

**STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR RESOURCES**

Notice of Public Hearing and Comment Period

Concerning proposed Amendments to Air Pollution Control Regulations No. 8 “Sulfur Content of Fuels” and Air Pollution Control Regulations No. 20 “Burning of Alternative Fuels”

Notice is hereby given that a public hearing regarding proposed amendments to Air Pollution Control Regulations No. 8 “Sulfur Content of Fuels” and Air Pollution Control Regulations No. 20 “Burning of Alternative Fuels”, will be held in Room 230 of the Department of Environmental Management, at 235 Promenade Street, Providence, Rhode Island on Friday April 11, 2014 at 10:00 AM, at which time interested parties will be heard.

The Department is proposing to revise Air Pollution Control Regulation No. 8 to lower the allowable limits on the sulfur content of petroleum-based distillate and residual fuel oils and remove some outdated provisions of the regulation. The proposed revisions would reduce the sulfur content (by weight) of:

- Distillate oil to 0.05 percent (500 ppm) by no later than 2014 (Phase I);
- Distillate oil to 0.0015 percent (15 ppm) by no later than 2018, depending on supply availability (Phase II);
- Residual oil to 0.5 percent (5000 ppm) by no later than 2018.

The outdated provisions that are proposed to be removed are subsections 8.3.2 “Emission Bubbling”, 8.3.3 “Conversion and Conservation Incentive”, 8.3.4 “Large Fuel Burning Devices Using Coal” and 8.4.2 “Residual Fuel Oil Shipments to Marine Terminals.

Additionally, DEM is proposing a revision to APC Regulation No. 20 to revise the sulfur content limitation of alternative fuels so that they are consistent with the proposed amendments to APC Regulation No. 8.

DEM has complied with the requirements of R.I. Gen. Laws Section 42-35-3 by considering alternative approaches to the proposed regulations and has determined that there is no alternative approach that would be as effective and less burdensome. DEM has also determined that the proposed regulations do not overlap or duplicate any other state regulation. DEM has complied with the requirements of R.I. Gen. Laws Section 42-35-3.3, 42-35.1-3 and 42-35.1-4 by preparing an Economic Impact Statement and a Regulatory Flexibility Analysis and providing these to the Office of Regulatory Reform.

Copies of the proposed amendments and a Fact Sheet are available at the Office of Air Resources at 235 Promenade Street, Providence, Rhode Island or on the Department's web site at www.dem.ri.gov. Written comments on the proposed amendments may be sent to the Office of Air Resources at the above address until 4:00 PM, April 14, 2014, at that time the comment period will end, unless extended by the hearing officer. It is requested that persons who wish to

make oral comments during the public hearing submit a copy of their statement for the record.

The Department of Environmental Management building is accessible to those with disabilities. Persons with disabilities requiring accommodation should contact the Office of Air Resources at TCDD (401) 222-6800, or (401) 222-2808, or toll free at 1-800-752-8088, at least three business days prior to the hearing.

Signed this 14th day of March, 2014.

Douglas L. McVay, Chief
Office of Air Resources



FACT SHEET

In re: Proposed revisions to Air Pollution Control Regulation No. 8 “Sulfur Content of Fuels” and Air Pollution Control Regulation No. 20 “Burning of Alternative Fuels”

Introduction

The Department of Environmental Management (DEM), Office of Air Resources, is proposing to revise two of its air pollution control regulations, Air Pollution Control Regulation No. 8 “Sulfur Content of Fuels” and Air Pollution Control Regulation No. 20 “Burning of Alternative Fuels”. APC Regulation No. 8 limits the sulfur content of fuels stored, sold and used in Rhode Island. APC Regulation No. 20 specifies the requirements for the burning of alternative fuels, such as used oil.

Description of Proposed Amendments

The Department is proposing to revise Air Pollution Control Regulation No. 8 to lower the allowable limits on the sulfur content of petroleum-based distillate and residual fuel oils and remove some outdated provisions of the regulation.

In 2009, Rhode Island adopted its *Regional Haze State Implementation Plan Revision*, committing to various control measures representing Rhode Island’s “fair share” contribution towards achieving the reasonable progress visibility goals in the MANE-VU region by 2018. (EPA established 5 regional planning organizations to coordinate regional haze efforts. Rhode Island is a member of one of these regional organizations, the Mid-Atlantic Northeast Visibility Union (MANE-VU)). These measures included a two-phased reduction in the sulfur content of fuel oils. The specific commitment was to reduce the sulfur content (by weight) of:

- Distillate oil to 0.05 percent (500 ppm) by no later than 2014 (Phase I);
- Distillate oil to 0.0015 percent (15 ppm) by no later than 2018, depending on supply availability (Phase II);
- Residual oil to 0.5 percent (5000 ppm) by no later than 2018.

APC Regulation No. 8 is being revised to incorporate the control measures committed to in the Regional Haze Plan. Limitations on the sulfur content of fuel oils consistent with what RI is proposing have been adopted in the states of Maine, Vermont and Massachusetts and proposed for adoption in Connecticut. New York and New Jersey have adopted the same limitations, but they become effective sooner.

The outdated provisions that are proposed to be removed are subsections 8.3.2 “Emission Bubbling”, 8.3.3 “Conversion and Conservation Incentive”, 8.3.4 “Large Fuel Burning Devices Using Coal” and 8.4.2 “Residual Fuel Oil Shipments to Marine Terminals.”

Additionally, DEM is proposing a revision to APC Regulation No. 20 to revise the sulfur content limitation of alternative fuels so that they are consistent with the proposed amendments to APC Regulation No. 8.

Demonstration of Need

In 2009, Rhode Island adopted its *Regional Haze State Implementation Plan Revision*, committing to various control measures representing Rhode Island's "fair share" contribution towards achieving the reasonable progress visibility goals in the MANE-VU region by 2018. Reducing the allowable sulfur content of fuel oils was one of the control measures. The proposed revisions are needed to satisfy that commitment.

Alternative Approaches Considered

No alternative approaches were identified other than to maintain the status quo.

Identification of Overlapped or Duplicated State Regulations

The Office of Air Resources has identified no state regulations that overlap or duplicate the proposed amendments.

Determination of Significant Adverse Economic Impact on Small Business or Any City or Town

The Department has determined that the proposed revisions to lower the allowable sulfur content of fuel oils should have a net beneficial economic impact on small businesses or any city or town. It is possible that the cost of fuel oil may increase 1 to 3 cent per gallon due to the adoption of this proposal. This should be considered a worst case scenario. Consumers (including small business consumers) will realize a net savings in maintenance costs (estimated \$50 per year per heating plant) and a 2 percent improvement in combustion efficiency (estimated at 6 cents per gallon) due to the lower sulfur content of the fuel oil.

For more information or copies of the proposed amendments contact:

Douglas L. McVay, Chief
Office of Air Resources
235 Promenade Street
Providence, RI 02908
Phone: (401) 222-2808 ext. 7011
E-Mail: doug.mcvay@dem.ri.gov
Or, visit the DEM web site at www.dem.ri.gov

**STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR RESOURCES**

AIR POLLUTION CONTROL REGULATION NO. 8

SULFUR CONTENT OF FUELS



Effective 21 October 1971

Last Amended XX Month 2013

AUTHORITY: These regulations are authorized pursuant to R.I. Gen. Laws § 42-17.1-2(s) and 23-23, as amended, and have been promulgated pursuant to the procedures set forth in the R.I. Administrative Procedures Act, R.I. Gen. Laws Chapter 42-35.

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR RESOURCES

AIR POLLUTION CONTROL REGULATION NO. 8

SULFUR CONTENT OF FUELS

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**RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR RESOURCES
AIR POLLUTION CONTROL REGULATION NO. 8**

SULFUR CONTENT OF FUELS

8.1 Definitions

Unless otherwise expressly defined in this section, the terms used in this regulation shall be defined by reference to the Rhode Island Air Pollution Control General Definitions Regulation.. As used in this regulation, the following terms shall, where the context permits, be construed as follows:

- 8.1.1 **"Approved stack gas cleaning process"** means a process, approved by the Director, which removes sulfur dioxide from the products of combustion of fossil fuel.
- ~~8.1.2 **"Effective stack height"** means the sum of the physical stack height and the plume rise as calculated according to the current practice of the Department of Environmental Management as described in the Rhode Island Guideline for Air Quality Modeling.~~
- ~~8.1.3 **"Fuel burning device"** means any device engineered to burn fuel for the primary purpose, as determined by the Director, of producing steam, heat or power.~~
- ~~8.1.4 **"High sulfur fuel"** means any fuel except fuel oil containing more than 0.55 pounds of sulfur per million Btu heat release potential or fuel oil containing more than 1.0 percent sulfur by weight.~~
- ~~8.1.5 **"Low sulfur fuel"** means any fuel except fuel oil containing 0.55 pounds or less of sulfur per million Btu heat release potential or fuel oil containing 1.0 percent sulfur or less by weight.~~
- ~~8.1.6 **"Permanent energy conservation measures"** means any combination of permanent measures designed to increase the available heat, power, or steam output for a given fuel input or to increase the amount of heat or steam required to produce an equivalent amount of product or heat an equivalent amount of space.~~
- ~~8.1.7 **"Significant impact"** means an increase in the annual average or maximum short-term ambient concentration of a pollutant that would exceed any of the following:~~

Pollutant	Annual	Averaging Time (Hours)			
		24	8	3	1
SO ₂	1.0 ug/m ³	5 ug/m ³		25 ug/m ³	
TSP	1.0 ug/m ³	5 ug/m ³			
NO ₂	1.0 ug/m ³				
CO			0.5 mg/m ³		2 mg/m ³

8.2 General Limitations

- 8.2.1 Unless the Director declares in writing after a hearing that a shortage of low-sulfur fuel oil meeting the requirements of this regulation exists, no person shall store for sale, offer for sale, sell or deliver for use in Rhode Island and no person shall use ~~or store high-sulfur fuel except as provided in Section 8.3~~ any fuel oil having a sulfur content in excess of that in Table 1.

Table 1

<u>Fuel Type</u>	<u>Percent by weight</u>	<u>Effective date(s)</u>
<u>Distillate Oil, Biodiesel or Alternative Fuel</u>	<u>0.5% (5000 ppm)</u>	<u>Current requirement</u>
<u>Distillate Oil, Biodiesel or Alternative Fuel</u>	<u>0.05% (500 ppm)</u>	<u>July 1, 2014 through June 30, 2018</u>
<u>Distillate Oil, Biodiesel or Alternative Fuel</u>	<u>0.0015% (15 ppm)</u>	<u>On and after July 1, 2018</u>
<u>Residual Oil</u>	<u>1.0%</u>	<u>Current requirement</u>
<u>Residual Oil</u>	<u>0.5%</u>	<u>On and after July 1, 2018</u>

- 8.2.2 No person shall store for sale, offer for sale, sell or deliver for use in Rhode Island and no person shall use any solid fossil fuel containing more than 0.55 pounds of sulfur per million Btu heat release potential.

8.3 Exemptions

8.3.1 Limitations with Stack Gas Cleaning Process

The Director may approve the use of ~~high sulfur fuels that do not meet the requirements of Section 8.2~~ when combined with an approved stack gas cleaning process, provided the sulfur compound emissions (expressed as sulfur dioxide) from the stack ~~do not exceed 1.1 pounds per million Btu actual heat input~~ are no greater than if the applicable sulfur content fuel were used, and the person using such process gives evidence satisfactory to the Director that the emissions do not exceed the requirements of this subsection.

- 8.3.2 Fuel oil stored in Rhode Island that met the applicable requirements of subsection 8.2.1 at the time the fuel oil was stored in Rhode Island may continue to be stored or used after the effective date in subsection 8.2.1, but may not be offered for sale, sold or delivered for use.

~~8.3.2 Emission Bubbling~~

~~The provisions of Section 8.2 shall not apply to fuels included in an emissions bubble. In an emissions bubble, the owner or operator of a source with more than one fuel burning device, each of which is subject to specific emission requirements under the applicable regulations, may propose to meet the total emission control requirements of the applicable regulations, for a given pollutant, through a different mix of control technology than that mandated by existing regulations. Sulfur compound emissions (expressed as sulfur dioxide) from such a bubble shall not exceed 1.1 pounds per million Btu actual heat input and the sulfur content of any fuel used within the bubble shall not contain over 1.21 pounds of sulfur per million Btu heat release potential. Particulate emissions from the bubble shall not exceed 0.10 pounds per million Btu actual heat input and particulate emissions from any single fuel burning device within the bubble shall not exceed 0.15 pounds per million Btu actual heat input.~~

~~(a) It is the responsibility of the owner or operator of the source to develop a specific emission bubble. Application for approval of an emission bubble shall be made to the Department and must include the following:~~

- ~~(1) Certification that all fuel burning devices to be included in the emissions bubble are at the same plant location and are under the control of, or operated by, the same person; and~~

- ~~(2) Identification of each fuel burning device and stack to be included in the emissions bubble, including the types of fuel to be burned in each unit, the maximum sulfur content of each fuel, the heat input capacity for each unit, the annual fuel use and operating hours per year for each unit; and for each stack, the physical stack height; the exit velocity of the stack gas, the inside diameter of the stack exit and the exit stack gas temperature; and~~
- ~~(3) Sufficient information to evaluate aerodynamic downwash effects in accordance with all applicable federal requirements; and~~
- ~~(4) Air quality modeling meeting the requirements of the Rhode Island Guideline for Air Quality Modeling, including aerodynamic downwashing modeling, to demonstrate that the bubble will not cause a violation of any National Ambient Air Quality Standard, or applicable PSD increment, and will not have a significant impact on any nonattainment area or Class I PSD area. If there is no increase in actual emissions, the air quality modeling requirement may be waived under the following conditions:
 - ~~(i) All the fuel burning devices included in the bubble discharge through the same stack; or~~
 - ~~(ii) Emissions from the most polluting fuel are released at an effective stack height within 10 percent of the greatest effective stack height within the bubble and all stacks included in the bubble are co-located. Co-located shall be held to mean within 100 meters of each other.~~~~
- ~~(b) The Department shall not approve any emissions bubble without first giving public notice and affording all interested persons opportunity to comment on the emissions bubble. Additionally, the Department shall notify the public after each final approval.~~
- ~~(c) An emissions bubble shall not allow a source to supersede any of the following applicable conditions or standards:
 - ~~(1) Conditions of any Prevention of Significant Deterioration permit; or~~
 - ~~(2) Conditions of any nonattainment area permit; or~~
 - ~~(3) Federal New Source Performance Standards; or~~~~

~~(4) — National Emissions Standards for Hazardous Air Pollutants.~~

~~(d) — An approved bubble shall be in effect for a period of no more than three years from the date of issuance. At the end of such three-year period, the Department shall review the bubble for compliance and may either terminate or extend approval of the bubble based on consideration of air quality, control technology innovation, and such other determinations as the Department deems appropriate.~~

~~(e) — The provisions of any bubble shall be incorporated in a permit issued in accordance with the provisions of Air Pollution Control Regulation 9.~~

~~(f) — Any bubble approved by the Department and incorporated into the State Implementation Plan prior to the effective date of this regulation may be continued at the discretion of the Department, subject to the provisions of paragraphs (c), (d) and (e) of this subsection.~~

~~8.3.3 — Conversion and Conservation Incentive~~

~~The Department may authorize the use of high sulfur fuel oil for a period of up to 30 months in any fuel burning device with an energy input capacity of less than 250 million Btu's per hour. The use of the high sulfur fuel oil will be contingent on the source committing to implement permanent energy conservation measures to convert to a fuel (other than a petroleum product such as coal, wood, coal-oil mixture, etc.). The savings realized from burning high sulfur fuel oil during this period shall be used to finance the necessary modifications or installation of pollution control equipment.~~

