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## **Appendix 1A**

### **List of Class I Areas In or Impacted by Midwest RPO States**

## **List of Class I Areas In or Impacted by Midwest RPO States**

The purpose of this paper is to provide a draft list of Class I areas located within or impacted by a Midwest Regional Planning Organization (MRPO) State. A variety of technical analyses were considered in developing the draft list, including base year (2002) and future year (2018) modeling, back trajectories, and other data analyses. This information shows that every MRPO State impacts multiple Class I areas in the eastern U.S.

### **Regulatory Requirements**

EPA's regional haze rule requires a state to "address regional haze in each mandatory Class I Federal area located within the State and in each mandatory Class I Federal area located outside the State which may be affected by emissions from within the State." (40 CFR Part 51.308(d)) EPA has interpreted this provision as requiring a table identifying each mandatory Class I Federal area located within the State and each mandatory Class I Federal area located outside the State affected by emissions from within the State (see Draft EPA Checklist for Regional Haze SIPs Submitted Under 40 CFR 51.308 - *7/13/06 Staff Draft* ).

### **Discussion**

Technical analyses conducted by the RPOs were consulted to obtain information on areas of influence and culpability for Class I areas in the eastern U.S.<sup>1</sup> A summary of this information is provided below and in Table 1.

For the MRPO analyses, a state was assumed to affect visibility impairment in a Class I area if it contributes 2% (or more) to total light extinction. This criterion was selected based on a review of the back trajectory and modeling results which showed that states contributing 2% (or more) make-up about 90-95% of total light extinction, whereas states contributing 5% (or more) make-up only about 75-80% of total light extinction. For the other RPO analyses, deference was given to the criteria established by each group to identify contributing states.

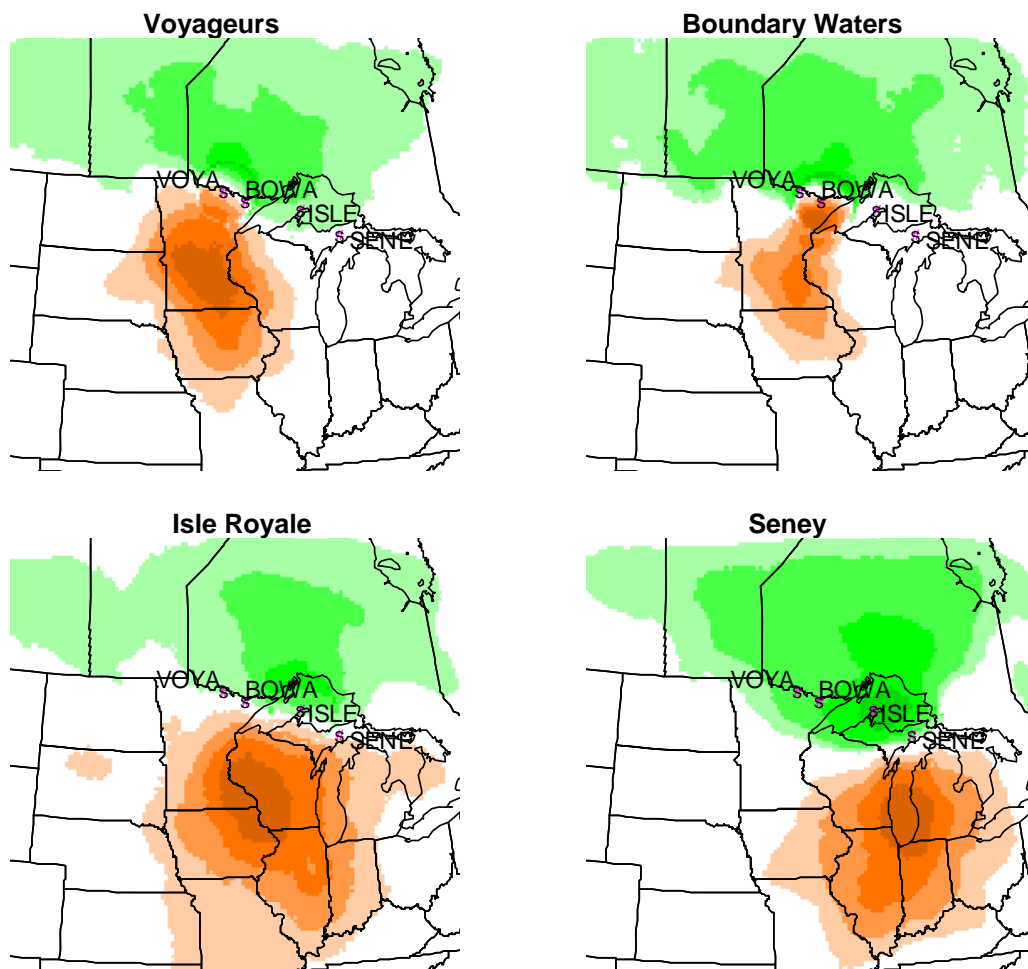
### **(1) MRPO Back Trajectory Analyses**

An initial trajectory analysis was conducted using data for 1997-2001 (all sampling days), a start height of 200 m, and a 72-hour (3-day) trajectory period (Cite: "Quantifying Transboundary Transport of PM<sub>2.5</sub>: A GIS Analysis", May 2003, LADCO). By combining trajectory frequencies with concentration information, the average contribution to PM<sub>2.5</sub> mass and individual PM<sub>2.5</sub> species was estimated (which, in turn, was used to estimate the average contribution to light extinction). The results for 17 Class I areas in eastern U.S. were examined to identify those Class I areas where an MRPO state had at least a 2% contribution to total light extinction (based on all days).

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<sup>1</sup> Back trajectories and modeling conducted by the WRAP indicate that the Midwest RPO States are not important contributors to visibility impairment due to sulfates and nitrates in western Class I areas (Cite: "Attribution of Haze Phase I Report, Geographic Attribution for the Implementation of the Regional Haze Rule", March 14, 2005). The analyses show only five groups of western Class I areas with at least 5% contribution from states outside the WRAP. The outside-WRAP contribution is generally small (on the order of 0-15%), and is likely due mostly to nearby CENRAP states.

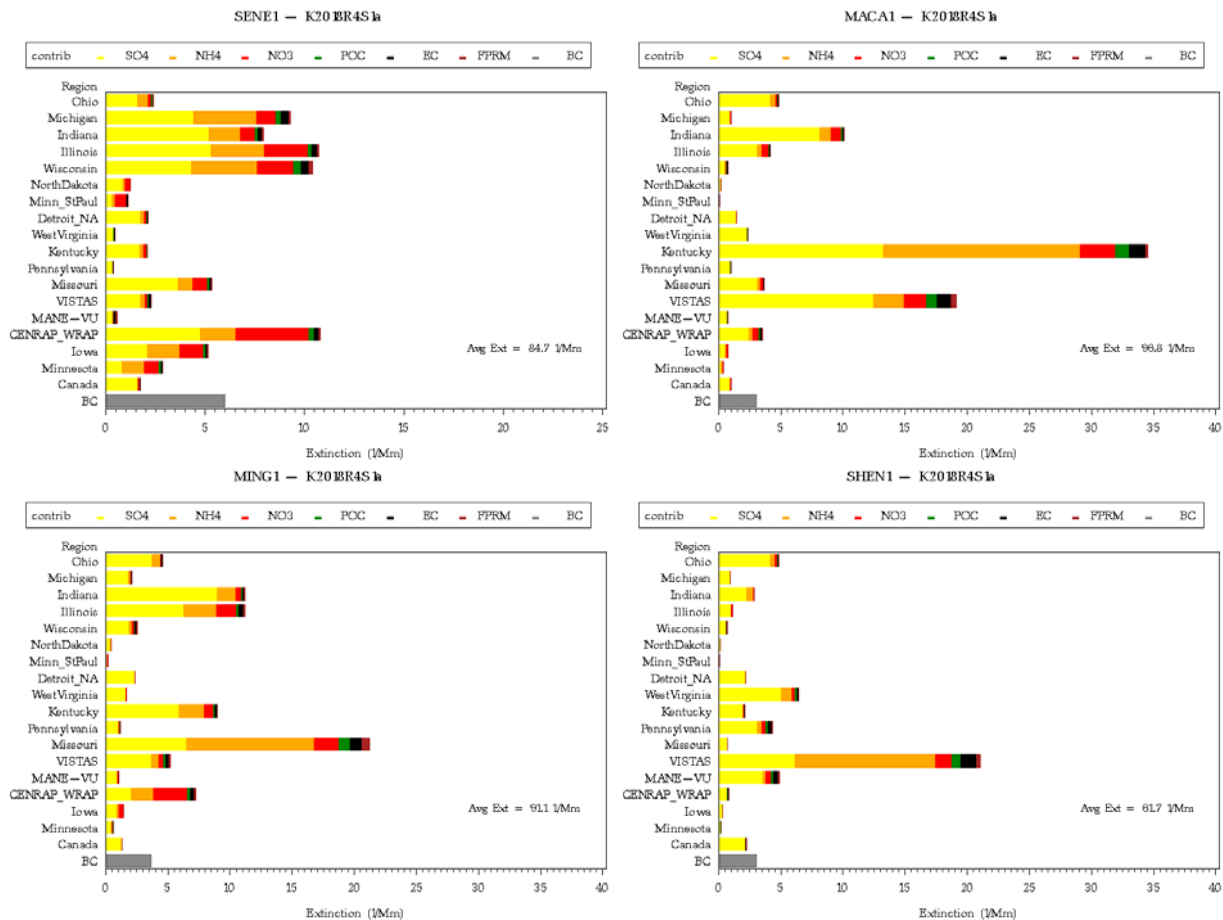
A second trajectory analysis was conducted using data for 2000-2003 (20% highest and lowest days), a start height of 200m, and a 120-hour (5-day) trajectory period (Cite: "Sensitivity Analysis of Various Trajectory Parameters", June 2005, LADCO). Back trajectory plots were prepared for each of the four northern Class I areas in Michigan and Minnesota for the high extinction days (see Figure 1 – note: areas in orange are mostly likely upwind and the areas in green are least likely upwind on poor visibility days). Although somewhat qualitative, these results provide additional information in identifying states impacting the northern Class I areas.



**Figure 1. Contoured trajectory plots for poor visibility days for Class I areas in northern Minnesota and Michigan**

## **(2) MRPO PSAT Modeling**

A photochemical grid model (CAMx) was applied to provide source contribution information for 2018 conditions. Specifically, the model estimated the impact of 18 geographic source regions and 6 source sectors (EGU point, non-EGU point, on-road, off-road, area, and ammonia sources) at Class I areas in the eastern U.S. Example results for four Class I areas (Seney, Mammoth Cave, Mingo, and Shenandoah) are presented in Figure 2. The results for 13 Class I areas in eastern U.S. were examined to identify those Class I areas where an MRPO state had at least a 2% contribution to total light extinction.



**Figure 2. Source region contributions to light extinction based on MRPO PSAT modeling for select Class I areas: Seney, Mammoth Cave, Mingo, and Shenandoah**

### (3) MANE-VU Contribution Assessment

A weight-of-evidence report was prepared by NESCAUM (on behalf of MANE-VU) to understand the causes of sulfate-driven visibility impairment at Class I areas in the northeastern and mid-Atlantic portions of the U.S. (cite: "Contributions to Regional Haze in the Northeast and Mid-Atlantic United States", August 2006) The report provides information on the relative contribution of various emissions sources and geographic source regions. The analytical and assessment tools considered include Eulerian and Lagrangian air quality models, and data analysis techniques, such as source apportionment analyses, back trajectories, and examination of emissions and monitoring data. Sulfate impacts were quantified using five analytical techniques based on 2002 conditions: REMSAD, Q/d, CALPUFF (w/ NWS data), CALPUFF (w/ MM5 data), and percent time upwind (based on trajectory analyses). Figure 3 summarizes the five sets of results for three MANE-VU Class I areas. Although no specific criteria were identified in the report to determine a significant contribution, the States of Vermont, New Hampshire, Maine, and New Jersey assumed a 2% sulfate impact in recent letters to other states inviting them to consult on reasonable progress goals. The MRPO States identified as contributing to a MANE-VU Class I area were Illinois, Indiana, Michigan, and Ohio.

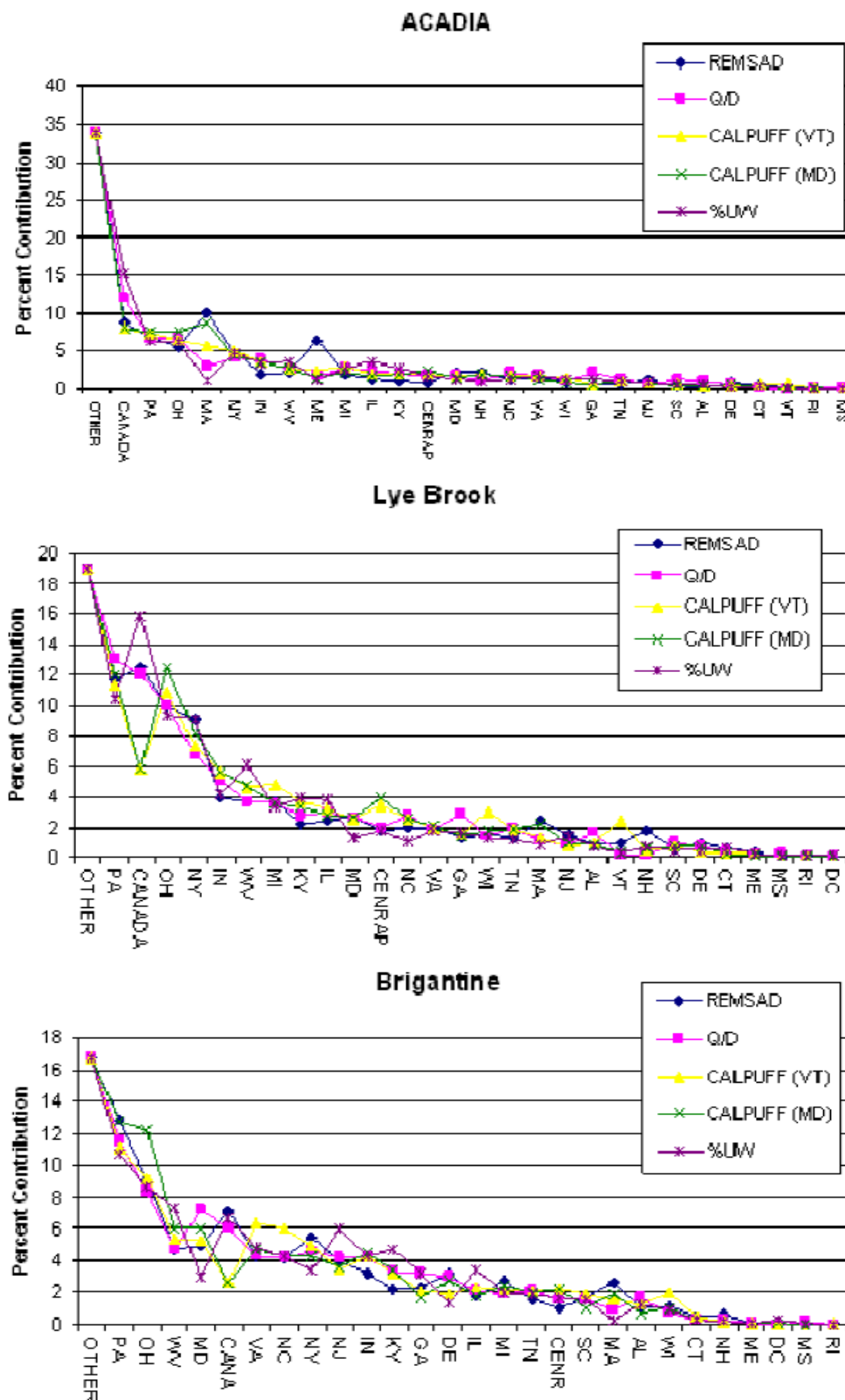


Figure 3. Percent contribution results using different techniques for ranking state contributions to sulfate levels at MANE-VU Class areas (cite: "Contributions to Regional Haze in the Northeastern and Mid-Atlantic Portions of the U.S.", August 2006)

#### (4) Missouri-Arkansas Contribution Assessment

The draft Consultation Plan for the two Missouri and two Arkansas Class I areas provides information on source regions affecting these Class I areas (i.e., areas of influence) using a variety of data and analyses. (cite: "Central Class I Areas Consultation Plan", States of Missouri and Arkansas, February 2007) A decision on whether a given state is a contributor to visibility impairment in these Class I areas was based on the combined results of three approaches: areas of influence (see Figure 4), PSAT modeling (based on 2018 conditions), and monitoring data analyses (PMF and back trajectories). According to the draft plan, if a state was a major contributor for at least two of the three approaches (for either sulfate or nitrate), then it was determined to be a significant contributor. The MRPO States identified as contributing to a central CENRAP Class I area were Illinois, Indiana, and Ohio.

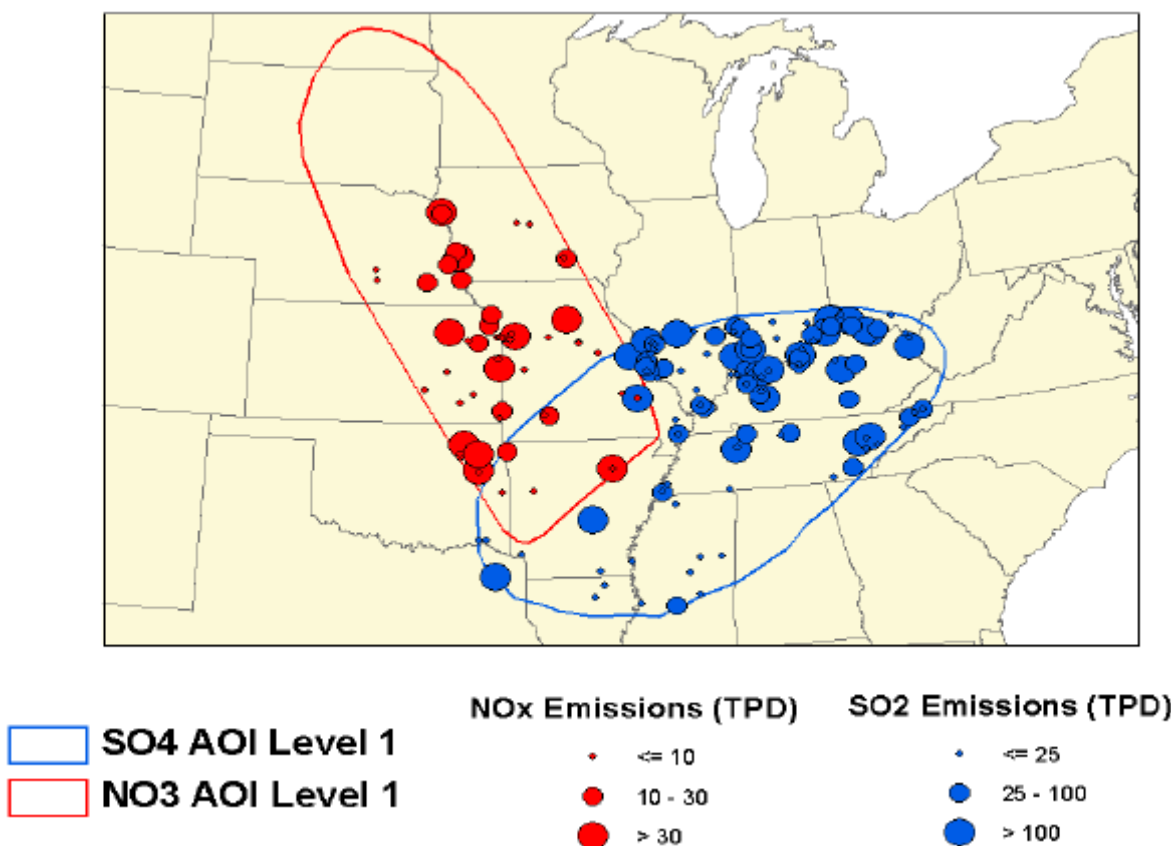
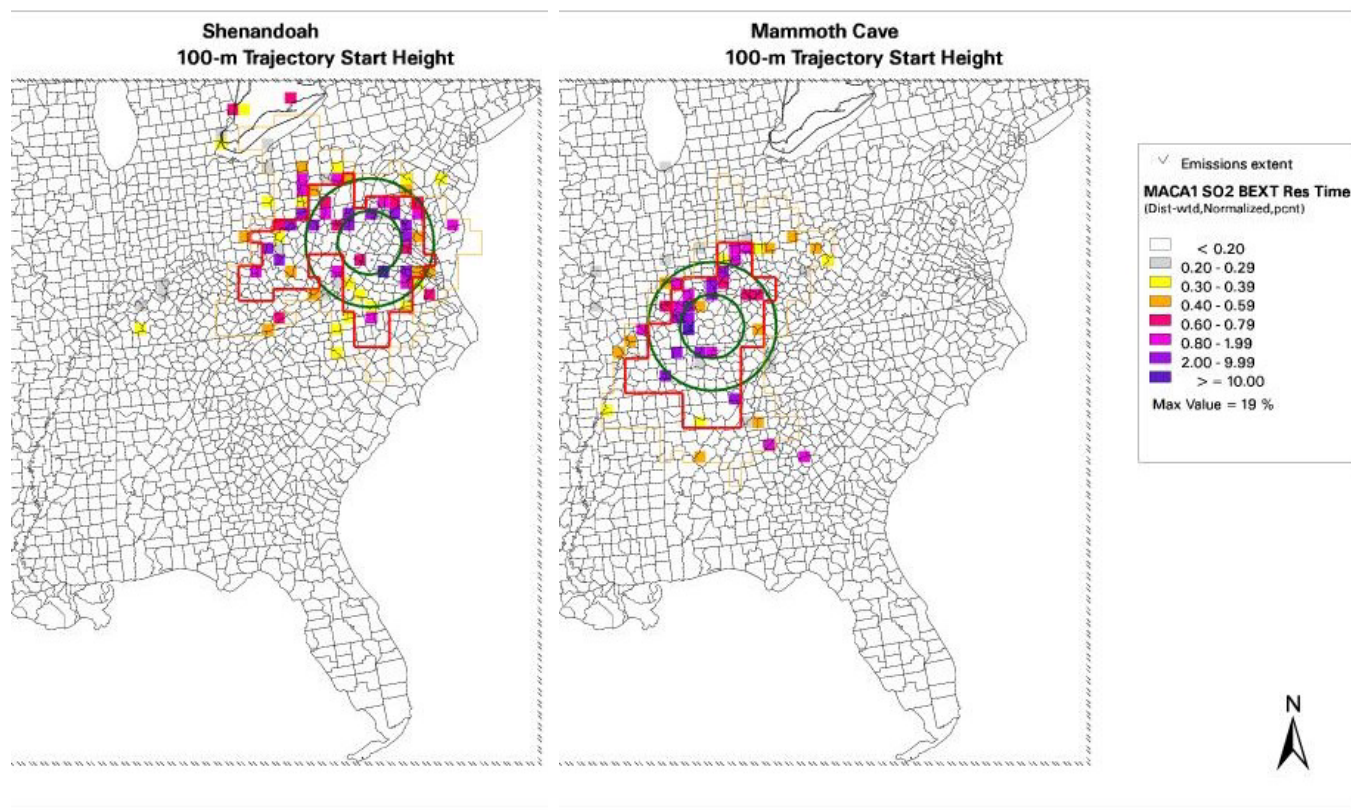


Figure 4. Areas of Influence for Central CENRAP Class I Areas (cite: "Central Class I Areas Consultation Plan", States of Missouri and Arkansas, February 2007)

#### (5) VISTAS Area of Influence Analysis

Areas of influence (AOI) were identified for Class I areas in the southeastern U.S. using residence time plots based on wind trajectory direction and frequency, and weighted by visibility impact (light extinction by ammonium sulfate, ammonium nitrate, or elemental carbon). (Cite: "VISTAS Areas of Influence Analysis", Draft, February 28, 2007). These extinction-weighted residence time analyses were overlaid on gridded emissions (for both 2002 and 2018) to define emission sources in the areas of greatest influence for each Class I area. Figure 5 shows the plots for two VISTAS Class I areas. AOIs were defined on the basis of residence times greater than 10%. The MRPO States identified as contributing to a VISTAS Class I area were Illinois, Indiana, and Ohio.



**Figure 5. Areas of Influence for Shenandoah (left) and Mammoth Cave (right) for 2018 conditions (cite: "VISTAS Area of Influence Analyses" PowerPoint presentation, November 28, 2006)**

**Note: green circles indicate 100- and 200-km radii from Class I area, red line perimeter indicate AOI with residence time  $\geq 10\%$ , and orange line perimeter indicate AOI with residence time  $\geq 5\%$**



**Table 1. Draft List of Class I Areas Impacted by MRPO States - References**

<b>AREA NAME</b>	<b>IL</b>	<b>IN</b>	<b>MI</b>	<b>OH</b>	<b>WI</b>
<b>81.401 Alabama.</b>					
Sipsey Wilderness Area	(1)	(1)			
<b>81.404 Arkansas.</b>					
Caney Creek Wilderness Area	(2), (4)	(2), (4)		(2), (4)	
Upper Buffalo Wilderness Area	(1),(2a),(4),(5)	(2a), (4)		(2), (4)	(2)
<b>81.408 Georgia.</b>					
Cohotta Wilderness Area					
Okefenokee Wilderness Area					
Wolf Island Wilderness Area					
<b>81.411 Kentucky.</b>					
Mammoth Cave NP	(1a), (2), (5)	(1a), (2a), (5)	(1), (2)	(1), (2a), (5)	
<b>81.412 Louisiana.</b>					
Breton Wilderness Area					
<b>81.413 Maine.</b>					
Acadia National Park	(3)	(3)	(3)	(3)	
Moosehorn Wilderness Area.	(3)	(3)	(3)	(3)	
<b>81.414 Michigan.</b>					
Isle Royale NP.	(1a), (2a)	(1), (2a)	(1), (2a)		(1a), (2a)
Seney Wilderness Area	(1a), (2a)	(1a), (2a)	(1a), (2a)	(1), (2)	(1a), (2a)
<b>81.415 Minnesota.</b>					
Boundary Waters Canoe Area Wilderness	(2)	(2)	(2)		(1a), (2a)
Voyageurs NP	(2)	(2)			(1a), (2a)
<b>81.416 Missouri.</b>					
Hercules-Glades Wilderness Area	(2a), (4), (5)	(2a), (4), (5)		(2), (4)	(2)
Mingo Wilderness Area	(2a), (4), (5)	(2a), (4), (5)	(2)	(2a), (4)	(2)
<b>81.419 New Hampshire.</b>					
Great Gulf Wilderness Area	(3)	(3)	(3)	(1), (3)	
Pres. Range-Dry River Wilderness Area.					

<b>81.42 New Jersey.</b>					
Brigantine Wilderness Area	(3)	(3)	(1), (3)	(1), (3)	
<b>81.422 North Carolina.</b>					
Great Smoky Mountains NP{1}	(1)	(1)		(1)	
Joyce Kilmer-Slickrock Wilderness Area{2}					
Linville Gorge Wilderness Area.					
Shining Rock Wilderness Area.					
Swanquarter Wilderness Area					
<b>81.426 South Carolina.</b>					
Cape Romain Wilderness					
<b>81.428 Tennessee.</b>					
Great Smoky Mountains NP{1}.	(1)	(1)		(1)	
Joyce Kilmer-Slickrock Wilderness{2}					
<b>81.431 Vermont.</b>					
Lye Brook Wilderness	(2), (3)	(2), (3)	(2), (3)	(1), (2), (3)	
<b>81.433 Virginia.</b>					
James River Face Wilderness.	(2)	(2)	(2)	(2a), (5)	
Shenandoah NP	(2), (3)	(1), (2a), (3)	(2), (3)	(1a),(2a),(3),(5)	
<b>81.435 West Virginia.</b>					
Dolly Sods/Otter Creek Wilderness.	(2), (3)	(1), (2a), (3)	(1), (2), (3)	(1a),(2a),(3),(5)	

### Key

- (1) MRPO Back Trajectory Analyses having a 2%-5% impact
- (1a) MRPO Back Trajectory Analyses having >5% impact
- (2) MRPO PSAT Modeling having a 2%-5% impact
- (2a) MRPO PSAT Modeling having >5% impact
- (3) MANE-VU Contribution Assessment
- (4) Missouri-Arkansas Contribution Assessment
- (5) VISTAS Areas of Influence

## **Appendix 2A**

### **Public and FLM Comments and DNRE Responses**

**(The following 3 pages contain the DNRE notice of the second public comment period, which was held in May 2010, as published in DNRE's biweekly Calendar of Events.)**



**MICHIGAN DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENT**  
**PO BOX 30473**  
**LANSING MI 48909-7973**

## **ENVIRONMENTAL CALENDAR**

**May 24, 2010**

### **DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENT**

On October 8, 2009, Governor Granholm issued Executive Order 2009-45, creating the Department of Natural Resources and Environment (DNRE) to protect and conserve Michigan's air, water and other natural resources, effective January 17, 2010. The new department will assume the powers and functions of the former Department of Natural Resources and the former Department of Environmental Quality. More information about DNRE programs may be found at [www.michigan.gov/dnre](http://www.michigan.gov/dnre).

**ENVIRONMENTAL  
ASSISTANCE CENTER**  
800-662-9278  
E-mail: [deq-ead-env-assist@michigan.gov](mailto:deq-ead-env-assist@michigan.gov)

The DNRE Environmental Assistance Center (EAC) is available to provide direct access to environmental programs, answers to environmental questions, referrals to technical staff, and quick response. Questions on any items listed in the calendar can be referred to the EAC.

### **PUBLICATION SCHEDULE**

The calendar is published every two weeks, on alternate Mondays, by the Michigan Department of Natural Resources and Environment. We welcome your comments.

### **CALENDAR LISTSERV**

You may subscribe to receive the DNRE Calendar electronically by sending an E-mail to the listserv at [LISTSERV@LISTSERV.MICHIGAN.GOV](mailto:LISTSERV@LISTSERV.MICHIGAN.GOV) and in the body of the message type Subscribe, DNRE-CALENDAR, and your name.

**INTERNET ACCESS**  
[www.michigan.gov/deqcalendar](http://www.michigan.gov/deqcalendar)

The calendar is available on the DNRE Web site in pdf format. Access the calendar at [www.michigan.gov/deqcalendar](http://www.michigan.gov/deqcalendar).

### **TIMETABLE FOR DECISIONS**

No decision listed in the DNRE Calendar will be made prior to seven days after the initial Calendar publication date.

### **CONTENTS**

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# ENVIRONMENTAL CALENDAR

May 24, 2010

AIR QUALITY  
DIVISION  
See Map - Statewide

[www.michigan.gov/deq/proposedconsentorders](http://www.michigan.gov/deq/proposedconsentorders). Submit written comments to Richard Tazsreak, Michigan Department of Natural Resources and Environment, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909. Written comments must be received by June 23, 2010. If a request is received in writing by June 23, 2010, a public hearing will be scheduled. Information Contact: **Richard Tazsreak**, Air Quality Division, 517-335-4826. Decision-maker: **G. Vinson Hellwig**, Air Quality Division Chief.

**MICHIGAN'S REGIONAL HAZE STATE IMPLEMENTATION PLAN (SIP)**, revised for Michigan's two Class I areas, Isle Royale National Park and Seney Wilderness Area. The Air Quality Division will hold a public comment period through June 23, 2010. This public comment period meets the public participation requirements for a SIP submittal. The Regional Haze SIP can be viewed on the Web at [www.michigan.gov/deq/0,1607,7-135-3310-142916--,00.html](http://www.michigan.gov/deq/0,1607,7-135-3310-142916--,00.html). If requested by June 23, 2010, a hearing will be held June 29, 2010 (see June 29 listing in this calendar). Written comments should be sent to the Michigan Department of Natural Resources and Environment, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909, to the attention of Lorraine Hickman. Information Contact: **Cindy Hodges**, Air Quality Division, 517-335-1059.

## Proposed Settlements of Contested Cases

NONE

## Administrative Rules Promulgation

NONE

## Announcements

NONE

## Public Hearings and Meetings

Note: Persons with disabilities needing accommodations for effective participation in any of the meetings noted in this Calendar should call or write the appropriate meeting information contact listed below at least a week in advance to request mobility, visual, hearing, or other assistance.

MAY 26, 2010

**DEADLINE FOR PUBLIC COMMENT REGARDING EAGLE VALLEY RECYCLE AND DISPOSAL FACILITY (SRN: N3845), ORION, OAKLAND COUNTY**, for the proposed approval of a draft renewal of a Renewable Operating Permit (ROP) for the operation of a municipal solid waste landfill. The draft permit is intended to simplify and clarify the facility's applicable requirements and will not result in any air emission changes at the stationary source. The ROP public notice documents can be viewed on the web at [www.deq.state.mi.us/aps/](http://www.deq.state.mi.us/aps/). The responsible official of the stationary source is Charles Cassie, 36600 29 Mile Road, Lenox, Michigan 48048. Comments on the draft permit are to be submitted to James Voss, Michigan Department of Natural Resources and Environment, Air Quality Division, Southeast Michigan District Office, 27700 Donald Court, Warren, Michigan 48092-2793. The decision-maker for the permit is Teresa Seidel, Southeast Michigan District Supervisor. If requested in writing by May 26, 2010, a public hearing may be scheduled. Information Contact: **James Voss**, Air Quality Division, 313-456-4687.

MAY 26, 2010

**DEADLINE FOR PUBLIC COMMENT REGARDING FORD MOTOR COMPANY, DEARBORN, WAYNE COUNTY**. Written comments are being accepted on a proposed Consent Order to administratively resolve alleged air pollution violations. You may obtain copies of the proposed Consent Order and Staff Activity Report on the Web at [www.michigan.gov/deq/proposedconsentorders](http://www.michigan.gov/deq/proposedconsentorders). Submit written comments to Thomas Hess, Michigan Department of Natural Resources and Environment, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909. Written comments must be received by May 26, 2010. If a request is received in writing by May 26, 2010, a public hearing will be scheduled. Information Contact: **Thomas Hess**, Air Quality Division, 517-335-4615.

# ENVIRONMENTAL CALENDAR

May 24, 2010

	<p>Karen M. Cummins, Site Services Manager, 26701 Telegraph Road, Southfield, Michigan 48034-2091. Comments on the draft permit are to be submitted to Iranna Konanahalli, Michigan Department of Natural Resources and Environment, Air Quality Division, Southeast Michigan District Office, 27700 Donald Court, Warren, Michigan 48092-2793. The decision-maker for the permit is Teresa Seidel, Southeast Michigan District Supervisor. If requested in writing by June 23, 2010, a public hearing may be scheduled. Information Contact: <i>Iranna Konanahalli</i>, Air Quality Division, 586-753-3741.</p>
JUNE 23, 2010	<p><b>DEADLINE FOR PUBLIC COMMENT REGARDING CITY ENVIRONMENTAL SERVICES INC. OF WATERS (SRN: N5988), FREDERIC, CRAWFORD COUNTY</b>, for the proposed approval of a draft renewal of a Renewable Operating Permit (ROP) for the operation of a municipal solid waste landfill. The draft permit is intended to simplify and clarify the facility's applicable requirements and will not result in any air emission changes at the stationary source. The ROP public notice documents can be viewed on the web at <a href="http://www.deq.state.mi.us/aps/">www.deq.state.mi.us/aps/</a>. The responsible official of the stationary source is James Palmer, District Manager, 11375 Sherman Road, Frederic, Michigan 49733. Comments on the draft permit are to be submitted to Rob Dickman, Michigan Department of Natural Resources and Environment, Air Quality Division, Cadillac District Office, 120 West Chapin Street, Cadillac, Michigan 49601. The decision-maker for the permit is Janis Denman, Cadillac District Supervisor. If requested in writing by June 23, 2010, a public hearing may be scheduled. Information Contact: <i>Rob Dickman</i>, Air Quality Division, 231-876-4412.</p>
JUNE 23, 2010	<p><b>DEADLINE FOR PUBLIC COMMENT REGARDING GLEN'S SANITARY LANDFILL (SRN: N3261), MAPLE CITY, LEELANAU COUNTY</b>, for the proposed approval of a draft renewal of a Renewable Operating Permit (ROP) for the operation of a municipal waste landfill. The draft permit is intended to simplify and clarify the facility's applicable requirements and will not result in any air emission changes at the stationary source. The ROP public notice documents can be viewed on the web at <a href="http://www.deq.state.mi.us/aps/">www.deq.state.mi.us/aps/</a>. The responsible official of the stationary source is James Palmer, District Manager, 518 East Traverse Highway, Maple City, Michigan 49664. Comments on the draft permit are to be submitted to Rob Dickman, Michigan Department of Natural Resources and Environment, Air Quality Division, Cadillac District Office, 120 West Chapin Street, Cadillac, Michigan 49601. The decision-maker for the permit is Janis Denman, Cadillac District Supervisor. If requested in writing by June 23, 2010, a public hearing may be scheduled. Information Contact: <i>Rob Dickman</i>, Air Quality Division, 231-876-4412.</p>
JUNE 23, 2010	<p><b>DEADLINE FOR PUBLIC COMMENT REGARDING MICHCON MILFORD COMPRESSOR STATION (SRN: B7221), MILFORD, OAKLAND COUNTY</b>, for the proposed approval of a draft renewal of a Renewable Operating Permit (ROP) for the operation of four 4,000 horsepower natural gas fired compressor engines. The draft permit is intended to simplify and clarify the facility's applicable requirements and will not result in any air emission changes at the stationary source. The ROP public notice documents can be viewed on the web at <a href="http://www.deq.state.mi.us/aps/">www.deq.state.mi.us/aps/</a>. The responsible official of the stationary source is Olukayode Dawodu, Manager of Transmission and Storage Operations, 12700 30 Mile Road, Washington, Michigan 48095. Comments on the draft permit are to be submitted to Rebecca Loftus, Michigan Department of Natural Resources and Environment, Air Quality Division, Southeast Michigan District Office, 27700 Donald Court, Warren, Michigan 48092. The decision-maker for the permit is Teresa Seidel, District Supervisor. If requested in writing by June 23, 2010, a public hearing may be scheduled. Information Contact: <i>Rebecca Loftus</i>, Air Quality Division, 586-753-3735.</p>
JUNE 23, 2010	<p><b>DEADLINE FOR PUBLIC COMMENT REGARDING MICHIGAN'S REGIONAL HAZE STATE IMPLEMENTATION PLAN (SIP)</b>, revised for Michigan's two Class I areas, Isle Royale National Park and Seney Wilderness Area. This public comment period meets the public participation requirements for a SIP submittal. The Regional Haze SIP can be viewed on the Web at <a href="http://www.michigan.gov/deq/0,1607,7-135-3310-142916--,00.html">www.michigan.gov/deq/0,1607,7-135-3310-142916--,00.html</a>. If requested by June 23, 2010, a hearing will be held June 29, 2010 (see June 29 listing in this calendar). Written comments should be sent to the Michigan Department of Natural Resources and Environment, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909, to the attention of Lorraine Hickman. Information Contact: <i>Cindy Hodges</i>, Air Quality Division, 517-335-1059.</p>
JUNE 23, 2010	<p><b>DEADLINE FOR PUBLIC COMMENT REGARDING NJT ENTERPRISES, LLC (SRN: N1316), STERLING HEIGHTS, MACOMB COUNTY</b>, for the proposed approval of a draft renewal of a Renewable Operating Permit (ROP) for the operation of a spray coating line and interior/exterior</p>

## **General Summary of Comments from the 2010 Public Comment Period and DNRE Responses**

Three sets of comments were received: one from the Forest Service (FS), a joint set from the Fish and Wildlife Service (FWS) and National Park Service (NPS), and one set from the Environmental Protection Agency (EPA).

**Comment:** Two comments (FS and EPA) expressed a concern for how the reasonable progress goals (RPGs) will account for BART. The reasonable progress goals are based on modeling runs that do not reflect BART determinations in Michigan and other states. While future haze levels are difficult to predict, especially due to uncertainties regarding utility control requirements and control levels, the EPA will expect Michigan to establish reasonable progress goals that reflect at least an approximation of BART control levels. There is still no statement in the State Implementation Plan (SIP) as to when remodeling will be done that shows the effect of BART determinations such as Lafarge and other sources in Michigan and elsewhere. How will the RPGs in the SIP be revised to reflect the implementation of BART in Michigan and other states?

**Response:** The DNRE will redo modeling to include BART when we have definite emissions information based on final Lafarge controls. This data is scheduled to be available no later than 2016. Other BART sources in other states are expected to have controls in place by this date as well, allowing for revised modeling for RPGs (see Section 5.1).

**Comment:** The FS commented that Michigan should include details on current controls on electric generating units (EGUs) and controls being installed, by date and by level of emissions reductions expected. As discussed later in their letter, they are particularly interested in planned controls for the top contributing sources as illustrated in Tables 10.3.2a-d.

**Response:** The DNRE has added information on EGU controls to Section 5.3 of the SIP document.

**Comment:** Two comments (FS and FWS/NPS) questioned how Michigan responded to the MANE-VU ask. According to the Regional Haze Rule, such consultations are not expected to result in agreement on everything, but the areas of agreement and disagreement that occur via consultation are to be documented in the SIP. They found some lengthy meeting notes but no list of specific areas of agreement and disagreement between Michigan and MANE-VU. Their questions include: 1) Much of the material is dated (was from 2007). What happened after that? 2) Is MANE-VU satisfied that the stacks they identified in Michigan are controlled adequately? 3) What is planned for control of those stacks and of those projects, how many are in enforceable documents?

**Response:** LADCO and MANE-VU continued discussions on a CAIR replacement rule and ICI boilers and sent ask letters to the EPA. The joint letter shows areas of agreement between LADCO and MANE-VU and the other two separate LADCO and MANE-VU letters indicate areas of disagreement. These letters have been included in the SIP

in Appendix 3D. The DNRE had no specific dialogue with MANE-VU to address whether MANE-VU was satisfied with controls on stacks identified by MANE-VU.

**Comment:** The FWS and the NPS commented that the Regional Haze Rule requires that RPGs be established to protect the 20% cleanest days (i.e., visibility on the cleanest days cannot degrade). The SIP assumes that RPGs are met, despite data showing that the cleanest days are in fact getting dirtier. (See Table 5.2b, Haze Results). Therefore, progress in meeting regional haze goals is not demonstrated in the plan as it is currently drafted.

**Response:** The DNRE believes that there are several reasons that could explain the cleanest days showing degradation. Modeling is not an exact science and a reasonable interpretation of the modeling is that there is little expected change in the clean day visibility levels. Also growth for ammonia was assumed for 2018, and no controls on ammonia emissions were added. Any assumptions regarding levels of ammonia emissions are estimates at best. In addition, BART controls were generally not modeled which also may improve the visibility. Recent measured visibility values are actually below the modeled values, indicating the models may be over-predicting the actual values. More detail on this issue is included in Section 5.2 of the SIP.

**Comment:** The FWS/NPS requested more information in several areas:

- Modeling that was performed, the tools used, and a description of model performance establishing the level of confidence in the results, should be included in the SIP narrative.
- **Response:** This information is provided in Appendix 5A starting on page 47.
- More information based upon the IMPROVE monitoring data, which illustrates the importance of sulfate, nitrate, and organic carbon to visibility impairment, and how Michigan is using these data to define its emission control priorities.
- **Response:** Over time, as the DNRE continues to evaluate the haze problem in Michigan, we will determine whether our emission control priorities need to be revised.
- More discussion regarding all emission inventories, the inventory development methods, and the assumptions made with all iterations in inventory development.
- **Response:** The emissions inventory is thoroughly discussed in Appendix 8A. In addition the modeling inventory is discussed in Appendix 5A starting on page 51.

**Comment:** The EPA commented that given the regional nature of regional haze, Michigan's test for significance, based on whether a state contributes 5% of the regional haze, is too exclusive a test. Although the EPA does not specify a particular test of significance for states to use, the alternative contemplated by Michigan, based on whether a state contributes 2% of the regional haze, likely provides a better indicator of whether a state has a contribution that warrants addressing.

**Response:** The DNRE disagrees. As explained in Appendix 1A, the back trajectory and modeling results showed that states contributing 2% (or more) make up about 90 to 95% of total light extinction, whereas states contributing 5% (or more) make up about



75-80% of total light extinction. Since this is the first planning period for regional haze, we believe that focusing on a 5% grouping of states is adequate. In future years this will be re-evaluated and a larger impacting group of states may be appropriate.

**Comment:** The EPA commented that they do not agree that the Midwest Regional Planning Organization (RPO) is dormant. In any case, the DNRE should note that LADCO continues to perform work on regional haze and other related air pollution issues, currently based primarily on state funding.

**Response:** The DNRE removed this language from Section 3.1 of the SIP. The RPO has no federal funding for regional haze activities. The DNRE acknowledges that LADCO is an integral part of the DNRE's modeling and other related activities. However, modeling priorities continue to focus on PM<sub>2.5</sub> and ozone.

**Comment:** The EPA commented that the discussion of factors to be considered in defining BART lists instead the statutory factors for evaluating reasonable progress. The Clean Air Act has a set of five factors for BART that differs somewhat from the four factors listed on page 7.

**Response:** On page 7, the discussion is about reasonable progress factors. There is no discussion about the BART factors in this section.

**Comment:** The FS questions why Michigan did not ask for emission reductions from the other contributing states shown in Table 10.2.3.a.

**Response:** Several states contributing to Michigan Class I areas were planning emission reductions in their states. Therefore, the DNRE did not deem it necessary to ask for additional reductions.

**Comment:** The FS noted that efforts spent to achieve compliance with the PM<sub>2.5</sub> and ozone ambient standards don't preempt compliance with other parts of the Clean Air Act (i.e., regional haze). The nonattainment areas are generally in the opposite end of the state from the Class I areas so the sources determined to have the most contribution to the state's nonattainment problems may not be the same ones who contribute the most to visibility impairment in the Class I areas.

