

**DRAFT**

**Michigan Department of Environmental Quality  
Air Quality Division**



**STATE IMPLEMENTATION PLAN  
SUBMITTAL**

**FOR**

**REGIONAL HAZE**

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## **1 Background and Overview of the Federal Regional Haze Regulation**

### **1.1 General Background/History of Federal Regional Haze Rule**

In the 1977 amendments to the Clean Air Act (CAA), Congress added Section 169 (42 USC 7491) setting forth the following national visibility goal:

*Congress hereby declares 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 impairment results from man-made air pollution.*

In 1977, Congress added the goal of restoring pristine visibility conditions in national parks and wilderness areas to the CAA. Section 169 of the Act calls for the prevention of any future, and the remedying of any existing, human-made visibility impairment in Class I areas. Over the following years modest steps were taken to address the visibility problems in Class I areas. The control measures taken mainly addressed plume blight from specific pollution sources and did little to address regional haze issues in the Eastern United States.

When the CAA was amended in 1990, Congress added Section 169B (42 USC 7492), authorizing further research and regular assessments of the progress made so far. In 1993, the National Academy of Sciences concluded that “current scientific knowledge is adequate and control technologies are available for taking regulatory action to improve and protect visibility.”<sup>1</sup>

In addition to authorizing creation of visibility transport commissions and setting forth their duties, Section 169B(f) of the CAA mandated creation of the Grand Canyon Visibility Transport Commission (Commission) to make recommendations to the Environmental Protection Agency (EPA) for the region affecting the visibility of the Grand Canyon National Park. The Commission submitted its report to the EPA in June 1996, following four years of research and policy development. The Commission report, as well as the many research reports prepared by the Commission, contributed invaluable information to the EPA in its development of the federal Regional Haze Rule.

The EPA’s Regional Haze Rule was adopted July 1, 1999, and went into effect on August 30, 1999. The Regional Haze Rule aimed at achieving national visibility goals by 2064. This rulemaking addressed the combined visibility effects of various pollution sources over a wide geographic region. This wide-reaching pollution net means that many states – even those without Class I Areas – are required to participate in haze reduction efforts. The EPA designated five Regional Planning Organizations (RPOs) to assist with the coordination and cooperation needed to address the haze issue. The

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<sup>1</sup> *Protecting Visibility in National Parks and Wilderness Areas*. National Research Council. Washington, DC: 1993.

northern Midwest states of Indiana, Illinois, Michigan, Ohio, and Wisconsin formed the Midwest Regional Planning Organization (MRPO).

The EPA's Regional Haze Rulemaking process was not without controversy and strife. On May 24, 2002, the US Court of Appeals, DC District Court ruled on the challenge brought by the American Corn Growers Association against the EPA's Regional Haze Rule of 1999. The Court remanded to the EPA the BART provisions of the rule, and denied industry's challenge to the haze rule goals of natural visibility and no degradation requirements. The EPA has revised the Regional Haze Rule pursuant to the remand and on July 6, 2005, finalized its guideline for determining BART.

On February 18, 2005, the US Court of Appeals, DC Circuit Court issued a ruling based on a second suit brought by the Center for Energy and Economic Development (CEED) challenging an optional emissions trading program (the WRAP Annex Rule). The EPA finalized revisions to the alternative trading programs on December 12, 2006.

All Regional Haze state implementation plans (SIPs) are due three years after the EPA designates PM<sub>2.5</sub> attainment and nonattainment areas. The EPA approved PM<sub>2.5</sub> designations for all areas of each state on December 17, 2004, and has determined that the Regional Haze SIPs are due by December 17, 2007.

## 1.2 States and Tribes Class I Areas

Isle Royale National Park and Seney Wilderness Area are the two Class I areas in Michigan subject to the Regional Haze Rule.

Isle Royale National Park, Michigan's largest wilderness area, is a 571,790-acre island located in Lake Superior. Isle Royale was established in 1940 by President Franklin D. Roosevelt and was designated part of the National Wilderness Preservation System in 1976. In 1981, Isle Royale was designated an International Biosphere Reserve by the United Nations, giving it global scientific and educational significance. Well known for its timber wolves and moose, Isle Royale is the site of the longest running large mammal predator-prey study in the world.

Seney Wilderness Area is 25,150 acres located in the western portion of the Seney National Wildlife Refuge in the Upper Peninsula of Michigan. The Refuge was established in 1935 and the Wilderness Area was designated by the United States Congress in 1970. Seney's "string bogs" provide a unique habitat to a large variety of birds, mammals and unusual plants.

In accordance with 40 CFR 51.308, photochemical modeling has been done to evaluate Michigan's impact on other Class I areas. Based on the modeling, emissions sources within Michigan have or may have impacts on the following Class I Areas:

- Isle Royale National Park
- Seney Wilderness Area
- Mammoth Cave National Park
- Acadia National Park
- Moosehorn Wilderness Area
- Boundary Waters Canoe Area Wilderness
- Mingo Wilderness Area
- Great Golf Wilderness Area
- Brigantine Wilderness Area
- Lye Brook Wilderness Area
- James River Face Wilderness
- Shenandoah National Park, and
- Dolly Sods/Otter Creek Wilderness.

More detailed analysis on Class I impacts is included in Appendix A.