~~(a) — Approval for burning of high sulfur fuel oil under this section may be granted provided that:~~

~~(1) — The applicant demonstrates by means of air quality modeling, including aerodynamic downwash modeling meeting the requirements of the Rhode Island Guideline for Air Quality Monitoring, that the increase in sulfur dioxide and particulate emissions resulting from the use of the high sulfur fuel oil will not cause a violation of any National Ambient Air Quality Standard or any applicable PSD increment and will not have a significant impact on any nonattainment area or Class I PSD area; and~~

~~(2) — The applicant enters into a Consent Agreement with the Department that specifies a schedule with deadlines by which time various aspects of the conversion and installation of pollution control equipment or the implementation of energy conservation measures~~

shall be completed. In no event shall final installation of pollution control equipment and completion of the conversion or complete implementation of energy conservation measures be accomplished more than 30 months from the commencement of installation unless the Department finds good cause for a longer time. Financial difficulty will not be considered a good cause; and

- (3) — The applicant agrees to submit to the Department a quarterly report stating the quantity of high sulfur fuel oil used, the cost of fuel, the cost of an equivalent quantity of low sulfur fuel oil and the hours of operation for the high sulfur fuel burning unit; and
- (4) — The applicant, where practicable and deemed necessary by the Department, shall have a three day supply of low sulfur fuel oil on hand and be prepared to convert as soon as possible after receiving notice from the Department. If the above is not practicable, then, at a minimum, the company shall have a commitment from its fuel oil supplier to supply the low sulfur fuel within a specified time; and
- (5) — If the conversion does not take place or the energy conversion measures are equivalent to the difference between the cost of the high sulfur fuel oil used and the equivalent amount of low sulfur fuel oil. The applicant shall put up a bond for the amount of money estimated to be saved during the burning of high sulfur fuel oil. This money shall be forfeited if the final conversion or implementation of energy conservation measures does not take place; and
- (6) — If the applicant implements permanent energy conservation measures, they must reduce oil consumption by at least 50,000 gallons/year below average consumption in the two calendar years immediately preceding the 30 month period. The applicant can continue to burn high sulfur fuel after the 30 month period if, through the use of permanent energy conservation measures, annual oil consumption has been reduced by 56 percent from the average annual consumption during the two calendar years immediately preceding the 30 month period; and
- (7) — In the case of conversion, the capacity of the unit that will be converted or installed shall be at least equal to the estimated average heat input rate of high sulfur fuel oil during the 30 month period. This requirement may be waived by the Director if, in his judgment, an increase in the efficiency of the unit due to conversion would decrease the required capacity of the converted unit; and

~~(8) — Approval to burn high sulfur oil shall be granted for only one 30-month period per facility. Such approval may not be renewed or extended except as provided in paragraph 8.3.3(a)(6). After the 30-month period, the source must meet the sulfur dioxide and particulate emission standards which were in effect prior to the approval, except if an applicable standard is amended during the 30-month period, in which case the source may elect to meet the new standard; or except as may be allowed under paragraph 8.3.3(a)(6). Additionally, the applicant must agree to conduct stack testing of any converted unit at his expense to verify compliance with applicable standards for sulfur dioxide and particulates. The Department may, where appropriate, approve fuel testing rather than stack testing for determining compliance with sulfur dioxide emission limits; and~~

~~(9) — The sulfur content of the high sulfur fuel oil used in this section shall not exceed 1.21 pounds of sulfur per million Btu actual heat input.~~

~~(b) — An application for approval under this section shall be made to the Department and must include the following:~~

~~(1) — The required air quality modeling; and~~

~~(2) — A proposed schedule for completing conversion or for implementing conservation measures; and~~

~~(3) — Information on any proposed modifications intended to be made at the facility before it burns high sulfur oil; and~~

~~(4) — For conversions, information on the facility as it will exist after the conversion; and~~

~~(5) — For conservation applications, a listing of each conservation measure and a preliminary estimate of the fuel savings expected; and~~

~~(6) — Historical fuel usage for the facility and preliminary estimates of the quantity of high sulfur fuel oil to be consumed and the total hours burning of high sulfur fuel oil that will take place.~~

~~(c) — Any fuel burning device included in a plan under this section must have been installed and in operation prior to the effective date of this regulation.~~

~~8.3.4 — Large Fuel Burning Devices Using Coal~~

~~(a) — Any fuel burning device with a rated energy input capacity of 250 million~~

~~Btu's per hour or more may use high sulfur fuel provided that:~~

- ~~(1) — the high sulfur fuel is coal; and~~
 - ~~(2) — the average sulfur content does not exceed 1.21 pounds per million Btu's heat release potential in any 30-day period of 2.31 pounds per million Btu's in any 24-hour period; and~~
 - ~~(3) — the stack height, from which emissions resulting from the burning of the high sulfur fuel exit, meets or exceeds good engineering practice; and~~
 - ~~(4) — emissions resulting from the use of the high sulfur fuel will not cause a violation of any National Ambient Air Quality Standard or any applicable PSD increment and will not have a significant impact on any nonattainment area.~~
- ~~(b) — It is the responsibility of the owner or operator of the facility to provide evidence, satisfactory to the Department, and meeting the requirements of the Rhode Island Guideline for Air Quality Modeling, that the above conditions are met.~~
- ~~(c) — If any new or amended federal law requires a reduction in the total emissions of sulfur oxides or nitrogen oxides in Rhode Island or sets a maximum limit on such emissions, then the owner or operator of a facility burning high sulfur fuel under the provisions of paragraph 8.3.4(a) must obtain emission offsets or emission reductions for the increased sulfur oxide emissions due to coal burning.~~
- ~~(1) — The actual amount of emission offsets or emission reductions at any time shall be the difference between the actual annual sulfur oxide emission rate and the actual annual sulfur oxide emission rate during the baseline period established by federal law; except that the amount of emission offsets or reductions required shall be reduced to the extent that the new or amended federal law does not count the increased sulfur oxide emissions due to coal burning as part of the maximum allowable emissions for sulfur oxides and nitrogen oxides in Rhode Island.~~
 - ~~(2) — Such emission offsets or emission reductions must meet any conditions specified in federal law to be creditable against Rhode Island sulfur oxide and nitrogen oxide emissions and must be obtained within the period established by the new or amended federal law.~~

~~(3) — The Director may waive any or all of the required emission offsets or emission reductions at his discretion, provided that the total emissions of sulfur oxides and nitrogen oxides in Rhode Island shall not exceed the maximum amount allowed under federal law.~~

8.3.3 Storage Facilities

Any person ~~seeking to store~~ing for sale, selling or delivering, ~~high sulfur fuel oil that does not meet the requirements of subsection 8.2.1,~~ for use in Rhode Island under the provisions of Subsections 8.3.1, ~~8.3.2, 8.3.3 and 8.3.4~~ or for use outside of Rhode Island shall obtain the prior written approval of the Director.

8.3.4 The limitations of this regulation shall not apply to marine vessels or motor vehicles.

8.4 Determination of Compliance

8.4.1 Compliance with the applicable limitations set forth in this regulation shall be determined by procedures referenced below or deemed equivalent by the Director. Such procedures shall include but not be limited to any of the following:

- (a) Emission testing conducted by the owner or operator of the source according to the Reference Methods of Appendix A to 40 CFR 60; ~~and/or~~
- (b) The owner or operator of a stationary source using fuel oil shall obtain a certification from the fuel supplier which contains:
 - (1) the name of the supplier; and,
 - (2) the sulfur content of the fuel oil and the ASTM method used to determine the sulfur content of the fuel oil; and,
 - (3) the location of the fuel oil when the sample was drawn for analysis to determine the sulfur content of the fuel oil , specifically including where the fuel oil was sampled; or
- (c) Laboratory analysis of ~~fossil fuels~~fuel oils by the owner or operator of the stationary source or by the supplier. Sampling and analysis shall be conducted after each new shipment of fuel oil is received by the source. Samples shall be collected from the fuel tank immediately after the fuel tank is filled and before any fuel oil is combusted. A sampling valve shall be installed in the fuel line between the feed pump and the burner by the owner or operator for sample collection. ~~Fossil fuels~~All fuel oil must be sampled and analyzed ~~according to~~ in accordance with applicable ASTM methods or

another method which haves the prior approval of or are required by the Director; or

- (d) A continuous monitoring system for the measurement of sulfur dioxide that meets the performance specifications in Appendix B of 40 CFR 60. The monitoring equipment shall also be installed, calibrated, operated, and maintained in accordance with the procedures in Appendix B of 40 CFR 60 and the minimum specifications in Appendix P of 40 CFR 51.

~~8.4.2 Residual Fuel Oil Shipments to Marine Terminals~~

~~Each shipment of residual fuel oil received at a marine terminal shall be sampled and tested for sulfur content using methods approved by the Director. Such sampling and testing shall be performed by a qualified referee laboratory. Results of such tests must be reported to the Director. In addition, a representative sample of each shipment of oil shall be submitted to the Rhode Island Health Laboratory or other laboratory designated by the Director, by the close of business on the next business day after the oil has been received at the terminal. The following information shall be included with each sample:~~

- ~~(a) The name of the vessel delivering the oil and compartment or tank number where applicable.~~
- ~~(b) The name of the inspector taking the sample and the name of the referee laboratory.~~
- ~~(c) The name of the terminal where the oil was delivered and the name of the owner of the oil.~~
- ~~(d) The amount of oil in the shipment.~~

~~Results of tests conducted by the Rhode Island Health Laboratory or other designated laboratory shall be reported to the owner of the oil.~~

8.4.2 Taking of Fossil Fuel Samples

The Director may require, under his supervision, the collection of fossil fuel samples for the purpose of determining compliance with this regulation. Sampling and analysis of fossil fuels under Subsection 8.4.2 shall not limit the collection of samples under this section.

~~8.4.4 Sulfur Variability in Coal~~

~~Coal burning devices with a rated energy input capacity of less than 250 million Btu's per hour shall be considered in compliance with sulfur dioxide and particulate emission limitations if the average emission rate in any 24-hour period does not~~

~~exceed the applicable emission limitation.~~

8.5 Recordkeeping

- 8.5.1 Copies of all fuel supplier certifications or fuel oil analyses shall be maintained by the owner or operator of a source using fuel oil and be made accessible for review by the Office of Air Resources or its authorized representative and USEPA.
- 8.5.2 All records required by this regulation shall be maintained for a minimum of five years after the date of each record and shall be made available to representatives of the Office of Air Resources upon request.

8.6 General Provisions

8.6.1 Purpose

The purpose of this regulation is to limit the sulfur content of fuels.

8.6.2 Authority

These regulations are authorized pursuant to R.I. Gen. Laws § 42-17.1-2(s) and 23-23, as amended, and have been promulgated pursuant to the procedures set forth in the R.I. Administrative Procedures Act, R.I. Gen. Laws Chapter 42-35

8.6.3 Application

The terms and provisions of this regulation shall be liberally construed to permit the Department to effectuate the purposes of state law, goals and policies.

8.6.4 Severability

If any provision of this regulation or the application thereof to any person or circumstance, is held invalid by a court of competent jurisdiction, the validity of the remainder of the regulation shall not be affected thereby.

8.6.5 Effective Date

The foregoing regulation, "Sulfur Content of Fuels", as amended, after due notice, is hereby adopted and filed with the Secretary of State this _____ day of _____, 2013_ to become effective twenty (20) days thereafter, in accordance with the provisions of Chapters 23-23, 42-35, 42-17.1, 42-17.6, of the General Laws of Rhode Island of 1956, as amended.

Janet Coit, Director
Department of Environmental Management

Notice Given on: **Month XX, 2013**

Public Hearing held: **Month XX, 2013**

Filing Date: **Month XX, 2013**

Effective Date: **Month XX, 2013**

~~POLICY FOR INCREMENT CONSUMPTION FROM APPLICATION UNDER SECTION 8.3.3 OF REGULATION 8—14 MARCH 1985~~

~~As part of an application under the Conversion and Conservation Incentive Section of Regulation 8, the applicant must demonstrate "...that the increase in sulfur dioxide and particulate emissions resulting from the use of the high sulfur oil will not cause a violation of ... any applicable PSD increment..."~~

~~Air Pollution Control Regulation 9, Section 9.15, contains the rules governing increment consumption, and these requirements supersede those of any other regulations. Section 9.15.1 (c) allows for the exclusion of certain concentrations from increment consumption. One such exclusion is for "...concentrations attributable to the temporary increase in emissions of sulfur dioxide of particulate matter from stationary sources which are affected by State Implementation Plan revisions meeting the following criteria:~~

- ~~(a) The duration of the State Implementation Plan revision shall not exceed thirty (30) months; and~~
- ~~(b) The duration of the exclusion is not renewable; and~~
- ~~(c) The emissions increase from the source would not cause or contribute to the violation of a national ambient air quality standard or impact an area where an applicable increment is known to be violated; and~~
- ~~(d) At the end of the State Implementation Plan revision, the emission levels from the source shall not exceed those levels occurring before the State Implementation Plan revision was approved..."~~

~~Any approval under the Conversion and Conservation Incentive Section of Regulation 8 would satisfy all of these criteria. Therefore, in general, applications under Section 8.3.3 will no longer be required to assess increment consumption as part of the application. If, however, an applicant will have a significant impact in either Massachusetts or Connecticut, it will be required to assess increment consumption in that state.~~

~~For those applications where the impacts are in Rhode Island only, the applicant will be required to assess compliance with the applicable NAAQS, impacts on nonattainment areas, impacts on Class I PSD areas and impacts on any area where an increment is known to be violated.~~

**STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR RESOURCES**

AIR POLLUTION CONTROL REGULATION NO. 20

BURNING OF ALTERNATIVE FUELS



Effective 3 April 1985

Last Amended XX Month 2013

AUTHORITY: These regulations are authorized pursuant to R.I. Gen. Laws § 42-17.1-2(s) and 23-23, as amended, and have been promulgated pursuant to the procedures set forth in the R.I. Administrative Procedures Act, R.I. Gen. Laws Chapter 42-35.

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR RESOURCES

AIR POLLUTION CONTROL REGULATION NO. 20

BURNING OF ALTERNATIVE FUELS

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**RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR RESOURCES**

AIR POLLUTION CONTROL REGULATION 20

BURNING OF ALTERNATIVE FUELS

20.1 Definitions

Unless otherwise expressly defined in this section, the terms used in this regulation shall be defined by reference to the Rhode Island Air Pollution Control General Definitions Regulation. As used in this regulation, the following terms shall, where the context permits, be construed as follows:

- 20.1.1 **"Alternative fuel"** means any materials, other than fuel oil, natural gas, coal or wood residue that is burned for the purpose of creating useful heat. Types of alternative fuels include, but are not limited to waste oil and hazardous waste. This definition does not include refuse derived fuel (RDF).
- 20.1.2 **"Fuel burning equipment"** means any furnace, boiler, apparatus, stack and all appurtenances thereto used in the process of burning fuel for the primary purpose of producing heat or power.
- 20.1.3 **"Hazardous waste"** means any waste or combination of wastes of a solid, liquid, gaseous or semi-solid form which is defined as a hazardous waste in the Rhode Island Rules and Regulations for Hazardous Waste, Generation, Transportation, Treatment, Storage and Disposal.
- 20.1.4 **"Waste oil"** means used or spent oil of any kind, including but not limited to those oils from automotive, industrial, aviation and other source categories.
- 20.1.5 **"Wood residue"** means a waste by-product of the pulp and paper industry which consists of bark, sawdust, slabs, chips, shavings and mill trim.