**Response:** Some large sources of visibility-impairing emissions, EGUs, will achieve reductions under CAIR and the new proposed Clean Air Transport Rule (CATR), and some are located in ozone and PM<sub>2.5</sub> nonattainment areas. Therefore, improvements from these sources to address the ozone and PM<sub>2.5</sub> nonattainment areas will have an effect on visibility.

**Comment:** The FS commented that to support Regional Haze SIPs, a large amount of resources were spent to produce technical information such as the list of most culpable sources in Tables 10.3.2.a and b. While a broad cap and trade system such as CAIR can improve visibility at the Class I areas, Tables 10.3.2.a and b show that the most benefit will be seen from reductions at specific plants. Yet after presenting the technical information, no explanation is given as to what pollution controls are planned for any of these sources (and how much of the planned projects are included in any enforceable documents), or whether Michigan asked any of the specified sources to implement

controls, including asking the contributing states (e.g., Minnesota and Wisconsin) regarding their sources in the tables.

**Response:** Most of the sources in Tables 10.3.2.a and b are either BART-subject or EGUs subject to CAIR and the proposed CATR. Information on EGU controls has been added to Section 5.3. The DNRE is still evaluating the proposed CATR to determine how EGUs will be affected. Several states contributing to Michigan Class I areas were planning emission reductions in their states. Therefore, the DNRE did not deem it necessary to ask for additional reductions.

**Comment:** The FS commented that Michigan notes that the majority of EGUs whose emissions significantly affect Isle Royale and Seney are subject to CAIR and may be subject to the CAIR replacement rule. However, the DNRE is assuming that the CAIR replacement rule will still be deemed a substitute for BART. What if CAIR or its replacement does not end up representing BART?

**Response:** The DNRE is carefully reviewing the proposed CATR, the CAIR replacement rule, to determine how EGUs will be affected. If the Regional Haze Rule is changed to not allow this substitution, Michigan will re-evaluate whether additional controls on EGUs are appropriate.

**Comment:** The FS commented that Figure 10.3.2b clearly shows that the uniform rate of progress (URP) is achievable. The EC/R concluded that additional controls on EGUs beyond CAIR are economically feasible.

**Response:** The DNRE is currently analyzing the proposed CATR rule that the EPA considers to be the first Phase of EPA-required EGU controls. Additional controls on EGUs will be addressed by the EPA as the second phase of CATR, which the EPA will promulgate following the phase I rule currently proposed.

**Comment:** The FS commented that Michigan states, "Some of the largest EGUs, such as DTE's Monroe power plant and Consumer Energy's Campbell plant, have installed or are in the process of installing CAIR-compliant controls. EGUs in other states that have been shown to impact Michigan's Class I areas (see Section 10.3.2 of this document) also are expected to install and operate CAIR-compliant controls." In a cap and trade system, how does Michigan know what level of controls constitutes a compliant system? A source can buy and bank allowances instead of installing controls. Also please give more specifics on the control plans for these and the other plants identified in Tables 10.3.2.a and b.

**Response:** Since haze is a regional problem, cap and trade should still lower emissions that will result in improved visibility. However, with the proposed CATR rule, trading is limited. The DNRE is evaluating the proposed CATR to determine how EGUs will be affected. The DNRE added a table showing the installed controls for EGUs in Section 5.3 of the SIP.

**Comment:** The FS commented that Michigan states, "Since all EGUs are subject to CAIR and since the Regional Haze Rule has allowed CAIR to equal BART, the DNRE believes that no further controls on EGUs should be considered as reasonable for purposes of regional haze at this time. This includes any EGUs that are not specifically

BART-subject, since controls beyond BART should not be considered reasonable under regional haze.” It appears that under Michigan’s assumption that the new CAIR will be a substitute for BART, they also assume it will be a substitute for reasonable progress. This is incorrect. Reasonable progress is a separate requirement from BART in the Regional Haze Rule and requires separate analysis and justification. Reasonable progress must result from consideration of a four-factor analysis. The relationship between CAIR and BART is not part of a four factor analysis.

**Response:** Section 10.3.2 was revised. The reasonable progress analysis in the Haze SIP document accounts for all controls currently expected to be implemented by 2018. We believe EGUs will be controlled via the CATR and by any additional future controls we determine to be necessary to meet the NAAQS.

**Comment:** The FS commented that Michigan states, “The control levels evaluated by the LADCO contractor, EGU 1 and EGU 2, both provide more emission reductions than achieved by CAIR at costs that could be seen as reasonable. However, CAIR clearly is intended by the EPA to address reasonable controls for EGUs in terms of the Regional Haze SIP. To require EGU 1 and/or EGU 2 levels of control for haze reasonable progress goes beyond what the EPA intends, and the DNRE does not believe such controls are reasonable.” We are unclear what EPA intention is being referred to here. As stated above, reasonable progress is a separate requirement from BART.

**Response:** As stated above, the reasonable progress analysis in the Haze SIP document accounts for all controls currently expected to be implemented by 2018. We believe EGUs will be controlled via the CATR and by any additional future controls we determine to be necessary to meet the NAAQS. However, the DNRE has removed this language from Section 10.3.2 of the SIP because we are evaluating the CATR controls to determine how EGUs will be affected.

**Comment:** The FS commented that Michigan states, “The RPG is set at the visibility level shown to result from the application of all the elements of the DNRE’s long-term strategy, along with all currently known controls being applied by other states. However, several of these control measures include CAIR controls that currently are being revised by the EPA.” This is not correct since it is our understanding that the RPGs in the SIP do not include the affect of non-EGU BART determinations in Michigan and surrounding states. How and when will this deficiency be corrected?

**Response:** The DNRE will redo modeling to include BART when we have definite emissions information based on final Lafarge controls. This data is scheduled to be available no later than 2016. Other BART sources in other states are expected to have controls in place by this date as well, allowing for revised modeling for RPG (see Section 5.1).

**Comment:** The FS commented that Michigan states, “The control levels evaluated by ECR, EGU 1 and EGU 2, both provide more emission reductions than achieved by CAIR. However, CAIR clearly is intended by the EPA to address reasonable controls for EGUs in terms of the Regional Haze SIP. To require EGU 1 and/or EGU 2 levels of control for haze reasonable progress goes beyond what EPA intends, and the DNRE does not believe such controls are reasonable for this phase of the reasonable progress

determination. Future determinations of reasonable progress may re-evaluate controls that are tighter than were addressed in the CAIR program.” Again, as stated above, reasonable progress is a separate requirement from BART.

**Response:** As stated above, CAIR and CATR are expected to address haze. However, the DNRE has removed this language from Section 10.3.2 of the SIP because we are evaluating the CATR controls to determine how EGUs will be affected.

**Comment:** The FS commented that the discussion regarding the state's Mercury/Multi-pollutant Rules shows that DNRE can go beyond CAIR to require SO<sub>2</sub> and NO<sub>x</sub> controls as it chose to do in this instance to encourage mercury reductions.

**Response:** The DNRE allowed co-benefit mercury reductions from proposed NO<sub>x</sub> and SO<sub>x</sub> reductions at the choice of the EGUs. These reductions are not mandatory.

**Comment:** The FS questioned how new emission sources, especially new major sources under New Source Review, will show they are not negatively affecting the RPG?

**Response:** New sources with emissions impacting Seney and Isle Royale take haze into consideration via modeling submitted in a New Source Review permit application, which is reviewed by FLMS.

**Comment:** The FS stated they are eager to implement the draft smoke management plan (SMP) and are curious to learn when it will be finalized.

**Response:** The SMP is nearly completed, only requiring a few more signatures.

### ***BART***

**Comment:** The FS wanted the Q/d analysis to include all three main visibility-impairing pollutants, including particulate (PM<sub>10</sub>). It is unclear if their approach would make any difference in the number of facilities in Michigan that moved on to the next step in the subject to BART analysis because the Q (including PM<sub>10</sub>) of each of the sources in Table 1 of the Appendix 9B is not listed.

**Response:** All EGUs in Michigan have particulate control either by ESP or baghouses. Analysis of species contributions indicated that SO<sub>2</sub> and NO<sub>x</sub> were the primary pollutants contributing to visibility impairment, thus were the only pollutants modeled in the Q/d analysis.

**Comment:** The FWS and NPS commented that DNRE must evaluate particulate emissions from EGUs subject to BART. While BART guidance allows states to conclude that reductions of sulfates and nitrates regulated under the Clean Air Interstate Rule (CAIR) are better than BART, this does not include particulate emissions from these sources. Also, for the sources for which BART determinations were performed, the three yearly deciviews improvements were averaged for comparisons of Pre- and Post-BART visibility improvements (see Table 9.3a, BART Controls and Comparison of Visibility-Impairing Pollutant Impacts on Class I Areas). They do not agree with averaging deciviews for comparison.

**Response:** Particulate emissions were evaluated via sensitivity tests. Sensitivity tests showed that primary particulate emissions play only a very minor role in long-range transport contributing to haze, see Section 9.1 for additional detail. Regional sulfates and nitrates account for nearly all predicted long-range anthropogenic haze. Modeling guidance for determining BART applicability is very specific and does not include annual averaging to determine BART eligibility. However, once a facility is determined to be BART eligible, the states have modeling discretion on how to determine the effectiveness of control strategies. During these control sensitivity modeling runs, the averaging of annual results was used to provide guidance on the effectiveness of proposed controls.

**Comment:** The EPA commented that although the regional haze rule provides for CAIR where applicable to satisfy the BART requirement with respect to SO<sub>2</sub> and NO<sub>x</sub> from electric generating units, the EPA is reconsidering this guidance. Therefore, they would not necessarily agree that it is “EPA’s position” that CAIR satisfies pertinent BART requirements. Similarly, Michigan should avoid statements as to whether EPA does or doesn’t intend for CAIR to “address reasonable controls for [electric generating units] in... Regional Haze SIPs.”

**Response:** The DNRE has removed this language from Section 10.5.2 of the SIP and is evaluating the CATR proposal in relation to EGUs.

**Comment:** The EPA commented that Michigan must submit the documents that are to provide for federal enforceability of specific limits representing BART. Even if these limits are already federally enforceable, Michigan must submit these documents for inclusion in the docket for EPA’s rulemaking on Michigan’s prospective SIP submittal and for incorporation by reference as part of Michigan’s SIP.

**Response:** The DNRE believes it has met this requirement by including appropriate permit language and references. For Lafarge, the BART reductions are currently contained in a consent order, and will be rolled into an NSR permit in the future.

### ***Empire Mine***

**Comment:** Comments from EPA and the FS were concerned that the BART-subject emission unit at the Empire facility is permanently shut down and reflected in an enforceable document.

**Response:** The facility is permanently decommissioned as per Title V permit, Renewable Operating Permit (ROP) No. MI-ROP-B1827-2008. The decommissioned Kiln # 1 is not included in the Title V permit issued July 1, 2008. Kiln # 1 was included in NSR permit to install No 494-87B that was voided on November 6, 2000, as part of the Title V permit procedure for. ROP #199600365, issued November 6, 2000. It will require a new approved NSR permit to restart Kiln # 1.

## ***Lafarge***

**Comment:** The FWS/NPS commend Lafarge for its proposed BART decisions. Lafarge proposed BART that is generally consistent with the control equipment already committed to under the Lafarge Global Settlement/Consent Decree – Alpena Facility (Consent Decree). Lafarge proposed that BART should consist of Selective Non-Catalytic Reduction (SNCR) for NO<sub>x</sub> control at all five cement kilns, along with wet flue gas desulfurization (FGD) for SO<sub>2</sub> control for the two kilns in Kiln Group 6. The DNRE included as BART Dry Absorption Additions (DAA) for SO<sub>2</sub> controls for the three kilns in Kiln Group 5 as required by the Consent Decree. They note that low NO<sub>x</sub> burners (LNB) are proposed for all five kilns, but this control equipment is not included in the definition of BART. The DNRE should consider the inclusion of LNB as BART and explain in the SIP the decision as to its inclusion or exclusion.

**Response:** The DNRE considers that all the controls, for NO<sub>x</sub>, SO<sub>2</sub> and PM, as stated in the Global settlement, are included as BART.

**Comment:** The FWS/NPS commented that the Consent Decree requires a 12-month rolling average emission limit for NO<sub>x</sub> of 4.89 lb NO<sub>x</sub>/ton of clinker, with the provision that a 30-day rolling average emission limit will be developed at a later date. Retrofitted 30-day rolling average emission rates in the range of 2.0 lb NO<sub>x</sub>/ton of clinker and lower can be attained by using SNCR/LNB on pre-calciner kilns. The 35 to 40% removal efficiency using SNCR and LNB on a long dry kiln might account for the higher emission limit, but more discussion and calculations should be provided to justify the higher emission limit as is indicated will be done in the SIP.

**Response:** The DNRE considers that all the controls, for NO<sub>x</sub>, SO<sub>2</sub> and PM, as stated in the Global settlement, meet BART requirements. The 30-day rolling average NO<sub>x</sub> emission limits will be established following the installation of SNCR on the five kilns. These are scheduled to be operating on enforceable milestones of the Consent Decree, ranging from October 1, 2011 to March 1, 2012. Comparison of 30-day average feasible limits can then be made to the 30-day average limits set through the Global settlement's requirements.

**Comment:** The EPA commented that the consent decree that Michigan is relying on to require BART level controls specifies interim emission limits but also provides for testing to determine final emission limits. At that point the consent decree will be replaced by a permit that Michigan is expected to issue. Although the interim limit may suffice for current haze SIP purposes, Michigan needs to describe how it intends for the ultimate limit to become enforceable by the State and by EPA and to become part of the SIP, to replace the consent decree before the consent decree expires. If Michigan intends to rely on a Title V permit to provide for federal enforceability of the replacing limits, Michigan will need to address questions about whether it has authority to define a BART limit in a Title V permit rather than having the Title V permit simply compile a limit established elsewhere. As a general matter, Title V permits do not offer a proper mechanism for setting new limits.

**Response:** The BART reductions currently contained in the consent order will be rolled into a NSR permit in the future. At that time the NSR permit will be submitted to EPA to be made part of the BART SIP.

### ***New Page – Escanaba Paper (NP)***

**Comment:** The FS said in regards to the recovery furnace, NP states they already have installed staged combustion but offered no data to indicate how well it is operating.

**Response:** According to NP, the company is responsible for operating the recovery furnace in a manner that is both safe and environmentally responsible. The recovery furnace as an emission unit is regulated for, among other pollutants, total reduced sulfur (TRS) and particulate. A CEMS is installed and operated to continuously monitor TRS emissions. Likewise, a continuous opacity monitoring system is installed to continuously monitor opacity as a surrogate indicator for particulate emissions. Poor combustion within the furnace will yield poor char bed formation, incomplete oxidation of TRS, and fuming, which yields high particulate carryover out of the furnace. Each of these parameters, among others, is monitored to indicate adequate and proper combustion is occurring.

**Comment:** The FWS/NPS suggested that regarding the recovery furnace, low-temperature oxidation was not considered as a NO<sub>x</sub> control alternative. It has never been used on a recovery furnace, but is commercially available and has been successfully applied to, and permitted for, industrial processes (e.g., Minnesota Steel PSD permit). It would be ideally suited to the relatively cool exhaust here. EPC should show why it is not applicable to its recovery furnace.

**Response:** NP has stated that to the best of their knowledge, this technology has not been applied to any recovery furnace in the pulp and paper industry. The ability to apply low-temperature oxidation technology is likely to be extremely different on a recovery furnace than the type of furnace referenced in the comment. Although both are furnaces, they are vastly different.

**Comment:** The FS, FWS/NPS, and EPA comment that there is no basis for rejecting control options for the boilers because "...visibility modeling does not indicate it will result in a significant visibility improvement (i.e., at least 0.5 deciviews)." The BART guidelines provide no such basis for rejecting control options.

**Response:** The DNRE accepts that the information in the SIP document, submitted by NP, adequately supports the BART determination.

**Comment:** The FS commented that in the BART guidelines EPA states that the threshold of perceptibility is 0.5 deciviews and not 1 as proposed by NP. The installation of control for one pollutant (NO<sub>x</sub>) on just one BART subject unit at NP improved visibility by 0.4 deciviews. NP thinks this is small, the FS sees it as very large in and of itself and when added to other controls at the facility would lead to an even more significant improvement in air quality at Seney.

**Response:** The DNRE accepts that the information in the SIP document, submitted by NP, adequately supports the BART determination.

**Comment:** All three commenters stated that to be consistent with other BART analyses the interest rate and expected equipment life for the low NO<sub>x</sub> burner (LNB) analysis for Boiler No. 8 should be 15 years and 7% versus 10 years and 10%. If this change is made the average cost-effectiveness is \$2900 per ton. They also questioned what an employee needs to do for 0.5 hour per shift, for three 8-hour shifts per day, for an LNB? If that cost is removed then the average cost effectiveness is \$2,100 per ton and is not excessive.

**Response:** The DNRE accepts that the information in the SIP document, submitted by NP, adequately supports the BART determination.

**Comment:** The FWS/NPS commented that NP proposed that no additional controls could be justified as BART, based on lack of technical feasibility or cost-effectiveness. It was claimed that serious space limitations at Boiler No. 8 would require adding fans and a new stack to accommodate several of the BART alternatives. Adding these costs to each BART alternative caused all cost estimates to be excessive, except possibly low NO<sub>x</sub> burners (LNB) at \$3,600 per ton of NO<sub>x</sub> removed. The DNRE should confirm that lack of space is an issue at Boiler No. 8.

**Response:** The DNRE accepts that the information in the SIP, submitted by NP, adequately supports the BART determination.

**Comment:** Comments from the FS stated that based on current fuel prices (#6 fuel oil at \$1.5 per gallon and natural gas at \$6 per 1000 cubic feet, see: [www.eia.doe.gov/dnav/](http://www.eia.doe.gov/dnav/)) it is actually a cost savings to operate Boiler No. 8 on natural gas versus the \$482,502 annual cost shown in the BART analysis.

**Response:** NP cost figures are based on 2006 prices, and NP states that there is no guarantee that the natural gas prices will remain low in the future. The DNRE accepts that the information in the SIP document, submitted by NP, adequately supports the BART determination.

**Comment:** All three commenters stated that the SNCR BART analysis for Boiler No. 9 (a wood/natural gas fired, 250,000 pound per hour boiler) appears to be flawed. The MANE-VU document notes an example, "Installing SNCR to achieve 0.15 lb/MMBtu NO<sub>x</sub> emissions on a 300,000 pound per hour wood boiler: Capital \$1.5 million; operating \$0.1 million/yr." NP's total capital cost is \$4.4 million and operating cost is \$1.1 million. This large discrepancy should be explained. NP also again uses an expected equipment life of 10 years and an interest rate of 10%, which the commenters believe should be 15 years and 7%, respectively.

**Response:** The DNRE accepts that the information in the SIP document, submitted by NP, adequately supports the BART determination.

**Comment:** The FS stated the assumed fuels are important to the BART analysis. Are the fuels burned in the No. 9 boiler limited by an enforceable document to only bark and natural gas?



**Response:** Presently only bark and natural gas are being used as fuel for the No. 9 boiler. However, the limitation for burning wood bark, natural gas, as well as paper core is given in the ROP No. MI-ROP-A0884-2008.

### ***St. Mary's Cement (SMC)***

**Comment:** All three commenters disagreed with SMC's determination that a selective, non-catalytic reduction system is technically infeasible and not cost-effective. There does not appear to be documentation describing why SMC has insurmountable problems operating an SNCR system in winter. Also, four other cement plants are proposing SNCR as BART. These are Ash Grove Cement in Montana, CEMEX in Colorado, Holcim Cement in Montana, and Lafarge North America in Washington. The average cost-effectiveness range of \$900-1200 per ton, as reported in the MANE-VU document for SNCR, further suggests the cost effectiveness of SNCR. In addition, the 10% control efficiency that SMC assumed for SNCR appears too low and is among the lowest performing in the industry. The Lafarge BART analysis, which is planning to install a number of SNCR systems at its plant for year-round operation, for example, states the "...expected control effectiveness of SNCR (on the order of 30 to 40 percent based on publicly available data)." Other efficiencies are variously reported at 85%, 80%, 47%, and 25-50%. SMC should consider an examination of its SNCR system seeking improvement in its operating efficiency.

**Response:** The DNRE accepts that the information in the SIP document, submitted by SMC, adequately supports the BART determination.

**Comment:** The FS, FWS/NPS, and EPA stated that the cost estimate for the SNCR system (\$ 7,568 per ton) is too high for SMC.

- a. The MANE-VU document showed an average cost-effectiveness range of \$900-1200 per ton. This is the same reference document SMC used for their sulfur dioxide control costs. Appendix F notes the average cost-effectiveness range down to \$1,000 per ton. This report had limited data since it was from 2004. As more SNCR systems have been applied the costs will likely have come down. Furthermore, other reported SNCR installation ranging from \$498-\$713/ton (Lafarge, MI) to \$1400-\$2300/ton (Ellis County Texas Study).
- b. It is not clear which facility from Appendix F was used to arrive at a capital cost \$1.37M, with an additional cost of \$400,000 for winterization. The need for the winterization cost is unsupported.
- c. They didn't believe a new SNCR system will need five cleanout events per year, so this cost item can be reduced or removed.
- d. The 10-year equipment life assumed is too short. Appendix F assumes 15 years as does the EPA's document: Alternative Control Techniques Document- NOx Emissions from Cement Manufacturing, EPA-453/R-94-004.
- e. The very low 10% control efficiency assumption, a somewhat inflated capital cost, a 10-year, rather than 15-year, amortization factor, along with an excessive assumption for the cost of annual operation, all contribute to the unrealistic high cost per ton.

- f. SMC claimed that the cold winter climate of Michigan made proper temperature control for SNCR difficult. SNCR has been successfully operated without significant efficiency impairment in many cold climates.
- g. Higher control efficiency assumptions on a new SNCR along with more realistic cost functions may result in a feasible retrofitted installation.

**Response:** The DNRE accepts that the information in the SIP document, submitted by SMC, adequately supports the BART determination.

**Comment:** Comments from the FWS/NPS cite The Portland Cement Association report<sup>1</sup> that a relatively inexpensive but effective NO<sub>x</sub> control technique is a “high pressure air injection system” (also called a mixing air system) that can be installed on the kiln. Mixing air systems have shown significant emissions reduction up to 48% on the 13 kilns operating with this technology. This should have been considered among the BART NO<sub>x</sub> control alternatives.

**Response:** The DNRE accepts that the information in the SIP document, submitted by SMC, adequately supports the BART determination.

**Comment:** The FWS/NPS state the proposed NO<sub>x</sub> emission limit of 6.5 lb NO<sub>x</sub>/ton of clinker is lenient compared to the 2.8 lb NO<sub>x</sub>/ton of clinker emission limit for pre-calciner kilns and the Lehigh kiln in Iowa that is subject to 2.8 lb NO<sub>x</sub>/ton of clinker.

**Response:** The DNRE accepts that the information in the SIP document, submitted by SMC, adequately supports the BART determination.

**Comment:** The FWS/NPS comment that the fifth BART factor, namely the visibility impact analysis of each BART alternative, was not presented, probably on the assumption that the high cost per ton dropped each alternative from consideration. After more reasonable costs are determined as discussed above, visibility impact analysis should be performed to assess the potential visibility improvement associated with each control alternative. Since the maximum impact of this facility on the Seney Wilderness Area is a relatively large 5.257 deciviews, this analysis becomes more important.

**Response:** The DNRE accepts that the information in the SIP document, submitted by SMC, adequately supports the BART determination.

**Comment:** The FWS/NPS comment regarding SO<sub>2</sub> control, wet FGD was considered with a cost-effectiveness estimate of \$9,258 per ton and was dismissed due to the high cost. A wet limestone forced oxidation (LSFO) scrubber system was not considered by SMC. These systems demonstrate high removal efficiencies (e.g., 81 to 90%). The Lafarge cement plant in Michigan has proposed the LSFO as BART at a reasonable cost (\$1,087/ton SO<sub>2</sub>). The LSFO alternative should be considered and the costs should be examined.

**Response:** The DNRE accepts that the information in the SIP document, submitted by SMC, adequately supports the BART determination.

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<sup>1</sup> “Summary of Control Techniques for Nitrogen Oxide” by Zephyr Environmental Corporation for the Portland Cement Association, 2008, p. 2.

### ***Smurfit-Stone Container Corporation***

**Comment:** The FWS/NPS commented that a permit or other enforceable document should be provided to Smurfit-Stone Container Corporation stating that all permit limitations for the facility are zero.

**Response:** The Company is in the process of bankruptcy. However, it has been determined that the permits have not been voided. Therefore Smurfit has been added back into this SIP document.

The DNRE has agreed that controls installed at Smurfit-Stone Container Corporation and planned for installation represent BART. If the company comes out of bankruptcy or is bought by some other company, a new NSR permit will be required to be submitted and approved by DNRE to make the BART controls legally enforceable at that time.

### ***Tilden Mining Company (TMC)***

**Comment:** The EPA and FS commented that the only taconite plants in the US are located in Minnesota and Michigan. The same company that operates Tilden operates facilities in Minnesota. Early on in the regional haze consultations, Michigan agreed to mirror what Minnesota did in their SIP with their taconite facilities to ensure consistency. When comparing the two SIPs they found omissions in Michigan's SIP. The DNRE should thoroughly review what is contained in Minnesota's Regional Haze SIP and revise the determination for Tilden to make it consistent with Minnesota.

(<http://www.pca.state.mn.us/index.php/air/air-quality-and-pollutants/general-air-quality/minnesota-regional-haze-plan.html>)

**Response:** The DNRE accepts the company's claim their operations are different enough from the facilities in Minnesota to warrant a different approach in the BART determination.

**Comment:** The EPA and FS suggested that the control technology information in the Tilden BART submittal is completely out of date. In April, USS Minntac installed a low-NOx main burner firing solid fuels in its furnace. Extensive CFD work done by a number of companies in Minnesota has shown that burner designs that lower the flame temperature can reduce NOx formation in taconite furnaces. Low-NOx burners are also being designed for a new taconite plant, Essar Steel, to be built near Nashwauk that will fire natural gas. Essar was originally permitted to install LoTOx to control NOx and mercury. In a separate permitting action for a different taconite facility the MPCA has determined that LoTOx is technically and economically feasible. Babcock Power has made a proposal to a Minnesota taconite plant to pilot test its RSCR system to determine how well it will work.

**Response:** The projects and technologies described above were not selected or proposed for BART, but rather were proposed primarily as projects to be studied, and were agreed to be completed as part of PSD permitting (not BART) or enforcement situations. None of the technologies and projects described above have been established for BART at taconite plants in Minnesota.

**Comment:** The EPA and FS suggested that in regards to sulfur dioxide, the MPCA determined that the addition of a scrubber at the United Taconite plant that burns primarily coal was technically and economically feasible. In doing so, the MPCA had to correct the cost figures submitted by the same consultant who submitted Tilden's BART analysis. They saw no evidence presented that would indicate that a similar conclusion is not justified for Tilden.

**Response:** The DNRE accepts that the information in the SIP, submitted by TMC, adequately supports the BART determination. According to TMC, the facility-specific circumstances and evaluations completed for Tilden do not warrant further wet scrubber evaluations to make a BART determination. TMC's wet scrubber (absorber) evaluation shows costs to be \$6,000/ton of sulfur dioxide removed. TMC states that the implementation of a wet scrubber (absorber) would have negative environmental effects by increasing the sulfur constituent loading in water.

**Comment:** The EPA and FS commented that other items included in the Minnesota's Regional Haze SIP that are missing from the Michigan SIP include requirements to install NO<sub>x</sub> and SO<sub>2</sub> CEMs by November 2008, and a pilot testing program of potential NO<sub>x</sub> control strategies starting in July 2011.

- a. The FS commented multiple times on Minnesota's RH SIP that stack testing/ PEMS (predictive emission monitoring systems) are not appropriate for these sources since the taconite plants will be attempting to find methods to reduce emissions and in doing so need real-time emissions information. It should also be noted that taconite plants produce NO<sub>x</sub> emissions on the scale of utilities which are required to install CEMs. CEMs have been operated by a number of taconite plants for years and no insurmountable operating problems have been established.
- b. Tilden is unique among the taconite plants in the US in that it processes hematite and magnetite. The oxidation of magnetite produces significant heat versus hematite. It is this difference that led the EPA to subcategorize the taconite MACT standard and set a different limit for Tilden. It is also this difference that should compel Michigan to require CFD modeling, low-NO<sub>x</sub> main burner design, and pilot testing of NO<sub>x</sub> controls on this line.

**Response:** The DNRE accepts that the information in the SIP, submitted by TMC, adequately supports the BART determination.

**Comment:** The EPA and FS commented that Tilden's revised BART scenario, which shows that SO<sub>2</sub> alone does not cause visibility impairment to Class I areas, is inconsistent with EPA policy and therefore is not an adequate basis for concluding that the current Title V permit limits for SO<sub>2</sub> emissions of 28,800 lbs per day should be considered BART. They also disagreed that Tilden should be allowed to go back and model pollutant by pollutant at an individual BART-subject emission unit in an attempt to exempt certain pollutants from the unit, as was done for sulfur dioxide at Tilden Furnace 1. The EPA memo dated July 19, 2006 from Joseph Paisie that is included in New Page's BART analysis states, "Because of the complexity and nonlinear nature of atmospheric chemistry and chemical transformation among pollutants, the EPA does not generally recommend that CALPUFF be used on a pollutant specific basis to

determine whether a source meets the threshold test for BART.” Also it goes on to state, “Because the task of predicting the impacts of PM on visibility is a relatively straight-forward exercise, unlike predicting the impacts of SO<sub>2</sub> and NO<sub>x</sub>, we would recommend the use of CALPUFF on a pollutant specific basis to model only the impact of PM emissions on visibility.”

**Response:** There appears to be a misunderstanding of the modeling runs that were completed as part of the Tilden BART analysis. The Tilden modeling is consistent with the EPA memo cited. Multi-pollutant CALPUFF runs were performed to evaluate visibility impacts, not single pollutant runs as implied in the comments. Two baseline scenarios were evaluated reflecting the range of fuels at Tilden, natural gas (high NO<sub>x</sub> emissions, low SO<sub>2</sub> emissions) and coal (low NO<sub>x</sub> emissions, high SO<sub>2</sub> emissions). Further, the significantly lower impact of the coal-fueled run was only one factor that contributed to the BART determination for SO<sub>2</sub>.

**Comment:** The FS disagreed with the assertion in Tilden’s BART analysis that, “The CALPUFF model is conservative, resulting in an over prediction of impacts. This modeled high impact from the BART eligible sources is 0.72 dV, which is below perceptible levels of one to two dV. Real impacts to the Class I areas from Tilden are expected to be even less than these modeled impacts.” The perceptibility threshold is not 1 to 2 deciviews it is 0.5 deciview. Also, the EPA goes into detail regarding a number of reasons why the CALPUFF modeling analysis may not be conservative (see FR Vol. 70, No. 128 p. 39119).

**Response:** According to the Winter/April 1993 IMPROVE newsletter (IMPROVE Vol. 2 No. 1), “...a 1 to 2 dV difference corresponds to a small visibility perceptible change in scene appearance where the assumptions used to develop the dV scale are met.” The BART guidelines identify the 0.5 dV as a threshold for requiring a BART determination. The language in question does not affect the conclusion of the analysis, that Tilden impacts are very small. Given the emissions assumptions (operating at maximum rates 8,760 hours per year), “The real impacts to the Class I areas from Tilden are expected to be even less than these modeled impacts...” still applies even without the other elements of the quote.

**(The following 3 pages contain the DNRE notice of the second public comment period which was held in October 2008 as published in DNRE’s bi-weekly Calendar of events.)**



MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY  
PO BOX 30473  
LANSING MI 48909-7973

# CALENDAR

September 29, 2008

**ENVIRONMENTAL  
ASSISTANCE CENTER**  
800-662-9278  
E-mail: [deq-ead-env-  
assist@michigan.gov](mailto:deq-ead-env-assist@michigan.gov)

**PUBLICATION  
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**TIMETABLE FOR  
DECISIONS**

**TIPS FOR CITIZEN INPUT**

The DEQ Environmental Assistance Center (EAC) is available to provide direct access to DEQ environmental programs, answers to environmental questions, referrals to DEQ technical staff, and quick response. Questions on any items listed in the DEQ Calendar can be referred to the EAC.

The DEQ Calendar is published every two weeks, on alternate Mondays, by the Michigan Department of Environmental Quality. We welcome your comments.

You may subscribe to receive the DEQ Calendar electronically by sending an Email to the listserv at [LISTSERV@LISTSERV.MICHIGAN.GOV](mailto:LISTSERV@LISTSERV.MICHIGAN.GOV) and in the body of the message type Subscribe, DEQ-CALENDAR, and your name.

The DEQ Calendar is available on the DEQ World Wide Web site in pdf and html format. Access the calendar at [www.michigan.gov/deqcalendar](http://www.michigan.gov/deqcalendar).

No decision listed in the DEQ Calendar will be made prior to seven days after the initial Calendar publication date.

Refer to the "Public Involvement Handbook, A Citizens Guide" to increase the effectiveness of your input into DEQ programs. Access the handbook at [www.michigan.gov/deq](http://www.michigan.gov/deq) and click on "Get Involved, Programs for Citizens."

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**PART I:  
ENVIRONMENTAL ISSUES, PERMITTING AND RELATED REGULATIONS**

**Permit Decisions Before the Office of the Director**

**AIR QUALITY  
DIVISION**  
See Map - ❶

**EES COKE BATTERY, LLC, RIVER ROUGE, WAYNE COUNTY**, proposed Permit to Install application for a 5 percent increase in production of metallurgical coke on an annual basis from the existing by-product recovery coke oven battery. Additionally, the 5 percent increase in production of metallurgical coke on an annual basis from the existing by-product recovery coke oven battery will require revisions to Renewable Operating Permit (ROP) No. 199600332. This public comment period meets the public participation requirements for a future administrative amendment to the ROP. The facility is located at Zug Island, River Rouge, Michigan. The responsible official for the source is Gary Gross, General Manager, P.O. Box 18309, River Rouge, Michigan. New Source Review and ROP public notice documents can be viewed at [www.michigan.gov/deqair](http://www.michigan.gov/deqair). If a public hearing is requested in writing by September 26, 2008, an informational session and public hearing will be held September 30, 2008, (see September 30 listing in this calendar). Written comments and/or a request for a public hearing should be sent to the Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909, to the attention of Mary Ann Dolehanty, Acting Permit Section Supervisor. Information Contact: **Randal Telesz**, Air Quality Division, 517-373-7089. Decision-maker: **G. Vinson Hellwig**, Air Quality Division Chief.

**AIR QUALITY  
DIVISION**  
See Map - ❷

**SIETSEMA FARMS FEEDS, INC., HOWARD CITY, MONTCALM COUNTY**: Written comments are being accepted until October 28, 2008, on a proposed Permit to Install application for installation and operation of a gasification facility to produce steam and electricity from turkey manure/litter. The facility is located at 19117 Lake Montcalm Road, Howard City, Michigan. Public notice documents can be viewed at [www.deq.state.mi.us/aps/cwerp.shtml](http://www.deq.state.mi.us/aps/cwerp.shtml). A public hearing will be held on October 28, 2008 (see October 28 listing in this calendar). Written comments should be sent to the Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909, to the attention of Mary Ann Dolehanty, Acting Permit Section Supervisor. Information Contact: **Paul Schleusener**, Air Quality Division, 517-335-6828. Decision-maker: **Lynn Fiedler**, Acting Air Quality Division Assistant Chief.

**AIR QUALITY  
DIVISION**  
See Map - ❸

**WOLVERINE POWER SUPPLY COOPERATIVE, INC., ROGERS CITY, PRESQUE ISLE COUNTY**: Written comments are being accepted until November 24, 2008, on a draft permit for the proposed installation and operation of a 600-megawatt coal-fired steam electric power plant. The facility would be located within the Oglebay-Norton Quarry property, Rogers Township, Michigan. New Source Review public notice documents can be viewed at [www.michigan.gov/deqair](http://www.michigan.gov/deqair). An informational session will be held on October 1, 2008 (see October 1 listing in this calendar). Additional informational sessions and public hearings will be held on October 29, 2008 and on October 30, 2008 (see the October 29 and October 30 listings in this calendar). Written comments should be sent to the Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909, to the attention of Mary Ann Dolehanty, Acting Permit Section Supervisor. All statements received by November 24, 2008, will be considered by the decision-maker prior to final action. Information Contact: **Melissa Byrnes**, Air Quality Division, 517-373-7065. Decision-maker: **G. Vinson Hellwig**, Air Quality Division Chief.

**Other Decisions Before the Office of the Director**

**AIR QUALITY  
DIVISION**  
See Map - Statewide

**MICHIGAN'S REGIONAL HAZE STATE IMPLEMENTATION PLAN (SIP)**, proposed for Michigan's two Class I areas, Isle Royale National Park and Seney Wilderness Area. The Air Quality Division will hold a public comment period through October 29, 2008, meets the public participation requirements for a SIP submittal. The Regional Haze SIP can be viewed on the Web at [www.michigan.gov/deqair](http://www.michigan.gov/deqair). If requested by October 29, 2008, a hearing will be held November 3, 2008 (see November 3 listing in this calendar). Written comments should be sent to the Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909, to the attention of Sheila Blais. Information Contact: **Cindy Hodges**, Air Quality Division, 517-335-1059.



# CALENDAR

September 29, 2008

	Chris Hare, Acting District Supervisor. If requested in writing by October 29, 2008, a public hearing may be scheduled. Information Contact: <b>Jennifer Lang</b> , Air Quality Division, 989-686-8025, Extension 8254.
OCTOBER 29, 2008	<b>DEADLINE FOR PUBLIC COMMENT REGARDING VECTOR PIPELINE L. P., HIGHLAND COMPRESSOR STATION (SRN: N6838), HIGHLAND, OAKLAND COUNTY</b> , for the proposed approval of a draft permit for the renewal of a Renewable Operating Permit (ROP) for the operation of two natural gas fired turbines and a natural gas fired emergency generator. The draft permit is intended to simplify and clarify the facility's applicable requirements and will not result in any air emission changes at the stationary source. The ROP public notice documents can be viewed on the Web at <a href="http://www.michigan.gov/deqair">www.michigan.gov/deqair</a> . The responsible official of the stationary source is Belinda Feriis, General Counsel, Chief Compliance Officer & Corporate Secretary, 38705 Seven Mile Road, Suite 490, Livonia, Michigan 48152. Comments on the draft permit are to be submitted to Sebastian G. Kallumkal, Michigan Department of Environmental Quality, Air Quality Division, Southeast Michigan District Office, 27700 Donald Court, Warren, Michigan 48092. The decision-maker for the permit is Teresa Seidel, Southeast Michigan District Supervisor. If requested in writing by October 29, 2008, a public hearing may be scheduled. Information Contact: <b>Sebastian G. Kallumkal</b> , Air Quality Division, 586-753-3738.
OCTOBER 29, 2008 5:00 P.M. – 6:30 P.M. INFORMATIONAL SESSION 7:00 P.M. – PUBLIC HEARING and OCTOBER 30, 2008 4:00 P.M. – 5:30 P.M. INFORMATIONAL SESSION 6:00 P.M. – PUBLIC HEARING	<b>INFORMATIONAL SESSIONS AND PUBLIC HEARINGS REGARDING WOLVERINE POWER SUPPLY COOPERATIVE, INC., ROGERS CITY, PRESQUE ISLE COUNTY</b> : Written comments are being accepted on a draft permit for the proposed installation and operation of a 600-megawatt coal-fired steam electric power plant. The facility would be located within the Oglebay-Norton Quarry property, Rogers Township, Michigan. New Source Review public notice documents can be viewed at <a href="http://www.michigan.gov/deqair">www.michigan.gov/deqair</a> . The informational sessions and public hearings will be held in the Rogers City High School Gymnasium, 1033 West Huron Avenue, Rogers City, Michigan. On October 29, 2008, a public hearing will be held starting promptly at 7:00 p.m. Prior to the hearing, an informational session will be held in an open-house format from 5:00 p.m. until 6:30 p.m. Staff will be available to answer questions. The public hearing will follow at 7:00 p.m. An additional public hearing will be held on October 30, 2008, starting promptly at 6:00 p.m. Prior to the hearing, an informational session will be held in an open-house format from 4:00 p.m. until 5:30 p.m. Staff will be available to answer questions. The public hearing will follow at 6:00 p.m. Written comments should be sent to the Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909, to the attention of Mary Ann Dolehanty, Acting Permit Section Supervisor. All statements received by November 24, 2008 will be considered by the decision-maker prior to final action. Information Contact: <b>Melissa Byrnes</b> , Air Quality Division, 517-373-7065.
NOVEMBER 3, 2008 1:00 p.m.	<b>TENTATIVELY SCHEDULED PUBLIC HEARING REGARDING MICHIGAN'S REGIONAL HAZE STATE IMPLEMENTATION PLAN (SIP)</b> , proposed for Michigan's two Class I areas, Isle Royale National Park and Seney Wilderness Area. This public comment period meets the public participation requirements for a SIP submittal. The Regional Haze SIP can be viewed on the Web at <a href="http://www.michigan.gov/deqair">www.michigan.gov/deqair</a> . If requested by October 29, 2008, a public hearing will be held in the Constitution Hall, Lillian Hatcher Conference Room, 3 <sup>rd</sup> Floor North, 525 West Allegan Street, Lansing, Michigan. Those interested may contact the Air Quality Division at 517-335-1059 on October 30, 2008, to determine if a hearing was requested and will be held. Information Contact: <b>Cindy Hodges</b> , Air Quality Division, at 517-335-1059.
NOVEMBER 24, 2008	<b>DEADLINE FOR PUBLIC COMMENT REGARDING WOLVERINE POWER SUPPLY COOPERATIVE, INC., ROGERS CITY, PRESQUE ISLE COUNTY</b> , on a draft permit for the proposed installation and operation of a 600-megawatt coal-fired steam electric power plant. The facility would be located within the Oglebay-Norton Quarry property, Rogers Township, Michigan. New Source Review public notice documents can be viewed at <a href="http://www.michigan.gov/deqair">www.michigan.gov/deqair</a> . Written comments should be sent to the Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909, to the attention of Mary Ann Dolehanty, Acting Permit Section Supervisor. All statements received by November 24, 2008, will be considered by the decision-maker prior to final action. Information Contact: <b>Melissa Byrnes</b> , Air Quality Division, 517-373-7065.



## **General Summary of Comments from the 2008 Public Comment Period and DNRE Responses**

**Comment:** Several comments addressed issues with BART for non-EGUs, such as:

- being incomplete;
- adjusting RPGs when BART is complete;
- some clarifications in the current SIP for Q/d calculations;
- a specific date when BART determinations will be made.

**Response:** The BART portion of the Regional Haze SIP will not be completed until fall of 2009. When it is completed, the DNRE will remodel using the BART emission reductions to see how the Reasonable Progress Goals are affected. The SIP will also include additional details about the Q/d calculations.

**Comment:** Several comments addressed issues with BART for EGUs such as:

- a specific date when BART determinations will be made;
- BART for particulate emissions;
- SIP relies on CAIR to satisfy BART for EGUs.

**Response:** With the possible CAIR vacatur, there is a great deal of uncertainty in dealing with EGUs. EGUs have been informed that, should CAIR be vacated they will be required to submit BART analyses. The SIP and all the modeling based on CAIR has been proceeding for several years. To completely redo the whole SIP and modeling based on a variety of possible EGU scenarios is not reasonable. However, the DNRE will be discussing control options with the EGUs, including possible BART controls, over the next few months. The DNRE has determined that primary particulates from EGUs are not significant and this is explained in greater detail in the SIP document.

**Comment:** Comments from the FS recommended including details on current controls on EGUs, controls being installed, by what date and by what level of emissions reductions are expected.

**Response:** The DNRE is working on assembling this data, considering uncertainty with the CAIR rule. The DNRE will include this in the BART submittal in 2009.

**Comment:** Several comments indicated that the DNRE did not respond to the EC/R report that indicated cost effective controls for EGUs and other non-EGUs.

**Response:** The DNRE addressed this issue in Part 10.5.2 of the SIP document.

**Comment:** The EPA suggested that the DNRE should consider lowering the state to state contribution threshold to below 5%.

**Response:** The DNRE disagrees. As explained in Appendix 1A to this SIP, the back trajectory and modeling results showed that states contributing 2% (or more) make up about 90-95% of total light extinction, whereas states contributing 5% (or more) make up only about 75-80% of total light extinction. Since this is the first planning period for regional haze, we believe that focusing on a 5% grouping of states is adequate. In

future years this will be re-evaluated and a larger impacting group of states may be appropriate.

**Comment:** Comments from the FS recommended including emissions summaries for 2012 and 2018 as well as 2005.

**Response:** The DNRE agrees; however, modeling was only done for 2009 and 2018. Therefore emission summaries for 2009 and 2018 were included in the SIP.

**Comment:** Comments from the FS suggests some clarifications as well as indicating missing appendices.

**Response:** The DNRE agrees with and has added these clarifications and included the missing appendices.

**Comment:** Comments from the FLMs suggest that Michigan's SIP assumes RPGs are met even though the 20% best days at Seney are getting worse.

**Response:** The DNRE believes that this should not be an issue of concern; there are several reasons that could explain this including modeling or growth factors. More detail is included in the SIP.

**(The following 3 pages contain the DNRE notice of the first public comment period which was held in November 2007 as published in the DNRE's biweekly Calendar of Events.)**



MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY  
PO BOX 30473  
LANSING MI 48909-7973

# CALENDAR

October 29, 2007

- ♦ ENVIRONMENTAL ASSISTANCE CENTER  
800-662-9278  
E-mail: [deq-ead-env-assist@michigan.gov](mailto:deq-ead-env-assist@michigan.gov)

The DEQ Environmental Assistance Center (EAC) is available to provide direct access to DEQ environmental programs, answers to environmental questions, referrals to DEQ technical staff, and quick response. Questions on any items listed in the DEQ Calendar can be referred to the EAC.

