Notice of Public Comment Period

The Rhode Island Department of Environmental Management (RI DEM), Office of Air Resources is now accepting public comments on the proposed "Rhode Island Regional Haze Five Year Progress Report." This document addresses the requirement in 40 CFR 51.308(g) for periodic reports evaluating a state's progress towards implementing emission reduction commitments identified in the state's regional haze State Implementation Plan (SIP) and towards meeting Reasonable Progress Goals (RPGs) that have been established for Federal Class I areas. Concurrent with the submittal of the 5-year progress report, each state must make a determination of the adequacy of its existing regional haze SIP and, based on that determination, must either provide a negative declaration stating that further revision of the existing implementation plan is not needed at this time or provide a plan for addressing deficiencies.

Rhode Island has implemented all of the commitments in the Rhode Island Regional Haze SIP (RI RH SIP), which was submitted to the US Environmental Protection Agency on August 7, 2009. Rhode Island's emissions of sulfur dioxide (SO_2), the pollutant most strongly linked to regional haze, have decreased substantially since the RI RH SIP was submitted and are on track to decrease further by 2018. In addition, all Federal Class I areas currently are measuring reduced levels of haze and are on track to meet established 2018 RPGs for both best and worst visibility days. Therefore, RI DEM has determined that the elements and strategies in the current implementation plan are adequate to ensure that Rhode Island will not interfere with Federal Class I areas meeting all established RPGs. Therefore, in this document, RI DEM is providing a negative declaration affirming that further revision of the existing implementation plan is not needed at this time.

The proposed Rhode Island Regional Haze Five Year Progress Report is available on the Office of Air Resources' web page at www.dem.ri.gov/programs/benviron/air/pdf/prophaze.pdf.

Comments on this document will be accepted until 4:00 PM on December 22, 2014 and can be submitted electronically or in hard copy to:

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Rhode Island Regional Haze
Five Year Progress Report

Rhode Island Department of Environmental Management
Office of Air Resources

Posted for Public Comment:
Submitted to the EPA as SIP Revision:

Executive Summary

The Clean Air Act mandates actions to protect visibility, especially in Class I Federal areas. In 1999, the U.S. Environmental Protection Agency (EPA) finalized the Regional Haze Rule (64 FR 35714, 40 CFR et seq.). The rule calls for state, tribal, and federal agencies to work together to improve visibility in 156 national parks and wilderness areas designated as Class I Federal areas.

States are required to develop and implement plans (State Implementation Plans, or SIPs) in order to reduce the pollution that causes visibility impairment. These plans establish reasonable progress goals for visibility improvement and include strategies to reduce air pollutant emissions from sources contributing to visibility impairment. To fulfill that requirement, Rhode Island submitted the "Rhode Island Regional Haze State Implementation Plan Revision" (RI RH SIP) to the EPA as a SIP revision on August 7, 2009.

As a member of the Mid-Atlantic/Northeast Visibility Union (MANE-VU), Rhode Island committed in the SIP to implement MANE-VU's long term strategy to improve visibility. The MANE-VU strategy for 2018 includes:

- Timely implementation of Best Available Retrofit Technology (BART),
- Reducing the sulfur content of fuel oil,
- Reducing sulfur dioxide emissions from electric power plants,
- Seeking to reduce emissions outside MANE-VU that impair visibility in our region, and
- Continuing to evaluate other measures such as energy efficiency, alternative clean fuels, and measures to reduce emissions from wood and coal combustion.

This document addresses the requirements of 40 CFR 51.308(g) requiring periodic reports evaluating progress in implementing the measures included in regional haze SIPs. Rhode Island is implementing all of the commitments in the RI RH SIP.

Based on the progress that has been made in reducing emissions in the State, a revision of the RI RH SIP is not needed at this time and Rhode Island is submitting a negative declaration to the EPA stating that the RI RH SIP is sufficient for meeting the requirements of the Regional Haze Rule.

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Contents

I. Introduction

On August 7, 2009, the Rhode Island Department of Environmental Management (RI DEM) submitted the "Rhode Island Regional Haze State Implementation Plan Revision" (RI RH SIP) to the United States Environmental Protection Agency (EPA) to comply with the requirements of Title 40 of the Code of Federal Regulations: Protection of Environment, Part 51 – Requirements for Preparation, Adoption, and Submittal Of Implementation Plans, Subpart P – Protection of Visibility (40 CFR 51.300-309), the Regional Haze Rule. The RI RH SIP was approved by the EPA as meeting the requirements of 40 CFR 51.308 on May 22, 2012.[1]

Section 51.308(g) of Subpart P requires states to submit a report to the EPA Administrator every five years which evaluates progress towards meeting the reasonable progress goal identified in regional haze SIPs for each mandatory Class I Federal area located within the state and for each mandatory Class I Federal area located outside the state which may be affected by emissions from within the state. Class I areas include all national parks greater than 6,000 acres, all national wilderness areas and national memorial parks greater than 5,000 acres, and one international park.

Rhode Island is part of the Mid-Atlantic/Northeast Visibility Union (MANE-VU) regional planning organization. The seven Class I areas in MANE-VU are shown in Figure I. There are no Class I areas in Rhode Island.

The first regional haze progress report is due 5 years after submittal of the initial regional haze SIP revision. Therefore, Rhode Island's first progress report was due on August 7, 2014. This document is intended to serve as that report. Progress reports must be in the form of SIP revisions and, as such, must comply with the procedural requirements of 40 CFR 51.102 and 51.103, including a thirty day public notice and the opportunity for a public hearing. The public notice for this document was posted on the RI DEM website and sent electronically to the RI DEM Office of Air Resources' mailing list on November 19, 2014. The notice and a summary of comments received and RI DEM's response to those comments are attached to this document as Appendix A. In accordance with 40 CFR 51.308(i), Rhode Island provided Federal Land Managers an opportunity for consultation before the start of the public process. The EPA was also afforded that opportunity. A summary of pre-proposal comments from the Federal Land Managers and the EPA and RI DEM's response to those comments is attached as Appendix B.

Progress reports must contain the following elements:

1. A description of the status of implementation of all measures included in the Regional Haze SIP for achieving reasonable progress goals for mandatory Class I Federal areas within and outside the State.