20.2 Applicability

The provisions of this regulation shall apply to any person burning alternative fuels in fuel burning equipment with a heat input capacity of one million Btu per hour or greater.

20.3 Prohibitions

No person shall burn alternative fuels without first obtaining written approval from the Director.

20.4 Approval to Burn Alternative Fuels

20.4.1 Alternative Fuels Containing PCB's

Approval to burn alternative fuels containing PCB's shall be granted consistent with the requirements of Title 40 of the Code of Federal Regulations Part 761 entitled "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions" and the Rhode Island Rules and Regulations for Hazardous Waste Generation, Transportation, Treatment, Storage and Disposal.

20.4.2 Alternative Fuels Containing Less than 50 ppmv PCB's

- (a) For consideration as an alternative fuel, a material must meet the following standards:

Heating Value	8,000 Btu/lb or greater
Halogens	0.1% by weight or less
Lead	100 ppm by weight or less
Sulfur	1.0% by weight or less Meet the requirements of Air Pollution Control Regulation No. 8
PCB	50 ppm by volume or less
Flashpoint	100°F minimum
Arsenic	5 ppm by volume or less
Cadmium	2 ppm by volume or less
Chromium	10 ppm by volume or less

- (b) Any person seeking permission to burn alternative fuels must provide the Director with:
- (1) A laboratory analysis of the material for the properties or constituents listed in Subsection 20.4.2 (a), heavy metals, flash point, viscosity, bottom solids and water, and ash, and any other hazardous components suspected of being in the material; and
 - (2) Identification of the process that generates the alternative fuel, the maximum feed rate of the alternative fuel and the maximum percent of the total fuel feed rate that is alternative fuel.
- (c) Any facility permitted to burn alternative fuels must have a full- time operator in attendance who is knowledgeable in the operation of the fuel

burning equipment used for burning the alternative fuels.

20.5 Limitation on Air Contaminants

- 20.5.1 Any person burning alternative fuels must be in compliance with all applicable rules and regulations of the Division or subject to the requirements of an enforceable compliance schedule.
- 20.5.2 No person shall at any time cause or permit the emission of air contaminants from the burning of alternative fuels that will:
- (a) cause or contribute to a violation of any state or national ambient air quality standard; or
 - (b) by reason of their concentration or duration may be injurious to human, plant or animal life; or
 - (c) unreasonably interfere with enjoyment of life or property or cause damage to property.
 - (d) cause an increase in ground level concentrations of a listed toxic air contaminant, at or beyond the property line of that facility, in excess of the Acceptable Ambient Levels, delineated in Air Pollution Control Regulation No. 22, entitled, "Air Toxics."
- 20.5.3 The Department may set standards for the properties of alternative fuels more stringent than those listed in Subsection 20.4.2 (a) as may be necessary to prevent air pollution where it is determined that an aerodynamic downwash problem exists at a source.

20.6 Sampling and Analysis of Alternative Fuels

- 20.6.1 To ensure that the alternative fuel meets the specifications of Section 20.4 of this regulation, the source approved to burn alternative fuels shall sample and analyze alternative fuels for the applicable standards, along with the flash point, viscosity, bottom solids and water, and ash content, according to a schedule approved by the Department. Appendix B of this regulation may be used as a guideline for developing an approvable schedule.
- 20.6.2 All analyses performed for the fulfillment of any requirements of this regulation shall be according to those methods specified in Appendix A of this regulation where applicable. Alternative methods may be used providing they have the prior approval of the Director. Where test methods are not specified, the analyst should consult with the Director on the methods proposed to be used.

20.7 Trial Burns and Emission Testing

- 20.7.1 The Director may require a trial burn for each alternative fuel that is significantly different in physical or chemical characteristics from any alternative fuel previously demonstrated to have been burned successfully under equivalent conditions. Such testing shall be conducted to determine the level of emission of air contaminants from the burning of alternative fuels.
- 20.7.2 The above required emission testing shall be conducted at the expense of the owner or operator of the source according to methods that have the prior approval of the Director.
- 20.7.3 The above required emission testing shall include the following minimum determinations:
- (a) An analysis of the exhaust gases for concentrations of carbon monoxide, carbon dioxide, oxygen, particulates, hydrogen halides (if applicable) and any principal hazardous components identified by the Director:
 - (b) A measurement of combustion temperature
 - (c) A computation of destruction efficiency for each principal hazardous component identified by the Director, where

$$\text{Destruction efficiency} = \frac{(W_{in} - W_{out})}{W_{in}} \times 100$$

W_{in} = mass feed rate of principal hazardous components of alternative fuel going into fuel burning equipment

W_{out} = mass emissions rate of principal hazardous components in alternative fuel

20.8 Alternative Standards and Schedules

The Director may approve alternative standards to those listed in Subsection 20.4.2(a) of this regulation provided that the applicant can demonstrate to the Director's satisfaction that the emissions resulting from the burning of alternative fuels not meeting the requirements of Subsection 20.4.2 (a) either alone or in combination with other emissions, by reason of their concentration and duration in the outdoor atmosphere, will not be injurious to human, plant or animal life or cause damage to property, or cause to contribute to a violation of the standards in Section 20.5.2 of the regulation.

20.9 Record Keeping

20.9.1 The owner or operator of a source burning alternative fuels shall maintain records for a period of three (3) years that include:

- (a) The feed rate of alternative fuels;
- (b) The total fuel feed rate;
- (c) The date and hour deliveries or additions to the fuel storage tanks are made and the quantity;
- (d) The date and hour samples required by Section 20.6 are taken;
- (e) The time that burning of the alternative fuel commenced and ceased, or was interrupted, including the date and hour;
- (f) The name and address of the supplier of the alternative fuel.

20.9.2 Sources or suppliers required to have analyses performed pursuant to Section 20.6 of this regulation shall forward results of these analyses to the Office of Air Resources within ten (10) working days of required sampling.

20.9.3 Sources receiving exemptions under Section 20.10 may be required to maintain records of the alternative fuel burned at their facility. The nature of this record keeping shall be determined when approval is granted to burn the alternative fuel.

20.10 Exemptions

The provisions of this regulation, except for Subsection 20.9.3, insofar as they relate to air pollution, shall not apply to any person who blends alternative fuels with their primary fossil fuel where the maximum amount of alternative fuel as a percent by volume of the primary fossil fuel is less than or equal to one. This exemption shall not apply to alternative fuels containing greater than 50 ppm PCB's nor does it exempt any person from compliance with the Department's Hazardous Waste Rules and Regulations. Exemptions under this section will be considered after a written request to the Department from the applicant that explains the nature of the alternative fuel that is requested to be burned.

20.11 Alternative Fuels Sellers

Any person selling alternative fuels must retain for a period of three (3) years records of each sale, including gallons sold, the date of delivery and the person who receives the alternative fuel for burning, and shall make these records available to the Department for inspection upon request.

20.12 Compliance with Hazardous Waste Regulations

Compliance with this regulation does not relieve any person from compliance with the Department's Hazardous Waste Rules and Regulations.

20.13 General Provisions

20.13.1 Purpose

The purpose of this regulation is to specify the requirements for burning alternative fuels.

20.13.2 Authority

These regulations are authorized pursuant to R.I. Gen. Laws § 42-17.1-2(s) and 23-23, as amended, and have been promulgated pursuant to the procedures set forth in the R.I. Administrative Procedures Act, R.I. Gen. Laws Chapter 42-35

20.13.3 Application

The terms and provisions of this regulation shall be liberally construed to permit the Department to effectuate the purposes of state law, goals and policies.

20.13.4 Severability

If any provision of this regulation or the application thereof to any person or circumstance, is held invalid by a court of competent jurisdiction, the validity of the remainder of the regulation shall not be affected thereby.

20.13.5 Effective Date

The foregoing regulation, "Burning of Alternative Fuels", as amended after due notice, is hereby adopted and filed with the Secretary of State this ____ day of _____, 2014 to become effective twenty (20) days thereafter, in accordance with the provisions of Chapters 23-23, 42-35, 42-17.1, 42-17.6, of the General Laws of Rhode Island of 1956, as amended.

Janet Coit, Director
Department of Environmental Management

Notice Given on:

Public Hearing held:

Filing Date:

Effective Date:

APPENDIX A
WASTE OIL/SOLVENT BURNING REGULATION
RECOMMENDED TEST PROCEDURES

Heavy Metals

EPA test method SW-846, November 1986, 3rd edition "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods."

Flash Point

ASTM Test Method D 93-77 "Flash Point by Pensky Martens Closed Tester."

Viscosity

ASTM Test Method D 445-74 "Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)" with the modification that for oils which give evidence (increased viscosity with time outside repeatability limits, low flash point) of contamination by volatiles; a notation should be in the test report that repeatability was not obtained and list the viscosity values in sequence.

Heating Value

ASTM Test Method D 240-76 "Heat of Combustion of Hydrocarbon Fuels by Bomb Calorimeter" with the modification that the alternative fuel sample be vigorously agitated immediately prior to taking the test sample so that all particulate material be in complete suspension.

BS & W

ASTM Test Method D 95-70 "Water in Petroleum Products and Bituminous Materials by Distillation" with the modification that the sample volume taken for analysis be reported.

ASTM Test Method D 473-69 "Sediment in Crude and Fuel Oils by Extraction" with the modification that a new refractory thimble be used for each determination. Note: Value should be reported either as a combined value for water and sediment on a weight basis or reported separately.

Ash

ASTM Test Method D 874-77 "Sulfated Ash from Lubricating Oils and Additives" with the modification that platinum crucibles should not be used.

Total Sulfur

ASTM Test Method D 1552 "Sulfur in Petroleum Products (High Temperature Method)."

Lead

ASTM Test Method D 2788-72 "Trace Metals in Gas Turbine Fuels (Atomic Absorption Method)" with the modification described in NBS Technical Note 1130 "Recycled Oil Program" Phase 1 - Test Procedures for Recycled Oil Used as a Burner Fuel."

Modified D 2788-72 Test Procedure

Prepare lead metallo-organic standard as described on NBS-SRM 1059b Certificate of Analysis; however, methyl isobutyl ketone (MIBK) is substituted for the light oil in the dissolution procedure.

Place sample in a vigorous paint shaker and agitate for 20 minutes. Transfer 1 g test portions to a tared 50 mL beaker. Re-weight beaker and transfer test portion of 100mL volumetric flask using methyl isobutyl ketone (MIBK). Add 5 mL of a 1 percent succinimide dispersing agent and dilute to calibrated volume with MIBK. Just prior to the sampling of the test portion for the standard addition, place the volumetric flask in an ultrasonic bath and agitate the sample for 10 minutes. Then transfer immediately four aliquots of the test portion to volumetric flasks. (Note: the optimum concentration of lead for flame AAS is 5 to 10 ug/mL. If the final lead concentration including the standard addition exceeds 20 ug/mL, a non-linear curve is obtained which has a tendency to produce high analytical values.) With a volumetric pipet, transfer known concentrations of the lead metallo-organic standard solution to three of the volumetric flasks and dilute to a calibrated volume with MIBK.

Turn on the AAS instrument and insert a lead hollow cathode lamp. Adjust the lamp current to the recommended value and set the wave length to 283.3 nm using a spectral bandpass of 0.7 nm. Allow the hollow cathode lamp to warm up for 15 minutes. Insert a 10 cm single slot burner head on the burner. Turn on the air-acetylene flame and adjust the nebulizer to a flow rate of 2 to 3 mL/min. Then while nebulizing MIBK, adjust the acetylene flow rate to obtain a lean flame. Nebulize the unknown solutions and obtain a net absorbance for each solution. Always nebulize MIBK before and after taking a measurement. Repeat the measurements three times and then determine the concentration in the unknown sample by extrapolation.

Halogens

ASTM Test Method D 808-63 "Chlorine in New and Used Petroleum Products (Bomb Method)."

ASTM Test Method D 1317-64 "Chlorine in New and Used Lubricants (Sodium Alcoholate Method)."

Nitrogen

ASTM Test Method E 258-67 "Standard Test Method for Total Nitrogen Inorganic Material by Modified KJELDAHL Method."

APPENDIX B
GUIDELINES FOR APPROVABLE SAMPLING AND ANALYSIS SCHEDULES

Sampling

A source approved to burn alternative fuels may take a sample for analysis after each addition of alternative fuel to the fuel storage tank. Said sample should be taken from the fuel line between the feed pump and the burner at least six hours after the addition but no later than 18 hours.

or

The source can sample the material prior to its addition to the storage tank.

Analysis

Samples taken may be blended into a composite sample and analyzed for the following parameters according to the schedule listed below.

Burning rate (Gallons/Weeks)

	0-2,000	2-6,000	6-15,000	15,000+
Heating Value	Semiannually	Quarterly	Monthly	Biweekly
Flash Point	Semiannually	Quarterly	Monthly	Biweekly
Viscosity	Quarterly	Monthly	Biweekly	Weekly
Halogen	Quarterly	Monthly	Biweekly	Weekly
BS & Ws	Quarterly	Monthly	Biweekly	Weekly
Lead	Quarterly	Monthly	Biweekly	Weekly
PCB's	Quarterly	Monthly	Biweekly	Weekly
Sulfur	Semiannually	Quarterly	Monthly	Biweekly
Ash	Quarterly	Monthly	Biweekly	Weekly
Arsenic	Quarterly	Monthly	Biweekly	Weekly
Cadmium	Quarterly	Monthly	Biweekly	Weekly
Chromium	Quarterly	Monthly	Biweekly	Weekly



**RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT**

235 Promenade Street, Providence, RI 02908-5767

TDD 401-831-5508

Date: 28 February 2014

To: Kelly Mahoney
Governor's Office

Nancy Scarduzio
Office of Management and Budget
Department of Administration

From: Douglas L. McVay, Chief
Office of Air Resources
Department of Environmental Management

RE: Economic Impact Statement & Regulatory Flexibility Analysis for Revisions to Air
Pollution Control Regulations No. 8 and No. 20

Reason for the Rulemaking

The Department is proposing to revise Air Pollution Control Regulation No. 8 to lower the allowable limits on the sulfur content of petroleum-based distillate and residual fuel oils and remove some outdated provisions of the regulation.

In 2009, Rhode Island adopted its *Regional Haze State Implementation Plan Revision*, committing to various control measures representing Rhode Island's "fair share" contribution towards achieving the reasonable progress visibility goals in the MANE-VU region by 2018. (EPA established 5 regional planning organizations to coordinate regional haze efforts. Rhode Island is a member of one of these regional organizations, the Mid-Atlantic Northeast Visibility Union (MANE-VU)). These measures included a two-phased reduction in the sulfur content of fuel oils. The specific commitment was to reduce the sulfur content (by weight) of:

- Distillate oil to 0.05 percent (500 ppm) by no later than 2014 (Phase I);
- Distillate oil to 0.0015 percent (15 ppm) by no later than 2018, depending on supply availability (Phase II);
- Residual oil to 0.5 percent (5000 ppm) by no later than 2018.

APC Regulation No. 8 is being revised to incorporate the control measures committed to in the Regional Haze Plan. Limitations on the sulfur content of fuel oils consistent with what RI is proposing have been adopted in the states of Maine, Vermont and Massachusetts and proposed for adoption in Connecticut. New York and New Jersey have adopted the same limitations, but they become effective sooner.