- ♦ PUBLICATION SCHEDULE

The DEQ Calendar is published every two weeks, on alternate Mondays, by the Michigan Department of Environmental Quality. We welcome your comments.

- ♦ CALENDAR LISTSERV

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- ♦ INTERNET ACCESS  
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- ♦ TIMETABLE FOR DECISIONS

No decision listed in the DEQ Calendar will be made prior to seven days after the initial Calendar publication date.

- ♦ TIPS FOR CITIZEN INPUT

Refer to the "Public Involvement Handbook, A Citizens Guide" to increase the effectiveness of your input into DEQ programs. Access the handbook at [www.michigan.gov/deq](http://www.michigan.gov/deq) and click on "Get Involved, Programs for Citizens."

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## PART I: ENVIRONMENTAL ISSUES, PERMITTING, AND RELATED REGULATIONS

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## PART II: ENVIRONMENTAL CONFERENCES, WORKSHOPS, AND TRAINING PROGRAMS

13



	<p>Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909. Written comments must be received by November 14, 2007. If a request is received in writing by November 14, 2007, a public hearing will be scheduled. Information Contact: <b>Tom Andrzejewski</b>, Air Quality Division, 517-373-0134. Decision-maker: <b>G. Vinson Hellwig</b>, Air Quality Division Chief.</p>
<p><b>AIR QUALITY DIVISION</b> See Map – No. 6</p>	<p><b>CRYSTAL AGGREGATES, LLC, COPEMISH, MANISTEE COUNTY.</b> Written comments are being accepted on a proposed Consent Order to administratively resolve alleged air pollution violations. You may obtain copies of the proposed Consent Order and Staff Activity Report on the Web at <a href="http://www.michigan.gov/deqair">www.michigan.gov/deqair</a>. Submit written comments to Malcolm Mead-O'Brien, Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909. Written comments must be received by November 28, 2007. If a request is received in writing by November 28, 2007, a public hearing will be scheduled. Information Contact: <b>Malcolm Mead-O'Brien</b>, Air Quality Division, 517-241-2094. Decision-maker: <b>G. Vinson Hellwig</b>, Air Quality Division Chief.</p>
<p><b>AIR QUALITY DIVISION</b> See Map – No. 7</p>	<p><b>KRAFT FOODS GLOBAL, INC., BATTLE CREEK, CALHOUN COUNTY.</b> Written comments are being accepted on a proposed Consent Order to administratively resolve alleged air pollution violations. You may obtain copies of the proposed Consent Order and Staff Activity Report on the Web at <a href="http://www.michigan.gov/deqair">www.michigan.gov/deqair</a>. Submit written comments to Tom Andrzejewski, Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909. Written comments must be received by November 28, 2007. If a request is received in writing by November 28, 2007, a public hearing will be scheduled. Information Contact: <b>Tom Andrzejewski</b>, Air Quality Division, 517-373-0134. Decision-maker: <b>G. Vinson Hellwig</b>, Air Quality Division Chief.</p>
<p><b>AIR QUALITY DIVISION</b> Statewide</p>	<p><b>MICHIGAN'S REGIONAL HAZE STATE IMPLEMENTATION PLAN (SIP):</b> proposed for Michigan's two Class I areas, Isle Royale National Park and Seney Wilderness Area. Public comment will be taken through November 29, 2007. This public comment period meets the public participation requirements for a SIP submittal. The Regional Haze SIP can be viewed on the Web at <a href="http://www.michigan.gov/deqair">www.michigan.gov/deqair</a>. If requested by November 29, 2007, a hearing will be held December 4, 2007 (see December 4 listing in this calendar). Written comments should be sent to the Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909, to the attention of Mary Ann Halbeisen. Information Contact: <b>Cynthia Hodges</b>, Air Quality Division, 517-335-1059. Decision-maker: <b>DEQ Director</b>.</p>
<p><b>ENVIRONMENTAL SCIENCE AND SERVICES DIVISION</b> See Map – No. 8</p>	<p><b>CLEAN CORPORATE CITIZEN DESIGNATION, MAHLE POWERTRAIN, LLC, 41000 VINCINTI COURT, NOVI, OAKLAND COUNTY.</b> The Michigan Department of Environmental Quality has received an application for Clean Corporate Citizen (C3) designation from MAHLE Powertrain, LLC, 41000 Vincinti Court, Novi, Michigan as provided for under Administrative Rules R324.1508: Clean Corporate Citizen Program. The C3 program provides incentives for improved environmental protection. Regulated establishments that have demonstrated environmental stewardship can receive C3 designation and public recognition for their efforts and are entitled to certain regulatory benefits. Information Contact: <b>Kelie Bond</b>, Environmental Science and Services Division, 517-241-7969. Decision-maker: <b>DEQ Director</b>.</p>
<p><b>ENVIRONMENTAL SCIENCE AND SERVICES DIVISION</b> See Map – No. 9</p>	<p><b>CLEAN CORPORATE CITIZEN DESIGNATION, MAHLE TECHNOLOGY, INC., 23030 HAGGERTY ROAD, FARMINGTON HILLS, OAKLAND COUNTY.</b> The Michigan Department of Environmental Quality has received an application for Clean Corporate Citizen (C3) designation from MAHLE Technology, Inc., 23030 Haggerty Road, Farmington Hills, Michigan as provided for under Administrative Rules R324.1508: Clean Corporate Citizen Program. The C3 program provides incentives for improved environmental protection. Regulated establishments that have demonstrated environmental stewardship can receive C3 designation and public recognition for their efforts and are entitled to certain regulatory benefits. Information Contact: <b>Kelie Bond</b>, Environmental Science and Services Division, 517-241-7969. Decision-maker: <b>DEQ Director</b>.</p>
<p><b>LAND AND WATER MANAGEMENT DIVISION</b> See Map – No. 10</p>	<p><b>PROPOSED FILLED BOTTOMLANDS DEED, MACKINAC COUNTY.</b> Proposed filled bottomlands deed to a 0.11-acre parcel of Lake Huron public trust bottomlands in Clark Township, Mackinac County. File LH 476. Contact: <b>Tom Graf</b>, Land and Water Management Division, 517-335-3471. Decision-maker: <b>DEQ Director</b>.</p>



## CALENDAR

October 29, 2007

	<p>Office, 3058 West Grand Boulevard, Suite 2-300, Detroit, Michigan 48202. The decision-maker for the permit is Teresa Seidel, District Supervisor. If requested in writing by November 28, 2007, a public hearing may be scheduled. Information Contact: <b>Lee H. Varner</b>, Air Quality Division, 313-456-4684.</p>
NOVEMBER 29, 2007	<p><b>DEADLINE FOR PUBLIC COMMENT REGARDING EMPIRE IRON MINING PARTNERSHIP (SRN B1827), PALMER, MARQUETTE COUNTY</b>, for the proposed approval of the Renewable Operating Permit for the company's Palmer facility. This draft permit is a renewal of the original Renewable Operating Permit #199600365 which was issued to the company on November 6, 2000. The equipment included in this proposed ROP renewal is the iron ore pellet manufacturing operations and related material handling equipment. The responsible official of the facility is David B. Blake, General Manager, P.O. Box 38, Palmer, Michigan 49871. The draft permit is intended to simplify and clarify the facility's applicable requirements and will not result in any air emission changes at the facility. The ROP public notice documents can be viewed on the Web at <a href="http://www.michigan.gov/deqair">www.michigan.gov/deqair</a>. Comments on the proposed permit are to be submitted to Thomas Maki, Department of Environmental Quality, Air Quality Division, 420 Fifth Street, Gwin, Michigan 49841. If requested in writing by November 29, 2007, a public hearing will be held on December 6, 2007 (see December 6 listing in this calendar). Information Contact: <b>Thomas Maki</b>, Air Quality Division, 906-346-8503.</p>
NOVEMBER 29, 2007	<p><b>DEADLINE FOR PUBLIC COMMENT REGARDING MICHIGAN'S REGIONAL HAZE STATE IMPLEMENTATION PLAN (SIP)</b>, proposed for Michigan's two Class I areas, Isle Royale National Park and Seney Wilderness Area. This public comment period meets the public participation requirements for a SIP submittal. The Regional Haze SIP can be viewed on the Web at <a href="http://www.michigan.gov/deqair">www.michigan.gov/deqair</a>. If requested by November 29, 2007, a hearing will be held December 4, 2007 (see December 4 listing in this calendar). Written comments should be sent to the Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909, to the attention of Mary Ann Halbeisen. Information Contact: <b>Cynthia Hodges</b>, Air Quality Division, 517-335-1059.</p>
NOVEMBER 29, 2007 9:00 a.m.–12:00 p.m.	<p><b>MICHIGAN SMALL BUSINESS CLEAN AIR COMPLIANCE ADVISORY PANEL MEETING, LANSING</b>. The Michigan Department of Environmental Quality is holding a meeting of the Michigan Small Business Clean Air Compliance Advisory Panel (CAP) in Constitution Hall, Katherine Cushman Conference Room, 525 West Allegan Street, Lansing, Michigan. The CAP is a seven-member panel through which members speak freely and openly about air quality matters. The public is encouraged to attend. Individuals needing accommodations for effective participation at the meeting should contact Donna Davis, Environmental Science and Services Division, 517-335-2784, a week in advance to request mobility, visual, hearing or other assistance.</p>
DECEMBER 4, 2007 1:00 p.m.	<p><b>TENTATIVELY SCHEDULED PUBLIC HEARING REGARDING MICHIGAN'S REGIONAL HAZE STATE IMPLEMENTATION PLAN (SIP)</b>, proposed for Michigan's two Class I areas, Isle Royale National Park and Seney Wilderness Area. This public comment period meets the public participation requirements for a SIP submittal. The Regional Haze SIP can be viewed on the Web at <a href="http://www.michigan.gov/deqair">www.michigan.gov/deqair</a>. If requested by November 29, 2007, a public hearing will be held in the Constitution Hall, Lillian Hatcher Conference Room, 3<sup>rd</sup> Floor North, 525 West Allegan Street, Lansing, Michigan. Those interested may contact the Air Quality Division at 517-335-1059 on November 30, 2007, to determine if a hearing was requested and will be held. Information Contact: <b>Cynthia Hodges</b>, Air Quality Division, at 517-335-1059.</p>
DECEMBER 6, 2007 10:00 a.m.	<p><b>TENTATIVELY SCHEDULED PUBLIC HEARING REGARDING EMPIRE IRON MINING PARTNERSHIP (SRN B1827), PALMER, MARQUETTE COUNTY</b>, for the proposed approval of the Renewable Operating Permit for the company's Palmer facility. This draft permit is a renewal of the original Renewable Operating Permit #199600365 which was issued to the company on November 6, 2000. The equipment included in this proposed ROP renewal is the iron ore pellet manufacturing operations and related material handling equipment. The draft permit is intended to simplify and clarify the facility's applicable requirements and will not result in any air emission changes at the facility. If requested in writing by November 29, 2007, a public hearing will be held at the Department of Environmental Quality District Office, 420 Fifth Street, Gwin, Michigan. Information Contact: <b>Thomas Maki</b>, Air Quality Division, 906-346-8503.</p>

## **General Summary of Comments from the 2007 Public Comment Period and DNRE Responses**

**Comment:** Comments were received from several groups that supported DNRE's CAIR=BART.

**Response:** This comment may no longer pertain due to the possible vacatur of CAIR.

**Comment:** Two comments did not support discontinuing either Class I monitors if federal funding was not met.

**Response:** The DNRE will look at other options if federal funding is cut.

**Comment:** DTE Energy encouraged the use of later year base year emissions inventories (2005).

**Response:** The DNRE agrees and has made appropriate updates.

**Comment:** Consumers Energy supports the DNRE's Regional Haze SIP in light of the states current economy, the actions being taken by the 1997 PM<sub>2.5</sub> NAACS, and the fundamental difference of Regional Haze to other criteria pollutants.

**Response:** The DNRE appreciates the support.

**Comment:** Consumers Energy suggests DNRE use the glide path diagrams in the body of the SIP submittal.

**Response:** The DNRE agrees and has made appropriate updates.

**Comment:** WE Energies supported DNRE's Reasonable Progress approach and provided several references to EPA documents that support our approach.

**Response:** The DNRE appreciates the support.

**Comment:** The Little Traverse Bay Bands of Odawa Indians (Tribe) suggests that Michigan should have clearly defined milestones established and fulfilled for the next five decades (to 2064).

**Response:** The DNRE has had difficulty predicting and setting milestones for the next five and ten years due to many factors beyond our control. The example, RPG in the SIP document shows possible milestones for the next five decades, but clearly this has little meaning in light of the many unknowns over that period of time.

**Comment:** The Tribe wanted DNRE to discuss the issues with the location of the Isle Royale monitor.

**Response:** This monitor is located within the boundaries of EPA regulations, but the DNRE did include some discussion of this issue in the SIP document.

## **FLM Comments**

**Comment:** Several areas in the SIP needed more details or clarification such as:

- Monitoring
- Identifying sources with Q/d and PSAT (AOI)
- No reasonable progress goals for the 20% cleanest days
- Values used to set reasonable progress goals
- Plans for future consultation
- Basis for emissions reductions
- Information analyzed in periodic reports
- Determination of adequacy of the plan
- Contingency measures
- Emissions inventory
- Information on modeling by MRPO
- Wildland fires and smoke management plans

**Response:** The DNRE has made these corrections/clarifications.

**Comment:** The values for natural background conditions were incorrect.

**Response:** The DNRE has made these corrections.

**Comment:** Absence of information on BART analysis.

**Response:** The DNRE has not completed its BART analyses, but will provide the FLMs a 60-day comment period when BART analyses are complete. Furthermore with the pending vacatur of CAIR, DNRE is uncertain of the requirements for EGUs, since DNRE originally determined that CAIR=BART.

**Comment:** Non-health based terminology is problematic.

**Response:** The Class I areas in Michigan are located in some of the cleanest areas of the state with annual average PM<sub>2.5</sub> of 5 ug/m<sup>3</sup>. This is below the 15 ug/m<sup>3</sup> NAAQS for PM<sub>2.5</sub>, which the EPA considers safe. Therefore, reducing haze in the Class I areas is mainly to protect visibility, as the Regional Haze Rule in 40 CFR Part 51, II, states, "Congress adopted the visibility provisions in the CAA to protect visibility in these 'areas of great scenic importance.'"

The same particles that impact haze have health effects and are of greatest concern in PM<sub>2.5</sub> nonattainment areas. The Haze program is a welfare-based program, not health-based, which is the point the DNRE was making in the earlier version of the SIP document. However, the CAA does not suggest that visibility is less important than other parts of the CAA. Therefore, the DNRE has removed any such language from the SIP.

## **Appendix 3A**

**Midwest Regional Planning Organization,  
Principles for Regional Planning**



Midwest Regional Planning Organization  
**PRINCIPLES FOR REGIONAL PLANNING**

The purpose of this paper is to outline the Midwest Regional Planning Organization's principles for regional planning to address regional haze.

**Background**

In 1999, the United States Environmental Protection Agency (USEPA) promulgated regional haze regulations that, among other things, require all states to develop regional haze rules to establish goals and emission reduction strategies for improving visibility due to regional haze in the 156 national park and wilderness areas throughout the United States designated as mandatory Federal Class I areas. USEPA's regional haze regulations allow for, and encourage through deferment of deadlines, a coordinated approach to addressing regional haze issues. As part of the implementation of the regional haze regulations, USEPA has provided grant funds for five regional planning organizations (RPOs) to facilitate their efforts to assess visibility impairment in the region. Ohio has been included for this purpose with the States of Illinois, Indiana, Michigan, and Wisconsin in the Midwest RPO.

**Purpose**

The Midwest RPO is a non-regulatory entity whose purpose is to provide technical assessments for and assistance to its members on problems of air quality, and provide a forum for its members to discuss air quality issues. In particular, the Midwest RPO shall assess visibility impairment due to regional haze in the mandatory Federal Class I areas located inside the borders of the States of Illinois, Indiana, Michigan, Ohio, and Wisconsin, and the impact of emissions from the five states (including tribal lands in the five states) on visibility impairment due to regional haze in the mandatory Federal Class I areas located outside the borders of the five states.

**Roles and Responsibilities**

The regional planning process will include states, tribes, Federal Land Managers and other Federal agencies, such as USEPA, and other interested stakeholders, including citizen groups and industry.

The states have the primary regulatory responsibility and authority under the regional haze regulations. Specifically, pursuant to 40 CFR Part 51, Subpart P, section 51.300, states are required to "...develop programs to assure reasonable progress toward meeting the national goal of preventing any future, and remedying any existing, impairment of visibility in mandatory Class I Federal areas which impairment results

from manmade air pollution... . As noted in the preamble to the regional haze regulations, states are required to ...develop SIP revisions to address regional haze, to update the SIP every 10 years, and to continue to evaluate progress toward the national visibility goal. To facilitate the interaction of the states in meeting their regulatory obligations, the five states entered into a Memorandum of Agreement on October 26, 2000 ( Memorandum of Agreement for the Midwest Regional Planning Organization to Address Regional Haze ).

In the preamble to the regional haze regulations, USEPA noted that tribal participation can help provide emissions inventory information to better understand the importance of sources in Indian country to regional visibility impairment, and provide a forum for tribal participants to alert RPO s to air quality concerns in Indian country. At this time, tribes in the Midwest RPO states have no regulatory responsibility under the regional haze regulations. Nevertheless, tribes shall retain a special consultation role in the regional planning process, and shall participate at the Midwest RPO policy, planning, and technical levels.

The Federal Government, including Federal Land Managers (FLMs) and USEPA, should be involved in the regional planning process. As custodians of the national parks and wilderness areas and as a source of air pollution (e.g., prescribed burns) in and around national parks and wilderness areas, the FLMs need to participate in the regional planning process. Furthermore, the regional haze regulations require states to consult with FLMs before adopting and submitting their regional haze SIPs. Thus, FLMs and USEPA will have a special consultation role in the regional planning process and shall participate at the Midwest RPO policy, planning, and technical levels.

The Midwest RPO will attempt to operate on a consensus approach on technical and policy matters. While the states have the primary regulatory responsibility and authority, tribes (and appropriate Federal agencies) will be involved in the decision-making process.

Stakeholders should be involved in both an advisory role and on technical workgroups. All workgroup members (i.e., states, tribes, USEPA, FLMs., and stakeholders) must be active and constructive participants, and agree to share technical information. Casual observers are discouraged from joining the technical workgroups.

Also, the Midwest RPO recognizes the need for interregional coordination on a wide range of regional haze and visibility issues. To that end, the Midwest RPO will work cooperatively with other RPOs on administrative and technical issues.

## **Organizational Structure**

The Midwest RPO will be organized as follows (see attached figure):

**Policy Steering Committee** - The Policy Steering Committee will consist of the Environmental Directors of the member states of the Midwest RPO, tribal representatives, Federal Land Managers, and the Regional Administrator of USEPA, Region 5 (or his designee). The Policy Steering Committee shall provide the overall policy direction for the regional planning effort, and shall serve as the forum for the resolution of disputes. The Policy Steering Committee will meet as appropriate to oversee the progress of the effort.

**Technical Steering Committee** - The Technical Steering Committee will consist of the Directors of the Air Quality offices of the member states of the Midwest RPO, tribal representatives, Federal Land Managers, and the Director of the Air and Radiation Division of USEPA, Region 5. The Technical Steering Committee shall be responsible for the management of the regional planning effort, and shall meet as necessary to carry out these duties.

**Project Team** - Personnel designated by the Directors of the Air Quality offices of the member states of the Midwest RPO and by the tribal representatives shall organize a Project Team to carry out the directions of the Technical Steering Committee and to guide the development of the regional planning effort. In addition, the USEPA, U.S. National Park Service, U.S. Forest Service, and U.S. Fish and Wildlife Service shall designate representatives to participate on the Project Team. The states and tribes will make every reasonable effort to ensure that the designated representatives receive support for full participation in the regional planning process. The Project Team shall prepare a long-range strategy of the regional planning process, as well as detailed annual work plans. The Project Team will meet on a regular basis and may form appropriate technical workgroups as necessary to address specific concerns (e.g., monitoring, emissions, data analysis, modeling, and public outreach).

**LADCO** - Subject to the availability of funding, the professional staff of LADCO shall be available to work on the regional planning effort. LADCO staff shall support the activities of the Policy Steering Committee, Technical Steering Committee, and the Project Team.

**Advisory Committee** - The Advisory Committee will consist of representatives from citizen groups, industry, academia, and local government located within the five states. These representatives are expected to provide a range of perspectives which need to be heard from in the regional planning process. Each state will designate at least four representatives to serve on the Advisory Committee. The Advisory Committee will meet on a regular basis.

### **Travel Policy**

To promote the participation of states and tribes in the regional planning process, grant funds can be used to pay for travel for state and tribal representatives to attend Midwest RPO and national RPO meetings. Reimbursable expenses include costs for transportation, lodging, and meals. (Note, it may be necessary to limit the number of representatives from each state or tribe receiving reimbursement for a given meeting.)

### **Scope of Work**

The regional planning process is expected to consist of three phases:

***Phase I: Organization and Coordination Phase***

This phase will take place during the first two years. The objective of this phase is to develop a framework for regional planning.

***Phase II: Technical Assessment Phase***

This phase is expected to take place over the first five years or so. Additional details will be provided in the work plans provided with each year's grant application. The objectives of this phase include: (1) understanding current pollution levels; (2) identifying the principal contributing sources; (3) determining which states or areas contribute to another state's problem, and (4) estimating the impact of future strategies on air quality, costs, and other factors.

***Phase III: Strategy Development, Adoption, and Implementation***

This phase will take place after the technical assessment phase is completed and will be addressed in a future work plan. The objectives of this phase include: (1) reaching consensus about the regional strategies needed to make reasonable progress toward the national visibility goal in Class I areas, and (2) adopting and implementing SIPs which reflect the regional strategy.

Midwest Regional Planning Organization  
**ORGANIZATIONAL STRUCTURE**

**Policy Development:**

**POLICY STEERING COMMITTEE**

State Environmental Commissioners  
(IL, IN, MI, OH, WI)  
Tribal Representatives (MI, WI)  
USEPA Reg V Administrator  
Federal Land Managers

**TECHNICAL STEERING COMMITTEE**

State Air Directors  
(IL, IN, MI, OH, WI)  
Tribal Representatives (MI, WI)  
USEPA, Reg V Air Director  
Federal Land Managers

**Planning:**

**ADVISORY  
COMMITTEE**

Citizen Groups  
Industry  
Academia  
Local Government

**PROJECT TEAM**

States (IL, IN, MI, OH, WI)  
Tribes (MI, WI)  
USEPA (Region V, OAQPS)  
FLMs (USNPS, USFWS, USFS)

**LADCO**

Board of Directors  
LADCO Staff

**Technical Work:**

**TECHNICAL WORKGROUPS**

States/LADCO Staff/Tribes/USEPA/FLMs/Stakeholders

**Monitoring**

**Emissions**

**Data Analysis**

**Modeling**

**Public Outreach**

## **Appendix 3B**

### **Regional Haze in the Upper Midwest: Summary of Technical Information**

# **Regional Haze in the Upper Midwest: Summary of Technical Information**



*Voyageurs National Park*

*Photo Courtesy of Chris Holbeck,  
Environmental Planning and Partnerships Specialist,  
Voyageurs National Park*

Version 2.2

February 22, 2008

# Scope of Document

This document provides a summary of available technical information about regional haze and visibility impairment in the four northern Class I areas: Boundary Waters Canoe Area Wilderness, Voyageurs National Park, Isle Royale National Park, and Seney Wilderness Area. This information includes a conceptual model of haze, the technical basis for visibility analysis, and the effectiveness of control measures in improving visibility. The document represents the technical information agreed to by the responsible states and satisfies, in part, the consultation requirements of the Regional Haze Rule. The document does not address policy issues and strategies necessary to deal with regional haze. States can use this technical information to highlight the relevant issues for their state policymakers.



# Executive Summary

The States of Michigan and Minnesota, along with representatives of other states, tribal governments, and federal agencies<sup>1</sup>, are working to address visibility impairment due to regional haze in four northern Class I areas: Boundary Waters Canoe Area Wilderness, Voyageurs National Park, Isle Royale National Park, and Seney Wilderness Area. Pursuant to the Clean Air Act, states are required to make reasonable progress toward meeting a national goal of natural conditions (i.e., visibility levels in the absence of manmade air pollution).



**Class I areas in Michigan and Minnesota<sup>2</sup>**

Based on a review of technical information, several key findings should be noted:

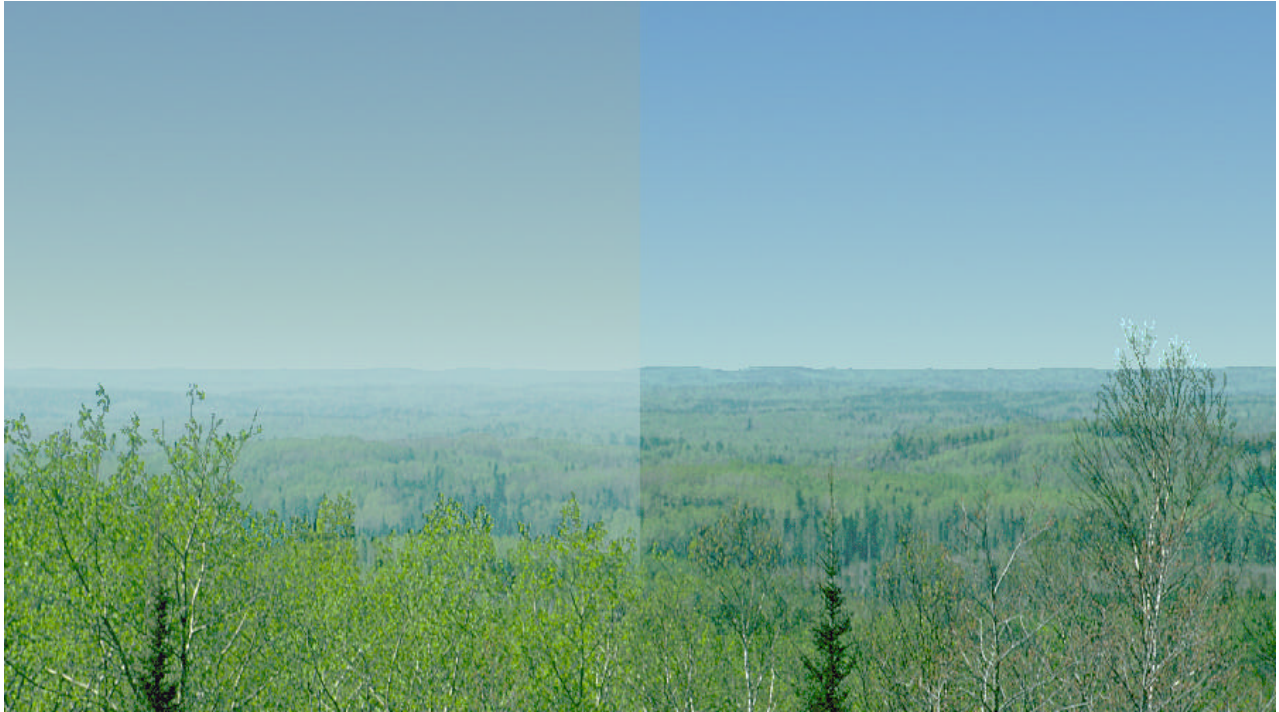
- The chemical species which affect visibility impairment include ammonium sulfate and, to a lesser degree, ammonium nitrate and organic carbon.
- The pollutants and source sectors which contribute the most to visibility impairment include SO<sub>2</sub> emissions from electrical generating units (EGUs) and certain non-EGUs, which lead to sulfate formation, and NO<sub>x</sub> emissions from a variety of source types (e.g., motor vehicles), which lead to nitrate formation. Ammonia emissions from livestock waste and fertilizer applications are also important, especially for nitrate formation. (Organic carbon concentrations are thought to be mostly secondary organic aerosols of biogenic origin and, on an occasional episodic basis, from fire activity.)
- The source regions which contribute the most to visibility impairment are the States of Michigan, Minnesota, and Wisconsin. Other nearby states, including Illinois, Indiana, Iowa, Missouri, and North Dakota, also contribute to visibility impairment.

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<sup>1</sup> Representatives from the following entities are participating in the northern states Class I area consultation process: States of Minnesota, Michigan, Wisconsin, North Dakota, Iowa, Missouri, Illinois, and Indiana; Ontario Ministry of Environment; Mille Lacs, Fond du Lac, Grand Portage, and Leech Lake Tribes; and U.S. Forest Service, U.S. National Park Service, and U.S. EPA.

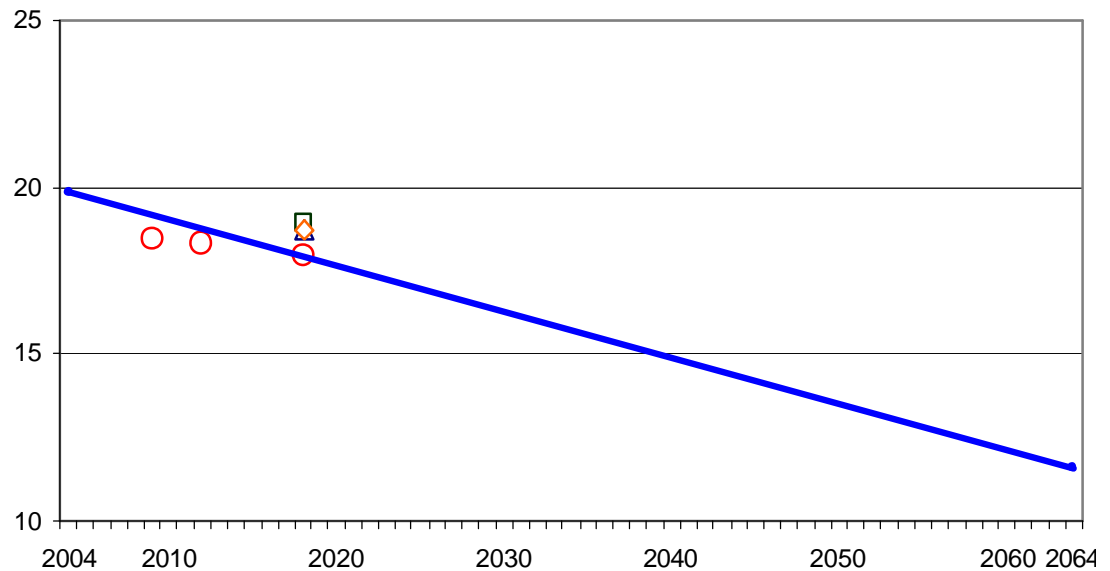
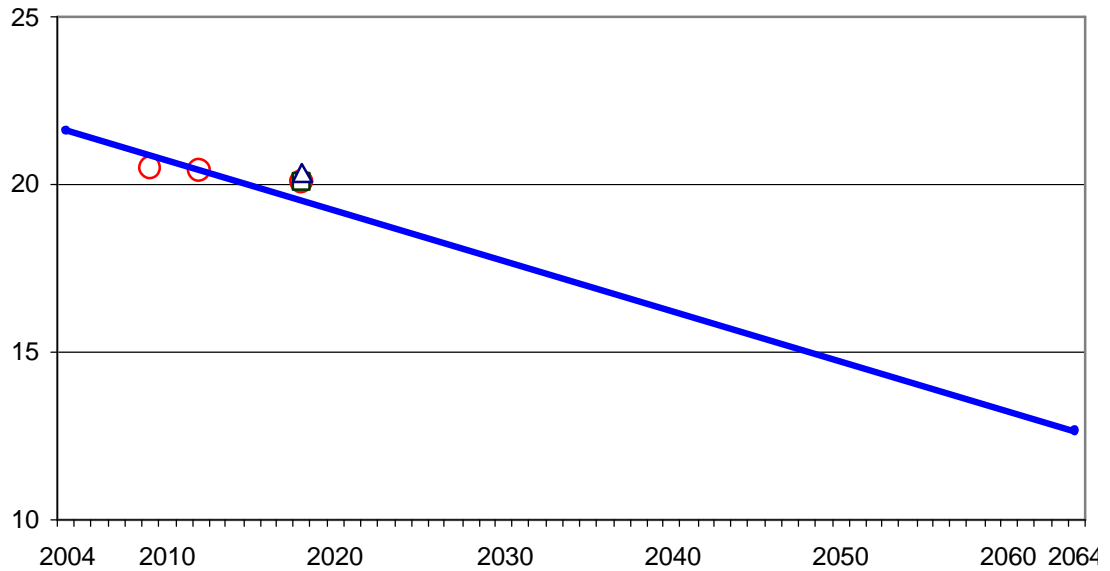
<sup>2</sup> Although Rainbow Lake in northern Wisconsin is also a Class I area, the visibility rule does not apply because the Federal Land Manager determined that visibility is not an air quality related value there.

- Current (baseline) visibility levels are well above natural conditions (see, for example, picture below for Boundary Waters Canoe Area).



**Boundary Waters Canoe Area – current visibility conditions on 20% worst days (left side) and the natural conditions goal (right side)**

- Projected near-term visibility conditions based on existing (“on the books”) controls are close to or above the uniform rate of visibility improvement line (see figure below). The regional haze rule calls for Class I areas to meet natural visibility conditions by the year 2064, with an initial implementation period extending to the year 2018. To determine whether the model-projected 2018 values (based on existing controls) represent reasonable progress, states are required to consider four factors (i.e., costs of compliance, time necessary for compliance, energy and non-air quality environmental impacts, and remaining useful life).



**Projected future year visibility levels for 20% worst visibility days in Isle Royale National Park (top) and Boundary Waters Canoe Area (bottom) based on existing controls**

**Note: symbols represent results of four modeling analyses: LADCO 2005 base year - circle, LADCO 2002 base year – square, MPCA 2002 base year – diamond, and CENRAP 2002 base year - triangle**

- The same particles (sulfates, nitrates, organic carbon, smoke, and soil dust) which affect visibility, are linked to serious health effects (e.g., National Ambient Air Quality Standards for PM<sub>2.5</sub>) and environmental effects (e.g., ecosystem damage). Thus, actions to reduce levels of visibility-impairing pollutants will benefit public health and reduce certain adverse effects to the environment.

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## **Section 1**

### **Regulatory Requirements**

Section 169A of the Clean Air Act sets as a national goal “the prevention of any future and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which implementation results from manmade air pollution.”

Section 169A requires states to “make reasonable progress toward meeting the national goal.” In determining reasonable progress, states shall consider four factors:

- costs of compliance
- time necessary for compliance
- energy and non-air quality environmental impacts of compliance
- remaining useful life of any existing source subject to such requirements

On July 1, 1999, EPA adopted a regional haze rule to implement the provisions of section 169A by establishing a program to address regional haze visibility impairment (USEPA, 1999). Pursuant to the regional haze rule, the determination of reasonable progress shall also consider:

- uniform rate of visibility improvement (needed to attain natural visibility conditions by 2064) – i.e., “the line” (see, for example, Figure 5)

EPA’s regional haze rule requires states to set reasonable progress goals for each Class I area which provide for an improvement in visibility for the most impaired days (i.e., 20% worst visibility days) and ensure no degradation in visibility for the least impaired days (i.e., 20% best visibility days).

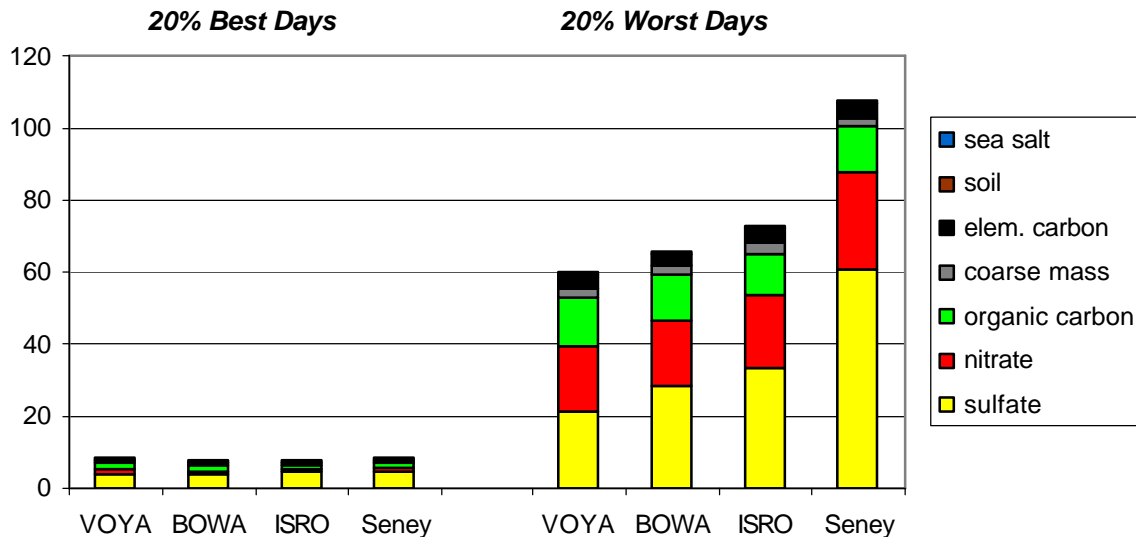
The regional haze rule also requires states to develop a long-term strategy for regional haze which covers an initial implementation period extending to the year 2018. The haze State Implementation Plan (SIP) was due to EPA in December 2007. States must also submit a report to EPA every 5 years evaluating progress towards the reasonable progress goal, and submit a SIP revision by July 31, 2018 and every ten years thereafter.

## Section 2 Technical Questions

### 1. Conceptual model of haze

- a. What are the chemical constituents that cause visibility impairment in the northern Class I areas?

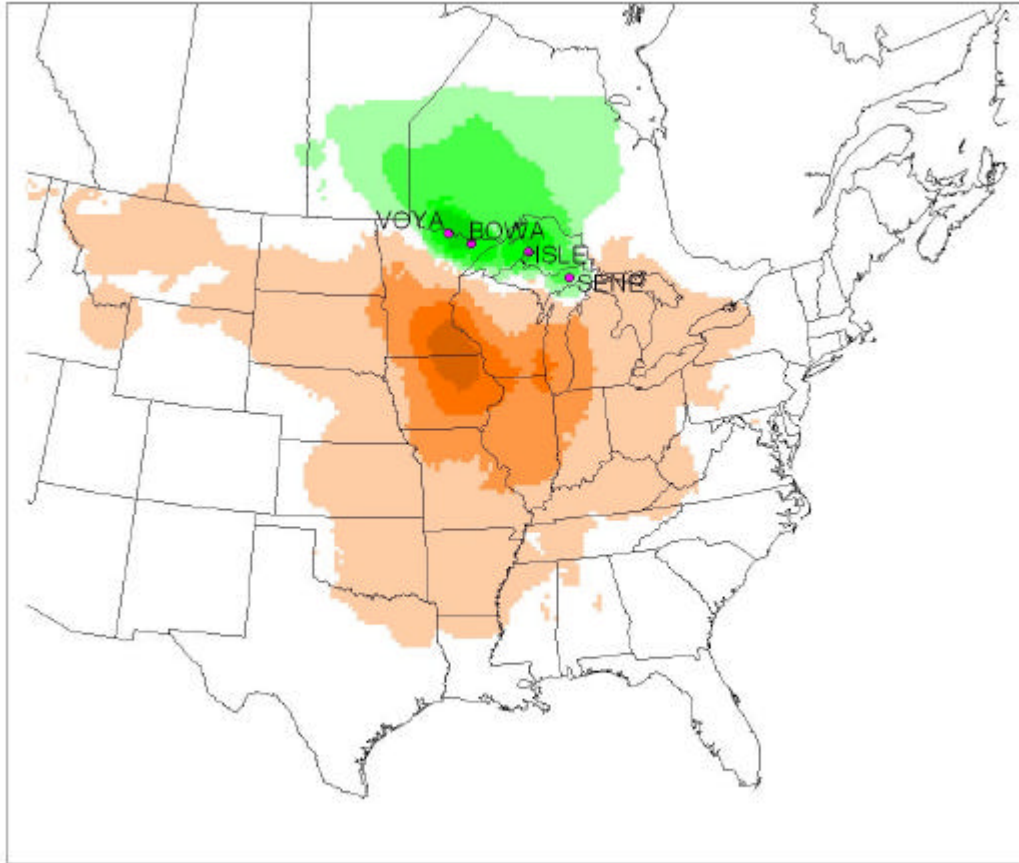
The most important chemical species are ammonium sulfate, ammonium nitrate, and organic carbon. The contribution of these species on the 20% best and 20% worst visibility days (based on 2000 – 2004 data) is provided in Figure 1. For the 20% worst visibility days, the contributions are: sulfate = 35-55%, nitrate = 25-30%, and organic carbon = 12-22%. It should also be noted that sulfate and nitrate contribute more to light extinction than to  $PM_{2.5}$  mass because of their hygroscopic properties.



**Figure 1. Chemical composition of light extinction for 20% best visibility days (left) and 20% worst visibility days (right) in terms of  $Mm^{-1}$**

- b. Which geographic areas and sources contribute to regional haze in the northern Class I areas?

Air quality data analyses and dispersion modeling were conducted to provide information on source region and source sector contributions to regional haze in the northern Class I areas (see Appendix I: Contribution Assessment for Northern Class I Areas). Based on this information, the most important contributing states are Michigan, Minnesota, and Wisconsin, as well as Illinois, Indiana, Iowa, Missouri, and North Dakota. For example, Figure 2 presents the results of composite back trajectories for light extinction on the 20% worst visibility days. The orange areas are where the air is most likely to come from, and the green areas are where the air is least likely to come from. As can be seen, poor visibility days are generally associated with transport from regions located to the south of these Class I areas.



**Figure 2. Composite back trajectories for light extinction**

Note: orange is where air is most likely to come from, green is where air is least likely to come from

The most important contributing pollutants and source sectors are SO<sub>2</sub> emissions from electrical generating units (EGUs) and certain non-EGUs, which lead to sulfate formation, and NO<sub>x</sub> emissions from a variety of source types (e.g., motor vehicles), which lead to nitrate formation. Ammonia emissions from livestock waste and fertilizer applications are also important, especially for nitrate formation. (As discussed below, organic carbon concentrations are thought to be mostly secondary organic aerosols of biogenic origin and, on an occasional episodic basis, from fire activity.)

- c. What are the meteorological conditions that are associated with good visibility and poor visibility in the northern Class I areas? Is there a seasonal effect to visibility impairment in those areas?

As noted above, bad air days are generally associated with southerly transport (see Figure 2). Examination of the 20% worst visibility days for the northern Class I areas shows that these days occur throughout the year, suggesting a range of other meteorological parameters (see, for example, Boundary Waters data in Figure 3). This figure, as well as Figure 4 (which presents the monthly average light extinction values based on all sampling days), also show that sulfate and organic carbon concentrations are higher in the summer, and nitrate concentrations are higher in the winter, suggesting the importance of different sources and meteorological conditions at different times of the year.

