

# Infrastructure State Implementation Plan Requirements Relating to the Interstate Transport of Fine Particles

This State Implementation Plan (SIP) revision addresses Minnesota's "Good Neighbor" responsibilities for the interstate transport of pollutants under section 110(a)(2)(D)(i)(I) of the Clean Air Act (CAA) for the 2012 National Ambient Air Quality Standards (NAAQS) for particulate matter of less than 2.5 micrometers in diameter (PM<sub>2.5</sub>). Section 110(a)(2)(D)(i)(I) of the CAA requires that states address the interstate transport of pollutants and ensure that emissions within the state do not contribute significantly to nonattainment in, or interfere with maintenance by, any other state. This requirement means that Minnesota must show that emissions from within its borders are not significantly contributing to air pollution problems or violations in other states.

Minnesota's Good Neighbor SIP for the 1997 annual PM<sub>2.5</sub> NAAQS was submitted on October 23, 2007 and approved by EPA in the *Federal Register* on June 2, 2008 (effective August 1, 2008). Minnesota was found to significantly contribute to nonattainment of the 2006 24-hour PM<sub>2.5</sub> NAAQS in the Milwaukee, Wisconsin area and was included in the Cross State Air Pollution Rule, thereby fulfilling Good Neighbor responsibilities for that standard.

Based on the evidence outlined below, the Minnesota Pollution Control Agency (MPCA) believes that the limits and controls currently in place to limit PM<sub>2.5</sub> and its precursors are sufficient to ensure that Minnesota will not significantly contribute to nonattainment, or interfere with maintenance, in any downwind state. Therefore, Minnesota requires no further controls or emissions limits to fulfill Minnesota's responsibilities under the Good Neighbor provisions of the 2012 PM<sub>2.5</sub> NAAQS.

## Background

An Environmental Protection Agency (EPA) memorandum from March 17, 2016 entitled "Information on the Interstate Transport 'Good Neighbor' Provision for the 2012 Fine Particulate Matter National Ambient Air Quality Standards under Clean Air Act Section 110(a)(2)(D)(i)(I)" (2016 Memo) describes the preferred methodology for addressing Good Neighbor responsibilities. The methodology has been used most notably for the Cross-State Air Pollution Rule (CSAPR), which addressed both the 1997 annual and 2006 24-hour PM<sub>2.5</sub> NAAQS. EPA's approach uses a threshold to determine which states contribute significantly to nonattainment in or interfere with maintenance by downwind states with respect to an applicable NAAQS. EPA has determined that if a state's contribution to downwind air quality problems is below one percent of the applicable NAAQS, then it does not consider that state to be significantly contributing to the downwind area's nonattainment or maintenance concerns. EPA's approach to addressing interstate transport has been shaped by public notice and comment and refined in response to court decisions.

For the 2016 Memo, EPA used recent air quality modeling to identify monitor locations projected to have difficulty attaining or maintaining the NAAQS by the attainment deadline (2017). The Memo identified 19 potential nonattainment and maintenance receptors for 2017. Seventeen of these receptors are located in California, one is in Idaho, and one in Allegheny County, Pennsylvania.

The EPA did not conduct, and does not plan to conduct, additional modeling to determine what states significantly contribute to the 19 locations of concern identified through the forecasting discussed in the 2016 Memo. In the 2016 Memo, the EPA states that a weight-of-evidence approach would provide sufficient information to address the Good Neighbor requirements for the 2012 PM<sub>2.5</sub> NAAQS. Though states are welcome to conduct air quality modeling to identify individual state contributions to the locations of concern, EPA believes it sufficient for states to provide other kinds of data, such as emissions inventories, historical modeling, or other air quality information, to support a demonstration that the state is not a significant contributor to downwind air quality problems. Based on the evidence outlined below, the MPCA believes that the controls and emissions limits already in place in Minnesota are sufficient to ensure that emissions in the state will not significantly contribute to nonattainment, or interfere with maintenance, in any downwind state.

## Minnesota contributions

Minnesota has not historically contributed significantly to pollution concentrations in any of the areas projected to have nonattainment and maintenance problems identified in the 2016 Memo. In the original 2011 CSAPR modeling, which predicted base case (no CSAPR controls) contributions by states to downwind monitors in 2012, Minnesota was only shown to contribute significantly to nonattainment and maintenance problems under the 2006 24-hour PM<sub>2.5</sub> NAAQS in the Milwaukee, WI area. However, Wisconsin has no known air quality problems in relation to the 2012 PM<sub>2.5</sub> NAAQS. CSAPR modeling showed that Minnesota did not contribute significantly to nonattainment or interfere with maintenance of the 1997 annual PM<sub>2.5</sub> NAAQS for any downwind receptor. The 2012 annual PM<sub>2.5</sub> NAAQS is more stringent than the 1997 annual PM<sub>2.5</sub> NAAQS; however, air quality has generally improved across the nation, and there now is just one location of concern (Allegheny County, PA) in the eastern half of the country for the 2012 annual NAAQS versus 16 in the original CSAPR modeling. The following analysis addresses the locations identified in the 2016 Memo as having future nonattainment or maintenance problems.