The outdated provisions that are proposed to be removed are subsections 8.3.2 “Emission Bubbling”, 8.3.3 “Conversion and Conservation Incentive”, 8.3.4 “Large Fuel Burning Devices Using Coal” and 8.4.2 “Residual Fuel Oil Shipments to Marine Terminals.

Additionally, DEM is proposing a revision to APC Regulation No. 20 to revise the sulfur content limitation of alternative fuels so that they are consistent with the proposed amendments to APC Regulation No. 8.

Economic Impact Statement

The Department has determined that the proposed revisions to lower the allowable sulfur content of fuel oils should have a net beneficial economic impact on small businesses or any city or town. It is possible that the cost of fuel oil may increase 1 to 3 cent per gallon due to the adoption of this proposal. This should be considered a worst case scenario. Consumers (including small business consumers) will realize a net savings in maintenance costs (estimated \$50 per year per heating plant) and a 2 percent improvement in combustion efficiency (estimated at 6 cents per gallon) due to the lower sulfur content of the fuel oil.

The complete Regulatory Flexibility Analysis and Small Business Impact Statements are attached.

A public notice regarding the proposed regulation revisions is scheduled to be published on 14 March 2014.

Regulatory Flexibility Analysis
Air Pollution Control Regulation Nos. 8 and 20

1. The establishment of less stringent compliance or reporting requirements for small businesses.

The compliance requirements specified are the minimum requirements necessary to ensure compliance with the regulation. For most regulated entities under these regulations, the proposed revisions do not create any new compliance requirements. Regulated entities are required to obtain a certification from the fuel supplier which certifies the sulfur content of the fuel oil or have the fuel oil sampled themselves. The regulation does not contain any reporting requirements. No additional flexibility for small business is possible.

2. The establishment of less stringent schedules or deadlines for compliance or reporting requirements for small businesses.

The implementation dates for the lower sulfur in fuel requirements are structured to be consistent with requirements already adopted in Maine, Vermont and Massachusetts and proposed for adoption in Connecticut. New York and New Jersey have adopted the same limitations, but they become effective sooner.

3. The consolidation or simplification of compliance or reporting requirements for small businesses.

There is no consolidation or simplification possible. The regulation simply limits the sulfur content of the fuel oil stored for sale, offered for sale, sold or delivered for use in Rhode Island. The Department knows of no other way to simplify the compliance requirement. The regulation does not contain any reporting requirements.

4. The establishment of performance standards for small businesses to replace design or operational standards required in the proposed regulation.

The Department believes that a performance standard, such as an emission limit, would be more burdensome for the regulated entities. The compliance requirements would need to include stack testing which would increase the cost of compliance with the regulation for small businesses. Limiting the sulfur content of the fuel oil should be the preferred alternative.

5. The exemption of small businesses from all or any part of the requirements contained in the proposed regulation.

If the Department were to exempt small businesses from all or any part of the requirements in the proposed regulation, then achieving Rhode Island's "fair share" contribution towards the reasonable progress visibility goals in our Regional Haze Plan would be compromised. Additionally, because similar requirements are being implemented throughout the Northeast region, it is unlikely that a supply of higher sulfur fuel oil will be available to small businesses.

SMALL BUSINESS IMPACT STATEMENT

Agency submitting regulation:

Department of Environmental Management, Office of Air Resources

Subject matter of regulation:

Air Pollution Control Regulation No. 8 – Sulfur Content of Fuels

ERLID No:

TBD, formerly 4503

Statutory authority:

Rhode Island General Laws § 42–17.1–2(s) and 23–23, as amended

Other agencies affected:

None.

Other regulations that may duplicate or conflict with the regulation:

None.

Describe the scope and objectives of the regulation:

Regulation No. 8 limits the sulfur content of fuels stored for sale, offered for sale, sold or delivered for use in Rhode Island.

What was the rationale for establishing this regulation?

To limit the quantity of sulfur dioxide emissions entering the atmosphere from the burning of fuels. During the combustion process, sulfur in the fuel reacts with oxygen to form sulfur dioxide. Exposure to sulfur dioxide can cause difficulty breathing, including changes in the body's ability to take a breath or breathe deeply, or take in as much air per breath. Long term exposure to sulfur dioxide can cause changes in lung function and aggravate existing heart disease.

Sulfur dioxide is also a major component of acid rain since it mixes with water vapor in the atmosphere, reacting to produce sulfuric acid. Acid rain can damage forests and crops, change the acidity of soils, and make lakes and streams acidic and unsuitable for aquatic life. Sulfur dioxide also contributes to the decay of building materials and paints, including monuments and statues.

In addition, sulfur dioxide reacts in the atmosphere to form sulfates and other sulfur oxides. Gaseous sulfur oxides can react with other compounds in the atmosphere to form small particles called particulate matter. These particles penetrate deeply into sensitive parts of the lungs and

can cause or worsen respiratory disease, such as emphysema and bronchitis, and can aggravate existing heart disease, leading to increased hospital admissions and premature death.

EPA has set air quality standards for sulfur oxides and particulate matter. The National Ambient Air Quality Standard for sulfur dioxide and particulate matter is designed to protect against exposure to these pollutants. EPA regulates these pollutants by developing human health-based and/or environmentally-based criteria for setting permissible levels. The Office of Air Resources is required by EPA to measure and monitor the ambient air levels of sulfur dioxide and particulate matter in the state.

In 2009, Rhode Island adopted its Regional Haze State Implementation Plan Revision, committing to various control measures representing Rhode Island's "fair share" contribution towards achieving the reasonable progress visibility goals in the MANE-VU region by 2018. (EPA established 5 regional planning organizations to coordinate regional haze efforts. Rhode Island is a member of one of these regional organizations, the Mid-Atlantic Northeast Visibility Union (MANE-VU)). These measures included a two-phased reduction in the sulfur content of fuel oils.

Does the rationale still exist?

Yes, the requirement to regulate the sulfur content of fuels still exist as the sulfur content of fuel oil from the refinery can differ.

Is the rationale still relevant?

Yes, the rationale to regulate and reduce the emissions of sulfur dioxide in the atmosphere is still a major concern for protection of human health and the environment and to reduce visibility impacts.

Business industry (s) affected by the regulation:

Any business/industry which combusts fuel oil either for space heating needs or process needs.

Types of businesses included in the industry (s):

Any type of business may be subject to the regulation. Applicability is determined based on the type of fuel used by the business for their process and/or heating needs.

Total number of small businesses included in the regulated industry (s)

The number of small businesses that could be included in the regulated industry is not quantifiable. The regulation limits the sulfur content of fuel oil used or sold in Rhode Island and is not based on quantity of fuel used.

Number of small businesses potentially subject to the proposed regulation:

The number of small businesses potentially subject to the regulation is not quantifiable.

How often do small businesses contact your agency for assistance with clarification of the regulation and/or receive assistance with compliance issues?

Very few small businesses have ever contacted this office for assistance with clarification of this regulation and/or receive assistance with compliance issues.

What is the cost to your agency of establishing and enforcing this regulation?

The cost to our agency to establish and enforce is minimal. A regulation limiting the sulfur content of fuel oil has been in place since 1971.

What would the consequences be if the regulation did not exist?

If this regulation did not exist and the sulfur content of fuel oil was uncontrolled, the emissions of sulfur dioxide would increase leading to increases in respiratory disease, heart disease, and acid-rain deposition.

Effective date used in cost estimate:

Not applicable.

1.	Yes	No ✓	Do small businesses have to create, file, or issue additional reports? <i>Additional reports do not need to be created, filed, or issued.</i>
2.	Yes	No ✓	Do small businesses have to implement additional recordkeeping procedures? <i>If requested, any entity would be required to demonstrate that they were in compliance with the regulation if using fuel oil. This could be in the form of a fuel certification issued by the fuel oil supplier or a fuel oil analysis.</i>
3.	Yes	No ✓	Do small businesses have to provide additional administrative oversight? <i>Additional administrative oversight would be in the form of maintaining the fuel oil certification or analysis on file.</i>
4.	Yes	No ✓	Do small businesses have to hire additional employees in order to comply with the proposed regulation? <i>The regulation does not require the source to hire additional employees in order to comply with the regulation.</i>
5.	Yes	No ✓	Does compliance with the regulation require small businesses to hire other professionals (e.g. a lawyer, accountant, engineer, etc.)? <i>Compliance with regulation does not require the source to hire other professionals in order to comply with the regulation.</i>
6.	Yes	No ✓	Does the regulation require small businesses to purchase a product or make any other capital investments in order to comply with the regulation? <i>The regulation does not impose new requirements or require any purchases or capital investments in order to comply with the regulation.</i>

7.	Yes	No ✓	Are performance standards more appropriate than design standards? <i>Performance standards if they were in the form of an emission limitation, as opposed to a limit on the fuel oil sulfur content, would be more burdensome.</i>
8.	Yes ✓	No	Does the regulation require small businesses to cooperate with audits, inspections, or other regulatory enforcement activities? <i>The regulation requires facilities to make records available to DEM on request.</i>
9.	Yes	No ✓	Does the regulation have the effect of creating additional taxes and/or fees for small businesses? <i>No addition fees are imposed by this regulation.</i>
10.	Yes	No ✓	Does the regulation require small businesses to provide educational services to keep up to date with regulatory requirements? <i>The regulation does not require small businesses to provide educational services to keep up-to-date with the regulatory requirements.</i>
11.	Yes	No ✓	Is the regulation likely to <i>deter</i> the formation of small businesses in RI? <i>The regulation does not have an effect on small businesses that would influence it's stability in any way. The regulation is consistent with requirements in neighboring states.</i>
12.	Yes	No ✓	Is the regulation likely to <i>encourage</i> the formation of small businesses in RI? <i>The limitations on sulfur content of fuel oil are similar to those in many Northeast states, so the regulation is unlikely to encourage small businesses in RI.</i>
13.	Yes	No ✓	Can the regulation provide for less stringent compliance or reporting requirements for small businesses? <i>It is unlikely that the compliance requirements imposed by this regulation could be made less stringent for small businesses. There are no reporting requirements for small businesses.</i>
14.	Yes	No ✓	Can the regulation establish less stringent schedules or deadlines for compliance or reporting requirements for small businesses? <i>The deadlines for compliance are intended to be consistent with those in other Northeast states.</i>
15.	Yes	No ✓	Can the compliance or reporting requirements be consolidated or simplified for small businesses? <i>The compliance requirements are already simplified. There are no reporting requirements.</i>
16.	Yes	No ✓	Can performance standards for small businesses replace design or operational standards? <i>Performance standards if they were in the form of an emission limitation, as opposed to a limit on the fuel oil sulfur content, would be more burdensome.</i>

17.	Yes	No ✓	<p>Are there alternative regulatory methods that would minimize the adverse impact on small businesses?</p> <p><i>No adverse impacts are known to impact small businesses from this regulation. The Department believes the lower allowable sulfur content for fuel oils will have a net beneficial economic impact on small businesses.</i></p>
18.	Yes	No ✓	<p>Have any small businesses or small business organizations been contacted during the preparation of this document? If so, please describe.</p>

SMALL BUSINESS IMPACT STATEMENT

Agency submitting regulation:

Department of Environmental Management, Office of Air Resources

Subject matter of regulation:

Air Pollution Control Regulation No. 20 – “Burning of Alternative Fuels”

Regulation No. 20 is applicable to any source burning alternative fuels in fuel burning equipment with a heat input capacity of one million Btu per hour or greater.

ERLID No:

TBD, formerly 4514

Statutory authority:

Rhode Island General Laws § 42-17.1-2(s) and 23-23, as amended

Other agencies affected:

None.

Other regulations that may duplicate or conflict with the regulation:

None.

Describe the scope and objectives of the regulation:

The objective of the regulation is to reduce the quantity hazardous and toxic air contaminants related to the burning of alternative fuels. Alternative fuels are any material, other than fuel oil, natural gas, coal, or wood residue that is burned for the purpose of creating useful heat.

What was the rationale for establishing this regulation?

The rationale for establishing this regulation is to regulate the quantity and type of air contaminants emitted from the burning of alternative fuels for the protection of human health and environmental degradation.

Does the rationale still exist?

Yes, it is still necessary to regulate emissions from the burning of alternative fuels, as alternative fuels when combusted still emit hazardous and toxic air contaminants to the atmosphere.

Is the rationale still relevant?

Yes, air pollutants generated from the burning of alternative fuels can still cause degradation to human health and the environment if not properly regulated. The regulation sets minimum standards for alternative fuels, and it is essential to protect the environment from the effects of burning alternative fuels that exceed the minimum standards.

Business industry (s) affected by the regulation:

The types of industry issued permits under this regulation are historically asphalt plants, but any industry that burns fuel oil could apply for a permit to burn alternative fuels.

Types of businesses included in the industry (s):

Any type of business would be subject to this regulation if they would like to burn alternative fuels in fuel burning equipment with a heat capacity of one million Btu per hour or greater.

Total number of small businesses included in the regulated industry(s)

The number of small businesses that could be included in the regulated industry is not quantifiable. Any small business that burns fuel oil, has a fuel burning device greater than 1 MMBTU/hr size and would like to burn an alternative fuel could be subject to the regulation.

Number of small businesses potentially subject to the proposed regulation:

See above.

How often do small businesses contact your agency for assistance with clarification of the regulation and/or receive assistance with compliance issues?

Rarely. Contact with this agency for clarification of this regulation is on the order of less than once contact per year. Small businesses are subject to the regulation only if they choose to burn alternative fuels.

What is the cost to your agency of establishing and enforcing this regulation?

The cost to our agency to establish and enforce is minimal. The rare applications are reviewed by the existing permit staff.

What would the consequences be if the regulation did not exist?

If this regulation did not exist, waste materials, possibly including hazardous wastes, could be burned in fuel burning equipment without regulation. Hazardous and toxic emissions from the burning of alternative fuels would be emitted in the atmosphere in greater quantities, which could be detrimental to the environment and human health.

Effective date used in cost estimate:

Not applicable.