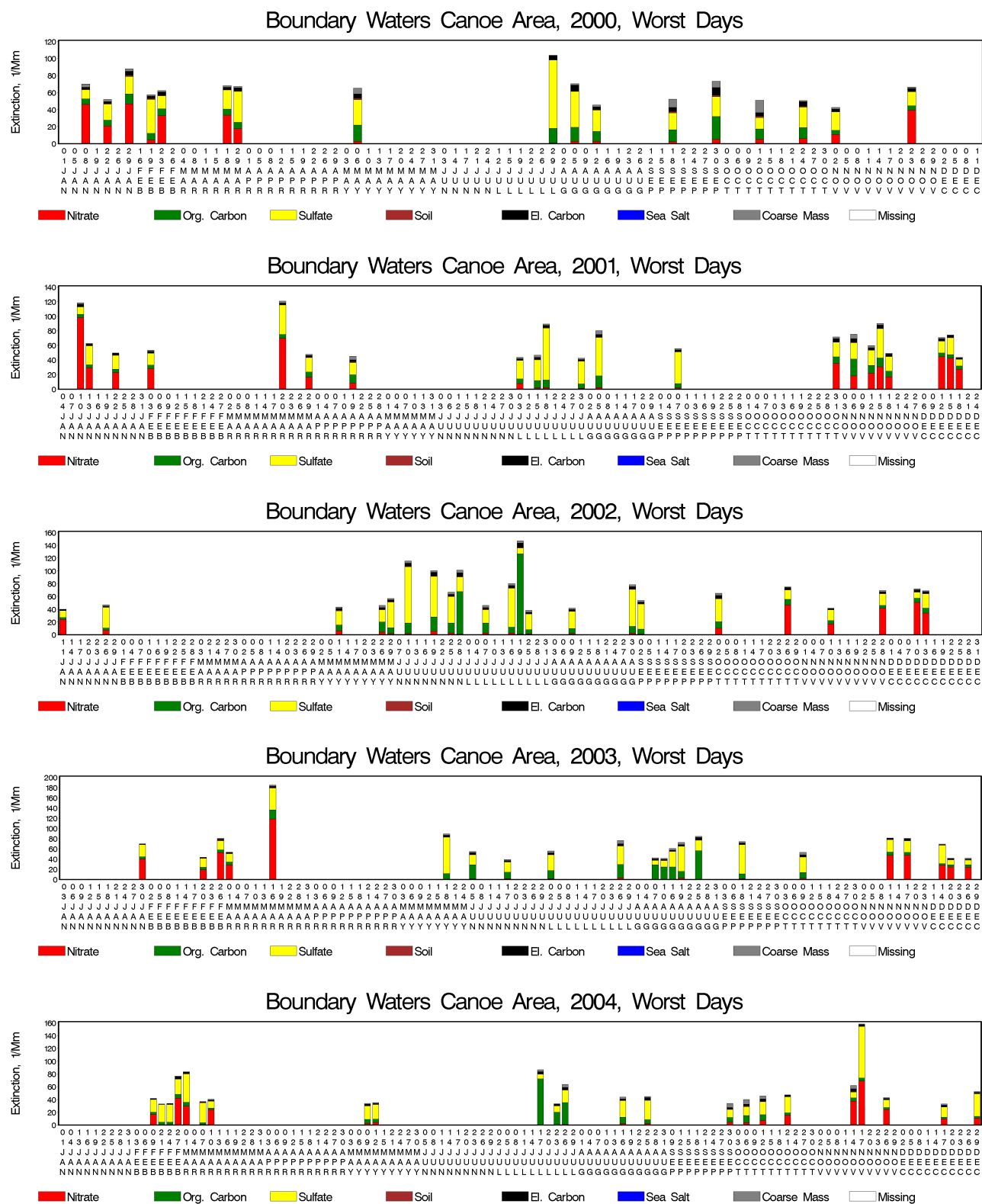
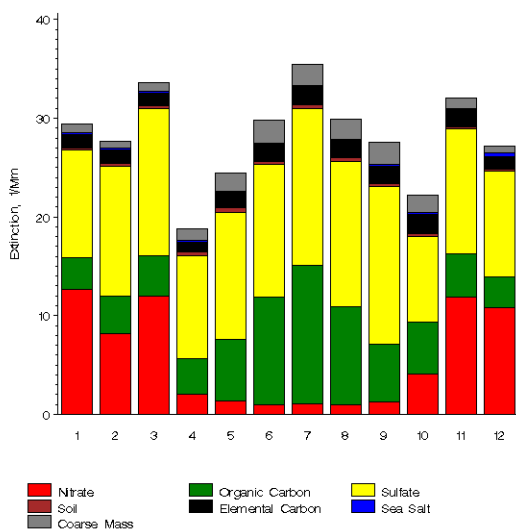


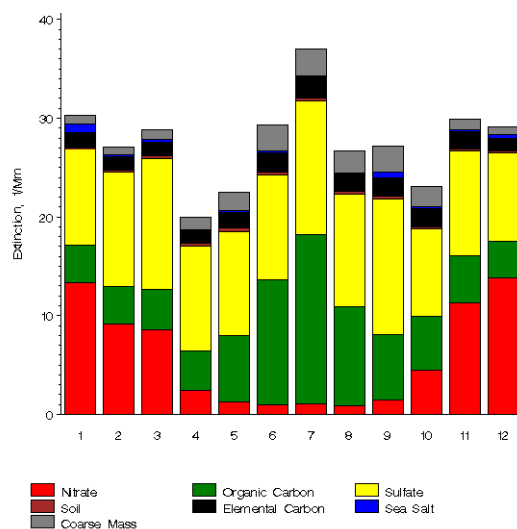
Figure 3. Daily light extinction values for 20% worst days at Boundary Waters (2000 – 2004)



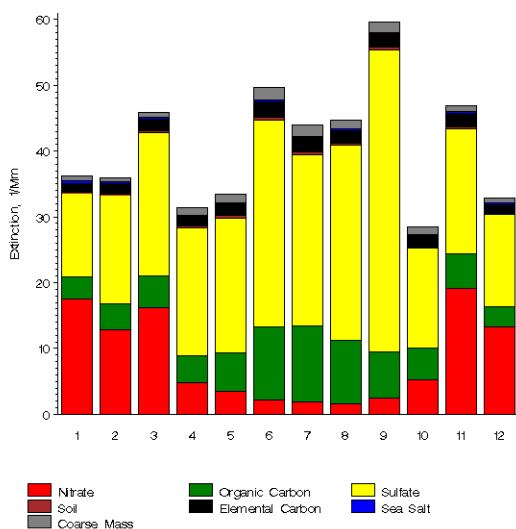
Monthly Extinction, Boundary Waters Canoe Area



Monthly Extinction, Voyageurs National Park 2



Monthly Extinction, Seney



Monthly Extinction, Isle Royale National Park (New)

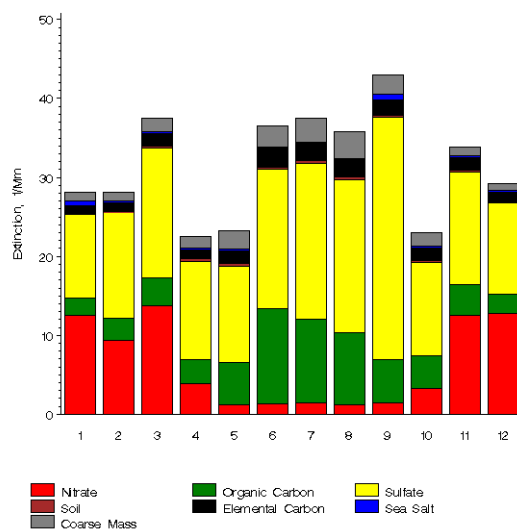


Figure 4. Monthly average light extinction values for northern Class I areas

## 2. Technical basis for visibility-related analyses

- a. What are the present visibility conditions and how were the values calculated? How were the 20% worst and 20% best days determined?

Initially, the baseline (2000 – 2004) visibility condition values were derived using the average for the 20% worst and 20% best days for each year, as reported on the VIEWS website: <http://vista.cira.colostate.edu/views/Web/IMPROVE/SummaryData.aspx>. These values were calculated using the original IMPROVE equation for reconstructed light extinction.

Three changes were made to the baseline calculations to produce a new set of values. First, the reconstructed light extinction equation was revised by the IMPROVE Steering Committee in 2005 (DeBell, et al, 2006). The new IMPROVE equation was used to calculate updated baseline values.

Second, due to sampler problems, the 2002-2004 data for Boundary Waters were invalid for certain chemical species. (Note, sulfate and nitrate data at Boundary Waters were valid.) A “substituted” data set was developed by using values from Voyageurs for the invalid species.

Third, LADCO identified a number of days during 2000-2004 where data capture at the Class I monitors was incomplete (e.g., coarse mass and soil were missing species) (Kenski, 2007). The missing data cause the days to be excluded from the baseline calculations. However, the light extinction due to the remaining measured species is significant (i.e., above the 80<sup>th</sup> percentile). It makes sense to include these days in the baseline calculations, because they are largely dominated by anthropogenic sources. (Only one of these days is driven by high organic carbon, which might indicate non-anthropogenic aerosol from wildfires.) As seen in Table 1, inclusion of these days in the baseline calculation results in a small, but measurable, effect on the baseline values (i.e., values increase from 0.2 to 0.8 dv).

**Table 1. Average of 20% Worst Days, With and Without Missing Data Days**

	Average Worst Day DV, per RHR	Average Worst Day DV, with Missing Data Days	Difference
BOWA	19.59	19.86	0.27
ISLE	20.74	21.59	0.85
SENE	24.16	24.38	0.22
VOYA	19.27	19.48	0.21

A summary of the initial and updated baseline values for the Class I areas in northern Michigan and northern Minnesota are presented in Table 2. The updated baseline values reflect the most current, complete understanding of visibility impairing effects and, as such, will be used for SIP planning purposes.

b. What are natural conditions and how were the values calculated?

Initially, the values for the natural conditions goal for each Class I area were taken directly from USEPA guidance (USEPA, 2003). These values were calculated using the original IMPROVE equation. This equation was revised by the IMPROVE Steering Committee in 2005 (DeBell, et al, 2006), and the new IMPROVE equation was used to calculate updated natural conditions values. The updated values are reported on the VIEWS website (<http://vista.cira.colostate.edu/views/>).

A summary of the initial and updated natural conditions values are presented in Table 2. The updated natural conditions values (based on the new IMPROVE equation) will be used for SIP purposes. The states must establish goals that provide for reasonable progress towards achieving natural conditions. The reasonable progress goals must provide for an improvement in visibility for the 20% worst days, and no degradation in visibility for the 20% best days.

**Table 2. Summary of Visibility Metrics for Northern Class I Areas in Terms of Deciviews**

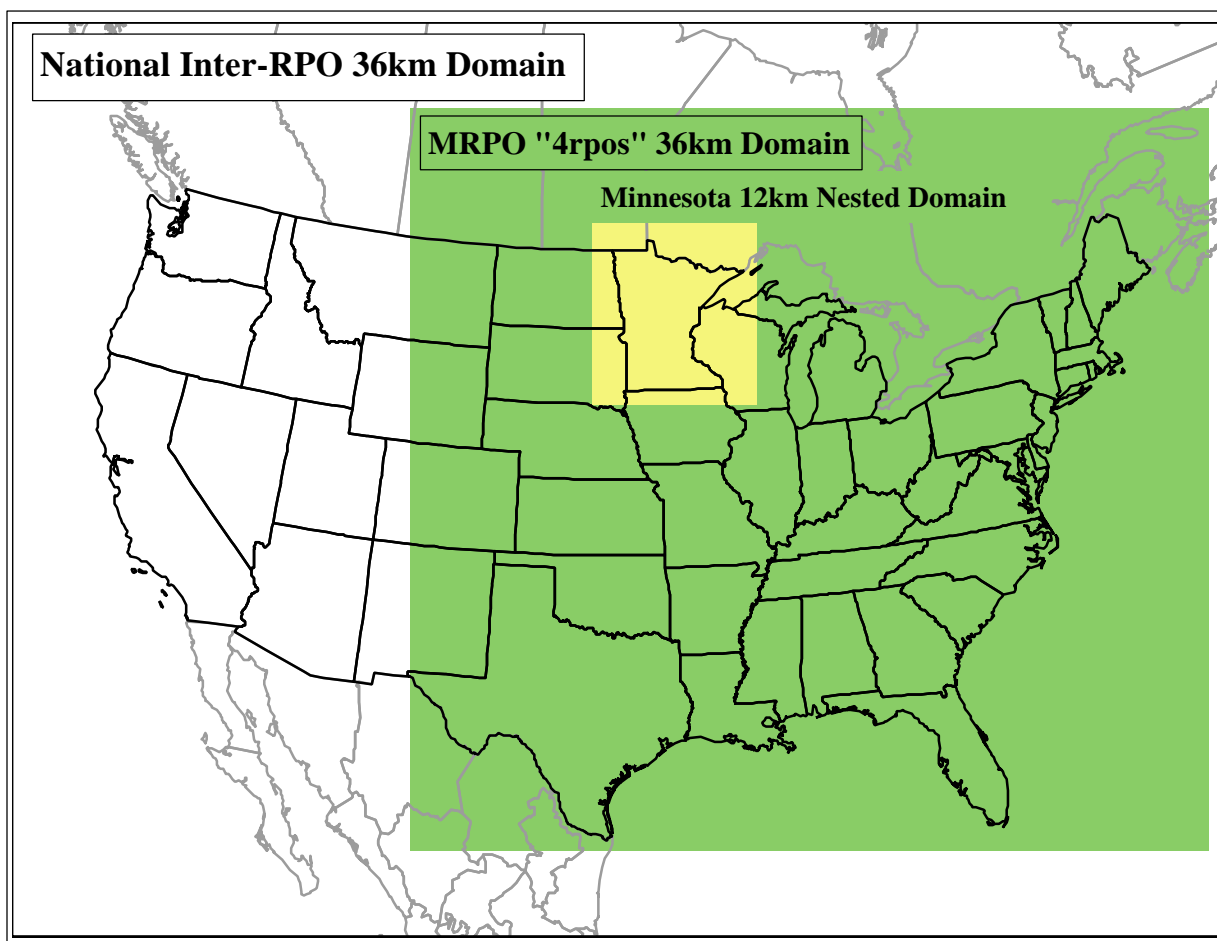
Old IMPROVE Equation (Cite: VIEWS, November 2005)									
		20% Worst Days					Baseline	2018	Natural
		2000	2001	2002	2003	2004	Value	URI Value	Conditions
Voyageurs		18.50	18.00	19.00	19.20	17.60	18.46	16.74	11.09
BWCA		19.85	19.99	19.68	19.73	17.65	19.38	17.47	11.21
Isle Royale		20.00	22.00	20.80	19.50	19.10	20.28	18.17	11.22
Seney		22.60	24.90	24.00	23.80	22.60	23.58	20.73	11.37
		20% Best Days					Baseline		Natural
		2000	2001	2002	2003	2004	Value		Conditions
Voyageurs		6.30	6.20	6.70	7.00	5.40	6.32		3.41
BWCA		5.90	6.52	6.93	6.67	5.61	6.33		3.53
Isle Royale		5.70	6.40	6.40	6.30	5.30	6.02		3.54
Seney		5.80	6.10	7.30	7.50	5.80	6.50		3.69
New IMPROVE Equation (Cite: VIEWS, March 2006)									
		20% Worst Days					Baseline	2018	Natural
		2000	2001	2002	2003	2004	Value	URI Value	Conditions
Voyageurs		19.55	18.57	20.14	20.25	18.87	19.48	17.74	12.05
BWCA		20.20	20.04	20.76	20.13	18.18	19.86	17.94	11.61
Isle Royale		20.53	23.07	21.97	22.35	20.02	21.59	19.43	12.36
Seney		22.94	25.91	25.38	24.48	23.15	24.37	21.64	12.65
		20% Best Days					Baseline		Natural
		2000	2001	2002	2003	2004	Value		Conditions
Voyageurs		7.01	7.12	7.53	7.68	6.37	7.14		4.26
BWCA		6.00	6.92	7.00	6.45	5.77	6.43		3.42
Isle Royale		6.49	7.16	7.07	6.99	6.12	6.77		3.72
Seney		6.50	6.78	7.82	8.01	6.58	7.14		3.73
Notes: (1) BWCA values for 2002 - 2004 reflect "substituted" data. (2) New IMPROVE equation values include Kenksi, 2007 adjustment for missing days									

### 3. Evaluation of control measure effectiveness

#### a. What tools are available to evaluate the effectiveness of emission reductions?

USEPA's modeling guidelines (USEPA, 2007) recommend using air quality models, along with complementary analyses of ambient monitoring, emissions, and meteorological data to determine whether a given control strategy meets the air quality goal. CAMx was used by LADCO (LADCO, 2006; LADCO, 2007) and the Minnesota Pollution Control Agency (MPCA, 2008), while both CAMx and CMAQ were used by CENRAP (Environ, 2007).

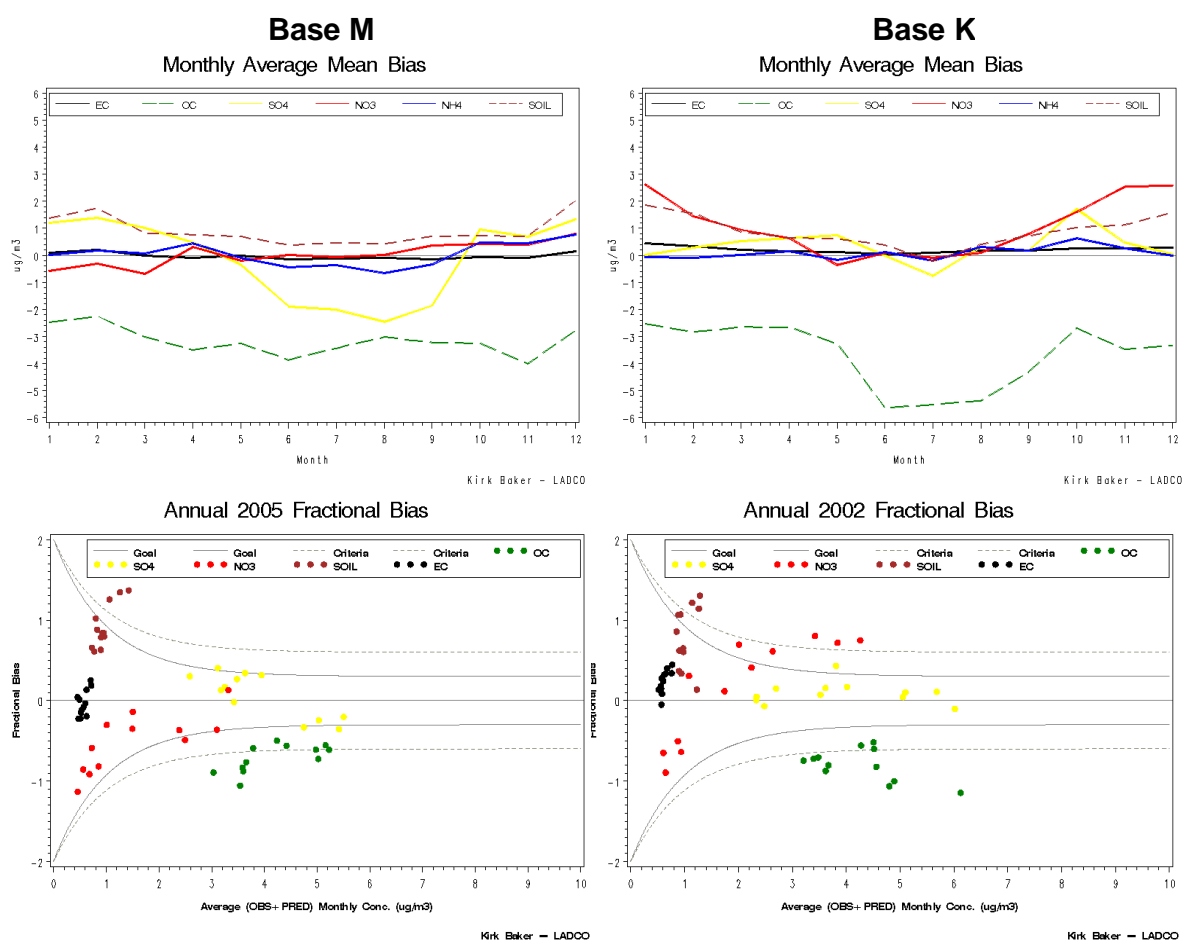
Figure 5 shows the spatial coverage of the modeling domains used by CENRAP, LADCO, and MPCA. CENRAP used the National Inter-RPO domain with 36 km grid spacing, LADCO used a subset of the National Inter-RPO domain (referred to as the "4rpos" domain) with 36 km spacing, and MPCA used the "4rpos" domain with 36 km spacing and a Minnesota domain with 12 km spacing. The purpose of the Minnesota 12 km domain was to address local source impacts on the northern Class I areas.



**Figure 5. Modeling domains for CENRAP (National Inter-RPO 36km Domain), LADCO (MRPO "4rpos" 36km Domain), and MPCA (Minnesota 12km Nested Domain)**

Two base years were used in the modeling: 2002 and 2005. USEPA's modeling guidelines recommend using 2002 as the baseline inventory year, but also allow for use of an alternative baseline inventory year, especially a more recent year (USEPA, 2007). LADCO initially conducted modeling with a 2002 base year (i.e., Base K4/Round 4 modeling). CENRAP and MPCA also used a 2002 base year in their modeling. The three sets of 2002 base year analyses are generally consistent, with differences attributable to modeling domain (i.e., CENRAP's domain is larger), baseline values (i.e., CENRAP's data do not reflect all the adjustments noted above), and emissions inventory data (e.g., different base year emission estimates, and growth and control factors). LADCO subsequently decided to conduct modeling with a 2005 base year (i.e., Base M/Round 5). Examination of multiple base years provides for a more complete technical assessment. The results from all four modeling analyses are discussed here.

The models were shown to provide reasonable estimates for sulfates and nitrates (see, for example, Figure 6), and can, therefore, be used to examine sulfate and nitrate control strategies. The models are less reliable for organic carbon – note, the large underestimation in monthly average organic carbon concentrations in the plots below. To compensate for model uncertainty and to provide a more robust analysis, additional information should be considered as part of a weight-of-evidence demonstration.



**Figure 6. Results of LADCO's model performance for PM<sub>2.5</sub> – monthly average mean bias and annual fractional bias for Base M – 2005 base year (left side) and Base K – 2002 base year (right side)**

- b. How effective will existing (“on the books”) controls be in improving visibility in the northern Class I areas?

Air quality modeling conducted by LADCO, MPCA, and CENRAP assessed future year visibility levels based on the following existing (“on the books”) controls:

**On-Highway Mobile Sources**

- Federal Motor Vehicle Emission Control Program, low-sulfur gasoline and ultra-low sulfur diesel fuel
- Inspection/Maintenance programs (nonattainment areas)
- Reformulated gasoline (nonattainment areas)

**Off-Highway Mobile Sources**

- Federal control programs incorporated into NONROAD model (e.g., nonroad diesel rule), plus the evaporative Large Spark Ignition and Recreational Vehicle standards
- Heavy-duty diesel (2007) engine standard/Low sulfur fuel
- Federal railroad/locomotive standards
- Federal commercial marine vessel engine standards

**Area Sources (Base M only)**

- Consumer solvents
- AIM coatings
- Aerosol coatings
- Portable fuel containers

**Power Plants**

- Title IV (Phases I and II)
- NOx SIP Call
- Clean Air Interstate Rule
- Clean Air Mercury Rule

**Other Point Sources**

- MACT standards: VOC 2-, 4-, 7-, and 10-year MACT standards, combustion turbine, and industrial boiler/process heater/RICE MACT
- State NOx RACT rules (Illinois and Wisconsin)

The model results are provided in Table 3 and Figure 7. For the 20% worst days, “on the books” controls are expected to improve visibility levels, but will still result in levels above the uniform rate of visibility improvement line (i.e., glide path) in the Michigan and, perhaps, Minnesota Class I areas.

In comparing LADCO’s Round 4 and Round 5 results for the 20% worst days, one noticeable difference is that the Minnesota Class I areas are much closer to the glide path in the newer Round 5 modeling. This difference is due to more SO<sub>2</sub> emission reduction in nearby states in the Round 5 modeling (i.e., -28% v. -41% - see Table 4), which reflects EPA’s latest (IPM3.0) EGU projections and, perhaps, differences in meteorology between 2002 and 2005.

For the 20% best days, “on the books” controls are expected to produce little change in visibility levels, but may result in a slight degradation in a few locations, including Seney. A preliminary review of source contributions and associated future year growth and control assumptions, however, suggests that these visibility levels may be overestimated (e.g., future year Canadian emissions do not reflect planned emission reductions).

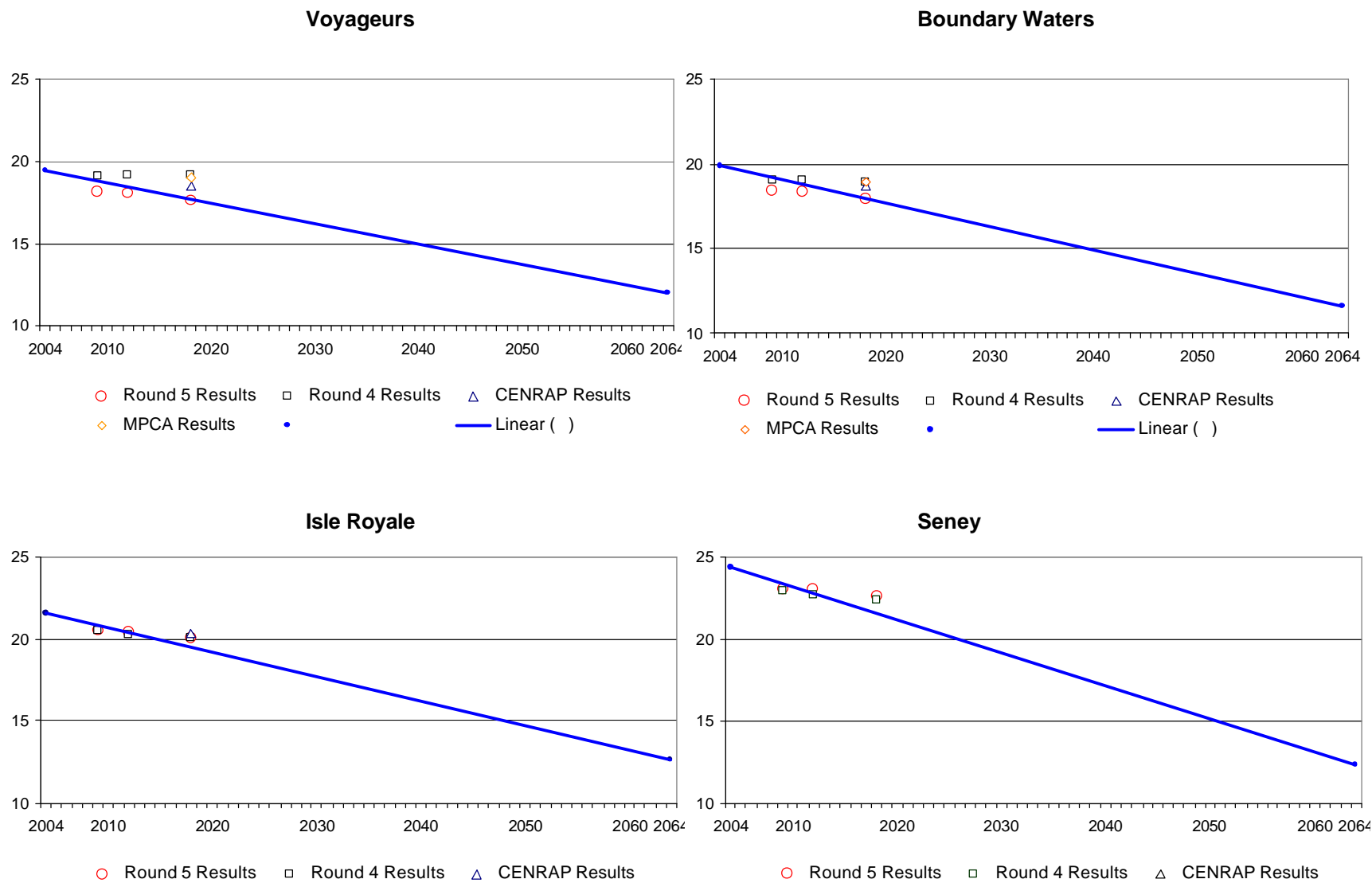
**Table 3. Modeling Results for Northern Class I Areas**

<b>Worst 20%</b>				<b>2018</b>	<b>2018</b>
<b>Site</b>		Model BY	<b>Baseline</b>	<b>URI</b>	<b>OTB</b>
BOWA1	CENRAP	2002	19.58	17.72	<b>18.30</b>
	MPCA	2002	19.9	17.9	<b>18.7</b>
	LADCO	2002	19.86	17.70	<b>18.94</b>
	LADCO	2005	19.86	17.94	17.94
VOYA2	CENRAP	2002	19.27	17.58	<b>18.37</b>
	MPCA	2002	19.9	17.8	<b>19.0</b>
	LADCO	2002	19.48	17.56	<b>19.18</b>
	LADCO	2005	19.48	17.74	17.63
SENE1	CENRAP	2002			
	MPCA	2002			
	LADCO	2002	24.38	21.35	<b>22.38</b>
	LADCO	2005	24.38	21.64	<b>22.59</b>
ISLE1	CENRAP	2002	20.74	18.78	<b>19.36</b>
	MPCA	2002			
	LADCO	2002	21.59	19.21	<b>20.04</b>
	LADCO	2005	21.59	19.43	<b>20.09</b>
ISLE9*	LADCO	2005	21.59	19.43	<b>19.84</b>
* = result for grid cell located on Isle Royale, all other results for grid cells with IMPROVE monitors					

<b>Best 20%</b>					<b>2018</b>
<b>Site</b>		Model BY	<b>Baseline</b>		<b>OTB</b>
BOWA1	CENRAP	2002	6.4		6.4
	MPCA	2002	6.4		<b>6.5</b>
	LADCO	2002	6.42		<b>6.87</b>
	LADCO	2005	6.42		6.14
VOYA2	CENRAP	2002	7.1		7.0
	MPCA	2002	7.1		7.1
	LADCO	2002	7.09		<b>7.34</b>
	LADCO	2005	7.09		6.75
SENE1	CENRAP	2002			
	MPCA	2002			
	LADCO	2002	7.14		<b>7.23</b>
	LADCO	2005	7.14		<b>7.71</b>
ISLE1	CENRAP	2002			
	MPCA	2002			
	LADCO	2002	6.75		6.47
	LADCO	2005	6.75		6.60
ISLE9*	LADCO	2005	6.75		6.52
* = result for grid cell located on Isle Royale, all other results for grid cells with IMPROVE monitors					

Note: MPCA modeling for the Minnesota 12km domain looked at several receptors throughout the Class I areas. Results for Boundary Waters on the 20% worst days range from 18.3 – 19.0 dv, with an average value of 18.7 dv, which is consistent with the 36km results at the IMPROVE monitor location shown in the table.





**Figure 7. Modeling results for four northern Class I areas for 20% worst visibility days**

**Table 4. EGU SO2 Emissions for States in the Upper Midwest**

	EGU - SO2 (Base K)			EGU - SO2 (Base M)	
State	2002	2018		2005	2018
Minnesota	318	266		319	188
		<b>-16%</b>			<b>-41%</b>
Wisconsin	602	500		545	435
		<b>-17%</b>			<b>-20%</b>
Michigan	1,102	1,058		1,251	725
		<b>-4%</b>			<b>-42%</b>
Iowa	412	482		430	352
		<b>17%</b>			<b>-18%</b>
North Dakota	376	330		369	124
		<b>-12%</b>			<b>-67%</b>
Illinois	1,310	810		1,158	870
		<b>-38%</b>			<b>-25%</b>
Indiana	2,499	1,048		2,614	1,036
		<b>-58%</b>			<b>-60%</b>
Missouri	835	909		889	759
		<b>9%</b>			<b>-15%</b>
	<b>7,454</b>	<b>5,403</b>		<b>7,575</b>	<b>4,487</b>
		<b>-28%</b>			<b>-41%</b>

- c. What additional control measures will be effective in improving visibility in the northern Class I areas?

LADCO's air quality modeling (Round 4) examined several additional control measures, as summarized below.

**Sulfate Control Strategies:** Reductions in SO<sub>2</sub> emissions will decrease sulfate concentrations. Because most the SO<sub>2</sub> emissions in the upper Midwest are from EGUs, additional EGU SO<sub>2</sub> control measures were examined. In particular, the following SO<sub>2</sub> emission targets were modeled (MRPO, 2005):

	SO <sub>2</sub> (lb/MMBTU)	NO <sub>x</sub> (lb/MMBTU)
EGU1	0.15	0.10
EGU2	0.10	0.07

The modeling shows that additional EGU control will improve visibility in the northern Class I areas (see Table 5). Increasing the spatial extent of this additional control produces greater visibility improvement (i.e., 12-state control program provides more benefit than 5-state control program).

**Table 5. LADCO Round 4 Modeling Results for EGU Control Strategy**

		2018	2018	2018	2018
20% Worst Days	Baseline	URI	OTB	EGU2 (5 state region)	EGU2 (12 state region)
BOWA1	19.86	17.70	18.94	18.40	17.72
VOYA2	19.48	17.56	19.18	18.94	18.38
SENE1	24.38	21.35	22.38	21.26	20.63
ISLE1	21.59	19.21	20.04	19.09	18.64

**Nitrate Control Strategies:** Reductions in NO<sub>x</sub> emissions will decrease nitrate concentrations. NO<sub>x</sub> emissions in the upper Midwest are from a variety of sources, principally, mobile sources (on-road and off-road) and stationary sources (EGUs and non-EGUs). The modeling for EGU1 and EGU2 reflects lower SO<sub>2</sub> and NO<sub>x</sub> emission targets. No additional NO<sub>x</sub>-specific strategies were modeled by LADCO to address regional haze.

To determine whether additional SO<sub>2</sub> and NO<sub>x</sub> control measures satisfy the requirement for reasonable progress, an assessment of the five factors was performed (ECR, 2007a). Specifically, ECR examined reductions in SO<sub>2</sub> and NO<sub>x</sub> emissions from EGUs and industrial, commercial, and institutional (ICI) boilers; NO<sub>x</sub> emissions from mobile sources and reciprocating engines and turbines; and ammonia emissions from agricultural operations. The impacts of "on the books" controls were also examined to provide a frame of reference for assessing the impacts of the additional control measures.

The results of ECR's analysis of the reasonable progress factors are summarized below:

Factor 1 (Cost of Compliance): The average cost effectiveness values (in terms of \$ per ton are provided in Table 6. For comparison, cost-effectiveness estimates previously provided for "on the books" controls include:

CAIR	SO2: \$700 - \$1,200, NOx: \$1,400 – \$2,600 (\$/T)
BART	SO2: \$300 - \$963, NOx: \$248 - \$1,770
MACT	SO2: \$1,500, NOx: \$7,600

Most of the cost-effectiveness values for the additional controls are within the range of cost-effectiveness values for "on the books" controls.

Factor 2 (Time Necessary for Compliance): All of the control measures can be implemented by 2018. Thus, this factor can be easily addressed.

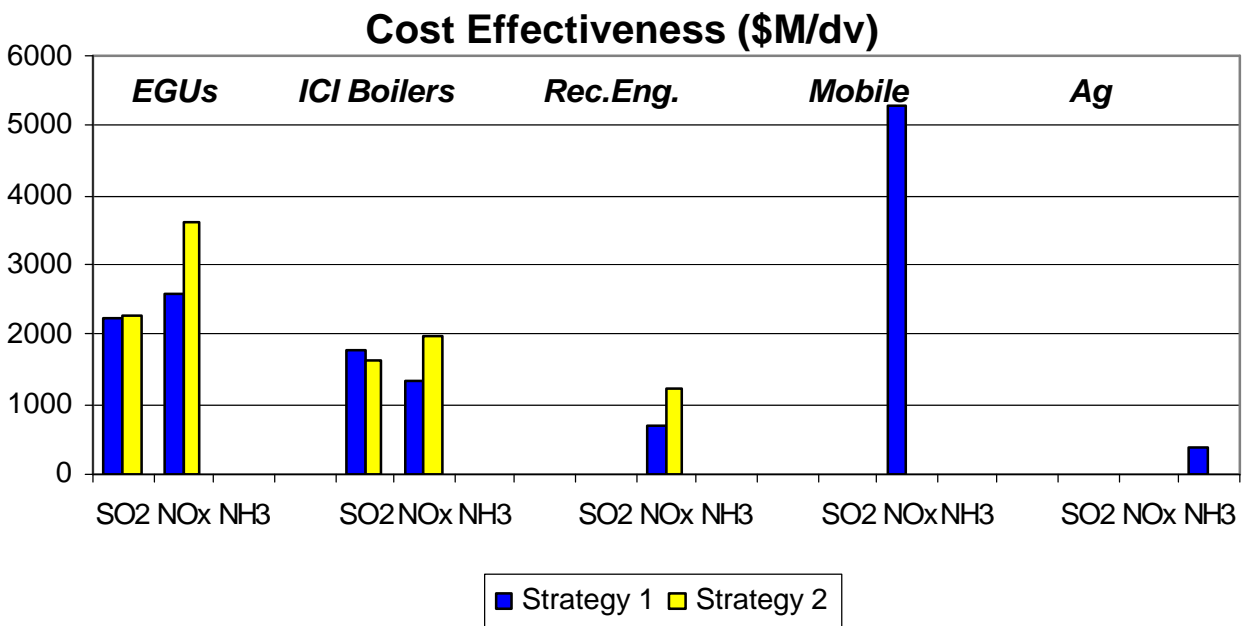
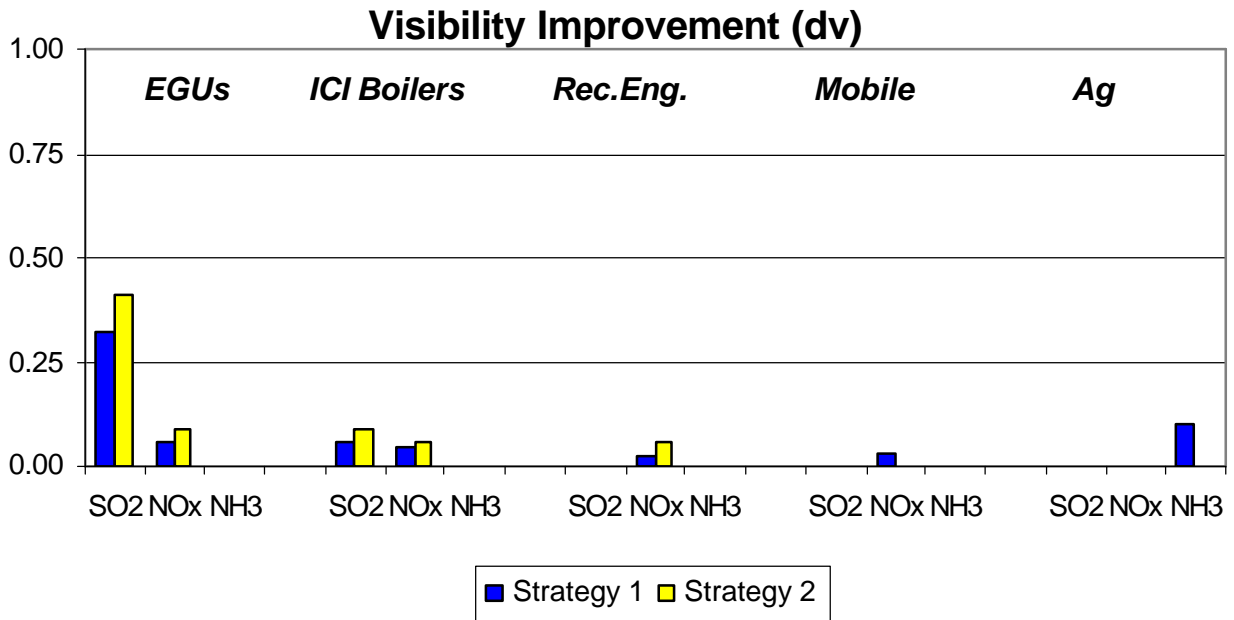
Factor 3 (Energy and Non-Air Quality Environmental Impacts): The energy and other environmental impacts are believed to be manageable. For example, the increased energy demand from add-on control equipment is less than 1% of the total electricity and steam production in the region, and solid waste disposal and wastewater treatment costs are less than 5% of the total operating costs of the pollution control equipment. It should also be noted that the SO2 and NOx controls would have beneficial environmental impacts (e.g., reduced acid deposition and nitrogen deposition).

Factor 4 (Remaining Useful Life): The additional control measures are intended to be market-based strategies applied over a broad geographic region. It is not expected that the control requirements will be applied to units that will be retired prior to the amortization period for the control equipment. Thus, this factor can be easily addressed.

Factor 5 (Visibility Impacts): The estimated incremental improvement in 2018 visibility levels for the additional measures is shown in Figure 8, along with the cost-effectiveness expressed in \$/M per deciview improvement). These results show that although EGU and ICI boiler controls have higher cost-per-deciview values (compared to some of the other measures), their visibility impacts are larger.

**Table 6. Estimated Cost Effectiveness for Potential Control Measures**

Emission category	Control strategy	Region	Average Cost effectiveness (\$/ton)		
			SO2	NOX	NH3
EGU	EGU1	3-State	1,540	2,037	
		9-State	1,743	1,782	
	EGU2	3-State	1,775	3,016	
		9-State	1,952	2,984	
ICI boilers	ICI1	3-State	2,992	2,537	
		9-State	2,275	1,899	
	ICI Workgroup	3-State	2,731	3,814	
		9-State	2,743	2,311	
Reciprocating engines and turbines	Reciprocating engines emitting 100 tons/year or more	3-State		538	
		9-State		506	
	Turbines emitting 100 tons/year or more	3-State		754	
		9-State		754	
	Reciprocating engines emitting 10 tons/year or more	3-State		1,286	
		9-State		1,023	
	Turbines emitting 10 tons/year or more	3-State		800	
		9-State		819	
Agricultural sources	10% reduction	3-State			31 - 2,700
		9-State			31 - 2,700
	15% reduction	3-State			31 - 2,700
		9-State			31 - 2,700
Mobile sources	Low-NOX Reflash	3-State		241	
		9-State		241	
	MCDI	3-State		10,697	
		9-State		2,408	
	Anti-Idling	3-State		(430) - 1,700	
		9-State		(430) - 1,700	
	Cetane Additive Program	3-State		4,119	
		9-State		4,119	
	Process Modification	Michigan		-	
	Conversion to dry kiln	Michigan		9,848	
Glass Manufacturing	LoTox™	Michigan		1,399	
	LNB	Wisconsin		1,041	
	Oxy-firing	Wisconsin		2,833	
	Electric boost	Wisconsin		3,426	
	SCR	Wisconsin		1,054	
	SNCR	Wisconsin		1,094	
Lime Manufacturing	Mid-kiln firing	Wisconsin		688	
	LNB	Wisconsin		837	
	SNCR	Wisconsin		1,210	
	SCR	Wisconsin		5,037	
	FGD	Wisconsin		128 - 4,828	
Oil Refinery	LNB	Wisconsin		3,288	
	SNCR	Wisconsin		4,260	
	SCR	Wisconsin		17,997	
	LNB+FGR	Wisconsin		4,768	
	ULNB	Wisconsin		2,242	
	FGD	Wisconsin		1,078	



**Figure 8. Results of ECR analysis of reasonable progress factors – visibility improvement (Factor 5) is on top, and cost effectiveness (Factor 1) is on bottom**

Organic Carbon Strategies: Although organic carbon is also an important contributor to visibility impairment, no organic carbon control strategies were considered for the following reasons.

First, a special study was performed in Seney to identify sources of organic carbon (Sheesley, et al, 2004). As seen in Figure 9, the highest PM<sub>2.5</sub> concentrations occurred during the summer, with organic carbon being the dominant species. The higher summer organic carbon concentrations were attributed mostly to secondary organic aerosols of biogenic origin, because of the lack of primary emission markers in the summer<sup>3</sup>, and concentrations of known biogenic-related species (e.g., pinonic acid) were also higher during the summer.

Second, to assess further whether fire activity is a significant contributor to visibility impairment in the northern Class I areas, the PM<sub>2.5</sub> chemical speciation data were examined for days with high organic and elemental carbon concentrations, which are indicative of biomass burning impacts. A handful of such days were identified:

**Table 7. Days with High OC/EC Concentrations in Northern Class I Areas**

Site	2000	2001	2002	2003	2004
Voyageurs	---	---	Jun 1	Aug 25	Jul 17
			Jun 28		
			Jul 19		
Boundary Waters	---	---	Jun 28	Aug 25	Jul 17
			Jul 19		
Isle Royale	---	---	Jun 1	Aug 25	---
			Jun 28		
Seney	---	---	Jun 28	---	---

Back trajectories on these days point mostly to wildfires in Canada. Elimination of these high organic carbon concentration days has a small effect in lowering the baseline visibility levels in the northern Class I areas (i.e., Minnesota Class I areas change by about 0.3 deciviews, and Michigan Class I areas change by less than 0.2 deciviews).

This suggests that fire activity, although significant on a few days, is on average a relatively small contributor to visibility impairment in the northern Class I areas.

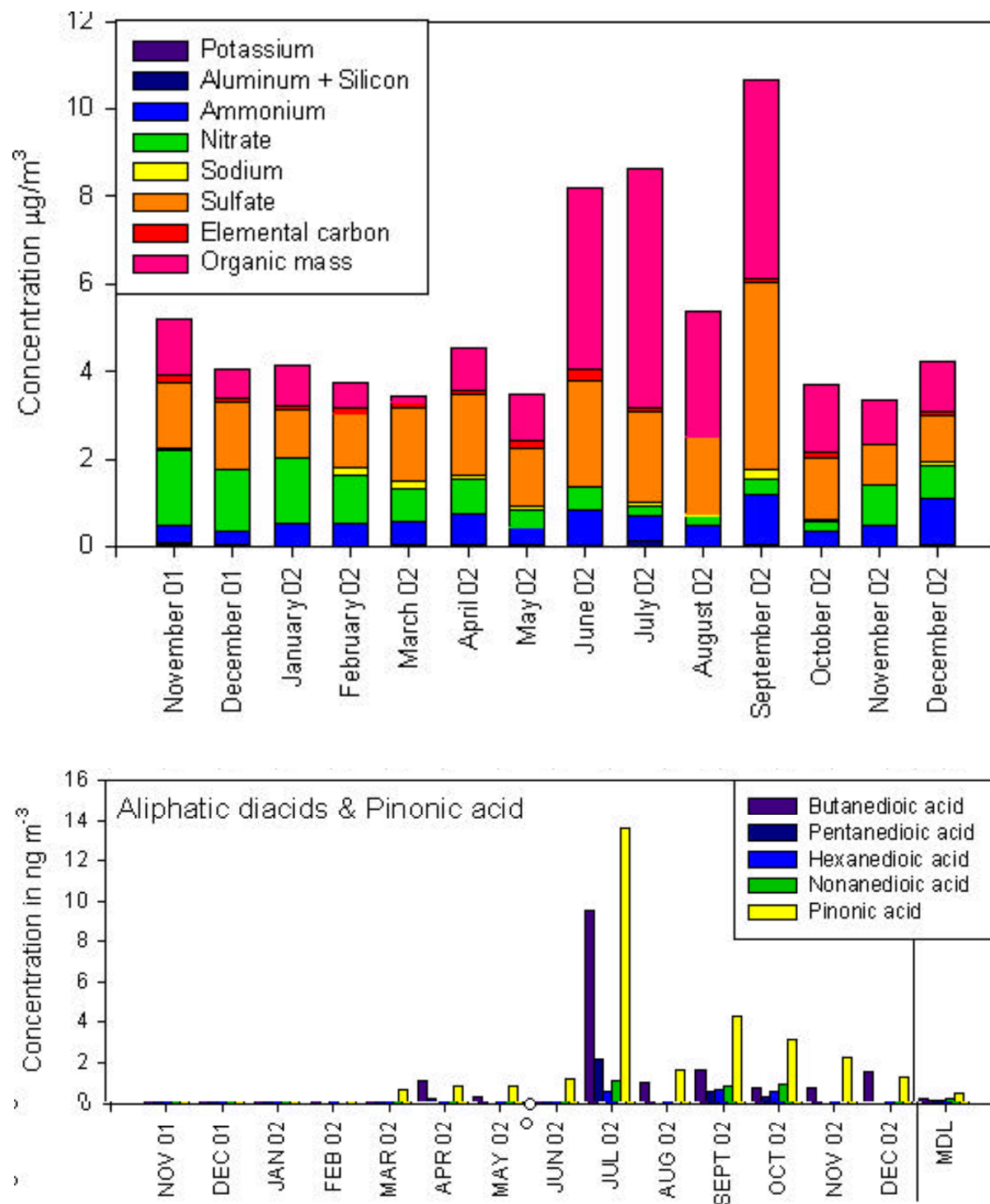
In summary, these two analyses indicate that organic carbon in the northern Class I areas is largely uncontrollable.

