

Order
Department of Environmental Protection
Environmental Quality Board
(25 Pa. Code Chapters 121, 123 and 139)
Commercial Fuel Oil Sulfur Limits for Combustion Units

The Environmental Quality Board (Board) amends Chapters 121, 123 and 139 (relating to general provisions; standards for contaminants; and sampling and testing) to read as set forth in Annex A. This final-form rulemaking lowers the allowable sulfur content limits of commercial fuel oils used in oil-burning combustions units in this Commonwealth and replaces the existing geographic area-specific sulfur content limits for commercial fuels oils with a statewide sulfur limit.

This order was adopted by the Board at its meeting of _____, 2012.

A. Effective Date

This final-form rulemaking will be effective upon publication in the *Pennsylvania Bulletin*.

This final-form rulemaking will be submitted to the United States Environmental Protection Agency (EPA) for approval as a revision to the Pennsylvania State Implementation Plan (SIP) upon publication.

B. Contact Persons

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C. Statutory Authority

This action is being taken under the authority of section 5(a)(1) of the Air Pollution Control Act (APCA) (35 P. S. § 4005(a)(1)), which grants to the Board the authority to adopt regulations for the prevention, control, reduction and abatement of air pollution in this Commonwealth, and section (5)(a)(8) of the APCA, which grants the Board the authority to adopt rules and regulations designed to implement the Clean Air Act (CAA) (42 U.S.C.A. §§ 7401-7671q).

D. Background and Summary

Combustion of sulfur-containing commercial fuel oils releases sulfur dioxide (SO₂) emissions, which contribute to the formation of regional haze and fine particulate matter (PM_{2.5}), both of which are serious public welfare and human health threats. Regional haze is visibility impairment that is produced by a multitude of sources and activities that emit fine particles and their precursors and which are located across a broad geographic area. Fine particles have a diameter smaller than 2.5 micrometers (PM_{2.5}). Particles affect visibility through the scattering and absorption of light, and PM_{2.5}—particles similar in size to the wavelength of light—are most efficient, per unit of mass, at reducing visibility. Regional haze affects urban and rural areas, including National parks, forests and wilderness areas (Federal Class I areas).

SO₂ is the most significant pollutant involved in the formation of regional haze. SO₂ emissions oxidize in the atmosphere to form sulfate particles. Visibility impairment, including regional haze, in rural areas of eastern North America is mostly due to sulfate particles, according to the 2006 Contribution Assessment prepared by the Mid-Atlantic/Northeast Visibility Union (MANE-VU). *Contributions to Regional Haze in the Northeast and Mid-Atlantic United States*, MANE-VU Contribution Assessment, August 2006, p. 2 – 4.

In 1977, Congress amended the CAA by adding section 169A (42 U.S.C.A. § 7491), regarding visibility protection for Federal Class I areas, to set a National goal of the "prevention of any future, and the remedying of any existing, impairment of visibility in mandatory class I Federal areas which impairment results from manmade air pollution." See section 169A(a)(1) of the CAA. Congress amended the CAA in 1990 by adding section 169B (42 U.S.C.A. § 7492), regarding visibility, to authorize further research and regular assessments of the progress made so far toward the National visibility goals.

The National Academy of Sciences concluded in 1993 that the average visual range in the eastern United States has been reduced to approximately 30 kilometers or 1/5 of the visual range that would exist under natural conditions. (Committee on Haze in National Parks and Wilderness Areas, National Research Council, National Academy of Sciences, *Protecting Visibility in National Parks and Wilderness Areas*, Washington, D.C., 1993.)

The United States Environmental Protection Agency (EPA) published its initial regulations setting forth states' requirements to reduce regional haze at 64 FR 35714 (July 1, 1999). The regulations aimed to achieve the National visibility goal set by the CAA by 2064. The EPA published final regional haze regulations at 70 FR 39104 (July 6, 2005), and later amended them. The regulations are codified in 40 CFR Part 51, Subpart P (relating to protection of visibility). The EPA's regulations require all states, even those that do not contain a Federal Class I area, to submit a revision to their State Implementation Plan (SIP) containing emission reduction strategies to improve visibility in Class I areas that their emissions affect.

The EPA regulations require states to demonstrate reasonable progress toward meeting the National goal of a return to natural visibility conditions by 2064. States with Class I areas must establish reasonable progress goals, expressed in deciviews, for visibility improvement at each Class I area. (The lower the deciview value, the better the perception of visibility.) The first set

of reasonable progress goals shall be met through measures in each state's long-term strategy covering the period from the present until 2018. A long-term strategy includes enforceable emissions limitations, compliance schedules and other measures as necessary to achieve the reasonable progress goals.

States are required to evaluate progress toward reasonable progress goals every 5 years to assure that emissions controls are on track with emissions reduction forecasts in the SIP. The first progress report is due 5 years from the submittal of the initial implementation plan. If emissions controls are not on track to meet SIP forecasts, then a state would need to take action to assure emissions controls by 2018 would be consistent with the SIP or to revise the SIP to be consistent with the revised emissions forecast.