1.	Yes ✓	No	Do small businesses have to create, file, or issue additional reports? <i>The regulation requires submission of laboratory analysis of the alternative fuel under an approved schedule.</i>
2.	Yes ✓	No	Do small businesses have to implement additional recordkeeping procedures? <i>Recordkeeping is required under this regulation.</i>
3.	Yes	No ✓	Do small businesses have to provide additional administrative oversight? <i>No additional administrative oversight is required.</i>
4.	Yes	No ✓	Do small businesses have to hire additional employees in order to comply with the proposed regulation? <i>The regulation requires an operator of the fuel burning device to be in attendance whenever the device is operating.</i>
5.	Yes	No ✓	Does compliance with the regulation require small businesses to hire other professionals (e.g. a lawyer, accountant, engineer, etc.)? <i>No.</i>
6.	Yes	No ✓	Does the regulation require small businesses to purchase a product or make any other capital investments in order to comply with the regulation? <i>No.</i>
7.	Yes ✓	No	Are performance standards more appropriate than design standards? <i>Performance standards in the form of emissions limitations are used in this regulation.</i>
8.	Yes ✓	No	Does the regulation require small businesses to cooperate with audits, inspections, or other regulatory enforcement activities? <i>If a small business is subject to this regulation, the Office of Air Resources does have the authority to conduct inspections and/or other regulatory enforcement activities regardless of the size of the business.</i>
9.	Yes	No ✓	Does the regulation have the effect of creating additional taxes and/or fees for small businesses? <i>No additional taxes and/or fees are created as a result of being subject to this regulation.</i>
10.	Yes	No ✓	Does the regulation require small businesses to provide educational services to keep up to date with regulatory requirements? <i>The regulation does not require a small business to provide educational services to keep up to date with the regulatory requirements.</i>
11.	Yes	No ✓	Is the regulation likely to <i>deter</i> the formation of small businesses in RI? <i>It is unlikely this regulation would deter the formation of small businesses.</i>
12.	Yes ✓	No ✓	Is the regulation likely to <i>encourage</i> the formation of small businesses in RI? <i>It is unlikely that this regulation would encourage the formation of a small business.</i>
13.	Yes ✓	No	Can the regulation provide for less stringent compliance or reporting requirements for small businesses? <i>Compliance and reporting requirements under this regulation are minimal. The regulation does include an exemption for businesses that do not burn alternative fuels in quantities greater than one percent by volume of their primary fuel.</i>

14.	Yes ✓	No	<p>Can the regulation establish less stringent schedules or deadlines for compliance or reporting requirements for small businesses?</p> <p><i>The schedules under this regulation are minimal and may be adjusted if necessary. The regulation does include an exemption for businesses that do not burn alternative fuels in quantities greater than one percent by volume of their primary fuel.</i></p>
15.	Yes ✓	No	<p>Can the compliance or reporting requirements be consolidated or simplified for small businesses?</p> <p><i>Compliance and reporting requirements under this regulation are already minimal. The regulation does include an exemption for businesses that do not burn alternative fuels in quantities greater than one percent by volume of their primary fuel.</i></p>
16.	Yes	No ✓	<p>Can performance standards for small businesses replace design or operational standards?</p> <p><i>Performance standards are already imposed by this regulation.</i></p>
17.	Yes ✓	No	<p>Are there alternative regulatory methods that would minimize the adverse impact on small businesses?</p> <p><i>The regulation does include an exemption for businesses that do not burn alternative fuels in quantities greater than one percent by volume of their primary fuel.</i></p>
18.	Yes	No ✓	<p>Have any small businesses or small business organizations been contacted during the preparation of this document? If so, please describe.</p>



**RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT**

235 Promenade Street, Providence, RI 02908-5767

TDD 401-831-5508

Date: 28 February 2014

To: Sharon Savicki
Budget Office
Department of Administration

From: Douglas McVay, Chief
Office of Air Resources
Department of Environmental Management

RE: The Department of Environmental Management (DEM), Office of Air Resources, amendments to Air Pollution Control Regulation No. 8, "Sulfur Content of Fuels" and Air Pollution Control Regulation No. 20, "Burning of Alternative Fuels"

Pursuant to RIGL 22-12-1.1, the DEM Office of Air Resources (OAR) is notifying the Budget Officer that it will be proposing the subject amended APC regulations. These amendments would lower the allowable limits on the sulfur content of distillate and residual fuel oils and remove some outdated provisions of the regulations.

Description of the proposed rule changes

In 2009, Rhode Island adopted its *Regional Haze State Implementation Plan Revision*, committing to various control measures representing Rhode Island's "fair share" contribution towards achieving the reasonable progress visibility goals in the MANE-VU region by 2018. (EPA established 5 regional planning organizations to coordinate regional haze efforts. Rhode Island is a member of one of these regional organizations, the Mid-Atlantic Northeast Visibility Union (MANE-VU)). These measures included a two-phased reduction in the sulfur content of fuel oils. The specific commitment was to reduce the sulfur content (by weight) of:

- Distillate oil to 0.05 percent (500 ppm) by no later than 2014 (Phase I);
- Distillate oil to 0.0015 percent (15 ppm) by no later than 2018, depending on supply availability (Phase II);
- Residual oil to 0.5 percent (5000 ppm) by no later than 2018.

APC Regulation No. 8 is being revised to incorporate the control measures committed to in the Regional Haze Plan. Limitations on the sulfur content of fuel oils consistent with what RI is proposing have been adopted in the states of Maine, Vermont and Massachusetts and proposed

for adoption in Connecticut. New York and New Jersey have adopted the same limitations, but they become effective sooner.

The outdated provisions that are proposed to be removed are subsections 8.3.2 “Emission Bubbling”, 8.3.3 “Conversion and Conservation Incentive”, 8.3.4 “Large Fuel Burning Devices Using Coal” and 8.4.2 “Residual Fuel Oil Shipments to Marine Terminals.

Additionally, DEM is proposing a revision to APC Regulation No. 20 to revise the sulfur content limitation of alternative fuels so that they are consistent with the proposed amendments to APC Regulation No. 8.

Economic impact on the State or any city/ town

The Department has determined that the proposed revisions to lower the allowable sulfur content of fuel oils should have a net beneficial economic impact on small businesses or any city or town. It is possible that the cost of fuel oil may increase 1 to 3 cent per gallon due to the adoption of this proposal. This should be considered a worst case scenario. Consumers (including small business consumers) will realize a net savings in maintenance costs (estimated \$50 per year per heating plant) and a 2 percent improvement in combustion efficiency (estimated at 6 cents per gallon) due to the lower sulfur content of the fuel oil.

Conclusion

As indicated above, it is DEM's conclusion that promulgation of these regulations will have a net beneficial economic impact on small businesses or any city or town. Please let me know if you disagree. We plan to publish the public notice for these regulation changes on or about 14 March 2014. If I don't hear from you, I will assume you concur.

Feel free to contact me with any questions or for more information. I can be reached by phone at 222-2808, x-7011 or by e-mail at doug.mcvay@dem.ri.gov. Please direct all correspondence concerning this Fiscal Note to me.

Attachments: Proposed Amended Air Pollution Control Regulations No. 8 & 20

*State of Rhode Island and Providence Plantations
Department of Administration
Office of Management and Budget - Budget Office
(Revised: 02/18/2014)*

Fiscal Note for Proposed Administrative Rules (R.I.G.L. 22-12-1.1)

Name of Administrative Rule: Proposed Amendments to Air Pollution Control Regulation No. 8 “Sulfur Content of Fuels” and Air Pollution Control Regulation No. 20 “Burning of Alternative Fuels”

Date of Notice: March 14, 2014

Date of Hearing: April 11, 2014

RIGL: § 42-17.1-2(s) and § 23-23

FISCAL IMPACT

<i>State Revenues</i>		<i>State Expenditures</i>		<i>City/Town Expenditures</i>	
FY 2014	\$0	FY 2014	\$0	FY 2014	\$0
FY 2015	\$0	FY 2015	\$0	FY 2015	\$0
FY 2016	\$0	FY 2016	\$0	FY 2016	\$0

Summary of Policy Change: Proposed Amendments to Air Pollution Control Regulation No. 8 “Sulfur Content of Fuels” and Air Pollution Control Regulation No. 20 “Burning of Alternative Fuels” to lower the allowable limits on the sulfur content of distillate and residual fuel oils and remove some outdated provisions of the regulations.

Summary of State Fiscal Impact: The Department has determined that the proposed revisions to lower the allowable sulfur content of fuel oils should have a net beneficial economic impact on small businesses or any city or town. It is possible that the cost of fuel oil may increase 1 to 3 cent per gallon due to the adoption of this proposal. This should be considered a worst case scenario. Consumers (including small business consumers) will realize a net savings in maintenance costs (estimated \$50 per year per heating plant) and a 2 percent improvement in combustion efficiency (estimated at 6 cents per gallon) due to the lower sulfur content of the fuel oil.

City or Town Impact: The Department has determined that the proposed revisions to lower the allowable sulfur content of fuel oils should have a net beneficial economic impact on small businesses or any city or town. It is possible that the cost of fuel oil may increase 1 to 3 cent per gallon due to the adoption of this proposal. This should be considered a worst case scenario. Consumers (including small business consumers) will realize a net savings in maintenance costs (estimated \$50 per year per heating plant) and a 2 percent improvement in combustion efficiency (estimated at 6 cents per gallon) due to the lower sulfur content of the fuel oil.

Approved:

Thomas A. Mullaney
Executive Director/State Budget Officer

Date



Technical Support Document
For Proposed Revisions to
Rhode Island Air Pollution Control Regulation No. 8
“Sulfur Content of Fuels”

February 2014

Proposal

The Rhode Island Department of Environmental Management (RIDEM) proposes to amend Air Pollution Control Regulation No. 8, lowering the allowable limits on the sulfur content of petroleum-based distillate and residual fuel oils.

Background

Distillate and residual fuel oils are derived by refining crude oil, a complex mixture principally comprised of organic compounds with a wide range of boiling points. In its initial steps, the refining process distills the crude oil, separating species with similar boiling points into different fractions. In subsequent steps, higher molecular weight species are converted to lighter products and further fractionated. Crude oil also contains a considerable amount of sulfur compounds. The average sulfur content of crude supplied to U.S. refineries over a recent ten year period (2001-10) was 1.42 percent¹ (14,200 ppm). Due to their physical properties, the sulfur compounds in crude and in the intermediate refinery products are also separated in the fractionation processes that produce the various distillate fractions. Since the sulfur compounds typically have high molecular weights, they tend to concentrate in the middle and heavy distillate streams. As a result, without further treatment, distillate and residual fuel oils have a higher sulfur content than the crude from which they are derived.

When distillate and residual fuel oils are combusted for the purpose of providing energy in residential, commercial, and industrial applications, the sulfur compounds are largely converted to sulfur dioxide (SO₂), a portion of which undergoes transformation in the atmosphere to fine particulate matter (PM_{2.5}) in the form of sulfate. The presence of sulfur in these fuels has a negative effect on combustion efficiency. This effect is magnified over time due to deposition of contaminants onto surfaces in the combustion zone. As a result, emissions of products of incomplete combustion increase, notably nitrogen oxides (NO_x), carbon monoxide (CO) and carbonaceous PM_{2.5}. In addition, when combustion efficiency decreases, more fuel must be consumed in order to produce the same amount of useful energy. Thus, emissions of all air contaminant species, as well as greenhouse gasses in the form of carbon dioxide (CO₂), increase per volume of fuel consumed.

The U.S. Environmental Protection Agency (EPA) has established ambient air quality standards for a number of these pollutants (SO₂, PM_{2.5}, CO, NO₂ – a component of NO_x), to limit the deleterious effects on health and welfare associated with exposure to those substances. NO_x further reacts with other pollutants in the atmosphere to form photochemical oxidants including ozone; another pollutant with associated negative health effects for which EPA has established standards. Therefore, reducing the sulfur content of distillate and residual fuel oils reduces emissions of these “criteria pollutants” and their precursors, resulting in health and welfare benefits.

Regional Haze

Atmospheric PM_{2.5} levels in the eastern United States are dominated by sulfate species. These sulfates are largely responsible for the persistent regional haze problem in the region. On the haziest 20 percent of days, sulfate accounts for one-half to two-thirds of total PM_{2.5} mass and three-quarters of total light extinction in “Class I” national park and wilderness areas in the Northeast and Mid-Atlantic states. On the clearest 20 percent of days, sulfates comprise 40 percent or more of total PM_{2.5} mass in the region. Moreover, sulfate accounts for 60 to 80 percent of the difference in fine particle mass concentrations on hazy versus clear days.²

In 1977, Congress enacted section 169A of the Clean Air Act (42 U.S.C.A. § 7491) to address visibility protection and to set a goal of the "prevention of any future, and the remedying of any existing,

¹ Energy Information Administration, *Annual U.S. Sulfur Content of Crude Oil Input to Refineries*.

² Rhode Island Regional Haze State Implementation Plan, June 2009.

impairment of visibility in mandatory class I Federal areas which impairment results from manmade air pollution." Congress amended the Clean Air Act in 1990, adding among other provisions section 169B (42 U.S.C.A. § 7492), authorizing creation of visibility transport commissions and setting forth their duties. EPA followed up in 1999, promulgating the Regional Haze Rule (40 C.F.R. Part 51), setting forth requirements for state implementation plans for protection of visibility. Accordingly states, even those without Class I areas, are required to participate in regional haze reduction efforts because of the potential impacts of emissions from those states on downwind Class I areas. EPA designated five Regional Planning Organizations to assist in coordinating these efforts. The Mid-Atlantic and Northeast states, the District of Columbia and certain Northeast tribes formed the Mid-Atlantic/Northeast Visibility Union (MANE-VU).

In 2007, the MANE-VU states and tribes jointly issued a “*Statement of MANE-VU Concerning a Request for a Course of Action by States Within MANE-VU Toward Assuring Reasonable Progress.*” This statement outlined a strategy for reducing haze in Class I areas that included a low-sulfur fuel oil strategy. In 2009, Rhode Island adopted its *Regional Haze State Implementation Plan Revision*, committing to various control measures representing Rhode Island’s “fair share” contribution towards achieving the reasonable progress visibility goals in the MANE-VU region by 2018. These measures included a two-phased reduction in the sulfur content of fuel oils. The specific commitment was to reduce the sulfur content (by weight) of:

- No. 1 & 2 distillate oil to 0.05 percent (500 ppm) by no later than 2014 (Phase I);
- No. 1 & 2 distillate oil to 0.0015 percent (15 ppm) by no later than 2018, depending on supply availability (Phase II);
- No. 4 residual oil to 0.25-0.5 percent (2500-5000 ppm) by no later than 2018;
- No. 6 residual oil to 0.5 percent (5000 ppm) by no later than 2018.

Table 1 – Promulgated & Proposed Limits by Jurisdiction on Sales of No. 1 & 2 Distillate Oil by Sulfur Content (ppm)

Jurisdiction	Currently ^a	2014	2016	2018
Connecticut		500 ^b		15 ^b
Delaware			15	
Massachusetts		500		15
Maine			50	15
New Jersey		500	15	
New York	15 ^c	15 ^d		
New York City	15 ^c	15 ^d		
Pennsylvania			500	
Vermont		500		15
Rhode Island		500 ^e		15 ^e

^aMany jurisdictions have sulfur limits currently in place. The ones listed in this column are for jurisdictions where the sulfur limit already fulfills one or more of the MANE-VU commitments.

^bThese limits for no. 2 heating oil are included in amended Connecticut General Statute 16a-21a and have also been proposed for distillate oil (no. 1 & 2) combusted in stationary sources pursuant to Regulations of Connecticut State Agencies section 22a-174-19b.

^cThis is a statutory limit that applies to home heating oil only.

^dThis limit applies to all No. 1 & 2 distillate oil.

^eThese limits are proposed for Rhode Island.

Each jurisdiction’s sulfur limits in fulfillment of the MANE-VU fuel oil strategy in the Northeast (New England, New Jersey, and New York) is shown in Table 1 above for distillate fuel oil and Table 2 below

for residual fuel oil. Some of these limits have been formally proposed by the states but are still in the process of promulgation as indicated by the footnotes.

Table 2 – Promulgated & Proposed Limits by Jurisdiction on the Sales of Residual Fuel Oil by Sulfur Content (ppm)

Jurisdiction	Currently ^a	2014	2016	2018
Connecticut	3000 ^b /5000 ^b			3000 ^c
Delaware			5000	
Massachusetts	5000 ^d	5000 ^e		5000 ^f
Maine				5000
New Jersey	3000/5000 ^g	3000/5000 ^g		
New York		5000		
New York City	3000			
Pennsylvania			5000	
Vermont				5000
Rhode Island				5000 ^h

^aMany jurisdictions have sulfur limits currently in place. The ones listed in this column are for jurisdictions where the sulfur limit already fulfills one or more of the MANE-VU commitments.

