12. Long Term Strategy

40 CFR Section 51.308(d)(3) requires the State of Maine to submit a long-term strategy that addresses regional haze visibility impairment for each mandatory Class I Federal area within and outside the State which may be affected by emissions from within Maine. These Class I areas include: Acadia National Park; Great Gulf Wilderness Area; Presidential Range-Dry River Wilderness; Moosehorn Wilderness and Roosevelt Campobello International Park. The long-term strategy must include enforceable emissions limitations, compliance schedules, and other measures necessary to achieve the reasonable progress goals established by States/Tribes where the Class I areas are located. As described in Section 3.0, Regional Planning and Consultation, Maine consulted with states and tribes both within and outside MANE-VU when developing the emission management strategies in this SIP. The following describes how Maine meets the long-term strategy requirements of the Regional Haze Rule.

Maine's long term strategy includes enforceable emissions limitations, compliance schedules, and other measures necessary to achieve the reasonable progress goals established in Section 11. Additional measures may be reasonable to adopt at a later date after further consideration and review. In developing this long-term strategy, Maine also considered the requirements of the Clean Air Act, Section 110(a)(2)9D)(i)(ii), pertaining to interstate and international transport of pollutants. Maine has previously addressed this issue in its "Transport SIP Revision," submitted to EPA on April 24, 2008. As that document observed, states must include provisions in their implementation plans to prohibit any source or activity from emitting air pollutants in amounts that would interfere with another state's ability to prevent significant deterioration of air quality and visibility. The long-term strategy presented herein is designed to protect visibility in Maine as well as in areas outside of Maine that are affected by Maine emissions.

12.1 Overview of the Long Term Strategy Development Process

The regional strategy development process identified reasonable measures that would reduce emissions contributing to visibility impairment at MANE-VU Class I areas by 2018 or earlier. The process for identifying potential emission reduction measures and the technical basis for the long term strategy is discussed in the following sections.

As a MANE-VU member and participant, Maine supported a number of technical analyses that were developed to assist the MANE-VU states in deciding which regional haze control measures to pursue. These analyses are documented in the following reports:

- "Contributions to Regional Haze in the Northeast and Mid-Atlantic United States" (also known as the Contribution Assessment), August 3, 2006, NESCAUM (Attachment A).

- "Comparison of CAIR and CAIR Plus Proposal using the Integrated Planning Model®" (also known as the CAIR+ Report), May 30. 2007, ICF/MARAMA (Attachment U).
- "Assessment of Reasonable Progress for Regional Haze in MANE-VU Class I Areas" (also known as the Reasonable Progress Report), July 9, 2007, MACTEC/MARAMA (Attachment T).
- "Five-Factor Analysis of BART-Eligible Sources: Survey of Options for Conducting BART Determinations," June 1, 2007, NESCAUM (Attachment N).
- "Assessment of Control Technology Options for BART-Eligible Sources: Steam Electric Boilers, Industrial Boilers, Cement Plants and Paper and Pulp Facilities," March 7, 2005, NESCAUM (Attachment R).

12.2 The Regional Process for Identifying Potential Strategies

MANE-VU reviewed a wide range of potential control measures to reduce regional haze at the affected Class I areas by the 2018 milestone. The process of choosing a set of proposed regional haze control measures started in late 2005. The Ozone Transport Commission (OTC) selected a contracting firm to assist with the analysis of ozone and regional haze control measure options, and provided the contractor with a "master list" of some 900 potential control measures, based on experience and previous state implementation plan work. With the help of an internal OTC control measure workgroup, the contractor narrowed the list of available regional haze control measures for further consideration by MANE-VU.

MANE-VU then developed an interim list of control measures for regional haze. The identified control measures can be divided into three general categories:

- Beyond-CAIR sulfate reductions from electricity generating units (EGUs) and related control measures targeted at specific EGUs in the eastern United States;
- Low-sulfur heating oil (residential and commercial);
- Controls on ICI boilers (both coal and oil-fired);
- Controls on lime and cement kilns; and
- Controls on residential wood combustion, and outdoor burning (including outdoor wood boilers).

The next step was to further refine this list, with the aid of several of the reports named above. The CAIR Plus Report (Attachment U) documents MANE-VU's assessment of the costs of CAIR and provides a cost analysis for additional SO_2 and NO_x controls at EGUs in the eastern United States. The Reasonable Progress Report documents the assessment of control measures for EGUs and the other source categories selected for analysis. Further analysis is provided in the NESCAUM document entitled, "Assessment of Control Technology Options for BART-Eligible Sources: Steam Electric Boilers, Industrial Boilers, Cement Plants and Paper and Pulp Facilities."

The beyond-CAIR EGU strategy quickly became central to the MANE-VU long term strategy planning efforts, since EGU sulfate emissions are the largest contributor to

visibility impairment at MANE-VU Class I areas. Similarly, a low-sulfur oil strategy gained traction after a NESCAUM-initiated conference with refiners and fuel-oil suppliers concluded that such a strategy could fully implemented by 2018. Thus the low-sulfur heating oil and the oil-fired ICI boiler sector control measures merged into an overall strategy requiring the use of low-sulfur oil. Under this strategy, low-sulfur oil would be required for all residential and commercial heating units and all ICI boilers burning #2, #4, or #6 fuel oils.

During MANE-VU's internal consultation meeting in March 2007, member states reviewed the interim list of control measures to make additional refinements. States determined, for example, that there may be too few coal-fired ICI boilers in the MANE-VU states for that to be considered as a "regional" strategy, but those sources could be controlled on a state-by-state basis. The MANE-VU members also decided that lime and cement kilns, of which there are few in the MANE-VU region, would best be handled via the BART determination process. Residential wood burning and outdoor wood boilers remained on the list for those states where localized visibility impacts are a consideration, even though emissions from these sources are primarily organic carbon and direct particulate mater. Finally, the MANE-VU membership decided that the issue of outdoor wood burning should be examined further by individual states, because of concerns related to enforcement and penetration of existing state regulations[59].

12. 3 The Technical Basis for Strategy Development

40 CFR Section 51.308(d)(3)(iii) requires Maine to document the technical basis for the State's apportionment of emission reductions necessary to meet reasonable progress goals in each Class I area affected by its emissions. Maine relied on the technical analyses developed by MANE-VU to demonstrate that the Maine emission reductions, when coordinated with those of other States and Tribes, are sufficient to achieve reasonable progress goals in Class I areas affected by emissions originating in Maine.

The emission reductions necessary to meet reasonable progress goals in the Class I areas affected by Maine are described in the following documents:

- "Baseline and Natural Background Visibility Conditions—Considerations and Proposed Approach to the Calculation of Baseline and Natural Background Visibility Conditions at MANE-VU Class I Areas," December 31, 2006, NESCAUM (Attachment G).
- "The Nature of the Fine Particle and Regional Haze Air Quality Problems in the MANE-VU Region: A Conceptual Description," November 2, 2006, NESCAUM (Attachment V).

[59] Maine regulates outdoor burning activities through statute at 12 MRSA §9321 et seq. and through its 06-096 CMR Chapter 102 Open Burning and 06-096 CMR Chapter 150 Control of Emissions From Outdoor Wood Boilers rule.

- "Contributions to Regional Haze in the Northeast and Mid-Atlantic United States (also known as the Contribution Assessment)," August 31, 2006, NESCAUM (Attachment A).
- "Comparison of CAIR and CAIR Plus Proposal using the Integrated Planning Model® (also known as the CAIR+ Report) May 30, 2007, ICF/MARAMA (Attachment U).
- "Assessment of Reasonable Progress for Regional Haze in MANE-VU Class I Areas" (called the Reasonable Progress Report), July 9, 2007, MACTEC/MARAMA) (Attachment T).
- "Five-Factor Analysis of BART-Eligible Sources: Survey of Options for Conducting BART Determinations," June 1, 2007, NESCAUM (Attachment N).
- "Assessment of Control Technology Options for BART-Eligible Sources: Steam Electric Boilers, Industrial Boilers, Cement Plants and Paper and Pulp Facilities," March 7, 2005, NESCAUM (Attachment R).
- "MANE-VU Modeling for Reasonable Progress Goals: Model Performance Evaluation, Pollution Apportionment, and Control Measure Benefits," February 7, 2008, NESCAUM (Attachment P).
- "2018 Visibility Projections," March 31, 2008, NESCAUM (Attachment Q).

In addition, Maine relied on analyses conducted by neighboring RPOs, including the following documents, which are available upon request but are not incorporated into this SIP:

- VISTAS Reasonable Progress Analysis Plan by VISTAS, dated September 18, 2006.
- Reasonable Progress for Class I Areas in the Northern Midwest-Factor Analysis, by EC/R, dated July 18. 2007..

As described in Subsection 12.2, above, Maine worked with the other members of MANE-VU and with the Ozone Transport Commission to evaluate a large number of potential emission reduction strategies covering a wide range of sources of SO_2 and other pollutants contributing to regional haze. 40 CFR 51.308(d)(3)(v) requires states to consider several factors in developing their long-term strategies. Operating within this framework and using the available information about emissions and potential impacts, the MANE-VU Reasonable Progress Workgroup selected the following source categories for detailed analysis:

- Coal and oil-fired electric generating units, (EGUs);
- Point and area source industrial, commercial and institutional (ICI) boilers;
- Cement and lime kilns;
- Sources capable of using low-sulfur heating oil; and
- Residential wood combustion and open burning.

These efforts led to the selection of the emission reductions strategies presented in this SIP.

12.4 Emission Reductions Due to Ongoing Air Pollution Reduction Programs

40 CFR Section 51.308(d)(3)(v)(A) requires Maine to consider emission reductions from ongoing pollution control programs. In developing its Long Term Strategy, Maine considered emission control programs being implemented between the 2002 baseline period and 2018. The emission reduction programs described in Subsection 12.4.1, 12.4.2 and 12.4.3 below represent commitments already made by Maine and other states to implement air pollution control measures for EGU point sources, non-EGU point sources, and area sources, respectively. These control measures are the very same measures that were included in the 2018 emissions inventory and used in the modeling. While these control measures were not designed expressly for the purpose of improving visibility, the pollutants they control include those that contribute to visibility impairment in MANE-VU Class I Areas.

MANE-VU's 2018 "beyond on the way" (BOTW) emissions inventory accounts for emission controls already in place as well as emission controls that are not yet finalized but are likely to achieve additional reductions by 2018. The BOTW inventory was developed based on the MANE-VU 2002 Version 3.0 inventory and the MANE-VU 2018 on the books/on the way (OTB/OTW) inventory. Inventories used for other RPOs reflect anticipated emissions controls that will be in place by 2018. The inventory is termed "beyond on the way" because it includes control measures that were developed for ozone SIPs that were not yet on the books in some states. For some states it also included controls that were under consideration for Regional Haze SIPs that have not yet been adopted. More information may be found in the following documents:

- "Development of Emissions Projections for 2009, 2012, and 2018 for Non-EGU Point, Area, and Non-road Sources in the MANE-VU Region," February 2007, MACTEC/MARAMA (Attachment J)
- "Documentation of 2018 Emissions from Electric Generating Units in Eastern U.S. for MANE-VU Regional Haze Modeling," April 28, 2008, Alpine Geophysics/MARAMA (Attachment S)
- "MANE-VU Modeling for Reasonable Progress Goals: Model Performance Evaluation, Pollution Apportionment, and Control Measure Benefits," February 7, 2008, NESCAUM (Attachment P)
- "2018 Visibility Projections," March 31, 2008, NESCAUM (Attachment Q)

12.4.1 EGU Emissions Controls Expected by 2018

The following EGU emission reduction programs were included in the modeling used to develop the reasonable progress goals. These programs represent the greatest opportunities for reducing SO_2 emissions at Class I areas in the MANE-VU region and serve as the starting point for MANE-VU's long-term strategy to mitigate regional haze.