2. A summary of the emissions reductions achieved in the State through implementation of the above measures.

[1] US EPA, "Approval and Promulgation of Air Quality Implementation Plans; Rhode Island; Regional Haze," final rule. FR 77(99):30214-6, 22 May 2012.

3. For each mandatory Class I Federal area within the State, the State must assess the following visibility conditions and changes, with values for most impaired and least impaired days expressed in terms of 5-year averages of these annual values:

    a. The current visibility conditions for the most impaired and least impaired days;
    b. The difference between current visibility conditions for the most impaired and least impaired days and baseline visibility conditions; and
    c. The change in visibility impairment for the most impaired and least impaired days over the past 5 years.

4. An analysis of the change in emissions of pollutants contributing to visibility impairment from all sources and activities within the State in the previous 5 years. Emissions changes should be identified by type of source or activity. The analysis must be based on the most recent updated emissions inventory, with estimates projected forward as necessary and appropriate, to account for emissions changes during the applicable 5-year period.

5. An assessment of any significant changes in anthropogenic emissions within or outside the State that have occurred over the past 5 years that have limited or impeded progress in reducing pollutant emissions and improving visibility.

6. An assessment of whether the current implementation plan elements and strategies are sufficient to enable the State, or States with mandatory Federal Class I areas affected by emissions from the State, to meet all established reasonable progress goals.

7. A review of the State's visibility monitoring strategy and any modifications to the strategy that may be necessary.

Since there are no Class I areas in the State, Elements Nos. 3 and 7 above are not applicable to Rhode Island. Element No. 1 will be addressed in Section II of this document, “Implementation of Regional Haze Measures;” Element Nos. 2 and 4 will be addressed in Section III, “Emissions Inventories;” and Element Nos. 5 and 6 in Section IV, “Adequacy of Measures.” Note that, concurrent with the submittal of the 5-year progress plan, states must make a determination of the adequacy of the existing regional haze SIP and, based on that determination, must either provide a negative declaration stating that further revision of the existing implementation plan is not needed at this time or provide a plan for addressing deficiencies. As discussed in Section IV, with this document, Rhode Island is providing a negative declaration which affirms that further revision of the existing implementation plan is not needed at this time

In summary, this 5-Year Progress Report fulfills all requirements for progress reports pursuant to 40 CFR 51.102, 40 CFR 51.103 and 40 CFR Part 51 Sections 308 (g), (h) and (i), and thus meets EPA criteria for full approval.

Figure I MANE-VU Class I Areas

Acadia National Park

People have been drawn to the rugged coast of Maine throughout history. Awed by its beauty and diversity, early 20th-century visionaries donated the land that became Acadia National Park, the first national park east of the Mississippi River. The park is home to the tallest mountain on the U.S. Atlantic coast. Today visitors come to Acadia to hike granite peaks, bike historic carriage roads, or enjoy the scenery.

Roosevelt Campobello International Park

A memorial to Franklin Delano Roosevelt and symbol of Canadian-American friendship, Roosevelt Campobello International Park is a combination indoor/outdoor site renowned internationally. Its historic beauty contributes to the tourism in both the Province of New Brunswick and the State of Maine. Wooded paths and fields offer vistas of nearby islands, bays, and shores.

Brigantine Wilderness

This trailless area, a tidal wetland and shallow bay habitat along New Jersey's Atlantic coastline, is one of the most active flyways for migratory water birds in North America. Birdwatchers, binoculars in hand, have zoomed in on close to 300 species, including Atlantic Brant and American Black Duck.

Great Gulf Wilderness

Cradled within the rugged crescent of New Hampshire's Presidential Range lies the Great Gulf Wilderness. This steep-walled bowl begins at Mount Washington, and is flanked by Mounts Jefferson, Adams, and Madison. Great Gulf is the largest cirque in the White Mountains of New Hampshire with the small and beautiful Spaulding Lake lying at its floor. From the cirque's low end, the West Branch of the Peabody River flows eastward.

Lye Brook Wilderness

The Lye Brook Wilderness is in the southern Green Mountains of Vermont. Lye Brook flows through the western half of this wilderness, which ranges from 900 feet to 2900 feet above sea level. Most of the wilderness is above 2500 feet, on a high plateau with several ponds and bogs. Waterfalls and rocky streams are found here as well as reflecting pools. The western section is extremely steep, facing west-northwest towards U.S. Route 7 and Manchester. Four and a half miles of the Appalachian/Long Trail cross the northwest tip of the wilderness.

Moosehorn Wilderness

This wilderness is located within northern Maine's Moosehorn National Wildlife Refuge, a refuge and breeding ground for migratory birds, endangered species, and other wildlife. Scientists at Moosehorn have provided valuable information to stem the decline in the American Woodcock, also called a Timberdoodle. Bald eagles frequent the refuge, and black bears and white-tailed deer are common. Ducks, geese, and loons congregate on more than 50 lakes.

Presidential Range/Dry River Wilderness

The large glacial cirque known as Oakes Gulf lies at the headwaters of the Dry River in New Hampshire. This river - and just to the east the Rocky Branch - carve sharply down through the heart of this Wilderness and offer contrast to the surrounding long, high ridgelines of the Southern Presidential Range and Montalban Ridge. The Dry River is something of a misnomer, as anyone who has tried to cross it after a period of even moderate rain can attest. The streams in this Wilderness are flashy and swift and run cold and clear from snow that melts well into the summer.

Photo credits: National Park Service, US Fish and Wildlife Service, wilderness.net

II. Implementation of Regional Haze Measures

On June 20, 2007, the member states of the Mid-Atlantic/Northeast Visibility Union (MANE-VU) regional planning organization, including Rhode Island, agreed to pursue a coordinated course of action (the MANE-VU Ask) designed to assure reasonable progress toward preventing any future and remedying any existing impairment of visibility in mandatory Class I Federal Areas within MANE-VU and to leverage the multi- pollutant benefits that such measures may provide for the protection of public health and the environment. Given the dominant role of sulfate in the formation of regional haze in the MANE-VU region, the Ask focuses on sulfur dioxide (SO_2) emissions control measures. In the RI RH SIP, Rhode Island committed to implementing the measures identified in the Ask in the State. Those measures, and Rhode Island's status in implementing those measures, are as follows:

- ***Implementation of Best Available Retrofit Technology (BART) requirements:*** RI DEM analyzed sources in Rhode Island and determined in the RI RH SIP that there are no BART-eligible sources in the State. The EPA agreed with that determination in its 2012 approval of the SIP. Therefore, BART requirements are not applicable in Rhode Island.