## Western states

Weather patterns carry Minnesota's emissions to the south and east. Minnesota has not been previously shown to significantly contribute to air quality problems to the west of its borders. It is therefore reasonable to assume that Minnesota will not significantly contribute to any attainment or maintenance concerns in California or Idaho.

## Allegheny County, Pennsylvania

A monitor in Allegheny County, PA (Air Quality System ID #420030064) is the only monitor in the Eastern United States that EPA's updated modeling projects to have maintenance concerns by the initial 2017 attainment deadline for the 2012 PM<sub>2.5</sub> NAAQS. Minnesota has not been previously shown to contribute significantly to air quality concerns in Allegheny County.

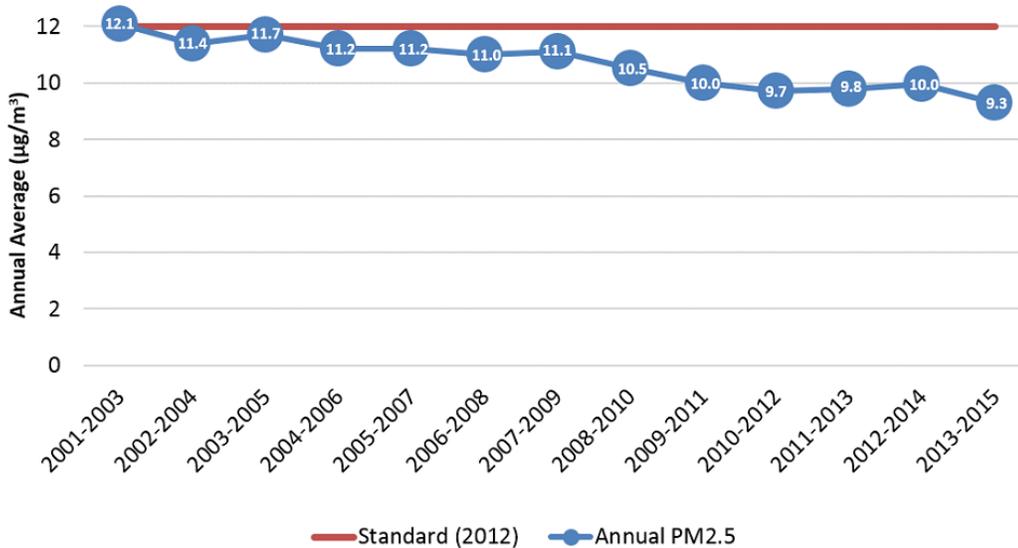
EPA has determined that if a state's contribution to downwind air quality problems is below one percent of the applicable NAAQS, then it does not consider that state to be significantly contributing to the downwind area's nonattainment or maintenance concerns. Minnesota's contribution to Allegheny County's air quality concerns was previously found to be significantly under the one percent threshold.

In the original CSAPR technical analysis, EPA conducted source apportionment modeling predicting state contributions to downwind monitors in 2012 under conditions expected without emissions reductions resulting from CSAPR implementation (base case). EPA's modeling projected that the highest annual PM<sub>2.5</sub> NAAQS contribution Minnesota would have on any monitor in Allegheny County was 0.047 µg/m<sup>3</sup>. Minnesota's contribution to AQS monitor number 420030064 – the monitor of concern in the 2016 Memo modeling – was 0.046 µg/m<sup>3</sup>. The one percent threshold for the 1997 annual standard was 0.15 µg/m<sup>3</sup> and for the 2012 annual standard – relevant to this submittal – would be 0.12 µg/m<sup>3</sup>. Though state-level emissions and air quality concentrations have varied in the years since the original CSAPR modeling was conducted, Minnesota's downwind contribution can be reasonably assumed to still be significantly under the one percent threshold, especially since Minnesota's emissions have been decreasing in recent years (see below).

## Minnesota ambient concentrations

Fine particle pollution levels in Minnesota have been steadily improving since 2003. The Figure 1 demonstrates the ongoing reductions in fine particle concentrations found in Minnesota, which would be reasonably assumed to be indicative of reduced contributions to PM<sub>2.5</sub> concentrations in other states.