## 2 General Planning Provisions

Pursuant to the requirements of 40 CFR 51.308(a) and (b), Michigan submits this SIP to meet the requirements of the EPA's Regional Haze rules that were adopted to comply with CAA requirements. Elements of this SIP address the Core Requirements pursuant to 40 CFR 51.308(d) and the Best Available Retrofit Technology (BART) components of 40 CFR 50.308(e). In addition, the SIP addresses Regional Planning, State and Federal Land Manager coordination, and contains a commitment to provide SIP revisions and adequacy determinations.

Michigan has authority to adopt the SIP under Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451).

Michigan provided public notice of the opportunity to comment on the SIP on <dates>. Michigan provided notice of public hearing on <dates>. Michigan held public hearings regarding the SIP on <dates>. Public comments were addressed and are summarized in Appendix B.

**<This section will be updated pending the public comment/hearing.>**

### 3 Regional Planning

In 1999, the EPA and affected States/Tribes agreed to create five Regional Planning Organizations (RPOs) to facilitate interstate coordination on Regional Haze SIP/TIPs. The State of Michigan is a member of the Midwest RPO (MRPO). Members of MRPO are listed in Table 1.

**Table 1: MRPO Members**

Indiana	Wisconsin
Illinois	Tribal Leaders (MI and WI)
Michigan	EPA Region V
Ohio	Federal Land Managers

This SIP utilizes data analysis, modeling results and other technical support documents prepared for MRPO members. By coordinating with MRPO and other RPOs, Michigan has worked to ensure that its long-term strategy and BART determinations provide reasonable reductions to mitigate impacts of sources from Michigan on affected Class I areas. A copy of MRPO's *Principles for Regional Planning* can be found in Appendix C.

Staff of the Lake Michigan Air Director's Consortium (LADCO) provided much of the technical resources for the MRPO. LADCO was started in 1989 by the States of Illinois, Indiana, Michigan and Wisconsin in conjunction with the EPA to oversee the Lake Michigan ozone study. Ohio later joined as the fifth state member. The EPA encouraged states to form regional partnerships to address the Regional Haze Rule and the MRPO was formed in 1999. The MRPO is lead by the five states, LADCO, and federally recognized tribes in Michigan and Wisconsin.

The MRPO has established an active committee structure to address both technical and nontechnical issues related to regional haze. The Policy Steering Committee provides policy direction for regional planning. The Technical Steering Committee manages the technical portion of regional planning. The Project Team carries out the orders of the Technical Steering Committee and guides the development of the regional planning effort. LADCO provides supportive activities for the three committees.

A description of the photochemical modeling performed for this SIP is currently being drafted by LADCO in conjunction with the MRPO and will be available shortly.

#### **4 State/Tribe and Federal Land Manager Coordination**

Rule 40 CFR 51.308(i) requires coordination between States/Tribes and the Federal Land Managers (FLMs). Opportunities have been provided by MRPO for FLMs to review and comment on each of the technical documents developed by MRPO and included in this SIP. Michigan has provided agency contacts to the FLMs as required. In development of this SIP, the FLMs were consulted in accordance with the provisions of 40 CFR 51.308(i)(2).

Michigan provided FLMs an opportunity for consultation, in person and approximately 60 days prior to holding a public hearing on the SIP.

During the consultation process, the FLMs were given the opportunity to address their:

- Assessment of the impairment of visibility in any Class I areas;
- Recommendations on the development of reasonable progress goals; and
- Recommendations on the development and implementation of strategies to address visibility impairment.

Michigan sent the draft SIP to the FLMs on <dates>. Michigan notified the FLMs of public hearings held on <dates>.

Comments received from the FLMs on the SIP were addressed. A summary of FLM comments and responses is included in Appendix B.

Michigan will continue to coordinate and consult with the FLMs during the development of future progress reports and SIP revisions, as well as during the implementation of programs having the potential to contribute to visibility impairment in the mandatory Class I areas. The FLMs will be consulted in the following instances:

- Development and review of SIP revisions;
- Review of 5-year progress reports; and
- Development and implementation of other programs that may contribute to impairment of visibility in Class I areas.

**<This section will be updated pending FLM comments.>**

## 5 Assessment of Baseline, Natural, and Current Conditions

Under the CAA, the Regional Haze SIPs must contain measures to make reasonable progress toward the goal of achieving natural visibility. Comparing natural visibility levels to current baseline conditions helps indicate how much progress we should try to make in the next five years. Determining natural visibility conditions is a SIP element and each state containing a Class I area (in consultation with FLMs and other states) must estimate natural visibility levels.

The EPA guidance gives states a “default” estimate of natural visibility. The MRPO estimated natural visibility using the default method. The MRPO calculated estimates for the 20 percent best and worst days. The MRPO along with Minnesota discovered several days in the data set that had high sulfate or nitrate (which would be in the worst 20 percent), but due to missing data (e.g., coarse mass, soil) were not included in the estimate. Since sulfates and nitrate are from anthropogenic sources, the MRPO and Minnesota included these days in our estimated 20 percent worst days.

### 5.1 Isle Royale National Park Class I Area

The Isle Royale National Park Class I area has an established baseline visibility of 6.77 deciviews for the cleanest 20 percent of the days and 20.73 deciviews for the 20 percent worst visibility days. This is based on data at the Isle Royale (ISLE1) Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring site (near Eagle Harbor), described in Appendix D. A five-year average (2000 to 2004) was calculated for each value (both best and worst) in accordance with 40 CFR 51.308(d)(2), and detailed on pages 6 and 7 of *Regional Haze in the Upper Midwest: Summary of Technical Information* (Appendix E).