- ***Low-sulfur fuel oil strategy in the outer zone states***: Consistent with the Ask, the RI RH SIP committed to adopting enforceable requirements limiting the sulfur content of fuel oil in the State as follows, pending MANE-VU verification that sufficient supplies of oil meeting the above specifications would be available by the applicable dates:

    - Distillate oil - 0.05% sulfur by weight (500 ppm) by 2014 and 15 ppm by 2018,
    - #4 Residual oil - 0.25 - 0.5% sulfur by weight by 2018, and
    - #6 Residual oil - 0.5 % sulfur by weight by 2018.

    Consistent with that commitment, RI DEM amended Rhode Island Air Pollution Control (RIAPC) Regulation No. 8, "Sulfur Content of Fuels," effective June 24, 2014, to limit the sulfur content in all fuel oil sold or delivered in the State "(u)nless the Director declares in writing after a hearing that a shortage of fuel oil meeting the requirements of this regulation exists" as follows:

    - Distillate oil, biodiesel and alternative oil - 0.05% sulfur by weight (500 ppm) by July 1, 2014 and 0.0015% (15 ppm) by July 1, 2018, and
    - Residual oil - 0.5 % sulfur by weight by July 1, 2018.

    Since the sulfur limits in amended RIAPC Regulation No. 8 are consistent with those in the Ask, adoption of that amendment fulfills the low-sulfur fuel oil commitments in the RI RH SIP. Note that the Rhode Island rule does not include a separate limit for #4 residual oil. However, since #4 fuel oil sold in Rhode Island is blended in-state using roughly equal portions of #2 distillate oil and #6 residual oil, the sulfur content of #4 oil in the State on and after July 1, 2018 will be in the range of 0.25 - 0.5% sulfur by weight, as specified in the Ask.

- ***Targeted Electricity Generating Unit (EGU) strategy:*** Since none of the 167 EGU emission points identified in the MANE-VU strategy are located in Rhode Island, that strategy is not applicable to the State.

- ***Continued evaluation of other control measures:*** In the RI RH SIP, RI DEM committed to continue to work in consultation with Class I states to identify additional reasonable and cost-effective control measures as needed. To fulfill this requirement, RI DEM participates in MANE-VU consultations and provides MANE-VU with emissions data needed for visibility modeling and emissions inventory analyses.

  The SIP also noted that legislation pending in 2009 at the Rhode Island General Assembly would, if passed, mandate that RI DEM require outdoor wood boilers sold in the State to meet EPA's Phase II emissions standards. Although neither the 2009 legislation nor similar bills introduced in subsequent years were approved by the State legislature, RI DEM promulgated emissions limits for that source category in 2011 as RIAPC Regulation No. 48, "Outdoor Wood Boilers." That regulation stipulates that, after July1, 2011, all outdoor wood boilers imported, supplied, distributed, sold, or installed in the State must be certified or qualified by the EPA to meet a particulate matter emission standard of 0.32 pounds per million British Thermal Units output, which is the EPA's Phase II standard.

  With the adoption of Regulation No. 48, along with Rhode Island's continued participation in MANE-VU consultations and emissions gathering activities, Rhode Island has fulfilled its commitment to identify additional reasonable and cost-effective control measures as needed.

In Section 11.3 of the RI RH SIP, which is entitled "Existing Commitments to Reduce Emissions," RI DEM notes that, although Rhode Island is not covered by the EPA's Clean Air Interstate Rule (CAIR), emissions from all electricity generating units (EGUs) in Rhode Island are restricted by permit. The primary fuel for all EGUs in the State is natural gas, but three of the EGUs have dual fuel burning capability and burn a limited amount of distillate fuel oil. The fuel oil sulfur content limits and corresponding SO_2 emission rates specified in State and federally enforceable preconstruction and operating permits for the three EGUs that burn fuel oil are as follows:

- *Dominion Energy Manchester Street, Providence:* fuel oil sulfur content is limited to 500 ppm (0.05%), which corresponds to an SO_2 emission rate of 0.055 lb/MMBtu;

- *Ocean State Power, Harrisville:* fuel oil sulfur content is limited to 15 ppm (0.0015%), which corresponds to an SO_2 emission rate of 0.00165 lb/MMBtu; and

- *Pawtucket Power, Pawtucket:* fuel oil sulfur content is limited to 2,000 ppm (0.2%), which corresponds to an SO_2 emission rate of 0.22 lb/MMBtu.

Those permit conditions continue to be in force. In addition, the fuel oil sulfur limits in amended RIAPC Regulation No. 8, as discussed above, further limit the sulfur content of fuel burned by two of those facilities. Specifically, the Regulation No. 8 amendments reduce the fuel oil sulfur limit for Pawtucket Power from 2,000 ppm to 500 ppm as of July 1, 2014 and further reduce that limit to 15 ppm as of July 1, 2018. The permitted sulfur limit for Dominion, 500 ppm, is consistent with the July 1, 2014 regulatory limit; however, the requirements in amended RIAPC Regulation No. 8 will reduce the sulfur limit for that facility to 15 ppm as of July 1, 2018.

40 CFR Section 51.308(d)(3)(v)(D) of the Regional Haze Rule requires Rhode Island to consider source retirement and replacement schedules in developing reasonable progress goals. To fulfill that requirement, the RI RH SIP provided a list of sources which had shut down after the 2002 base year. Those sources, which were not included in the projected 2018 inventory in the RI RH SIP, are listed in Table 1.