Figure 1: Statewide maximum annual PM<sub>2.5</sub> design value trend (2003-2015)



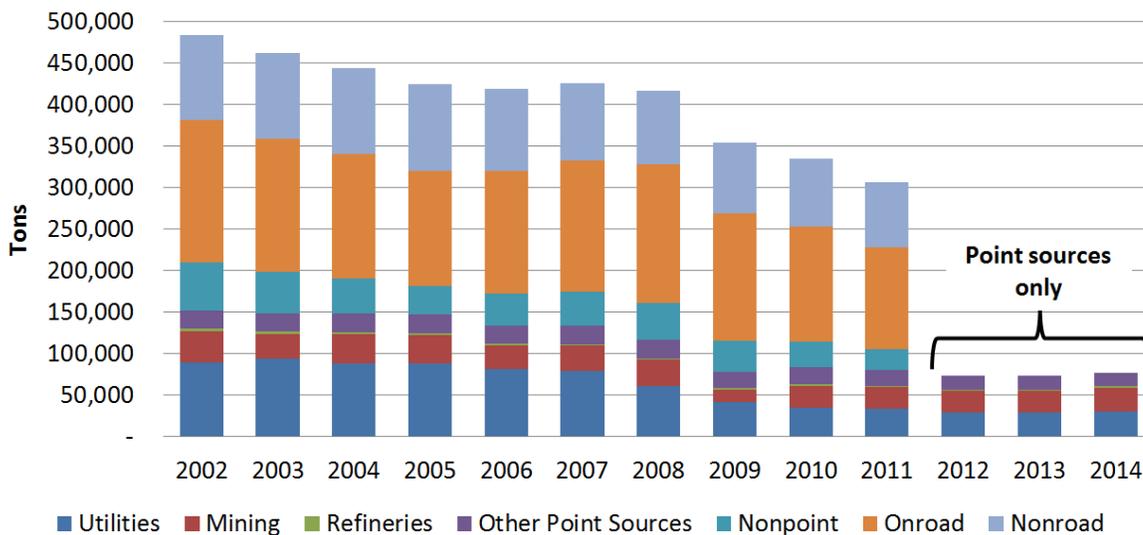
## Minnesota emissions

The final implementation rule for the 2012 PM<sub>2.5</sub> NAAQS identifies sulfur dioxide (SO<sub>2</sub>), oxides of nitrogen (NO<sub>x</sub>), volatile organic compounds (VOCs), and ammonia as PM<sub>2.5</sub> precursors. PM<sub>2.5</sub> can also be directly emitted. The following sections address Minnesota's emissions trends for PM<sub>2.5</sub> precursor pollutants and directly emitted PM<sub>2.5</sub>.

### Nitrogen oxides (NO<sub>x</sub>)

Figure 2 shows that emissions of NO<sub>x</sub> in Minnesota have been declining in recent years. Data for 2012-2014 is for point sources only, as nonpoint source inventories are only prepared in National Emission Inventory (NEI) years and the most recent (2014) data is not yet available.

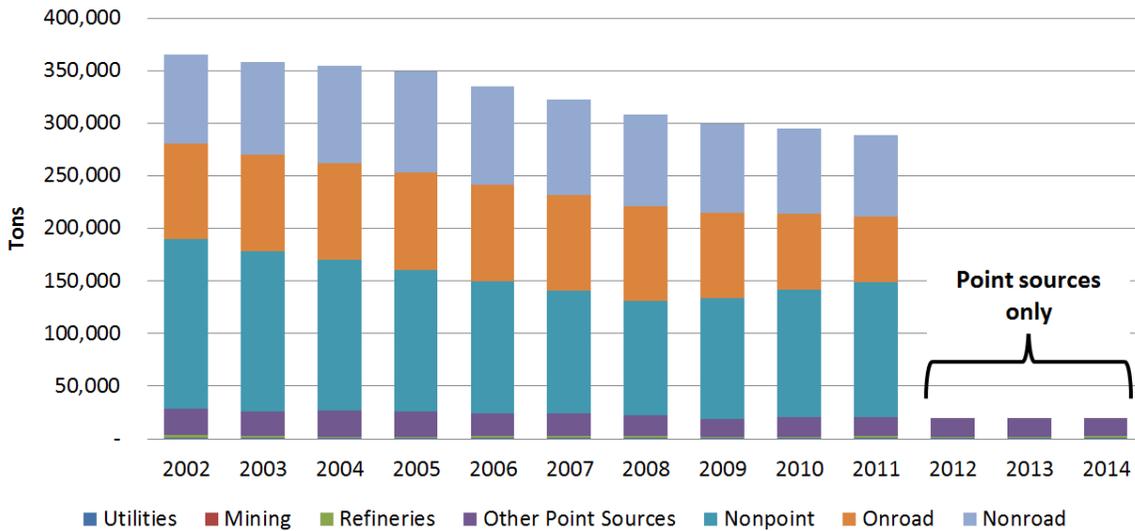
Figure 2: NO<sub>x</sub> annual anthropogenic emissions in Minnesota from 2002 to 2014



### Volatile organic compounds (VOCs)

Emissions of VOCs have been declining in recent years (Figure 3). Data for 2012-2014 is for point sources only, as nonpoint source inventories are only prepared in NEI years and the most recent (2014) data is not yet available.

