of any plan provision.

Subsection (i) relating to adequate resources:

Under MCL 324.5503, the MDEQ retains authority to adequately enforce the Michigan SIP. Act 451, Executive Reorganization Order 2011-1, and a Governor's Delegation Letter provide the MDEQ with legal authority under state law to carry out the Michigan SIP. A delegation letter from the Governor to the MDEQ Director delegates to the MDEQ authority to make any submittal, request, or application under the federal CAA, including the ability to carry out SIP requirements. A copy of the letter is available in Attachment A.

The MDEQ maintains adequate personnel and funding to carry out the Michigan SIP. The MDEQ air program is funded through the USEPA Section 103 and 105 grants and matching funds via the State's General Fund. These funding sources are expected to remain stable for the next five years and projected into the future.

Subsection (ii) relating to conflicts of interest:

Section 110(a)(2)(E)(ii) requires each SIP to contain provisions that comply with the state board requirements of Section 128 of the CAA. The requirements of Section 128 are:

- (1) *That any board or body which approves permits or enforcement orders under this chapter shall have at least a majority of members who represent the public interest and do not derive any significant portion of their income from persons subject to permits and enforcement orders under this chapter; and*
- (2) *That any potential conflicts of interest by members of such board or body or the head of an executive agency with similar powers be adequately disclosed.*

The authority to approve air permits and enforcement orders rests with the MDEQ Director and his or her designee under MCL 324.301(b), MCL 324.5503, Executive Order No. 1995-18, and Delegation Letters from the MDEQ Director to the AQD Director and various AQD supervisors. Copies of these letters are available upon request.

Employees of the MDEQ comply with the Section 128 requirements through Civil Service Rule 2-8.3(a)(1). This rule specifies that at least annually, an employee shall disclose to the employee's appointing authority all personal or financial interests of that employee or members of the employee's immediate family in any business or entity with which the employee has direct contact while performing official duties as a classified employee. By definition, in Civil Service Rule 1-9.1, all MDEQ employees, including the Director, are subject to this disclosure rule. These rules were incorporated into Michigan's SIP on October 13, 2015 (80 FR 61311).

- **Section 110(a)(2)(F): Stationary source monitoring and reporting**

*Each such plan shall [...] require, as may be prescribed by the Administrator:*

- (i) *the installation, maintenance, and replacement of equipment, and the implementation of other necessary steps, by owners or operators of stationary sources to monitor emissions from such sources;*
- (ii) *periodic reports on the nature and amounts of emissions and emissions-related data from such sources; and*
- (iii) *correlation of such reports by the State agency with any emission limitations or standards established pursuant to this chapter, which reports shall be available at reasonable times for public inspection.*

Section 110(a)(2)(F) contains three subsections: (i) relating to monitoring emissions from sources; (ii) relating to periodic emission reports from sources; and (iii) correlation and public inspection of emission reports.

Subsections (i) and (ii) relating to monitoring emissions from sources and periodic emission reports from sources:

The MDEQ, under the authority of MCL 324.5503 and MCL 324.5512, implements a stationary source monitoring and reporting program in compliance with 40 CFR 51.212. The MDEQ requires stationary source performance testing, sampling, and reporting as provided in APCR R 336.2001 through R 336.2199 and as conditions of NSR permits. APCR R 336.2101 through R 336.2199 provides requirements for continuous emissions monitoring (CEM), and APCR R 336.201 through R 336.202 requires annual reporting of emissions, as required in 40 CFR Sections 51.211, 51.321 through 51.323, and Subpart A of 40 CFR Part 51. In addition, the MDEQ compliance and enforcement personnel oversee stack tests and CEMs verification and follow up if irregularities are indicated.

Subsection (iii) relating to correlation and public inspection of emission reports:

The MDEQ compiles and submits emissions data to the USEPA Emissions Inventory System in accordance with the USEPA regulations at 40 CFR Part 51, Subparts A and Q. State air permits and reported emissions are available to the public by request and online at [www.michigan.gov/deqair](http://www.michigan.gov/deqair).

- **Section 110(a)(2)(G): Emergency powers**

*Each such plan shall [...] provide for authority comparable to that in section 7603 of this title and adequate contingency plans to implement such authority.*

The MDEQ has adequate authority and resources to immediately address any ozone or ozone precursor emergency episodes. MCL 324.5518 grants the MDEQ authority to require the immediate discontinuation of air contaminant discharges that constitute an imminent and substantial endangerment to public health, safety, or welfare, or to the environment. MCL 324.5530 provides for civil action by the Michigan Attorney General for any violation described in MCL 324.5518. Where excess emissions have been identified, the MDEQ has taken immediate steps to curtail emissions, notify the public, and involve public health officials. Enforcement actions have also been pursued.

The MDEQ requests exemption from the contingency plan requirements, under 40 CFR Section 51.152(d), for all areas in the state because they are designated attainment/unclassifiable, or a Priority III region for the 2015 ozone NAAQS.

- **Section 110(a)(2)(H): SIP revisions**

*Each such plan shall [...] provide for revision of such plan:*  
*(i) from time to time as may be necessary to take account of revisions of such national primary or secondary ambient air quality standard or the availability of improved or more expeditious methods of attaining such standard; and*



- (ii) except as provided in paragraph (3)(C), whenever the Administrator finds on the basis of information available to the Administrator that the plan is substantially inadequate to attain the national ambient air quality standard which it implements or to otherwise comply with any additional requirements established under this chapter.*

The MDEQ has the authority to revise the Michigan SIP to comply with subsection (i) and to revise the Michigan SIP for situations described in subsection (ii). MCL 324.5503 designates the MDEQ as the Michigan agency that liaisons with the USEPA, including responding to any findings of inadequacy regarding the Michigan SIP and the air quality program. MCL 324.5503 and MCL 324.5512 grant authority to the MDEQ to promulgate rules for controlling or prohibiting air pollution, complying with the federal CAA, and establishing suitable emission standards consistent with the NAAQS established by the USEPA. The MDEQ uses this authority to promulgate and revise rules that are submitted to the Michigan SIP to comply with Section 110(a)(2)(H).

- **Section 110(a)(2)(I): Plan revisions for nonattainment areas**

*Each such plan shall [...] in the case of a plan or plan revision for an area designated as a nonattainment area, meet the applicable requirements of part D of this subchapter (relating to nonattainment areas).*

The Guidance states that the USEPA's interpretation of the CAA does not require this element be addressed in an infrastructure SIP due to the different submission schedule required under CAA Title I Part D. The MDEQ therefore commits to submitting the required 2015 ozone attainment SIPs on the schedule set out in Part D.

- **Section 110(a)(2)(J): Consultation with government officials, public notification, and PSD and visibility protection**

*Each such plan shall [...] meet the applicable requirements of section 121 of this title (relating to consultation), section 127 of this title (relating to public notification), and part C of this subchapter (relating to prevention of significant deterioration of air quality and visibility protection).*

The MDEQ has adequate authority to comply with the first sub-element related to consultation. MCL 324.5503 designates the MDEQ as the Michigan agency to cooperate with appropriate agencies of the federal government, other states, and interstate and international agencies on air pollution control activities. The MDEQ, Air Quality Division's Director is an active board member of the Lake Michigan Air Directors Consortium (LADCO), which involves state and local governments, businesses, and community groups in the Lake Michigan area in air quality planning activities. LADCO's Article of Incorporation can be found at [http://www.ladco.org/about/ladco\\_doc/](http://www.ladco.org/about/ladco_doc/). Formal Memorandums of Understanding have been developed for processes involving transportation conformity and regional planning with state and local governments.

The MDEQ also consults with stakeholders from local governments, the business community, community and environmental groups, Federal Land Managers, and Tribal Nations during rule development, SIP planning, and permit issuance. Federal Land Managers are provided with notification of permit applications that may impact air quality and visibility in Class I areas, as required by APCR R 336.2816.

The MDEQ has adequate authority to comply with the second sub-element related to public participation. Under the authority of MCL 324.5511(3), draft permits and consent orders are subjected to the public participation process. Public comment periods and hearings, if requested, are held for all proposed revisions to the Michigan SIP, as required by 40 CFR, Part 51. Promulgation of administrative rules, authorized in MCL 324.5512, are also subject to the notice and hearing requirements of the Michigan Administrative Procedures Act, 1969 Public Act 306, as amended.

Under APCR R 336.2817, the MDEQ seeks comments on PSD applications from the public in the area near the proposed source, other state and local air pollution control agencies, chief executives of cities and counties, regional land use planning agencies, Federal Land Managers, and nearby states or Tribal governing bodies whose land may be affected. The MDEQ has a USEPA-approved PSD program, which includes all regulated pollutants, and is previously addressed above in the response to Section 110(a)(2)(E). The MDEQ intends the same provisions to satisfy the applicable requirements of this Section.

The MDEQ notifies the public: 1) if a NAAQS is exceeded, 2) of any public health hazards associated with those exceedances, and 3) to enhance public awareness of air quality issues through the MIAir Clean Air *Action!*, AIRNow, and EnviroFlash programs. The MDEQ also posts current air quality concentrations on the MDEQ website to enhance public awareness of air quality. On an annual basis, the MDEQ publishes an air quality report that describes the air monitoring data collected the previous calendar year and compares it to the NAAQS.

The visibility sub-element of this Section is not being addressed in this SIP submittal. In accordance with the USEPA's interpretation of the CAA in the Guidance, addressing this element is not required, as there are no new visibility protection requirements under CAA Title 1 Part C resulting from a revised NAAQS.