Table 1 Sources that Ceased Operation between 2002 and 2009

STATE	FIPS	SITE ID	FACILTY NAME
44	001	AIR3625	Albin
44	001	AIR3753	Display World
44	003	AIR684	Clariant
44	003	AIR876	Leviton
44	007	AIR1177	CCL Manufacturing
44	007	AIR447	Eastern Butcher Block
44	007	AIR	Fiber Mark
44	007	AIR2682	Metals Recycling
44	007	AIR1395	Slater Pawtucket
44	007	AIR3315	Slater Cumberland
44	009	AIR248	Charbert

The Metals Recycling facility has been purchased and is currently operated by Schnitzer Steel; however, the diesel engines that were the primary stationary emissions source at that facility have been replaced by electric engines, eliminating the emissions that caused Metals Recycling to be a significant source. None of the remaining sources have reopened. An additional source, Brookwood Laminating (44-009- AIR825) also closed in 2007 but was omitted from the above list in the RI RH SIP.

Since the submittal of the RI RH SIP in 2009, several additional Rhode Island point sources have closed permanently. Those sources, which are listed in Table 2, were included in the 2002 base year and 2018 projection inventories presented in the RI RH SIP but are not included in RI DEM's 2018 point source projections from the 2011 inventory discussed below. Facilities that closed before 2011, as noted in the table, were not included in the 2011 inventory.

Table 2 Sources that Ceased Operation after Submittal of the 2009 RI RH SIP

STATE	FIPS	SITE ID	FACILTY NAME	In 2011 inventory?
44	003	AIR1808	United Printing	No
44	007	AIR3101	B & D Plastics	No
44	001	AIR1007	Monarch Industries	No
44	007	AIR1489	Portola Tech International	No
44	003	AIR1438	Stanley Black and Decker	Yes
44	007	AIR572	Osram Sylvania	Yes
44	009	AIR174	Bradford Printing and Finishing	Yes

RI DEM continues to enforce all measures that limit emissions, as identified in the RI RH Haze SIP, including Prevention of Significant Deterioration (PSD) requirements, permit conditions for point sources, NOx RACT, and rules limiting emissions from consumer products, architectural and industrial maintenance coatings, adhesives and sealants, emulsified and cutback asphalt paving, solvent cleaning and mobile equipment repair and refinishing. Therefore, Rhode Island has implemented all emissions control measures specified in the RI RH SIP.

III. Emissions Tracking

Requirements

Section 51.308(g) of Subpart P requires inclusion of the following emissions-related elements in states' five year progress reports:

- A summary of the emissions reductions achieved in the State through implementation of the measures identified in the state's regional haze SIP; and

- An analysis of the change in emissions of pollutants contributing to visibility impairment from all sources and activities within the State in the previous 5 years. Emissions changes should be identified by type of source or activity. The analysis must be based on the most recent updated emissions inventory, with estimates projected forward as necessary and appropriate, to account for emissions changes during the applicable 5-year period.

As discussed above, MANE-VU determined that, as a precursor to sulfate, SO_2 emissions are responsible for most of the fine-particle mass on the haziest days at MANE-VU Class I Areas and, as such, the MANE-VU Ask targeted measures that reduce emissions of that pollutant. Rhode Island has no BART or targeted EGU sources, so the only significant SO_2 reduction measure identified in the Ask that is applicable to the State is the adoption of reduced limits on the sulfur content of fuel oil.

Since the first phase of Rhode Island's reduced limits on sulfur in fuel oil took effect on July 1, 2014 and the remaining limits are not effective until July 1, 2018, the most recent available (2011) periodic emissions inventory does not reflect emissions reductions associated with implementation of those limits. However, as discussed below, RIDEM developed an updated 2018 projected emissions for the affected source categories to calculate expected emissions reductions associated with implementation of the lower sulfur fuel oil limits.

Emissions Inventories

Tables 3-5 present anthropogenic emissions inventories for SO_2, NOx and fine particulate matter ($PM_{2.5}$), respectively, to fulfill the requirement for a statewide inventory of pollutants that are reasonably anticipated to cause or contribute to visibility impairment. Those tables include stationary point source, stationary area (nonpoint) source, nonroad mobile source and onroad mobile source emissions inventories for 2002, 2011 and 2018. The 2002 emissions are the base year emissions presented in the RI RH SIP. The 2011 emissions are from the 2011 EPA's National Emissions Inventory (NEI), Version 2, with the following adjustments:

- Emissions for area source industrial and commercial boilers were recalculated using a residual oil sulfur content of 1%, rather than the 2.25% value used in the NEI, to reflect the actual sulfur content of oil sold in the State. That change affected both SO_2 and $PM_{2.5}$ emissions; and

- Emissions from sources that RI DEM inventories as point sources were subtracted from the appropriate categories in EPA's non-point (area source) inventory to avoid double counting of those emissions.

Two 2018 projection emissions inventories are presented in the tables:

- MANE-VU's Best & Final (B & F) inventory for 2018, as presented in the RI RH SIP, which was projected from the 2002 base year inventory; and

- The B & F inventory with updated emission projections for stationary point and area sources. The updated projections for those categories were calculated by applying SCC-specific growth factors obtained from the Mid-Atlantic Regional Air Management Association (MARAMA)[2] and the 2018 sulfur in fuel oil limits in amended RIAPC Regulation No. 8 to the 2011 emissions for those categories. Emissions for the other source categories were not changed.

A spreadsheet showing calculations of the adjusted 2011 inventory and the updated stationary source 2018 emissions projections is attached as Appendix C.

Emissions of SO_2, the pollutant responsible for most of the fine-particle mass on the haziest days at MANE-VU Class I Areas, are presented in Table 3.

Table 3 2002 and 2011 Anthropogenic Inventories and 2018 Projections – SO_2

SO_2 (tons per year)				
Sector	**2002 from RI RH SIP**	**2011 NEI (adjusted)**	**B&F 2018 from RI RH SIP**	**2018 with Point & Area Adjustments**
Point	2,666	978	1,509	900
Area	4,557	3,235	52	159
Onroad	425	77	100	100
Nonroad	377	549	42	42
TOTAL	8,026	4,839	1,703	1,201

As discussed above, the only emissions reduction measure in the MANE-VU Ask applicable in Rhode Island is the limitation on the sulfur content of fuel oil. Since that limitation did not become effective until 2014, SO_2 emissions associated with that measure are not reflected in the 2011 inventory. To evaluate reductions associated with lower sulfur fuel oil, the last column of Table 3 shows 2018 point and area source emissions projected from the 2011 inventory using MARAMA growth factors and the 2018 sulfur in fuel oil limits. The resulting predicted stationary source (combined point and area source) SO_2 emissions for 2018 are 85% lower than 2002 emissions and 75% lower than 2011 emissions for those sectors.