Finally, the modeling results are presented in Figure 10 in terms of chemical species. In comparison to the 2000-2004 baseline and 2018 projected visibility level, the 2064 natural conditions level reflects comparable organic carbon concentrations, but much lower sulfate and nitrate concentrations. This suggests the need for additional sulfate and nitrate concentration reduction to achieve natural conditions.

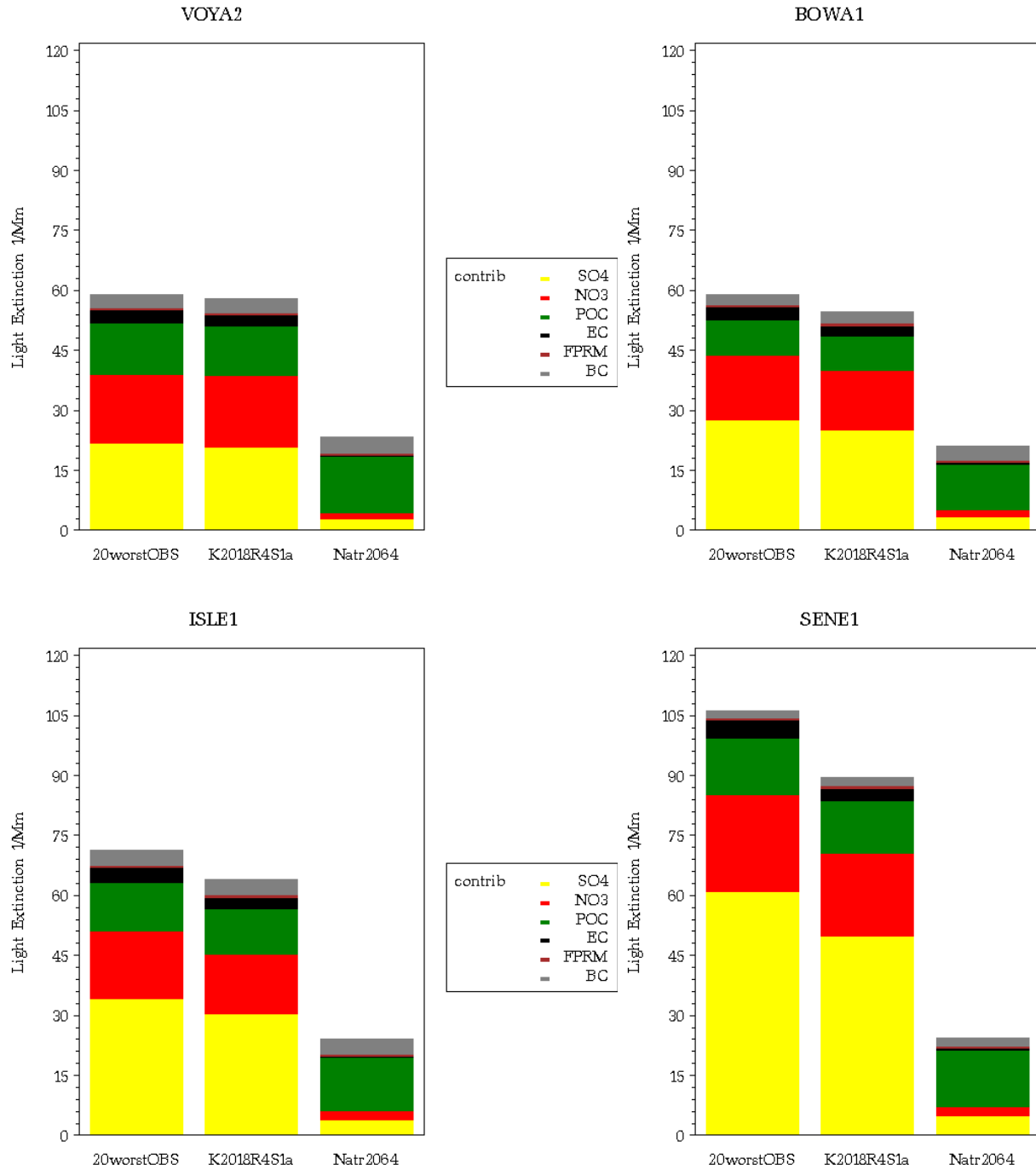
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<sup>3</sup> Analysis of primary source emission markers and chemical mass balance modeling of the Seney data showed that the impact of primary emission sources (e.g., biomass burning, motor vehicles, and road dust) was fairly low. Biomass burning, in particular, contributed less than 1% on an annual average basis, although episodic impacts were found (e.g., see high organic carbon days in Figure 3).





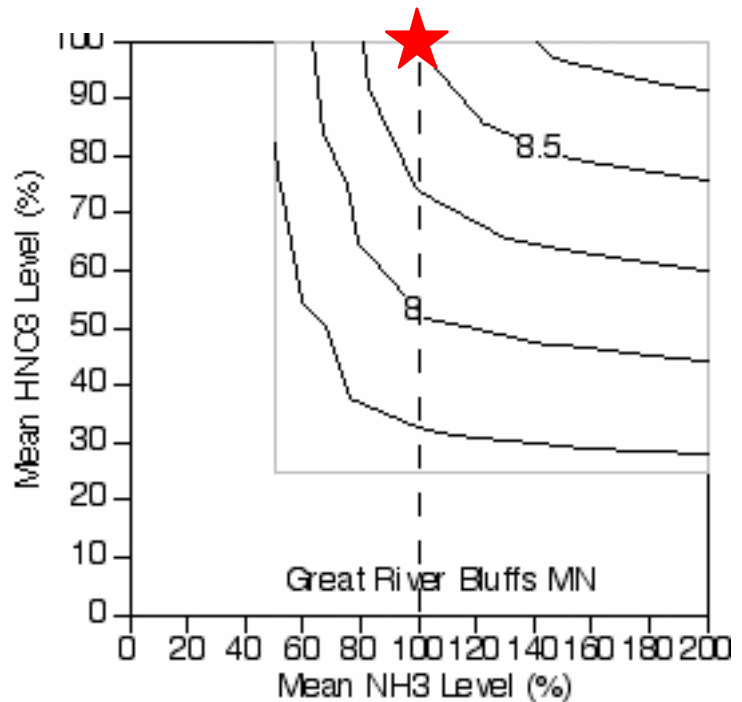
**Figure 9. Monthly concentrations of PM<sub>2.5</sub> species (top) and biogenic-related organic carbon species in Seney (bottom)**



**Figure 10. Comparison of 2002 base yea, 2018 future year, and 2064 natural condition levels for the four northern Class I areas (LADCO Round 4 modeling)**

- d. Should we consider control measures for ammonia?

Technical analyses have shown that  $PM_{2.5}$  concentrations will respond to reductions in sulfate, nitrate (nitric acid), and ammonia – see, for example, Figure 11 based on data from the Great River Bluffs, MN site in the Midwest regional ammonia network (Blanchard, 2005). The plot shows  $PM_{2.5}$  concentrations as a function of ammonia ( $NH_3$ ) and nitric acid ( $HNO_3$ ). Reductions in ammonia (i.e., movement to left of the baseline value (represented by the red star), as well as reductions in nitric acid (i.e., movement downward from the baseline value) result in lower  $PM_{2.5}$  concentrations. Thus, ammonia emission reductions will lower  $PM_{2.5}$  concentrations and improve visibility levels in the northern Class I areas.



**Figure 11. Predicted  $PM_{2.5}$  mass levels at Great River Bluffs, MN as functions of changes in ammonia and nitric acid**

Current regional inventories show most ammonia emissions come from livestock waste and fertilizer applications. A white paper on candidate control measures for agricultural ammonia emissions was prepared by a contractor (ECR, 2007b). ECR examined several measures which would mitigate air emissions, and water pollution from livestock waste management and synthetic fertilizer usage. Information on emission reductions (and other impacts), cost effectiveness, and geographic and seasonal applicability are considered in the white paper.

Further analyses (and discussions with stakeholders) are necessary before deciding whether to pursue control measures for ammonia. Key issues which need to be addressed include technical uncertainties, such as reliability of emission estimates, treatment of ammonia by current photochemical modeling systems, and lack of ambient measurements. It is worth noting, however, that LADCO and CENRAP have attempted to address these uncertainties by supporting development of a new process-based emissions model, conducting model sensitivity studies of ammonia deposition, and collecting ambient ammonia data as part of the Midwest regional ammonia network. Another issue was noted by USEPA in its final CAIR rulemaking: “reductions in ammonia emissions alone would also tend to increase the acidity of  $PM_{2.5}$  and precipitation.... this might have untoward environmental or health consequences.” (70 FR 25182)

### **Section 3**

### **References**

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Web Sites:

<http://vista.cira.colostate.edu/views/>

## APPENDIX I

### Contribution Assessment for Northern Class I Areas

Air quality data analyses involving back trajectories, dispersion modeling, and emissions inventories were examined to provide information on source region and source sector contributions to regional haze in the northern Class I areas. Based on this information, the following key findings should be noted:

- The most important contributing states are Michigan, Minnesota, and Wisconsin, as well as Illinois, Indiana, Iowa, Missouri, and North Dakota.
- The most important contributing pollutants and source sectors are SO<sub>2</sub> emissions from electrical generating units (EGUs), which lead to sulfate formation, and NO<sub>x</sub> emissions from a variety of source types (e.g., motor vehicles), which lead to nitrate formation. Ammonia emissions from livestock waste and fertilizer applications are also important, especially for nitrate formation.

#### LADCO Back Trajectory Analysis (1997-2001 Data)

Back trajectories were prepared by LADCO using data for 1997-2001 (all sampling days), a start height of 200 m, and a 72-hour (3-day) trajectory period (Kenski, 2004). By combining trajectory frequencies with concentration information, the average contribution to PM<sub>2.5</sub> mass and individual PM<sub>2.5</sub> species was estimated (which, in turn, was used to estimate the average contribution to light extinction). The results for three northern Class I areas are provided in Table I-1 for the 20% best days, all days, and 20% worst days. The table shows that the most important contributing states are Michigan, Minnesota, and Wisconsin, and, to a lesser degree North Dakota, South Dakota, Missouri, Iowa, Illinois, Ontario, and Manitoba.

#### LADCO Back Trajectory Analysis (2000-2003 Data)

Back trajectories were prepared by LADCO using data for 2000-2003 (20% worst and 20% best days), a start height of 200m<sup>4</sup>, and a 120-hour (5-day) trajectory period (Kenski, 2005). Composite back trajectory plots were prepared for light extinction, sulfate, and nitrate (see Figure I-1). For the high light extinction (poor visibility) and high sulfate and nitrate concentration days, the orange areas are where the air is most likely to come from, and the green areas are where the air is least likely to come from. As can be seen, bad air days are generally associated with transport from Michigan, Minnesota, and Wisconsin, as well as North Dakota, South Dakota, Missouri, Iowa, Illinois, and Indiana. On the other hand, the good air days (low extinction) are generally associated with transport from Canada.

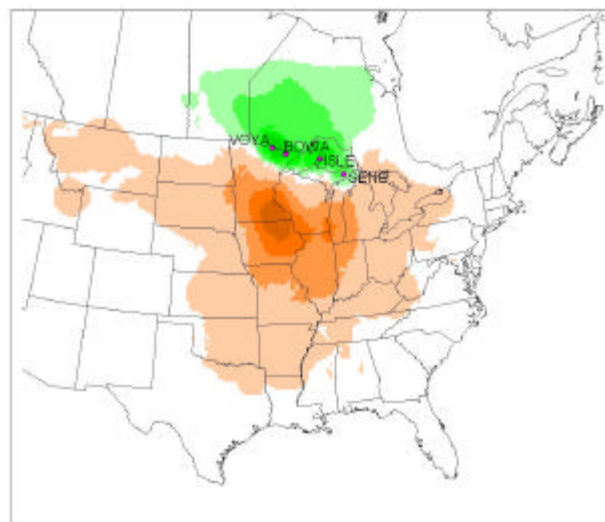
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<sup>4</sup> A sensitivity analysis was performed to determine the effect of start height. Increasing westerly influence was seen as start height increases. 200 m was assumed to be an appropriate compromise to represent the mixed boundary layer, but not unduly influenced by surface features.

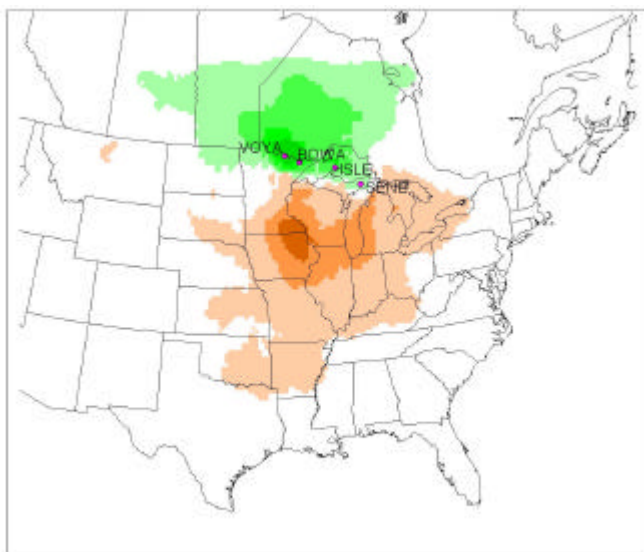
**Table I-1. Estimated Contributions to Visibility (Light Extinction) – Percentages**

		Boundary Waters Extinction				Voyageurs Extinction				Seney Extinction		
		Best	All Days	Worst		Best	All Days	Worst		Best	All Days	Worst
US	Alabama		0.03							0.20	0.39	
	Arkansas		0.30	0.40			0.10	0.19		1.54	2.93	
	Florida									0.09	0.17	
	Georgia									0.21	0.39	
	Illinois		1.68	2.74			0.50	1.22		4.99	7.43	
	Indiana		0.57	1.18						1.67	2.17	
	Iowa		5.14	7.44			6.12	10.24		5.27	5.66	
	Kentucky									1.14	2.18	
	Louisiana		0.12	0.23			0.03	0.06		0.78	1.23	
	Michigan	0.78	1.17	0.66		0.27	1.22	1.57		14.51	13.68	14.68
	Minnesota	22.04	34.75	37.63		20.96	34.60	36.88		1.46	5.41	3.79
	Mississippi		0.06							0.62	1.04	
	Missouri		2.17	3.26			1.02	0.30		2.42	3.17	
	New Hampshire									0.02		
	New York									0.07	0.10	
	North Carolina		0.09							0.19	0.36	
	North Dakota	1.21	5.13	5.91		1.59	6.51	7.11		1.26	0.64	
	Ohio		0.19	0.23						0.07	1.61	2.80
	Pennsylvania									0.49	0.15	0.26
	South Carolina									0.21	0.39	
	South Dakota	0.45	3.06	4.38			4.08	6.93		1.13	1.12	
	Tennessee		0.01							0.47	0.85	
	Vermont									0.02		
	Virginia		0.03							0.17	0.33	
	West Virginia		0.05							0.54	1.02	
	Wisconsin	1.31	7.86	10.06			5.50	9.66		0.26	10.63	8.44
	Western States	1.10	4.31	5.74			7.05	9.53		5.80	5.90	
Canada	Manitoba	9.95	7.45	3.71		17.65	10.35	6.04		3.77	2.37	0.77
	Ontario	47.52	15.96	8.92		49.56	13.59	4.98		50.97	12.86	7.66
	Quebec	1.77	0.15			0.21	0.01			0.97	0.93	0.41
	Other Provinces	2.27	3.73	2.46		6.05	6.29	2.35		0.86	1.72	2.28
Other (over water, etc.)		11.61	6.02	5.05		3.72	3.05	2.94		26.65	21.86	21.44
Total		100.00	100.00	100.00		100.00	100.00	100.00		100.00	100.00	100.00

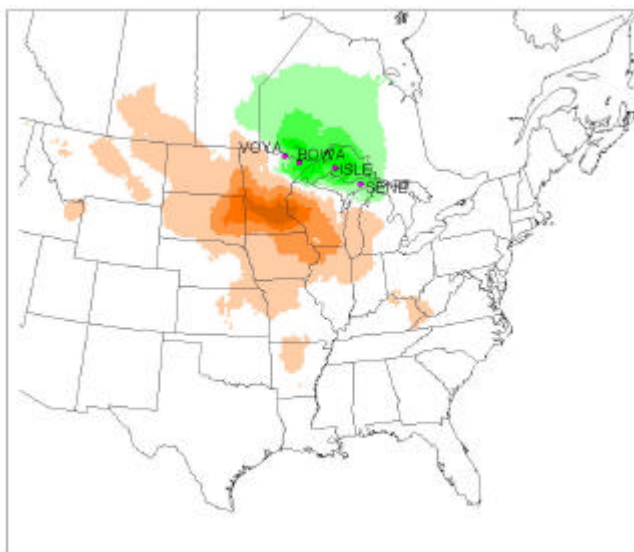
Note: Because Seney is more surrounded by water (the Great Lakes) than the other monitoring sites, the analysis shows greater impacts associated with the Other (over water) category. Actually, most of the Other (over water) impacts at Seney are from nearby (over land) emission sources, not over water emission sources.



High extinction days



High sulfate concentration days



High nitrate concentration days

**Figure I-1. Composite back trajectories for light extinction, sulfates, and nitrates**

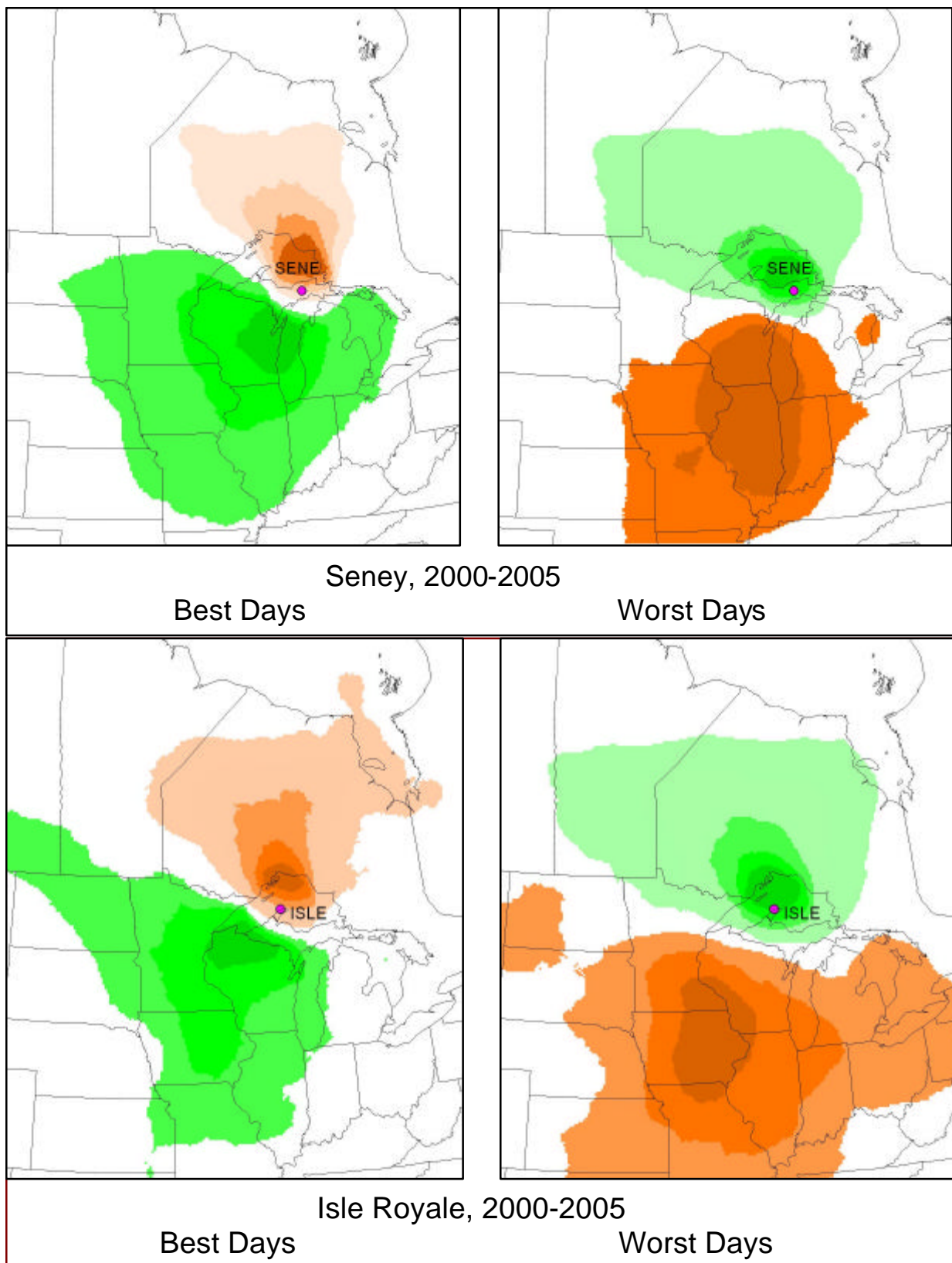
Note: orange is where air is most likely to come from, green is where air is least likely to come from

### **LADCO Back Trajectory Analysis (2000 – 2005 Data)**

LADCO's back trajectory study (based on 2000-2003 data) was updated using data for 2000-2005 (Kenski, 2007). Composite back trajectory plots were prepared for each Class I area (see Figures I-2 and I-3). In each plot, the orange areas are where the air is most likely to come from, and the green areas are where the air is least likely to come from. As can be seen, bad air days are generally associated with transport from Michigan, Minnesota, and Wisconsin, as well as North Dakota, South Dakota, Missouri, Iowa, Illinois, and Indiana. On the other hand, the good air days are generally associated with transport from Canada.

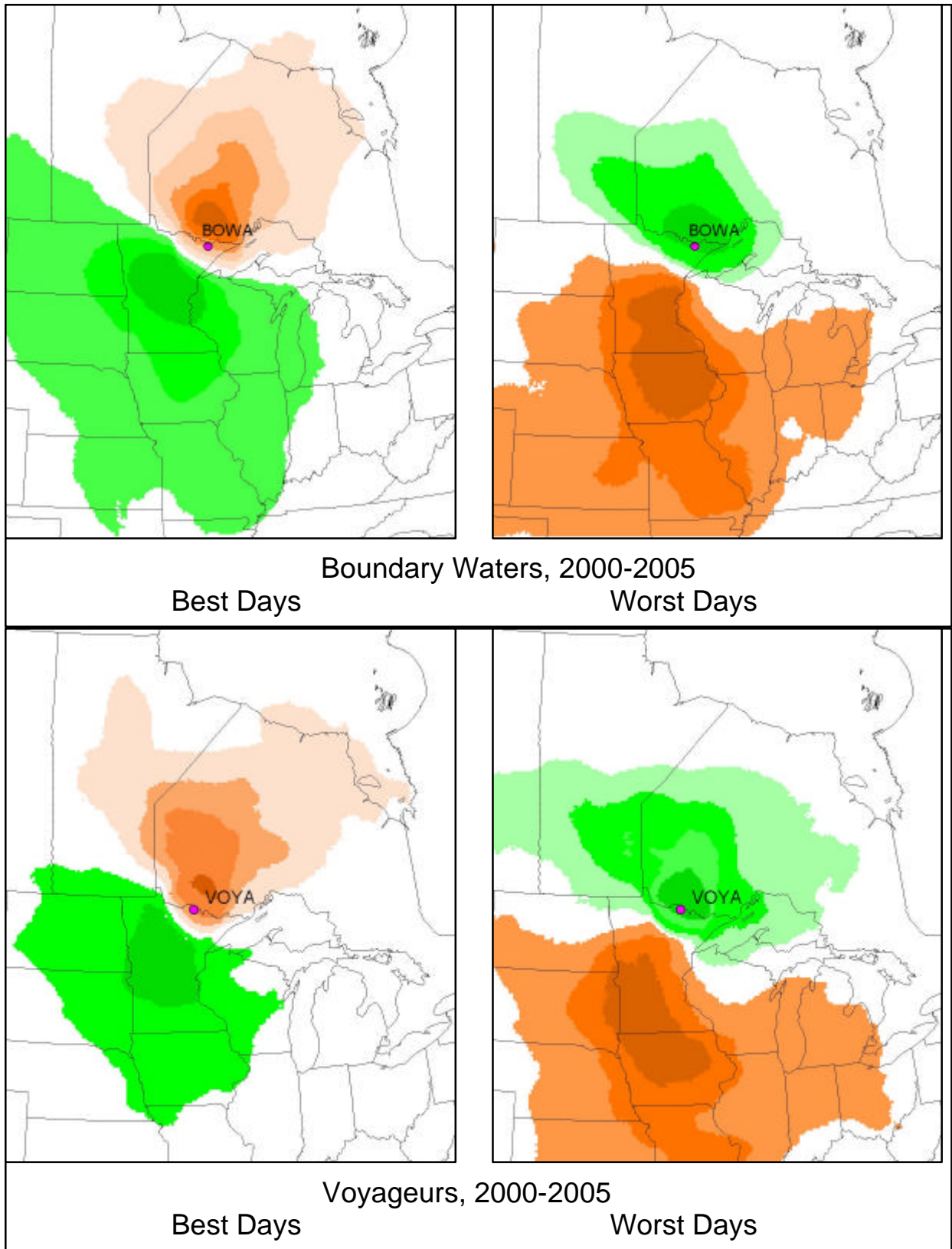
Figures I-4 and I-5 compare the transport patterns for the two base years: 2002 and 2005. Figure I-4 shows strong similarities in the transport patterns for the two years. Additional detail on the transport patterns for the two base years is provided in Figure I-5 for Seney and Voyageurs. The dots are plotted in graduated colors, by day, so that it is easier to distinguish one day from another. It is worth noting that even though a few of the worst-day trajectories originate in Canada, many of these trajectories actually spend significant time in the U.S. and should not be thought of as strictly Canadian influences.



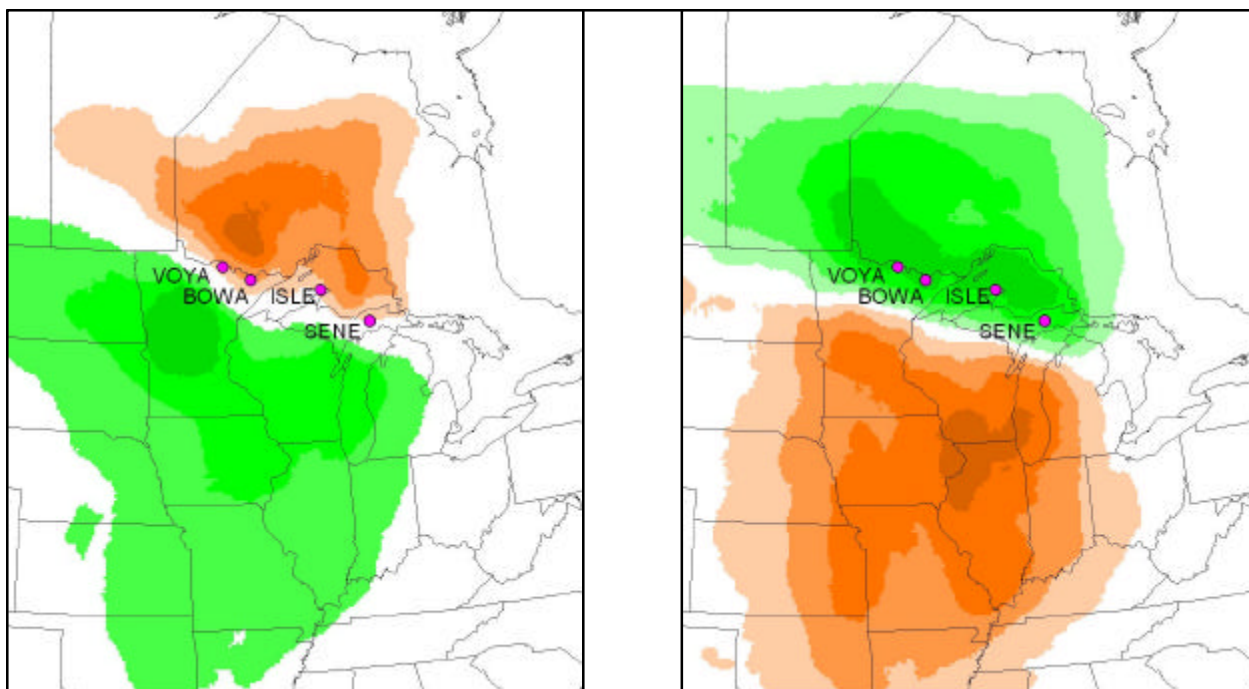


**Figure I-2. Composite back trajectories for Seney (top) and Isle Royale (bottom)**

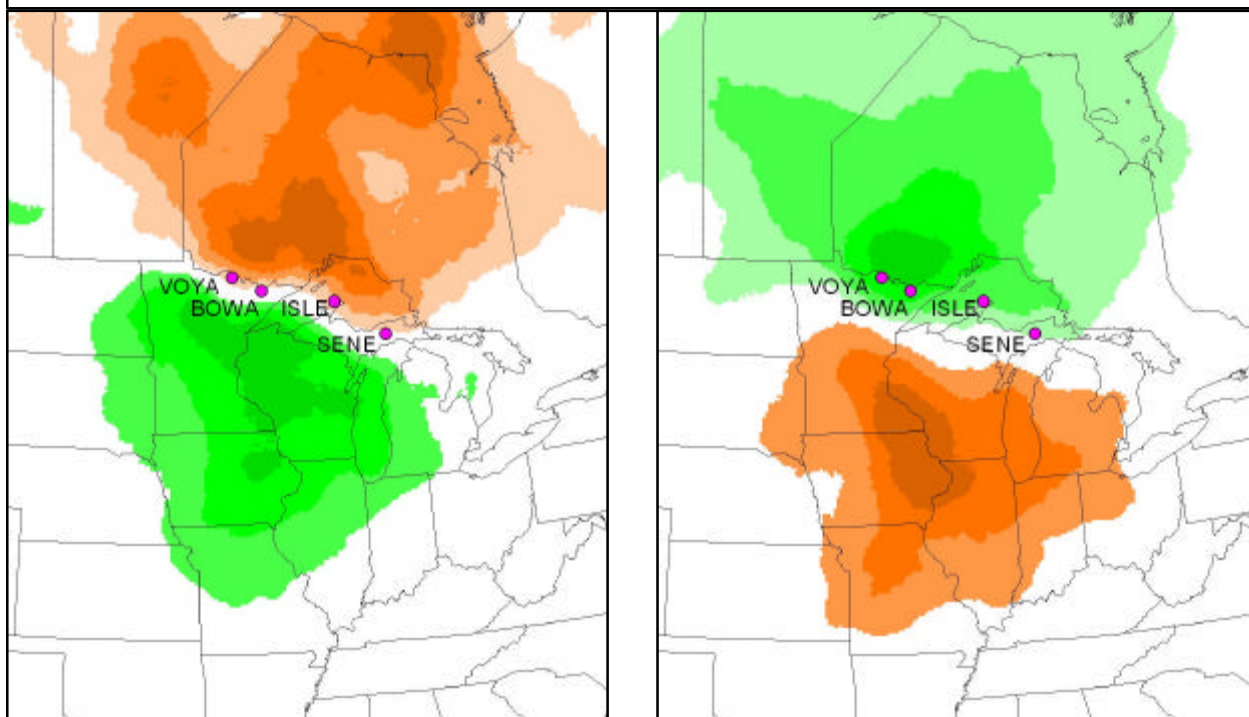
Note: orange is where air is most likely to come from, green is where air is least likely to come from



**Figure I-3. Composite back trajectories for Boundary Waters (top) and Voyageurs (bottom)**  
 Note: orange is where air is most likely to come from, green is where air is least likely to come from



4 Northern Class 1 Sites, 2002  
Best Days Worst Days

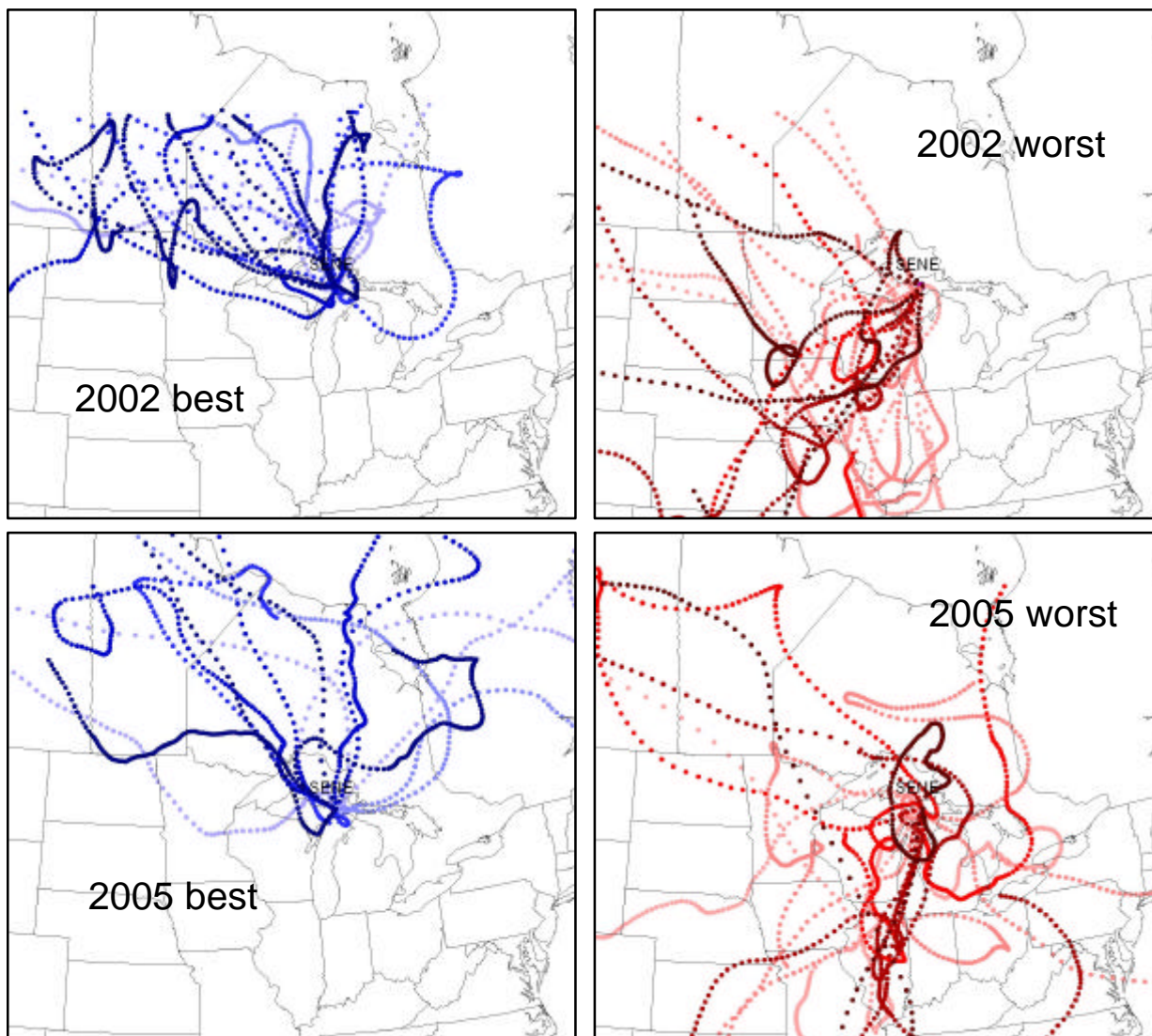


4 Northern Class 1 Sites, 2005  
Best Days Worst Days

**Figure I-4. Composite back trajectories for 2002 (top) and 2005 (bottom)**

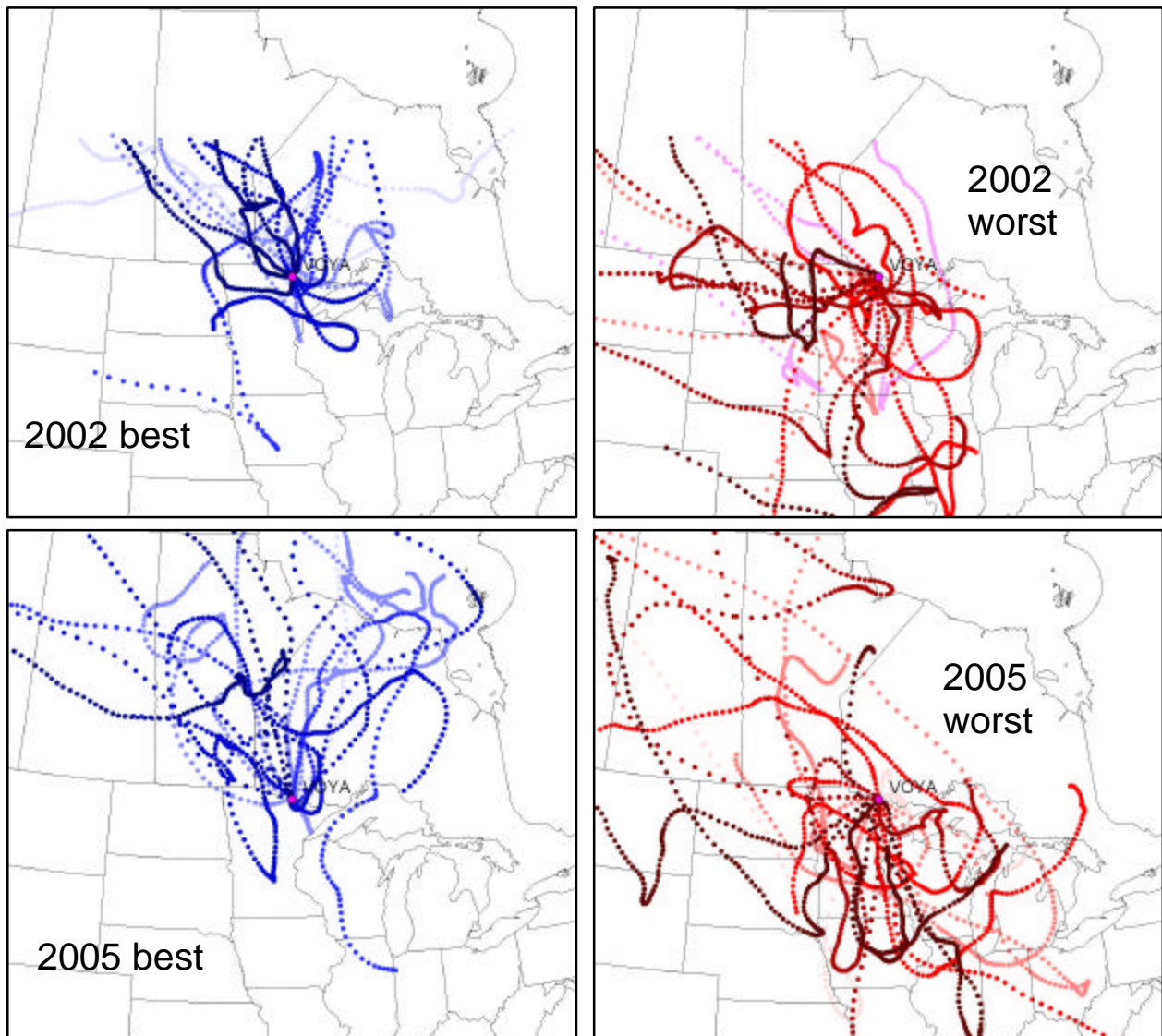
Note: orange is where air is most likely to come from, green is where air is least likely to come from





## Seney NWR

Figure I-5a. Composite back trajectories for Seney



## Voyageurs

Figure I-5b. Composite back trajectories for Voyageurs

### CENRAP Areas of Influence Assessment Using Back Trajectories and Other Tools

Areas of Influence (AOI) were developed using several back trajectory analyses, including Residence Time Difference Plots, the Probability of Regional Source Contribution to Haze plots, and Tagged Species Source Apportionment Results (Alpine Geophysics, 2006). AOIs were constructed for 10 Class I areas in the CENRAP region, including Boundary Waters/Voyageurs (see Figure I-6). Green contours represent AOIs for nitrates, and red contours represent AOIs for sulfates. Similar to LADCO's composite trajectory plots in Figure I-1, nitrate impacts are associated with more westerly transport, while sulfate impacts are associated with more southerly transport.



Figure I-6. AOIs for nitrates (green) and sulfates (right) for Boundary Waters/Voyageurs

### CENRAP Emissions Inventory Potential Analysis

Back trajectories were combined with emissions inventory data to estimate the Emissions Impact Potential (CENRAP, 2006). This approach weights emissions at a particular location by the probability of transport from that location to a given receptor under days of high sulfate or nitrate concentrations. The EIP results for SO<sub>2</sub> and NO<sub>x</sub> for Voyageurs, which are provided in Figure I-7, show that contributions are greatest from source regions in northeastern Minnesota and the Twin Cities urban area.

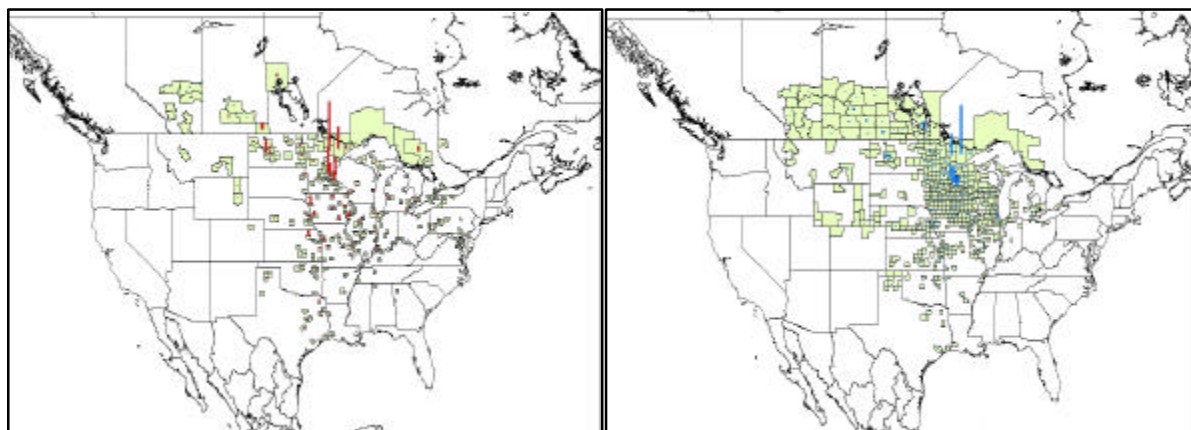


Figure I-7. EIP for SO<sub>2</sub> (left) and NO<sub>x</sub> (right) as calculated for Voyageurs

### Receptor Modeling Study

Ambient monitoring data for the period 1991 – 2002 were analyzed to identify sources impacting  $PM_{2.5}$  levels in several Class I areas, including Boundary Waters (DRI, 2005). Using statistical tools (i.e., receptor models), the relative contributions associated with various primary and secondary emissions were estimated. The results from three receptor models (CMB, PMF, and UNMIX) for Boundary Waters are presented in Figure I-8. Because most of the fine particle mass is secondary in nature, the tools were unable to provide much definition - e.g., over 80% of the impacts on the 20% worst visibility days at Boundary Waters was due to a combination of secondary sulfate, secondary nitrate, and (mostly secondary) organic carbon. Back trajectory analysis of these sources showed the largest impacts are associated with transport from the following directions: (1) sulfate – south and southeast, (2) nitrate – west and southwest, and (3) organics – west and south.