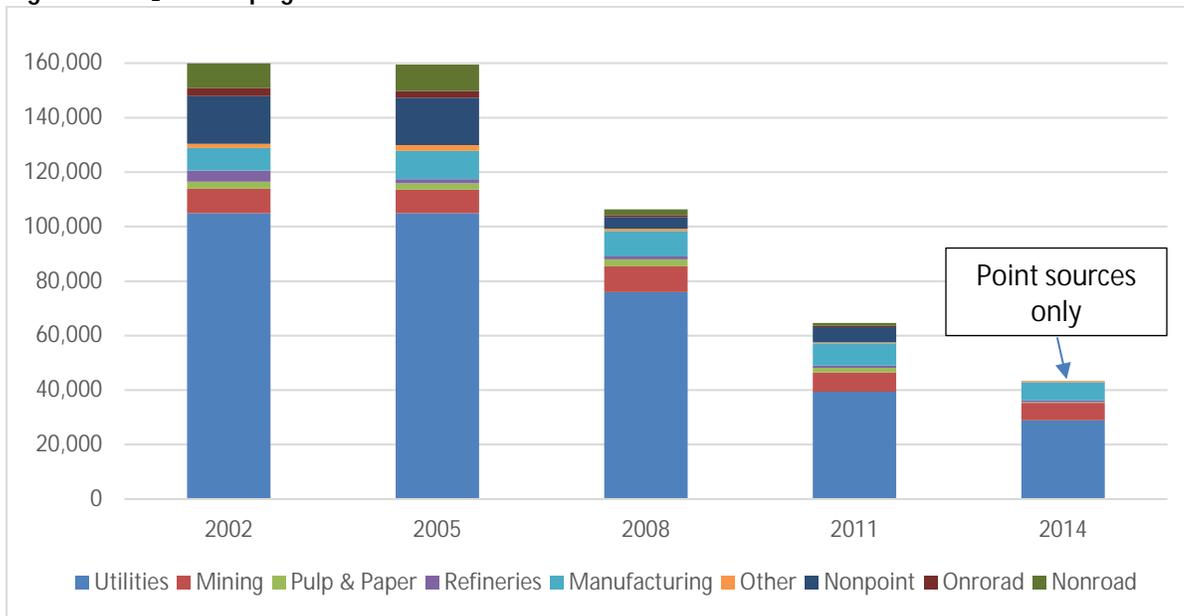
Figure 3: VOC annual anthropogenic emissions in Minnesota from 2002 to 2014



### Sulfur dioxide (SO<sub>2</sub>)

Figure 4 shows that emissions of SO<sub>2</sub> have been declining in recent years in Minnesota. Data is available only for years when the NEI is prepared. For 2014, only point-source data is shown, as nonpoint source inventories are only prepared in NEI years and the most recent (2014) data is not yet available.

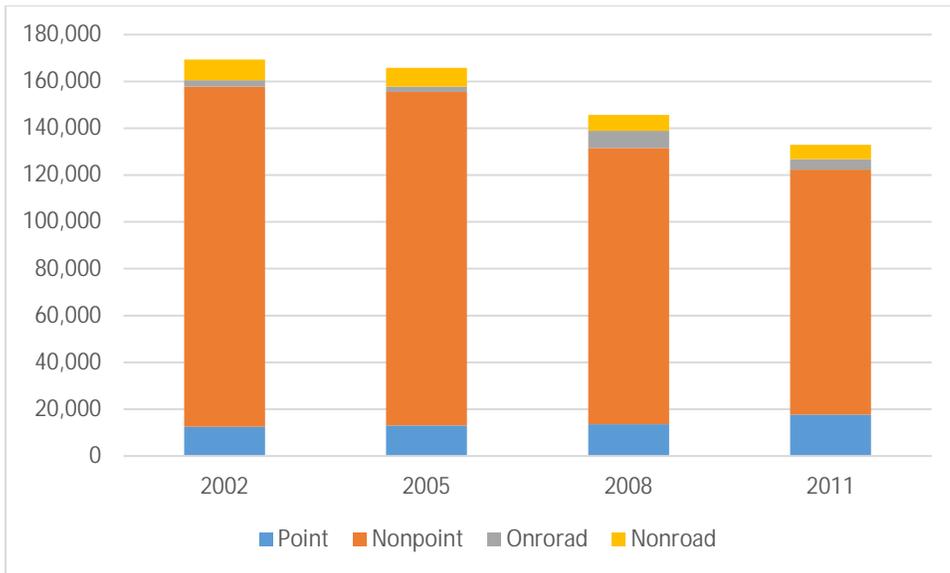
Figure 4: SO<sub>2</sub> anthropogenic emissions in tons in Minnesota from 2002 to 2014