[2] SRA, International for MARAMA, "TSD Inventory Growth and Control Factors Based on EPA2011NEIvi Emissions Modeling Platform," Aug. 27, 2014.

NOx and $PM_{2.5}$ emissions, which have a more minor role in visibility in the MANE-VU region, are presented in Tables 4 and 5, respectively.

Table 4 - 2002 and 2011 Anthropogenic Inventories and 2018 Projections –NOx

NOx (tons per year)				
Sector	**2002 from RI RH SIP**	**2011 NEI (adjusted)**	**2018 B&F from RI RH SIP**	**2018 with Point & Area Adjustments**
Point	2,764	1,587	3,018	1,648
Area	3,886	6,630	4,249	6,611
Onroad	16,677	10,202	5,351	5,351
Nonroad	5,001	4,942	2,723	2,723
TOTAL	28,329	23,362	15,342	16,333

Table 5 - 2002 and 2011 Anthropogenic Inventories and 2018 Projections – $PM_{2.5}$

$PM_{2.5}$ (tons per year)				
Sector	**2002 from RI RH SIP**	**2011 NEI (adjusted)**	**2018 B&F from RI RH SIP**	**2018 with Point & Area Adjustments**
Point	183	58	340	56
Area	2,064	2,877	1,570	2,955
Onroad	211	370	148	148
Nonroad	443	366	303	303
TOTAL	2,901	3,671	2,362	3,462

It is not appropriate to directly compare the 2002, 2011 and 2018 inventories. The methodologies and assumptions used to estimate emissions are continually updated as better information becomes available. Therefore, methodologies and assumptions used to calculate 2011 emissions for many source categories were different from those that formed the basis of the 2002 base year inventory and the 2018 B & F inventory, which was projected from the 2002 base year inventory.

Assumptions and Uncertainties – 2002 and 2011 Emissions Inventories

One of the most significant differences between the 2002 and 2011 methodologies is the model used to calculate onroad mobile emissions. The 2002 onroad mobile source inventory used EPA's MOBILE6.2 model, which was the recommended model at the time that that inventory was developed, while the 2011 periodic inventories used the newer MOVES model; those models give significantly different results for similar inputs. Therefore, a direct comparison of the onroad mobile source emissions in the two inventories is not possible.

Additional inconsistencies between the methodologies used to calculate 2002 and 2011emissions include:

- Differences in the calculations of the condensable particle portion of $PM_{2.5}$;

- Residential wood combustion is the largest contributor to regional fine particulate emissions. A calculation tool was used in the 2011 inventory to estimate emissions from residential wood combustion; that tool was not available when the 2002 inventory was compiled. Thus, the resulting emissions for this sub-category of area emissions are not comparable between the 2002 and 2011 inventory suites;

- In addition to residential wood, the methodology used to estimate emissions for several other area source categories has been improved. In some cases several SCC codes were consolidated into a single combined SCC. In other cases new SCC codes were established. These shifts make a direct comparison of the inventories at the SCC level difficult;

- EPA revised the recommended calculation methodology for road dust; that revision, in most cases, resulted in as increase in estimates of emissions from paved roads;

- The definition of point source is not always consistent from year to year, so emissions characterized as point sources in one inventory are, in some cases, included in area source emissions in another;

- Different versions of the EPA-developed NMIM/NONROAD model were used in the 2002 and 2011 inventories to estimate nonroad mobile sector emissions; and

- The methodology used to estimate marine, airport and railroad sources was significantly revised between development of the 2002 and the 2011 inventories.

Assumptions in Projection Inventories

The development of projection inventories requires the application of additional assumptions, including predictions of the future balance of sales among fuel types as well as economic, population, fuel consumption and regulatory trends. Significant unforeseen changes in many of these areas have occurred since the 2018 projected emissions inventory was developed for the RI RH SIP. Most notably, Rhode Island's sales of residual oil and, to a lesser extent, distillate oil, have significantly declined since 2002 (see Figure II).

As shown in Figure II, the vast majority of residual oil in the State is sold to commercial and industrial sources; sales of residual oil to both of those sectors have significantly decreased since 2002. Most of stationary source distillate oil is sold to residential and, to a lesser degree, commercial sources. Sales of distillate declined substantially between 2005 and 2006. Industrial sources account for a smaller portion of distillate sales; sales to that sector have decreased in recent years. Note that, although three EGUs in Rhode Island burn a small amount of distillate, that sector is not a significant purchaser of distillate oil in the State.

Fuel oil sale trends are influenced by a variety of factors. For commercial and industrial sources that have dual fuel burning capability, the relative prices of natural gas and fuel oil influence the balance between purchases of the two fuels. Cheaper natural gas prices may also spur residential

home heating system conversions. If the observed decreases in fuel oil consumption were primarily the result of switching to cheaper natural gas, it would be expected that natural gas consumption would have increased as fuel oil consumption decreases. As shown if Figure III, that trend was observed in the industrial source sector; natural gas purchases by that sector increased between 2002 and 2012, while both residual and distillate oil purchases decreased. However, although fuel oil sales to the residential and commercial sectors also declined between 2002 and 2012, natural gas sales to those sectors did not increase during that period. Therefore, although fuel switching may help explain the recent decrease in fuel oil purchases by the industrial sector, it does not explain the declining fuel oil sales to the residential and commercial sectors. In fact, in the residential sector, the trend in fuel consumption for natural gas is similar to that for distillate oil.

Weather also plays a role in annual fuel use. The sharp drop in sales of residual and distillate in 2006 and the increase in those sales in 2009 may have been influenced by milder temperatures in 2006 and the cooler temperatures of 2009, as shown in Figure IV. Economic factors, including facility shut downs, as well as the use of alternative heating/energy sources like wood, solar and wind power and improvement in boiler efficiencies and implementation of conservation measures also influence fuel oil use. Due to the large number of factors that affect annual fuel sales, future fuel use projections are approximate at best.