- **Section 110(a)(2)(K): Air quality modeling and submission of modeling data**

*Each such plan shall [...] provide for:*

- (i) the performance of such air quality modeling as the Administrator may prescribe for the purpose of predicting the effect on ambient air quality of any emissions of any air pollutant for which the Administrator has established a national ambient air quality standard; and*
- (ii) the submission, upon request, of data related to such air quality modeling to the Administrator.*

The MDEQ has the authority under APCR R 336.1240 and R 336.1241 to conduct modeling to evaluate proposed sources under the major and minor NSR permitting programs. The MDEQ also has the capability to perform source-oriented dispersion modeling with AERMOD to assess pollutant impacts for permitting and SIP development. This modeling includes predicting the effect the source will have on ambient air quality for the NAAQS and is conducted in accordance with the USEPA modeling guidelines in 40 CFR Part 51, Appendix W. In addition, the MDEQ contracts with LADCO to do any required photochemical modeling for the ozone and particulate matter 2.5 and 10 NAAQS SIP requirements.

The MDEQ, under MCL 324.5503, is the designated Michigan agency that submits any requested modeling data to the USEPA. The MDEQ also submits, upon request, modeling data to other interested parties.

- **Section 110(a)(2)(L): Permitting fees**

*Each such plan shall [...] require the owner or operator of each major stationary source to pay to the permitting authority, as a condition of any permit required under this chapter, a fee sufficient to cover:*

- (i) the reasonable costs of reviewing and acting upon any application for such a permit; and*
- (ii) if the owner or operator receives a permit for such source, the reasonable costs of implementing and enforcing the terms and conditions of any such permit (not including any court costs or other costs associated with any enforcement action), until such fee requirement is superseded with respect to such sources by the Administrator's approval of a fee program under subchapter V of this chapter.*

MCL 324.5522 grants the MDEQ the authority to levy and collect annual air quality fees from owners or operators of each fee-subject facility in Michigan as defined in MCL 324.5501. The MDEQ collects these permitting fees under its USEPA-approved Title V program.

- **Section 110(a)(2)(M): Consultation/participation by affected local entities**

*Each such plan shall [...] provide for consultation and participation by local political subdivisions affected by the plan.*

The MDEQ regularly involves local political subdivisions in attainment planning and decision-making as stated in the previous response addressing Section 110(a)(2)(J). The MDEQ intends that response to satisfy the applicable requirements of this section.

In addition, the MDEQ actively participates in forums with regional government planning organizations and establishes stakeholder workgroups in the development of air pollution control rules.

## **Part 2. Requirements for Section 110(a)(2)(D)(i)(I), Interstate Transport for the 2015 Ozone NAAQS**

The purpose of this analysis is to address the CAA's "Good Neighbor SIP" provisions for Michigan's ISIP for the 2015 ozone NAAQS. Specifically, it fulfills the requirements of the CAA, section 110(a)(2)(D)(i)(I), which states:

*Each such plan shall [...] contain adequate provisions prohibiting, consistent with the provisions of this title, any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will —*

*(I) contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any such national primary or secondary ambient air quality standard ...*

- **Summary**

The CAA section 110(a)(2)(D)(i)(I) prohibits any state from emitting any air pollutant that "will contribute significantly to nonattainment in or interfere with maintenance" of any other state's compliance with the NAAQS. This section of the CAA attempts to solve unique issues of air pollutants being emitted in one state and causing an impact in another state; i.e., interstate transport. With this analysis, the MDEQ is focused on Michigan's contribution to any other state's ability to meet the 2015 ozone NAAQS.

As with previous transport guidance, the USEPA suggested and the MDEQ used a four-step analysis to determine Michigan's contribution and any required emission reductions by Michigan. Through this analysis, the MDEQ demonstrates that additional emission reductions beyond existing and already-planned controls are not warranted to mitigate Michigan's contribution to maintenance and nonattainment issues in downwind states.

The following is an analysis that utilizes modeling performed by the USEPA and LADCO to quantify Michigan's emissions impact on downwind monitors. The "significant" modeled impact concentration is then determined through a combination of the USEPA guidance and our analysis. Based on this value, three monitors were found to be significantly impacted by Michigan's emissions for potential interference with maintenance. The LADCO analysis demonstrates that there will be no projected nonattainment monitors where Michigan's emissions contribute significantly. The remainder of this section analyzes Michigan's contributions and other factors to establish weight-of-evidence demonstrating that Michigan does not need to take any additional action to address the Good Neighbor SIP provisions of the CAA for the 2015 ozone NAAQS.

- **USEPA Modeling and Guidance Documents**

The USEPA issued a guidance memorandum and technical support document on March 27, 2018 (March 2018 memo), addressing the Good Neighbor provision for the 2015 ozone NAAQS. The memo references the four-step process to determine compliance with CAA section 110(a)(2)(D)(i)(I). This process was established for the Cross-State Air Pollution Rule (CSAPR) and gives modeling results projecting both maintenance and nonattainment receptors for 2023, modeling that both included and excluded water grid cells, and possible flexibilities that states could use when developing their Good Neighbor SIPs.

The USEPA used Comprehensive Air Quality Modeling with Extensions (CAMx) to identify projected maintenance and nonattainment receptors for the 2015 ozone standard. Projected maintenance receptors are those with a projected 2023 maximum design value (DV) over the standard. Nonattainment receptors are those with a projected 2023 average DV over the standard.

When a DV is determined for purposes of designating attainment or nonattainment at a monitor location, three years of monitoring data are averaged, using the 4<sup>th</sup> highest value from each year. If the three-year average is above the NAAQS, the monitor is deemed to be in nonattainment. A maximum monitored value above the NAAQS does not, by itself, result in the monitor being nonattainment or maintenance. The USEPA method used to project DVs to 2023 follows this same terminology but does not use the same methodology. See the 2015 ozone NAAQS Preliminary Interstate Transport Assessment (2016) for more details on the DV development methodology.

The March 2018 memo contains modeling for two scenarios; both include a 3x3 array of grid cells surrounding the location of the monitoring site. The first, referred to as “water,” uses all cells for the analysis. The second, “no water,” excludes cells that are more than 50 percent water by surface area if those cells do not include the monitoring site. This “no water” cell modeling was done because there is a theory that models may not perform well over areas dominated by water due to dynamical and chemical differences when compared to land. Given there were two modeling scenarios, the March 2018 memo gave results from both “water” and “no water” models.

The modeling results also contained linkage and contribution data. Source apportionment data was compiled for each state, boundary, biogenic, initial, and Canadian and Mexican emissions. Together this source apportionment resulted in linking states to monitors due to each state’s individual source contributions.

The March 2018 memo reiterates the use of the four-step analysis previously established for addressing interstate transport. The four steps are:

Step 1: Identification of downwind air quality problems.

Step 2: Identification of upwind states that contribute to downwind monitors that warrant further review and analysis.

Step 3: Identification of emission reduction factors necessary to identify any emissions that significantly contribute to nonattainment or interfere with maintenance of the NAAQS downwind.

Step 4: Adopt permanent and enforceable measures needed to achieve emission reductions.

This memo also suggested potential flexibilities related to the analytical approaches used for this Good Neighbor SIP analysis. The analysis below discusses some of the flexibilities addressed in the March 2018 memo.

- **LADCO Modeling and Technical Support Document**

LADCO provided modeling and supporting information titled “LADCO Interstate Transport Modeling for the 2015 Ozone National Ambient Air Quality Standard Technical Support Document” (LADCO TSD) dated August 13, 2018, in support of their member states’ ISIP submittals. This document is available in Attachment B. The LADCO TSD contains a modeling consistency demonstration, model assessment analyses, 2023 projections for maintenance and nonattainment monitors, and source apportionment analysis for projected maintenance monitors linked to states in the LADCO region.

In the LADCO TSD, modeling consistency with the USEPA modeling was established by demonstrating that the 2011 USEPA modeling platform could be adequately duplicated by LADCO modeling. Details of the methods used, and other benchmarking analyses, are located in the attached LADCO TSD. LADCO used the same techniques as the USEPA in their December 2014 memo “Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM<sub>2.5</sub>, and Regional Haze” to calculate all design values. Like the USEPA, LADCO conducted “water” and “no water” cell modeling. Finally, as with the USEPA modeling, source apportionment was completed using the CAMx Anthropogenic Precursor Culpability Assessment (APCA) tool.

The LADCO modeling deviated from the USEPA modeling in one substantial way. They enlisted the use of the Eastern Regional Technical Advisory Committee Electrical Generating Units Projection Tool (ERTAC EGU) to predict electrical generating unit (EGU) emissions as opposed to the USEPA, which used updated 2011-based EGU emission modeling platforms in conjunction with an “engineering analytics approach.” Using ERTAC EGU caused relevant differences in the modeling results, which are explained below. LADCO looked at the model bias in transport modeling. Further technical information regarding the LADCO modeling is available in the LADCO TSD.

- **Analysis**

Based on the March 2018 memo and previously established methods for addressing the Good Neighbor SIP, as discussed above, there are four steps to a Good Neighbor SIP analysis. The following analysis discusses each step separately along with any flexibilities described in the memo.

**Step 1: Identification of downwind air quality problems**

The first step in addressing transport issues is to identify which receptors are projected to be in nonattainment or maintenance for the target year of 2023. The USEPA and LADCO modeling resulting in 15 to 16 monitors linked to Michigan (Tables 1 and 2).

The USEPA and LADCO modeling used 2023 as the target year because it was the attainment date for moderate nonattainment areas when the modeling was conducted. Both models also used the same technique to distinguish between nonattainment and maintenance receptors. As previously described, modeled DVs are calculated for each receptor and used to determine whether that receptor is projected to be in nonattainment or maintenance. Projected maintenance receptors are those with a projected 2023 *maximum* DV over the 2015 ozone NAAQS, or at least 71 ppb. Nonattainment receptors are those with a projected 2023 *average* DV over the standard.

Table 1 contains the 16 monitor locations with a projected maximum or average DV exceeding the NAAQS, which also had some linkage to Michigan according to the USEPA modeling. (Linkages to be discussed in Step 2.) Exceedances of the standard are shaded.