^bThese limits apply to certain large stationary sources in Connecticut, defined as “affected units”. The more stringent limit (3000 ppm) applies to affected units that are subject to the federal acid rain (Title IV) requirements.

^cIf adopted, this proposed limit will apply to all non-affected unit stationary sources in Connecticut, regardless of size, in 2018.

^dThis limit applies to Boston and other cities in Boston’s metro area.

^eThis limit will apply to large power generating facilities in Massachusetts.

^fThis limit will apply to all stationary sources in Massachusetts except for those in Berkshire County.

^gThe more stringent limit (3000 ppm) applies to urbanized counties in New Jersey. The 5000 ppm limit applies to certain counties bordering the urbanized counties. Beginning in 2014, 5000 ppm is the limit for all non-urbanized counties in New Jersey.

^hThis limit is proposed for Rhode Island.

Reducing the Sulfur Content of Distillate & Residual Fuels – Historical Context

Refiners have continually reduced the sulfur content of their distillate products over the past two decades, primarily in response to public health and environmental requirements in the United States and Europe. In 1993, EPA established a 500 ppm sulfur limit for highway diesel fuel. In 2001, EPA promulgated the next phase of highway diesel sulfur regulation, establishing a refiner limit of 15 ppm. This limit began to take effect in 2006 with full phase-in completed in 2010.

In 2004, EPA finalized its regulation for the control of emissions from new non-road diesel engines. Prior to this rulemaking, the industry-standard maximum sulfur content of non-road diesel fuel was 5000 ppm and the average was on the order of 3000 ppm.³ The non-road regulation required phasing down the sulfur content of diesel fuel in two steps. Beginning June 2007, refiners were subject to a 500 ppm limit and, by June 2010, a 15 ppm limit. For the locomotive and marine diesel fuel market, refiners were given an additional two years, to June 2012, before the refinery 15 ppm limit took effect.

³ U.S. EPA, *Regulatory Impact Analysis: Heavy-Duty Engine and Vehicle Standards and Highway Diesel Sulfur Control*, December 2000 (EPA A420-R-00-026).

In 2010, the International Maritime Organization (IMO) amended the International Convention for the Prevention of Pollution from Ships (MARPOL), designating portions of U.S. and Canadian waters as the North American Emission Control Area (ECA) and establishing sulfur limits on marine bunker fuel in the ECA. In 2012, a 10,000 ppm sulfur cap took effect within the ECA. In 2015, the sulfur cap for marine distillate fuel in the ECA will be reduced to 1000 ppm.

Sales/Consumption & Movement of Distillate & Residual Fuels

Sales patterns in nine states⁴ were examined as part of this analysis. These states share common supply sources and are the principal consumers of distillate fuel oil in the Northeast/Mid-Atlantic Region. Collectively, these states comprise 18 percent of the U.S. population, according to the 2010 Census, but account for 82 percent of residential sales and 37 percent of commercial (non-industrial, non-utility, non-transportation) sales of distillate fuel oil.⁵ As indicated in Table 3, sales of distillate fuel oil in Rhode Island are relatively small at 4 percent of the market share in the nine-state region.

**Table 3 – 2012 Distillate⁶ Sales in 9 States
 (millions of gallons)**

	CT	ME	MA	NH	NJ	NY	PA	RI	VT
Sales	445	230	549	125	222	1148	634	124	78
Market Share	13	6	15	4%	6	32	18	4	2%

As indicated in Table 4, sales of distillate fuel oil dominate the Rhode Island fuel oil market, with the vast majority of this commodity going to residential customers for home heating purposes. Nos. 4 and 6 residual fuel oils are purchased comparatively sparingly by industrial and commercial customers, presumably as boiler or process fuels.

**Table 4 – Rhode Island Distillate (DFO) & Residual (RFO) Fuels Sales for
 Multiple Sectors, 2007-2012 (thousands of gallons)**

Year	2008	2009	2010	2011	2012	5-Year Average	2002 Baseline
No. 2 DFO							
Residential	122,242	124,087	118,511	108,102	110,540	116,696	144,952
Indus/Comm	21,646	26,993	22,027	14,337	12,828	19,566	26,283
Utility	1,879	1,040	1,089	1,126	1,005	1,228	1,191
Total	145,767	152,120	141,627	123,565	124,373	137,490	172,426
No. 4 RFO							
Indus/Comm	2,217	1,688	2,943	1,170	443	1,692	2,941
No. 6 RFO							
Indus/Comm	8,556	13,870	5,473	5,127	2,187	7,043	27,478
Utility	8	0	0	0	0	2	34
Total	8,564	13,870	5,473	5,127	2,187	7,045	27,512

Energy Information Administration (EIA), *Rhode Island Distillate Fuel Oil and Kerosene Sales by End Use*

⁴ The nine states are Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

⁵ Energy Information Administration (EIA), *Sales of Distillate Fuel Oil by End Use*, 2011.

⁶ This is a summation of No. 1 and 2 distillate in residential, commercial, industrial, and utility categories but does not include any fuel categorized as diesel.

Virtually all of Rhode Island’s net electricity generation is derived from natural gas.⁷ This explains why no. 6 residual fuel oil is not a major commodity in the utility sector. It is also noteworthy that overall sales of distillate and residual fuel oil have declined over the five year period presented in the table. This decline is especially dramatic when compared to 2002, the baseline year used by Rhode Island DEM in its regional haze plan. According to one regional fuel supplier, numerous commercial and industrial customers are switching from residual fuel oil to natural gas and propane because it is more economical to burn these fuels. Examples include asphalt batch plants and hospital boilers.⁸ Similarly, residential use of distillate fuel oil is declining as customers switch to natural gas.

The Port of Providence is a major petroleum products hub for New England. Virtually all heating fuel products consumed in Rhode Island, eastern Connecticut, and parts of Massachusetts are supplied via marine shipments through this port. Five companies operate petroleum product terminals within or near the Port for receipt of marine shipments. They are Sprague Operating Resources, New England Petroleum Terminal, Capital Terminal Company, Motiva Enterprises, and ExxonMobil Oil Corporation.⁹ A small-capacity pipeline, owned by ExxonMobil Pipeline Company, runs from Providence to Springfield, Massachusetts, moving heating oil and other petroleum products. Gasoline and distillate fuel oil collectively comprise over 90 percent of the total tonnage of petroleum products entering the Port of Providence via waterborne shipment. Residual fuel oil is a minor contributor to the total at slightly more than 1 percent of total tonnage. Table 5 compares total waterborne shipments of these three products to actual consumption in Rhode Island and punctuates the fact that Providence is a significant regional hub for product distribution to other parts of New England.

Table 5 – 2011 Waterborne Receipts of Petroleum Products – Port of Providence Compared to Statewide Consumption (thousands of gallons)

Product	Receipts			In-State Sales (2011)
	Domestic	Foreign	Total	
Gasoline	307,408	602,460	909,868	356,800
Distillate FO ¹⁰	338,246	157,440	495,686	195,723
Residual FO	15,682	0	15,682	6,297

U.S. Army Corps of Engineers Navigation Data Center, *Origin and Destination of Waterborne Commerce of the United States by Commodity, 2011*.

New York Harbor (New York and New Jersey) is a major upstream hub for petroleum product distribution to consumer markets in New England, supplying the Port of Providence among other destinations. The harbor terminals receive product via the Colonial Pipeline from Gulf Coast refineries (PADD III) and via lesser pipelines from Delaware River and northern New Jersey refineries. The terminals also receive a significant amount of foreign product via tanker and barge.¹¹ Products from the New York Harbor terminals are redistributed by barge and pipeline. Domestic waterborne shipments of petroleum products to Providence originate principally from three states; New Jersey (87 percent), New York (7 percent), and Delaware (4 percent). Canada is the major source of foreign shipments to

⁷ Energy Information Administration (EIA), *State Profile and Energy Estimates*, 2013.

⁸ Telephone conversation with Mike Zampano, Director of Industrial Fuel Sales & Asphalt Marketing, Sprague Energy, September 4, 2013

⁹ Internal Revenue Service, *Active Fuel Terminals*, March 31, 2013.

¹⁰ This represents all uses of distillate fuel oil, including 72,158 thousand gallons of diesel fuel.

¹¹ EIA, *New York/New Jersey Intra Harbor Petroleum Supplies Following Hurricane Sandy: Summary of Impacts Through November 13, 2012*.

Providence, accounting for 52 percent of the foreign total. The Irving Oil Refinery in Saint John, New Brunswick is a major supplier to the U.S. Northeast.¹²

According to the U.S. Census Bureau 2007 Economic Census, 96 heating oil dealers are based in Rhode Island. For the most part, these are small business, averaging 13 employees with annual gross sales of just over \$5 million each. These heating oil dealers move product from the terminals to the consumer.

Reducing the Sulfur Content of Distillate & Residual Fuels – Emissions Implications

The *Rhode Island Regional Haze State Implementation Plan* (2009) projected criteria pollutant emissions for the various haze reducing strategies, compared against a 2002 baseline emissions inventory. The plan assessed the effect in the year 2018 of three different control strategies. The on-the-books/on-the-way (OTB/OTW) control strategy accounted for emission control regulations already in place by mid-2005 plus some yet-to-be-finalized regulations that would achieve additional reductions by 2009. The OTB/OTW control strategy did not include provisions for reducing the sulfur content of distillate fuels. The beyond-on-the-way (BOTW) control strategy included the Phase I 500 ppm sulfur limit for distillate fuel oil only (i.e., no Phase II limit for distillate and no sulfur limits for residual fuel oil). The best-and-final control (B&F) strategy included the Phase II 15 ppm sulfur limit for distillate fuel oil and the sulfur limits for no. 4 and no. 6 residual fuel oil. Table 6 compares the projected area and point source SO₂ emissions in 2018 associated with each of those three strategies against the 2002 baseline.

Table 6 – SO₂ Emissions (TPY) – Baseline vs. Three Control Strategies

Strategy	Year	Area Source	Point Source	Total
Baseline	2002	4,557	2666	7223
OTB/OTW	2018	5,398	3219	8618
BOTW	2018	1,368	3055	4423
B&F	2018	52	1509	1561

Growth assumptions accounted for the increase in SO₂ emissions under the OTB/OTW strategy, relative to the baseline. However, SO₂ emissions under the BOTW strategy were 39 percent lower and under the B&F strategy, 78 percent lower than the baseline. These emissions reductions are due solely to implementing the low sulfur fuel oil limits as Rhode Island’s “fair share” contribution outlined in the MANE-VU strategy, compared to baseline sulfur concentrations of 3000 ppm for distillate fuel oil and 22,500 ppm for no. 6 residual fuel oil.¹³

For comparison purposes and as an update to the inventory work performed in 2009 for the *Rhode Island Regional Haze State Implementation Plan*, Table 7 projects SO₂ emissions, based on the two phases (2014 & 2018) of the low sulfur fuel oil strategy and compared against a later baseline. In all three instances, fuel consumption was based on a 5-year average (2008-2012) of EIA data for Rhode Island. Emission factors were taken from EPA’s *Report on Revisions to 5th Edition AP-42, Section 1.3, Fuel Oil Combustion*, 1998. The updated projected emissions in Table 7 represent a 65% reduction from the baseline for 2014, due to the Phase I limits, and an 89% reduction from the baseline for 2018, when the Phase II limits become effective.

Table 7 – SO₂ Emissions (TPY) – Baseline vs. Low Sulfur Fuel Strategy

Strategy	Year	DFO #2	RFO #4	RFO #6	Total
Baseline	2008-12 Average	2929	87	553	3569
Phase I	2014	487	87	553	1127

¹² EIA, *Potential Impacts of Reductions in Refinery Activity on Northeast Petroleum Product Markets*, 2012.

¹³ These sulfur concentrations are national averages, taken from the report, *Documentation for the Draft 2002 Nonpoint Source National Emission Inventory for Criteria and Hazardous Air Pollutants (March 2005 Version)*, prepared by E.H. Pechan & Associates under contract to EPA. Pechan in turn references reports developed by EPA in 1999 and earlier as the source of these values.

Phase II	2018	14	39	276	329
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There are a number of significant differences when comparing total emissions in Table 6, taken from the *Rhode Island Regional Haze State Implementation Plan*, against total emissions in Table 7. The baseline emissions (7223 tons in Table 6 versus 3569 tons in Table 7) are different for three principal reasons. First of all, the Table 6 baseline used 2002 as the base year compared to a 5 year average (2008-2012) as the baseline in Table 7. As shown in Table 4, fuel consumption was considerably higher in 2002, compared to the later 5-year average. Secondly as already indicated, emissions in Table 6 are based on national average sulfur content values, developed by EPA in the 1990s, of 22,500 ppm for residual fuel oil and 3000 ppm for distillate fuel oil. In contrast, emissions in Table 7 for residual fuel oil are based on Rhode Island’s current regulatory limit of 10,000 ppm. The 3000 ppm level for distillate fuel oil was used to calculate emissions in Table 7 as this level represents the top of the range commonly found in samples at the terminals in the state.¹⁴ No. 4 residual fuel oil is a blend of distillate fuel oil (40-50 percent) and residual fuel oil (50-60 percent). A sulfur level of 6850 ppm was used to calculate SO₂ emissions in Table 7 for this particular product. Finally, emissions in Table 6 are based on the assumption that fuel consumption would continue to increase from the 2002 base year, out to 2018. In contrast, emissions in Table 7 are based on an assumption that consumption would remain flat from the 5-year average baseline out to 2018. A reasonable case could be made for calculating emissions based on further decline in fuel consumption as these liquid fuels continue to be replaced with gaseous fuels.

Reducing the Sulfur Content of Fuel Oil – Improved Efficiency

Lower sulfur fuel oil produces less fouling of the heat transfer surfaces inside boilers and furnaces. This helps improve the long-term efficiency of the boiler or furnace by maintaining high heat transfer rates from the hot flame gases to the boiler water or furnace warm air. Research conducted by Brookhaven National Laboratory in New York indicates that the drop in heating equipment efficiency is about 2 percent each year. Reduced sulfur fuel therefore will improve efficiency of boilers and furnaces over the heating season.¹⁵

The use of 500 ppm and ultimately 15 ppm heating oil also offers the opportunity to improve boiler and furnace designs to include flue gas condensation and increase efficiencies into the mid to upper 90 percent range. This is comparable to the highest efficiencies now available from natural gas-powered equipment. Historically, condensing oil furnaces have been available. However, design and maintenance problems associated with the use of higher sulfur heating oil limited widespread use of condensing oil equipment. Restrictions requiring the use of lower sulfur oil will lower equipment and service costs and permit expanded use of higher efficiency warm air oil furnaces and hot water boilers.¹⁶

The added benefits of improved efficiency are two-fold. First, heating costs are reduced, as less fuel is required to supply the required heating demand. Second, the emissions of all pollutants are reduced, as less fuel is consumed by more efficient boilers and furnaces.

¹⁴ A reasonable case could be made for using a baseline sulfur concentration for distillate fuel oil lower than 3000 ppm. At least one of the major Rhode Island terminals has set 2000 ppm as the maximum for the product they sell. In addition, a number of regulated stationary sources have permit limits on the order of 2000 ppm, 500 ppm, and in some cases, 15 ppm.

¹⁵ Low Sulfur Home Heating Oil Demonstration Project, Energy Research Center, Inc. and Brookhaven National Laboratory, funded by the New York State Energy Research and Development Authority, Final Report, March 2005. Available at <http://www.bnl.gov/isd/documents/30441.pdf>.