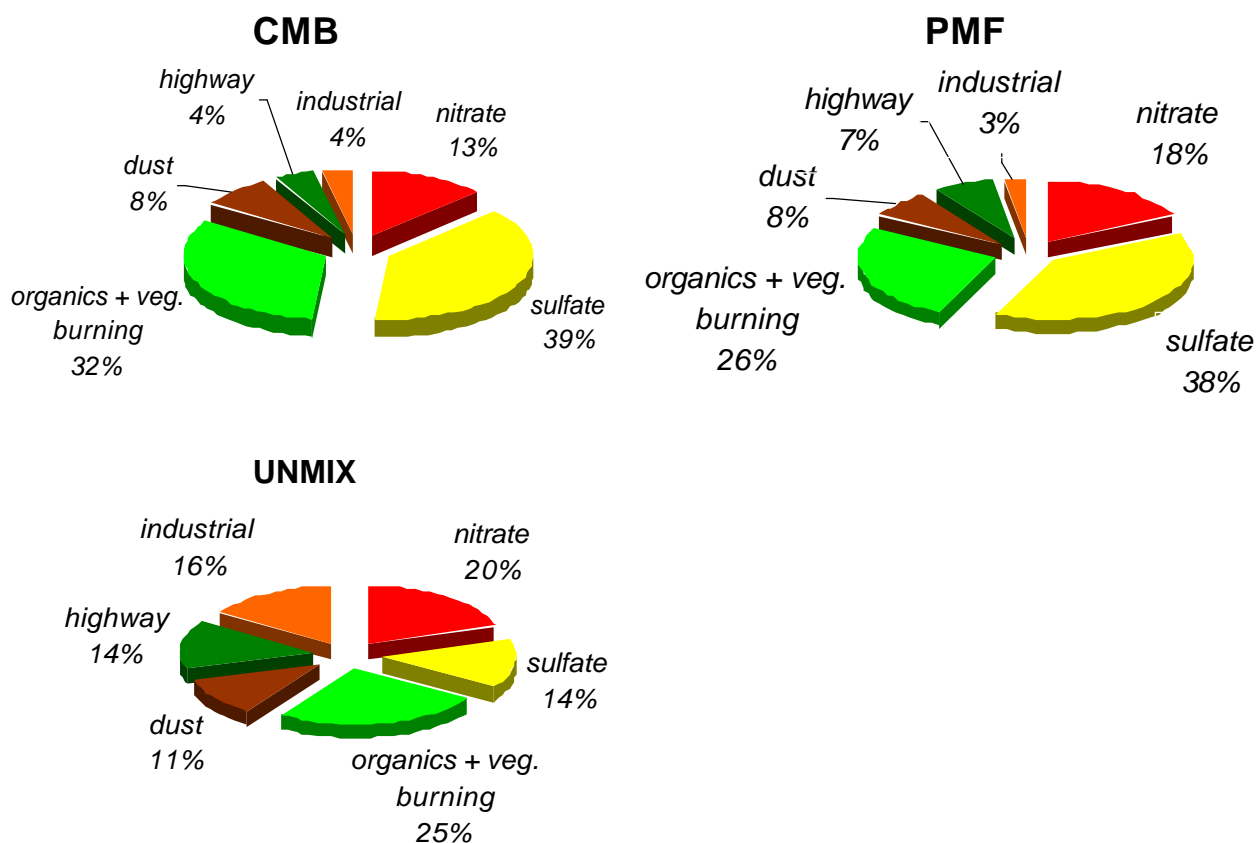
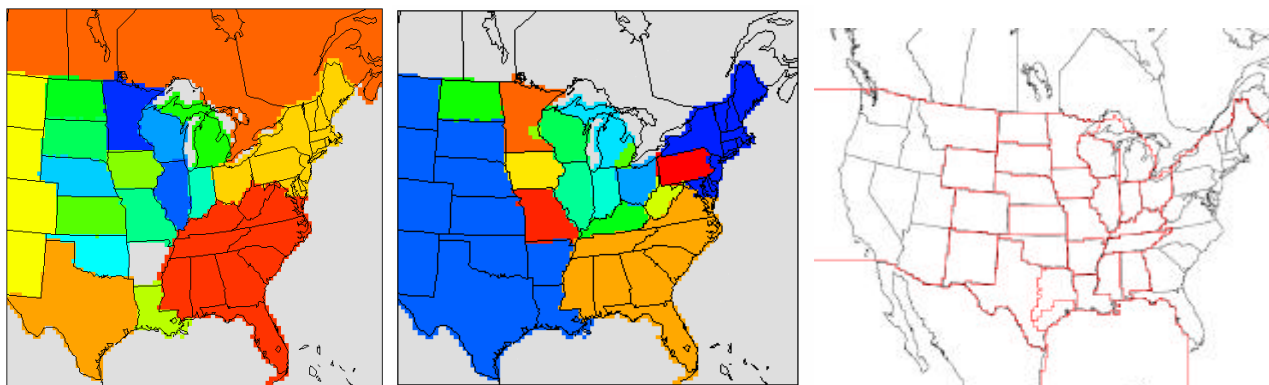


Figure I-8. Source apportionment results from three receptor models for Boundary Waters



### Dispersion Modeling Studies: MPCA, CENRAP, and LADCO

Dispersion models were used to estimate source region and source sector contributions for the northern Class I areas. Source contribution information based on the particle source apportionment tool (PSAT) in CAMx is available from several modeling studies: (1) MPCA modeling 2002 and 2018 (MPCA, 2008), (2) CENRAP modeling for 2018 (Environ, 2007), (3) LADCO modeling for 2018 (LADCO, 2006 and LADCO, 2007). MPCA's analyses included 19 source regions, LADCO's included 18, and CENRAP's included 30 (see Figure I-9). All the analyses considered similar source groups: EGU point, non-EGU point, on-road, nonroad, area, and ammonia.



**Figure I-9. Source regions in PSAT analyses: MPCA (left), LADCO (center), and CENRAP (right). Contiguous areas of the same color represent a source region.**

The contributions to light extinction on the 20% worst visibility days at each of the four Class I areas are shown in Figures I-10 thru I-13. A few comments on these results should be noted:

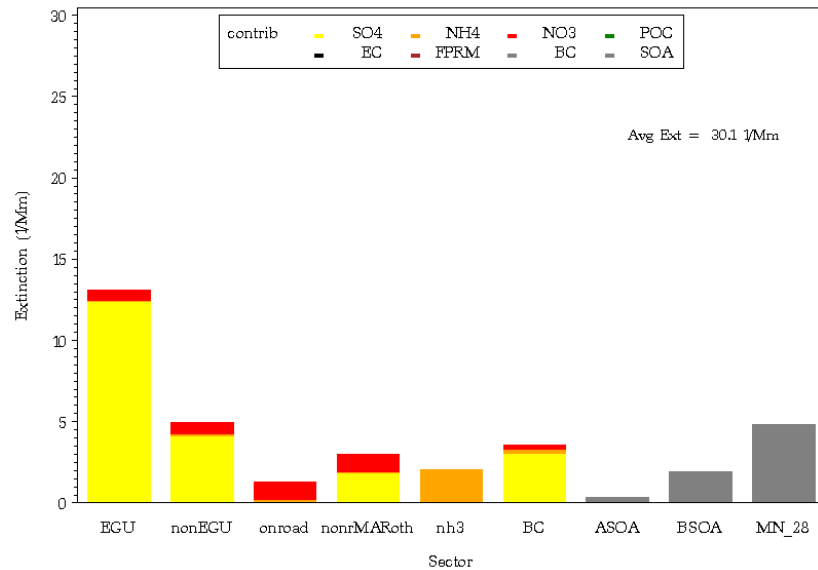
- Source apportionment differs from source response. The source apportionment results represent how much a given source sector and source region contribute to light extinction, whereas the source response is how much light extinction changes due to changes in emissions from a given source sector and source region.
- The source sector and source region contributions are similar for the base years (2002, 2005) and future year (2018).
- Sulfate impacts are dominated by point source (EGU and non-EGU) SO<sub>2</sub> emissions. Nitrate impacts are due to a variety of source sectors.
- The contributions in the two Minnesota Class I areas are dominated by emissions from Minnesota, while the contributions in the two Michigan Class I areas come from several northern and midwestern states.
- CENRAP's modeling shows a higher Canadian contribution compared to LADCO's and MPCA's modeling. This is due to the larger spatial extent of the CENRAP modeling domain, and differences in the Canadian emissions inventory.

Table II-2 provides a summary of the estimated state-level culpabilities based on the LADCO back trajectory analysis and the PSAT analyses for 2018.

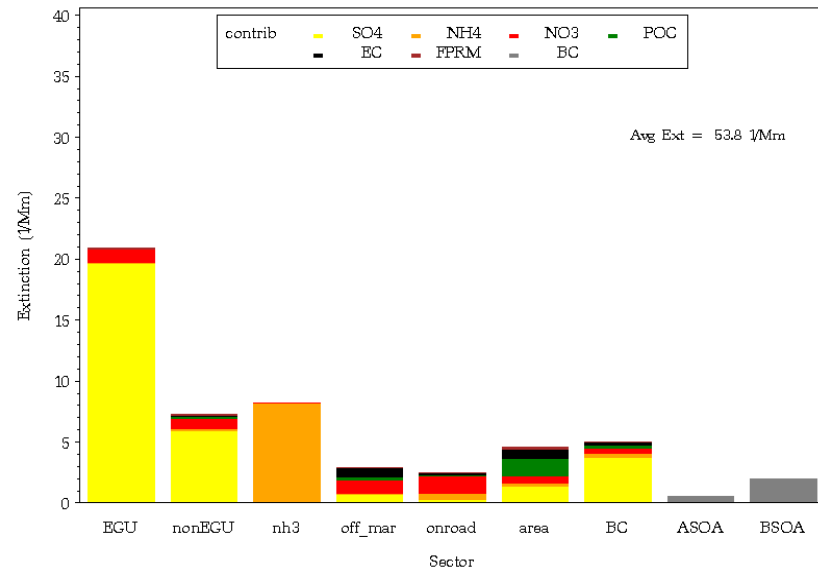


## Boundary Waters, Minnesota

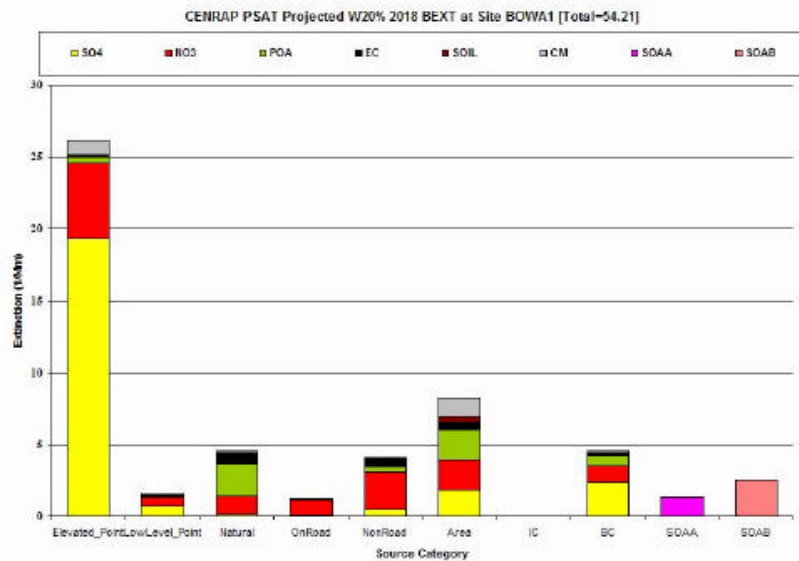
2002 (MPCA)



2005 (LADCO Round 5)



2018 (CENRAP)



2018 (LADCO Round 5)

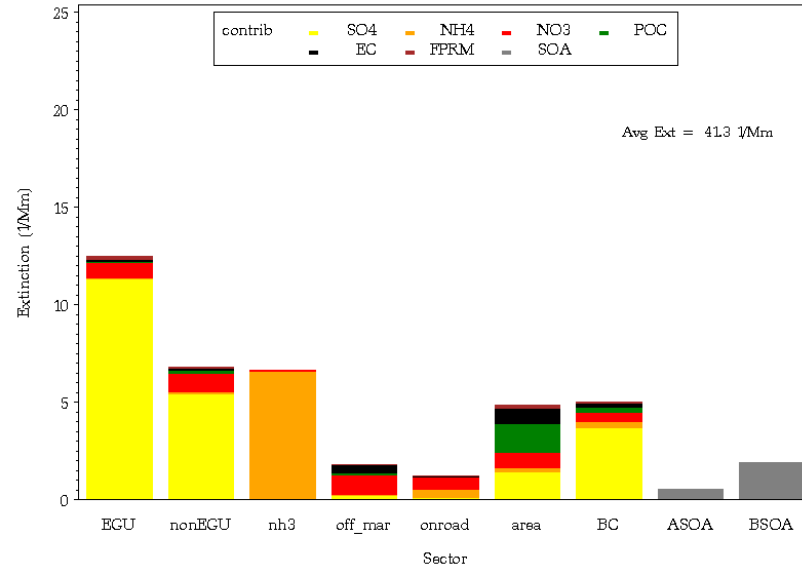
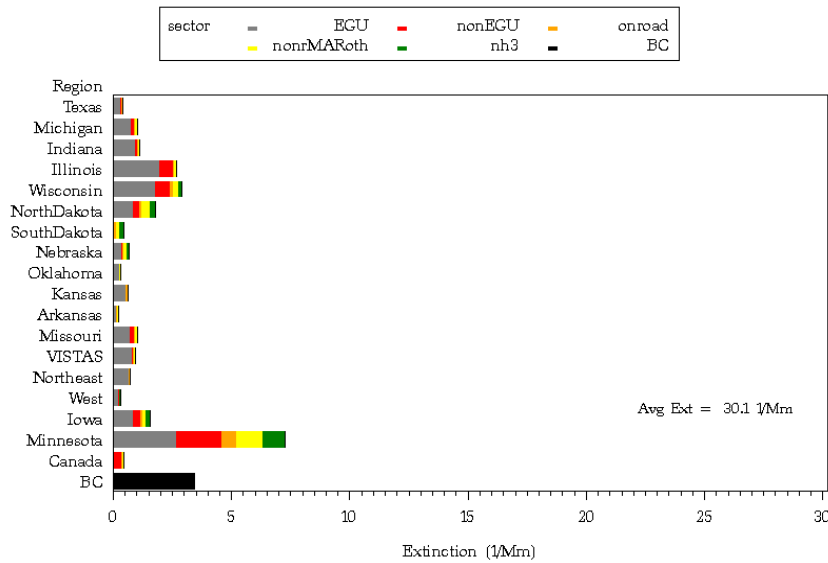


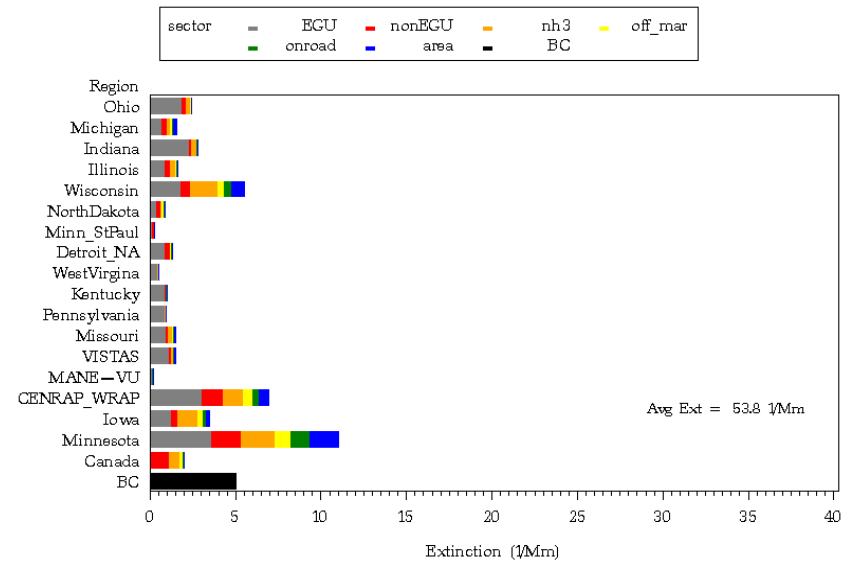
Figure I-10a. Model-based source apportionment for 20% worst days – Boundary Waters

## Boundary Waters, Minnesota

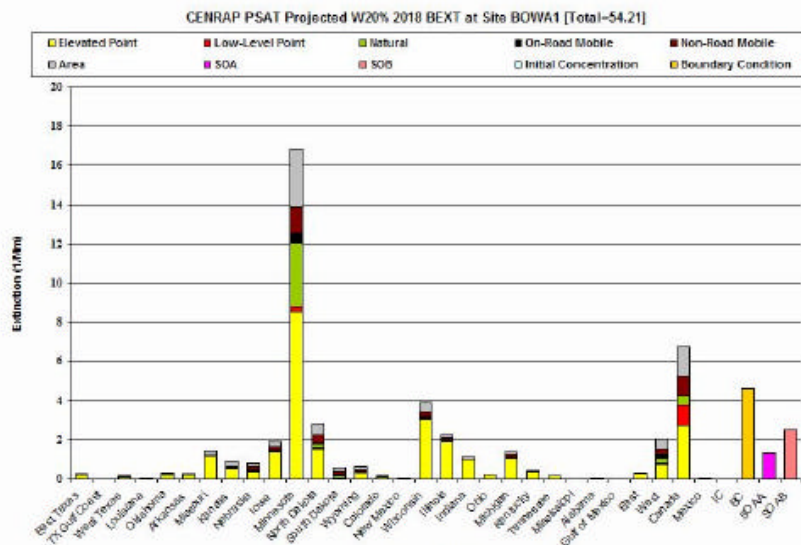
2002 (MPCA)



2005 (LADCO Round 5)



2018 (CENRAP)



2018 (LADCO Round 5)

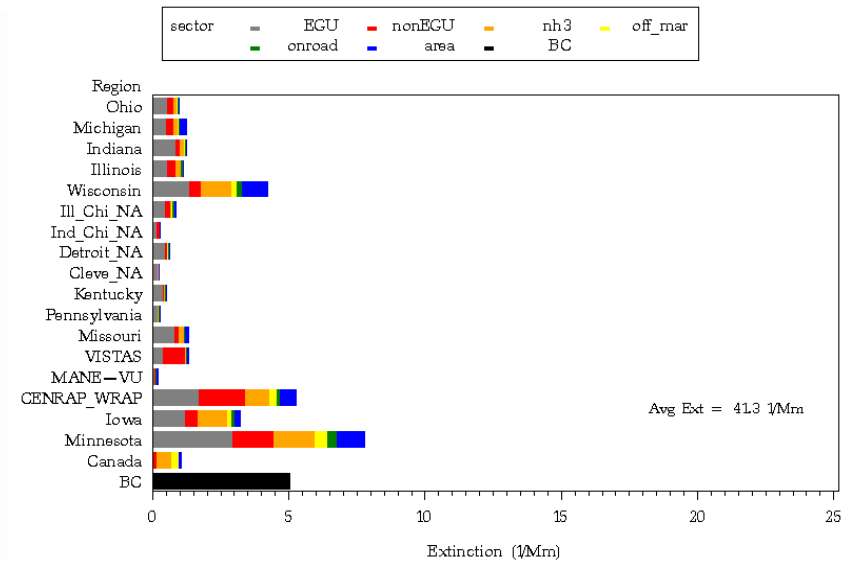
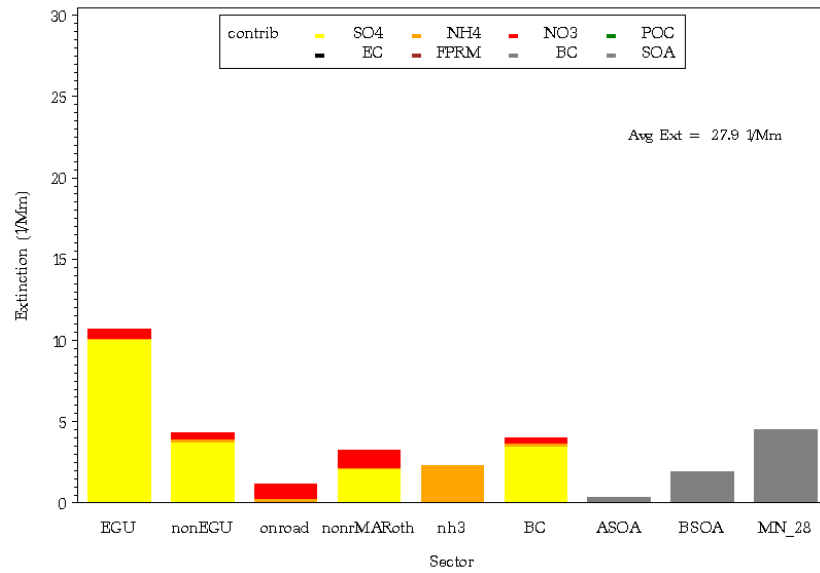


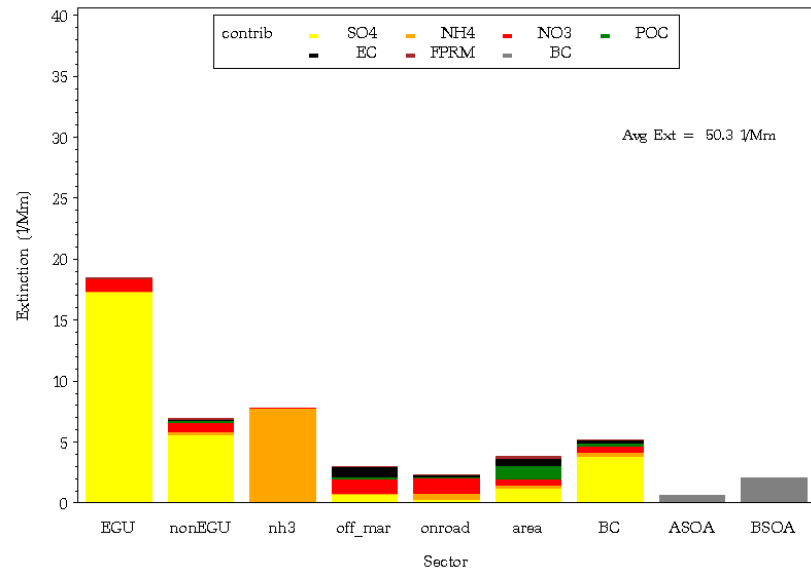
Figure I-10b. Model-based source apportionment on 20% worst days – Boundary Waters

## Voyageurs, Minnesota

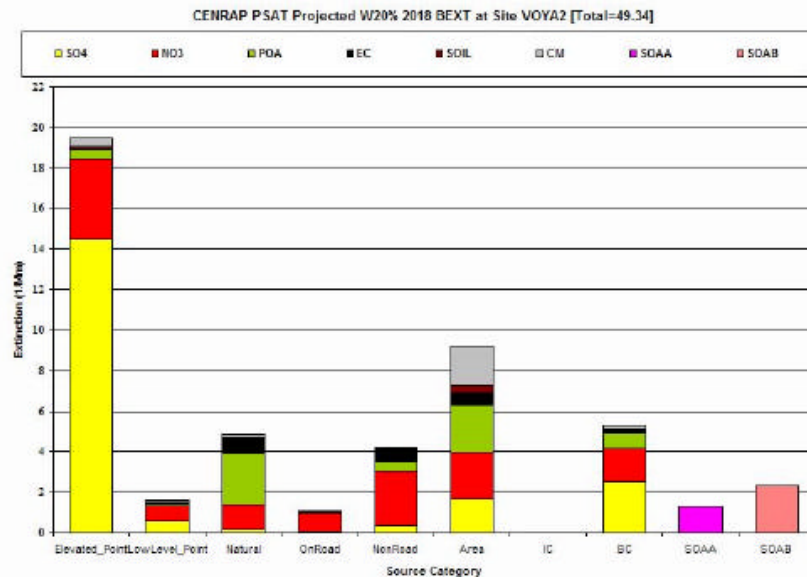
2002 (MPCA)



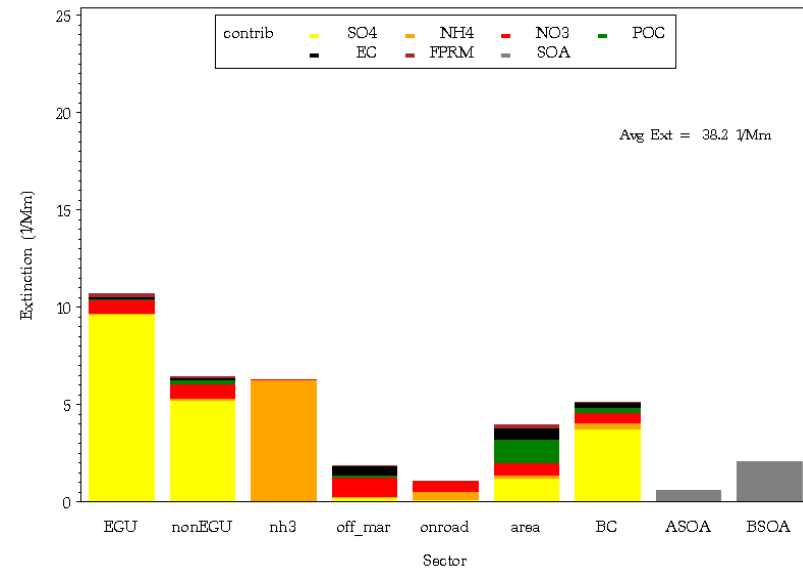
2005 (LADCO Round 5)



2018 (CENRAP)



2018 (LADCO Round 5)

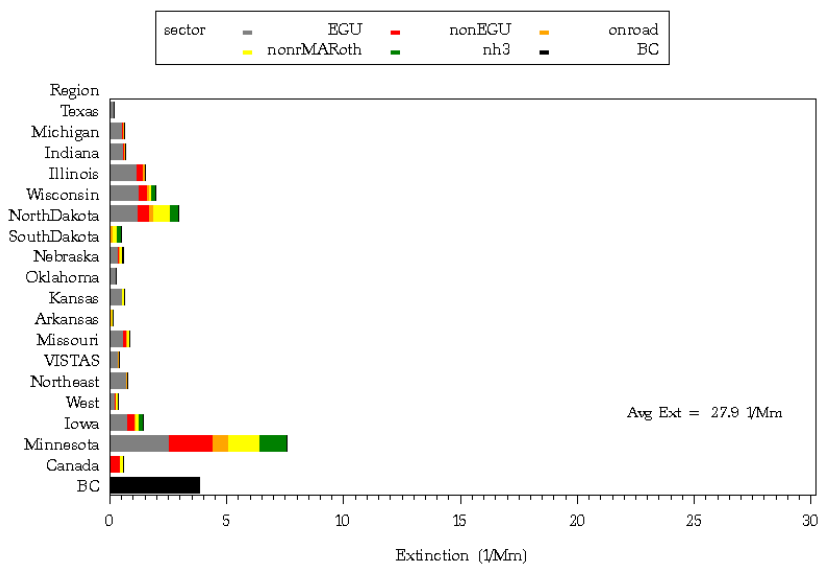


**Figure I-11a. Model-based source apportionment for 20% worst days – Voyageurs**

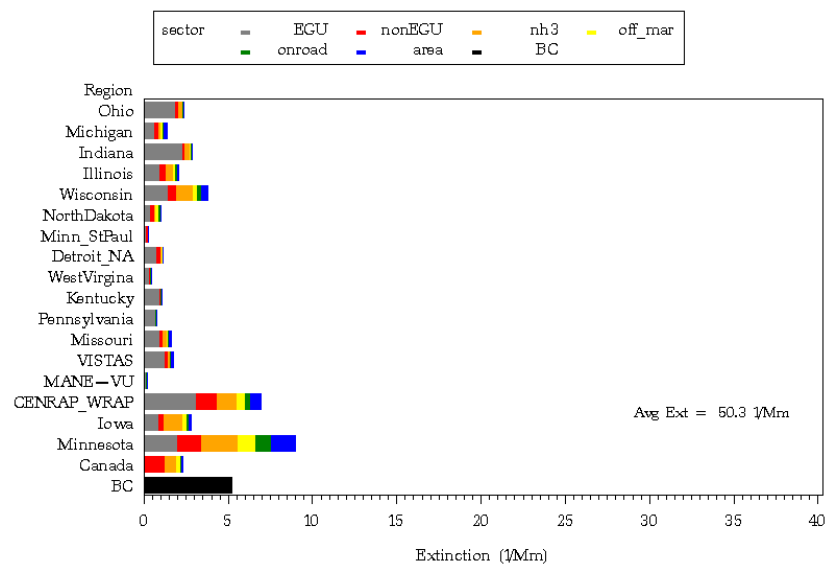
**Voyageurs, Minnesota**

2002 (MPCA)

2005 (LADCO Round 5)



2018 (CENRAP)



2018 (LADCO Round 5)

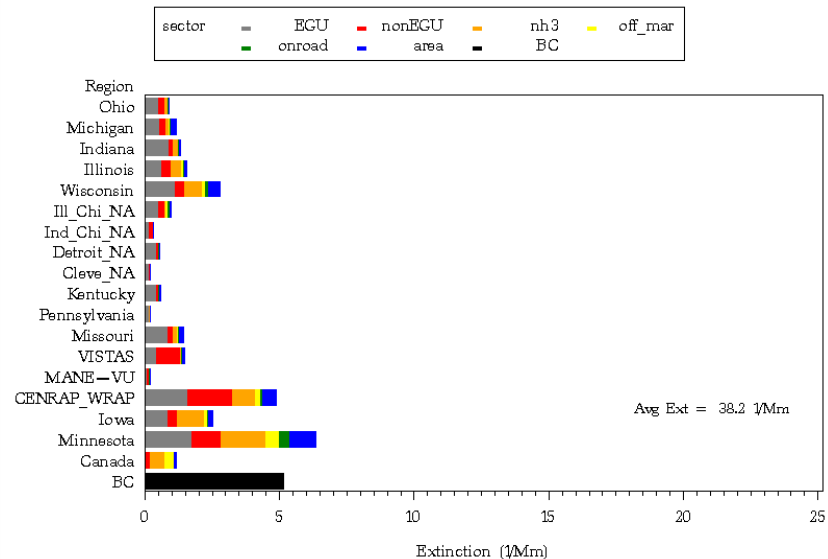
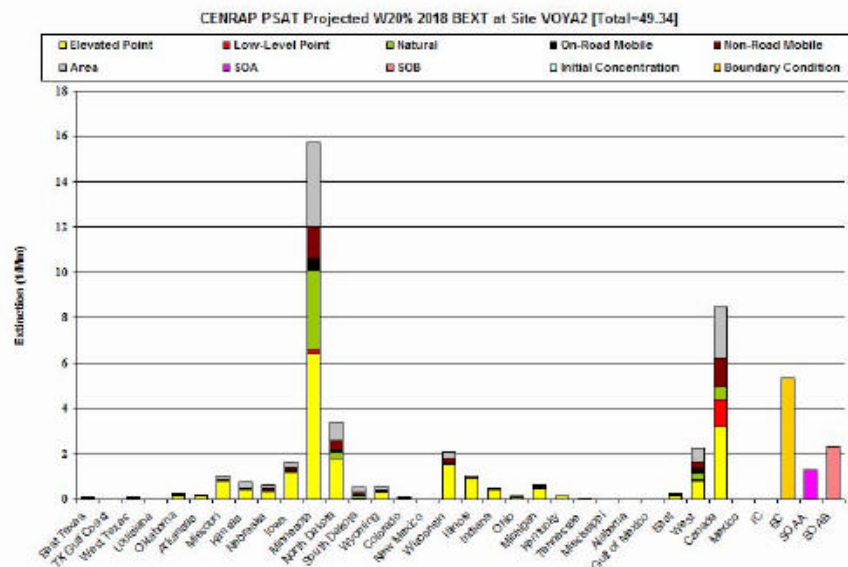
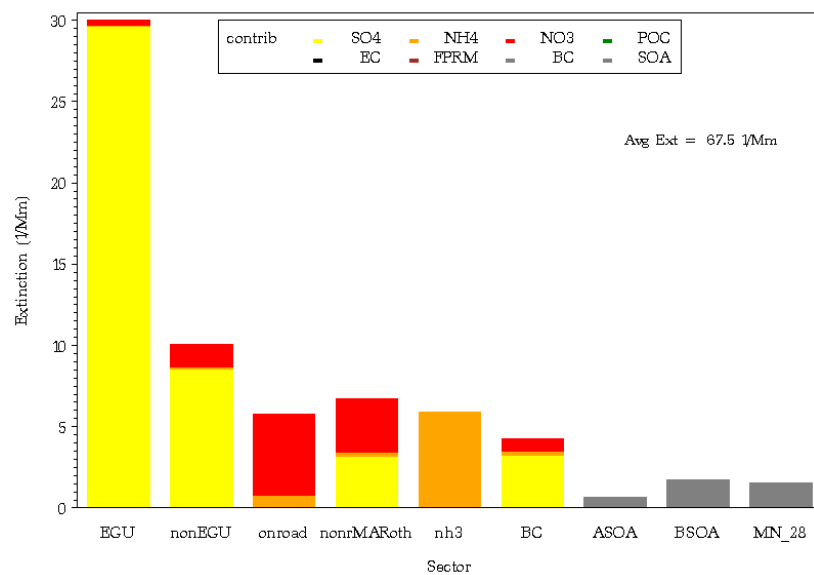


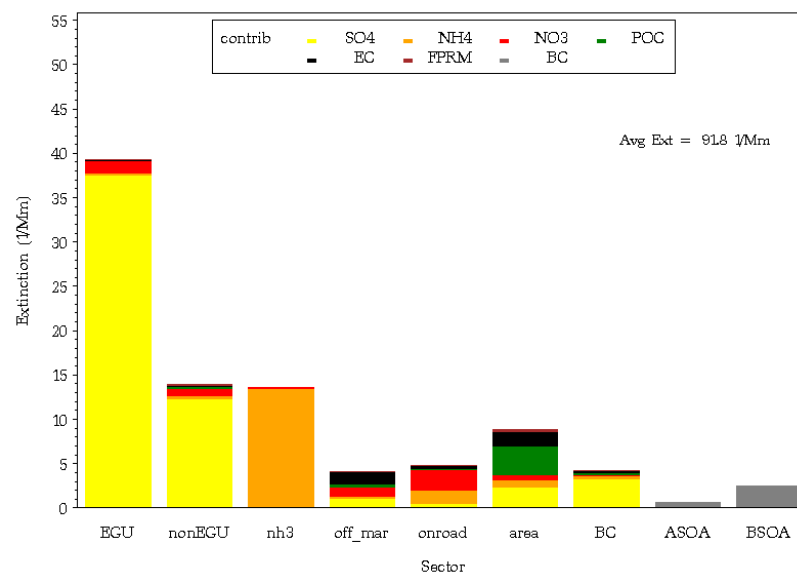
Figure I-11b. Model-based source apportionment for 20% worst days – Voyageurs

### Seney, Michigan

2002 (MPCA)



2005 (LADCO Round 5)



2018 (LADCO Round 5)

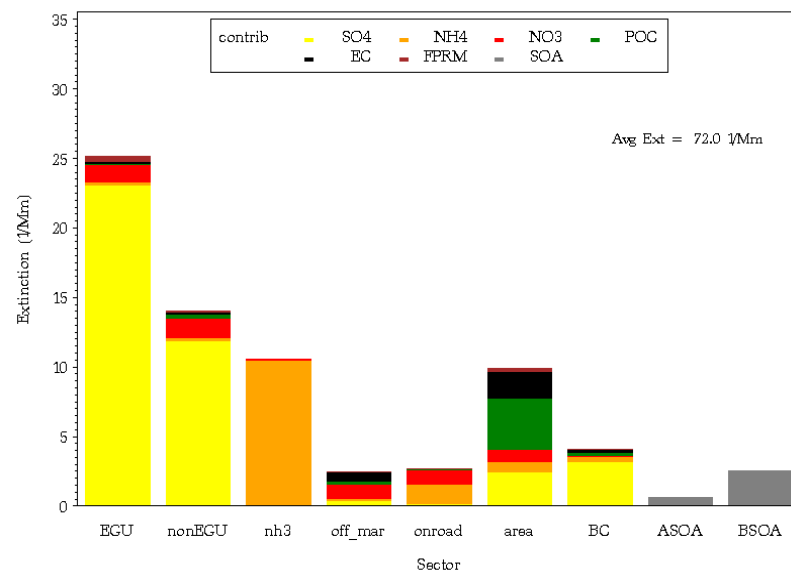
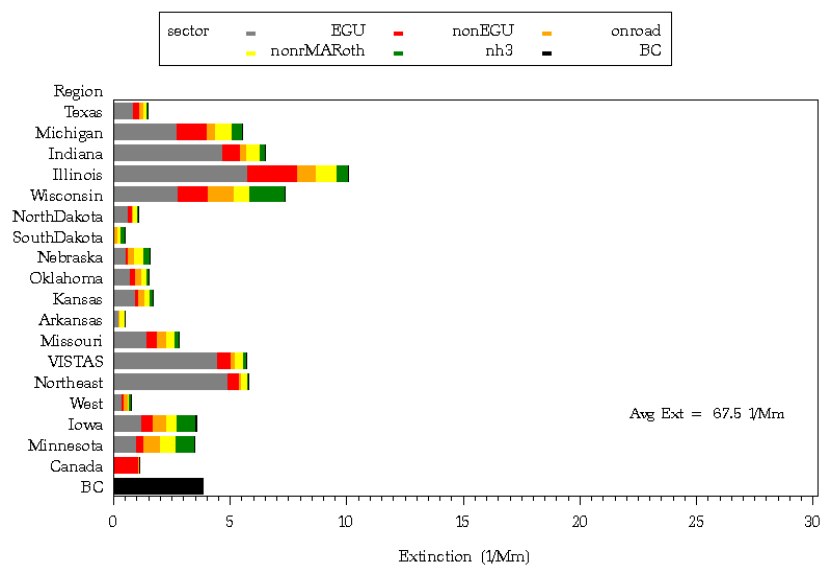


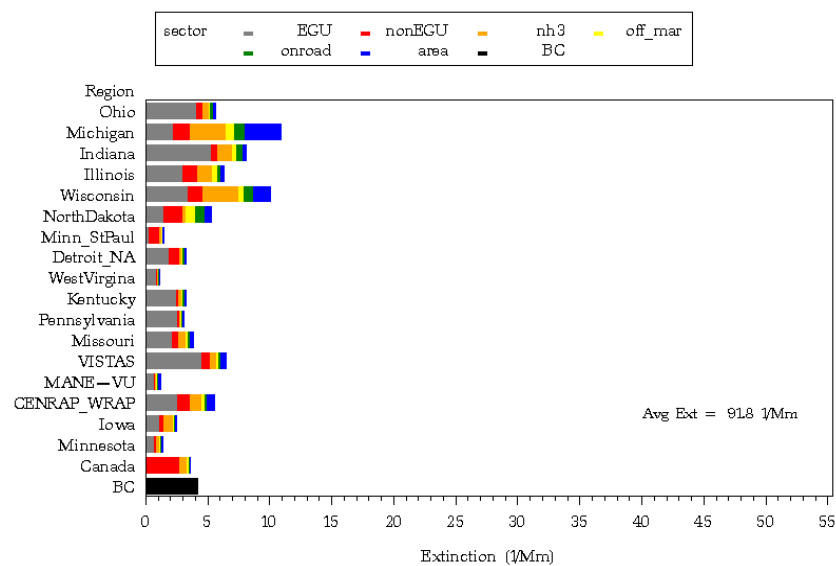
Figure I-12a. Model-based source apportionment for 20% worst days – Seney

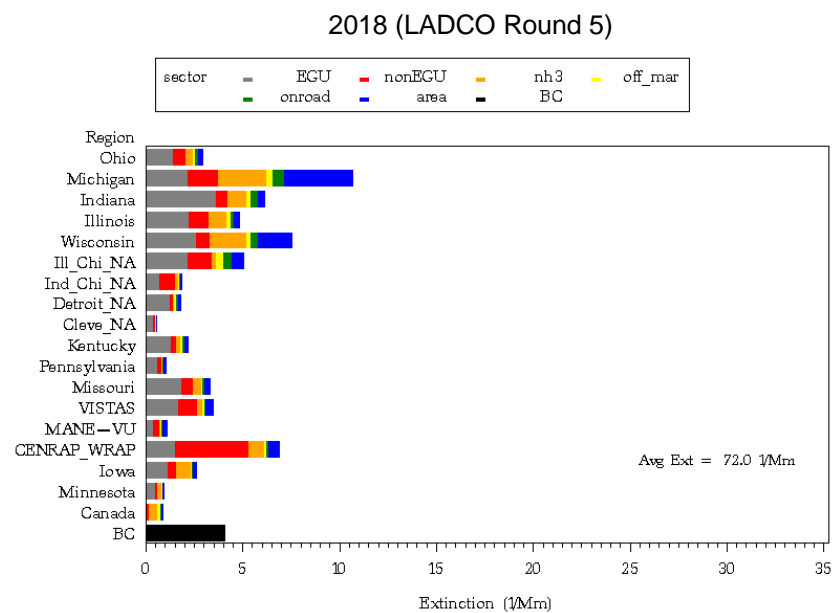
### Seney, Michigan

2002 (MPCA)



2005 (LADCO Round 5)

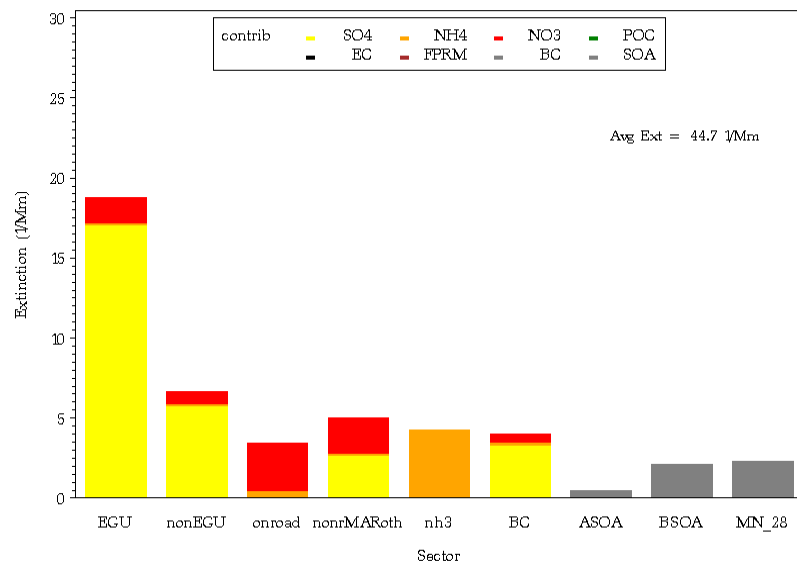




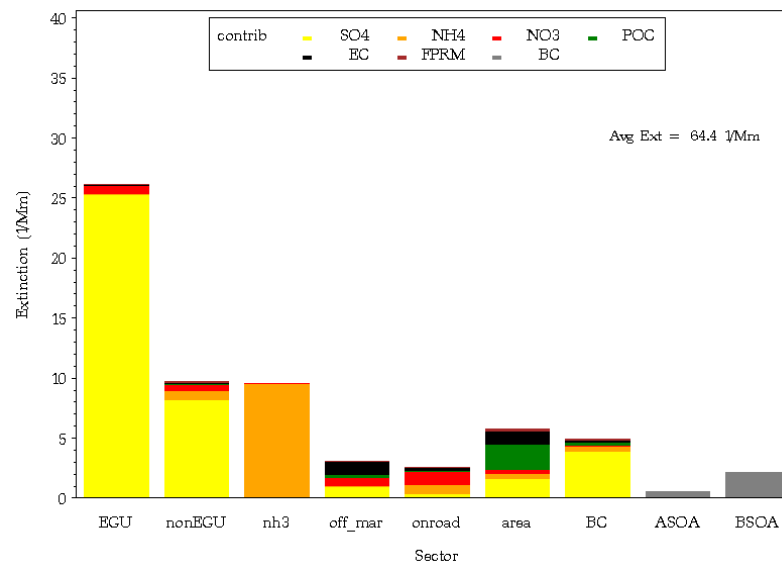
**Figure I-12b. Model-based source apportionment for 20% worst days – Seney**

# Isle Royale, Michigan

2002 (MPCA)



2005 (LADCO Round 5)



2018 (LADCO Round 5)

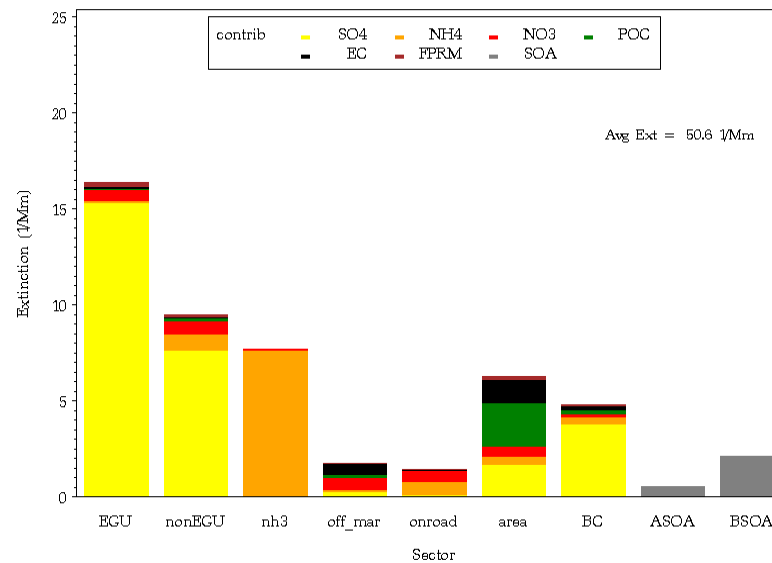
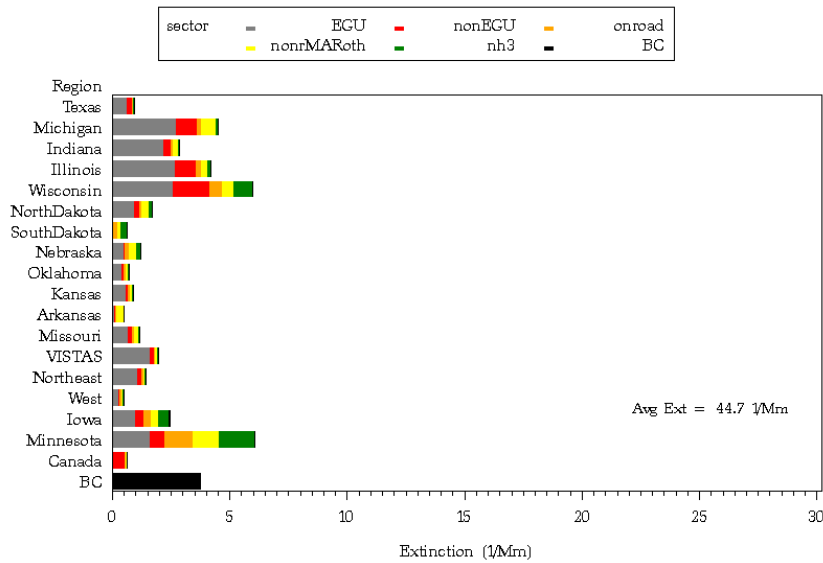