### Directly emitted particulate matter (PM<sub>2.5</sub>)

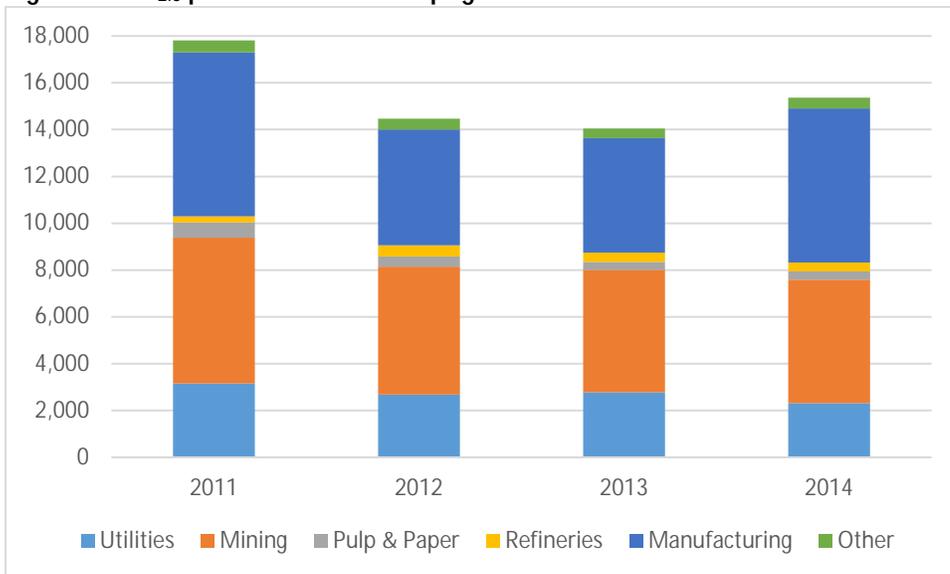
Emissions of PM<sub>2.5</sub> have been declining in recent years. Full emissions inventory data, including nonpoint sources, is available only for years when the NEI is prepared, so Figure 5 shows only NEI years.

Figure 5: PM<sub>2.5</sub> anthropogenic emissions in tons in Minnesota 2002 to 2011



Point-source PM<sub>2.5</sub> data is available annually and recent data is shown in Figure 6. Figure 6 also breaks out the direct PM<sub>2.5</sub> emissions from point sources into more specific categories to make it more legible, since point sources are a relatively small contributor to overall direct PM<sub>2.5</sub> emissions.

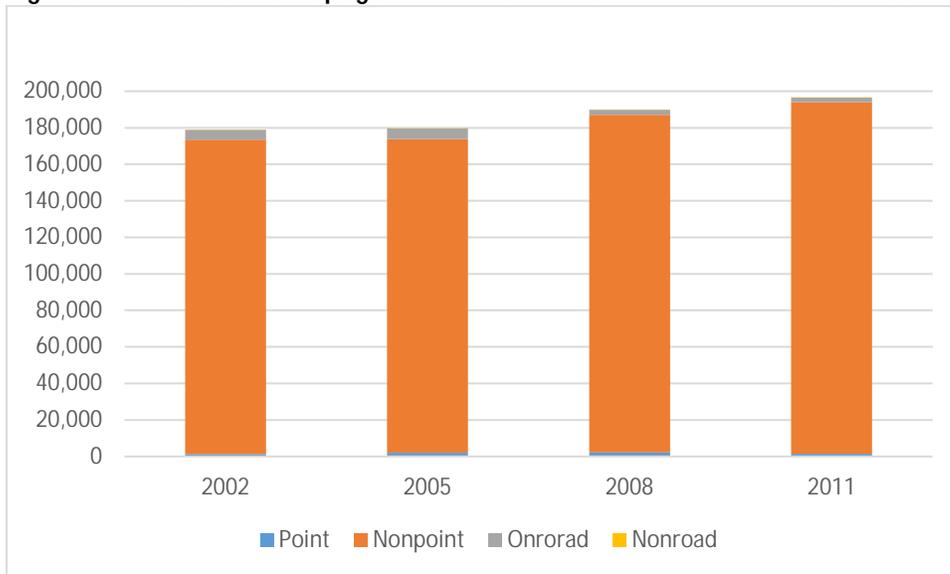
**Figure 6: PM<sub>2.5</sub> point-source anthropogenic emissions in tons in Minnesota 2011 to 2014**