**Table 1 – USEPA modeling results with DV greater than 2015 ozone standard and modeled linkage to Michigan**

Site ID	Monitor Location	No Water 2023 Avg. (ppb)	No Water 2023 Max. (ppb)	With Water 2023 Avg. (ppb)	With Water 2023 Max. (ppb)
90010017	Fairfield, CT	68.9	71.2	69.8	72.1
90013007	Fairfield, CT	71.0	75.0	71.2	75.2
90019003	Fairfield, CT	73.0	75.9	72.7	75.6
90099002	New Haven, CT	69.9	72.6	71.2	73.9
240251001	Harford, MD	70.9	73.3	71.4	73.8
360810124	Queens, NY	70.2	72.0	70.1	71.9
360850067	Richmond, NY	67.1	68.5	71.9	73.4
36103002	Suffolk, NY	74.0	75.5	72.5	74.0
480391004	Brazoria, TX	74.0	74.9	74.0	74.9
481210034	Denton, TX	69.7	72.0	69.7	72.0
482010024	Harris, TX	70.4	72.8	70.4	72.8
482011034	Harris, TX	70.8	71.6	70.8	71.6
482011039	Harris, TX	71.8	73.5	71.8	73.5
484392003	Tarrant, TX	72.5	74.8	72.5	74.8
550790085	Milwaukee, WI	71.2	73	64	67
551170006	Sheboygan, WI	72.8	75.1	70.8	73.1

Table 2 gives the same subset of results as Table 1 but using results from the LADCO modeling rather than the USEPA modeling. The LADCO modeling results in Michigan’s link to 15 monitors, most with lower projected DVs than with the USEPA modeling. Exceedances of the standard are shaded. A complete list of the modeled values is available in Attachment C.

**Table 2 – LADCO modeling results with DV greater than 2015 ozone standard and modeled linkage to Michigan**

Site ID	Monitor Location	No Water 2023 Avg. (ppb)	No Water 2023 Max. (ppb)	With Water 2023 Avg. (ppb)	With Water 2023 Max. (ppb)
90010017	Fairfield, CT	67.7	70	68.9	71.2
90013007	Fairfield, CT	69.3	73.2	69.8	73.7
90019003	Fairfield, CT	71.6	74.4	71.4	74.2
90099002	New Haven, CT	68.4	71	69.9	72.6
240251001	Harford, MD	70.5	72.8	71	73.3
360810124	Queens, NY	69.2	71	69.2	71
360850067	Richmond, NY	65.8	67.2	70.9	72.4
361030002	Suffolk, NY	72.9	74.4	71.6	73.1
480391004	Brazoria, TX	74.1	74.9	74.1	74.9
481210034	Denton, TX	69.8	72	69.8	72
482010024	Harris, TX	70.3	72.6	70.3	72.6
482011034	Harris, TX	70.8	71.7	70.8	71.7
482011039	Harris, TX	71.7	73.5	71.7	73.5
484392003	Tarrant, TX	72.6	74.8	72.6	74.8
551170006	Sheboygan, WI	72.3	74.6	70.5	72.8

**Step 2: Identification of upwind states that contribute to downwind monitors that warrant further review and analysis**

The next step described in the March 2018 memo is to determine which receptors are projected to be significantly impacted by Michigan emissions.

As previously mentioned, to determine each state’s contribution, a source apportionment analysis was completed using the CAMx APCA tool by the USEPA and LADCO. Table 3 includes Michigan’s modeled contributions to the monitoring locations specified in Tables 1 and 2 (those monitors that are projected to be in maintenance or nonattainment in 2023 and linked to Michigan). Contribution data was included for both “water” and “no water” modeling scenarios.

The LADCO and USEPA modeling gave very similar results across much of the country; however, there are small variations in areas relevant to Michigan’s projected responsibility to neighboring states. For example, using the LADCO “water” modeling, Michigan is only linked to projected maintenance receptors.



**Table 3 – Michigan’s modeled 2023 contributions to linked receptors**

Site ID	Monitoring Location	LADCO No water (ppb)	LADCO With water (ppb)	USEPA No water (ppb)	USEPA With water (ppb)
90010017	Fairfield, CT	NA	0.48	0.50	0.51
90013007	Fairfield, CT	0.67	0.68	0.70	0.70
90019003	Fairfield, CT	0.60	0.60	0.63	0.62
90099002	New Haven, CT	0.66	0.67	0.79	0.75
240251001	Harford, MD	0.76	0.77	0.79	0.79
360810124	Queens, NY	1.22	1.22	1.26	1.05
360850067	Richmond, NY	NA	1.03	NA	1.26
361030002	Suffolk, NY	0.98	0.96	0.94	0.92
480391004	Brazoria, TX	0.22	0.22	0.22	0.22
481210034	Denton, TX	0.08	0.08	0.08	0.08
482010024	Harris, TX	0.05	0.05	0.06	0.06
482011034	Harris, TX	0.17	0.17	0.17	0.17
482011039	Harris, TX	0.28	0.28	0.27	0.27
484392003	Tarrant, TX	0.13	0.13	0.13	0.13
550790085	Milwaukee, WI	NA	NA	2.01	NA
551170006	Sheboygan, WI	1.89	1.85	2.06	2.0

To this point in the analysis, the MDEQ has presented both the USEPA and LADCO modeled results to demonstrate relatively good agreement, although LADCO results are often slightly lower in the receptors of most concern to the State of Michigan.

The March 2018 memo suggests some potential flexibilities that can be used during the Good Neighbor SIP analysis. The MDEQ will exercise some of these flexibilities at this point in the analysis, including using LADCO modeling in place of the USEPA’s modeling, the ability to include or exclude certain model cells in post-processing based on the percentage of surface area covered by water within the cell, and the use of an alternative significance level.

**LADCO vs. USEPA Modeling:** One flexibility named in the March 2018 memo is the “[u]se of alternative power sector modeling consistent with the USEPA’s emission inventory guidance.” As stated previously, the LADCO modeling employs ERTAC EGU for its energy sector modeling, while the USEPA modeling employs an engineering analytics approach. The MDEQ prefers to use the LADCO modeling results as ERTAC EGU uses a more transparent and state-driven data gathering mechanism for EGU emissions and control projections. Although we recognize all regional air quality modeling will have uncertainties, the MDEQ has the most confidence in the LADCO modeling as described in the LADCO TSD.

For example, Table 4 shows the top eleven EGU sources in Michigan according to the USEPA’s 2023en modeling and ERTAC EGU. Some corrections to the modeling inputs from ERTAC EGU include three significant shutdowns verified by the MDEQ. The ERTAC EGUs 2023 modeling inputs were derived with robust review and comment by state air agency staff, are informed by the federal Energy Information Agency’s Annual Energy Outlook projections and also ensure projected generation is preserved for each region. Alternatively, the USEPA’s 2023en platform simply duplicated 2016 NOx emissions for many units or the USEPA made assumptions about how to adjust the operations of specific units without substantial involvement by state air agency staff or facility specific information.

**Table 4 – Modeled input and actual emissions of NOx from Michigan’s top eleven EGUs modeled by USEPA and ERTAC EGU.**

Unit	Source Name	2016 NOx Emissions	USEPA 2023en Inputs	ERTAC EGU 2023 Inputs	Comment
2	DTE St. Clair/Belle River	3954	3954	5339	
1	DTE St. Clair/Belle River	3043	2380	3631	
9A	DTE - Trenton Channel	1766	1394	0	Expected to close in 2022
3	DTE - Monroe	1221	1221	1087	
1	Consumers - JH Campbell	1151	1155	1484	
4	DTE - Monroe	1129	1129	1839	
1	LBWL	1058	1058	1292	
1	DTE - Monroe	999	999	1638	
3	DTE River Rouge	1859	988	0	Expected to close in 2021
3	Consumers - JH Campbell	796	807	2247	
7	DTE St. Clair/Belle River	1049	776	0	Expected to close in 2022

Water Cell vs. No Water Cell: The March 2018 memo includes a flexibility by the USEPA that modifies the 3x3 standard modeling grid cell approach by eliminating from the DV calculations grid cells dominated by water (“no water”). This technique has merit and deserves further study, but at this time, eliminating water cells appears arbitrary and unsupported with observational evidence. Therefore, the MDEQ concludes the results of the “no water” option will not be considered any further in this analysis and the MDEQ will use the LADCO “water” modeling only.

Significance Level of 1 percent vs 1 ppb: One March 2018 memo flexibility includes “establishing a contribution threshold...that leverage some of the analytics and statistical data created to support the development of the Significant Impact Level for ozone.”

The original methodology used for the CSAPR analysis established a significance level if a state contributed more than 1 percent of the NAAQS to another state’s projected maintenance or nonattainment monitor. For the 2015 ozone NAAQS this would be equivalent to 0.7 ppb. It is worth noting that photochemical modeling naturally contains errors and biases much larger than 0.7 ppb, therefore using a significance threshold of 0.7 ppb may not be appropriate.