The Commonwealth is a member of the MANE-VU, established in 2000 as the regional planning organization to help the northeast states plan for their Regional Haze SIP submittals. The MANE-VU states are Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont and the District of Columbia. Native American tribes in the region, the EPA, the United States Fish and Wildlife Service and the United States Forest Service are also members.

Although this Commonwealth has no mandatory Class I Federal areas, emissions from this Commonwealth are considered to impact the seven mandatory Class I Federal areas in the MANE-VU region. In addition, the emissions from this Commonwealth are considered to impact the Dolly Sods Wilderness Area in West Virginia and Shenandoah National Park in Virginia.

MANE-VU evaluated several large source categories for their contribution to the MANE-VU SO₂ emission inventory, including electric generating units (EGU), residential and commercial oil heat burners and furnaces, and industrial/commercial/institutional (ICI) boilers. The Northeast States for Coordinated Air Use Management (NESCAUM) performed this evaluation for MANE-VU in 2005 using 2002 data, which was the most current information available at the time of the study. While EGUs are by far the largest source of SO₂ emissions in the MANE-VU region at 71%, SO₂ emissions from the burning of sulfur-containing commercial fuel oil in residential and commercial combustion units, combined and in ICI boilers, each contribute about 7% to the MANE-VU SO₂ emission inventory, for a total of 14%. In this Commonwealth, commercial fuel oil combustion in residential and commercial combustion units contributes between 2% and 3% of SO₂ emissions in the MANE-VU region, depending on the season. The NESCAUM evaluation indicates that the anticipated annual SO₂ emission reduction benefits in this Commonwealth would be approximately 25,000 tons when the final-form low-sulfur content limits for commercial fuel oils are fully implemented.

MANE-VU identified the reduction of sulfur limits in commercial fuel oils used in residential and commercial combustion units as a cost effective strategy for reducing regional haze and adopted a statement in which member states agreed to pursue this strategy. The Department evaluated the NESCAUM studies and MANE-VU recommendations and determined that the recommended low-sulfur content limits for commercial fuel oil were appropriate measures to be pursued in this Commonwealth as part of the regional strategy to improve visibility. Lowering the sulfur content in commercial fuel oil sold for and used in combustion units in this

Commonwealth would contribute to the MANE-VU goals of improving visibility in the region's mandatory Class I Federal areas. Actions taken as part of this Commonwealth's obligations for reducing haze on a regional level would also improve visibility in this Commonwealth's recreational and urban areas.

The existence of PM_{2.5} in the atmosphere not only produces regional haze but also has significant adverse health effects. Epidemiological studies have shown a significant correlation between elevated PM_{2.5} levels and premature mortality. Other important health effects associated with PM_{2.5} exposure include aggravation of respiratory and cardiovascular disease (as indicated by increased hospital admissions, emergency room visits, absences from school or work and restricted activity days), lung disease, decreased lung function, asthma attacks and certain cardiovascular problems. Individuals particularly sensitive to PM_{2.5} exposure include older adults, people with heart and lung disease and children.

The EPA set health-based (primary) and welfare-based (secondary) PM_{2.5} annual National Ambient Air Quality Standards (NAAQS) at a level of 15 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). See 62 FR 38652 (July 18, 1997). The 24-hour NAAQS was subsequently revised in October 2006 to a concentration of 35 $\mu\text{g}/\text{m}^3$. See 71 FR 61144 (October 17, 2006). The EPA designated the following counties or portions thereof as being in nonattainment of either the annual or the 24-hour PM_{2.5} standard or both: Allegheny (Liberty-Clairton); Allegheny (remainder); Armstrong; Berks; Beaver; Bucks; Butler; Cambria; Chester; Cumberland; Dauphin; Delaware; Greene (partial); Indiana (partial); Lancaster; Lawrence (partial); Lebanon; Lehigh; Montgomery; Northampton; Philadelphia; Washington; Westmoreland; and York. All areas except the Liberty-Clairton area are measuring air quality that meets both existing PM_{2.5} standards, but in order to be designated as attainment, the EPA must approve a plan that demonstrates the area can maintain the standard through 2025.

On June 29, 2012, the EPA found that the existing annual PM_{2.5} standard is not protective of public health and proposed a more protective primary standard to be set between 12-13 $\mu\text{g}/\text{m}^3$. See 77 FR 38890 (June 29, 2012). The EPA further proposed a new more protective secondary standard for visibility of either 28 or 30 deciviews (a measure of visibility impairment); the Pittsburgh-Beaver Valley area was one of the few that the EPA projected would need additional reductions by 2020 to meet this proposed standard. The EPA intends to finalize this rulemaking by mid-December 2012.