## Ammonia

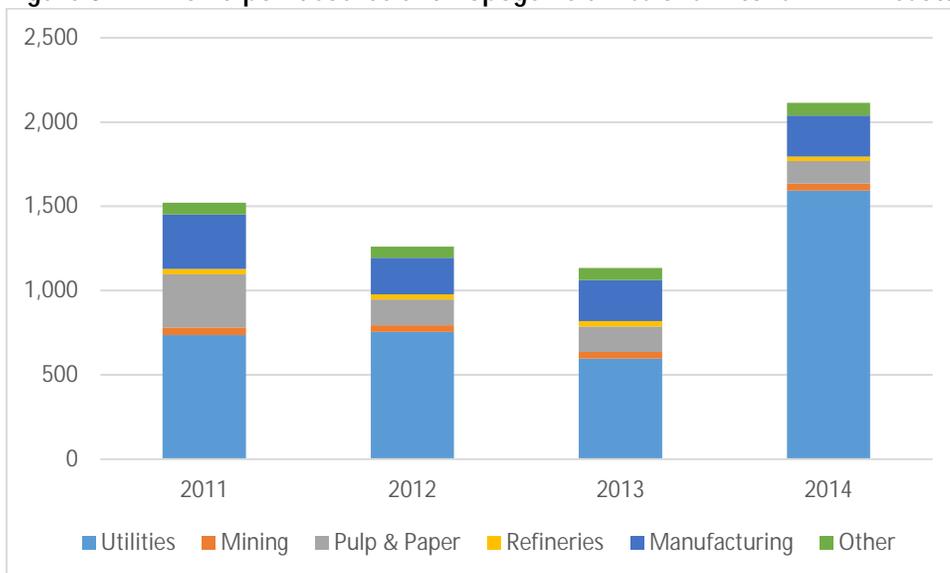
Figure 7 shows emissions of ammonia in Minnesota. Data collection methodologies for this pollutant are improving and have been changed several times in recent years, so the MPCA does not feel that it can draw any trend conclusions from this data.

Figure 7: Ammonia anthropogenic emissions in tons in Minnesota from 2002 to 2011



In 2011, the MPCA began collecting annual data on point source emissions of ammonia, which is shown in Figure 8. Point source contributions to overall ammonia emissions are extremely small.

Figure 8: Ammonia point source anthropogenic emissions in tons in Minnesota 2011 to 2014



## Minnesota pollution controls

As discussed in the previous section, the final implementation rule for the 2012 PM<sub>2.5</sub> NAAQS identifies sulfur dioxide (SO<sub>2</sub>), oxides of nitrogen (NO<sub>x</sub>), volatile organic compounds (VOCs), and ammonia as PM<sub>2.5</sub> precursors. PM<sub>2.5</sub> can also be directly emitted. Minnesota has rules and permit limits in place that drive ongoing reductions in emissions of PM<sub>2.5</sub> and its precursors. The following sections describe the current limits that will continue to reduce emissions in the state and can be reasonably assumed to assist in limiting the state's contribution to air quality concerns elsewhere in the country.

## Multi-pollutant limits

Minnesota has several methods of limiting emissions from facilities in the state. The primary way in which emissions of SO<sub>2</sub>, NO<sub>x</sub>, VOCs, and PM<sub>2.5</sub> are limited in Minnesota is through limits held in Part 70 permits.

Minnesota is subject to CSAPR's annual SO<sub>2</sub> and NO<sub>x</sub> programs to address the 1997 and 2006 PM<sub>2.5</sub> NAAQS. CSAPR is expected to result in NO<sub>x</sub> and SO<sub>2</sub> emissions reductions from subject power plants, which will further reduce any contribution Minnesota might have to out of state PM<sub>2.5</sub> air quality concerns.

Across the state, Minnesota's coal-fired boilers have been converting to gas and adding emissions controls in response to Minnesota's Mercury Emissions Reduction Act of 2006 (MERA) and, more recently, the less-stringent Mercury and Air Toxics Standard (MATS). While these rules target mercury reductions, they have driven significant reductions in co-pollutants, especially SO<sub>2</sub>.