¹⁶ Northeast States for Coordinated Air Use Management, *Low Sulfur Heating Oil in the Northeast States: An Overview of Benefits, Costs and Implementation Issues*, NESCAUM, Boston, MA, December 2005. Available at <http://www.nescaum.org/documents/report060101heatingoil.pdf/>.

Reducing the Sulfur Content of Fuel Oil – Reduced Maintenance Costs

Homeowners and fuel oil service companies will benefit from reduced fouling of boiler and furnace heat transfer surfaces that permits extended intervals between vacuum cleanings. Cleanings are now required at intervals of 1 to 2 years; with lower sulfur fuel oil, that interval will be extended to 3 to 5 years, reducing annual service costs for oil heating equipment. The added cost for the cleaner fuel is expected to be offset by the savings resulting from reduced maintenance and improved burner efficiency.

Residual Fuel Oil – Economic Implications of Lower Sulfur Content

As indicated in Table 2, three states in the region plus New York City currently have source or region-specific sulfur caps in place for residual fuel oil that meet the limits specified in the MANE-VU Course of Action. In 2014, the sulfur limits apply to additional sources or regions in two states and by 2018, all of the MANE-VU states are expected to have limits in place that meet the sulfur cap for residual fuel oil. Supply constraints are not expected to be an issue. The U.S. refining industry is increasingly a net exporter of residual fuel oil as domestic supplies increasingly exceed domestic demand. The decline in residual fuel sales, as shown in Table 4, is expected to continue as consumers continue the trend of switching to more economical alternatives, such as natural gas and propane.¹⁷

According to a major regional supplier of residual fuel oil, the cost of this product is driven by the export market and in particular, the market for marine fuels. Therefore, the sulfur limits that are being adopted regionally are not expected to have any significant impact on the price of the fuel. This supplier also indicated that the cost differential between the 5000 ppm sulfur product and the 10,000 ppm product has varied over the past two years by between \$4 and \$18 per barrel (9.5¢ and 43¢ per gallon).¹⁸ The price differential may have the effect of accelerating the trend by facilities to switch to alternate energy sources.

There are 41 facilities registered with RIDEM as major or minor stationary sources that burn no. 4 or no. 6 residual fuel oil. Table 8 lists the types of facilities along with their fuel consumption:

**Table 8 – Nos. 4 & 6 Residual Fuel Consumption in Rhode Island by Facility Type
 2010/2011 – Thousands of Gallons Per Year**

Facility Type	Number of Facilities	Fuel Consumption
Textiles/Paper Manufacturing	9	2301
Hospital/Medical Facilities	7	1422
Liquid Asphalt Storage	1	1300
Military Installation	1	698
Educational Institutions	5	539
Miscellaneous/Other	6	417
Real Estate/Warehousing	6	218
Metal Fabrication	4	128
Plastics/Rubber Fabrication	2	41
Totals	41	7064

The annual average residual fuel consumption for the 41 facilities is 172,000 gallons per year. However the median annual fuel consumption is 67,000 gallons per year. A total of 11 facilities individually consume more than the annual average and collectively account for 78 percent of the total consumption. Based on the historical ranges of the price differential between fuel of different sulfur content, the average facility would pay between \$16,000 and \$74,000 more per year for the lower sulfur product. The

¹⁷Telephone conversation with Mike Zampano, Director of Industrial Fuel Sales & Asphalt Marketing, Sprague Energy, September 4, 2013.

¹⁸ Ibid.

median facility would pay between \$6,000 and \$29,000 more per year. Since the low sulfur requirement would not become effective until 2018, it is difficult to predict what the actual price differential will be at that time.

Developments Affecting Fuel Cost & Supply – Refineries, Pipelines & Terminals

Several studies have assessed the economic and supply impacts of recently enacted or impending low sulfur fuel requirements. Some of these studies are summarized in Appendix A. The most common approach of these studies has been to estimate the increased cost to a gallon of fuel as the result of adding desulfurization capacity at the refinery (i.e., capital cost) and operating the desulfurization equipment. Some of these studies have also addressed competitive price impacts on the premise that supply will become tighter as demand increases, local refineries close, and product must be transported longer distances. Much has changed in the domestic petroleum refining and product movement business and in the energy supply outlook since the historic assessments summarized in Appendix A were produced. The import/export balance has changed dramatically. According to the EIA 2013 Annual Energy Outlook, the U.S. is projected to be a net exporter of petroleum products at least through 2040. Most developments have had a favorable impact on supply of low sulfur products relative to demand. Some of these developments are discussed below.

Most of the Northeast’s refineries that either had closed or were in danger of closing reopened or remained in business due to ownership changes and favorable developments related to petroleum and product supply. In 2010, PBF Energy purchased the Valero refineries in Delaware City, DE and Paulsboro, NJ. In conjunction with the purchase of the Delaware City facility, PBF Energy announced plans to invest \$500 million for the purpose of producing low-sulfur heating oil, and stated it would be the first refining company to support low-sulfur heating oil.¹⁹ In 2011, PBF Energy announced plans to invest \$1 billion at the Delaware City refinery to boost distillate output and heavy crude capacity. In early 2013, PBF Energy completed a rail terminal project to take delivery of Bakken crude at its Delaware City refinery,²⁰ and is also seeking approval to barge oil from the rail terminal to its refinery at Paulsboro, NJ.²¹

Sunoco closed its Marcus Hook, NJ refinery in 2011 and also considered closing its Philadelphia, PA refinery. In 2012, Sunoco entered into a joint venture with The Carlyle Group to keep the Philadelphia refinery open. Shortly thereafter, Sunoco began construction of a high-speed rail car unloader to be completed in 2013 to offload Bakken crude at the Philadelphia refinery. Late in 2012, Sunoco announced plans to partially reopen the Marcus Hook facility to “process, store and distribute propane and ethane from the Marcellus Shale in western Pennsylvania through [the Sunoco Logistics] Mariner East pipeline project.”²² In addition in 2012, Sunoco Logistics completed storage capacity expansion of its Eagle Point terminal in New Jersey by an additional 2 million barrels. The Eagle Point terminal also has been upgraded to improve handling of large vessels at its deep water marine docks and handling of rail-car offloading. Pipeline connectivity at Eagle Point has been installed to link with the Colonial Pipeline and two other pipeline systems to better serve the Northeast market.²³

In 2012, Delta Airlines purchased the closed ConocoPhillips Trainer, PA refinery and announced plans to restart the facility as a hedge against increasing jet fuel prices. Delta indicated it would exchange

¹⁹ heatingoil.com, *Delaware Refinery to Reopen with Plans to Produce Low-Sulfur Heating Oil and Biofuels*, Posted June 2, 2010.

²⁰ Bloomberg, *PBF Energy Completes Delaware City Rail Terminal for Bakken Oil*, February 4, 2013.

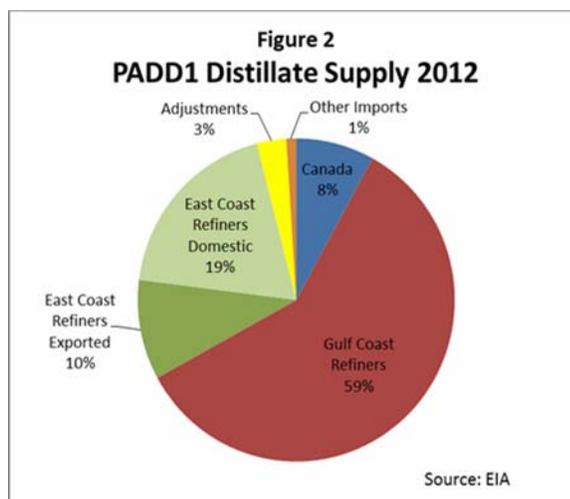
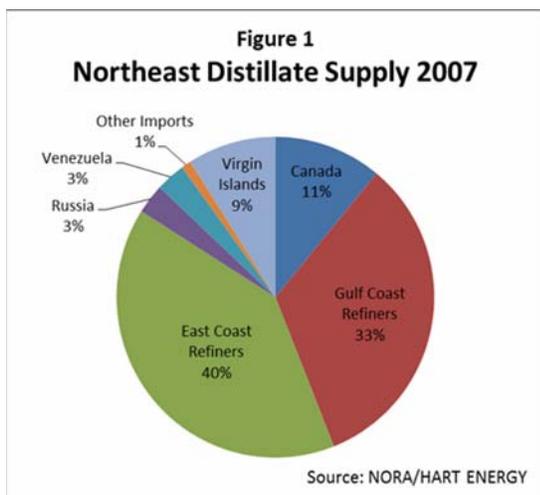
²¹ delawareonline.com, *Oil sent by rail to Del. may go to NJ by water*, April 10, 2013.

²² Philadelphia Business Journal, *Idled Sunoco Marcus Hook Refinery to Re-open*, September 27, 2012.

²³ Oil Price Information Service, *Sunoco’s Eagle Point Oil Products Terminal Completes Capacity Expansion*, November 15, 2012.

gasoline, diesel and other petroleum products produced at the refinery for jet fuel from other sources such as BP and Phillips 66.²⁴

The U.S. Gulf Coast (PADD III) is a major supplier of petroleum products to the Northeast via the Colonial Pipeline. Expansion of the southern portion of the Pipeline was completed in 2012, enhancing ability to move distillate from PADD III into the Northeast. In 2013, another expansion will be completed (Greensboro, NC to Linden, NJ), further segregating gasoline and distillate streams, thereby facilitating the movement of distillate farther north.²⁵



In 2010, Marathon Petroleum completed a \$3.9 billion expansion, nearly doubling the capacity of its Garyville, LA (PADD III) refinery.²⁶ This refinery is now the fourth largest in the U.S. and increases the ability of PADD III to augment the petroleum product needs in the Northeast.

In 2009, Irving Oil Refinery (Saint John, New Brunswick) completed a \$220 million upgrade. The majority of the work focused on improving their yield of ultra-low sulfur products. The Saint John Refinery is Canada's largest and exports more than 80 percent of its products to the U.S.²⁷ Irving makes ultra-low sulfur heating oil (PRO HEAT®) and markets it to the Northeast through its Revere, MA terminal.

Product Supply Picture – Past & Present

Figure 1 is taken from the 2008 NORA Report, summarized in Appendix A, and illustrates the distillate (diesel fuel and distillate fuel oil) supply picture for the Northeast in 2007. At that time, East Coast refiners were the principal suppliers of distillate to the Northeast market. With the national highway and non-road diesel regulations being implemented and the potential for some East Coast refiners either to close or to opt to continue to make higher sulfur products for export only, there was concern about the ability of the regional infrastructure to meet demand for low-sulfur distillates, especially if there were new low-sulfur heating oil rules on top of the transportation diesel requirements.

²⁴ New York Times, *Delta Buys Refinery to Get Control of Fuel Costs*, April 30, 2012.

²⁵ EIA, *Update of the Status of East Coast Refineries*, July 25, 2012.

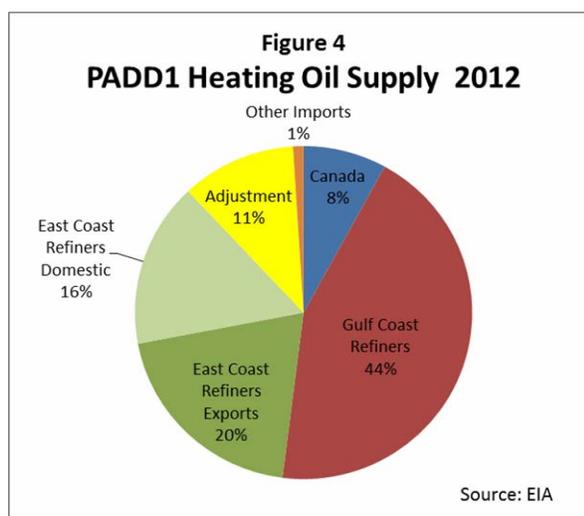
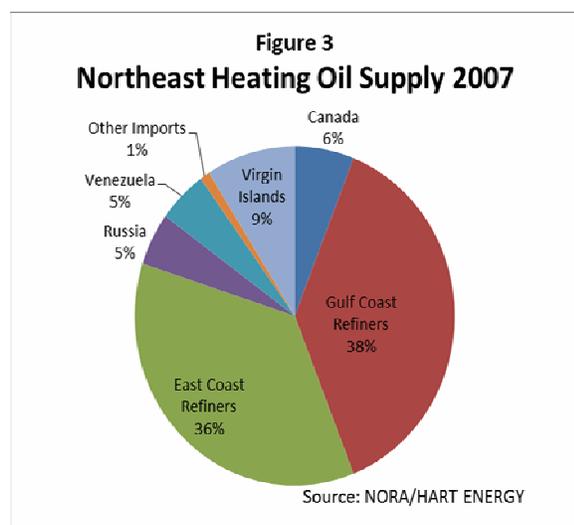
²⁶ The Times-Picayune, *Marathon Completes \$3.9 Billion Expansion in Garyville*, March 25, 2010.

²⁷ Irving Oil Company, Press Release: *Irving Oil Refinery Completes \$220 Million Investment Project*, November 17, 2009.

Gulf Coast refiners were already supplying a significant portion of the demand in the Northeast, but as previously discussed, the concern was that PADD I and PADD II would be in competition for low-sulfur distillates being produced in PADD III, creating uncertainty over long-term reliability of this supply source. Foreign supply sources were not expected to significantly contribute to the low sulfur distillate market for many years to come because of their inability to make the product.

Figure 2 illustrates the PADD I distillate supply picture as of 2012, based on EIA data, indicating significant changes since 2007. Gulf Coast refiners have become the principal suppliers of distillates to PADD I. The percentage of distillate supplied by East Coast refiners has decreased, but not the volumes produced. Instead, the refiners are exporting their market surplus to foreign countries. Except for supplies from Canada, imports now play an insignificant role in supplying distillate to PADD I. The refinery in the Virgin Islands closed in early 2012, but potential negative impacts of this closure on meeting PADD I market demands have not materialized.

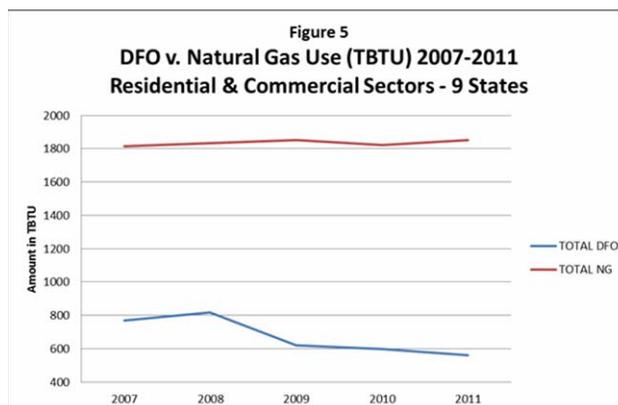
A similar pattern emerges when focusing specifically on the heating oil supply in 2007 (Figure 3) as outlined in the 2008 NORA Report and compared to the supply in 2012 (Figure 4) as reported by EIA. Gulf Coast refiners have increased their market contribution in the ensuing five years, though not to the same extent as with total distillate. East Coast refiners have maintained the same overall contribution to supply but now export almost half of what they produce. Canada’s overall market share has increased, likely due to the increased contribution by the Irving Oil New Brunswick refinery, and other foreign suppliers have almost left the market.