SO₂ emissions also contribute to the formation of acid rain. Both acid rain and PM_{2.5} contribute to agricultural crop and vegetation damage, and degradation of the Chesapeake Bay. Combustion of low sulfur-content commercial fuel oil will contribute to reducing the incidences of these adverse effects in this Commonwealth.

There are several important cobenefits of this final-form rulemaking, including reducing SO₂ emissions that could lead to violations of the 1-hour SO₂ standard as well as reducing PM_{2.5} and nitrogen oxides (NO_x) emissions. Emissions of NO_x, which contribute to a number of public health and environmental problems in the northeast, including unhealthy levels of PM_{2.5} and ground-level ozone, are another product of combustion and will also decrease with the use of low sulfur-content commercial fuel oil due to furnace and boiler efficiency improvements. Emissions

of carbon dioxide, a greenhouse gas, should also decrease due to improved furnace and boiler combustion efficiency.

Ozone is a serious human and animal health and welfare threat, causing or contributing to respiratory illnesses and decreased lung function, agricultural crop loss, visible foliar injury to sensitive plant species, and damage to forests, ecosystems and infrastructure. In March 2008, the EPA lowered the ozone NAAQS from 0.080 ppm to 0.075 ppm averaged over 8 hours to provide even greater protection for children, other at-risk populations and the environment against the array of ozone-induced adverse health and welfare effects. See 73 FR 16436, March 27, 2008. In April 2012, the EPA designated five areas in Pennsylvania as nonattainment for the 2008 ozone NAAQS. These areas include the following counties: Allegheny, Armstrong, Berks, Beaver, Bucks, Butler, Carbon, Chester, Delaware, Fayette, Lancaster, Lehigh, Montgomery, Northampton, Philadelphia, Washington and Westmoreland.

This final-form rulemaking is designed to lower the allowable sulfur content limits of commercial fuel oils used in oil-burning combustion units in this Commonwealth and to replace the existing area-specific sulfur content limits for commercial fuel oils with a Statewide sulfur limit. The final-form rulemaking will reduce the levels of sulfur in commercial fuel oils used in residential and commercial oil heat burners and furnaces, and in ICI boilers. Section 123.22 (relating to combustion units) regulates Nos. 2, 4, 5 and 6 commercial fuel oils. No. 2 and lighter commercial fuel oil is generally used for residential and commercial heating. Nos. 4, 5 and 6 and heavier commercial fuel oils are used in ICI boilers.

The final-form rulemaking applies to the owner or operator of refineries, pipelines, terminals, retail outlet fuel storage facilities and ultimate consumers, including commercial and industrial facilities, facilities with a unit burning regulated fuel oil to produce electricity and domestic home heaters. The requirements focus on persons or entities that "offer for sale, deliver for use, exchange in trade or permit the use of commercial fuel oil." These are the suppliers and operations selling to the ultimate consumer. Recordkeeping or reporting is not required of the ultimate consumer receiving commercial fuel oil for use at a private residence or an apartment or condominium building that houses private residents; they only need to buy and use compliant commercial fuel oil.

In response to comments received during the official public comment period on the proposed rulemaking, and following the Department's review of other related information, the Department prepared a draft final-form rulemaking for public comment. The draft final-form rulemaking contained significant changes in several areas and the Department believed that, while not legally required, further discussion and an additional comment period would serve the public interest. An Advance Notice of Final Rulemaking (ANFR) was published at 42 Pa.B. 3596 (June 23, 2012). The most significant changes made in the draft final-form rulemaking included the following: (1) an increase in the sulfur limit for No. 2 and lighter commercial fuel oil from 15 parts per million (ppm) to 500 ppm; (2) a postponement of the compliance date for revised sulfur limits from May 1, 2012, to July 1, 2016; (3) changes in the temporary suspension provision to remove EPA concurrence and to remove the maximum allowable sulfur content of 500 ppm for a temporary increase; (4) changes in the sampling and testing requirements to require sampling, testing and calculating of sulfur content by a transferor only if records are not otherwise provided

with the shipment; and (5) a change to allow sulfur content to be recorded as either ppm by weight or weight percent and to clarify that the actual sulfur content (not the regulated maximum allowable sulfur content) must be in the record.

There are additional significant changes to the final-form rulemaking, including the following changes to the temporary suspension provisions: (1) a requirement that the requestor identify the nonair basin county or counties, or the air basin, for which a temporary suspension or increase is requested; (2) a requirement that the Department may not grant a temporary suspension or increase unless the Department determines that the circumstances leading to the insufficiency are due to events that could not have been reasonably foreseen or prevented and that are not due to lack of prudent planning on the part of the transferor of the commercial fuel oil into or within the specified nonair basin area or air basin; and (3) a 60-day limit of the term of a temporary suspension or increase. Other changes are described below.

The Department worked with the Air Quality Technical Advisory Committee (AQTAC) in the development of this final-form rulemaking. The Department discussed the ANFR with AQTAC at the committee's June 14, 2012, meeting. At the committee's September 12, 2012, meeting, the AQTAC concurred with the Department's recommendation to advance the regulation to the Board for consideration as a final-form rulemaking.