Figure I-13a. Model-based source apportionment for 20% worst days – Isle Royale

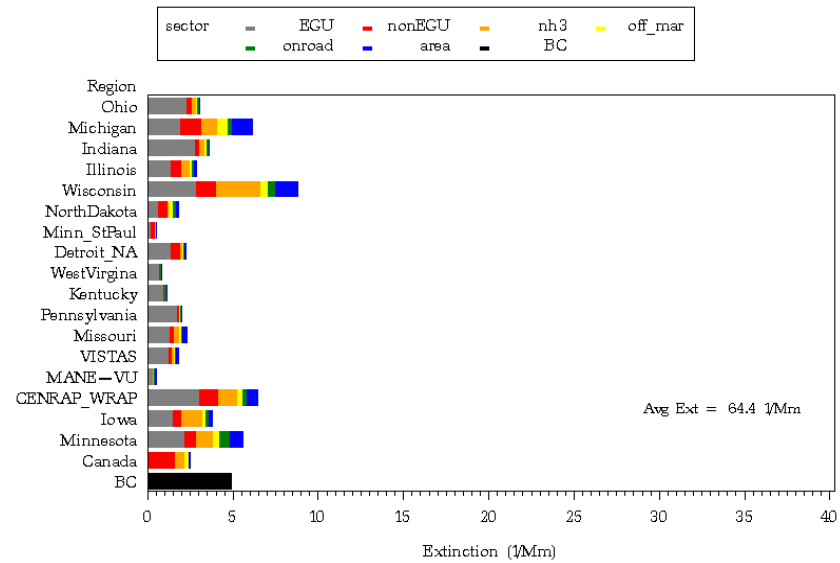


# Isle Royale, Michigan

2002 (MPCA)



2005 (LADCO Round 5)



2018 (LADCO Round 5)

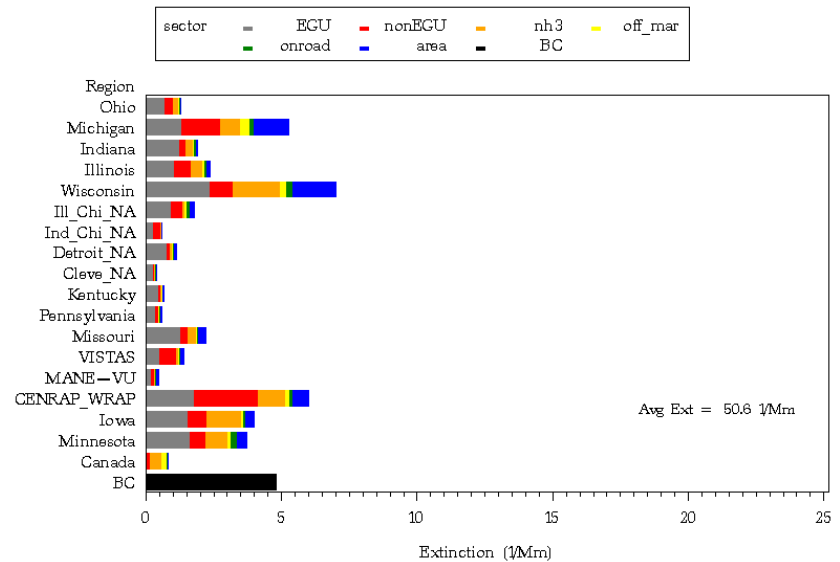


Figure I-13b. Model-based source apportionment for 20% worst days – Isle Royale

**Table II-2. State Culpabilities Based on PSAT Modeling and Trajectory Analyses**

	<b>Boundary Waters</b>						<b>Seney</b>			
	<b>LADCO - Round 4 PSAT</b>	<b>LADCO - Round 5 PSAT</b>	<b>MPCA- PSAT</b>	<b>CENRAP - PSAT</b>	<b>LADCO - Traj. Analysis</b>		<b>LADCO - Round 4 PSAT</b>	<b>LADCO - Round 5 PSAT</b>	<b>CENRAP - PSAT</b>	<b>LADCO - Traj. Analysis</b>
Michigan	3.4%	4.8%	3.0%	1.9%	0.7%		13.8%	18.1%		14.7%
Minnesota	30.5%	23.5%	28.0%	30.6%	37.6%		4.8%	1.6%		3.8%
Wisconsin	10.4%	10.9%	10.0%	6.4%	10.6%		12.6%	10.9%		8.4%
Illinois	5.2%	5.1%	6.0%	3.5%	2.7%		13.0%	14.3%		7.4%
Indiana	2.9%	3.9%	3.0%	1.8%	1.2%		9.6%	11.6%		2.2%
Iowa	7.6%	8.3%	8.0%	2.5%	7.4%		6.2%	3.8%		5.7%
Missouri	5.2%	3.4%	6.0%	2.1%	3.3%		6.5%	4.8%		3.2%
N. Dakota	5.7%	1.1%	6.0%	4.6%	5.9%		1.5%	0.1%		0.6%
Canada	1.9%	2.7%	3.0%	12.5%	15.1%		2.1%	1.2%		11.1%
CENRAP-WRAP	10.9%	13.5%		4.2%	10.1%		13.1%	10.0%		7.0%
	<b>83.6%</b>	<b>77.2%</b>	<b>73.0%</b>	<b>70.2%</b>	<b>94.6%</b>		<b>83.3%</b>	<b>76.4%</b>		<b>64.1%</b>
	<b>Voyageurs</b>						<b>Isle Royale</b>			
	<b>LADCO - Round 4 PSAT</b>	<b>LADCO - Round 5 PSAT</b>	<b>MPCA- PSAT</b>	<b>CENRAP - PSAT</b>	<b>LADCO - Traj. Analysis</b>		<b>LADCO - Round 4 PSAT</b>	<b>LADCO - Round 5 PSAT</b>	<b>CENRAP - PSAT</b>	<b>LADCO - Traj. Analysis</b>
Michigan	2.0%	4.9%	2.0%	1.0%	1.6%		12.7%	13.4%		
Minnesota	35.0%	20.2%	31.0%	31.5%	36.9%		14.1%	9.5%		
Wisconsin	6.3%	7.9%	6.0%	3.7%	9.7%		16.3%	14.7%		
Illinois	3.0%	7.1%	3.0%	1.8%	1.2%		7.0%	8.7%		
Indiana	1.6%	4.6%	2.0%	0.8%			5.6%	5.2%		
Iowa	7.4%	7.1%	7.0%	2.4%	10.2%		6.9%	8.3%		
Missouri	4.3%	4.0%	4.0%	1.6%	0.3%		3.9%	4.6%		
N. Dakota	10.3%	1.7%	13.0%	6.1%	7.1%		3.6%	0.3%		
Canada	2.7%	3.3%	5.0%	17.2%	13.3%		2.2%	1.7%		
CENRAP-WRAP	10.2%	13.7%		6.1%	16.5%		12.5%	12.6%		
	<b>82.7%</b>	<b>74.5%</b>	<b>73.0%</b>	<b>72.2%</b>	<b>96.8%</b>		<b>84.9%</b>	<b>79.0%</b>		

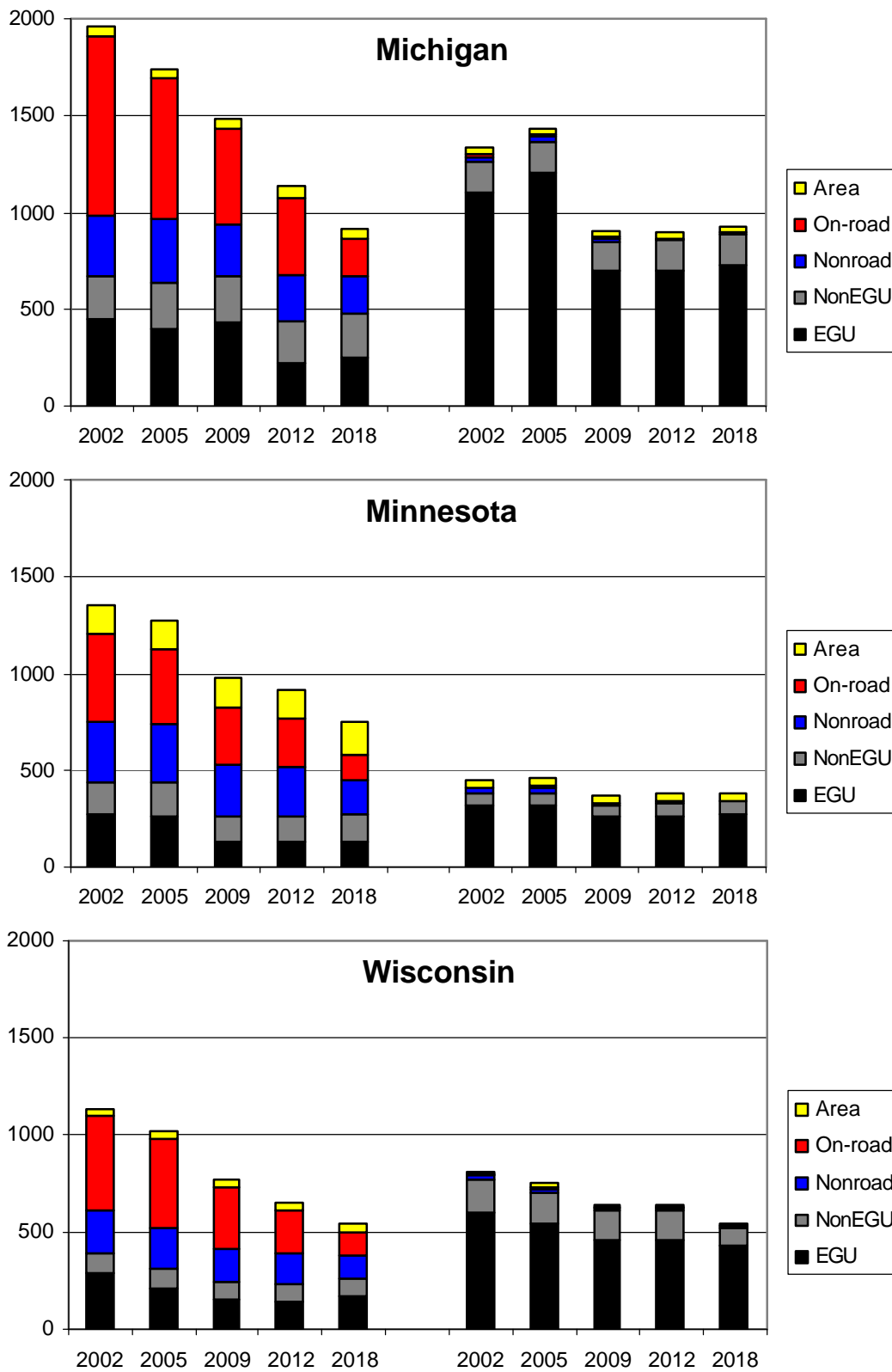
### **LADCO Emissions Inventory Comparison**

Emissions inventories were examined for the northern states which have the greatest impact on the northern Class I areas: Michigan, Wisconsin, and Minnesota. The sector-level emissions for the base years (2002, 2005) and future years of interest (2009, 2012, and 2018) are presented in Figure I-13 (LADCO, 2006, and LADCO, 2007).<sup>5</sup> The future year SO<sub>2</sub> emissions are dominated by EGUs, suggesting that an SO<sub>2</sub> emission reduction strategy, which is needed to reduce sulfate concentrations, should focus on control measures for EGUs. The future year NO<sub>x</sub> emissions come from a variety of sources, suggesting that a NO<sub>x</sub> emission reduction strategy, which is needed to reduce nitrate concentrations, may need to consider control measures for a variety of source sectors.

Table I-3 provides a summary of the EGU SO<sub>2</sub> and NO<sub>x</sub> emissions for the 2001-2003 period, as well as several 2018 projections (i.e., IPM2.1.9, which was used in the CENRAP modeling and LADCO's Base K/Round 4 modeling, and IPM3.0, which was used in LADCO's Base M/Round 5 modeling).

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<sup>5</sup> It is worth noting that the base year (2002) NO<sub>x</sub> and SO<sub>2</sub> emissions for the adjacent Canadian province (Ontario) are considerably less than the combined NO<sub>x</sub> and SO<sub>2</sub> emissions for the three northern states.



**Figure I-13. Emissions for Michigan (top), Minnesota (middle), and Wisconsin (bottom) for NOx (left side) and SO2 (right side)**

**Table I-3: EGU SO<sub>2</sub> and NO<sub>x</sub> Emissions**

	Heat Input (MMBTU/year)	Scenario	SO <sub>2</sub> (tons/year)	SO <sub>2</sub> (lb/MMBTU)	NO <sub>x</sub> (tons/year)	NO <sub>x</sub> (lb/MMBTU)
<b>IL</b>	<b>980,197,198</b>	<b>2001 - 2003 (average)</b>	<b>362,417</b>	<b>0.74</b>	<b>173,296</b>	<b>0.35</b>
		IPM 2.1.9	241,000		73,000	
	1,310,188,544	IPM3.0 (base)	277,337	0.423	70,378	0.107
		IPM3.0 - will do	140,296	0.214	62,990	0.096
		IPM3.0 - may do	140,296	0.214	62,990	0.096
<b>IN</b>	<b>1,266,957,401</b>	<b>2001 - 2003 (average)</b>	<b>793,067</b>	<b>1.25</b>	<b>285,848</b>	<b>0.45</b>
		IPM 2.1.9	377,000		95,000	
	1,509,616,931	IPM3.0 (base)	361,835	0.479	90,913	0.120
		IPM3.0 - will do	628,286	0.832	128,625	0.170
		IPM3.0 - may do	621,539	0.823	127,937	0.169
<b>IA</b>	<b>390,791,671</b>	<b>2001 - 2003 (average)</b>	<b>131,080</b>	<b>0.67</b>	<b>77,935</b>	<b>0.40</b>
		IPM 2.1.9	147,000		51,000	
	534,824,314	IPM3.0 (base)	115,938	0.434	59,994	0.224
		IPM3.0 - will do	115,938	0.434	59,994	0.224
		IPM3.0 - may do	100,762	0.377	58,748	0.220
<b>MI</b>	<b>756,148,700</b>	<b>2001 - 2003 (average)</b>	<b>346,959</b>	<b>0.92</b>	<b>132,995</b>	<b>0.35</b>
		IPM 2.1.9	399,000		100,000	
	1,009,140,047	IPM3.0 (base)	244,151	0.484	79,962	0.158
		IPM3.0 - will do	244,151	0.484	79,962	0.158
		IPM3.0 - may do	244,151	0.484	79,962	0.158
<b>MN</b>	<b>401,344,495</b>	<b>2001 - 2003 (average)</b>	<b>101,605</b>	<b>0.50</b>	<b>85,955</b>	<b>0.42</b>
		IPM 2.1.9	86,000		42,000	
	447,645,758	IPM3.0 (base)	61,739	0.276	41,550	0.186
		IPM3.0 - will do	54,315	0.243	49,488	0.221
		IPM3.0 - may do	51,290	0.229	39,085	0.175
<b>MO</b>	<b>759,902,542</b>	<b>2001 - 2003 (average)</b>	<b>241,375</b>	<b>0.63</b>	<b>143,116</b>	<b>0.37</b>
		IPM 2.1.9	281,000		78,000	
	893,454,905	IPM3.0 (base)	243,684	0.545	72,950	0.163
		IPM3.0 - will do	237,600	0.532	72,950	0.163
		IPM3.0 - may do	237,600	0.532	72,950	0.163
<b>ND</b>	<b>339,952,821</b>	<b>2001 - 2003 (average)</b>	<b>145,096</b>	<b>0.85</b>	<b>76,788</b>	<b>0.45</b>
		IPM 2.1.9	109,000		72,000	
	342,685,501	IPM3.0 (base)	41,149	0.240	44,164	0.258
		IPM3.0 - will do	56,175	0.328	58,850	0.343
		IPM3.0 - may do	56,175	0.328	58,850	0.343
<b>SD</b>	<b>39,768,357</b>	<b>2001 - 2003 (average)</b>	<b>12,545</b>	<b>0.63</b>	<b>15,852</b>	<b>0.80</b>
		IPM 2.1.9	12,000		15,000	
	44,856,223	IPM3.0 (base)	4,464	0.199	2,548	0.114
		IPM3.0 - will do	4,464	0.199	2,548	0.114
		IPM3.0 - may do	4,464	0.199	2,548	0.114
<b>WI</b>	<b>495,475,007</b>	<b>2001 - 2003 (average)</b>	<b>191,137</b>	<b>0.77</b>	<b>90,703</b>	<b>0.36</b>
		IPM 2.1.9	155,000		46,000	
	675,863,447	IPM3.0 (base)	127,930	0.379	56,526	0.167
		IPM3.0 - will do	150,340	0.445	55,019	0.163
		IPM3.0 - may do	62,439	0.185	46,154	0.137

### **Other Issues: Transboundary Impacts**

In a Technical Brief, EPRI proposed an alternative method for calculating future year visibility impacts in the northern Class I areas (EPRI, 2007). This method subtracts the transboundary impact from the 2018 future year visibility estimate and compares this adjusted future year value to the uniform rate of improvement value.

In a letter to EPRI dated July 20, 2007, LADCO cited two major concerns with EPRI's analysis (i.e., transboundary impact is flawed because it is based on VISTAS' modeling which relied on a bad version of the Canadian emissions inventory, and adjustment of only the 2018 visibility value is inconsistent). In addition, LADCO noted that technical analyses (e.g., LADCO's back trajectory analyses using 2000-2005 data) show that visibility impairment on the 20% worst visibility days is dominated by emissions from sources in the U.S., and are not greatly affected by transboundary impacts.

In a follow-up letter dated July 31, 2007, EPRI stated its belief that the emissions inventory problems may actually understate (not overstate) the Canadian contribution, and that its approach to only adjust 2018 values was a "reasonable way to examine the influence of transboundary pollution".

Putting aside the EPRI analysis and its criticisms, the fundamental issue is to what degree Canadian emissions are impacting visibility on the 20% worst visibility days in the northern Class areas<sup>6</sup>. There appear to be two principle pieces of information which address this issue:

- **Back Trajectory Analyses:** The contoured trajectories (Figures I-1 through I-4) show that, generally, bad air days are associated with transport from the south, and good air days with transport from Canada. As noted above, however, the detailed trajectories (Figure I-5 and I-6) show that a few of the worst-day trajectories originate in Canada. Nevertheless, many of these trajectories actually spend significant time in the U.S. and should not be thought of as strictly Canadian influences.
- **PSAT Analyses:** There are two fundamental differences between the MPCA/LADCO and CENRAP PSAT analyses: (1) extent of modeling domain (see Figure I-8), and (2) version of the Canadian emissions inventory. On the first point, the CENRAP domain is better, given that it includes much of the southern Canadian provinces, whereas the MPCA/LADCO domain only includes portions of some of these provinces (i.e., Saskatchewan and provinces to the east). On the second point, LADCO's Base M/Round 5 analysis is better, given that it reflects the most current version of the Canadian emissions inventory (including stack parameters). (Note, however, LADCO's modeling may overstate the 2018 Canadian contribution, because it assumed 2018 and 2005 emissions are the same.)

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<sup>6</sup> In a guidance memo, USEPA has stated that "States should not directly consider the effects of international emissions when calculating their uniform rates of progress by either adding the effects of international emissions to their estimates of natural conditions, or by subtracting international emissions from current conditions. Either of these approaches conflicts with the basic definitions of "current conditions" (baseline conditions for the first SIP) and "natural conditions," as described in the 1999 RHR. 64 Fed. Reg. 35728, (July 1, 1999)." (USEPA, 2006)

In conclusion, while the back trajectory analyses suggest the impact from Canadian sources in the northern Class I areas is small, there is sufficient uncertainty with the available modeling analyses that it is not possible to estimate, with any confidence, their impact. Further analyses may be warranted to quantify the Canadian contribution. In particular, an analysis should be conducted using the most current version of the Canadian emissions inventory (with up-to-date stack parameters) and an expanded CENRAP-like modeling domain.

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## **Appendix 3C**

### **MANE-VU Consultation Notes**

**MANE-VU Class I States' Consultation  
Open Technical Call Summary  
July 19, 2007**

**Introduction & Purpose of Call (A. Garcia, MANE-VU)**

Anna Garcia opened the call at 10 am (EDT) with a welcome and roll call by all 3 RPOs (see attached list of participants). She then reviewed the purpose of today's call, including:

After asking for general questions about the agenda and call purpose, the MANE- VU representatives began the substance of the call with an overview of the technical work to be discussed as organized in the MANE-VU briefing books provided for the call.

**MANE-VU Contribution Assessment (G. Kleiman, NESCAUM)**

Gary Kleiman provided a brief summary of the contribution assessment work that MANE-VU conducted to help them determine which states the Class I states would request be involved in consultation (see Tabs 4 & 5 of briefing book).

**Discussion:**

- M. Koerber (MRPO): Requested documentation of 2018 projections – MANE-VU work seems consistent with MRPO analyses. Also, it looks as if the Northeast states will be below the glide path for uniform progress by 2018.
- G. Kleiman (NESCAUM): There seems to be pretty good consistency across all the RPOs in terms of their modeling work. Also, VISTAS new emission inventory with GA reductions is not in the MANE-VU modeling. It also includes MANE-VU's 500 ppm low sulfur fuel strategy, but not the 15 ppm level.
- R. Papalski (NJ): So the modeling does take into account 500 ppm sulfur fuel oil?
- G. Kleiman (NESCAUM): Yes, and that is significant (not including VT or DE).
- M. Koerber (MRPO): I notice that in 2018 organic carbon is more significant, and may be as significant as sulfate. This issue is very complex, especially in urban areas. Where is MANE-VU's organic carbon coming from? MRPO will be interested in what our control measures analysis says for organic carbon.
- G. Kleiman (NESCAUM): There is some uncertainty with regard to what the modeling is indicating about organic carbon in 2018 – that is why MANE-VU is focusing on sulfate now.
- P. Wishinski (VT): Sulfate dominates extinction. Organic carbon does not contribute as much to extinction as sulfate in the MANE-VU region.
- P. Brewer (VISTAS): After discussion with Gary at MARAMA Science Meeting, our approach was more understandable.
- B. Lopez (WI): This work was based on IPM 2.1.9 – what is expected if put in context of EPA's IPM 3.0 runs?

- S. Wierman (MARAMA): IPM 3.0 results were not available at the time this analysis was done, so we used 2.1.9 with updated gas curves.
- L. Nixon (NH): On state by state basis sulfur levels from EPA 3.0 model runs. Liz, took a quick look at 3.0 and same SO<sub>4</sub> increases that look problematical.

### **MANE-VU Reasonable Progress Project Summary (S. Wierman, MARAMA)**

Susan Wierman provided a brief summary of the reasonable progress work that MANE-VU conducted to help them develop long-term strategies and control measures for the 2018 state implementation plans (see Tab 7 – A, B and C - of briefing book).

#### Discussion:

- J. Hornback (SESARM): Are costs in 1999 dollars? If so, how do they compare in current dollars?
- S. Wierman (MARAMA): Yes, these are reflected in 1999 dollars. If converted to 2006 dollars the cost figures would be higher – multiply 1999 by 1.186 to go from 1999 \$ to 2006 \$.
- D. MacLeod (VA): Regarding the MANE-VU statement, how would disagreements between a Class I State and a non MANE-VU state be handled in the SIP?
- A. Garcia (MANE-VU): The statements that MANE-VU issued are the request for the kinds of measures that our Class I states believe are needed based on the technical work we have done. In the consultations these requests are a starting point for discussion, and provide a basis for looking at the work the other RPOs have done in comparison to our work to determine what may be needed and is reasonable. According to the rule, the consultations are not expected to result in agreement on everything, but the areas of agreement and disagreement that occur via consultation are to be documented in the SIP.
- J. Johnson (GA): Regarding EGUs, is there a relationship between what is on pages 68-78 and CAIR+? And does MANE-VU have any idea of what level of reductions would result from CAIR+?
- S. Wierman (MARAMA): We have not done an analysis of CAIR+ and its impact on visibility. Impact on visibility is not one of the 4 factors and so is not applicable.
- M. Koerber (MRPO): Isn't there a 5<sup>th</sup> factor in guidance - \$/deciview ?
- S. Wierman (MARAMA) – EPA expects that we will look at visibility improvement, but still not a factor regarding reasonableness. MANE-VU is planning on looking at visibility improvement of the control measure we initially looked at as reasonable.
- S. Holman (NC): Modeling on visibility – are you doing CMAQ modeling for 2018? Or CALPUFF?
- G. Kleiman (NESCAUM): We are doing a CMAQ sensitivity run –not a full annual run, but for select periods, with tagging mechanism for different control measures.
- S. Holman (NC): In NC, 11 of 12 EGUs will have scrubbers - need to reflect units that have scrubbers on in VISTAS base G.

### **MANE-VU Long-Term Strategy/Statements**

As discussions proceeded after the reasonable progress overview, participants began to ask questions about the MANE-VU resolution and statements (see Tab 3 of briefing book). These documents outline how MANE-VU is approaching the consultation process and a request that states pursue strategies in various sectors that MANE-VU believes are needed for its Class I areas, as a starting point for consultation discussions.

Discussion:

- F. Durham (WV): Regarding the low sulfur fuel strategy, will regulatory impact analyses for this measure be done on state or regional basis?
- G. Kleiman (NESCAUM), S. Wierman (MARAMA) & Ray Papalski (NJ): That will be done on state basis, but with coordination across the MANE-VU states. NJ will be doing an analysis, but there is also a federal role in terms of any national rulemakings that may happen on low sulfur fuel.
- J. Johnston (GA): What is the basis for saying that the low sulfur fuel strategy is reasonable for States outside MANE-VU?
- G. Kleiman (NESCAUM), S. Wierman (MARAMA), A. Garcia (MANE-VU): Actually the Class I states are looking for equivalent reductions to what they are doing in the low sulfur fuel strategy – not necessarily expecting that MRPO and VISTAS states will pursue a low sulfur fuel strategy. We are asking you to look at what is reasonable in terms of making equivalent reductions, which is the point of having the consultations. We know the MRPO and VISTAS states are looking at reasonable measures for your own Class I areas. During the consultation we anticipate comparing what you are looking at as reasonable with what we are requesting as a starting point for what is “potentially” reasonable.
- J. Johnston (GA): Is there flexibility to get more reductions from EGUs and fewer reductions from non-EGUs? What if, for example, we get more sulfate reductions from EGU sources equivalent to the amount of non-EGU MANE-VU reductions?
- P. Wishinski (VT), A. Garcia (MANE-VU): VT would support that kind of alternative. MANE-VU does envision that flexibility in our consultation discussions.
- M. Koerber (MRPO): An issue they have been looking at is actually setting a reasonable progress goal - what is MANE-VU’s process for that?
- G. Kleiman (NESCAUM), A. Garcia (MANE-VU): A decision number will come out of our CMAQ sensitivity runs, and agreed-to reductions after consultations, with full CMAQ run. There may still be some overlap between what may and may not be agreed to and what the Class I states want to include as reasonable in CMAQ final run.
- M. Koerber (MRPO): There are very different EGU predictions between IPM 2.1.9, IPM 3.0, and what his states say will actually happen. Will it be possible to have further discussions after August 6<sup>th</sup> and August 20<sup>th</sup> consultations to refine and sync up EGU reductions and possible modeling run inputs?
- G. Kleiman (NESCAUM), A. Garcia (MANE-VU): It would be helpful for MRPO and VISTAS to share with us their information on their EGU inventory, so we can make sure our modeling for reasonable progress reflects their work and so that our states can understand what they will be doing. The in-person meetings are not the end of the consultation process. Our states are interested in having a continued dialogue, beyond the August in-person meetings.

- M. Koerber (MRPO): On page 61, is WI in or out? (in VT letter due to its CALPUFF runs)
- P. Wishinski (VT): VT CALPUFF modeling indicated that WI contributed >2% of emissions, so VT wants to include WI in consultation process, even though there are no WI EGUs on 167 list
- L. Bruss (WI): Please give him or Kevin Kessler a call (608) 266-0603
- D. Valentinetti (VT): We agree with Mike that this is an ongoing process for best science
- D. Andrews (KY): The two EGU modeling runs in the table of 167 stacks do not show much correlation – why?
- S. Wierman (MARAMA): Because the modeling for each of the different runs is based on different days, there were different meteorological inputs to each model and variability in wind fields (shows importance of meteorology).

#### **MWRPO Overview (M. Koerber, LADCO)**

- The MRPO states have moved ahead with some of their own state rules (consumer products, AIM, etc.). They also have PM SIPS to do.
- We updated our modeling to use 2005 as base year and made changes to IPM 3.0 based on what we know will actually happen – will be quite a bit different from 2.1.9 (not ready by Aug. 6<sup>th</sup>)
- Would hope modeling would form basis for a collaborative on future control strategies
- MRPO internal consultation process for the Northern Class I states has been ongoing for once a year – completed a great deal of technical work.
- Their reasonable progress project by EC/R is finished- provides a new metric - \$/deciview. Looked at “5<sup>th</sup> Factor” for on-the-books controls as context for candidate measures. Examined similar strategies as those that MACTEC did for MARAMA analysis. Now completing report on “5<sup>th</sup> Factor” - will send out later.
- Requirement to address regional haze Class I areas in state and outside state. Have done more work on who is contributing. Will provide MRPO states with a list of who they impact.

#### Discussion:

- A. Garcia (MANE-VU): Will MRPO states be looking for any national measures?
- M. Koerber (MRPO): Our Class I areas are still above the glidepath, so may need some regional/national reductions. We are looking at that – may have something as develop, but will not have it by Aug. 6<sup>th</sup>. Note that MANE-VU sites are at uniform progress with control measures but MRPO states are above uniform line.
- D. Littell (ME): How much of the contribution at their Class I sites is coming from Canada?
- M. Koerber (MRPO): On the 20% worst days, the contributions are mainly from the south.
- A. Garcia (MANE-VU): Would it be possible to include Canada (primarily Ontario) at the August 6<sup>th</sup> consultation? They have expressed an interest, and our northern Class I states would like to invite them to hear our discussions.
- M. Koerber (MRPO): That would be ok.

### **VISTAS Overview (Pat Brewer, VISTAS)**

- In VISTAS we the focus is on sulfate as well.
- Started with IPM 2.1.9 – in Base G, took account of results supplied by utilities – created hybrid between 2.1.9 and ground – truthing in summer 2006 (somewhere between versions 2.1.9 and 3.0) – pretty close to MV CAIR+ results. Base G2 has some changes in GA & FL
- See improvements at Southwest and Appalachian sites – mountain sites below the uniform progress line; less improvement at coastal sites – very close to uniform progress. Smaller reductions in units affecting relative reductions over whole year. GA and FL are working closely together on those sites.
- Distributed reasonable progress approach to stakeholders - looked at areas of influence.
- Reasonable progress analysis based on area of influence approach shows sulfate from EGUs and other sources dominated – most responses from sulfate reductions. When looking at areas of influence, we looked at their sulfate sources
- In modeling we included Brigatime and other sites
- Look at cost of controls, what are sulfate emissions after implementing the on-the-way controls. After 2018, EGUs still contribute 40% of emissions. Coal burning ICI boilers are the next largest at 20-30% of emissions, also a small percent from glass, pulp and paper, etc. Know by SEC code what kind of sources and costs of typical measures (AirControl.net). Will be using MARAMA 4- Factor analysis to inform their process.
- Delivered lists of sources in areas of influence in November. VISTAS states consultation occurred in December 2006 - agreed on approach to take on 4- Factor analysis. Got back together in May and repeated our process. Some states sent letters asking them to look at certain kinds of sources -- “tell us what you decide when you do your analysis of these sources on your Class I areas.” Provided schedules on next steps of SIP process.
- VISTAS has interstate consultations going on in southern states - May 2007 consultation, too, plus June FLM/EPA meeting, intrastate consultations . Now consultation has started with MANE-VU
- FLM/EPA feedback is commitment to good mid-course review in 2012 to see where EGU reductions are actually occurring .

### Discussion:

- S. Wierman (MARAMA): Please elaborate on your comment that IPM run with Base G are “close to” MANE-VU CAIR+ run?
- P. Brewer (VISTAS): There are similarities with MACTEC top 30 for VISTAS EGUs
- A. Garcia (MANE-VU): We/ MANE-VU received similar look-back comments from our FLMs
- J. Hornback (SESARM): Everyone should look at emissions reductions that are already in place. Substantial reductions have occurred already, not just what’s going to occur in 2018. Benefits from additional controls for upcoming NAAQS will help regional haze, too – substantial reductions in the southeast.
- T. Allen (FWS): CAIR uncertainly can be addressed by communicating with EGUs and can include in SIP instead of waiting for look-back
- G. Kleiman (NESCAUM): IPM projections a moving target, but info on controls on 167 stacks important to bring to consultation – we may not be very far apart. Any information

that the RPOs and states can provide about controls on 167 Stacks would be very valuable. We also recognize that states are looking at their own measures. Any info on control measure decisions that you have made for your own sources may show we are closer - by August 6<sup>th</sup> and August 20<sup>th</sup> meeting.

- R. Papalski (NJ) Is the material from the VISTAS June meeting available?
- P. Brewer (VISTAS): Yes, all presentations from the June meeting are posted on VISTAS' website.
- J. Hornback (SESARM): More on 28% reduction – ICI sulfur goes up from 10% to 24% nationwide and could be possible national rule John H – 16% of sulfur from ICI boilers in 2002 up to 24% after CAIR. As we move into next round of fine particle work – ask whether we have enough info re ICI boilers. Impact, concern and what control options/cost are – talk to EPA? Uncontrolled/inadequately controlled sources
- A. Garcia (MANE-VU): Our states have done some work on ICI boilers and have some information developed already. We would be glad to work with MRPO and VISTAS on this issue.
- S. Wierman (MARAMA): It may be possible to include something on ICI boilers as a potential amendment to MANE-VU National ask statement. Might be possible for it to come out of consultations.
- J. Hornback (SESARM): We should continue to collect data and be ready to move forward.
- S. Wierman (MARAMA): We would appreciate feedback at the consultation on joining MANE-VU on its request for a Phase 3 CAIR

#### **Comments from FLMs**

- Pay attention to mid course review – look at where you will be in 2012 compared to where you expected to be.
- Regarding the 2012 look back – discussions of source can be helpful and included in this SIP, with recognition of uncertainty.

#### **EPA**

- John Summerhays (EPA Region 5) and Michelle Notariani (EPA/OAQPS), expressed their appreciation for being invited to participate on the call and on future consultations.

#### **Outcomes & Next Steps**

- R. Papalski (NJ): Asked that all RPOs bring a list of the 167 EGUs and any planned controls on those units to the August meeting.
- P. Wishinski (VT): To confirm, VT will be asking WI to participate in the August 6<sup>th</sup> meeting – will be calling WI to ask them to attend.
- A. Garcia (MANE-VU): Gave a brief overview of the upcoming consultation meetings on August 6<sup>th</sup> and 20<sup>th</sup> – asked for any further comments/changes to the agendas to be sent to her next week.
- T.Aburn (MD): Opportunity to work with EPA on CAIR “Phase 3” for 2018/2020 would be a great outcome of consultations – Ann, Strengthen numbers – Tad, can we talk about PM? Mike, very relevant and need to look ahead

**Adjournment**

Anna Garcia thanked everyone for their participation and promised to circulate a draft summary of the call for comment – asked that each RPO share their attendance lists for the open call all around via email. Information on this and other MANE-VU consultations will be posted on the consultation page of the MANE-VU website, [www.manevu.org](http://www.manevu.org).



## Attendees

### MANE-VU

Affiliation	Name
Connecticut	Wendy Jacobs
Delaware	Jack Sipple
Maine	David Littell
Maine	Jeff Crawford
Maine	Tom Downs
Maryland	Tad Aburn
Maryland	Andy Hildebride
Massachusetts	Eileen Hiney
New Hampshire	Bob Scott
New Hampshire	Jeff Underhill
New Jersey	Chris Salmi
New Jersey	Ray Papalski
New Jersey	Sandy Krietzman
New York	Matt Reis
New York	Diana Rivenburgh
Penobscot Tribe	Bill Thompson
Vermont	Dick Valentinetti
Vermont	Paul Wishinski
MARAMA	Julie McDill
MARAMA	Susan Wierman
NESCAUM	Gary Kleiman
OTC	Doug Austin
OTC	Anna Garcia
EPA Region 1	Anne Arnold
EPA Region 1	Anne McWilliams
EPA Region 2	Bob Kelly
EPA Region 3	Ellen Wentworth
EPA Region 3	LaKeshia Robertson
FLM-NPS	Bruce Polkowsky
FLM-NPS	Holly Salazer
FLM-FWS	Tim Allen
FLM-FS	Ann Mebane

## VISTAS

Georgia	Heather Abrams
Georgia	Jimmy Johnston
Kentucky	John Lyons
Kentucky	Diana Andrews
Kentucky	Lona Brewer
Kentucky	Martin Luther
North Carolina	Keith Overcash
North Carolina	Sheila Holman
North Carolina	Laura Booth
North Carolina	George Bridgers
South Carolina	Renee Shealy
South Carolina	John Glass
South Carolina	Maeve Mason
South Carolina	Stacey Gardner
Tennessee	Barry Stephens
Tennessee	Quincy Styke
Tennessee	Julie Aslinger
Virginia	Tom Ballou
Virginia	Doris MacLeod
Virginia	Mike Kiss
West Virginia	Fred Durham
West Virginia	Bob Betterton
West Virginia	Laura Crowder
EPA Region 4	Brenda Johnson
EPA OAQPS	Michele Notarianni
Metro 4/SESARM	John Hornback
VISTAS	Pat Brewer

**MANE-VU/MRPO Consultation Meeting**  
**August 6, 2007**  
**Rosemont, IL**

On Monday, August 6, 2007, the Mid-Atlantic/Northeast Visibility Union (MANE-VU) Class I states (Maine, Vermont, New Hampshire, and New Jersey) held a consultation with several of the Midwest Regional Planning Organization (MRPO) states (Illinois, Indiana, Ohio, Michigan and Wisconsin). The following summary documents the discussions that took place during the consultation.

**Summary of Today's Consultation Agreements**

1. Define next steps for multi-pollutant approach to reduce regional haze, PM 2.5, and ozone
2. Discuss crafting a revised national ask among interested MANE-VU and MRPO states regarding needs for national action on EGUs, including potential multi-pollutant control levels for CAIR Phase III with emission rates and output-based options;
3. Pursue discussions on options for reducing SO<sub>2</sub> (and NO<sub>x</sub>) emissions from ICI boilers, including:
  - Reconvening the MANE-VU/MRPO ICI boiler workgroup to re-examine the workgroup's January 2007 straw proposal;
  - Developing a process for sharing information on SO<sub>2</sub> RACT for ICI boilers, and examining potential SO<sub>2</sub> control measures;
  - Contacting NACAA regarding expansion of the Boiler MACT model rule work to address SO<sub>2</sub> and NO<sub>x</sub>; and
  - Discuss crafting a national ask among interested MANE-VU and MRPO states regarding national action on ICI boilers.
4. Discuss crafting a national ask regarding low sulfur fuel for all off-road sources, and share information on biodiesel.
5. Continue to share modeling assumptions and analyses, and continue dialogue between MANE-VU and MRPO states regarding SIP submittals.
6. Define next steps to gather information on controls for locomotives and ocean-going vessels.
7. Develop list of controls for units that will be scrubbed, not just MANE-VU's list of 167 stacks.

## Attendees

### States and Tribes

### FLMs and EPA

<b><u>Maine</u></b> – Dave Littell, Jeff Crawford	<b><u>National Park Service</u></b> – Bruce Polkowsky
<b><u>New Hampshire</u></b> – Tom Burack, Bob Scott	<b><u>Forest Service</u></b> – Anne Mebane, Chuck Sams, Rich Fisher
<b><u>New Jersey</u></b> – Chris Salmi	<b><u>Fish and Wildlife Service</u></b> – Tim Allen
<b><u>Vermont</u></b> –Justin Johnson, Dick Valentinetti, Paul Wishinski	<b><u>EPA Region I</u></b> – Anne Arnold
<b><u>Illinois</u></b> – Laurel Kroack, Scott Leopold	<b><u>EPA Region II</u></b> – Bob Kelly
<b><u>Indiana</u></b> – Tom Easterly, Ken Ritter	<b><u>EPA Region III</u></b> (by phone) – Ellen Wentworth, Neil Bigioni
<b><u>Ohio</u></b> – Bob Hodanbosi	<b><u>EPA Region V</u></b> – John Summerhays
<b><u>Michigan</u></b> – Vince Hellwig, Cindy Hodges, Bob Irvine	<b><u>EPA – OAQPS</u></b> (by phone) – Todd Hawes, Michelle Notarianni
<b><u>Wisconsin</u></b> – Larry Bruss	
<b><u>MRPO</u></b> – Mike Koerber	
<b><u>MANE-VU</u></b> – Anna Garcia, Doug Austin	
<b><u>MARAMA</u></b> – Susan Wierman, Julie McDill	
<b><u>NESCAUM</u></b> – Gary Kleiman	

## Consultation Meeting Presentations and Discussions

### Welcome and Introductions – Goals for Today’s Meeting - David Littell, Maine DEP

- Presented goals for today’s consultation:
  - Review requirements, resources and critical timing issues to ensure all share a common understanding;
  - Discuss options for control measures to identify what is reasonable for joint work between regions;
  - Identify impediments to implementing control measures and discuss how to address them;
  - Identify links between haze and PM that help define what is reasonable;
  - Examine reasonable progress for MRPO and MANE-VU Class I areas in terms of control measure options; and
  - Summarize points of agreement and identify issues for follow-up consultation
- Compare our request for what we need in terms of reductions to improve visibility at our Class I areas with what the MRPO states have done to address their own Class I areas and regional haze/PM issues
- Find out how close we are, what gaps may still remain, and discuss how we may address them together.

**Overview of Open Technical Call & Consultation Briefing Book** – Anna Garcia, MANE-VU

- Open Technical Call discussions provided a good technical basis for today's meeting.
- MANE-VU staff is developing draft documentation of the Open Call and of today's discussions, and will circulate the drafts for comment and make the final documentation available to all states for use in their state implementation plans (SIPs).

**Summary of Reasonable Progress Work and Development of "Asks" for MANE-VU Class I Areas** – Chris Salmi, New Jersey DEP

Presentation:

- Provided a review of MANE-VU Class I states' Resolution on Principles;
- Showed focus for MANE-VU is on sulfate reductions for the 2018 milestone;
- Gave an overview of MANE-VU's four factor analysis;
- Outlined how MANE-VU Class I states developed the "asks" for the MANE-VU and MPRO regions;
- Provided a comparative analysis of the MANE-VU region "ask" with that of the MRPO "ask";
- Outlined the specifics of each of the asks, including for MRPO:
  - Timely implementation of BART requirements;
  - A focused strategy for the electricity generating units (EGUs) comprising a 90% reduction of sulfate emissions from 2002 levels from 167 stacks that modeling indicates affect visibility impairment in MANE-VU Class I areas;
  - A 28% reduction from non-EGU sector emissions based on 2002 levels; and
  - Continued evaluation of other measures, including measures to reduce SO<sub>2</sub> and nitrogen oxide (NO<sub>x</sub>) emissions from coal-burning facilities by 2018.
- Within MANE-VU, the Class I states have the following commitment:
  - Timely implementation of BART requirements;
  - A focused strategy for the electricity generating units (EGUs) comprising a 90% reduction of sulfate emissions from 2002 levels from 167 stacks that modeling indicates affect visibility impairment in MANE-VU Class I areas;
  - A low sulfur fuel oil strategy with different implementation timeframes for inner zone states versus outer zone states, that results in a 38% reduction from non-EGU sector emissions in the MANE-VU region; and
  - Continued evaluation of other measures, including measures including energy efficiency, alternative clean fuels and other measures to reduce SO<sub>2</sub> and nitrogen oxide (NO<sub>x</sub>) emissions by 2018.
- Also outlined the national "ask" MANE-VU plans to make of the US EPA, for a Phase 3 of CAIR that reduces SO<sub>2</sub> by at least an additional 18%.
- From presentation, next steps are:
  - Consult within and outside MANE-VU about which control strategies are reasonable;
  - Open a dialogue with the USEPA concerning a possible Phase 3 of CAIR;
  - Define strategies to include in the final modeling;
  - Determine goals based on the final modeling;
  - SIPs are due 12/17/07;
  - Adopt enforceable emissions limits & compliance schedules; and

- Progress evaluation due in 5 years.

Discussion:

- *Question (Tom Easterly, Indiana):* Are there emission rate targets instead of a flat 90% reduction?
  - *Answer (Chris Salmi, New Jersey):* No, and no net reductions.
- *Question (Tom Easterly, Indiana):* Where do the emissions go?
- *Answer (Gary Kleiman, NESCAUM):* MANE-VU EGU reduction on the order of 68,000 TPY would be “rearranged.” They are spread out between all EGUs proportionately, except for those in the 167 stacks, to maintain the cap.*Question (Tom Easterly, Indiana):* Did MANE-VU use the 0.5dV exemption threshold for BART sources?
  - *Answer (Gary Kleiman, NESCAUM):* MANE-VU did not exempt any BART sources from the BART determination process.
- *Question (Mike Koerber, MRPO):* What is the source of the MANE-VU numbers?
  - *Answer (Gary Kleiman, NESCAUM):* They are from MARAMA’s inventory work. National ask for EGU sector based on IPM results and increasing the SO<sub>2</sub> ratios.
- *Comment (Mike Koerber, MRPO):* The MANE-VU numbers are close to his, but we need to sync them up.
- *Comment (Tom Easterly, Indiana):* Companies make economic analyses for installation of controls and we keep changing the rules on them.
  - *Answer (Gary Kleiman, NESCAUM):* They are spread out between all EGUs proportionately, except for those in the 167 stacks, to maintain the cap.