Clean Air Interstate Rule (CAIR). This major federal rule has been remanded to EPA to correct deficiencies. The original CAIR imposed permanent caps on sulfur dioxide (SO_2) and nitrogen oxides (NO_x) in the eastern United States by 2015. When fully effective, this program was expected to reduce SO_2 emissions in the CAIR region by up to 70 percent. The first phase of CAIR was implemented on an interim basis in 2009, and EPA is expected to issue a revised CAIR rule in response to the remand in 2010 or 2011. To predict future emissions from EGUs after implementation of CAIR, MANE-VU used the Integrated Planning Model (IPM).[60] Adjustments to the IPM output were made to provide a more accurate representation of anticipated controls at specific EGU sources as documented in the Alpine Geophysics report listed above. In making these adjustments, emission controls originating from the following states and regional programs were considered.

Connecticut EGU Regulations: Connecticut adopted the following regulations governing EGU emissions:

- *Regulations of Connecticut State Agencies (RCSA) section 22a-174- 19a*, limiting the SO_2 emission rate to 0.33 lb SO_2/MMBtu for fossil fuel-fired EGUs greater than 15 MW that are also Title IV sources. (Implementation status - 2007).
- *RCSA section 22a-174-22*, limiting the non-ozone seasonal NO_X emission rate to 0.15 lb NO_X/MMBtu for fossil fuel-fired EGUs greater than 15 MW. (Implementation status - 2007).
- *Connecticut General Statutes section 22a-199*, limiting the mercury (Hg) emission rate to 0.0000006 lb Hg/MMBtu for all coal-fired EGUs or alternatively coal-fired EGUs can meet a 90% Hg emission reduction. (Implementation status - 2008).

Delaware EGU Regulations: Delaware adopted the following regulations governing EGU emissions:

1. *Reg. 1144, Control of Stationary Generator Emissions*, SO_2, PM, VOC and NO_x emission control, state-wide, effective January 2006.

2. *Reg. 1146, EGUs, Electric Generating Unit (EGU) Multi-Pollutant Regulation*, SO_2 and NO_x emission control, state-wide, effective December 2007. SO_2 reductions will be more than regulation specifies.

[60] The IPM model runs also anticipated the implementation of EPA's Clean Air Mercury Rule (CAMR), which was recently vacated by the courts. However, MANE-VU believes that the adjustments made to the predicted SO_2 emissions from EGUs will have a larger effect on the air quality modeling analysis conducted for this SIP than will the vacatur of the CAMR rule. The emission adjustments were based on state's comments on the actual levels of SO_2 controls expected to be installed in response to state-specific regulations and EPA's CAIR rule. MANE-VU believes these adjustments improve the reliability of both the emission inventory and modeling results.

3. *Regulation No. 1148, Control of Stationary Combustion Turbine Electric Generating Unit Emissions*, requiring SO_2, NO_x and $PM_{2.5}$ emission controls, state-wide, effective January 2007.

Delaware estimates that these regulations will result in the following emission reductions for affected units: SO_2 emissions of 32,630 tons in 2002 will decline to 8,137 tons in 2018 (a 75 percent reduction); NO_x emissions of 8,735 tons in 2002 will decline to 3,740 tons in 2018 (a 57 percent reduction).

Also, Delaware anticipates the following reductions resulting from the consent decree with the Valero Refinery Delaware City, DE (formerly Motiva, Valero Enterprises). 2002 SO_2 levels of 29,747 tons will drop to 608 tons in 2018 (a 98 percent reduction). NO_x 2002 levels of 1,022 tons will fall to 102 tons in 2018 (a 90 percent reduction).

Maine EGU Regulations: *Chapter 145 NO_X Control Program,* limits the NO_X emission rate to 0.22 lb NO_X /MMBtu for fossil fuel-fired units greater than 25 MW built before 1995 with a heat input capacity between 250 and 750 MMBtu/hr, and which also limits the NO_X emission rate to 0.17 lb NO_X /MMBtu for fossil fuel-fired units greater than 25 MW built before 1995 with a heat input capacity greater than 750 MMBtu/hr. (effective 2007)

Massachusetts EGU Regulations: Based on the Massachusetts Department of Environmental Protection's *310 CMR 7.29, Emissions Standards for Power Plants,* adopted in 2001, six of the largest fossil fuel-fired power plants in Massachusetts must comply with emissions limitations for NO_x, SO_2, mercury, and CO_2. These regulations will achieve an approximately 50 percent reduction in NO_x emissions and a 50 - 75 percent reduction in SO_2 emissions compared to previous emissions. Depending upon the compliance path selected by the affected facilities, the facilities will comply with the output-based NO_x and SO_2 standards between 2004 and 2008. This regulation also limits the six grandfathered EGUs to a CO_2 emission rate of 1,800 lb/MWh.

New Hampshire EGU Regulations: New Hampshire adopted the following regulations governing EGU emissions:

- *Chapter Env-A 2900* capping NO_x emissions at 3,644 tons NO_x per year, SO_2 emissions at 7,289 tons SO_2 per year, and CO_2 emissions at 5,425,866 tons CO_2 per year for all existing fossil steam units by December 31, 2006.

- *Chapter Env-A 3200 NO_x Budget Trading Program* limiting ozone season NO_x emissions on all fossil fuel-fired EGUs greater than 15 MW to 0.15 lb/MMBtu, effective November 2, 2007.

New Jersey New Source Review Settlement Agreements: The New Jersey settlement agreement with PSEG required the following actions for specific EGUs:

- *Bergen Unit #2*: Repower to combined cycle by December 31, 2002.
- *Hudson Unit #2*: install Dry FGD or approved alternative technology by Dec. 31,

2006 to control SO_2 emissions, and operate the control technology at all times the unit operates to limit SO_2 emissions to 0.15 lb SO_2/MMBtu; install SCR or approved alternative technology by May 1, 2007 to control NO_X emissions and operate the control technology year-round to limit NO_X emissions to 0.1 lb NO_x/MMBtu; and install a baghouse or approved alternative technology by May 1, 2007 to control PM emissions and limit PM emissions to 0.015 lb PM/MMBtu.

- *Mercer Unit #1*: install Dry FGD or approved alternative technology by Dec. 31, 2010 to control SO_2 emissions and operate the control technology at all times the unit operates to limit SO_2 emissions to 0.15 lb SO_2/MMBtu, and install SCR or approved alternative technology by 2005 to control NO_X emissions, and operate the control technology ozone season only in 2005 and year-round by May 1, 2006 to limit NO_X emissions to 0.13 lb NO_X/MMBtu.
- *For Mercer Unit #2*: install Dry FGD or approved alternative technology by Dec. 31, 2012 to control SO_2 emissions, and operate the control technology at all times the unit operates to limit SO_2 emissions to 0.15 lb SO_2/MMBtu, and install SCR or approved alternative technology by 2004 to control NO_X emissions, and operate the control technology ozone season only in 2004 and year-round by May 1, 2006 to limit NO_x emissions to 0.13 lb NO_x /MMBtu.

The New Jersey settlement also requires coal with monthly average sulfur content no greater than 2% at units operating an FGD.

New York EGU Regulations: New York adopted the following regulations governing EGUs:

Title 6 NYCRR Parts 237, Acid Deposition Reduction NO_x Budget Trading Program, limits NO_X emissions on all fossil fuel-fired EGUs greater than 25 MW to a non-ozone season cap of 39,908 tons in 2007.

Title 6 NYCRR Parts 238, Acid Deposition Reduction SO_2 Budget Trading Program limits annual SO_2 emissions from all fossil fuel-fired EGUs greater than 25 MW to an annual SO_2 cap of 197,046 tons SO_2/year, starting in 2007 and an annual SO_2 cap of 131,364 tons SO_2/year starting in 2008.

North Carolina Clean Smokestacks Act: Enacted in 2002, this legislation requires that coal-fired EGUs achieve a 77 percent cut in nitrogen oxide (NO_x) emissions by 2009 and a 73 percent cut in sulfur dioxide (SO_2) emissions by 2013. This legislation also establishes annual caps on both SO_2 and NO_x emissions for the two primary utility companies in North Carolina, Duke Energy and Progress Energy. These reductions must be made in North Carolina, and allowances are not saleable.

Consent Agreements in the VISTAS region: The effects of the following consent agreements in the VISTAS states were reflected in the emissions inventories used for those states:

- *Santee Cooper*: A 2004 consent agreement calls for Santee Cooper in South Carolina to install and commence operation of continuous emission control

equipment for $PM/SO_2/NO_x$ emissions; comply with system-wide annual $PM/SO_2/NO_x$ emissions limits; agree not to buy, sell or trade SO_2/NO_x allowances allocated to Santee Cooper System as a result of said agreement; and to comply with emission unit limits of said agreement.

- *TECO*: Under a settlement agreement, by 2008, Tampa Electric in Florida will install permanent emissions-control equipment to meet stringent pollution limits; implement a series of interim pollution reduction measures to reduce emissions while the permanent controls are designed and installed; and retire pollution emission allowances that Tampa Electric or others could use, or sell to others, to emit additional NO_x, SO_2 and PM.
- *VEPCO*: Virginia Electric and Power Co. agreed to spend $1.2 billion between by 2013 to eliminate 237,000 tons of SO_2 and NO_x emissions each year from eight coal-fired electricity generating plants in Virginia and West Virginia.
- *Gulf Power 7*: A 2002 agreement calls for Gulf Power to upgrade its operation to cut NO_x emission rates by 61 percent at its Crist 7 generating plant by 2007 with major reductions beginning in early 2005. The Crist plant is a significant source of nitrogen oxide emissions in the Pensacola Florida, area.

12.4.2 Non-EGU Point Point Source Controls Expected by 2018

For non-EGU sources within MANE-VU, Maine relied on MANE-VU's Version 3.0 Emission Inventory for 2002. MACTEC conducted an analysis of various control measures as documented in "Development of Emission Projections for 2009, 2012, and 2018 for Non-EGU, Area, and Nonroad sources in the MANE-VU Region" (Attachment I). Control factors were applied to the 2018 MANE-VU inventory for non-EGUs to represent the following national, regional, or state control measures:

- NO_x SIP Call Phase I (NO_x Budget Trading Program) (except ME, NH and VT)
- NO_x SIP Call Phase II (except ME, NH and VT)
- NO_x RACT in 1-hour Ozone SIPs (already included in the 2002 inventory)
- NO_x OTC 2001 Model Rule for ICI Boilers
- 2-, 4-, 7-, and 10-year MACT Standards
- Combustion Turbine and RICE MACT (NO_x co-benefits not included-assumed to be minimal)
- Industrial Boiler/Process Heater MACT[61]
- EPA's Refinery Enforcement Initiative (Fluid catalytic cracking units and fluid coking units; process heaters and boilers; flare gas recovery; leak detection and repair; and benzene (wastewater))

[61] The inventory was prepared before the MACT for Industrial Boilers and Process Heaters was vacated. Control efficiency was assumed to be at 4 percent for SO_2 and 40 percent for PM.