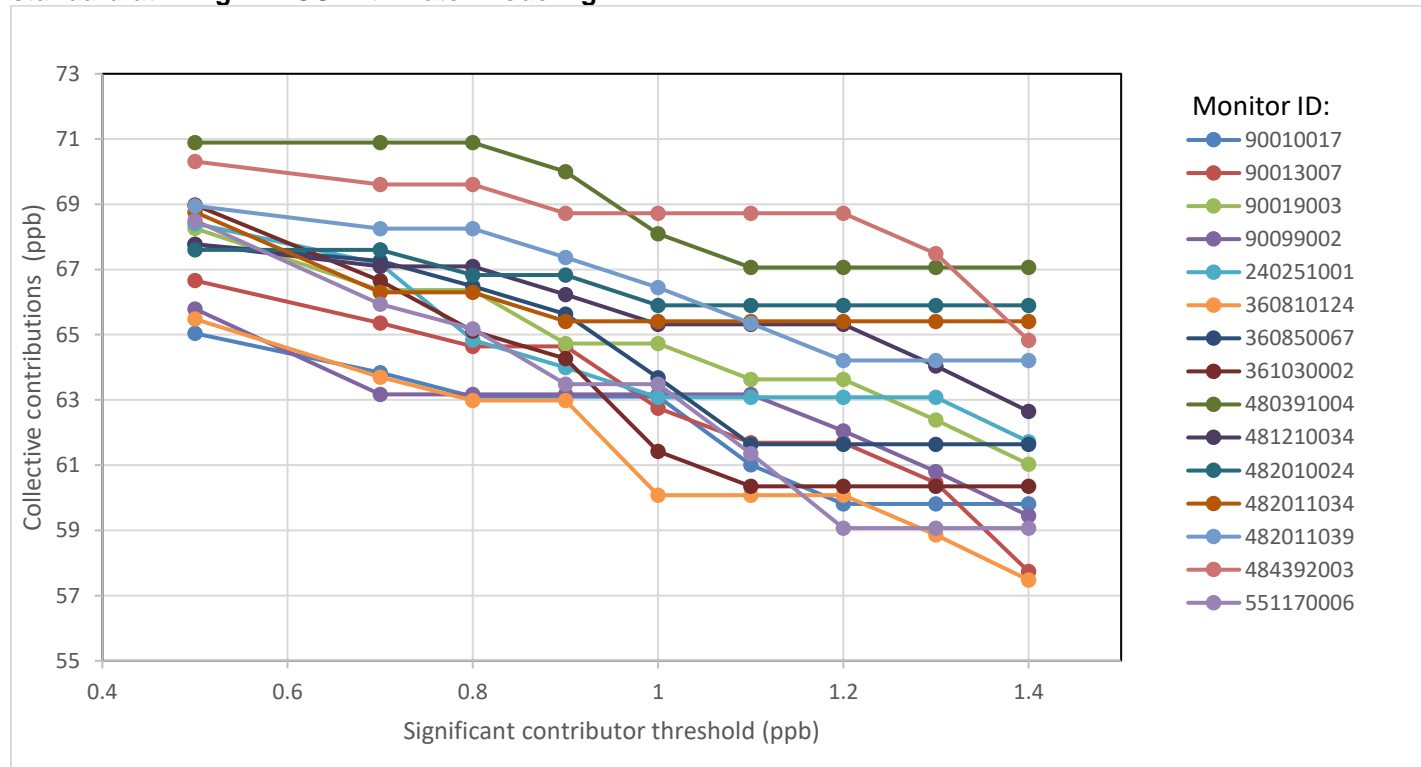
A recent guidance published on April 17, 2018, written for the PSD permitting program, establishes a Significant Impact Level (SIL) of 1 ppb for the 2015 ozone NAAQS. Logically, it

follows that if a stationary source is considered insignificant (under 1 ppb), a state should also be considered insignificant when it too is below the same threshold.

To further analyze whether a 1 ppb significance value is appropriate, the MDEQ looked at each receptor linked to Michigan using the LADCO “water” modeling results. First, the impact from all source categories and states with a contribution of 0.5 ppb or greater was summed to determine a “collective upwind contribution” at the 0.5 ppb significance level. This was then repeated at 0.1 ppb intervals up to 1.4 ppb. As the significance threshold rose from 0.5 ppb to 1.4 ppb, fewer sources were shown to contribute to impacts at each monitor. These values are plotted in Figure 1, showing the collective contribution as a function of the significant threshold for each monitor linked to Michigan. The premise is that, if the collective contribution remains nearly horizontal as the significance level changes, then significance can be assumed to be the last value before the plot slopes downward.

Figure 1 shows that a collective contribution decrease appears between the significant contribution threshold of 0.9 and 1.0 ppb. After 1.0 ppb, the majority of the monitors have a constant collective contribution. There is another inflection point between 1.2 ppb and 1.4 ppb for approximately half of the monitors. The first inflection point occurs in a majority of the collective contribution monitors between 0.9 ppb and 1.0 ppb, and that number correlates with the PSD permitting SIL.

**Figure 1 – Collective contribution for receptors with an impact linked to Michigan and a DV over standard utilizing LADCO with water modeling**



On August 31, 2018, the USEPA issued a memorandum, “Analysis of Contribution Thresholds for Use in Clean Air Act Section 110(a)(2)(D)(i)(I) Interstate Transport State Implementation Plan Submissions for the 2015 Ozone National Ambient Air Quality Standards,” in which a

similar analysis was performed. It states that, “a threshold of 1 ppb may be appropriate for states to use to develop SIP revisions addressing the Good Neighbor provision for the 2015 ozone NAAQS.” This memo; the March 2018 memo; the April 17, 2018 guidance; and the MDEQ analysis allow the MDEQ to confidently select a significance threshold of 1 ppb.

**Step 2 Summary:** Using the LADCO “with water” modeling and the 1 ppb threshold for significance, Michigan’s links are reduced to three receptors: Sheboygan, Wisconsin; Queens, New York; and Richmond, New York.

Table 5 summarizes information on the linked receptors based on the use of the LADCO “water” modeling and a significance threshold of 1 ppb. This table shows in 2023, the receptors linked to Michigan are projected to be maintenance receptors. Michigan is not projected to significantly impact any nonattainment receptors. It also shows that the maximum DV for the linked receptors is less than 2 ppb from meeting the 2015 ozone NAAQS and Michigan’s projected contribution to the total DV is 1.85 ppb or less.

**Table 5 – Receptors modeled to have impacts 1 ppb or greater linked to Michigan using LADCO “water” modeling**

Site ID	Monitor Location	2023 Average DV (ppb)	Margin from Standard (ppb)	2023 Maximum DV (ppb)	DV Margin from Standard (ppb)	Michigan Projected Contribution to the Total DV (ppb)
360810124	Queens, NY	69.2	(1.7)	71	0.1	1.22
360850067	Richmond, NY	70.9	0.0	72.4	1.5	1.03
551170006	Sheboygan, WI	70.5	(0.4)	72.8	1.9	1.85

**Step 3: Identification of emissions reduction factors necessary to identify any emissions that significantly contribute to nonattainment or interfere with maintenance of the NAAQS downwind**

The third step established by the USEPA in the CSAPR guidance and reiterated in the March 2018 memo is to identify any air quality reductions necessary to prevent upwind states from contributing significantly to nonattainment or interfering with maintenance of the NAAQS at a downwind monitor. As stated above, Michigan is not projected to contribute significantly to any nonattainment areas by 2023. The three monitors that Michigan is linked to are projected to be in attainment of the 2015 ozone NAAQS by 2023.

Michigan determined that if no emission reductions are required for the projected contribution to the Sheboygan, Wisconsin monitor, no emission reductions would be required for the Queens and Richmond, New York monitors. This assumption is due to Michigan’s projected contribution to the Sheboygan monitor being the largest of the three receptors linked to Michigan (Table 5).

**Weight-of-Evidence Analysis:** The MDEQ offers the following weight-of-evidence analysis to demonstrate that no emission reductions are necessary when the magnitude of Michigan’s impacts on maintenance of out-of-state monitors is considered along with on-the-way and on-the-books controls, as well as expected reductions in Michigan’s emissions profile. The analysis does not necessarily build on itself; rather, taken as a whole, it makes the case that emission reductions by Michigan are not necessary to satisfy Michigan’s obligation under the Good Neighbor SIP requirements.

The March 2018 memo lists several potential flexibilities that states can consider when determining what emission reductions are necessary to satisfy their Good Neighbor SIP obligations. The MDEQ will utilize several of these flexibilities for this weight-of-evidence analysis.

**a. Maintenance vs Nonattainment Receptor**

One of the March 2018 memo flexibilities is “whether the remedy for upwind states linked to maintenance receptors could be less stringent than those linked to nonattainment receptors.” Michigan believes that the response to a projected maintenance receptor should be assessed differently than a nonattainment receptor.

Under Part D of the CAA, if an area is in nonattainment, emission reductions need to occur to get the area into attainment. Once an area can be redesignated into attainment, that area is defined as a maintenance area. For SIP development, maintenance areas require a maintenance plan with contingency measures that can be enacted to reduce emissions *if the area violates that standard in the future*. There are no requirements in maintenance areas to actually reduce emissions until a violation occurs.

The CAA treats nonattainment areas and maintenance areas differently for nonattainment SIP development. Therefore, it stands to reason that they should be treated differently in a Good Neighbor SIP, as well. Because the CAA does not require emission reductions in maintenance areas, a state can make a valid demonstration that reductions are not necessary for projected maintenance monitors for a Good Neighbor SIP.

Michigan believes that requiring states to reduce the projected contribution amount to projected maintenance receptors is not required in certain circumstances such as the following:

- very small projected maintenance exceedance;
- very small projected contribution to the maintenance receptor, especially in comparison to other states;
- sector contributions that demonstrate the majority of the contribution is from federally regulated sources or sources without any possibility of regulation;
- large impacts of international emissions; and
- downward emission trends.

Sheboygan Small Projected Maintenance Exceedance: Again, maintenance receptors are those that have been projected to attain the standard by 2023 but have a maximum *projected* DV above the NAAQS. These are areas that will probably attain the standard but have a potential to violate the standard after attainment. Their potential to violate the standard can be shown in relation to how high above the standard their projected maximum DV falls.