The Department also conferred with the Citizens Advisory Council (CAC) air committee concerning the final-form rulemaking on August 29, 2012, and with the Small Business Compliance Advisory Committee on July 25, 2012.

E. Summary of Final-Form Rulemaking and Changes from Proposed to Final-Form Rulemaking

The final-form rulemaking adds a definition to § 121.1 (relating to definitions) for one new term, and amends the definitions of eight existing terms to provide clarity and support the amendments to Chapter 123. The final-form rulemaking adds the term "ultimate consumer" because this term is used elsewhere in the proposed rulemaking. The final-form rulemaking amends definitions of "commercial fuel oil" and "noncommercial fuel" to synchronize them. The Board changes "fuel oil-burning equipment," used in the definition of "commercial fuel oil" in the proposed rulemaking, to "combustion unit" in the final-form rulemaking.

The final-form rulemaking expands the definition of "carrier" so that it applies when commercial fuel oil is carried. The final-form rulemaking amends the definition of "distributor" so that it applies when commercial fuel oil is distributed and to broaden the list of transferees. The final-form rulemaking similarly expands the definitions of "retail outlet" and "terminal." The final-form rulemaking provides more specificity to the definitions of "transferee" and "transferor" by listing examples of persons and entities included in the definition. In a change from the proposed rulemaking, the final-form rulemaking specifies that certain portions of the definitions of "distributor," "transferee," and "transferor" are applicable for purposes of § 123.22, so as not to cause confusion in other Department regulations that use the same term in a different context.

The final-form rulemaking removes the definition of “ASTM,” which had appeared in § 121.1 in the proposed and draft final-form rulemakings, instead moving the information that had been in the proposed and draft-final definition into § 139.4 (relating to references).

The final-form rulemaking amends § 123.22 and adds two new subsections. Subsection (a) applies to nonair basin areas. Air basins are defined geographically in § 121.1. The amendments to subsection (a) make minor editorial revisions to the general provision in paragraph (1). In a change from the proposed rulemaking, the final-form rulemaking expresses the sulfur limits as maximum allowable sulfur content. In another change from the proposed rulemaking, the final-form rulemaking expresses the new maximum allowable sulfur contents both in parts per million (ppm) by weight and percentage by weight. Another change from the proposed rulemaking is that the final amendments reduce the maximum allowable sulfur content for commercial fuel oil in paragraph (2), subparagraph (i), to 500 ppm for No. 2 and lighter commercial fuel oils. This is consistent with the level in the draft final-form rulemaking made public in the ANFR, which was an increase from the proposed level of 15 ppm. Consistent with the proposed rulemaking, the final-form rulemaking reduces the maximum allowable sulfur content of commercial fuel oil in this subparagraph to 2500 ppm or 0.25% sulfur content by weight for No. 4 commercial fuel oil and 5000 ppm or 0.5% sulfur content by weight for No. 5 and 6 and heavier commercial fuel oils. In the proposed rulemaking, the new limits would have taken effect May 1, 2012, but in the final-form rulemaking the compliance date has moved to July 1, 2016. The final-form rulemaking reinstates the existing percent sulfur limits that would have been removed by the proposed rulemaking, now expressed as maximum allowable % sulfur by weight, through June 30, 2016. On and after July 1, 2016, a person is not authorized to offer for sale, deliver for use, exchange in trade or permit the use of a noncomplying commercial fuel oil in a nonair basin.

Amendments to paragraph (2) contain two exceptions. The first exception allows commercial fuel oil that is stored in this Commonwealth by the ultimate consumer prior to July 1, 2016, which met the applicable maximum sulfur content identified for the commercial fuel oil through June 30, 2016, to be used by the ultimate consumer in this Commonwealth after that date. The main difference from the proposed rulemaking is the cut-off date.

The second exception authorizes the Department to temporarily suspend or increase the applicable maximum allowable sulfur content for a commercial fuel oil if the Department determines that an insufficient quantity of compliant commercial fuel oil is reasonably available in a nonair basin area. Changes from proposed in the final-form rulemaking add additional criteria for granting a suspension; limit the term of a suspension to 60 days; and remove the condition that the Department obtain the written concurrence of the EPA Administrator. The changes from proposed to final-form rulemaking include the addition of a requirement to specify in the application the nonair basin county or counties or the air basin, for which a suspension or increase is requested. The Department may not grant a temporary suspension or increase unless the Department determines that an insufficient quantity of compliant commercial fuel oil is reasonably available in the specified nonair basin area. As a change from proposed to final-form rulemaking, the amendments also state that the Department may not grant a temporary suspension or increase unless the Department determines that the circumstances leading to the insufficiency are due to events that could not have been reasonably foreseen or prevented and that are not due to lack of prudent planning on the part of the transferor of the commercial fuel

oil into or within the specified nonair basin area. The final-form rulemaking clarifies that the transferor may not distribute the noncompliant commercial fuel oil into or within the specified nonair basin area unless and until the Department approves the request in writing.