In addition, states provided specific control measure information about specific non-EGU sources or regulatory programs in their state. For example, several states developed additional control measures in the course of their planning efforts to reduce ozone within the Ozone Transport Region (OTR). These control measures were included by MANE-VU in their inventories used for regional haze modeling. (The affected states may or may not have committed to adopting these measures in their ozone SIPs). For specific states, the ozone reduction strategies included in the modeling would reduce NO_x emissions from the following non-EGU point sources:

- Asphalt production plants in Connecticut, New Jersey, New York, and the District of Columbia;
- Cement kilns in Maine, Maryland, New York, and Pennsylvania; and
- Glass and fiberglass furnaces in Maryland, Massachusetts, New Jersey, New York and Pennsylvania.

For other regions, MANE-VU used emission inventory data developed by the RPOs for those regions, including VISTAS Base G2, MRPO's Base K, and CenRAP's emissions inventory. Non-EGU source controls incorporated into the modeling include the following consent agreements reflected in the VISTAS inventory:

- Dupont: A 2007 agreement calls for E. I. Dupont Nemours & Company's James River plant to install dual absorption pollution control equipment by September 1, 2009, resulting in emission reductions of approximately 1,000 tons SO_2 annually. The James River plant is a non-EGU located in the state of Virginia.
- Stone Container: A 2004 agreement calls for the West Point Paper Mill in Virginia owned by Smurfit/Stone Container to control with a wet scrubber the SO_2 emissions of the #8 Power Boiler. This control device should result in reductions of over 3,500 tons of SO_2 in 2018.

12.4.3 Area Source Controls Expected by 2018

For area sources within MANE-VU, Maine utilized MANE-VU's Version 3.0 Emissions Inventory for the 2002 base year. In general, MANE-VU developed the 2018 inventory for area sources by applying growth and control factors to the 2002 Version 3.0 inventory. Area source control factors were developed and incorporated in the modeling for the following national or regional control measures:

- OTC VOC Model Rules (Consumer Products, Architectural and Industrial Maintenance Coatings, Portable Fuel Containers, Mobile Equipment Repair and Refinishing and Solvent Cleaning);
- Residential Woodstove NSPS; and
- State-specific control strategies implemented since 2002.

The following additional control measures were included in the 2018 analysis to reduce VOC and NO_x emissions for the following area source categories for some states (as identified below):

- VOC control measures for adhesives and sealants (controls added in all MANE-VU states except VT);
- VOC control measures for emulsified and cutback asphalt paving (controls added in all MANE-VU states except ME, and VT);
- VOC control measures for consumer products (controls added in all MANE-VU states except VT);
- VOC control measures for portable fuel containers (controls added in all MANE-VU states except VT); and;
- NO_x control measures for the combustion of natural gas, no. 2, 4 and 6 fuel oil, and coal (CT, NJ, NY).

As noted above, inventory data for other regions were obtained from those Region's RPOs. Some of the area source control measures listed above may have been developed by states for the primary purpose of reducing ozone within the Ozone Transport Region (OTR)- see Subsection 12.4.2 for information on other measures included in state's ozone SIPs.

12.4.4 Mobile Sources Controls Expected by 2018

For the on-road mobile source emission inventory, Maine relied on MANE-VU's version 3.0 emission inventory, which included the following post-2002 emission control measures:

On-Board Refueling Vapor Recovery (ORVR) Rule: The 1990 Clean Air Act (CAA) Amendments contain provisions that require passenger cars to capture refueling emissions. In 1994, EPA published the ORVR rule establishing standards for refueling emissions controls for passenger cars and light trucks. The onboard controls were required to be phased in for all new car production by 2000 and for all light trucks by 2006. The rule established a refueling emission standard of 0.20 grams per gallon of dispensed fuel, which was expected to yield a 95 percent reduction of VOC emissions over uncontrolled levels. The CAA authorizes EPA to allow state and local agencies to phase out Stage II programs, even in the worst nonattainment areas, once EPA has determined that onboard systems are in "widespread use".

Heavy Duty Diesel (2007) Engine Emission Standards for Trucks and Buses: EPA set a PM emissions standard for new heavy-duty engines of 0.01 grams per brake-horsepower-hour (g/bhp-hr), to take full effect for diesel engines in the 2007 model year. This rule also includes standards for NO_x and non-methane hydrocarbons (NMHC) of 0.20 g/bhp-hr and 0.14 g/bhp-hr, respectively. These NO_x and NMHC standards will be

phased-in together between 2007 and 2010 for diesel engines. Sulfur in diesel fuel must be lowered to enable modern pollution-control technology to be effective on these trucks and buses. EPA began requiring the use of 500 ppm low sulfur diesel fuel in 1993. In 2006, the highway diesel sulfur content was lowered to 15ppm (ultra low sulfur diesel).

Tier 2 Motor Vehicle Standards: Tier 2 is a fleet averaging program, modeled after the California LEV II standards. Manufacturers can produce vehicles with emissions ranging from relatively dirty to zero, but the mix of vehicles a manufacturer sells each year must have average NO_x emissions below a specified value. Tier 2 standards became effective in the 2005 model year and are included in the assumptions used for calculating mobile source emissions inventories used for 2018.

12.4.5 Controls on Non-Road Sources Expected by 2018

For non-road emission sources, Maine used Version 3.0 of the MANE-VU 2002 Emissions Inventory. Because the NONROAD Model used to develop the nonroad source emissions did not include aircraft, commercial marine, and locomotives, MANE-VU's contractor, MACTEC, developed the inventory for these source categories. Nonroad mobile source emissions for the 2018 emission inventory were calculated with EPA's NONROAD2005 emissions model as incorporated in the NMIM2005 (National Mobile Inventory Model) database. The NONROAD model accounts for the emissions benefits associated with Federal non-road equipment emissions control measures such as the following:

- "Control of Air Pollution; Determination of Significance for Nonroad Sources and Emissions Standards for New Nonroad Compression Ignition Engines At or Above 37 Kilowatts," 59 FR 31306, June 17, 1994.
- "Control of Emissions of Air Pollution From Nonroad Diesel Engines," 63 FR 56967, October 23, 1998.
- "Control of Emissions From Nonroad Large Spark-Ignition Engines and Recreational Engines (Marine and Land-Based); Final Rule," 67 FR 68241, November 8, 2002.
- "Control of Emissions of Air Pollution From Nonroad Diesel Engines and Fuel; Final Rule," 69 FR 38958, June 29, 2004.

As noted above, the inventory information used for other regions was obtained from those region's RPOs.

12.5 Additional Reasonable Strategies

As required under 40 CFR Section 51.308(d)(3)(v), Maine and the other MANE-VU states applied a four-factor analysis to potential control measures for the purpose of establishing reasonable progress goals (See Subsection 11.4 for a detailed description). Reasonable measures include those that the affected states have already committed themselves to implementing, as described in Subsection 12.4, above. In addition, the MANE-VU states have identified other control measures that were found to be reasonable and were included in the modeling that was used to set reasonable progress goals. (These additional measures surpass the "beyond-on-the-way" emission controls and inventories). All of the control measures- those embodied in the states' commitments to existing or planned programs and the additional reasonable control measures described below- comprise the long-term strategy for improving visibility at MANE-VU Class I Areas.

Specifically, the MANE-VU long-term strategy includes the following additional measures to reduce pollutants that cause regional haze:

- Timely implementation of BART requirements;

- A low sulfur fuel oil strategy in the inner zone states (New Jersey, New York, Delaware, and Pennsylvania, or portions thereof) to reduce the sulfur content of:
  - Distillate oil to 0.05 percent sulfur by weight (500 ppm) by no later than 2012,
  - #4 residual oil to 0.25 percent sulfur by weight by no later than 2012,
  - #6 residual oil to 0.3 – 0.5 percent sulfur by weight by no later than 2012, and
  - Further reduce the sulfur content of distillate oil to 15 ppm by 2016;

- A low sulfur fuel oil strategy in the outer zone states (the remainder of the MANE-VU region) to reduce the sulfur content of:
  - Distillate oil to 0.05 percent sulfur by weight (500 ppm) by no later than 2014,
  - #4 residual oil to 0.25 percent-0.50 percent sulfur by weight by no later than 2018,
  - #6 residual oil to no greater than 0.5 percent sulfur by weight by no later than 2018, and
  - Further reduce the sulfur content of distillate oil to 15 ppm by 2018 depending on supply and availability;

- A 90 percent or greater reduction in sulfur dioxide (SO_2) emissions from each of the electric generating unit (EGU) stacks identified by MANE-VU (Attachment W) comprising a total of 167 stacks, dated June 20, 2007) as reasonably anticipated to cause or contribute to impairment of visibility in each mandatory Class I Federal area in the MANE-VU region. If it is infeasible to achieve that

level of reduction from a unit, alternative measures will be pursued in such State; and

- Continued evaluation of other control measures including energy efficiency, alternative clean fuels, and other measures to reduce SO_2 and nitrogen oxide (NO_x) emissions from all coal-burning facilities by 2018 and new source performance standards for wood combustion.

This suite of additional control measures are those that the MANE-VU states have agreed to pursue for the purpose of mitigating regional haze. The corollary is that the MANE-VU Class I states (Maine, New Hampshire, Vermont, and New Jersey) are asking states outside the MANE-VU region that contribute to visibility impairment inside the region to pursue similar measures. The control measures that non-MANE-VU states choose to pursue may be directed toward the same emission source sectors identified by MANE-VU for its own emission reductions, or they may be equivalent measures targeting other source sectors. Under the MANE-VU long-term strategy, states will be allowed until 2018 to pursue adoption and implementation of proposed control measures.

12.5.1 BART

Implementation of the BART provisions of the Regional Haze Rule (40 CFR 51.308(e)) is one of the reasonable strategies included in this SIP[62]. BART controls in Maine are identified in Section 10 of this SIP.

To assess the benefits of implementing the BART provisions of the Regional Haze Rule for non-EGU facilities, NESCAUM included estimated reductions anticipated for BART-eligible facilities in the MANE-VU region in the final 2018 CMAQ modeling analysis, as described previously in Subsection 11.5 of this SIP. The modeling assumed that 12 units at seven BART-eligible sources in MANE-VU would be controlled as a result of BART requirements alone. (see Table 12.1

Note that additional emission reductions will occur at many other BART-eligible facilities within MANE-VU as a result of controls achieved by either programs that serve as BART but are not specifically identified as such (e.g., RACT). While not specifically identified as being attributable to BART, these additional emission reductions were accounted for in the 2018 CMAQ modeling.

Additional visibility benefits are likely to result from the installation of new emissions controls at BART-eligible facilities that are located in neighboring RPOs. However, the MANE-VU modeling did not account for BART controls in other RPOs, and consequently, did not include the visibility improvements at MANE-VU Class I Areas that would likely result from such measures.

12.5.2 Low-Sulfur Oil Strategy

[62] For EGU's , EPA determined that CAIR would fulfill the BART requirement for his sector.