In the case of the Sheboygan monitor, with a projected 2023 maximum DV of 72.8 ppb, the potential to violate the 2015 ozone NAAQS is rather small or just 1.9 ppb (the difference between the projected value and the attainment value). This is a prime example of a receptor that has a very small projected maintenance exceedance, less than 2 ppb or 2.5 percent. As stated above, this monitor is projected to be in attainment in 2023, but due to the projected maximum DV above 70.9 ppb, there is a chance the

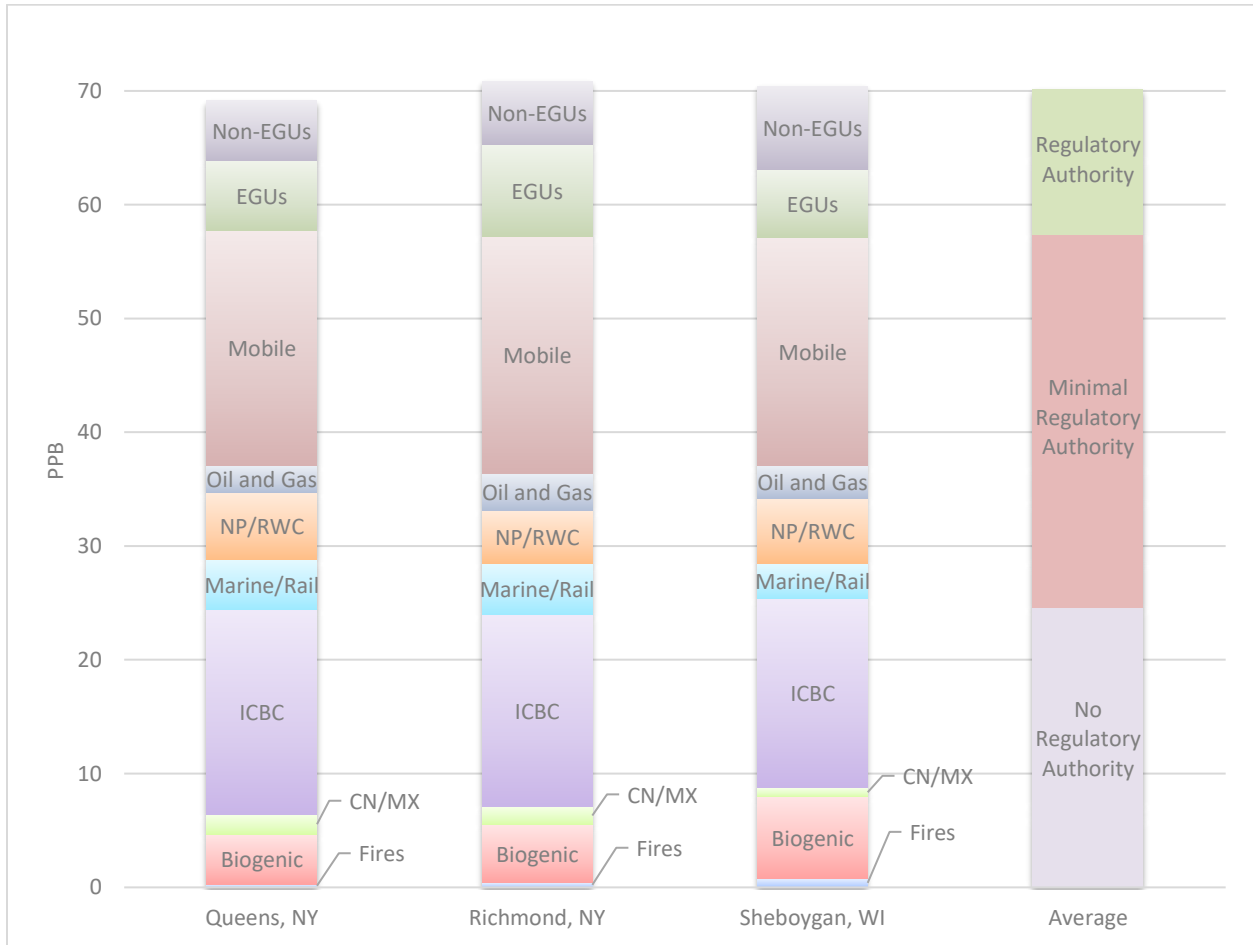
monitor will have trouble maintaining the 2015 ozone NAAQS. In a typical maintenance area, emission reductions would not be required because the area would be monitoring attainment. Again, the Sheboygan monitor is projected attainment. Therefore, requiring any reductions by Michigan would be premature and overly burdensome (more details in the following subsections).

**b. Sector Contributions**

As described in the LADCO TSD, LADCO performed modeling that examined the sector contributions from *all states collectively* to the receptors of interest. Although emissions were not broken down by state, they give insight into the ability of states, including Michigan, to affect the concentrations at monitors. The LADCO sector data is included as Attachment C.

Figure 2 demonstrates that approximately 15 ppb of the maximum projected DV for the three monitors Michigan is linked to are caused by sources over which states have regulatory authority (EGUs, non-EGUs, and oil and gas). Again, Michigan sources are only a fraction of the contributors displayed here as these contributions contain emissions from all states collectively. Mobile emissions are approximately 20 ppb of the minimal regulatory authority category. These emissions are mostly controlled at the federal level through fuel economy standards. Also, other sources (initial contributions and boundary conditions [ICBC], biogenic, Canada and Mexico [CN/MX], and fires) that cannot be controlled at all by Michigan or other states' regulations contribute approximately 25 ppb to these receptors. It should be noted that due to the receptor locations in the Great Lakes and northeastern states, the majority of the CN/MX emissions can be assumed to be Canadian.

**Figure 2 – LADCO “water” modeling showing Sector contributions from full modeling domain**



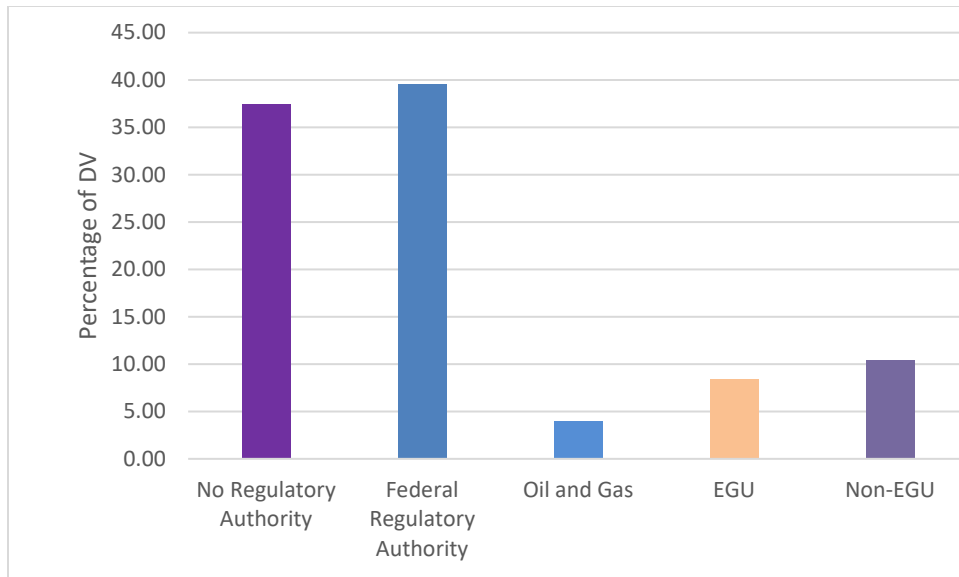
Sector contributions were discussed in the March 2018 memo as part of a weight-of-evidence argument addressing how remedies of upwind states linked to maintenance receptors should be considered differently than those linked to nonattainment receptors.

The three receptors linked to Michigan are projected maintenance receptors. The majority of the contributions come from fires, biogenic sources, Canada, ICBC, and mobile sources; i.e., sectors that are beyond the control of Michigan’s authorities. Therefore, it is unreasonable that states with relatively low contributions to projected maintenance receptors, such as Michigan, be required to reduce its already minor contributions.

Sheboygan Sector Contributions: Closer analysis of emission contributions at the Sheboygan monitor, which is 1.9 ppb above the 2015 ozone NAAQS, leads to a conclusion that Michigan exercises very little control over emissions causing that 1.9 ppb overage. The Sheboygan monitor is impacted 77 percent by sectors that are either federally regulated or there is no regulatory authority available (Figure 3).

This monitor is also impacted a total of 4 percent by emissions from the oil and gas sectors, 8 percent by emissions from EGUs, and 10 percent by emissions from non-EGUs. In Michigan, these sectors contain existing controls on sources (see subsection f).

**Figure 3 – Percentage of Sector Contributions to the Sheboygan Monitor 2023 Projected Maximum DV**



As noted above in Table 5, Michigan has a projected contribution of only 1.85 ppb to the Sheboygan monitor, just 2.5 percent of the DV. While the percentage that Michigan contributes to each sector in Figures 2 and 3 is not available, it illustrates that Michigan’s contribution to those sectors is very small because Michigan’s total impact to the Sheboygan DV is very small.

The sector contributions identified above include contributions from all states impacting the monitor and Michigan’s portion of these sector contributions is small. This coupled with the knowledge that Michigan sources in these sectors are already controlling emissions, suggests Michigan sources should not be required to implement additional emission controls to comply with the Good Neighbor SIP requirements.

**c. Comparison of Michigan’s Contributions to Other States and Sources**

Another flexibility addressed in the March 2018 memo is the consideration of high initial contributions and high contributions from other states and sources, and whether this should influence emission reduction factors. Figure 3 shows the monitors of interest, and graphically depicts the LADCO “water” modeling source apportionment. It shows Michigan and several other states’ contributions, biogenic and fire sources, the Canadian contributions, and boundary and initial condition contributions as well as miscellaneous others. It clearly demonstrates that the monitors are heavily influenced by international sources and states other than Michigan.