Figure II Oil Sale Trends in Rhode Island

US Energy Information Administration (EIA) http://www.eia.gov/dnav/pet/pet_cons_821use_dcu_SRI_a.htm

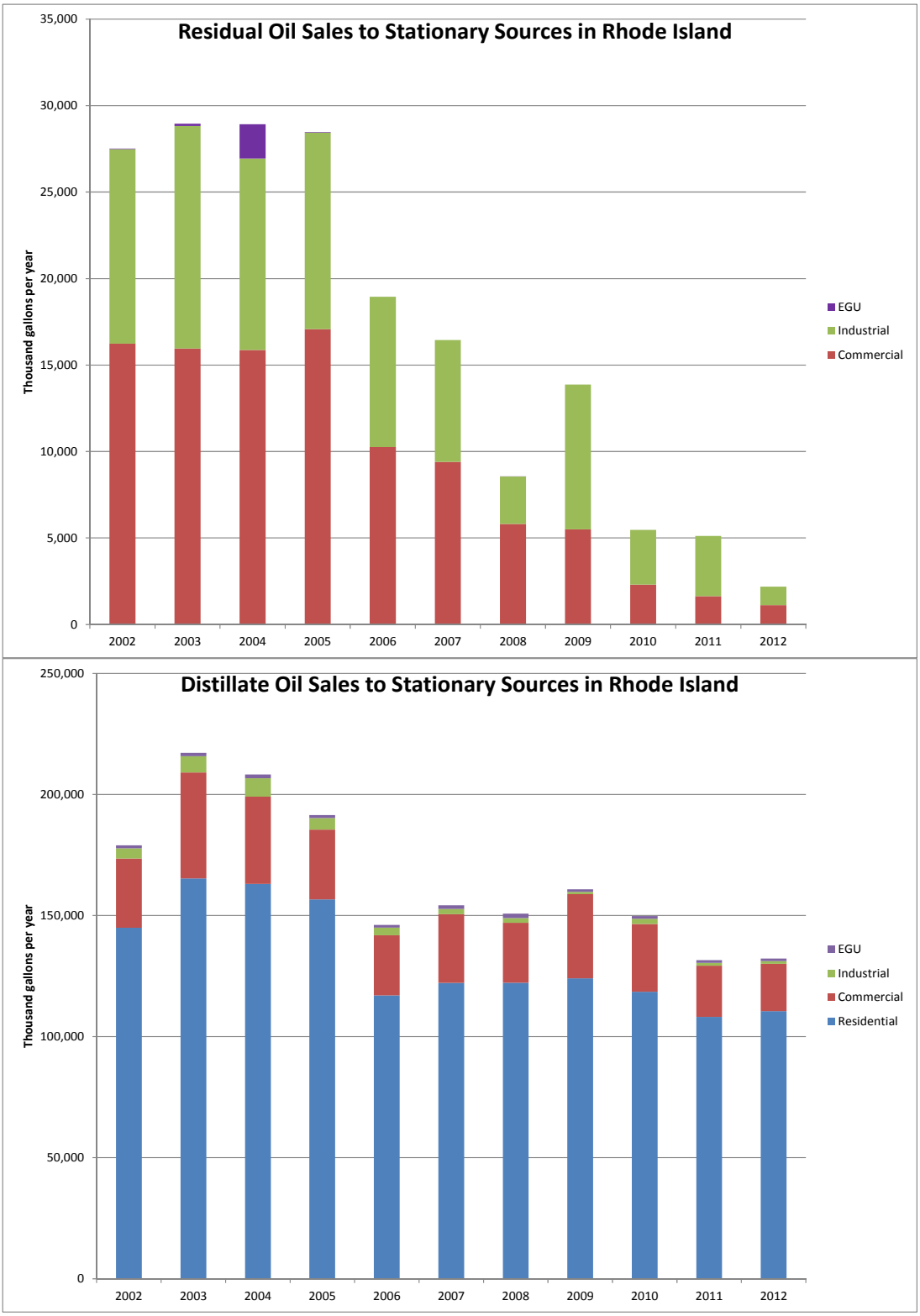


Figure III Rhode Island Fuel Sale Trends by User Sector (EIA)