The important assumption underlying MANE-VU's low-sulfur fuel oil strategy is based on the production and use of home heating and fuel oils that contain 50% less sulfur for the heavier grades (#4 and #6 residual), and a minimum of 75% and maximum of 99.25% less sulfur in #2 fuel oil (also known as home heating oil, distillate, or diesel fuel) at an acceptably small increase in price to the end user. As much as three-fourths of the total sulfur reductions achieved by this strategy come from using the low-sulfur #2 distillate for space heating in the residential and commercial sectors. The costs of these emission reductions are estimated at $550 to $750 per ton, as documented in the MANE-VU Reasonable Progress Report. While the costs of the low-sulfur fuel oil strategy vary depending on market conditions, they appear to be reasonable when measured against the costs of controlling other sectors.

Maine has already adopted a low sulfur fuel strategy. The 124th Second Regular Session of the Maine Legislature (2010) adopted LD 1662, "An Act To Improve Maine's Air Quality and Reduce Regional Haze at Acadia National Park and Other Federally Designated Class I Areas," which implements the MANE-VU low sulfur fuel strategy in Maine. This legislation establishes a statewide sulfur limit for distillate fuels of 50 ppm in 2016, and 15 ppm in 2018. For residual (#6) fuel oil, the statewide sulfur limit will be reduced to 0.5% in 2018. The legislation also directs the Department to undertake rulemaking (to be completed by 2014) to adopt rules that provide an opportunity for a licensed air contamination source that holds a license on the effective date of the statute to apply for an equivalent alternative sulfur reduction strategy to the residual fuel oil and distillate fuel requirements. The rules must provide for the achievement of equivalent sulfur emission reductions through other means, including, but not limited to, reductions in consumption of residual fuel oil and distillate fuel, early sulfur emission reductions from a baseline emissions inventory year of 2002, and conversions. LD 1662, as adopted by the Maine Legislature and signed by Governor Baldacci on April 5, 2010, is attached in Attachment Z.

12.5.3 Targeted EGU Strategy

MANE-VU has identified emissions from the top 167 EGU emission points that contribute most to visibility impairment at MANE-VU Class I Areas (see Figure 12-1). Controlling emissions from these contributing facilities is crucial to mitigating haze pollution in wilderness areas and national parks of the northeast states.

MANE-VU's agreed regional approach for the EGU source sector is to pursue a 90 percent control level on SO_2 emissions from the 167 identified stacks by 2018. MANE-VU has concluded that pursuing this level of sulfur reduction is both reasonable and cost-effective. Even though current wet scrubber technology can achieve sulfur reductions greater than 95 percent, and overall 90-percent sulfur reduction level would include the effects of lower average reduction rates from dry scrubbing technology, consistent with historic experience. The costs of SO_2 reductions will vary by unit. The MANE-VU Reasonable Progress Report (Attachment T) summarizes the various control methods and costs, which range from $170 to $5,700 per ton, depending on site-specific factors such as the size and type of unit, combustion technology, and type of fuel used. Maine has one EGU identified in the MANE-VU analysis, Wyman Station Unit #4, which is located in

located in Yarmouth, Maine. As a signatory to the MANE-VU statement of principles (Attachment D), Maine is committed to pursue additional emission reductions at this facility through its low sulfur fuel oil program. Maine DEP believes that the use of low-sulfur fuel at this facility (in lieu of add-on controls) will provide the most cost-effective sulfur reductions, and that additional controls at this unit should be subsumed under the low-sulfur fuel strategy. For more detail on Maine's implementation of the Targeted EGU Strategy, see Section 12.9, below.

Several states have implemented state-specific EGU emission reduction programs. These commitments, identified below, are included in the long-term strategy as reasonable measures to meet MANE-VU's reasonable progress goals.

Maryland Healthy Air Act: Maryland adopted the following requirements governing EGUs:

- For NO_x:
  - Phase I (2009) sets unit specific annual caps (totaling 20,216 tons) and ozone season caps (totaling 8,900 tons).
  - Phase II (2012) sets unit specific annual caps (totaling 16,667 tons) and ozone season caps (totaling 7,337 tons).
- For SO_2:
  - Phase I (2010) sets unit specific annual caps (totaling 48,818 tons).
  - Phase II (2013) sets unit specific annual caps (totaling 37,235 tons).
- For mercury:
  - Phase I (2010) requires a 12-month rolling average of a minimum of 80% removal efficiency.
  - Phase II (2013) requires a: 12-month rolling average of a minimum of 90% removal efficiency.

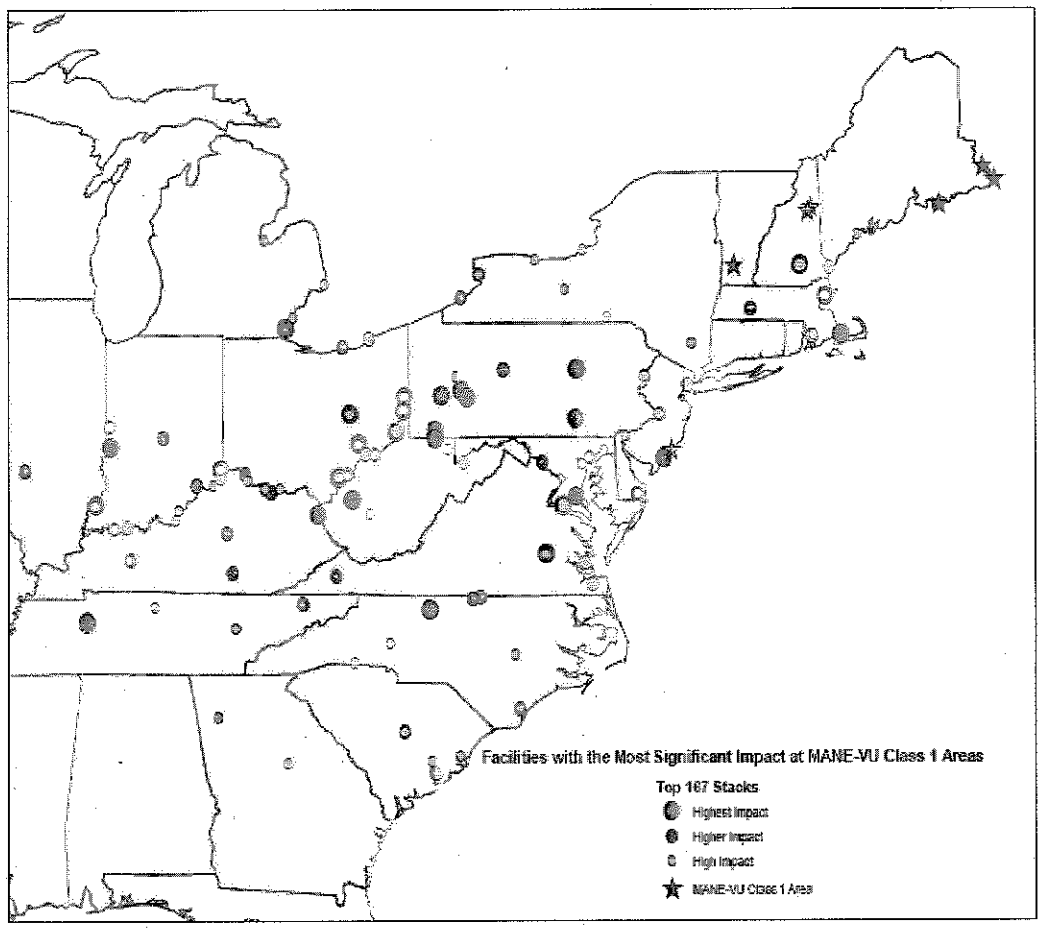
The specific EGUs included are: Brandon Shores (Units 1 and 2), C.P.Crane (Units 1 and 2), Chalk Point (Units 1, and 2), Dickerson (Units 1, 2, and 3), H.A. Wagner (Units 2 and 3) Morgantown (Units 1 and 2) and R. Paul Smith (Units 3 and 4). No out-of-state trading of emission allowances, no inter-company trading and no banking from year-to-year were included in this analysis

Table 12-1
Estimated Emissions from Non-CAIR Unit BART-Eligible Facilities Located in MANE-VU Used in Final Modeling

	Facility Name	Unit Name	SCC Code	Plant ID (from the MANE-VU Inventory)	Point ID (from the MANE-VU Inventory)	Facility Type	Fuel	2002 Emissions (tons)	2018 Emissions (tons)
MD	EASTALCO ALUMINUM	28	30300101	021-0005	28	Metal Production		1506	1356
MD	EASTALCO ALUMINUM	29	30300101	021-0005	29	Metal Production		1506	1356
MD	LEHIGH PORTLAND CEMENT	39	30500606	013-0012	39	Portland Cement		9	8
MD	LEHIGH PORTLAND CEMENT	16	30500915	021-0003	16	Portland Cement		1321	1,189
MD	LEHIGH PORTLAND CEMENT	17	30500915	021-0003	17	Portland Cement		976	878
MD	WESTVACO FINE PAPERS	2	10200212	001-0011	2	Paper and Pulp		8923	1338
ME	Wyman Station	Boiler 3	10100401	2300500135	004	EGU	Oil	616	308
ME	SAPPI Somerset	Power Boiler #1	10200799	2302500027	001	Paper and Pulp	Oil/Wood Bark/Process Gas	2884	1442
ME	IP Jay	Power Boiler #2	10200401	2300700021	002	Paper and Pulp	Oil	3086°	1543
ME	IP Jay	Power Boiler #1	10200401	2300700021	001	Paper and Pulp	Oil	2964°	1482
NY	KODAK PARK DIVISION	U00015	10200203	8261400205	U00015	Chemical Manufacturer		23798	14216
NY	LAFARGE BUILDING MATERIALS INC	41000	30500706	4012400001	041000	Portland Cement		14800	4440

° 1999 emissions

Figure 12-1
167 EGU Stacks Affecting MANE-VU Class I area(s)



Massachusetts EGU Regulations: Based on the Massachusetts Department of Environmental Protection's 310 CMR 7.29, Emissions Standards for Power Plants, adopted in 2001, six of the largest fossil fuel-fired power plants in Massachusetts must comply with emissions limitations. For mercury (Hg), 6 facilities must comply with: 85% Hg reduction or 0.0075 lbs Hg/GWh in 2008 and 90% Hg reduction or 0.0025 lbs Hg/GWh in 2012. The specific EGUs included are: Brayton Point (Units 1, 2, 3, 4, IC1, IC2, IC3, and IC4), Mystic (Units 4, 5, 6, 7, 307, 308, 309 and 310), NRG Somerset (Units 8, J1, and J2), Mount Tom (Unit 1), Canal (Units 1 and 2), and Salem Harbor (Units 1, 2, 3 and 4).

New Hampshire EGU Laws and Regulations: New Hampshire amended the following laws and regulations governing EGU emissions:

- RSA 125-O requires the installation of scrubbers on Merrimack Station (Units 1 and 2) by July 1, 2013 to control SO_2 and mercury emissions. This law allows State-level SO_2 credits for over- or early- compliance.

- Env-A 2900 sets limits for NO_x, SO_2, and CO_2 emissions by December 31, 2006 for all existing fossil EGUs.

New Jersey Hg MACT Rule: Under this rule, all coal-fired EGUs will have a mercury removal efficiency of 90%. (Some SO_2 reductions may occur as a result of this mercury rule.)