Natural background represents the visibility goal for each Class I area to be reached in 2064 and is visibility representative of the conditions before human activities affected air quality in the area. The Isle Royale Class I area has an estimated natural background visibility of 6.77 on the best days and 12.50 on the worst 20 percent of days. These best and worst 20 percent conditions were calculated using the above referenced EPA guidelines and are presented in Appendix E.

### 5.2 Seney Wilderness Area Class I Area

The Seney Wilderness Area Class I area has an established baseline visibility of 7.14 deciviews for the cleanest 20 percent of the days and 24.16 deciviews for the 20 percent worst visibility days. This is based on onsite data at the Seney (SENE1) IMPROVE monitoring site, described in Appendix D. A five-year average (2000 to 2004) was calculated for each value (both best and worst) in accordance with 40 CFR 51.308(d)(2), and detailed on pages 6 and 7 of *Regional Haze in the Upper Midwest: Summary of Technical Information* (Appendix E).

Natural background represents the visibility goal for each Class I area to be reached in 2064, visibility representative of the conditions before human activities affected air quality in the area. The Seney Class I area has an estimated natural background visibility of 7.14 on the best days and 12.80 on the worst 20 percent of days. These best and worst 20 percent conditions were calculated using the above referenced EPA guidelines and are presented in Appendix E.

## **6 Monitoring Strategy**

Rule 40 CFR 51.308(d)(4) of the federal Regional Haze Rule requires a monitoring strategy for measuring, characterizing, and reporting regional haze visibility impairment that is representative of all mandatory Class I areas within the state of Michigan. The monitoring strategy relies upon participation in the IMPROVE network.

The State evaluates its monitoring network periodically and makes changes as needed. However, to be able to assess whether reasonable progress goals are being achieved in each of Michigan's mandatory Class I areas, the Federal IMPROVE monitors are needed.

Michigan commits to meet the requirements under 40 CFR 51.308(d)(4)(iv) to report to the EPA visibility data for each of Michigan's Class I areas annually based on IMPROVE data. Should federal funding be cut for the IMPROVE network, the State of Michigan will not be able to continue monitoring at Isle Royale or Seney. Michigan has cut several monitors in other locations of Michigan because of State budget problems and EPA cuts in funding and cannot afford to maintain any additional monitors.

## **7 Emissions Inventory**

Rule 40 CFR 51.308(d)(4)(v) requires a statewide emission inventory of pollutants that are reasonably anticipated to cause or contribute to visibility impairment in any mandatory Class I area. As specified in the applicable EPA guidance, the pollutants inventoried by Michigan include volatile organic compounds, nitrogen oxides, fine particulate (PM<sub>2.5</sub>), coarse particulate (PM<sub>10</sub>), ammonia, and sulfur dioxide. An inventory is being developed for the baseline year 2005. In addition, projections of future emissions will be made for 2018. The State will update this inventory on a periodic basis, every three years. LADCO/MRPO is currently developing the 2005 inventory and it will be submitted to the EPA as soon as it is completed.

## 8 Best Available Retrofit Technology

On June 15, 2005, the EPA issued final amendments to its July 1999 Regional Haze Rule. These amendments apply to the provisions of the Regional Haze Rule that require emission controls known as Best Available Retrofit Technology, or BART, for industrial facilities emitting air pollutants that reduce visibility. These pollutants include fine particulate matter (PM<sub>2.5</sub>), and compounds that contribute to PM<sub>2.5</sub> formation, such as nitrogen oxides, sulfur dioxides, certain volatile organic compounds, and ammonia. The amendments include final guidelines, known as BART guidelines, for States to use in determining which facilities must install controls and the type of controls the facilities must use.

### 8.1 BART-Subject Sources in the State of Michigan

The BART-subject sources in the state of Michigan are shown in Table 2. A description of each BART-subject source is included in Appendix F.

**Table 2: Bart-Subject Sources in the State of Michigan**

<b>BART-Subject Facility Name</b>	<b>City</b>	<b>Category</b>	<b>SIC</b>
LaFarge Midwest Inc.	Alpena	4	3241
Saint Mary's Cement	Charlevoix	3	
Smurfit/Stone Container Corp	Ontonagon	22	2611
Escanaba Paper Company	Escanaba	22	2611
Cleveland Cliffs Corporation			
Tilden Mining Co	Marquette	24	1011
Empire Iron Mining	Marquette	24	1011

The BART-subject sources were identified using the methodology in the Guidelines for Best Available Retrofit Technology (BART) Determinations under the Regional Haze Rules 40 CFR Part 51, Appendix Y.

A major BART decision made by Michigan involved electric-generating units (EGUs). The EPA allows States to consider the Clean Air Interstate Rule (CAIR) program to be equivalent to BART for EGUs. In considering reasonable controls for the Haze SIP, Michigan determined that EGUs should not be expected to control emissions beyond the requirements of CAIR, as described further in Section 9. Thus EGUs do not have to conduct BART control analyses as a requirement for this SIP.