The final-form rulemaking amends the equivalency provision in paragraph (3) to provide greater clarity. The equivalency provision requires an equivalent amount of emission reductions when equipment or a process is used to reduce sulfur emissions from the burning of a fuel with a higher sulfur content than that specified in paragraph (2).

The final-form rulemaking makes similar amendments to the remaining four subsections of § 123.22, which apply as follows. Subsection (b) applies to the following air basins: Erie; Harrisburg; York; Lancaster; and Scranton, Wilkes-Barre. Subsection (c) applies to the following air basins: Allentown, Bethlehem, Easton; Reading; Upper Beaver Valley; and Johnstown air basins. Subsection (d) applies to the Allegheny County; Lower Beaver Valley; and Monongahela Valley air basins; and subsection (e) applies to the Southeast Pennsylvania air basin. Each of these air basins is defined in § 121.1. In subsection (d), the final-form rulemaking adds maximum allowable sulfur content limits because no limits pre-existed this final-form rulemaking, as well as the equivalency provision.

The final-form rulemaking adds § 123.22(f) to establish sampling and testing requirements for refinery and terminal owners and operators to ensure compliance with the maximum allowable sulfur content for commercial fuel oil. In a change from the proposed rulemaking, the final-form rulemaking clarifies that the sulfur content to be determined by a refinery owner or operator for purposes of compliance is the actual sulfur content of the commercial fuel oil. A refinery owner or operator who produces commercial fuel oil intended for use or used in this Commonwealth on or after July 1, 2016, must sample, test and calculate the actual sulfur content of each batch of the commercial fuel oil. A person other than the ultimate consumer that accepts a shipment of commercial fuel oil from a refinery or other transferor on or after July 1, 2016, must sample, test and calculate the actual sulfur content of the commercial fuel oil if the shipment lacks the required record that enables the transferee to determine if the sulfur content of the shipment meets the applicable maximum allowable sulfur content. This requirement replaces the requirement in the proposed rulemaking for the terminal owner or operator to develop and implement written procedures, including procedures for commercial fuel oil sampling and testing.

The final-form rulemaking adds § 123.22(g) to establish recordkeeping and reporting requirements applicable to transferors and transferees in the manufacture and distribution chain for commercial fuel oil, from the refinery owner or operator to the ultimate consumer. This subsection requires each transferor to provide each transferee with an electronic or paper record containing specified information each time the physical custody of, or title to, a shipment of commercial fuel oil changes hands. Additional clarity is provided, as compared to the proposed rulemaking, in the requirements for identifying the sulfur content of a shipment, including addition of the opportunity to use a product code in specified circumstances. The final-form rulemaking allows identification of the sulfur content to be identified by maximum sulfur content rather than by limit or weight percent on a per gallon basis. Persons subject to section 123.22 must maintain the records for at least 2 years. In a change from the proposed rulemaking, the

final-form rulemaking adds that records must be maintained for a longer period if required by other applicable recordkeeping requirements. Records must be provided to the Department upon request. Private residence ultimate consumers are not required to maintain records nor are ultimate consumers who are owners of apartment or condominium buildings housing private residents if the transfer or use of the commercial fuel oil occurs for use at the building. Other ultimate consumers are required to maintain the record provided to them in the transfer of the commercial fuel oil.

The final-form rulemaking amends § 139.4 (relating to references) to update six of the applicable sulfur method references, add two new sulfur method references, and provide the address to which a request for a temporary suspension or increase must be sent.

The final-form rulemaking amends § 139.16 (relating to sulfur in fuel oil) to add cross-references to the two new sulfur method references in § 139.4.

This final-form rulemaking is an important part of the Commonwealth's efforts to meet the reasonable progress goals for reducing regional haze established by the Commonwealth in consultation with the member states of MANE-VU. The final-form rulemaking, upon publication in the *Pennsylvania Bulletin*, will be submitted to the EPA as a revision to the SIP.

F. *Summary of Major Comments and Responses*

Major Comments and Responses on the Proposed Rulemaking

The Board approved publication of the proposed rulemaking at its meeting of July 13, 2010. The proposed rulemaking was published at 40 Pa.B. 5456 (September 25, 2010). Three public hearings were held on October 26, 27 and 28, 2010, in Harrisburg, Cranberry Township (Butler County) and Norristown, PA, respectively. The public comment period closed on November 29, 2010.

Public comments were received from 16 commentators. The Independent Regulatory Review Commission (IRRC) also provided comments.