Oil sales – http://www.eia.gov/dnav/pet/pet_cons_821use_dcu_SRI_a.htm

Gas sales - **http://www.eia.gov/dnav/ng/ng_cons_sum_dcu_SRI_m.htm**

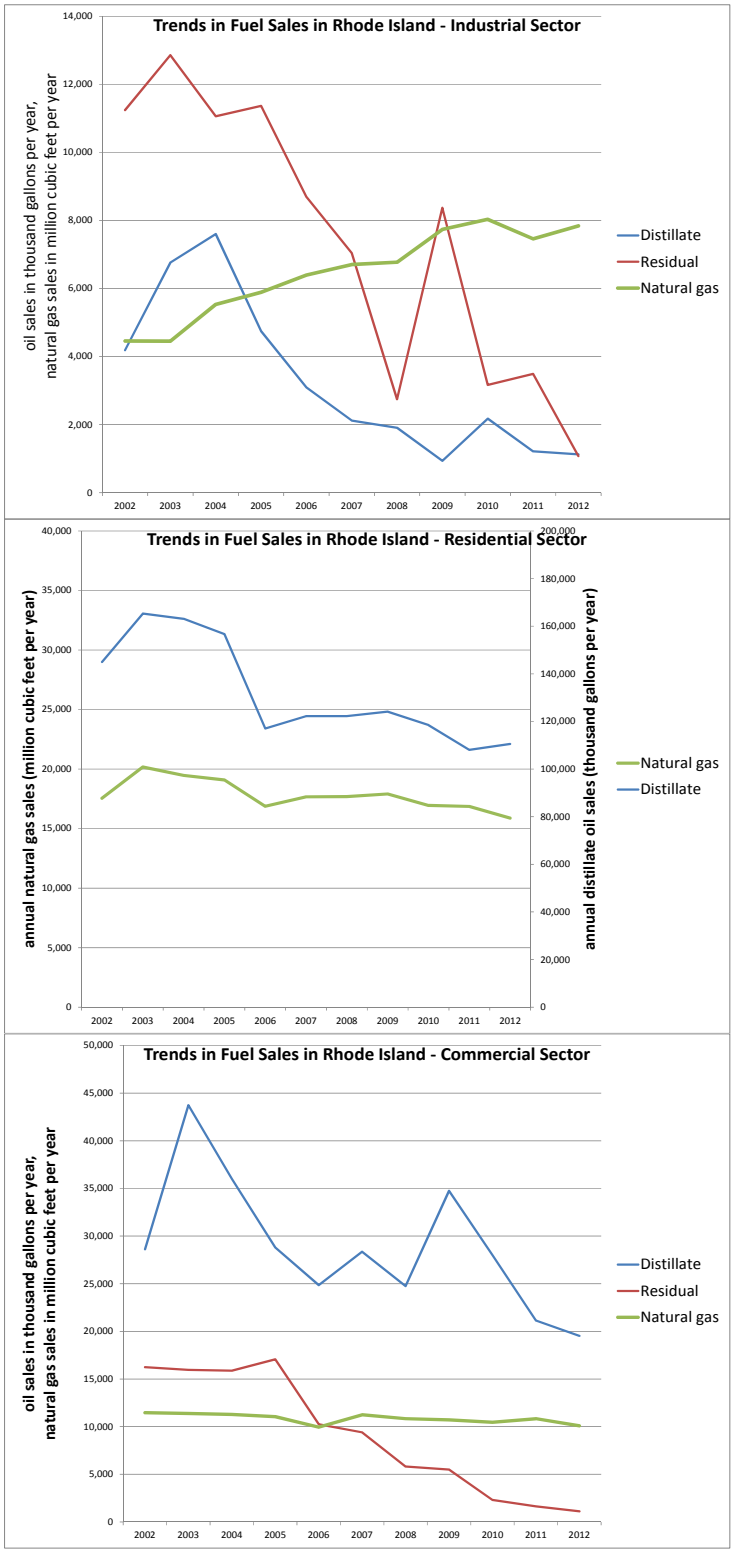
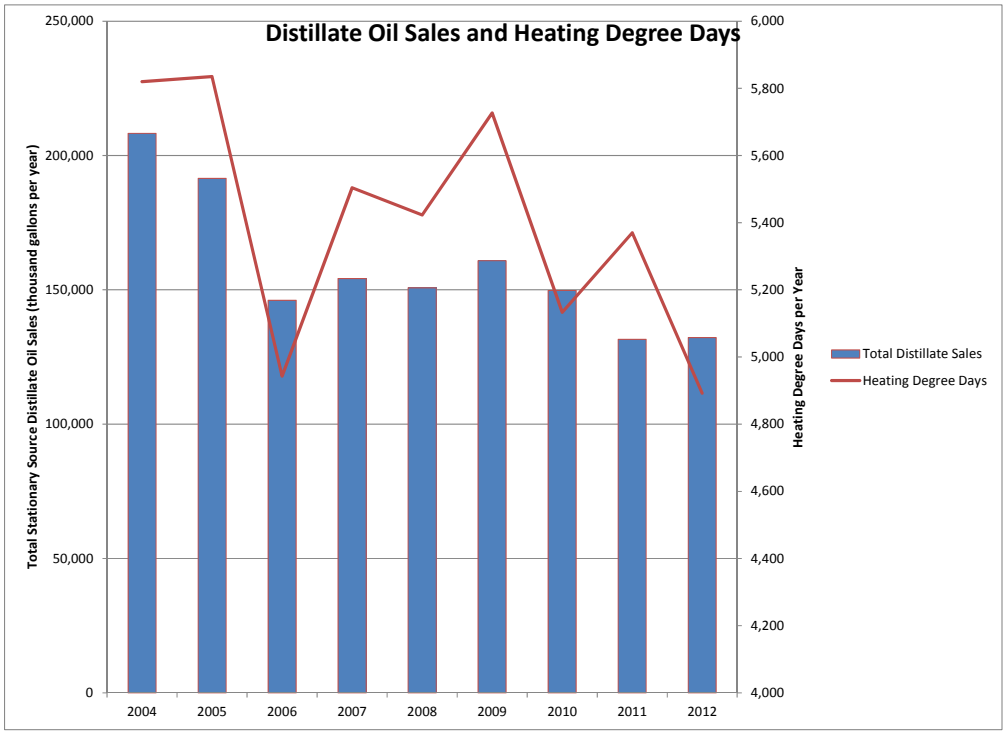
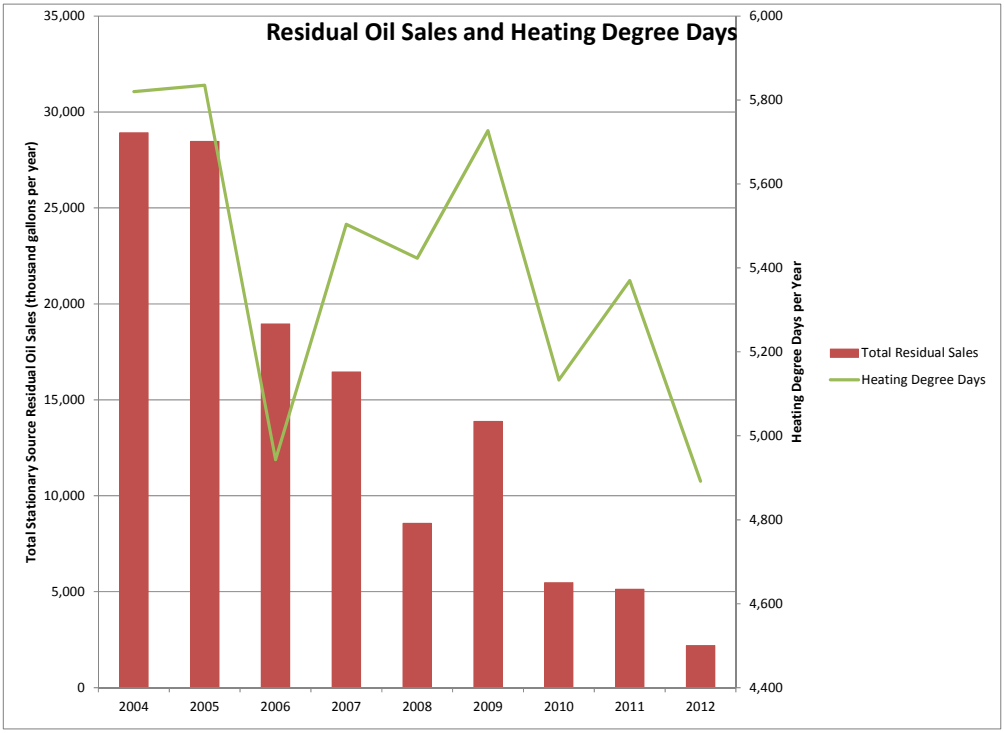


Figure IV Rhode Island Distillate Oil Sales and Heating Degree Days

Oil sales - EIA –http://www.eia.gov/dnav/pet/pet_cons_821use_dcu_SRI_a.htm
Degree days – ISO New England http://www.iso-ne.com/isoexpress/web/reports/load-and-demand/-/tree/deg-days





IV. Adequacy of Measures

The Regional Haze Rule requires five year progress reports to include assessments of the following:

- Any significant changes in anthropogenic emissions that have occurred over the past 5 years that have limited or impeded progress in reducing pollutant emissions and improving visibility.