A second major BART determination made by Michigan was which non-EGUs were BART-subject and therefore require a detailed BART engineering analysis. The first step taken by Michigan was to determine all potentially-affected sources based on the criteria listed in the EPA Guidelines. Michigan identified 34 non-EGU facilities with a total of 84 emission units within the state that were potentially subject to BART (i.e.,

BART-Eligible) based on dates of installation and commencement of operations. (See Table AI-1 in Appendix F).

Next, using emission inventory data from the years 2002 and 2004, Michigan evaluated the quantity of emissions in relationship to the distance from Michigan's Class I areas and other Class I areas in the region. This is called the Q/d analysis and was used as a screening method to identify those facilities most likely to impact the Class I areas. It was determined that a Q/d value of 10 TPY/km is a reasonable threshold such that facilities at or above 10 would be likely to significantly impact a Class I area. This analysis reduced the BART-eligible facilities to a total of 15. (See Table AI-2 in Appendix F.)

The next step involved Calpuff modeling for each of the 15 facilities using 2002 - 2004 meteorological data in a 36 km resolution grid. Emissions data for the same time period was based on the best available estimate of maximum actual 24-hour emissions. Any facility that was determined to contribute 0.5 deciviews (Dv) or more for seven or more days during any year at any Class I area was considered subject to BART regulations. Facilities that contributed less than this threshold were eliminated from further review. This final step resulted in the six non-EGU BART-subject sources shown in Table A1-3 in Appendix F and listed above.

#### 8.2 Determination of BART Requirements for Identified BART-Subject Sources and Analysis of BART controls for Each Source

BART determinations for the six BART-subject sources in Michigan have not been completed. This section of the SIP will be amended when Michigan has completed the BART determinations and incorporates BART emission limits and provisions in consent orders and/or permits.

#### 8.3 For State/Tribes with Class I Areas; Analysis of Visibility Improvement Achievable from all BART Sources in the Region

The modeled visibility improvement that will be achieved in each mandatory Class I federal area as a result of the emission reductions achievable from all sources subject to BART, including Michigan BART sources, located within the region that contributes to visibility impairment in each Class I area impacted by the BART sources is not yet available. This section of the SIP will be amended when Michigan has completed the BART determinations, incorporates BART emission limits and provisions in consent orders and/or permits, and has similar information from the other impacting states.

## 9 Reasonable Progress Goals

Rule 40 CFR 51.308(d)(1) requires Michigan to establish, for each Class I area within the state, goals (in deciviews) that provide for reasonable progress towards achieving natural visibility. The goals should provide improvement in visibility for the most impaired days and ensure no degradation in visibility for the least impaired days over the SIP period.

### 9.1 2018 Visibility Improvement

For Reasonable Progress Goals (RPGs), each state is to perform a four-factor analysis along with a “fifth” factor considering visibility impacts. EC/R Incorporated (EC/R) was contracted by the LADCO states along with Minnesota to do an analysis that the states would use to assist in developing our RPGs. EC/R provided *Reasonable Progress for Class I Areas in the Northern Midwest—Factor Analysis*<sup>2</sup>. In this report, EC/R did a five-factor analysis for on-the-books controls, five source sector categories (EGUs, ICI boilers, reciprocating engines and turbines, agricultural sources, and mobile sources), and 20 individual sources (10 EGUs and 10 industrial sources). Several tables from the EC/R report are included in Appendix G, Reasonable Progress Goals Tables. The results are summarized below.

#### Cost Effectiveness

Considering the first factor, cost effectiveness, additional EGU controls ((0.15 lb/million-BTU SO<sub>2</sub> and 0.10 lb/million-BTU NO<sub>x</sub> for EGU1 strategy and 0.10 lb/million BTU SO<sub>2</sub> and 0.07 lb/million-BTU for NO<sub>x</sub> for EGU2 strategy) would double the cost of CAIR and other cap-and-trade programs, on a \$/ton basis (see Appendix G, Tables 4-2 and 6.5-3). For example, the proposed EGU strategies (EGU1 and EGU2) cost \$1540 to \$3016/ton. These cost would be in addition to the \$720 to \$2600/ton cost for CAIR and other cap-and-trade programs. Therefore if the additional EGU strategies were added to the on-the-books controls, EGUs would be paying \$2260 to \$5616/ton. For ICI boilers, costs were slightly higher compared to EGU costs on a \$/ton basis. However, ICI controls were slightly cheaper than for EGUs on a \$/deciview basis (Appendix G, Table 6.5-3). For reciprocating engines and turbines, the \$/ton and \$/deciview were cheaper than for EGUs. For agricultural sources (ammonia sources), the \$/ton and \$/deciview cost had a very wide range, partly due to uncertainty of the emissions and modeling of ammonia sources. However, the lower end of the range was much less than for EGUs (Appendix G, Table 6.5-3). Finally costs for mobile sources vary widely, from potential savings to excessively expensive (Appendix G, Table 6.5-3).

#### Time for Compliance<sup>2</sup>

The second factor, the estimated time required for sources to comply with the potential control measures, could be attained by 2018. However, availability of contractors and

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<sup>2</sup> For complete paper, see [http://www.ladco.org/MRPO percent20Report\\_071807.pdf](http://www.ladco.org/MRPO_percent20Report_071807.pdf)

supplies needed for manufacturing controls were beyond the scope of this study and might increase the time required for compliance.