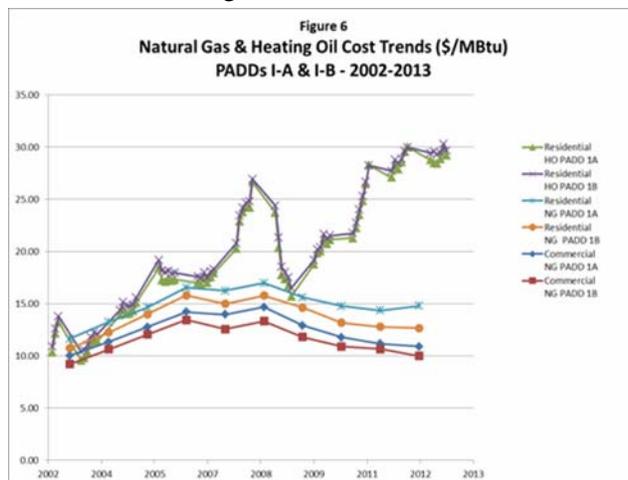
In summary, the postulated supply constraints related to impending refinery closures, limited desulfurization capacity, loss of foreign sources, competition for PADD III distillates, inadequacy of logistics infrastructure, and ultra-low sulfur diesel rules have not occurred.

Natural Gas Impact on Distillate Consumption

Although the nine-state region consumes much more distillate fuel oil on a per-capita basis than the rest of the U.S., natural gas still is by far the dominant energy source in the residential and commercial sectors for the region as illustrated in Figure 5. While natural gas has maintained its energy share or realized a slight increase over time in the region,

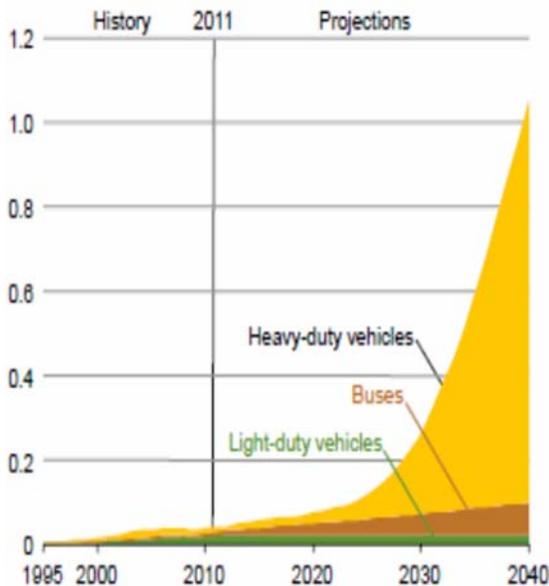


distillate fuel oil consumption clearly has decreased over the past several years. This trend is expected to continue and therefore should help to alleviate further concerns about tight supplies. Domestic supplies of natural gas have increased significantly in recent years with new discoveries of gas deposits and improved means to extract gas from “tight” underground formations. Increased supplies have lowered the price of natural gas and increased the price differential between natural gas and distillate fuel oil as illustrated in Figure 6. At the same time natural gas prices have decreased, heating oil prices have trended upward. Figure 6 shows this trend to be particularly evident since 2008. When the trend lines for heating oil in Figures 5 and 6 are compared from 2008, it is also evident that heating oil prices and consumption are related; i.e., high heating oil prices induce more consumers to choose natural gas over heating oil for meeting residential and commercial energy needs and further alleviate concerns over tight supplies of heating oil.

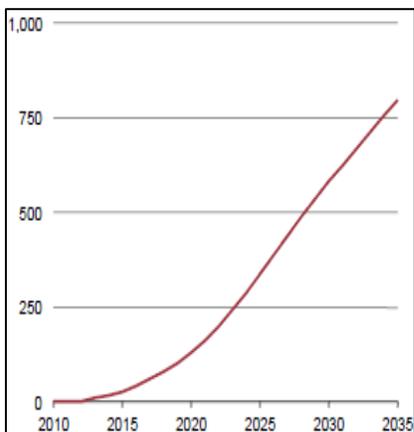


There is another significant trend involving natural gas consumption that will have a further beneficial effect on potential tight supplies of distillate fuel oil. Figure 7 is taken from the EIA 2012 Annual Energy Outlook in which projections are made nationally for a natural gas potential case involving heavy duty vehicles. This case recognizes the potential for natural gas to become a significant fuel source for heavy-duty trucks. Engine manufacturers are already developing heavy-duty natural gas powered engines and refueling infrastructure is growing nationally. Much of this development and growth has been driven by the high cost of diesel fuel. While the purchase price of a natural gas powered heavy-duty truck is higher than its diesel powered counterpart, there is a long term cost savings, particularly if the price of diesel fuel remains high relative to the price of natural gas. EIA projects strong potential growth in the use of natural gas as a heavy-duty transportation fuel, based on current trends.

Figure 7 – Natural Gas Consumption Transportation Sector (QBtu)



**Figure 8
 Reduction in Heavy-Duty Vehicle
 Liquid Fuel Use in HD NGV Potential**



The EIA 2012 Annual Energy Outlook also projects the implications of the heavy-duty natural gas potential case in terms of liquid fuel use avoided in the transportation sector, as shown in Figure 8. By 2018, the year the Phase II low sulfur distillate requirements would take effect in Rhode Island, natural gas has already displaced more than 78 thousand barrels per day of liquid fuels nationally that in the base case would have been consumed by heavy-duty vehicles. By 2035, the displaced fuel has reached more than 795 thousand barrels per day. This is ultra-low sulfur

diesel fuel that could be redirected as necessary to meet the demands created by the low sulfur distillate fuel oil requirements in the MANE-VU states.

Small Business Regulatory Fairness

Title 42, Chapter 42-35.1 of the Rhode Island Statutes requires state agencies to “seek to achieve statutory goals as effectively and efficiently as possible without imposing unnecessary burdens on small employers.” Under this proposed regulatory amendment, approximately 96 Rhode Island heating oil dealers will be required to provide compliant low-sulfur products to their customers. The dealers should not see any difference in the way they conduct business. They will continue to do business with the same terminals and be able to use the same fleet of tanker trucks for loading and delivering product. The terminals will be required to supply low-sulfur products to the dealers. The wholesale price of heating oil and other products will continue to rise and fall based on multiple factors, including supply, demand, world market prices, production costs, and the price of crude oil. Presumably, the retail price that dealers charge their customers will be based on the wholesale price plus a profit margin, affected by what their competitors are charging.

Consumers, including small business consumers will pay a retail price, based on the same factors described above. For numerous reasons already addressed, supplies of distillate fuel oil are not expected to be constrained. Therefore, expensive price margins based on tight supplies as described in the 2010 Hart Report are not expected to materialize. By 2018, when the 15 ppm sulfur limit takes effect for distillate fuel oil, much of the capital expenditures for expanded desulfurization capacity at refineries should be partially to fully amortized. Therefore, the cost of the fuel may be based in part on additional cost associated with the desulfurization process, but more so on the world market price that is affected more by the differential between the price of crude oil and the value of finished petroleum products.²⁸

The 2010 NORA Study is the only one of the above-cited sources that assumes no or minimal supply constraints in its price projections. For many reasons already stated, the minimal supply constraint scenario appears to be the most accurate in light of changes in the refinery sector to date. To recap, the 2010 NORA Study projects a 1 to 3 cents per gallon premium on the price of ultra-low sulfur heating oil based on observations of winter season ULSD wholesale prices in PADD I compared to heating oil prices. At the same time, this study states that the price impact on the consumer likely will be minimal because of the highly competitive nature of product markets. Therefore, the 1 to 3 cent per gallon premium should be considered a worst case scenario. Further, the report notes that consumers (including small business consumers) will realize a net savings in maintenance costs (estimated \$50 per year per heating plant) and a 2 percent improvement in combustion efficiency (estimated at 6 cents per gallon) due to the lower sulfur content.

The heating oil dealers also benefit when the environmental impact of heating oil is reduced because it makes their product more competitive with natural gas as a clean energy source for space heating. Therefore, the regulatory amendments should have a net beneficial economic impact on small businesses.

Conclusion

The regulatory amendments will have a beneficial effect on air quality, public health, and regional haze. For more than a decade, the refining industry has been preparing to meet ULSD requirements and some refiners have already endorsed low sulfur heating oil. By the time the amendments take full effect in 2018, there should be minimal or no supply issues associated with the distillate fuels. Consumers will see an economic benefit, based on reduced maintenance costs and greater fuel efficiency.

²⁸ EIA, *Performance Profiles of Major Energy Producers 2009*, February 2011.

Appendix A

Economic Impacts of Low Sulfur Fuel Oil Requirements – Frequently Cited Studies

In studies assessing the economic impacts of recently enacted low sulfur fuel requirements and/or projecting the impacts of impending requirements, the typical approach is to estimate the increased cost to a gallon of fuel as the result of adding desulfurization capacity at the refinery (i.e., capital cost) and operating the desulfurization equipment. Some of these studies also address competitive price impacts on the premise that the supply will become tighter as demand increases, local refineries close, and product must be transported longer distances. Several of the states in the MANE-VU region cited one or more of the following studies in economic impact analyses conducted in conjunction with adopting low sulfur distillate oil requirements:

American Petroleum Institute (API) Report²⁹ (2004) – This report builds on a 2003 study (Base Case) by the same authors that assessed the fuel supply impacts of the highway and non-road diesel regulations, predicting that 14 U.S. refineries would close by 2010 rather than install the desulfurization equipment necessary to produce ultra-low sulfur diesel fuel. As a result, the 2003 study predicted a significant shortfall in domestically produced distillate supplies and an increased reliance on foreign supply sources. The 2004 report considered two heating oil study cases; one with a 500 ppm sulfur limit and the other with a 15 ppm limit. They determined in the 500 ppm study case that supply would not be adversely impacted beyond the Base Case, but some domestic refineries would need to invest more capital in the means and/or capacity to produce the fuel. This would come at a cost (operating and capital) of 2 to 3 cents per gallon of fuel produced.

The 15 ppm study case was subdivided into two additional cases. In the Maximum Investment Case, several refineries were identified that would make capital investments in order to produce 15 ppm heating oil at an incremental cost (operating and capital) in the range of 3 to 14 cents per gallon of fuel produced. The Maximum Investment Case also would have the effect of reducing domestic production; i.e., the refiners will make the 15 ppm product but at lower volumes than their previous output of higher sulfur product. The shortfall would be made up through imports.

In the Maximum Export Case, these refiners would choose not to invest in increased desulfurization capacity. They would continue to make higher sulfur distillates for export to markets that do not have similar restrictions to those in the U.S. This would increase the domestic shortfall significantly and necessitate reliance on even larger import volumes (at incremental costs ranging from 10 to 17 cents per gallon) or on deliveries from PADD III refiners, in which case Northeast heating oil consumers (PADD I) would need to compete for product with Midwest diesel fuel consumers (PADD II). The incremental cost for domestically produced fuel would be the same in the Maximum Export Case as in the Maximum Investment Case. The report also projects that Canadian refiners would be unable to maintain current export volumes of low sulfur fuels to the U.S. because of their own domestic requirements.

National Oilheat Research Alliance (NORA) Report³⁰ (2008) – The premise of this report is that supplies of low sulfur distillate are already constrained as refiners adjust to requirements to

²⁹ Baker & O'Brien, Inc., *An Assessment of the Impact of Heating Oil Sulfur Regulation on Distillate Fuel Production and Availability in the U.S.*, Prepared for the American Petroleum Institute, November 2004.

³⁰ Hart Energy Consulting, *Northeast Heating Oil Assessment*, Prepared for the National Oilheat Research Alliance (NORA), March 2008.

produce ultra-low sulfur diesel fuel for highway and non-road use in the U.S. Citing the position adopted by the MANE-VU states in 2007, the report projects a further constrained distillate market as states require a 500 ppm sulfur cap on heating oil and an even more difficult market situation as states make the final transition to 15 ppm. The report notes that refiners are expanding desulfurization capacity, but the pace of expansion is such that capacity will be tight through 2012 and then begin to ease thereafter. By 2018, domestic and foreign desulfurization capacity should be sufficient to meet market needs in the U.S., Europe, and elsewhere but there would be periodic shortages in the intervening years.

The report goes on to state that, as long as supplies are constrained, the price differential at a minimum will reflect the full capital and operating costs of the desulfurization processes necessary to produce the fuel. In addition, increased competition for the limited low-sulfur commodity will drive the price even higher. In the longer term (after 2012 to 2014), the price differential will ease as supply meets demand and may actually fall below the full capital cost charge. They estimate the incremental cost of producing 500 ppm distillate at 6.3 to 6.8 cents per gallon and as high as 8.9 cents per gallon for the 15 ppm product.

The report also projects increased reliance on off-shore refiners, particularly in Russia, Venezuela, and Canada, and the U.S. Virgin Islands, to meet U.S. demand for total distillate and for heating oil, and makes the point that these sources are ill-equipped to provide low-sulfur products in the short term. Charts presented later in this Technical Support Document compare the NORA Report's assessment of supply sources against actual data from the U.S. Energy Information Administration (EIA) for 2012.

Hart Report³¹ (2010) – This report is by the same authors as the NORA Report (2008). It makes similar points about constrained supplies due to limited desulfurization capacity. Its specific focus is on the economic impacts if New York and New Jersey were to implement a 15 ppm cap on the sulfur content of heating oil by as early as 2011, well ahead of the dates proposed in the 2007 MANE-VU statement. In addition to repeating some of the information from the NORA Report about refining cost impacts, this report states that “given the tight market outlook, higher market premiums [of] 20 to 30 cents per gallon are expected to prevail if heating oil sulfur is significantly reduced, until additional desulfurization capacity can be brought on line.”

This report also discusses impending East Coast refinery closures as a development that further constrains fuel supplies and contributes to higher market premiums. Specifically, the report identifies the Sunoco refinery in New Jersey and the Valero refinery in Delaware as soon to shut down. Further, it mentions plans by Valero to sell its New Jersey refinery and plans by ConocoPhillips to sell off \$10 billion in assets. It also mentions that refineries in PADD III, eastern Canada, and the Virgin Islands that presently supply PADD I lack the capability to provide substantial volumes of ultra-low sulfur product. Much has changed in the refining industry since this assessment was prepared in 2010. Those changes will be discussed later in this Technical Support Document.

³¹ Hart Energy Consulting, *Ultra Low Sulfur Heating Oil Assessment*, February 2010.

NORA Study³² (2010) – This later NORA Study notes that domestic ultra-low sulfur diesel fuel (ULSD) supply exceeds demand. Consequently, U.S. refiners are net exporters of ULSD. A 15 ppm sulfur limit on heating oil would shift some presently exported ULSD back into the domestic market, causing heating oil prices to fall and ULSD prices to rise relative to world market prices.

The study projects that winter season ULSD wholesale prices in PADD I are expected to average over the long term 1 to 3 cents per gallon higher than the current heating oil product, implying that a shift to ultra-low sulfur heating oil would carry with it this same wholesale price differential. However, this study also notes that the price impact on the consumer is likely to be minimal because of the highly competitive nature of product markets and that consumers will realize a net cost savings in maintenance costs (estimated \$50 per year per heating plant) and a 2 percent improvement in combustion efficiency (estimated at 6 cents per gallon) due to the lower sulfur content.

The study also notes that heating oil demand has declined sharply and will continue to do so because of its high price relative to the price of natural gas. Decreased demand will alleviate potential tight supplies and costs associated with the differential between supply and demand. Later in this Technical Support Document, the effect of increased natural gas consumption relative to heating oil and diesel fuel will be examined in more detail.

³² Kevin J. Lindemer LLC, *Ultra-Low Sulfur Diesel Fuel/Heating Oil Market Study*, Prepared for the National Oilheat Research Alliance (NORA), April 2010.