## Pollutant-specific limits

Minnesota also has pollutant-specific methods of limiting emissions. Most of the state's pollutant-specific limits are for SO<sub>2</sub> and particulate matter (PM) because the state previously had nonattainment areas for those pollutants. As part of the state's efforts to come into attainment with the NAAQS for SO<sub>2</sub> and PM, limits on emissions were placed in the state's rules and permits. The state has fewer pollutant-specific limits for VOCs and NO<sub>x</sub> because Minnesota has never been designated nonattainment for NO<sub>2</sub> or ozone. The following is a summary of the pollutant-specific limits in Minnesota that help to reduce PM in the state and Minnesota's contribution to any other state's PM concentrations.

## Sulfur dioxide

Minnesota contains areas under maintenance plans for SO<sub>2</sub>. In order to ensure continued attainment of the NAAQS, Minnesota's SIP includes permits and administrative orders with SO<sub>2</sub> emission limits for facilities in the state's SO<sub>2</sub> maintenance areas. A list of these enforceable documents can be found in Table 1.

**Table 1: Enforceable documents with permanent SO<sub>2</sub> SIP conditions (status as of October 2016)**

Source	Permit Number or Order	State Effective Date	EPA Approval Date & FR Citation
Associated Milk Producers	10900010-001	05/05/97	03/09/01; 66 FR 14087
Franklin Heating Station	1148-83-OT-1 [10900019]	06/19/98	03/09/01; 66 FR 14087
IBM	10900006-001	06/03/98	03/09/01; 66 FR 14087
Olmsted Waste-to-Energy Facility	10900005-002	08/23/07	04/21/09; 74 FR 18138
Rochester Public Utilities – Cascade Creek	10900020-003	02/07/08	04/24/09; 74 FR 18638
Rochester Public Utilities – Silver Lake	10900011-004	09/07/07	12/02/09; 74 FR 63066
Saint Mary's Hospital	10900008-002	10/14/09	08/12/10; 75 FR 48864
BAE Technology Center (formerly ELT Minneapolis, River Road Industrial and United Defense, LP)	00300245-003	01/20/16	06/09/16; 81 FR 37164
Federal Cartridge Company	00300156-003	12/28/07	04/04/09; 74 FR 18634
GAF Building Materials	Administrative Order	05/27/92	04/14/94; 59 FR 17703
		09/18/97	02/08/99; 64 FR 5936
Hoffman Enclosures	00300155-001	01/31/08	04/04/09; 74 FR 18634

Source	Permit Number or Order	State Effective Date	EPA Approval Date & FR Citation
Minneapolis Energy Center, Inc. (NRG Energy Center Mpls)	Administrative Order	05/27/92	04/14/94; 59 FR 17706
Xcel Energy – Inver Hills Plant	03700015-004	07/16/14	01/28/16; 81 FR 4886
Xcel Energy – Riverside Plant	05300015-001	05/11/99	02/26/02; 67 FR 8727
Flint Hills Resources, L.P.	03700011-012	03/17/15	06/27/16; 81 FR 41450
Northern Tier Energy (Marathon Petroleum)	16300003-016	09/11/09	12/28/10; 75 FR 81471

In addition to the SO<sub>2</sub> SIP conditions, the administrative order issued to Xcel Energy – Northern States Power Company, Sherburne County Generating Station (Sherco) as part of Minnesota’s Regional Haze SIP includes both SO<sub>2</sub> and NO<sub>x</sub> emissions limits. EPA recently finalized a federal implementation plan under the Reasonably Attributable Visibility Impairment program for the Sherco facility that included additional SO<sub>2</sub> emission limits.

Other state rules incorporated into the SIP that set SO<sub>2</sub> emission limits include:

- 7011.0500-0553 Indirect Heating Fossil Fuel Burning Equipment
- 7011.0600-0625 Direct Heating Fossil Fuel Burning Equipment
- 7011.1400-1430 Petroleum Refineries
- 7011.1600-1605 Sulfuric Acid Plants
- 7011.2300 Stationary Internal Combustion Engines

Additionally, Minn. R. 7011.0900-0909 for hot mix asphalt plants includes fuel sulfur content restrictions aimed at limiting SO<sub>2</sub> emissions.

### Particulate matter

Limits and controls intended to limit emissions of PM generally or particulate matter of less than 10 micrometers in diameter (PM<sub>10</sub>) can also be expected to control PM<sub>2.5</sub>, since PM<sub>2.5</sub> is a subset of these other two categories. Control technologies intended to limit emissions of filterable PM<sub>10</sub> will also reduce emissions of filterable PM<sub>2.5</sub> and help to protect the PM<sub>2.5</sub> NAAQS. Therefore, the following section contains controls for PM, PM<sub>10</sub>, and PM<sub>2.5</sub>.