Consent Agreements in the VISTAS Region: The following consent agreements in the VISTAS states were reflected in the emissions inventories used for those states:

- *East Kentucky Power Cooperative*: A July 2, 2007 consent agreement between the EPA and East Kentucky Power Cooperative requires the utility to reduce its emissions of SO_2 by 54,000 tons per year and its emissions of NO_x by 8,000 tons per year, by installing and operating selective catalytic reduction (SCR) technology; low-NO_x burners, and PM and mercury Continuous Emissions Monitors at the utility's Spurlock, Dale and Cooper Plants. According to the EPA, total emissions from the plants will decrease between 50 and 75 percent from 2005 levels. As with all federal consent decrees, EKPC is precluded from using reductions required under other programs, such as CAIR, to meet the reduction requirements of the consent decree. EKPC is expected to spend $654 million to install pollution controls.
- American Electric Power: Under this agreement, American Electric Power will spend $4.6 billion dollars for emission controls at sixteen plants located in Indiana, Kentucky, Ohio, Virginia and West Virginia. These control measures will eliminate 72,000 tons of NO_x emissions each year by 2016 and 174,000 tons of SO_2 emissions each year by 2018.

12.6 Source Retirement and Replacement Schedules

40 CFR Section 51.308(d)(3)(v)(D) requires Maine to consider source retirement and replacement schedules in developing reasonable progress goals. Source retirement and replacement were considered in developing the 2018 emission inventory described previously in Subsection 11.2, Reasonable Progress Goals for Class I Areas in Maine. See also Table b-5 in the Emission Projections Report (Attachment N).

12.7 Additional Measures Considered

12.7.1 Measures to Mitigate the Impacts of Construction Activities

40 CFR Section 51.308(d)(3)(v)(B) requires Maine to consider measures to mitigate the impacts of construction activities on regional haze. MANE-VU's consideration of measures to mitigate the impacts of construction activities is documented in "Technical Support Document on Measures to Mitigate the Visibility Impacts of Construction Activities in the MANE-VU Region," Draft, October 20, 2006, MARAMA (Attachment X).

The construction industry is already subject to requirements for controlling pollutants that contribute to visibility impairment. For example, EPA's off-road engine standards and low sulfur fuel requirements result in reductions of PM and precursor emissions (SO_2 and NO_x) from construction vehicles.

At the state level, Maine currently regulates emissions of fugitive dust through its 06-096 CMR Chapter 101, Visible Emissions rules, which establishes opacity limits for emissions from several categories of air contaminant sources, including fugitive emissions from construction activities. Maine also regulates emissions from both on-road vehicles and construction activities through its 06-096 CMR Chapter 127 New Motor Vehicle Emission Standards rules (new motor vehicle emission standards), the 06-096 CMR Chapter 147 Diesel-Powered Motor Vehicle Emission Standards rules (opacity standards), and the 06-096 CMR General Permit Regulations for Nonmetallic Mineral Processing Plants rules. Non-road vehicles are subject to federal regulations.

MANE-VU's Contribution Assessment (Attachment B) found that, from a regional haze perspective, crustal material generally does not play a major role at MANE-VU Class I Areas. On the 20 percent best visibility days during the 2000-2004 baseline period, crustal material accounted for 6 to 11 percent of the particle-related light extinction at MANE-VU Class I Areas. On the 20 percent worst visibility days, however, the ratio was reduced to between 2 and 3 percent. Furthermore, the crustal fraction is largely made up of pollutants of natural origin (e.g., soil or sea salt) that are not targeted under the Regional Haze Rule. Nevertheless, the crustal fraction at any given location can be heavily influenced by the proximity of construction activities; and construction activities occurring in the immediate vicinity of MANE-VU Class I Areas could have a noticeable effect on visibility. The need for additional control measures for construction activities and their possible implementation will be evaluated in the first regional haze progress report.

12.7.2 Agricultural and Forestry Smoke Management

40 CFR Section 51.308(d)(3)(v)(E) requires Maine to consider smoke management techniques related to agricultural and forestry management in developing its long-term strategy. MANE-VU's analysis of smoke management in the context of regional haze SIPs is documented in "Technical Support Document on Agricultural and Forestry Smoke Management in the MANE-VU Region," September 1, 2006, MARAMA (Attachment Y).

As noted in this report, fires used for resource management are of far less significance to the total inventory of fine-particle pollutant emissions than other sources of wood smoke in the region. The largest wood smoke source categories, with respect to PM2.5 emissions, are residential wood combustion (73 percent); open burning (15 percent); and industrial, commercial and institutional wood combustion (9 percent). Unwanted fires involving buildings and wild lands make up only a minor fraction of wood burning emissions and cannot be reasonably addressed in this SIP. Fires that are covered under

smoke management plans, including agricultural and prescribed forest burning, constitute less than one percent of total wood smoke emissions in MANE-VU[63].

Moreover, smoke emissions from all sources represent only a minor fraction of fine-particle mass that is the cause of regional haze. MANE-VU's Contribution Assessment (Attachment A) found that elemental carbon, the main ingredient of smoke, contributed only 3 to 4 percent of fine particle mass on days of worst and best visibility. Additionally, elemental carbon absorbs light more readily than it scatters light. It is therefore reasonable to conclude that smoke emissions from controlled agricultural and forestry burning contribute, on average, only a small fraction of one percent of total light extinction on days of both good and poor visibility. Maine has no information to indicate that this situation would change significantly over the next decade.

12.7.3 Control of Residential and Commercial Wood Combustion Emissions

As noted in Section 8, residential wood combustion is responsible for 25 percent of primary fine particulate emissions in the MANE-VU region, and is a significant contributor to regional haze. Maine has adopted regulations to address emissions from outdoor wood and pellet boilers, an outdoor wood boiler replacement and buy-back program, and a woodstove replacement buy-back program.

The Chapter 150 Control of Emissions from Outdoor Wood Boilers Rule

In June 2007, the Maine Legislature adopted the EPA Phase I particulate emission limit of 0.60 lbs/MMBtu/hr heat input as the standard for new outdoor wood-fired hydronic heaters (OWHH), also known as outdoor wood boilers, sold in Maine beginning April 1, 2008. Beginning April 1, 2010 new OWHH sold in Maine are required to meet a more stringent particulate emission standard of 0.32 lbs/MMBTU heat output (Phase II).

06-096 CMR Chapter 150 Control of Emissions from Outdoor Wood Boilers, which incorporated the OWHH particulate emission standards adopted by the Legislature, became effective November 1, 2007, and also established setback, stack height, particulate emission limits, and fuel requirements for outdoor wood boilers (See Attachment BB). Chapter 150 was subsequently amended[64] to control the sale, installation, use, and siting of outdoor wood boilers that combust biomass pellets as fuel. Maine is submitting this rule to EPA for incorporation into the Regional Haze SIP.

The Chapter 160, Outdoor Wood Boiler Replacement and Buy Back Program:

In April 2008, the Maine Legislature also enacted Public Law, Chapter 680, An Act Establishing an Outdoor Wood Boiler Fund. This Public Law established a nonlapsing fund administered by commissioner to be used by the Department to upgrade, purchase and replace outdoor wood boilers that create a nuisance condition as defined in the

[63] For example, PM2.5 and PM10 emissions from agricultural burning and forestry management activities account for only 0.139% and 0.157% of total wood smoke emissions (Source: 2002 MANE-VU Modeling Inventory Version 3.0).

Department's rules or threat to public health or safety, and directed the Department to develop a rule that includes, but not limited to, criteria for determining whether an outdoor wood boiler constitutes a nuisance condition or threat to public health or safety and is eligible for use of the fund, compensation criteria and amounts and procedures for certification and verification of removal and possible replacement of eligible outdoor wood boilers.

Pursuant to this legislation, the Department adopted the 06-096 CMR Chapter 160, Outdoor Wood Boiler Replacement and Buy Back Program rules, which establish a replacement and buy back program to remove nuisance outdoor wood boilers that were installed prior to February 1, 2008 and replace them with approved heating appliances. The Department will maintain a list of nuisance outdoor wood boilers and prioritize them for the program based on the threat to public health and safety and proximity to neighbors and sensitive populations. To receive compensation, the owner of the outdoor wood boiler must have explored all possible remedies, including increasing the stack height and setback distances to neighbors and potential retrofits to eliminate the nuisance conditions. Compensation may include the cost of installation and disposal and shall not exceed $15,000.

The Residential Wood Stove Replacement Fund

On April 8, 2010, the Maine Legislature enacted 38 MRSA §610-D, which established a residential woodstove replacement program in the Maine Department of Environmental Protection. Under this program, eligible participants will be able to receive funding toward the purchase of new cleaner-burning residential heating appliances to replace older wood stoves that are not certified by the EPA lower emitting residential heating appliances, such as EPA certified wood, pellet or vented gas stoves. The Department will be establishing eligibility criteria for program participation, benefits, and approved methods for replacement and disposal of non-certified wood stoves.

12.8 Estimated Effects of the Long-Term Strategy on Visibility

40 CFR 51.308(d)(3)(v)(G) requires Maine to consider, in developing its long-term strategy, the anticipated net effect on visibility due to projected changes in point, area and mobile source emissions over the period addressed by the long-term strategy. NESCAUM conducted modeling to evaluate the expected improvements to visibility at affected Class I Areas by 2018 as a consequence of implementing MANE-VU's long-term strategy. Those visibility improvements will result, in part, from the efforts identified in this SIP to reduce emissions that originate in Maine.

All Class I states affected by emissions originating in Maine have (or will have) established reasonable progress goals for 2018 for each of their Class I Areas. The control measures included in this SIP represent the reasonable efforts of Maine, in conjunction with the efforts of other MANE-VU states, toward achieving the reasonable progress goals established by the affected states.

Based on the most recent MANE-VU modeling, the proposed control measures will reduce sulfate levels at affected Class I Areas by about one-third on the worst visibility days and by 6 to 31 percent on the best visibility days by 2018. Nitrate and elemental carbon levels will also show substantial reductions across all areas for both bets and worst days, while smaller reductions in organic carbon will occur. Small increases are predicted for the fine soil component of regional haze. There is the possibility that the predicted increases in this component are not real but, rather, related to structural differences in the data sets used in the modeling for the baseline and future years[65]. No changes were predicted for sea salt because the model does not track this component.

The 2000-2004 visibility readings at affected Class I areas provide the baseline against which future visibility readings will be measured to assess progress deriving from implementation of Maine's Regional Haze SIP and those of the other MANE-VU states. To determine baseline visibility for affected Class I areas, the 2000-2004 IMPROVE monitoring data was used to calculate the average deciview values for the 20 percent best visibility days and the 20 percent worst visibility days over that period. Thus, the 20 percent best day and 20 percent worst day values represent average visibility conditions for the top and bottom quintiles.

To create the series of visibility graphs which follow, 2018 visibility estimates were made in accordance with EPA modeling guidance. First, 2002 daily average baseline concentrations were multiplied by their corresponding relative reduction factors to obtain 2018 projected concentrations for each day. The 2018 projected concentrations were then used to derive daily visibility in deciviews. As a final step, the deciview values for the 20 percent of days having best visibility were averaged, and the process repeated for the 20 percent of days having worst visibility. The resulting averages represent the projected upper and lower quintiles of visibility in 2018.

The following is provided to assist with interpretation of the line graphs in Figures 12.2 through 12.7. Note that lower deciview values indicate better visibility.