General Support for Proposed Sulfur Content Levels and Compliance Dates

Various commentators supported the proposed rulemaking. A commentator stated that the proposed regulation is urgently needed in order to meet present and upcoming NAAQS throughout the Commonwealth and to achieve regional haze goals. A commentator noted that New York and New Jersey have already adopted rules with the goal of limiting sulfur in commercial fuel oil to 15 ppm. A commentator suggested that the sulfur content in home heating oil could be lowered in a thoughtful, flexible manner that helps improve the environment and limits economic impacts. The Department thanks the commentators for their support. The Department agrees that the emission reductions from this final-form rulemaking will be useful in meeting the long-term strategy of the Commonwealth's regional haze SIP, as co-benefits of the rule, and both current and anticipated more stringent NAAQS.

Several commentators supported the May 2012 compliance date. The Department thanks the commentators for their support; however, there were significant concerns expressed by commentators about the proposed sulfur content limits and implementation dates. The Department revised the compliance date to July 1, 2016 for reducing the allowable sulfur content in commercial fuel oil to allow time for refiners to add desulfurization capacity. In addition, the Department revised the sulfur content level in No. 2 fuel oil, which is most of the commercial fuel oil sold in the Commonwealth, to 500 parts per million.

One commentator notes that Pennsylvania's existing sulfur limits for commercial fuel oil have been in force for over 30 years. Over that time, technology has advanced greatly as has the understanding of the health impacts from exposure to PM and ozone. The Department agrees that the emerging technology and health impacts are both good reasons for establishing more stringent sulfur standards for fuel oil.

Several commentators expressed support of the rule due to its benefits to human health and the environment. They variously expressed concerns regarding SO₂, NO_x, PM_{2.5}, mercury, CO₂ emissions, ozone formation, acid rain formation, and regional haze from oil burning combustion units. One commentator supported the proposed rulemaking because the measures represent extremely cost effective SO₂ control measures and are appropriate as part of a comprehensive strategy for Pennsylvania. The Department agrees that the final-form rule is cost effective and will reduce pollutant emissions. The final-form rulemaking is being adopted to reduce sulfur emissions that contribute to the formation of regional haze. There are several important cobenefits of this final-form rulemaking, including reducing SO₂ emissions that could lead to violations of the 1-hour SO₂ standard as well as reducing fine particle (PM_{2.5}) and nitrogen oxides (NO_x) emissions. Emissions of NO_x, which contribute to a number of public health and environmental problems in the northeast, including unhealthy levels of PM_{2.5} and ground-level ozone, are another product of combustion and will also decrease with the use of low-sulfur content commercial fuel oil due to furnace and boiler efficiency improvements. Emissions of carbon dioxide, a greenhouse gas, should also decrease due to improved furnace and boiler combustion efficiency. SO₂ emissions also contribute to the formation of acid rain. Both acid rain and PM_{2.5} contribute to agricultural crop and vegetation damage, and degradation of the Chesapeake Bay. Combustion of low-sulfur content commercial fuel oil will contribute to reducing the incidences of these adverse effects in this Commonwealth. The Department disagrees that heating oil burners emit mercury.

General Opposition, Concerns, and Suggestions for Revised Sulfur Content Levels and Implementation Dates for No. 2 Fuel Oil

Many commentators expressed concern or opposition to the proposed rulemaking. They expressed support for the removal of sulfur from fuel oil, but expressed concerns that the levels were unnecessarily stringent, that there was not time for industry to comply, or that they had concern about price spikes or fuel supply. As an alternative to the 15 ppm standard, some commentators noted that a 500 ppm standard in No. 2 fuel oil would represent an 80% - 90% sulfur reduction from Pennsylvania's current standard of 0.3%.

Referencing such comments, the IRRC requested an explanation of why the compliance date of May 1, 2012 is reasonable and the effect on the supply and price of the fuels listed in the regulation, as well as other fuels derived from the same source. The IRRC also recommended review of the 15 ppm sulfur content standard for No. 2 oil and requested an explanation of how the limit in the final-form regulation recognizes the efficient operation of refineries while addressing the need to protect the environment.

The Department revised the compliance date in the final-form rulemaking to July 1, 2016 for reducing the allowable sulfur content in commercial fuel oil in light of the concerns expressed by these commentators. Given the longer lead-time for implementation, price spikes and market disruptions are not expected to be an issue. Written comments received on the proposed rulemaking, and the Hart Consulting report referenced in comments, entitled, "Ultra Low Sulfur Heating Oil Assessment," indicate that supply disruption and price spikes can be avoided if refiners are provided a four-year lead-time to plan and install additional desulfurization equipment to remove sulfur from the remaining part of the fuel stream. As for the sulfur level, 500 ppm sulfur provides both sulfur reduction and flexibility to the transportation and refinery segments. A 500 ppm sulfur content limit for No. 2 fuel oil is expected to reduce SO₂ emissions by approximately 21,000 tons per year compared to approximately 25,000 tons per year for a reduction to 15 ppm.