Minnesota contains areas under maintenance plans for PM<sub>10</sub>. In order to ensure continued attainment of the NAAQS, Minnesota’s SIP includes permits and administrative orders with PM emission limits for facilities in the state’s PM<sub>10</sub> maintenance areas. A list of the enforceable documents can be found in Table 2.

**Table 2: Enforceable documents with permanent PM SIP conditions (status as of October 2016)**

Source	Permit Number or Order	State Effective Date	EPA Approval Date & FR Citation
Rochester Public Utilities – Silver Lake	10900011-004	09/07/07	12/02/09; 74 FR 63066
Aggregate Industries, Yard A (formerly J.L. Shiely)	12300007-002	04/23/09	05/10/10; 75 FR 11461
Commercial Asphalt Plant 905	12300347-002	09/10/99	07/12/00; 65 FR 42861
Gerdau Ameristeel	12300055-004	08/28/08	05/20/09; 74 FR 23632
Great Lakes Coal & Dock Co (Great Western Dock and Terminal)	Administrative Order	08/25/92	02/15/94; 59 FR 7218
		12/21/94	06/13/95; 60 FR 31088

Harvest States Cooperatives	Administrative Order	01/26/93	02/15/94; 59 FR 7218
		12/21/94	06/13/95; 60 FR 31088
Lafarge North America, Childs Road Terminal	12300391-002	12/17/06	9/11/07; 72 FR 51713
Lafarge Corp., Red Rock	12300353-002	05/07/02	08/19/04; 68 FR 51371
Metropolitan Council, Metro Wastewater Treatment Plant	12300053-006	02/25/10	12/16/10; 75 FR 78602
St. Paul Terminals Red Rock Road	Administrative Order	02/02/96	07/22/97; 62 FR 39120

State rules that limit emissions of PM and help protect the 2012 PM<sub>2.5</sub> NAAQS include:

- 7011.0150 Preventing Particulate Matter from Becoming Airborne
- 7011.0500-0553 Indirect Heating Fossil Fuel Burning Equipment
- 7011.0600-0625 Direct Heating Fossil Fuel Burning Equipment
- 7011.0710-0735 Industrial Process Equipment
- 7011.0850-0859 Concrete Manufacturing Plant Standards of Performance
- 7011.0900-0922 Hot Mix Asphalt Plants
- 7011.1000-1015 Bulk Agricultural Commodity Facilities
- 7011.1100-1125 Coal Handling Facilities
- 7011.1300-1325 Incinerators
- 7011.1400-1430 Petroleum Refineries

### Volatile organic compounds

Minnesota's state rules incorporate by reference the National Emission Standards for Hazardous Air Pollutants, which limit VOC emissions. The primary method by which Minnesota limits VOC emissions is through the issuance of Part 70 permits and Title I emissions limits in permits to avoid classification as a major source.

### Nitrogen oxides and nitrogen dioxide

State rules that limit NO<sub>x</sub> and NO<sub>2</sub> emissions include:

- 7011.0500-0553 Indirect Heating Fossil Fuel Burning Equipment
- 7011.1700-1705 Nitric Acid Plants

Additionally, the administrative order issued to Xcel Energy – Northern States Power Company, Sherburne County Generating Station as part of Minnesota's Regional Haze SIP includes NO<sub>x</sub> limits.

### Ammonia

Minnesota's state rules incorporate by reference the National Emission Standards for Hazardous Air Pollutants, some of which limit ammonia emissions.

## Conclusion

It can be reasonably concluded from the above analysis that Minnesota does not significantly contribute to, or interfere with maintenance in, any downwind state for the 2012 annual PM<sub>2.5</sub> NAAQS. Minnesota has not historically contributed significantly to any of the monitors projected to have nonattainment or maintenance issues related to the 2012 PM<sub>2.5</sub> NAAQS and the monitors where Minnesota has historically contributed do not have any known attainment issues. Minnesota's emissions are on a downward trend and the state's emissions sources currently have limits and controls that will continue to control emissions of PM<sub>2.5</sub> and its precursors, thereby continuing to control Minnesota's contribution to neighboring states' air pollution concentrations. Therefore, Minnesota believes that the controls and limits already in place across the state are sufficient to be reasonably certain that Minnesota will not significantly contribute to nonattainment in, or interfere with maintenance by any other state, and no further controls or emissions

limits are required to fulfill the state's responsibilities under the interstate transport provisions for the 2012 annual  $PM_{2.5}$  NAAQS.