- The irregular blue line (~) represents the 20 percent best visibility average value as determined from monitoring data for each year of the period 2001-2005.
- The irregular red line (~) represents the 20 percent worst visibility average value as determined from monitoring data for each year of the period 2001-2005.
- The straight orange line (—) represents the 20 percent best visibility average value as determined from monitoring data for the 5-year period of 2000-2004. (This line represents the *20 percent best visibility baseline condition.*)
- The straight blue line (—) represents the 20 percent worst visibility average value as determined from monitoring data for the 5-year period of 2000-2004. (This line represents the *20 percent worst visibility baseline condition.*)

[65] Specifically, the fire emissions inventory used in VISTAS for the base year relied on an earlier version of fire emissions data than the one used for the 2018 inventory.

- The straight broken line (· · · ·) is a continuation of the 20 percent best visibility baseline, representing the 20 percent best visibility condition as it would be with no further degradation or improvement.

- The straight green line (—) represents the 20 percent worst visibility values that establish the uniform rate of progress for the period 2004-2064. (This line is sometimes referred to as the *uniform progress line*, or *"glide slope."* It was created by linear interpolation between the 20 percent worst visibility baseline value in 2004 and the 20 percent worst visibility value under natural conditions in 2064. If visibility improvements match this rate of progress, actual visibility will return to natural conditions in 2064).

- The light-green dash (---) shown at 2064 represents the theoretical 20 percent best visibility value under natural conditions (i.e., no anthropogenic emissions).

- The purple star (*) represents the 20 percent best visibility value in 2018 after implementation of MANE-VU's long-term strategy, as predicted by the CMAQ model. (This value is a *reasonable progress goal.*)

- The blue star (*) represents the 20 percent worst visibility value in 2018 after implementation of MANE-VU's long-term strategy, as predicted by the CMAQ model. (This value is a *reasonable progress goal.*)

Figures 12-2 through 12-4 are line graphs showing anticipated visibility improvements for the MANE-VU Class I Areas affected by emissions originating in Maine. Figures 12-2 and 12-3 illustrate the predicted visibility improvement at Acadia National Park and Moosehorn National Wildlife Refuge/Roosevelt Campobello International Park by 2018 resulting from the implementation of the long-term strategy (See the blue cross mark). This improvement is compared to the Uniform Rate of Progress for affected Class I areas (see green sloping line). Note that the blue cross mark is below than the green line as it passes over the 2018 date marked at the bottom of the chart. This indicates that the control measures identified in this SIP provide visibility improvements exceeding the uniform rate of progress for reaching natural visibility in 2064. The lower number of deciviews means better visibility.) Figure 12-4 demonstrates that Great Gulf Wilderness Class I area in New Hampshire, which is significantly affected by Maine emissions, is also projected to meet or exceed the uniform rate of progress goal for 2018. All Class I areas affected by Maine emissions are also projected to have no degradation from current baseline best visibility.

12.9 Implementation of the Regional Haze Strategies in Maine

40 CFR Section 51.308(d)(3)(ii) of the Regional Haze Rule requires Maine to demonstrate that its implementation plan includes all measures necessary to obtain the emission reductions needed to meet the reasonable progress goals. The modeling analysis referenced in Subsection 12.8 (Figures 12-2 through 12-4) above, which demonstrates that Maine's long-term strategy is sufficient to meet reasonable progress

goals, is predicated on Maine (and other MANE-VU) states reducing their SO_2 emissions as a result of a number of emission control programs.

Figure 12-2
Projected Visibility Improvement at Acadia National Park Based On 2018 Best and Final Projections

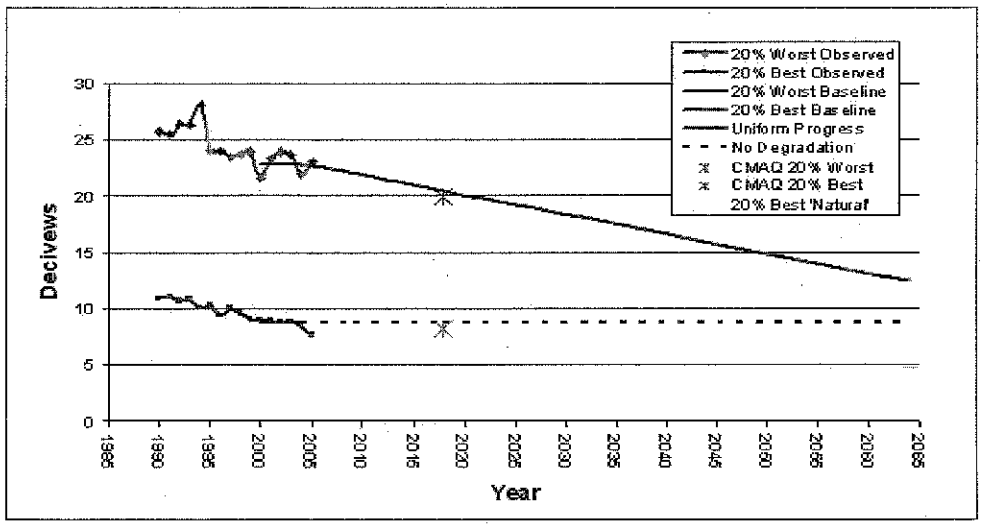


Figure 12-3
Projected Improvement in Visibility at Moosehorn National Wildlife Refuge and Roosevelt Campobello International Park based on 2018 Best and Final Projections

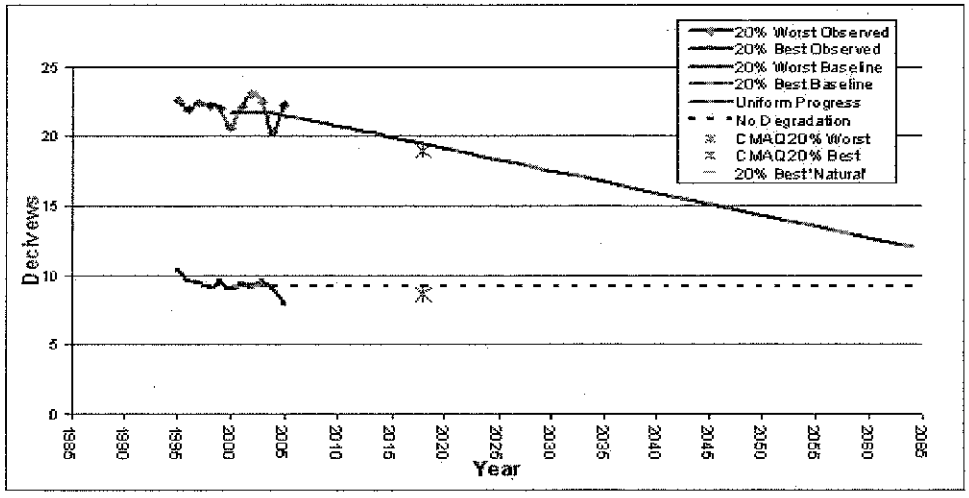
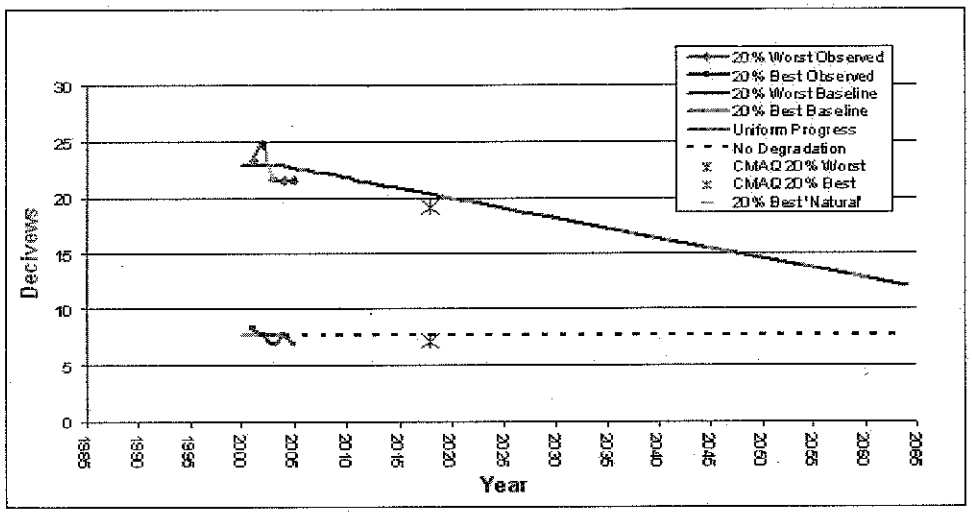


Figure 12-4
Projected Visibility Improvement at Great Gulf Wilderness
Based on Most Recent Projections for 2018



As previously noted, Maine has adopted, and will implement, the following measures as part of its long-term strategy to meet the reasonable progress goals:

1. A low sulfur fuel oil strategy in accordance with the MANE-VU statement providing SO_2 reductions for Wyman Station, ICI boilers, and residential heating units;
2. Timely implementation of BART requirements yielding a 50 percent or greater reduction in SO_2 emissions from Maine sources subject to BART;
3. A program to reduce SO_2 emissions at the Wyman Station #4 boiler by at least 84 percent from uncontrolled levels; and
4. A comprehensive program to reduce wood smoke emissions from outdoor wood and pellet boilers, woodstoves and other wood-burning devices.

12.9.1 The Maine Low Sulfur Oil Program

The Maine Low Sulfur Oil Program, as enacted by Public Law Chapter 604, (See Attachment Z), instituted the following restrictions on fuel sulfur content for residual (#4, #5, and #6) and distillate oil:

(1) Beginning January 1, 2018; a person may not use residual oil with a sulfur content greater than 0.5% by weight;

(2) Beginning January 1, 2016, a person may not use distillate oil with a sulfur content greater than 0.005 % by weight; and

(3) Beginning January 1, 2018, a person may not use distillate oil with a sulfur content greater than 0.0015 % by weight.

In addition to the low sulfur requirements for distillate and residual oil, the program contains two elements not included in the MANE-VU Low Sulfur Oil Strategy. These elements include:

1) An exemption from the low sulfur content limits for sources using distillate fuel for manufacturing purposes; and

2) Equivalent alternative sulfur reduction application. The Department of Environmental Protection is required to adopt major substantive rules[66] that provide an opportunity for a licensed air contamination source that holds a license on the effective date of this subsection to apply for an equivalent alternative sulfur reduction strategy to the residual fuel oil and distillate fuel requirements. The rules must provide for the achievement of equivalent sulfur emission reductions through other means, including, but not limited to, reductions in consumption of residual fuel oil and distillate fuel, early sulfur emission reductions from a baseline emissions inventory year of 2002 and conversions to alternative fuels. Approved alternate sulfur reduction strategies must be in effect by January 1, 2018.

The Distillate Fuel Exemption

The Department does not believe that the low sulfur content limit exemption for manufacturing purposes will have a significant impact on the emission reductions afforded by this strategy for 2018 and beyond. While the exemption allows the continued use of high-sulfur[67] distillate oil at several manufacturing facilities, there are structural impediments to the actual use of these fuels. First, since there is only a limited potential market for high-sulfur distillate[68] the Department believes that this fuel will not be readily available, and will likely be more expensive than the more widely-used 15 ppm distillate. Distributors and wholesalers of distillate fuels have noted that supplying high-sulfur distillate to a limited market introduces additional costs to their industry in the form of segregated storage and transportation/delivery systems, since even incidental contamination (co-mingling) can lead to non-compliance issues.