#### Energy and Environmental Impacts<sup>2</sup>

The third factor, energy and other environmental impacts, would increase electricity and steam use, solid waste and wastewater, but are believed to be manageable. CO<sub>2</sub> emissions would also increase. There would also be health and environmental benefits due to reduced acid deposition, nitrogen deposition, PM<sub>2.5</sub> and ozone.

#### Remaining Equipment Life<sup>2</sup>

For the fourth factor, remaining equipment life, most of the control strategies evaluated in the EC/R study were based on source sector evaluations. Thus, it was assumed that controls would not be applied to units that would be retired prior to the amortization period for the control equipment. Therefore, remaining equipment life was not expected to affect the cost of controls for most control measures.

#### Visibility Improvement

For the fifth factor, modeling indicated that significant beyond-CAIR reductions from EGUs (EGU1 or EGU2), especially for SO<sub>2</sub>, would be the most effective control for improving visibility (Appendix G, Table 6.5-2). For other sectors, the EC/R report shows very limited impact on improving visibility. Agricultural sources would be the next most effective control for visibility improvements; however, as stated above, the inventory and environmental impacts are uncertain. ICI boiler controls would have a small effect on visibility improvement. The last two source categories, reciprocating engines and turbines and mobile sources, show very minor improvements for visibility (Appendix G, Table 6.5-2).

#### Michigan's Reasonable Progress Approach

Michigan believes that the current on-the-books controls, listed in Appendix H, do constitute reasonable progress for its two Class I areas. Michigan is currently not attaining the National Ambient Air Quality Standards (NAAQS) for ozone and PM<sub>2.5</sub>, and additional control on some sectors may be pursued after further analysis of the new health-based standards. While Michigan is not planning to control beyond on-the-books for the first half of this haze planning period, the State will continue to evaluate multi-pollutant control measures for PM<sub>2.5</sub> and ozone that will ultimately reduce regional haze, too -- possibly within the 2018 timeframe.

Controlling EGUs beyond CAIR control levels would have the most effect on visibility improvement; however, controlling beyond CAIR at this time cannot be justified because Michigan utilities are still in the process of installing controls for the CAIR rule and the MDEQ is in the process of drafting new mercury control rules for EGUs. To add on additional requirements to meet nonhealth-based haze provisions is not reasonable. Beyond-CAIR controls are likely to be considered by Michigan and other states in the region when evaluating control options for meeting the new PM<sub>2.5</sub> 24-hour standard

and the potential new ozone standard. Such controls are likely to be implemented in a timeframe close to the 2018 haze progress date and will therefore result in additional improvements to visibility. In this regard, the State of Michigan does support the federal “ask” proposed by Mid-Atlantic/Northeast Visibility Union (MANE-VU) to decrease EGU emissions by an additional 28 percent (CAIR-Plus). This “ask” would benefit haze as well as the health-based PM<sub>2.5</sub> and ozone standards.

The non-EGU categories of sources evaluated also cannot reasonably be expected to control for haze purposes at this time. ICI boiler controls are estimated to be a little more expensive than EGU controls and have much less impact on visibility improvement than EGUs (Appendix G, Table 6.5-3). Requiring controls on other source sectors, such as reciprocating engines and turbines, and some mobile measures, may be cost effective, but they provide very little visibility improvement (Appendix G, Table 6.5-3). For agricultural sources, modeling is very uncertain and reducing ammonia may increase acid deposition, which could do more harm than the current visibility impacts. Costs for mobile sources varied widely, but all programs had very little impact on visibility (Appendix G, Table 6.5-3).

With the current bleak economic condition in Michigan, pursuing controls on these other sectors for haze reduction cannot be justified. Additionally, while Michigan would benefit from additional controls in upwind states, Michigan cannot expect other upwind states to control their sources if we do not believe it is reasonable for us to do so.

Notwithstanding the reasons described above for not pursuing additional controls on ICI boilers and other emissions sources, Michigan will continue to pursue BART controls on the 6 BART-eligible sources. As described in Part 8, these 6 sources have been modeled to show expected visibility impacts on Michigan’s 2 Class I areas using the Calpuff model. The result meets the EPA criteria for receiving the BART analysis and any resultant controls that are deemed appropriate under BART.

The Regional Haze Rule requires a state to determine a projected date of attaining natural visibility conditions. Based on cost of compliance, the time for compliance, the energy and non-air quality impacts of compliance and the remaining useful life of existing sources and visibility impacts, Michigan believes that the visibility improvement targets shown in Table 3 are reasonable progress goals for the listed Class I areas. Based on the current rate of improvement, Michigan will reach natural visibility conditions by 2094. However, due to uncertainties in 90 years, and even in the next 10 years, Michigan believes this date has little meaning.

**Table 3: Adjusted Reasonable Progress Goals for Michigan Class I Areas**

Class I Area	Deciview Improvement by 2018	Annual Rate of Improvement 2008-2018	Deciview Improvement by 2064	Projected Year for Reaching Natural Visibility
Isle Royale	1.58	0.099	6.12	2094
Seney	2.10	0.13	8.14	2094

Photochemical modeling of Michigan RPGs (based on on-the-books controls) shows that Michigan will not attain the EPA's suggested Uniform Rate of Progress (URP) glide path in 2018 for the 20 percent worst haze days. Table 4 provides a summary of the EPA's Suggested Reasonable Progress Goals for Class I areas located within Michigan.