**Figure 4 – LADCO with water modeling contribution – by source state**



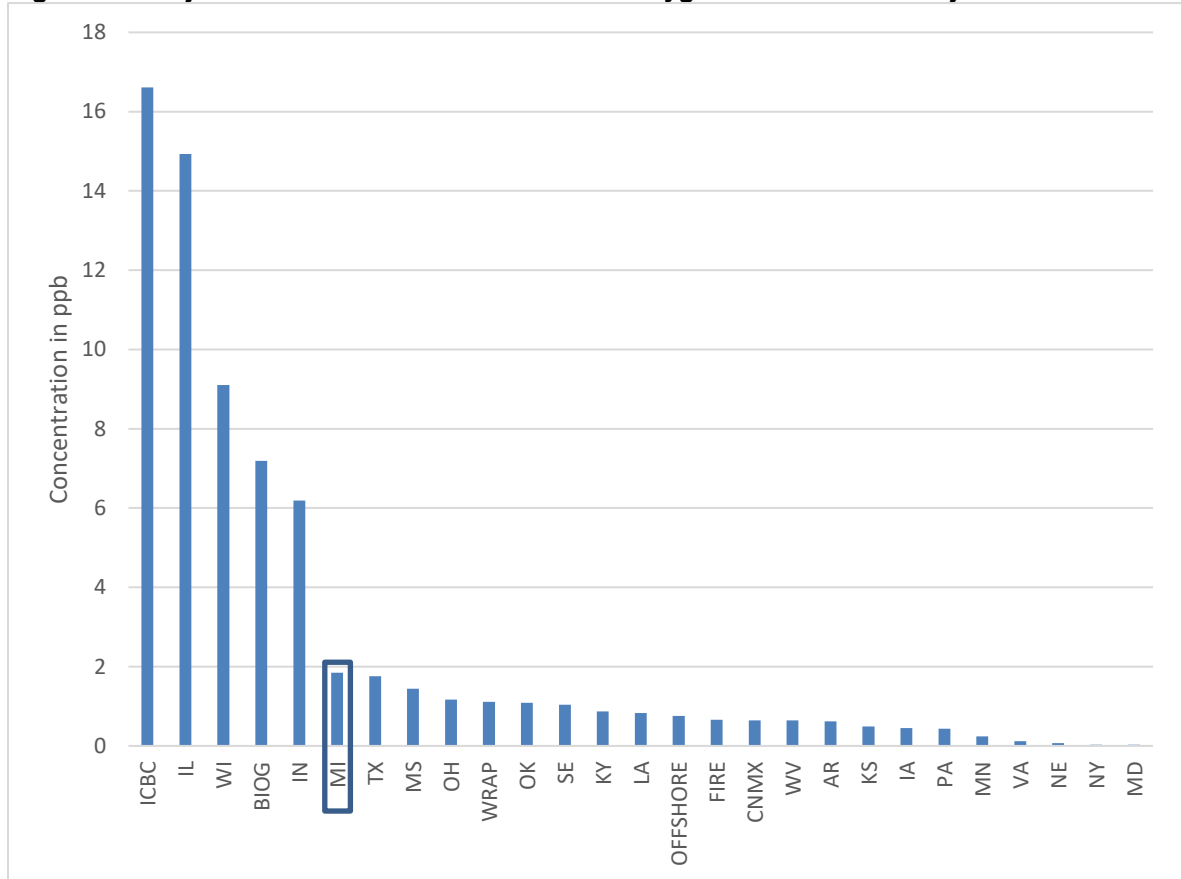
Table 6 gives numerical values for some of the values shown graphically in Figure 4. Michigan’s contribution to the three projected maintenance monitors is less than 12 percent of the boundary conditions, less than 28 percent of the biogenic contribution, and comparable to the Canadian and offshore source contributions.

**Table 6 – LADCO “water” modeling largest contributors with maximum receptor value over standard and contribution from Michigan > 1 ppb**

Contributors	Queens, NY (ppb)	Richmond, NY (ppb)	Sheboygan, WI (ppb)
Initial and boundary conditions	17.98	16.87	16.61
“Home” state	13.18	6.99	9.1
Single largest contributing non-home state	6.53 (PA)	9.83 (PA)	14.93 (IL)
Biogenic	4.4	5.1	7.19
Offshore	2.23	1.92	0.76
Canada and Mexico contribution	1.72	1.54	0.64
Michigan	1.22	1.03	1.85

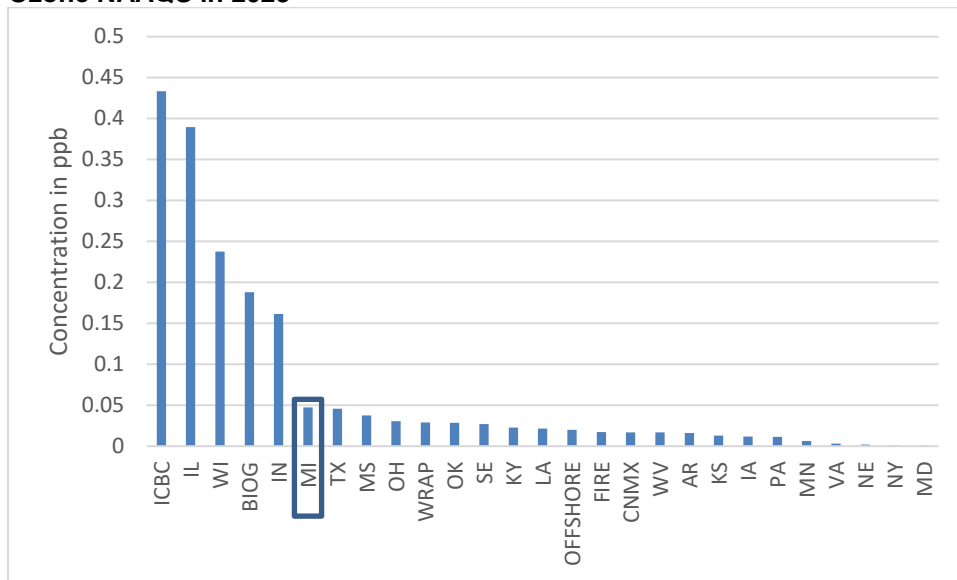
**Sheboygan Source Comparison:** Figure 5 ranks the contributions by states to the Sheboygan monitor from Figure 4 in a highest to lowest format. The two highest contributors are initial contributions and boundary conditions (ICBC) and Illinois (IL), contributing 16.61 ppb and 14.93 ppb, respectively. These two sources alone bring the 2023 Sheboygan monitor value to 31.54 ppb or 44 percent of the 2015 ozone NAAQS.

**Figure 5 – Projected Source Contributions to Sheboygan Monitor 2023 Projected DV**



There is a substantially diminished impact between the top two contributors (ICBC and IL) and the next three. The three next highest contributors to this monitor are Wisconsin (WI), biogenic sources (BIOG), and Indiana (IN), contributing 9.1 ppb, 7.19 ppb, and 6.19 ppb respectively, or 32 percent of the projected DV. Adding these top five contributing sources, the Sheboygan monitor has a projected 2023 value of 54.02 ppb, or 76 percent of the projected DV. In comparison, Michigan's projected contribution of 1.85 ppb is only 2.6 percent of the projected DV. When these sources are compared to the exceedance of the 2015 ozone NAAQS at the Sheboygan monitor, Michigan's impact is projected to be even smaller.

**Figure 6 – Projected Source Contribution to Sheboygan Monitor’s Exceedance of the 2015 Ozone NAAQS in 2023**



**Table 7 – Top 10 Projected Source Contribution Values to Sheboygan Monitor’s Exceedance**

Source	ICBC	IL	WI	BIOG	IN	MI	TX	MS	OH	WRAP
Contribution to exceedance (ppb)	0.43	0.39	0.24	0.19	0.16	0.05	0.05	0.04	0.03	0.03

The Sheboygan monitor has a projected maximum DV of 72.8 ppb, just 1.9 ppb over the 2015 ozone NAAQS. Figure 6 shows each source that contributes to the Sheboygan monitor as a percentage of the exceedance of the 2015 ozone NAAQS. Table 7 lists the top ten contributors to that monitor’s projected exceedance. The top two sources, initial contributions and boundary conditions plus Illinois contribute approximately 0.82 ppb to the Sheboygan monitor’s projected exceedance, or 43 percent. The top five contributors collectively contribute approximately 1.41 ppb to the projected exceedance, or 74 percent. Whereas Michigan has a projected contribution to the exceedance of just 0.05 ppb, or 2.6 percent. This small reduction could easily be attained by on-the-books and on-the-way controls (see subsection f). Therefore, requiring additional emission reductions from Michigan sources should not be required, especially when compared to the magnitude of other source contributors.

Sheboygan Monitor International Emissions Comparison: Because the Sheboygan monitor is in close proximity to Canada, it could be valid to eliminate that portion of the international contribution to this monitor’s DV. Canada can be said to contribute all of the CN/MX emissions to this monitor, again due to the close proximity to Canada. The Canadian emissions, approximately 0.64 ppb, when reduced from the Sheboygan DV, yield a maximum projected DV of 72.2 ppb. Reducing the international emissions by another 1.2 ppb, or 7 percent of the total ICBC, would result in attainment of the Sheboygan monitor.

Michigan’s projected contribution to the Sheboygan monitor, 1.85 ppb, are only 9 percent of the international contributions affecting the Sheboygan monitor. The international emissions were shown to cause 23 percent of the exceedance of the Sheboygan monitor, whereas Michigan was only shown to cause 2.6 percent of the exceedance, or 0.05 ppb. Using the projected DV with the elimination of the Canadian emissions, yields a projected exceedance for the Sheboygan monitor of only 1.3 ppb, with a Michigan projected contribution to that exceedance of only 0.03 ppb. Again, a 0.03 ppb reduction of emissions for Michigan can easily be achieved through existing on-the-book and on-the way controls; therefore, it would be premature to require additional emission reductions from Michigan sources at this time.