- Whether the elements and strategies in the current implementation plan are sufficient to enable the State, or States with mandatory Federal Class I areas affected by emissions from the State, to meet all established reasonable progress goals.

As discussed above, Rhode Island is implementing the emissions reductions commitments in the RI RH SIP. In addition, unforeseen reductions in fuel oil consumption have occurred in the State since that document was prepared. As a result, emissions of SO_2, the pollutant most strongly linked to visibility effects in the northeast, have decreased in the last five years and are expected to decline further by 2018 as the low sulfur fuel oil restrictions in RIAPC Regulation No. 8 take effect. RI DEM has not identified any significant changes in anthropogenic emissions that have occurred over the past 5 years that have limited or impeded progress in reducing pollutant emissions and improving visibility.

In 2013, the Northeast States for Coordinated Air Use Management (NESCAUM) prepared an analysis of trends in visibility data collected at the Class I areas for MANE-VU[3]. The analysis showed definite downward trends in overall haze levels at the Class I areas in and adjacent to the MANE-VU region and that the MANE-VU Class I areas appear to be on track to meet their 2018 Reasonable Progress Goals (RPGs) for both best and worst visibility days. In fact, NESCAUM concluded that, in some Class I areas, including Arcadia National Park and the Moosehorn Wilderness Area, the Class I areas which are most impacted by Rhode Island emissions, the 2018 RPGs have already been met and progress beyond those goals appears achievable.

Note further that, in the EPA's proposed approval of the RI RH Plan, which was published in the February 28, 2012 Federal Register, the EPA noted that "(t) he source apportionment modeling demonstrated that the contribution of Rhode Island emissions to total sulfate (the main contributor to visibility impairment in the Northeast) was consistently determined to be no more than 0.31% of the total sulfate at any Class I area" and that "(t)he MANE-VU Class I States determined that any State contributing at least 2% of the total sulfate observed on the 20 percent worst visibility days in 2002 were contributors to visibility impairment at the Class I area." Therefore, EPA proposed "to find that RI DEM has adequately demonstrated that emissions from Rhode Island sources do not cause or contribute to visibility impairment in nearby Class I Areas." This finding was confirmed in the final approval of the SIP, which was published in the May 21, 2012 Federal Register.

Concurrent with the submittal of the 5-year progress plan, states must make a determination of the adequacy of their existing regional haze SIP and, based on that determination, must either provide a negative declaration stating that further revision of the existing implementation plan is not needed at this time or provide a plan for addressing deficiencies. Since SO_2 emissions have decreased

[3] NESCAUM for MANE-VU, "Tracking Visibility Progress 2004-2011," revised May 24, 2013. http://www.nescaum.org/documents/manevu-trends-2004-2011-report-final-20130430.pdf/view

since the RI RH SIP was submitted and are on track to decrease further by 2018, RI DEM has determined that the current implementation plan elements and strategies are adequate to ensure that Rhode Island will not interfere with mandatory Federal Class I areas meeting all established reasonable progress goals. Therefore, RI DEM is hereby providing a negative declaration which affirms that further revision of the existing implementation plan is not needed at this time.

Appendix A

Public Notice and Comments

Appendix B

Preliminary Comments from Federal Land Managers and the EPA

In accordance with 40 CFR 51.308(i), RI DEM provided Federal Land Managers an opportunity to comment on a draft copy of this document before the start of the public process. EPA Region1 was also provided that opportunity. Comments were received from the US Department of the Interior National Park Service (NPS), the US Department of Agriculture Forest Service (USDA FS) and the EPA. The comments are attached. A summary of the comments received and RI DEM's response to the comments follows.

Comment: Rhode Island's adoption of low sulfur fuel requirements in RIAPC Regulation No. 8 is a positive development. (USDA FS)

Response: RI DEM agrees.

Comment: Moving Figure 1 to the end of the introduction would make it easier for a reader to follow that section. (USDA FS)

Response: Figure 1 was moved in response to this comment.

Comment: The word "pollutant" is spelled wrong on Page 14. (USDA FS)

Response: This typographical error has been corrected.

Comment: We agree that Rhode Island has demonstrated that the emissions reductions in the RH SIP are being implemented and that Rhode Island is not interfering with the ability of neighboring states to meet reasonable project goals for Class I areas. (NFS)

Response: RI DEM appreciates this comment.

Comment: To demonstrate that visibility is improving in Class I areas in the MANE-VU area, we recommend that Rhode Island summarize visibility trends from the IMPROVE monitoring network. (NFS)

Response: In response to this comment, RI DEM added a paragraph summarizing the conclusions of the NESCAUM/MANE-VU "Tracking Visibility Progress 2004-2011" report in the "Adequacy of Measures" section of this document.

Comment: For clarification, the first paragraph of the introduction should be revised to read, "The RI RH SIP was approved by EPA as meeting the requirements of 40 CFR 51.308 on May 22, 2012." (EPA)

Response: That language was revised as recommended in the comment.

Comment: The "Emissions Tracking" section is very information intensive. It may be helpful to divide this section into subsections. (EPA)

Response: That section was subdivided in response to this comment.

Comment: Figures II-IV should be updated to include 2013 data, if available. (EPA)

Response: Those data are not yet available, but will be incorporated into those figures if available before the document is final.

Appendix C

Adjustments to Stationary Source Emissions in 2011 NEI and 2018 B&F Inventories