Very small amounts of higher sulfur product can contaminate ultra low sulfur distillate, as illustrated in Figure 12-5, below. Since less than 7 gallons of high sulfur distillate can contaminate an entire truck load of ultra-low sulfur distillate fuel, segregated storage and transportation/delivery systems are probably the only mechanism that can assure compliance with federal and state ULSD requirements for the petroleum marketing industry. Given the low demand, and additional storage, transportation and delivery costs, the Department does not believe that high sulfur distillate fuel will be widely used by the manufacturing sector in 2018 and later.

[66] Rules must be adopted and submitted to the Maine Legislature for approval by January 1, 2014.
[67] Containing 2,000-5,000 ppm sulfur.
[68] All other users of distillate (diesel) fuel in Maine will be subject to the 15 ppm sulfur limits (including general use and space heating at manufacturing facilities).

Figure 12-5
Contamination of Ultra Low Sulfur Distillate (Diesel) Fuel

Fuel Type	Amount of non-ULSD added to 7,500 gallons of ULSD		
	7 gallons (0.1%)	37 gallons (0.5%)	75 gallons (1%)
500-ppm Fuel	+0.5 ppm	+2.5 ppm	+ 5.0 ppm
2,000 ppm Fuel	+2.0 ppm	+10.0 ppm	+ 20.0 ppm
5,000 ppm Fuel	+5.0 ppm	+ 25.0 ppm	+50.0 ppm

As noted above, Maine believes that future (2018) use of distillate fuel by the manufacturing sector will be limited due to cost and compliance concerns. Nevertheless, projected 2018 SO_2 emissions for Maine have been adjusted to address this exemption, and its impact on non-EGU point source emissions, as discussed in Section 12.10, below.

The Equivalent Alternative Sulfur Reduction Application
Under this provision of the Maine low sulfur oil program, the Department of Environmental Protection is required to adopt rules providing an opportunity for a licensed source that holds an air emission license to apply for an equivalent alternative sulfur reduction strategy to the residual fuel oil and distillate fuel requirements. Since these rules will require sulfur emission reductions that are equivalent to the use of 0.5% sulfur residual or 0.0015% sulfur distillate fuel, there will be no net change to the predicted SO_2 emission reductions provided by this strategy. The Department will be working with EPA to develop these rules, and will submit them for inclusion into the SIP.

12.9.2 BART in Maine

As required by 40 CFR §51.308(e), the Maine Regional Haze SIP includes emission limitations representing Best Available Retrofit Technology (BART) and schedules for compliance with BART for each BART-eligible source that may reasonably be anticipated to cause or contribute to any impairment of visibility in any mandatory Class I Federal area. Maine's implementation of the BART requirements is fully discussed in Section 10.

12.9.3 The Targeted EGU Strategy in Maine

As noted in section 12.5.3, above, MANE-VU's agreed regional approach for the EGU source sector is to pursue a 90 percent control level on SO_2 emissions from the 167 identified stacks by 2018. Maine has one EGU identified in the MANE-VU analysis; FPL Energy (FPLE) Wyman Station Unit #4.

FPLE Wyman Station is an 850-megawatt electric generating facility located on Cousins Island in Yarmouth, Maine. The facility consists of four generation units, all of which fire #6 residual fuel oil. The fifth unit is a smaller oil-fired auxiliary boiler which provides building heat and auxiliary steam, and the sixth unit is an emergency backup diesel generator that provides electricity for use on-site.

Unit #4 is powered by a Foster Wheeler boiler with a maximum design heat

input of 6290 MMBtu/hr, firing #6 and #2 fuel oil. This unit is equipped with 30 front wall fired burners capable of firing up to 41,333 gal/hr. Boiler #4 was manufactured in 1974 and installed in 1975, and therefore is subject to the New Source Performance Standards (NSPS) Subpart D, but not Subpart Da. Unit #4 is a peaking unit, and operated at an average annual capacity factor of less than 10 percent between 2002 and 2009[69], with annual SO_2 emissions of 1,170 tpy in 2002.

Although flue gas desulfurization (FGD) through the use of a wet, semi-dry or dry scrubber is technically feasible, this technology is cost prohibitive due to the low-capacity factor of this unit and site-specific restrictions. In lieu of requiring add-on controls, Maine will be utilizing its low-sulfur fuels program to implement the MANE-VU Targeting EGU Strategy at this unit. The Maine Low Sulfur Fuel Program will require the use of low-sulfur fuel containing no more than 0.5% sulfur beginning January 1, 2018, providing an 84 percent reduction from baseline (3.0% sulfur) fuel.

Maine is also committing to further analyze the visibility benefits that would be provided by the use of 0.3% sulfur fuel, and to require the use of this fuel (or an equivalent emissions rate) no later than January 1, 2018, if necessary to meet the reasonable progress goals at Class I areas in Maine or any other Class I area significantly affected by Maine emissions. Maine is committing to undertake this analysis no later than January 1, 2013 as part of its 5-year periodic implementation plan revision.

12.9.4 Wood Smoke Emission Reductions Strategies in Maine

Strategies to reduce wood smoke emissions in Maine will also provide significant reductions in regional haze. As detailed in Section 12.7.3, Maine has adopted a comprehensive suite of programs designed to reduce wood smoke emissions from outdoor wood and pellet boilers and residential wood stoves. Since the visibility improvements provided by these programs were not modeled as part of the MANE-VU process, Maine has included these programs in its Regional Haze SIP as SIP enhancements, or strengthening measures. The 06-096 CMR Chapter 150 Control of Emissions from Outdoor Wood Boilers (Attachment BB), is included for incorporation in the Maine Regional Haze SIP.

12.10 Maine's Share of Emission Reductions

Implementation of the long-term strategy will produce significant reductions in Maine's emissions inventory by the end of the first planning period, or 2018. Changes to the emissions inventory will also occur as a result of population growth; changes in land use and transportation; development of industrial, energy, and natural resources; and other air pollution measures not directly relate to regional haze. However, it is the expected reductions in SO_2 emissions that will have the greatest effect on visibility improvement at MANE-VU Class I Areas; and those reductions will be largely due to the implementation of the control measures developed in this SIP.

As noted in Subsection 12.9 (above) the emission controls included in the Maine Regional Haze SIP are generally consistent with those modeled in MANE-VU's

[69] For comparison, the nationwide capacity factor for coal-fired generation in 2008 was 72.2 percent.

development of reasonable progress goals for Maine and the other MANE-VU Class 1 states (see Section 11.2, above). However, since the Maine Low Sulfur Oil Program and efforts to reduce emissions at Wyman Station Unit #4 differ slightly from the programs and emission reductions modeled as reasonable progress goals, Maine must demonstrate that its long-term strategy will achieve the reasonable progress goals established by the Regional Haze SIP.

In an effort to demonstrate that the long-term strategy established by this SIP will achieve the modeled reasonable progress goals, Maine undertook a more refined analysis of its projected 2018 SO_2 emissions that is based on the 2008 Maine DEP Point Source Inventory.[70] The Maine analysis updated projected SO_2 emissions for point sources that included only the reductions provided by the use of 0.5% sulfur residual oil as implemented by the Maine Low Sulfur Fuel Program.[71] While this approach is necessarily very conservative, and does not capture all of the reductions provided by the use of low sulfur residual and ultra-low sulfur distillate fuel in Maine, it is more than sufficient to demonstrate that projected future emissions in Maine will be well below the level used to establish reasonable progress goals. The documentation for this effort and the updated Maine 2018 Projected Point Source Inventory are contained in Attachment AA.

After accounting for all facilities that ceased operation and/or surrendered their air emission licenses between 2001 and 2009 (25 sources) and accounting for the reductions provided by the use of 0.5% residual fuel, Maine's updated 2018 projected point source emissions were 8,445 tpy for all point sources (EGU and non-EGU combined); well below the 19,888 tpy utilized in the MANE-VU reasonable progress modeling.

Table 12-3, below, illustrates the MANE-VU 2002 (baseline) and MANE-VU 2018 (modeling) inventories for Maine, along with the Maine updated 2018 [projected inventories. The emission inventory for Maine 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. Table 12-4 compares the percentage reductions (SO_2) for the MANE-VU region and Maine for each source category. The implementation of the Long Term Strategy will reduce Maine's SO_2 emissions by 73.4 percent, as compared to the compared to the projected reduction of 67.5 percent in the MANE-VU region. Further information on Maine's emissions inventory, including other pollutants that contribute to visibility impairment, is available in Section 8.0, Emissions Inventory, and in Attachments I and AA.

[70] Since the Maine long-term strategies for non-point sources do not differ from those modeled, it is not necessary to update other source categories at this point in time.

[71] The Department's analysis did not include any reductions from the use of ULSD (15 ppm) at point sources.

Table 12-3
SO_2 Emissions from Point, Area and Mobile Sources in Maine
(tpy)

Source Category	MANE-VU 2002 Baseline	MANE-VU 2018 Modeling	Maine (Updated) 2018 Projected
On-Road Mobile	1,804	894	894
Non-Road Mobile	917	82	82
EGU Point	9,299	6,806	
Non-EGU Point	14,412	13,082	8,445
Area	13,149	1,127	1,127
TOTAL	39,581	21,991	10,548

Table 12-4
SO_2 Emissions from Point, Area and Mobile Sources in the MANE-VU Region and in Maine
(tpy)

Source Category	MANE-VU Region Percent Reduction 2002-2018	Maine Percent Reduction 2002-2018
On-Road Mobile	78.2	50.5
Non-Road Mobile	84.9	91.1
EGU Point	77.6	64.4
Non-EGU point	65.4	
Area	54.8	91.4
TOTAL	67.5	73.4

12.10 Emission Limitations and Compliance Schedules

40 CFR 51.308(d)(v)(C) requires Maine to establish emission limitations and compliance schedules to meet reasonable progress goals. Emission limitations and compliance schedules are in place for the Maine programs outlined in Subsection 12.9. Final BART determinations and control requirements for all Maine BART-eligible sources are included in the Regional Haze SIP, and include emission limitations and compliance schedules for all BART-eligible sources. The Maine Low Sulfur Fuel Program, implementing the MANE-VU low sulfur fuel strategy and the targeted EGU strategy in Maine was enacted by the Maine Legislature on March 25, 2010, and signed into law by Governor John Baldacci on April 5, 2010. As noted in Section 12.9.3, Maine is committing to further analyze the visibility benefits that would be provided by the use of

0.3% sulfur fuel, and to require the use of this fuel (or an equivalent emissions rate) no later than January 1, 2018, if necessary to meet the reasonable progress goals at Class I areas in Maine or any other Class I area significantly affected by Maine emissions. Maine is committing to undertake this analysis no later than January 1, 2013 as part of its 5-year periodic implementation plan revision.

12.11 Enforceability of Emission Limitations and Control Measures

40 CFR 51.308(d)(3)(v)(F) requires Maine to ensure that emission limitations and control measures used to meet reasonable progress goals are enforceable. All control measures incorporated into law or codified in administrative rules will be enforceable. Any facility subject to state or federal permit requirements, including BART-eligible and V facilities, will be required to comply with the specific permit conditions that reference the applicable provisions of those laws and rules.