**Summary of Reasonable Progress Work for MRPO Class I Areas** – Mike Koerber, MRPO

Presentation:

- MRPO results consistent with MANE-VU analyses.
- MRPO states still looking at strategies for their 4 northern Class I areas, nitrates a bigger share of visibility impairment, visibility impacts mostly from southerly transport.
- With OTB measures, we are above glide path in 2018 for all 4 Class I areas.
- Review of MRPO 5-Factor Analysis (including degree of visibility improvement) for reasonable progress.
- Review of new visibility metric of \$/dV improvement, additional control measures comparable in costs to existing OTB controls, most visibility improvement obtained from MRPO’s EGU1 (0.3dV) and EGU2 (0.4dV) strategies.
- MRPO analysis regional in nature, not a focused EGU strategy like MANE-VU due to different source / receptor relationships.
- Review of projected visibility levels, Seney above glide path in 2018, a lot more SO<sub>2</sub> will need to be “squeezed” out of the system to achieve 2064 natural conditions.
- Review of MRPO source apportionment analysis, MRPO contributes 10-15% of visibility impairment at Lye Brook in Vermont.
- Conclusions and key findings from MRPO analyses:
  - Many Class I areas in the eastern half of U.S. expected to be below the glide path in 2018 (with existing controls), including those in the Northeast;
  - Contribution analyses show closer states have larger impacts; and

- Regional emission reductions (in 2013-2018 timeframe), such as those identified in MANE-VU's June 2007 resolutions, may be necessary to meet reasonable progress goals in the MRPO Class I areas and provide for attainment of new tighter PM<sub>2.5</sub> and possibly tighter ozone standards in the MRPO states.

Discussion:

- *Question (Tom Easterly, Indiana):* How do we deal with ammonia?
  - *Answer (Mike Koerber, MRPO):* EPA won't touch it and ammonia is included in the analyses for completeness.
- *Question (Jeff Crawford, Maine):* Are mobile measures included?
  - *Answer (Mike Koerber, MRPO):* Only bundled measures including chip reflash and diesel retrofits where the states are not preempted from doing such measures.
- *Question (Tom Easterly, Indiana):* Would a monthly electric bill of \$150 be doubled?
  - *Answer (Mike Koerber, MRPO):* Yes, at least doubled.
- *Question (Dave Littell, Maine):* Are ammonia controls from the agricultural sector assumed?
  - *Answer (Mike Koerber, MRPO):* Yes, assumes 10% ammonia reductions from best practices.
- *Question (Jeff Crawford, Maine):* How much of the ammonia comes from CAFOs versus fertilizer application?
  - *Answer (Mike Koerber, MRPO):* Two-thirds to three-quarters comes from CAFOs, but urban ammonia sources are also important.
- *Question (Tim Allen, F&W Service):* How much benefit is there from ammonia controls?
  - *Answer (Mike Koerber, MRPO):* The analysis shows that a 10% ammonia decrease that may be cost-effective will result in greater than a 0.10dV improvement.
- *Comment (Bruce Polkowsky, NPS):* 10% is a lot.
- *Comment (Larry Bruss, Wisconsin):* There is a lot of uncertainty when it comes to the effects of ammonia reductions.
- *Question (Doug Austin, MANE-VU):* Is the \$/dV analysis based on three states or nine?
  - *Answer (Mike Koerber, MRPO):* It is based on three states, and a nine-state analysis would be higher
- *Comment (Gary Kleiman, NESCAUM):* MANE-VU saw almost identical MRPO contributions in the 10-15% range.
- *Comment (Chris Salmi, New Jersey):* New Jersey is looking at performance standards for the 24-hour PM<sub>2.5</sub> standard and a potentially tighter ozone standard.
- *Comment (Laurel Kroack, Illinois):* Illinois would be interested if New Jersey could share that information.

**EPA and FLM Perspectives on RPGs and Reasonable Measures Work** – Bruce Polkowsky, NPS; Chuck Sams, Forest Service; John Summerhays, EPA Region V; Todd Hawes, EPA - OAQPS

Bruce Polkowsky, National Park Service

- Tomorrow is the 30<sup>th</sup> anniversary of the passage of the 1977 Clean Air Act Amendments that enacted section 169A and established the regional haze program.

- The uniform progress line is “useful,” but the 4-Factor analyses are most important from FLM perspective.
- Don’t forget the 20% clean days reasonable progress goal (VISTAS getting 1 dv improvement).
- Are states being overly optimistic in their CAIR controls scenarios? Information coming in from states seems to be pointing to predicting a higher level of controls than what CAIR predicts.
- The location of controls is important for visibility as seen in the MANE-VU 167 stack analysis.
- The 2013 progress report is key, and it is important to know about new sources, too.
- PM 2.5, ozone and regional haze issues are all coming together in the 2013-2018 timeframe. The PM2.5 SIPs should take into account what the regional haze measures will achieve. Strategies should be coordinated to maximize their effectiveness for both regional haze, PM2.5, and ozone SIPs.
- The FLMs encourage states to be as detailed as possible in their regional haze SIPs, including dates, for control measure development. It is up to EPA through the approval and disapproval process as to how they will react to state promises to pursue control measures in the regional haze SIPs.

Chuck Sams, Forest Service

- There should be one hard copy of the regional haze SIP per FLM reviewer.
- The FLM goal is for comments back to the states 30 days before their public hearings.
- The FLMs need need the SIPs as soon as possible for their 60-day review.
- The FLMs would appreciate a summary sheet that provides a cross-reference as to when the specific items on their checklist can be found in the SIP.
- There is an FLM expectation for ongoing consultation.

John Summerhays, EPA Region V

- There are three main requirements of the Regional Haze Rule:
  - (1) Reasonable Progress – lots of questions about what conclusions and questions about what EPA will have as a requirement to the different scenarios;
  - (2) BART – haven’t seen much control taken on BART. EPA is thinking about how to ensure consistency in BART determinations by different states. EPA asks the RPOs to try to insure consistency across their states; and
  - (3) Consultations - RPOs have done valuable work in technical analyses and facilitating consultations.
- EPA appreciates being part of the current process and continuing that participation into the future.

Todd Hawes, EPA – OAQPS

- While EPA is not in a position to initiate consultations as required by the Regional Haze Rule, today’s meeting is a good representation of what they envisioned the consultation process would be.



- EPA is getting lots of questions from states about the regional haze SIPs. Some states are saying they are not going to set reasonable progress goals, while some say they are only going to do BART, use it for their reasonable progress goal with no analysis.
- EPA is legally bound and expecting full SIPs on 12/17/2007 that include all of the required elements. It is not acceptable for states to say they do not have the time or resources, or that the SIP cannot be done by December 17.
- The EPA lawyers are working on “what if” scenarios.

Discussion:

- *Question to FLMs and EPA (Dick Valentinetti):* Will the Federal agencies comment on the extent of agreement and disagreement on strategies?
  - *Answer (Bruce Polkowsky, NPS):* Yes, they will.
- *Comment (Tim Allen, F&W Service):* They will also be looking for regional consistency and that the various emission reductions for meeting the Class I reasonable progress goals are proportional between the states. They may comment more on any disagreements between RPOs.
- *Comment (Bruce Polkowsky, NPS):* The continuing consultation requirement is in 308(i)(4). The MANE-VU states have provided input on format and frequency. The monitoring aspects are crucial and especially important to consult about.
- *Question to EPA (Bruce Polkowsky, NPS):* The long-term strategy is a 10-year strategy from rule adoption, but are promises to look at reductions approvable?
  - *Answer (Todd Hawes, EPA):* Realistically, we have to see what comes in December. They realize that they will not get 100% approvable SIPs in December 2007 and will have to see then what they will do about it.
- *Comment (Bruce Polkowsky, NPS):* FLMs would rather have a SIP later that has all elements rather than one that is on time that does not.
- *Question to EPA (Susan Wierman, MARAMA):* Can EPA process the BART SIPs first to start BART clock?
  - *Answer (Todd Hawes, EPA):* Yes, they are discussing BART severability, and it would be easier to consider BART first if they get a complete SIP.
- *Comment (Susan Wierman, MARAMA):* Holding up BART approvals due to incompleteness of the rest of SIP would be unfortunate. Glad to hear EPA discussing this issue.
- *Comment (Todd Hawes, EPA):* They have 6 months to deem complete.
- *Question to MANE-VU (John Summerhays, EPA):* How are BART compliance dates set in M-V?
  - *Answer (Susan Wierman, MARAMA):* Some states are setting the date to be “as expeditiously as practicable.” The states need to be doing their best to get BART controls in place as we do not want a repeat of the NOx SIP call delays. The BART requirement is one of the best ways in the Clean Air Act for getting old facilities controlled.
- *Question to MRPO (Todd Hawes, EPA):* Can I get clarification on the \$/dV metric developed by MRPO? Is there any cost-effectiveness breakpoint?
  - *Answer (Mike Koerber, MRPO):* It is a reference point.
- *Question to EPA (Chris Salmi, New Jersey):* How will EPA react to inconsistencies between state SIPs?

- *Answer (Todd Hawes, EPA):* The rule says EPA is the arbiter of any disagreement and there is little guidance beyond that. EPA would lean heavily on consultation documentation, but EPA will ultimately have to decide.
- *Comment to EPA and FLMs (Chris Salmi, New Jersey):* It is one of the MANE-VU Class I States principles that the FLMs will help identify and EPA will act upon any inconsistencies.

### **Roundtable Discussion on Reasonable Progress Goals and Reasonable Measures**

States continued the consultation with a roundtable discussion open on all issues raised during the Open Technical Call and this consultation meeting. Most of the discussion focused on the substance of the MANE-VU statements, or “asks” from the MRPO states and from the U.S. EPA.

### **ICI Boilers, MACT and NO<sub>x</sub>/SO<sub>2</sub> RACT**

During the Open Technical Call it was suggested that there may be an opportunity to examine the scope of the ICI boiler sector and potential emission reductions from that source category. Several states brought up the recent vacatur of the Boiler MACT in terms of the possibility for states to work together on this sector. NACAA is discussing with its members and the Ozone Transport Commission and Northeast States for Coordinated Air Use Management an effort to develop a Boiler MACT model rule. While for Boiler MACT this effort would focus on hazardous air pollutants (HAPs), including volatile organic compounds (VOCs), it may be possible to include in that project a parallel process to gather information on NO<sub>x</sub> and SO<sub>2</sub> emissions from the boiler sector and develop options for control strategies, separate from the MACT levels.

MANE-VU states also inquired about what MRPO states are doing for PM 2.5 attainment. Many of the MRPO states are focusing on local sources for urban excess, and it appears that EPA is discouraging a focus on regional strategies. Illinois informed the group that it has a multi-pollutant agreement including scrubbers. Illinois also has a statewide NO<sub>x</sub> RACT proposal with stringent levels and is working on SO<sub>2</sub> RACT, such as low sulfur diesel for non-road and refinery SO<sub>2</sub> reductions. These RACT proposals are working their way through Illinois’ regulatory processes, so they are not yet included in SIPs and are not reflected in MRPO’s modeling. Michigan may also look at statewide RACT under the new PM<sub>2.5</sub> standard.

In addition to the work done by the ICI boiler workgroup, OTC has completed some regional inventory work on its ICI boilers and NESCAUM is completing a study on ICI boilers that was sponsored by EPA. All of this work can be included in the review of this sector.

### **Follow up items from this discussion include:**

- Reconvene MANE-VU/MRPO ICI Workgroup that was initiated under the State Collaborative to re-examine ICI boiler work and define next steps;
- Contact NACAA about possible addition to Boiler MACT model rule work to examine potential for NO<sub>x</sub> and SO<sub>2</sub> reductions and identify strategies; and

- Look at pursuing SO<sub>2</sub> RACT regionally, as well as asking EPA again for an ICI national rule.

## **Low Sulfur Fuels**

In addition to the low sulfur fuel measures that MANE-VU is pursuing, the states discussed other areas of opportunity for low-sulfur fuels, including nonroad low-sulfur diesel. Illinois indicated that they will be talking to their four refineries about non-road low-sulfur diesel. Michigan indicated that they are looking at a possible executive order mandating low-sulfur non-road diesel for state contracts. MRPO states also expressed interest in low-sulfur fuel for locomotives.

New Hampshire inquired as to whether the cost for biodiesel is similar to low-sulfur diesel, and suggested that we share information on biodiesel as an option. New Jersey expressed interest in ocean-going vessels as a source sector for low-sulfur fuel opportunities. The National Park Service folks indicated that there is a recent World Trade Organization agreement that could be of use in this regard, and that this is a sector that the VISTAS and WRAP states are also looking into.

### Follow up items from this discussion include:

- Look at federal rules that are in the works for non-road, locomotive and marine engines to see if there are gaps or opportunities that MANE-VU and MRPO could explore together; and
- Share information on biodiesel as a low-sulfur fuel option.

## **State/Regional EGU Strategy**

States discussed the EGU strategy proposed by the MANE-VU Class I areas, regarding a focus to pursue reductions of 90% or greater from the 167 stacks identified on the MANE-VU list. The MANE-VU states have agreed to pursue 90% EGU reductions and a low-sulfur fuel oil strategy. MRPO states will continue to examine what the potential for reductions are at these units, and provide information about which sources in their states are putting controls on, to better inform the process and our modeling. According to the information MRPO has at this time, over 70% of the emissions from the 167 stacks on the list will be scrubbed. The question remains whether that will be enough, or whether MRPO will still need to address the remaining 30% even if it has a very low impact. Another issue was raised regarding whether it would be acceptable for MRPO states to substitute reductions from the non-EGU sector that go beyond the 28% level for reductions that may not be obtainable in the EGU sector. MANE-VU states indicated that this would likely be acceptable, depending on the location and type of non-EGU source.

MANE-VU states raised the question as to whether the 70/30 split is the same for the rest of the EGUs, i.e. those in the MRPO region that are not part of the 167 stacks on the list. MRPO responded that they can get that information and provide it to MANE-VU. For example, IPM indicates that Rockport will be getting controls, while MRPO's information from the source is

that they will not. There is also a concern that cumulatively, the controls that the EGU sources say are going on will be larger than what is required by CAIR, i.e., it will not reflect reductions that will be “sold” on the trading market, or what units they will be sold to, to keep emissions at the CAIR budget level.

Another concern was raised regarding the addition of controls to older EGUs and how they can be permitted given NSR issues for increases in other emissions. Some states responded that it has been possible to add scrubbers to older units and address increases in other emissions by fine-tuning the control systems.

Generally, while the concept is feasible, MRPO states anticipate needing more assistance and information from the MANE-VU Class I areas to understand the justification for controls on these units. In addition, it will be helpful to look at ways to incentivize the retirement/closing of old units and their replacement with cleaner technology, such as through output-based standards. We will also need to work together to craft language that will work in our SIPs to reflect the approach that MANE-VU is requesting that will be acceptable to EPA.

Follow up items from this discussion include:

- Continue to share specific information about what MANE-VU and MRPO sources are anticipating as controls on EGUs as compared to what is indicated in IPM modeling;
- Update our inventories and databases accordingly so that our information is “synched”; and
- Continue dialogue on approaches for addressing this sector to meet the 90% reduction target for the 167 stacks and on equivalent alternatives.

**National “Ask” for CAIR Phase III**

There is interest from some MRPO states in joining MANE-VU in its “ask” for a Phase III of CAIR. All of the MRPO states will review and consider the option as we continue our consultation process. For many MRPO states the real concern is obtaining PM 2.5 reductions; regional haze is not their primary concern. As we continue to discuss the national “ask” we need to develop control levels that will help all of our states with attainment for ozone, PM and regional haze. MANE-VU based its request on the recent IPM modeling work done on the levels that came out of the state collaborative work. Those levels are not as stringent as those that are in the original OTC multi-pollutant position, and we are in the process of reviewing them.

Follow up items from this discussion include:

- MANE-VU to revisit its multi-pollutant strategy;
- MRPO and MANE-VU to have discussions on potential multi-pollutant control levels for a CAIR Phase III; and
- Craft a revised national “ask” to reflect revised levels, as appropriate.

**NEXT STEPS**

In addition to the agreements reached during the discussions (listed at the beginning and in the roundtable discussion sections of this document) the MANE-VU Class I states and the

MRPO states agreed to continue the consultation dialogue on the upcoming State Collaborative call, scheduled for 10:00 am CDT, 11:00 am EDT on Thursday, August 16<sup>th</sup>. The states will continue discussions from today's meeting, bring forth additional issues as necessary, and have a first opportunity to review and discuss the draft documentation of the consultation.

## **Appendix 3D**

### **EPA Ask Letters**

September 2, 2009

The Honorable Lisa P. Jackson, Administrator  
U.S. Environmental Protection Agency  
Ariel Rios Building  
1200 Pennsylvania Avenue, NW  
Mail Code 1101A  
Washington, DC 20460

Dear Administrator Jackson:

On behalf of 17 states in the eastern half of the U.S., we wish to provide the following recommendations to the Environmental Protection Agency (EPA) to consider as it develops a replacement rule for the Clean Air Interstate Rule (CAIR), in light of the December 23, 2008, remand by the U.S. Court of Appeals for the D.C. Circuit.

The recommendations follow through on the commitment we made in the March 9, 2009, Framework Document to work together to address the transport requirements of Section 110(a)(2)(D) of the Clean Air Act (CAA), and to attain the ozone and PM<sub>2.5</sub> National Ambient Air Quality Standards (NAAQS). Please understand that in preparing these recommendations our fundamental air quality objective is to achieve attainment and ensure maintenance of the NAAQS as expeditiously as practicable.

As the result of our collaboration, we recommend for your consideration a framework, which is based on in-depth technical evaluations and a sincere and concerted effort by all states to reach common ground on an overall approach to addressing transport. This comprehensive framework comprises national rules involving significantly contributing states that combine statewide emissions caps and complementary regional trading programs with a state-led planning process to address transport in a multi-pronged and layered approach. While the undersigned states have reached consensus on this suggested framework, there are some regional differences concerning the timing and stringency of electric generating unit (EGU) reductions, and the criteria for determining which states are included in the state-led planning process. In addition, the states differ in their perspectives on whether performance based standards should be part of the strategy.

The Lake Michigan Air Directors Consortium (LADCO) and the Ozone Transport Commission (OTC) will be submitting separate letters to explain their perspectives on these areas of regional differences on implementation of the framework.

Many areas in the eastern U.S. are designated as nonattainment for the current ozone and PM<sub>2.5</sub> standards (1997 version), and it is expected that even more areas will not be in compliance with 2008 ozone and 2006 PM<sub>2.5</sub> standards. Numerous data analysis and modeling studies have shown that some (not all) of these nonattainment problems are strongly influenced by inter-state transport.

Additional regional emission reductions will be necessary to help states meet the new air quality standards. A timely and robust federal program that requires substantial regional emission reductions from mobile sources, area sources and large point sources such as

EGUs is an essential component of any strategy to reduce interstate transport of air pollution. These reductions are necessary to attain and maintain compliance with the NAAQS.

The undersigned states recommend a 3-step approach, as further discussed below, to establish a framework from which to address the requirements of CAA section 110(a)(2)(D):

1. Identifying areas of interest (i.e., those not meeting the standards and those struggling to maintain the standards);
2. Identifying, based on specific criteria, upwind states which contribute to nonattainment or interfere with maintenance in these areas of interest; and
3. Implementing a multi-sector remedy to meet CAA requirements.

### **Step 1 - Identifying Areas of Interest**

- A. While the requirements of Section 110(a)(2)(D) apply to all areas, most attention should be given to those areas not meeting or struggling to maintain the NAAQS. These "areas of interest" should be identified using monitoring and modeling data.
- B. Specifically, areas with both base monitored design values and future modeled design values above the applicable NAAQS should be designated as areas of interest. The monitored design values are based on the maximum design value from the periods 2003-2005 through the most recent three-year period, and the future modeled values are based on future year modeling which reflects legally enforceable control measures and a conservative model attainment test - i.e., use of maximum design values rather than average design values.
  1. The use of maximum design values and a conservative model attainment test are intended to account for historic variability, which is necessary to ensure maintenance. An alternative means of accounting for historic variability is to conduct a statistical analysis of the year-to-year variation in meteorology.
  2. Requiring a more conservative model attainment test will necessitate a change in EPA's modeling guidance. EPA should also establish performance criteria to insure that the modeling is capturing transport appropriately.
  3. EPA's approach in CAIR also reflects a "monitored and modeled" test to identify areas of interest.

### **Step 2 - Identifying Upwind States that Significantly Contribute to Nonattainment or Interfere with Maintenance**

- A. An upwind state significantly contributes to nonattainment or interferes with maintenance in a downwind area of interest if its total impact from all source sectors equals or exceeds 1% of the applicable NAAQS.



- B. Individual state contributions should be determined through a weight-of-evidence approach, including source apportionment modeling.
- C. Use of 1% of the NAAQS as the significance threshold is consistent with EPA's approach in CAIR.

### **Step 3 - Implementing a Multi-Sector Remedy to Meet Clean Air Act Requirements**

A two-part process is recommended consisting of: (A) a national/regional control program adopted by EPA for EGUs and additional federal control measures for other sectors, and (B) state-led efforts to develop, adopt, and implement federally enforceable plans for each area of interest that is not expected to attain the standards even after implementation of the national/regional program.

#### **A. National/Regional Control Program**

A significantly contributing state (i.e., a state which contributes at least 1% to a downwind area of interest) must comply with the national/regional control program described below.

1. EGU point source strategy (applicable to units  $\geq 25$  MW)  
In adopting a CAIR replacement rule EPA should:
  - (a) make federally enforceable through appropriate mechanisms all nitrogen oxide (NO<sub>x</sub>) and sulfur dioxide (SO<sub>2</sub>) controls to comply with the original CAIR Phase I program;
  - (b) make federally enforceable through appropriate mechanisms optimization by no later than early 2014 of existing NO<sub>x</sub> and SO<sub>2</sub> controls;
  - (c) make federally enforceable through appropriate mechanisms application by 2015 of low capital cost NO<sub>x</sub> controls;
  - (d) establish statewide emission caps by no later than 2017 for all fossil fuel-fired units  $\geq 25$  MW. The caps should reflect an analysis of NO<sub>x</sub> and SO<sub>2</sub> controls on coal-fired units  $\geq 100$  MW which, in combination with the three measures above, will achieve rates that are not expected to exceed 0.25 lb/MMBTU for SO<sub>2</sub> (annual average for all units  $\geq 25$  MW) and 0.11 lb/MMBTU for NO<sub>x</sub> (ozone seasonal and annual average for all units  $\geq 25$  MW) and which will result in lower rates in some states. Previously banked emissions under the Title IV or CAIR programs shall not be used to comply with the state-wide emission caps; and
  - (e) to the fullest extent allowed under the Clean Air Act, EPA should work with the states to establish regional emissions caps with full emissions trading to replace the caps currently applicable under CAIR.

Again, there are regional differences on some elements of the EGU point source strategy, including mechanisms for achieving reductions prior to 2017. Further recommendations will be provided in separate letters by LADCO and OTC.

2. Non-EGU point source strategy

- a. EPA should identify and prioritize other categories of point sources with major emissions of NO<sub>x</sub> and/or SO<sub>2</sub> (e.g., cement plants) based on a review of available emissions inventories and other information, such as source apportionment studies.
  - b. For the non-EGU point sources, EPA should identify and evaluate control options for reducing NO<sub>x</sub> and/or SO<sub>2</sub> emissions. The evaluation should consider the technological, engineering, and economic feasibility of each control option.
  - c. At a minimum, EPA should evaluate the technological, engineering, and implementation feasibility, and cost-effectiveness of controlling SO<sub>2</sub> and NO<sub>x</sub> emissions from industrial, commercial, and institutional boilers  $\geq 100$  MMBTU/hour.
3. Mobile source strategy, such as new engine standards for on-highway and off-highway vehicles and equipment, and a single consistent environmentally-sensitive formulated fuel.
4. Area source strategy, such as new federal standards for consumer products and architectural, industrial and maintenance coatings as originally promised by EPA in 2007

B. State- Led Attainment Planning

The undersigned states recommend the use of a state-led attainment planning process concurrent with developing the transport SIP to address areas of interest that are not expected to attain after implementation of the national/regional control program. The state-led planning effort should involve a key subset of significantly contributing states to develop, adopt, and implement an appropriate attainment strategy. EPA should work with the states to establish criteria for determining which significantly contributing states should be involved in the state-led planning process. Additionally EPA should work with the states to determine the appropriate criteria for each state to satisfy CAA section 110(a)(2)(D). The advantages of this state-led planning effort include:


- A one-size-fits-all federal solution cannot provide the most appropriate and cost-effective solution for each area;
- Attainment planning is more effective and more likely to succeed if it is done on a non-attainment area basis with a key subset of contributing states;
- Additional controls are identified where they are needed; and
- States maintain their responsibility under the Clean Air Act to establish state implementation plans.

Further recommendations on this issue will be provided in separate letters by LADCO and OTC.


The comprehensive framework outlined above represents the culmination of our collaborative work over the past six months. We look forward to working with you further as EPA develops its CAIR replacement rule.

Sincerely,

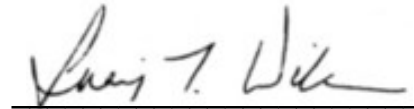
  
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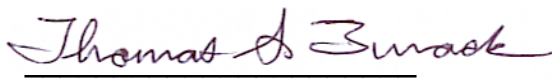
  
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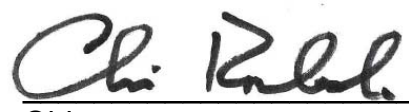
  
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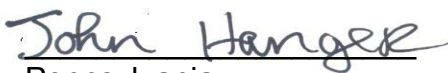
  
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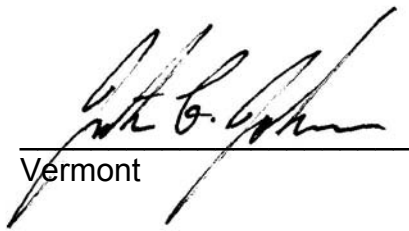
  
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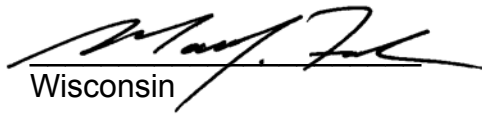
Peter B. Johnson

Vermont



David K. Paylor

Virginia



Mark Felt

Wisconsin

# LAKE MICHIGAN AIR DIRECTORS CONSORTIUM

9501 W. Devon Avenue, Suite 701

Rosemont, IL 60018

Phone: 847-720-7880

Fax: 847-720-7887

September 10, 2009

The Honorable Lisa P. Jackson, Administrator  
U.S. Environmental Protection Agency  
Ariel Rios Building  
1200 Pennsylvania Avenue, NW, Mail Code 1101A  
Washington, DC 20460

Dear Administrator Jackson:

On September 2, 2009, the five LADCO States, along with 12 other States in the eastern half of the U.S., sent recommendations to the Environmental Protection Agency (EPA) as it develops a replacement rule for the Clean Air Interstate Rule, in light of the December 23, 2008, remand by the U.S. Court of Appeals for the D.C. Circuit.

The recommendations follow through on the commitment we made in the March 9, 2009, Framework Document to work together to address the transport requirements of Section 110(a)(2)(D) of the Clean Air Act (CAA), and to attain the ozone and PM<sub>2.5</sub> National Ambient Air Quality Standards (NAAQS). Please understand that in preparing these recommendations our fundamental air quality objective is to achieve attainment and ensure maintenance of the NAAQS as expeditiously as practicable.

Consistent with the September 2, 2009, joint letter, we wish to provide further recommendations on two issues: the EGU point source strategy (in the national/regional control program), and the state-led attainment planning process. Our specific recommendations are provided below.

## **LADCO Recommendation 1**

### **A. National/Regional Control Program**

#### **1. EGU point source strategy (applicable to units $\geq$ 25 MW)**

Regional Emissions Cap: We recommend that EPA establish regional emissions caps (as referenced in the September 2, 2009, joint letter) effective by 2017. We believe that regional emissions caps for any earlier year (e.g., 2015) should not be established, either in addition to or in lieu of a 2017 cap. We conducted a state-by-state analysis of what level of EGU control for NO<sub>x</sub> and SO<sub>2</sub> is achievable over the next several years. A fundamental assumption in our analysis is a July 2012 start date for the planning, engineering, and construction of any new NO<sub>x</sub> and SO<sub>2</sub> controls. This date reflects a January 2011 promulgation date for a CAIR replacement rule and another 18 months for adoption of state rules. Four "layers" of control were considered: (1) all NO<sub>x</sub> and SO<sub>2</sub> controls to comply with the original CAIR Phase I program; (2) optimization of existing NO<sub>x</sub> and SO<sub>2</sub> controls by 2014; (3) application of low capital cost NO<sub>x</sub> controls (e.g., combustion modifications) by 2015; and (4) installation of new NO<sub>x</sub> and SO<sub>2</sub> controls (e.g., SCRs for NO<sub>x</sub> and FGDs for SO<sub>2</sub>) by 2017. We believe that the first three measures identified above are all that can be done by 2015.

Performance Standards: We understand that EPA is considering a hybrid approach in its CAIR replacement rule involving regional emissions trading and unit-specific performance standards (cite: July 9, 2009, testimony by Regina McCarthy before the Subcommittee on Clean Air and Nuclear Safety, Committee on Environment and Public Works, U.S. Senate). As discussed in the September 2, 2009, joint letter, we strongly support and encourage EPA to include regional emissions trading to the fullest extent allowed under the Clean Air Act.

We believe, however, that unit-specific performance standards go beyond the requirements of section 110 and the scope of a CAIR replacement rule; inhibit trading; and that performance standards with a near-term compliance timeframe, such as 2017, are not practical for all EGUs. Although we firmly believe that it is not appropriate to include performance standards in a CAIR replacement rule, if EPA decides to consider including performance standards, then EPA should work with the states to take into account the basis and timing of the requirements identified in the September 2, 2009, joint letter, cost effectiveness, site specific factors (such as space limitations) and the pollution control equipment already in place on the existing fleet of EGUs. Specifically, on this last point, we believe that EPA should not require replacement or repowering of units or control systems that are sound technology and operating at a reasonable effectiveness.

## **LADCO Recommendation 2**

### **B. State- Led Attainment Planning**

We recommend the use of a state-led attainment planning process concurrent with developing the transport SIP to address areas of interest that are not expected to attain after implementation of the national/regional control program. The advantages of this state-led planning effort include:

- A one-size-fits-all federal solution cannot provide the most appropriate and cost-effective solution for each area;
- Attainment planning is more effective and more likely to succeed if it is done on a non-attainment area basis with a limited number of states;
- Additional controls are identified where they are needed; and
- States maintain their responsibility under the Clean Air Act to establish state implementation plans.

A major contributing state (i.e., a state which contributes at least 4% to a downwind area of interest that is not expected to attain after implementation of the national/regional program) must also either:

1. In conjunction with other major contributing states, develop, adopt, and implement an appropriate attainment strategy for the area of interest, as follows:
  - a. An upwind state's responsibility for achieving air quality benefits in a downwind area should be commensurate with the magnitude of the upwind state's contribution to the downwind air quality problem.
  - b. To facilitate flexibility in developing control programs and reduce control costs, state planning efforts should accommodate interstate emissions trading to the fullest extent allowed by the Clean Air Act.
  - c. Photochemical modeling, performed in accordance with EPA modeling guidance, should be conducted to determine the amount of emission reduction needed to provide

for attainment and the relative contributions of the participating states and source sectors, and to assess candidate control measures.

2. In the event that the multi-state planning effort is unsuccessful, then each 4% state may still be able to satisfy its section 110(a)(2)(D) obligation if it can demonstrate to EPA that it has emission reductions measures for significantly contributing source categories that are commensurate with a Reasonably Available Control Measure analysis for the affected area. These measures should be determined by first identifying key pollutants and source categories that contribute to the air quality problem, and then identifying and evaluating control measures for the contributing source categories.

Enclosed please find supporting materials for these recommendations.

If you wish clarification of these comments, then please contact Michael Koerber, Lake Michigan Air Directors Consortium.

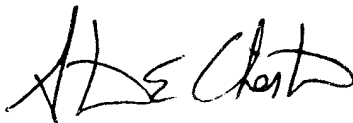
Sincerely,



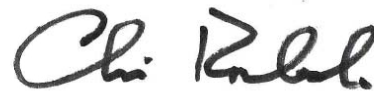
Douglas P. Scott  
Director, Illinois Environmental  
Protection Agency



Thomas Easterly  
Commissioner, Indiana Department  
of Environmental Management



Steven E. Chester  
Director, Michigan Department of  
Environmental Quality



Christopher Korleski  
Director, Ohio Environmental Protection  
Agency



Matthew J. Frank  
Secretary, Wisconsin Department of  
Natural Resources

Enclosure

c: Regina McCarthy, Assistant Administrator, Office of Air and Radiation, U.S. EPA  
Bharat Mathur, Acting Regional Administrator, U.S. EPA, Region V  
Cheryl Newton, Director, Air and Radiation Division, U.S. EPA, Region V



September 10, 2009

Connecticut

Delaware

District of Columbia

Maine

Maryland

Massachusetts

New Hampshire

New Jersey

New York

Pennsylvania

Rhode Island

Vermont

Virginia

Anna Garcia  
Executive Director

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The Honorable Lisa P. Jackson, Administrator  
U.S. Environmental Protection Agency  
Ariel Rios Building  
1200 Pennsylvania Avenue, NW  
Mail Code 1101A  
Washington, DC 20460

Dear Administrator Jackson:

On September 2, 2009, 17 states within the Ozone Transport Commission (OTC) and the Lake Michigan Area Directors Consortium (LADCO) submitted a letter to you containing recommendations for the Environmental Protection Agency (EPA) to consider as it develops a replacement rule for the Clean Air Interstate Rule (CAIR replacement). The OTC and LADCO States reached consensus on many critical issues, including the creation of a three-step framework to address the requirement of section 110(a)(2)(D) of the Clean Air Act (CAA). Building on the OTC and LADCO consensus, this letter provides EPA with additional recommendations related to several aspects of the joint OTC-LADCO letter of September 2<sup>nd</sup> based on OTC's 15 years of experience addressing the scientific phenomenon of air pollutant transport and its impact on public health.

Achieving the ozone and PM<sub>2.5</sub> National Ambient Air Quality Standards (NAAQS) is a challenge and widespread regional reductions are a very important piece in the solution to this puzzle. The U.S. Court of Appeals for the District of Columbia Circuit found that CAIR failed in at least two important ways: (1) it did not ensure sufficient reductions from each state; and (2) the schedule did not mesh with the attainment deadlines. The additional recommendations OTC is providing are intended to address both issues. By combining regional and state caps, electricity generating unit (EGU) emission reductions will be achieved cost-effectively throughout the region while ensuring that each State's emissions are reduced significantly. To the extent possible, given labor and supply constraints, emissions reductions need to occur three years prior to the attainment deadlines in order to provide the maximum benefit in a timely manner.

OTC recognizes that the attainment deadlines for the 75 ppb ozone NAAQS, or a more stringent ozone NAAQS, will be a function of the yet to be adopted nonattainment classification levels. OTC further suggests that EPA's rules also address a longer time period, including between 2017 and about 2025, to address longer-term air quality improvement needs and the very substantial emission reductions necessary to attain and maintain the air quality standards.



OTC appreciates the efforts put forth by EPA to work with all interested stakeholders in developing a CAIR replacement rule based on sound science. OTC further acknowledges that air pollutant transport within the OTC region is a significant issue that EPA should also address. The CAIR replacement rule should also recognize that our planning processes continue to evolve in the face of ever-tightening standards and newly uncovered air quality concerns, such as the impact of peaking unit emissions on high electricity demand days (HEDD). As such, OTC recommends that EPA propose measures to address HEDD emissions in the CAIR replacement rule.

Our recommendations are provided below in three parts. OTC considers these recommendations feasible, practicable and operable within the framework of the existing Clean Air Act, all of which facilitate a rapid adoption process as directed by the D.C. Circuit Court of Appeals in remanding CAIR. The CAIR replacement rule offers an opportunity for transformational change over incremental improvement. Providing regulatory certainty to America's electric generating sector promotes transformational change through business decisions that support our air quality goals. A summary of the technical analyses conducted by the OTC States and provided as support documentation for the recommendations provided in this letter and the September 2, 2009 letter is attached to support these recommendations.

#### A. Achievable EGU Limitations

The OTC States recommend that EPA consider a comprehensive, multi-layered, hybrid approach for obtaining further reductions from EGUs. This hybrid approach combines state and regional caps with phased-in performance standards to cost-effectively reduce nitrogen oxide (NO<sub>x</sub>) and sulfur dioxide (SO<sub>2</sub>) emissions. The components of this strategy (enforceable conditions, state-by-state reductions, regional trading caps/program and phased performance standards), should coordinate with each other and other EGU control initiatives such as federal MACT standards and greenhouse gas reduction programs.

A national strategy for EGUs should be implemented in phases. The first phase should combine federally enforceable NO<sub>x</sub> and SO<sub>2</sub> reductions from each state with a regional trading program. A later phase should include performance standards to achieve continuing reductions from the EGU sector over the course of the regulatory time frame for implementation of the 2008 ozone and 2006 PM<sub>2.5</sub> NAAQS.

Timing is essential to meet attainment obligations. Three years of data are needed to demonstrate attainment; therefore reductions are needed three years prior to the attainment deadline. While we recognize that full implementation of all controls may not be achieved in that time frame, it is essential that enforceable mechanisms be provided to lock in controls that are achievable. The OTC-LADCO submission reflects the participating states' agreement on state-specific caps that would be applicable no later than 2017. Years prior to 2017 may be critical for many states to demonstrate attainment with the applicable NAAQS. The OTC States seek to work with EPA to develop mechanisms for achieving interim reductions in the 2012-16 time period, including the possibility of interim state-specific caps in addition to a regional cap-and-trade program.

Since CAIR was not sufficient for attaining and maintaining the 1997 ozone NAAQS, EPA will need to make the limits in the CAIR replacement rule stricter to enable compliance with the recently revised ozone and PM NAAQS and any tighter standards that EPA enacts after reconsideration of those standards. The state caps are also necessary to ensure that each State contributes fully to the needed reductions.

Specifically, the OTC States propose that EPA include phased state-by-state reductions, complementary regional emission trading caps as early as possible (but no later than 2014), and performance standards as follows:

#### 1. State-by-State Reductions

The September 2, 2009 letter recommends the implementation of state caps by no later than 2017 that reflect the emission rates that would be achieved through installation of SCR and FGD controls on all coal-fired EGUs of 100 MW or larger in all significantly contributing states. In addition, the participating states recommend in that letter a number of interim measures including operation and optimization of all controls currently in place or being installed to meet other requirements, and installation and operation of all feasible, low capital cost NOx controls such as selective non-catalytic reduction (SNCR) and low NOx burners (LNB) not currently installed or in use on existing EGUs on a unit basis by 2015.

The OTC States recommend that EPA analyze and determine the state-by-state reductions needed prior to 2017 in order to address CAA Section 110(a)(2)(D) requirements to address interstate transport from EGUs within the NAAQS timeframe. The OTC States see interim state-by-state reductions prior to 2017 as a key part of addressing the Court of Appeals concerns over what is needed to satisfy the requirements of CAA Section 110(a)(2)(D).

#### 2. Regional Trading Programs for NOx and SO<sub>2</sub>

As explained in the September 2, 2009 submission, the second key element of the OTC-LADCO agreed framework for a CAIR replacement rule is the implementation of regional trading programs for both NOx and SO<sub>2</sub>, to complement the state-by-state caps described above. The OTC States recommend that EPA consider the following in developing the regional caps:

- The new regional caps should be implemented as early as possible and set at a level that will drive deeper regional NOx and SO<sub>2</sub> reductions than the regional reductions that would result from the implementation of the state-by-state caps by themselves. This pairing of state-by-state caps with an aggressive regional trading program will guarantee specific reductions in each state while also using market forces to further reduce regional emissions at lowest cost.
- OTC's analysis (attached) and the analysis that EPA recently prepared for Senator Carper show that stringent regional trading caps for NOx and SO<sub>2</sub>, implemented as early as possible (but no later than 2014), would provide significant public health benefits that substantially outweigh the costs.
- Banking and inter-state trading would continue to be allowed in the regional trading program.

- To be creditable under Section 110(a)(2)(D), controls installed in response to the regional trading program should be made federally enforceable through an appropriate mechanism.

### 3. Performance Standards

We understand that EPA is also considering a hybrid approach in its CAIR replacement rule involving regional emissions trading and unit-specific performance standards (cite: July 9, 2009, testimony by R. McCarthy before the Subcommittee on Clean Air and Nuclear Safety, Committee on Environment and Public Works, U.S. Senate).

The OTC States request that EPA work with the states to develop and phase in unit-specific performance standards that owners of fossil fuel-fired units should comply with between 2017 and 2025, or earlier if EPA's technical analysis demonstrates that an earlier date is reasonable. Performance standards should either be output-based or transition to output-based standards to reward efficiency. Such performance standards will give regulatory certainty to EGU owners and encourage transformational change in the energy market. In developing these performance standards:

- EPA should consider fuels, types and sizes of EGUs, the timing of other requirements included in this and the September 2, 2009 letter, cost-effectiveness and the pollution control equipment already in place on the existing fleet of EGUs.
- EPA should phase-in the performance standards to maximize efficiency and minimize costs to affected sources. For example:
  - The performance standards for coal-fired units greater than 100 MW should be coordinated with the state-by-state caps that are recommended for no later than 2017.
  - The performance standards for units subject to the upcoming federal MACT requirements should be coordinated with the MACT requirements.
- In later phases (2020 to 2025), the performance standards should be coordinated with greenhouse gas reduction programs and other energy efficiency initiatives and be output-based.
- OTC's analysis (attached) shows that performance standards on larger fossil-fuel fired EGUs (based on a 30-day rolling average) are feasible and should be implemented on an aggressive timeframe (as early as 2017).
- EPA should consider including incentives (e.g., alternative compliance schedules not to exceed three years), to promote the repowering or replacement of existing units.
- After the adoption and implementation of performance standards, EPA should evaluate the feasibility of eliminating the state-by-state caps.

## B. State-led Planning Process

The OTC States recommend that the state-led planning effort include all significantly contributing states (i.e., 1% of the NAAQS or greater impact) unless each state in the affected nonattainment area chooses to reduce the number of states involved.

- The OTC believes that this is the most appropriate way to identify those states that are required to participate in the state-led planning process as model performance (related to long-range transport) varies from one nonattainment area to another and the meteorology that affects some nonattainment areas is very complex.
- The states in the nonattainment area would use monitoring data, modeling and other information on ozone transport, meteorology, emissions, control programs, geography and chemistry to decide which significantly contributing states, if any, should be excused from the state-led planning process.
- Two scenarios are outlined below:
  - If the states in a nonattainment area have technical data that show that the state-led planning process for that area should be limited to just three or four states, that would be appropriate.
  - If the states in a nonattainment area are subject to highly complex transport patterns, it is most likely necessary to include all significantly contributing states in the state-led planning process.
- The OTC believes that the most appropriate way to address transport is through a suite of aggressive national programs to reduce NO<sub>x</sub>, VOC and SO<sub>2</sub> emissions from EGUs, other stationary sources, area sources and off-road and on-road mobile sources and that the role of the state-led planning process should be secondary.
- The OTC continues to have serious concerns over model performance related to long-range, aloft transport. It is critical for EPA to establish and implement performance criteria related to aloft transport to ensure that the process for identifying significantly contributing states is credible.
- As indicated in the September 2, 2009 joint letter, additional controls may be required where needed.

## C. Eliminating Significant Contribution

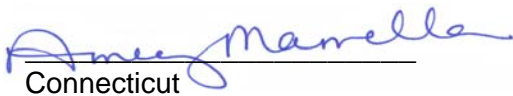
The OTC States recommend that under the state-led attainment planning process, both the upwind states and EPA remain accountable to address contributions to downwind areas' nonattainment of both the ozone and PM<sub>2.5</sub> NAAQS by the relevant attainment dates, without designing any new "off-ramp" that avoids direct and timely action to reduce emissions that are in violation of CAA Section 110(a)(2)(D).

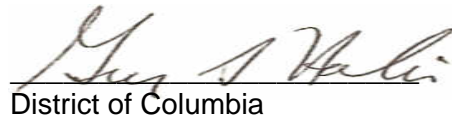
In addition to a program of controls for EGUs, OTC also urges EPA to address interstate transport through the development and implementation of national rules in

2012 or as early as feasible for additional controls on non-EGU sources, as supported in prior statements of the OTC to EPA. (See, e.g., Statement on the Need for National Rulemaking and Implementation of Ozone Control Measures, November 14, 2007).

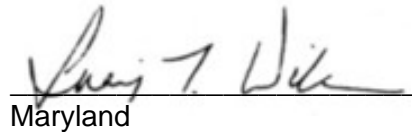
In acting on these recommendations, EPA can use the CAIR replacement rule to provide regulatory certainty to the EGU sector, which will enable business decisions that will move us many steps toward improved air quality and a more efficient electricity generating sector. We look forward to talking with you further about our recommendations for the CAIR replacement rule, and working with your staff as you expeditiously develop this important air quality and public health program.

Sincerely,

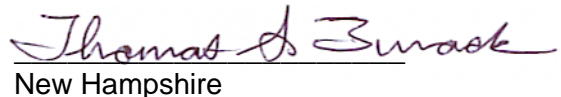
  
Connecticut

  
District of Columbia

  
Maine

  
Maryland

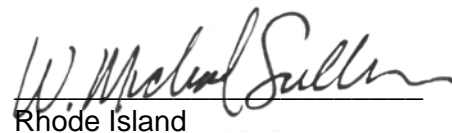
  
Massachusetts

  
New Hampshire

  
New Jersey

  
New York

  
Pennsylvania

  
Rhode Island

  
Vermont

Enclosures