A number of commentators expressed concern that the proposed implementation date of May 1, 2012 was infeasible because industry typically needs a four-year lead-time to accomplish budgeting, engineering, permitting, and construction for the start-up of hydro-desulfurization equipment. Several commentators stated that many refiners did not build hydrotreating capacity to make 100% of their diesel fuel stream 15 ppm sulfur content fuel, also known as ultra-low sulfur diesel. They said that refiners based their plans on the Federal on-road fuel standards which had phase-in dates as late as 2014. The commentators explained that the current hydrotreating equipment in place at refineries does not have adequate capacity to also treat heating oil volumes, and that adding hydrotreating capacity to make ultra-low sulfur diesel is capital intensive and requires four to five years of permits, engineering, construction and planning. The Department agrees and has revised the compliance date accordingly.

One commentator stated that the proposed rulemaking was misguided and not based on sound science. The Department responds that the Commonwealth is required to make progress toward achieving natural background visibility conditions at Federal Class I areas, under section 169A of the Federal Clean Air Act and corresponding EPA regulations. See 42 U.S.C.A. § 7491 and 40 CFR Part 51, Subpart P (relating to protection of visibility). Reduction of allowable sulfur content of fuel oil has been identified as a reasonable strategy by the MANE-VU, of which Pennsylvania is a member. The Department indicated in its Regional Haze State Implementation Plan (SIP) revision that the Commonwealth would pursue adoption of reduced sulfur content in commercial fuel oil and other emission management strategies, as appropriate and necessary, as part of its long term strategy to meet the reasonable progress goals contained in the SIPs of states with Class I areas that may be affected by emissions from the Commonwealth. MANE-VU modeling identified SO₂ as the primary source of visibility impairment in the region. MANE-VU performed a cost-benefit analysis for lowered sulfur limits and determined that the benefits

exceed the costs. In addition, reducing SO₂ levels will assist the Commonwealth in meeting current and anticipated NAAQS for PM_{2.5} and SO₂.

One commentator stated that visibility SIP requirements cannot be used as a basis to adopt a rule effective in 2012. The commentator stated that there are no Class I areas in Pennsylvania, and asserted that Pennsylvania has no obligation to show “reasonable further progress” toward attaining visibility standards in other states. The commentator stated that even if it did, the first milestone is not required until 2018. The Department disagrees with these comments, except to agree that there are no Class I areas in Pennsylvania for regional haze purposes. The Federal Clean Air Act requires Pennsylvania to make progress towards achieving natural background visibility conditions in those Federally designated Class I areas which are or may be affected by Pennsylvania emissions. Visibility modeling was performed by MANE-VU using two models that were either developed or supported by EPA and evaluated for performance in this application. Similar modeling was performed by the Visibility Improvement - State and Tribal Association of the Southeast (VISTAS). The modeling indicated that Pennsylvania’s emissions have the potential to contribute to visibility impairment in several Class I areas in other states. Reduction of allowable sulfur content of fuel oil was identified as a reasonable strategy by MANE-VU, of which Pennsylvania is a member. The Department indicated in its Regional Haze SIP that it would pursue adoption of sulfur content reduction and other emission management strategies, as appropriate and necessary, as part of its long term strategy to meet the reasonable progress goals contained in the SIPs of states with Class I areas that may be affected by emissions from the Commonwealth. The Department agrees that the first milestone is 2018. The compliance date for the final-form rulemaking has been changed to 2016.

The same commentator stated that the proposed rule would have minimal benefits on even those Class I areas closest to Pennsylvania. The commentator stated that SO₂ emissions from heating oil are approximately 2 – 3 % of the regional SO₂ emissions based on a 2002 inventory, and that since 2002, distillate and residual fuel oil demand have fallen sharply in Pennsylvania, by 25% and 33%, respectively. Heating oil is a wintertime fuel and, according to the commentator, reductions have little effect outside Pennsylvania in the winter, when local emissions trapped by inversions cause most of the visibility impairment. Additionally, the commentator stated, the rate of transformation of SO₂ to sulfate is slower in the winter and the cost effectiveness of the sulfur reduction appears to be based on reductions of SO₂ not PM_{2.5}. The commentator felt that because the PM_{2.5} NAAQS and regional haze rule are both based on control of PM_{2.5}, this was not an accurate representation, since not all SO₂ is converted to PM_{2.5} sulfate particles, particularly in the winter. The commentator stated that there is no basis to impose hundreds of millions of dollars in higher costs on Pennsylvania distillate and residual fuel oil consumers to benefit wilderness areas far from Pennsylvania.

The Department responds that the final-form rulemaking applies not only to home heating oil, which is used primarily (but not exclusively) in the winter, but also to numerous other types and uses of fuel oil. Distillate and residual fuels are burned at all times of the year, for purposes including electric generation (especially to meet peak electric demand on very hot summer days) and other commercial and industrial applications.