**d. Apportioning Contributions**

Another Step 3 flexibility suggested in the March 2018 memo is for states to apportion the contributions of all projected significant contributors to obtain a better picture of the individual states’ “relative” responsibility. Tables 8 through 10 list all the states with a modeled contribution greater than 1 ppb for each projected maintenance receptor linked to Michigan. The significant contributions were summed, and a percentage was calculated for Michigan. This was then multiplied by the amount the monitor is projected to be over the standard. The resulting value illustrates Michigan’s share of the exceedance of the standard.

The courts have established that requiring “over-control” is not allowed. In EPA v. EME Homer City Generation, L.P. (134 S. Ct. 1584, 2014), the Supreme Court stated that for maintenance receptors, “EPA is limited...to reduce only by ‘amounts’ that ‘interfere with maintenance’; i.e., by just enough to permit an already-attaining State to maintain satisfactory air quality.” For the projected DVs at the three monitors of interest in this analysis to maintain the NAAQS, a total reduction of less than 2 ppb is needed. This small difference between maintaining the standard and not maintaining the standard is a strong indication that the three receptors of interest here will be able to maintain satisfactory air quality without further reductions from linked states.

As can be seen in Tables 8 through 10, Michigan’s linkage, when distributed proportionally amongst only significantly contributing states (those greater than 1 ppb) and reflecting only the exceedance, falls to less than 0.12 ppb. As stated above, these receptors are projected to attain the 2015 ozone NAAQS and are only projected to be in maintenance. Therefore, complete emission reductions should not be required. Also, when the percentage of non-regulatory sources that contribute to each receptor and the home states’ responsibility to their own monitors is considered, it would stand to reason that Michigan’s relative responsibility to the maintenance exceedance is substantially less than 0.12 ppb.

**Table 8 – Apportionment of contributions from upwind states (>1 ppb) to Queens, New York receptor**

2023 maximum DV/ exceedance (ppb/ppb)	PA (ppb)	NJ (ppb)	OH (ppb)	MD (ppb)	MI (ppb)	VA (ppb)	Sum of significant states (ppb)	MI portion of contribution/ exceedance (%/ ppb)
71.0/0.1	6.53	8.13	1.88	1.38	1.22	1.43	20.57	5.9/0.006

**Table 9 – Apportionment of contributions from upwind states (>1 ppb) to Richmond, New York receptor**

2023 max. DV/ exceedance (ppb/ppb)	PA (ppb)	NJ (ppb)	OH (ppb)	MD (ppb)	MI (ppb)	WV (ppb)	IN (ppb)	VA (ppb)	Sum of significant states (ppb)	MI portion of contribution/ exceedance (%/ppb)
72.4/1.5	9.83	10.57	2.24	1.69	1.03	1.61	1	1.66	29.63	3.5/0.05

**Table 10 – Apportionment of contributions from upwind states (>1 ppb) to Sheboygan, Wisconsin receptor**

2023 maximum/ exceedance (ppb/ppb)	OH (ppb)	MI (ppb)	IN (ppb)	MS (ppb)	TX (ppb)	OK (ppb)	IL (ppb)	Sum of significant states (ppb)	MI portion of contribution/ exceedance (%/ppb)
72.8/1.9	1.17	1.85	6.19	1.44	1.76	1.09	14.93	28.43	6.5/0.12

**e. Modeling Variability**

Michigan’s projected contribution is modeled at less than 0.05 ppb of the projected maintenance exceedance at the Sheboygan receptor (Table 7). This is less than the variation among the modeled results, as shown in Tables 11 and 12. Although this analysis relies on the LADCO “water” modeling, all the models discussed in this document have built-in variability.

A value of 0.05 ppb is not meaningful given this inherent variability of the modeling results. Michigan’s contribution to the receptors is less than one-third of the variability in the modeling results showing the best agreement of the models (LADCO vs. USEPA “water”) and is as little as 10 percent of the variation between the “water” and “no water” models for either LADCO or the USEPA. Therefore, Michigan’s proportional contribution to the maintenance monitors is only a small portion of the uncertainty in the modeling used to determine Michigan’s projected contribution.

In addition, each photochemical model has built-in modeling noise, making it difficult to ascertain the validity of extremely small projected numbers such as Michigan’s 0.05 ppb contribution.

Due to the modeling uncertainties, it would be difficult to require additional reductions from Michigan sources, especially considering the already low values at the receptors of interest here.

**Table 11 – Modeled results of receptors significantly impacted by Michigan**

	Modeled Maximum Design Value (ppb)		
	Sheboygan, WI	Queens, NY	Richmond, NY
USEPA water	73.1	71.9	73.4
USEPA no water	75.1	72	68.5
LADCO water	72.8	71	72.4
LADCO no water	74.6	71	67.2

**Table 12 – Variations for modeled results of receptors significantly impacted by Michigan**

Variability Between	Modeled Maximum Design Value Difference (ppb)		
	Sheboygan, WI	Queens, NY	Richmond, NY
LADCO models water/no water	1.8	0	5.2
USEPA models water/no water	2	0.1	4.9
Water cells USEPA/LADCO	0.3	0.9	1.0
No water cells USEPA/LADCO	0.5	1.0	1.3

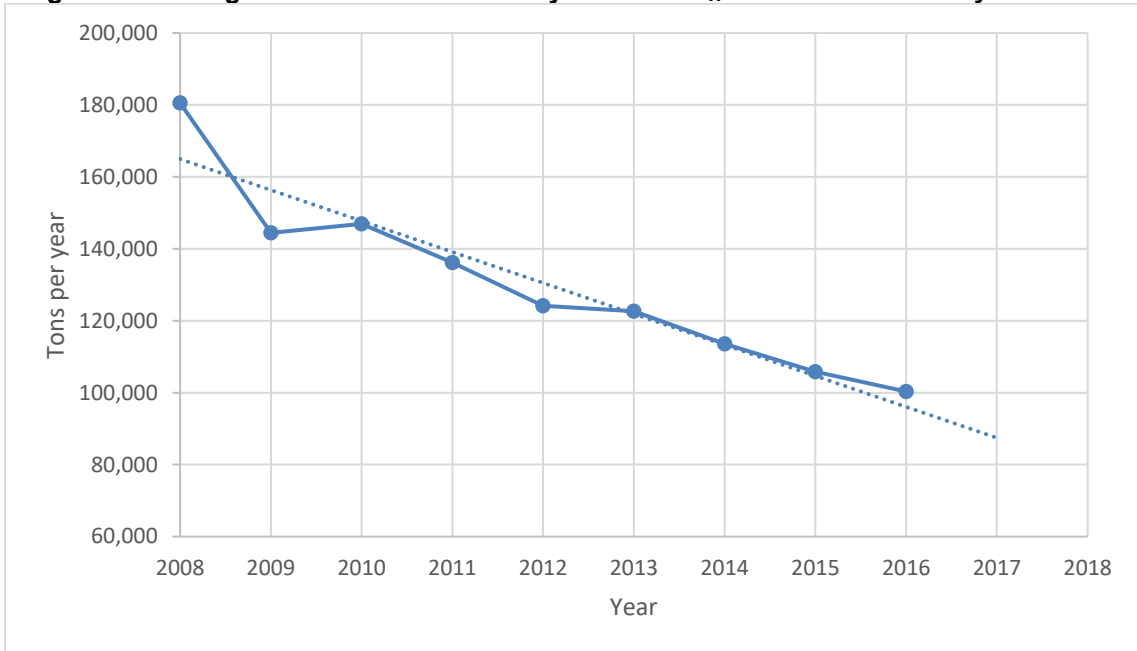
**f. Emissions Trends**

To help determine if additional emission reductions are necessary, it is useful to look at Michigan’s emissions trends and current emissions controls. Michigan is projecting a continued reduction in emissions from point sources of NO<sub>x</sub> and VOCs, EGUs, mobile sources, and from federal measures. In addition, Michigan EGU and non-EGU sources are currently controlling emissions by a variety of methods.

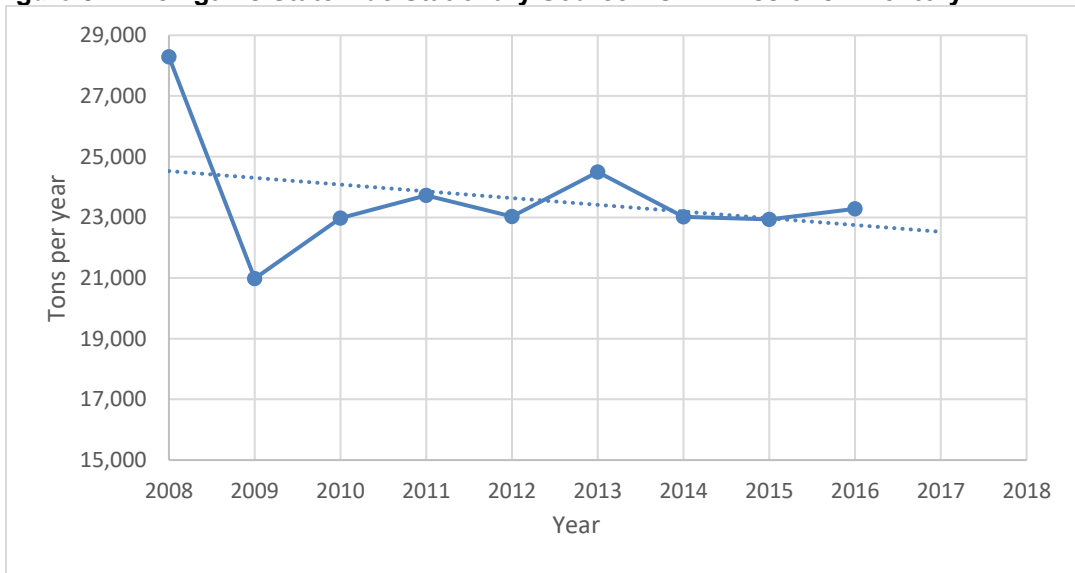
Since Michigan’s emissions have declined and are projected to continue to decline, Michigan is not likely to be a factor in another state’s ability to maintain their attainment status. Therefore, no additional reductions should be required.