**Table 4: EPA's Suggested Reasonable Progress Goals for 2064 Attainment**

Class I Area	Deciview Improvement Needed by 2018	Deciview Improvement Needed by 2064	Uniform Rate of Improvement Annually
Isle Royale	2.41	9.12	0.147
Seney	3.13	11.68	0.188

The modeling of current on-the-books controls shows that Isle Royale will require an additional 0.83 deciview improvement and Seney an additional 1.03 deciview improvement to meet the glide path in 2018 (Appendix G, Table 4.5-1).

In the EC/R report, modeling indicated that significant reductions from EGUs in a nine-state region are the most effective means to achieve the URP glide path for both of Michigan's Class I areas by 2018 (Figure 1).

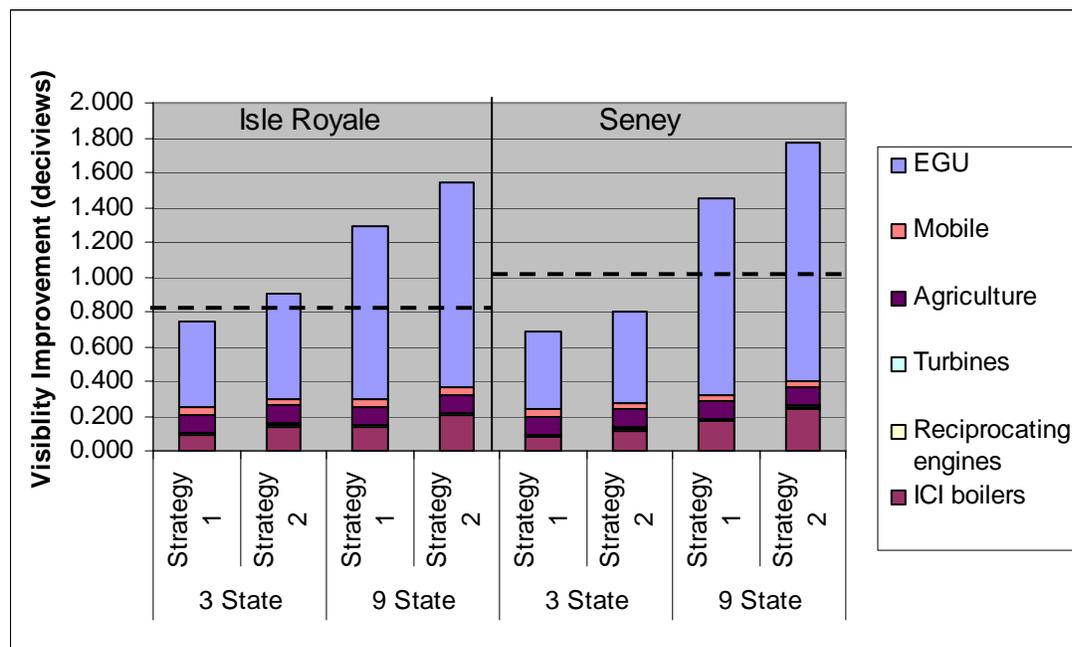


Figure 1: Source sector contribution to visibility improvement (deciviews) at Isle Royale and Seney on the 20 percent worst days for 2018 for possible additional control measures. Improvements are shown for a three-state and nine-state region where Strategy I or Strategy 2 is implemented for both NOX and SO2 (the mobile category does not have two strategy levels, thus the same level was used for both). The dashed line indicates the deciview improvement needed to reach the EPA's suggested URP glide path for 2018.

In order for most states in the nine-state region to implement either of the EGU strategies (EGU1 or EGU2) described in the EC/R report, large reductions in EGU emissions would be needed even when CAIR is fully implemented in 2018 (Appendix G, Table 1). As stated above, Michigan is not going beyond CAIR at this time, thus the suggested URP cannot be reached. Therefore, Michigan considered the URP glide path for 2018 unreasonable and not representing a reasonable progress goal for Michigan.

## 9.2 Comparison to Clean Air Act

The reasonable progress goal that was selected represents at least as much visibility improvement that is expected from implementation of other CAA requirements during the planning period. Appendix H shows our long-term strategy along with the CAA requirements that are being implemented.

## 9.3 Consultation

In determining a reasonable progress goal for each Class I area discussed above, Michigan has consulted with the other States/Tribes that are reasonably anticipated to

cause or contribute to visibility impairment in each of these Class I areas. Michigan is involved with monthly consultation calls with MRPO states, Minnesota, several other CENRAP states, tribes, FLMs, the Ontario Ministry of Environment, and Region 5 EPA. Minutes from these calls can be found on the MRPO website:  
[http://www.ladco.org/Regional\\_haze\\_consultation.htm](http://www.ladco.org/Regional_haze_consultation.htm)

#### 9.4 Reporting

Progress will be reported to the EPA every five years in accordance with 40 CFR 51.308(g).

## **10 Long-Term Strategy**

Rule 40 CFR 51.308(d)(3) requires Michigan to submit a long-term strategy that addresses regional haze visibility impairment for each mandatory Class I Federal area within and outside the state that may be affected by emissions from within the state. The long-term strategy must include enforceable emissions limitations, compliance schedules and other measures necessary to achieve the reasonable progress goals established by states where the Class I areas are located. This section describes how Michigan meets the long-term strategy requirements.