In Maine, the authority to create rules, issue permits and enforce laws related to regional haze is established in Title 38 Maine Revised Statutes Annotated (MRSA), Chapter 2, Department of Environmental Protection, Subchapter 1, Organization and Powers and in Title 38 MRSA, Chapter 4, Protection and Improvement of Air. Under 38 MRSA Chapter 2 and Chapter 4, the Department is authorized to enforce the state's air laws and regulations, establish a permit program, accept and administer grants, and exercise all incidental powers necessary to carry out the its statutory obligations.

Sections of Maine law of particular relevance to the regional haze SIP are:

- Title 38 Maine Revised Statutes Annotated (MRSA) section 581, Declaration of findings and intent, which declares the Legislature's intent to:

  "exercise the police power of the State in a coordinated state-wide program to control present and future sources of emission of air contaminants to the end that air polluting activities of every type shall be regulated in a manner that reasonably insures the continued health, safety and general welfare of all of the citizens of the State"

- 38 MRSA section 585. Establishment of emission standards, which states:

  "The board may establish and may amend standards, herein called "emission standards", limiting and regulating in a just and equitable manner the amount and type of air contaminants which may be emitted to the ambient air within a region. Such emission standards shall be designed to prevent air pollution and to achieve and maintain the ambient air quality standards within the region in which applicable"

- 38 MRSA section 585-A, Establishment of emission standards, which states:

  "The board may establish and amend regulations to implement ambient air quality standards and emission standards. These regulations shall be designed to

achieve and maintain ambient air quality standards and emission standards within any region and prevent air pollution"

- 38 MRSA section 590, Licensing, which states, in relevant part:

  "1. License required. After ambient air quality standards and emission standards have been established within a region, the board may by rule provide that a person may not operate, maintain or modify in that region any air contamination source or emit any air contaminants in that region without an air emission license from the department"

- 38 MRSA sections 347-A, 347-C, and 349, which provide for the enforcement of all SIP measures; and

- 38 MRSA section 353-A, which establishes annual air emission license fees and 38 MRSA section 353A (1) A, which establishes an annual fee surcharge for emissions of hazardous air pollutants.

The Maine regulations also provide for enforceable emission control measures and compliance schedules to meet the applicable requirements of the Clean Air Act and rules promulgated by EPA. The following regulations are of particular relevance to the Maine Regional Haze SIP:

06-096 CMR Chapter 100 Definitions Regulation
06-096 CMR Chapter 101 Visible Emissions Regulation
06-096 CMR Chapter 102 Open Burning Regulation
06-096 CMR Chapter 103 Fuel Burning Equipment Particulate Emission Standard
06-096 CMR Chapter 104 Incinerator Particulate Emission Standard
06-096 CMR Chapter 105 General Process Source Particulate Emission Standard
06-096 CMR Chapter 106 Low Sulfur Fuel
06-096 CMR Chapter 109 Emergency Episode Regulation
06-096 CMR Chapter 110 Ambient Air Quality Standards
06-096 CMR Chapter 114 Classification of Air Quality Control Regions
06-096 CMR Chapter 115 Major and Minor Source Air Emission License Regulations
06-096 CMR Chapter 116 Prohibited Dispersion Techniques
06-096 CMR Chapter 117 Source Surveillance
06-096 CMR Chapter 121 Emission Testing of Resource Recovery Facilities
06-096 CMR Chapter 126 Capture Efficiency Test Procedures
06-096 CMR Chapter 127 New Motor Vehicle Emission Standards
06-096 CMR Chapter 138 Reasonably Available Control Technology for Facilities that Emit Nitrogen Oxides
06-096 CMR Chapter 140 Part 70 Air Emission License Regulations
06-096 CMR Chapter 145 NOx Control Program
06-096 CMR Chapter 146 Diesel-Powered Motor Vehicle Emission Standards
06-096 CMR Chapter 148 Emissions from Smaller-Scale Electric Generating Resources
06-096 CMR Chapter 149 General Permit Regulation for Nonmetallic Mineral

Processing Plants
06-096 CMR Chapter 150 Control of Emissions from Outdoor Wood Boilers
06-096 CMR Chapter 160 Outdoor Wood Boiler Replacement and Buy Back Program

The Maine regulations provide for enforceable emission control measures and compliance schedules to meet the applicable requirements of the clean Air Act and rules promulgated by EPA. The Maine rules also define the State's air emission licensing (permit) program for stationary sources to ensure that national ambient air quality standards are achieved.

12.12 Prevention of Significant Deterioration

Prevention of Significant Deterioration (PSD) requirements for new major stationary sources and major modifications (emitting > 50 tons of any air contaminant) are implemented in Maine through the 06-096 CMR Chapter 100 Definitions Regulation which was approved into the SIP on October 15, 1996[72], the 06-096 CMR Chapter 113 Growth Offset Regulation which was approved into the SIP on February 14, 1996[73], and the 06-096 CMR Chapter 115 Major and Minor Source Air Emission License Regulations which were approved into the SIP by EPA on February 14, 1996.[74,75] PSD is applicable to all major sources (or existing sources making a major modification), triggering significance thresholds, located in an area that is in attainment with the National Ambient Air Quality Standards or unclassified. One of the intentions of the PSD program is to protect air quality in national parks, wilderness areas, and other areas of special natural, scenic, or historic value. The PSD permitting process requires a technical air quality analysis and additional analyses to assess the potential impacts on soils, vegetation and visibility.

The required procedures for evaluating the impacts of a proposed PSD source on air quality and visibility are provided in Section 7 of Maine's 06-096 CMR Chapter 115 Major and Minor Source Air Emission License Regulations. The Ambient Air Quality Impact Analysis must demonstrate that the new allowable emissions will not result in an exceedence of the remaining increments for SO_2, NO_2 or PM_{10} in any Class I area. The applicant must also demonstrate "that the increase in allowable emissions will not cause an adverse impact on visibility in any sensitive area or in any Class I area, and will not interfere with reasonable progress toward the remedying of existing man-made visibility impairment in a sensitive area. The analysis must be submitted to the Department and the appropriate Federal land Manager at least 60 days prior to the close of the public comment period on the source or modification. In this manner, new major sources and existing sources making major modifications will be constructed in a manner that will not

[72] 61 FR 53639
[73] 61 FR 5694
[74] 61 FR 5694
[75] Although these rules have been amended several times since being incorporated into the SIP, these revisions did not change any of the major source permitting requirements relevant to PSD, and the current state regulations are consistent with the SIP-approved versions for the purposes of implementing the PSD requirements.

degrade air quality or visibility. The PSD permitting program is an integral part of Maine's long-term strategy for meeting its regional haze goals.

12.13 Reasonably Attributable Visibility Impairment

40 CFR Section 51.302 (c) provides for general plan requirements in cases where the affected FLM has notified the State that Reasonably Attributable Visibility Impairment (RAVI) exists in a Class I Area in the state. There are no RAVI sources in the MANE-VU region.

13. Comprehensive Periodic Implementation Plan Revisions

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

In addition, 40 CFR Section 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 40 CFR Section 51.308(g) of the federal rule for regional haze, Maine commits to submitting a report on reasonable progress to EPA every five years following the initial submittal of the SIP. The report will be in the form of a SIP revision submitted by no later than December 17, 2012. The reasonable progress report will evaluate the progress made towards the reasonable progress goal for each mandatory Class I area located within Maine and in each mandatory Class I area located outside Maine, which may be affected by emissions from within Maine. All requirements listed in 51.308(g) shall be addressed in the SIP revision for reasonable progress.

Section (d)(4)(v) requires periodic updates of the emission inventory. Maine commits to update the inventory by no later than December 17, 2012.

13. Determination of the Adequacy of the Existing Plan

As required by 40 CFR Section 51.308(h), depending on the findings of the five-year progress report, required under 40 CFR Section 51.308 (g), Maine commits to taking one of the following actions at the same time the State submits the 5-year progress report:

(1) If the State determines that the existing implementation plan requires no further substantive revision in order to achieve established goals for visibility improvement and emissions reductions, the State will provide to the Administrator a negative declaration that further revision of the existing implementation plan is not needed.

(2) If the State determines that the implementation plan is or may be inadequate to ensure reasonable progress due to emissions from sources in another State(s) which participated in a regional planning process, the State will provide notification to the Administrator and to the other State(s) which participated in the regional planning process with the States. The State will also collaborate with the other State(s) through the regional planning process for the purpose of developing additional strategies to address the plan's deficiencies.

(3) If the State determines that the implementation plan is or may be inadequate to ensure reasonable progress due to emissions from sources in another country, the State will provide notification, along with available information, to the Administrator.

(4) If the State determines that the implementation plan is or may be inadequate to ensure reasonable progress due to emissions from sources within the State, the State will revise its implementation plan to address the plan's deficiencies within one year.

The findings of the five-year progress report will determine which action is appropriate and necessary.

References

Ansari, A. S., and Pandis, S.N., "Response of inorganic PM to precursor concentrations," *Environ. Sci. Technol.*, 32, 2706-2714, 1998.

Byun D.W., and J.K.S. Ching. *Science Algorithms of the EPA Models-3 Community Multiscale Air Quality (CMAQ) Modeling System*. EPA/600/R-99/030. March 1999.

Davidson, C., Strader, R., Pandis, S., and Robinson, A., Preliminary *Proposal to MARAMA and NESCAUM: Development of an Ammonia Emissions Inventory for the Mid-Atlantic States and New England.* Carnegie Mellon University, Pittsburgh, PA. 7-Jan. 1999.

Duyzer, J., "Dry Deposition of Ammonia and Ammonium Aerosols over Heathland," *J. Geophys. Res.*, 99(D9):18,757 – 18,763, 1994.

EarthTech, 2004, http://src.com/calpuff/calpuff1.htm

EPA 2005, http://www.epa.gov/ttn/chief/eiinformation.html.

EPA *National Emission Standards for Hazardous Air Pollutants for Industrial/ Commercial/Institutional Boilers and Process Heaters*, http://cascade.epa.gov/RightSite/dk_public_collection_detail.htm?ObjectType=dk_docket_collection&cid=OAR-2002-0058&ShowList=items&Action=view (Accessed February 25, 2004).

EPA, *National Air Quality and Emission Trends Report, 1998*, EPA 454/R-00-003, available online: http://www.epa.gov/oar/aqtrnd98/, 2000a.

EPA, *National Air Pollutant Trends, 1900 – 1998*, EPA 454/R-00-002, available online: http://www.epa.gov/ttn/chief/trends/trends98/trends98.pdf, 2000b.

MARAMA 2004, http://www.marama.org/visibility/2002%20NEI/index.html

NESCAUM, "Development of an Improved Ammonia Emissions Inventory for the United States," December 2001b.

NESCAUM, "Regional Haze and Visibility in the Northeast and Mid-Atlantic States," January 2001a.

SAI. *User's Guide to the Regional Modeling System for Aerosols and Deposition (REMSAD), Version 7.* ICF Consulting/SAI, San Francisco, CA. 2002

Strader, R., Anderson, N., and Davidson, C., *Development of an Ammonia Inventory for the Mid-Atlantic States and New England, Progress Report, October 18, 2000*, available online: http://marama.org/rt_center/MARAMAprogress10-18-00.pdf, 2000.