Recent trends: Figures 7 and 8 show graphs of the NO<sub>x</sub> and VOC emissions submitted to the USEPA National Emissions Inventory for Michigan. As Figure 7 demonstrates, there has been a large decrease in Michigan’s industrial point source NO<sub>x</sub> emissions from 2008 to 2016, more than 80,000 tons or a 44 percent reduction. Figure 8 demonstrates a smaller but noticeable decrease in VOC emissions over the same period, about 5,000 tons or an 18 percent reduction. 2016 is the last year, prior to submittal of this document, for statewide validated emissions data. Figures 7 and 8 also project a downward trend of emissions into 2017, which will be explained in further detail below.

**Figure 7 – Michigan’s Statewide Stationary Source NO<sub>x</sub> Emissions Inventory**



**Figure 8 – Michigan’s Statewide Stationary Source VOC Emissions Inventory**



**EGU reductions:** In 2018, one Michigan EGU, the Marquette Board of Light & Power Shiras Steam Plant, shut down. This closure was not expected before 2023 and therefore, the reduction in emissions was not included in either the LADCO or USEPA modeling.

The LADCO and USEPA modeling would have included the 2011 NO<sub>x</sub> emissions at this plant of 310 tons per year. The closure of the Shiras Steam Plant resulted in actual NO<sub>x</sub> reductions of 293 tons per year, the amount reported to the Michigan Emission

Reporting System in 2017. This demonstrates that Michigan’s contributions to the linked monitors should be even lower than stated in both the USEPA’s and LADCO’s modeling.

Future EGU reductions: Michigan’s annual NO<sub>x</sub> and VOC emissions are expected to decline or stay consistent over time. All indications are that Michigan’s EGUs will continue to shutdown coal-burning units and replace them with cleaner burning, natural gas turbines and renewable energy sources. For example, the following Michigan EGUs in Table 13 are scheduled to retire by 2023.

**Table 13 – Michigan coal-fired EGUs expected to retire by 2023**

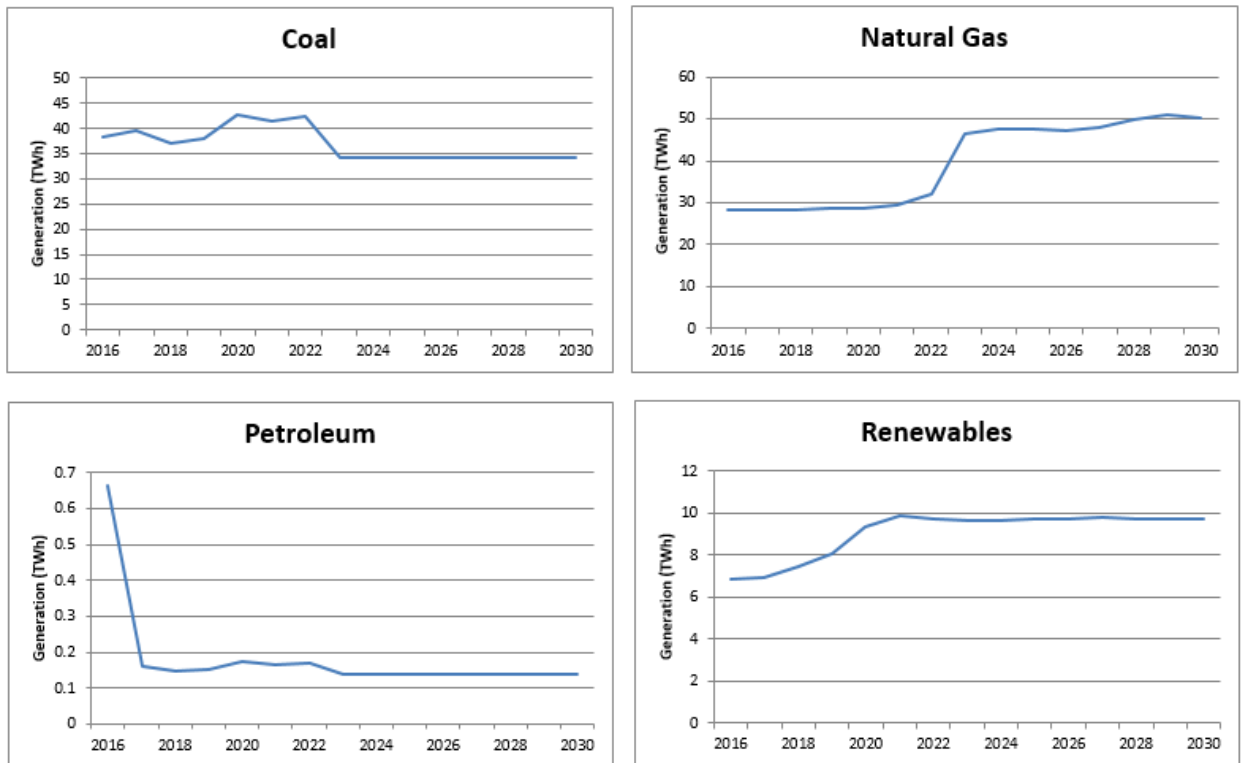
Plant	Size (Mega Watts)	Retirement Date
Lansing Board of Water and Light, Eckert Station, Units 1 and 3-6	375	2021
DTE, River Rouge, Unit 3	358	2021
We Energies, Presque Isle Power Plant, Units 5-9	359	2021
DTE St. Clair, Units 1-4 and 6-7	1,420	2022
DTE Trenton Channel, Unit 9	535	2022
Wyandotte, Unit 5	55	2022
Consumers Energy, Karn, Units 1-2	515	2023

In addition, power companies have made long-term planning commitments to grow renewable generation while continuing to encourage energy efficiency. This means fewer coal-fired power plants producing high emissions.

The Annual Energy Outlook (AEO) provided by the federal Energy Information Agency also corroborate these anticipated future power generation changes. For Michigan EGUs, the AEO forecasts the growth of renewables starting in 2019 and natural gas plants starting in 2023. The AEO also forecasts the decrease of coal starting in 2022. This gives assurance that the shift away from any closing plants will result in an overall decrease of emissions in Michigan.



**Figure 9 – 2018 AEO Forecast – Reliability First Corporation – Michigan**



Source: 2018 Annual Energy Outlook - Reference Case; Reliability First Corporation - Michigan

**Future Mobile Reductions:** One of the largest contributors to the receptors at issue here, shown in Figure 2, is the mobile sector. Future reductions from the mobile sector in Michigan will result from a variety of federal programs:

- Tier 3 Motor Vehicle Emission and Fuel Standards scheduled to be phased in between 2017 and 2025.
- CAFÉ standards scheduled to become more stringent through 2026.
- The “aging fleet” will continue to shift the percentage of “more” polluting vehicles to “less” polluting vehicles for many years.
- The Highway Heavy-duty Engine Rule.
- The Non-road Diesel Engine Rule.

**Future Federal Reductions:** Other federal measures will also contribute to additional NO<sub>x</sub> and VOC emission reductions in Michigan, such as:

- Implementation of the Reciprocating Internal Combustion Engine Standards. This will impact point sources.
- Category 3 Marine Diesel Engine Standards. These will be fully implemented by 2030.
- Oil and Natural Gas Industry Standards.
- Mercury and Air Toxic Standards.
- Landfill Standards.

Current Emission Controls: As stated in subsection b, the State of Michigan already requires controls on the industry sectors over which the State has regulatory control. Those controls include the following:

- In the oil and gas sector, sources are subject to applicable federal standards.
- Michigan's non-EGUs are subject to the NO<sub>x</sub> SIP Call. Collectively, these units are permitted to emit 2,209 tons of NO<sub>x</sub> per year. In reality, they emit a fraction of that limit; 132 to 441 tons or 6 to 20 percent of their permitted limits annually over the past 10 years.
- Michigan's EGUs are controlled using a variety of methods and are listed in Attachment D. Many are required to operate these controls as permit or consent order requirements. Michigan's EGUs are also in compliance with the CSAPR Update.

Attachment D includes a detailed list of Michigan's EGU and non-EGUs, their announced closing dates, and any control measures from the USEPA's Clean Air Markets Division.

### Step 3 Summary:

The third step established by the USEPA in the CSAPR guidance is to identify any air quality reductions necessary to prevent upwind states from contributing significantly to nonattainment or interfering with the maintenance of the NAAQS in a downwind monitor. The MDEQ, through weight-of-evidence demonstrated that no additional emission reductions are necessary to satisfy the Good Neighbor SIP requirements, especially because the monitors at issue are projected to be in maintenance.

The previous weight-of-evidence factors establish a very small projected maintenance exceedance for the violating monitors; a very small projected contribution to the maintenance receptor from Michigan, especially in comparison to other states; sector contributions that demonstrate the majority of the contributions are from federally regulated sources or sources without any possibility of regulation; large impacts of international emissions on the monitors of issue; and downward emission trends for Michigan sources. Taken as a whole, no emission reductions are necessary when the magnitude of Michigan's impacts on maintenance of these monitors are considered along with on-the-way and on-the-books controls as well as expected reductions in Michigan's emissions profile.

### **Step 4: Adopt permanent and enforceable measures needed to achieve emission reductions**

The analysis in Steps 1 through 3 collectively make it unreasonable for Michigan to take further actions to address transport in response to the promulgation of the 2015 ozone NAAQS. Michigan has only a trivial contribution to three projected maintenance monitors. These maintenance monitors are substantially impacted by background, natural sources, home-state contributions, and international contributions. Given the variability in the models, noting the emission trends, and current and future emission reductions, it is not practical to require Michigan to take additional actions.

Since Michigan is proposing that no additional action is necessary to address the Good Neighbor provisions of section 110(a)(2)(D)(i)(I), no permanent and enforceable measures to reduce emissions are necessary.