### **10.1 Consultation**

Rule 40 CFR 51.308(d)(3)(i) requires Michigan to consult with other states/Tribes to develop coordinated emission strategies. This requirement applies both where emissions from the state are reasonably anticipated to contribute to visibility impairment in Class I areas outside the state and when emissions from other States/Tribes are reasonably anticipated to contribute to visibility impairment in Class I areas within the state.

Michigan consulted with other states and Tribes by participation in the MRPO and inter-RPO processes that developed technical information necessary for development of coordinated strategies. Michigan also coordinated with MRPO and other RPOs to develop analyses that were used to develop the State's long-term strategy. Strategy development considered the impacts of the state's emissions on Class I areas within and outside the state. In addition to the monthly consultation calls described in Section 9.3, Michigan also consulted with the Mid-Atlantic Northeast-Visibility Union (MANE-VU) on calls and meetings (see Appendix I).

The State coordination with FLMs on long-term strategy development is described in Part 4.

### **10.2 Share of Emission Reductions**

Rule 40 CFR 51.308(d)(3)(ii) requires Michigan to demonstrate that its implementation plan includes all measures necessary to obtain its fair share of emission reductions needed to meet reasonable progress goals.

Michigan has determined that its reasonable progress constitutes on-the-books controls and other controls that upwind states will implement but that are not yet in place. This is described more fully in Part 9.

### 10.3 Technical Documentation

#### 10.3.1 Basis for Emission Reduction Obligations

Rule 40 CFR 51.308(d)(3)(iii) requires Michigan to document the technical basis for the state apportionment of emission reductions necessary to meet reasonable progress goals in each Class I area affected by the state's emissions. Michigan relied on technical analyses developed by MRPO and *Reasonable Progress for Class I Areas in the Northern Midwest—Factor Analysis* by EC/R Incorporated and the rationale described in Part 9 to demonstrate that the state's emission reductions, when coordinated with those of other States/Tribes, are sufficient to achieve reasonable progress goals in Class I areas affected by the states.

The demonstration of attainment of reasonable progress goals relies on the analysis of monitored and modeled data to determine whether visibility is improved on days when it is usually poor and does not deteriorate on days when it is usually good. Current visibility is estimated from monitored components of PM<sub>2.5</sub> and coarse mass.

The MRPO technical report on current visibility conditions is found in the Appendix E. MRPO technical reports on current and projected inventories (using base year 2005) and on regional modeling are still being completed, but parts can be found at the following website: [http://www.ladco.org/tech/emis/basem/baseM\\_reports.htm](http://www.ladco.org/tech/emis/basem/baseM_reports.htm). Michigan also relied on the EC/R report for its long-term strategy. This report can be found at: [http://www.ladco.org/MRPO\\_percent20Report\\_071807.pdf](http://www.ladco.org/MRPO_percent20Report_071807.pdf)

#### 10.3.2 Baseline Inventory

Rule 40 CFR 51.308(d)(3)(iii) requires Michigan to identify the baseline inventory on which the long-term strategy is based.

Michigan will use the 2005 MRPO Inventory Base M as its baseline inventory as described in Part 7.

### 10.4 Anthropogenic Sources of Visibility Impairment

Rule 40 CFR 51.308(d)(3)(iv) requires Michigan to identify all anthropogenic sources of visibility impairment considered by the State in developing its long-term strategy.

The 2005 inventory will contain these sources and will be submitted to the EPA when it is completed.

## 10.5 Factors the State Must Consider

Rule 40 CFR 51.308(d)(3)(v) requires Michigan to consider several factors in developing its long-term strategy. These are discussed below.

### 10.5.1 Emission Reductions Due to Ongoing Air Pollution Programs

Rule 40 CFR 51.308(d)(3)(v)(A) requires Michigan to consider emission reductions from ongoing pollution control programs.

Michigan accounted for on-the-books control programs listed in Appendix H in developing its long-term strategy.

### 10.5.2 Measures to Mitigate the Impacts of Construction Activities

Rule 40 CFR 51.308(d)(3)(v)(B) requires Michigan to consider measures to mitigate the impacts of construction activities. Isle Royale is an island that is only accessible by boat or helicopter and does not permit automobiles. Seney is located in the center of a large wilderness preserve. Neither of these Class I areas are likely to be exposed to any significant construction. Thus Michigan does not believe it is necessary to develop measures to mitigate construction.

### 10.5.3 Emission Limitations and Schedules of Compliance

Rule 40 CFR 51.308(d)(3)(v)(C) requires Michigan to identify additional measures to meet reasonable progress goals when ongoing programs alone are not sufficient to meet the goals.

Michigan believes that on-the-books controls provide sufficient measures to achieve reasonable progress goals, recognizing that there will be new additional reductions that will be occurring within and outside of Michigan in response to BART and other States' programs. Michigan is expecting to make additional reductions to meet the new PM2.5 NAAQS and the possible new ozone NAAQS, since many counties will likely be nonattainment for the new standards. These reductions, that are still to be determined, will likely reduce visibility impairment at Michigan's and other State's Class I areas.

### 10.5.4 Source Retirement and Replacement Schedules

Rule 40 CFR 51.308(d)(3)(v)(D) requires Michigan to consider source retirement and replacement schedules in developing reasonable progress goals.

Retirement and replacement will be managed in conformance with existing SIP requirements pertaining to PSD and New Source Review.

### 10.5.5 Agricultural and Forestry Smoke Management

Rule 40 CFR 51.308(d)(3)(v)(E) requires Michigan to consider smoke management techniques for the purposes of agricultural and forestry management in developing reasonable progress goals. Michigan is currently developing a Smoke Management Program (SMP) similar to *EPA's Interim Air Quality Policy on Wildland and Prescribed Fires*, and will certify in a letter to the Administrator of the EPA that a basic program has been adopted and implemented. (Special consideration will be given to air quality data resulting from fires managed for resource benefits.)

The SMP includes a process for assessing and authorizing burns. This includes: reporting of plan information to the administering agency that exceed the de minimis size of 20 acres with a fuel loading of less than 3 tons/acre for purposes of this plan.

- a. Location and legal description of the area to be burned.
- b. Personnel responsible for managing the fire.
- c. Type of vegetation to be burned.
- d. Area in acreage to be burned.
- e. Amount of fuel to be consumed (tons/acre).
- f. Fire prescription including smoke management components.
- g. Criteria the fire manger uses for the go-no-go decision.
- h. Safety and contingency plans; these will include addressing smoke intrusions.

The SMP also considers:

- Plan for the long-term minimization of emissions and impacts, including promotion of alternates to burning and the use of emission reduction techniques.
- Smoke management goals and procedures to be described in burn plans meeting the reporting requirement.
  - Actions to minimize emissions.
  - An evaluation of smoke dispersion.
  - Public notification and exposure reduction procedures to be implemented during air pollution episodes or smoke emergencies.
  - Air quality monitoring.
- Public education and awareness program development.
- Surveillance and enforcement of smoke management program compliance.
- Program and evaluation and a two-year plan review period for the initial implementation of the SMP.
- Optional programs; these may include special protection zones, buffer areas or performance standards.

#### 10.5.6 Enforceability of Emission Limitations and Control Measures

Rule 40 CFR 51.308(d)(3)(v)(F) requires Michigan to ensure that emission limitations and control measures used to meet reasonable progress goals are enforceable.

Michigan's authority for developing control programs is identified in Part 2, and such programs contain appropriate language to ensure enforceability.

#### 10.5.7 Anticipated Net Effect on Visibility resulting from Projected Changes to Emissions

Rule 40 CFR 51.308(d)(3)(v)(G) requires Michigan to address the net effect on visibility resulting from changes projected in point, area and mobile source emissions by 2018.

The emission inventory for Michigan projects changes to point, area and mobile source inventories by the end of the first implementation period resulting from population growth; industrial, energy and natural resources development; land management; and air pollution control. The 2005 and 2018 emissions inventory will be submitted to the EPA when it is completed. Photochemical modeling, as described in Part 3, quantifies the impact on visibility of all on-the-books control programs. Future modeling will also include impacts from yet-to-be implemented control programs.

## **11 Comprehensive Periodic Implementation Plan Revisions**

Rule 40 CFR 51.308(f) requires a State/Tribe to revise its regional haze implementation plan and submit a plan revision to the EPA by July 31, 2018 and every ten years thereafter. In accordance with the requirements listed in 40 CFR 51.308(f) of the federal rule for regional haze, Michigan commits to revising and submitting this regional haze implementation plan by July 31, 2018 and every ten years thereafter.

In addition, 40 CFR 51.308(g) requires periodic reports evaluating progress towards the reasonable progress goals established for each mandatory Class I area. In accordance with the requirements listed in 51.308(g) of the federal rule for regional haze, Michigan commits to submitting a report on reasonable progress to the EPA every five years following the initial submittal of the SIP. The report will be in the form of a SIP revision. The reasonable progress report will evaluate the progress made towards the reasonable progress goal for each mandatory Class I area located within Michigan and in each mandatory Class I area located outside Michigan that may be affected by emissions from within Michigan. All requirements listed in 51.308(g) shall be addressed in the SIP revision for reasonable progress.

## **12 Determination of the Adequacy of the Existing Plan**

Depending on the findings of the five-year progress report, Michigan commits to taking one of the actions listed in 40 CFR 51.308(h). The findings of the five-year progress report will determine which action is appropriate and necessary.

### List of Possible Actions – 40 CFR 51.308(h)

1. Michigan determines that the existing SIP requires no further substantive revision in order to achieve established goals. Michigan would provide to the Administrator a negative declaration that further revision of the SIP is needed at this time.
2. Michigan determines that the existing SIP may be inadequate to ensure reasonable progress due to emissions from other states that participated in the regional planning process. Michigan would provide notification to the Administrator and the states that participated in regional planning. Michigan would collaborate with states through the regional planning process to address the SIP's deficiencies.
3. Michigan determines that the existing SIP may be inadequate to ensure reasonable progress due to emissions from another country. Michigan would provide notification, along with available information, to the Administrator.
4. Michigan determines that the existing SIP is inadequate to ensure reasonable progress due to emissions within Michigan. Michigan would revise its SIP to address the plan's deficiencies within the required time period.

DRAFT State Implementation Plan  
Michigan Department of Environmental Quality  
Air Quality Division  
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