Furthermore, the MANE-VU and NESCAUM studies of visibility impairment do not conclude that localized emissions are the only contributor to the visibility impairment found in Pennsylvania urban and rural areas and the MANE-VU Class I areas. In fact, these studies and others conclude that the regional transport of emissions plays a predominant role in the air pollutant levels. Specifically, according to the Executive Summary of the MANE-VU report, “Contributions to Regional Haze in the Northeast and Mid-Atlantic United States,” “Summertime visibility is almost exclusively driven by the presence or absence of regional sulfate, whereas wintertime visibility depends on a combination of regional *and* local influences coupled with local meteorological conditions (inversions) that can lead to concentrated build-up of emissions from local sources.” According to the MANE-VU report, an “effective emissions management approach would rely heavily on broad-based regional SO₂ control efforts in the eastern United States.” This rulemaking will reduce emissions that have an impact both locally and regionally and could be classified as a broad-based regional SO₂ control effort.

The MANE-VU studies show that the predominant air pollutant in the Class 1 areas, regardless of season, is sulfate. Sulfate forms from the sulfur in fuels combining with oxygen during combustion to form SO₂ gas. While the transformation rate of gaseous sulfur dioxide to sulfate aerosol particles does diminish in winter, its transformation rate is not zero. Moreover, the days of worst visibility impairment do not always occur in the summer months. The VIEWS website (http://capita.wustl.edu/CAPITA/CapitaReports/PMFineAn/PMTopics_PPT/PM25Formation.ppt) lists the transformation rate of SO₂ to sulfate on a typical July day as 0.8 percent per hour. The transformation rate of SO₂ to sulfate on a typical January day is 0.2 percent per hour, or 25 percent of what the transformation rate would be on a typical July day. Depending on the quantity and location of the SO₂ released in Pennsylvania, this transformation could and does have a localized effect upon Pennsylvania’s air quality, even in winter.

The same commentator stated that the Department has not shown this rule is needed to meet the PM_{2.5} NAAQS. Area sources, which include, but are not limited to, heating oil use are a tiny fraction of SO₂ emissions in Pennsylvania. The commentator stated that most SO₂ emissions are from large point sources, so it is not rational to claim that a regulation targeted at heating oil is needed to achieve compliance with the PM_{2.5} NAAQS. The Department responds that it has cited reductions in PM_{2.5} concentrations as an ancillary benefit of this regulation. PM_{2.5} concentrations have both a regional and local component. Regional reductions of SO₂ will help to reduce the regional component of PM_{2.5} concentrations, and, therefore, will help nonattainment areas achieve compliance. On June 29, 2012, EPA proposed to conclude that the existing annual PM_{2.5} standard is not protective of public health and therefore proposed a more protective primary standard to be set between 12-13 µg/m³. See 77 FR 38890 (June 29, 2012). EPA further proposed a new more protective secondary standard for visibility of either 28 or 30 deciviews (a measure of visibility impairment); the Pittsburgh-Beaver Valley area was one of the few that EPA projected would need additional reductions by 2020 to meet this proposed standard. EPA intends to finalize this rulemaking by mid-December 2012.

The same commentator stated that the impact of the increased demand for ultra-low sulfur diesel must be considered coupled with refinery closures that have also reduced supplies of distillate to this region. It stated that refineries nationwide are experiencing record or near record losses and

many are hanging on by a thread. The commentator thought that this proposed rule would be particularly challenging to smaller refineries like Port Reading, American and United which cannot afford major capital investments in the current regulatory climate. The Department recognizes these concerns, particularly in regard to the smaller refineries. The final-form rulemaking does not increase the demand for ultra-low sulfur diesel. Since the comment period closed in November 29, 2010, there have been a number of significant changes in Eastern refineries, including the purchase and re-purposing of the former Sunoco Marcus Hook refinery, the purchase of the former Sunoco Philadelphia refinery, and the purchase of the Conoco-Phillips refinery. There are many reasons in addition to regulations, for the closures of smaller, less profitable refineries and the affordability of major capital investments. The factors include decreasing gasoline use due to economic conditions and consumer habits and preferences, as well as the inability of some Eastern refineries to process a wide range of crude oil types.

The same commentator stated that the rule could not be justified as needed in the SIP for the substantial areas of Pennsylvania that are in attainment of the 1997 and 2006 PM NAAQS, and that reductions are not needed statewide because areas that contribute to nonattainment would already be included in the nonattainment area. The commentator stated that the Department did not include the measure in the Pittsburgh-Beaver Valley attainment plan. The Department responds that it has cited reductions in PM_{2.5} concentrations as an ancillary benefit of this regulation. The Department did not include the measure in the Pittsburgh-Beaver Valley attainment plan because a state can only include measures in attainment plans that have already been adopted.

One commentator asked that the regulation not be included in the SIP because it may be difficult to amend if the fuel standard proves to be too problematic for the marketplace. The Department disagrees that the regulation should not be included in the SIP. This strategy was included as a measure the Department would pursue as part of the Commonwealth's long-term strategy in its regional haze SIP revision which was submitted to the EPA on December 20, 2010, and granted limited approval on June 13, 2012. See, 77 FR 41279. The low sulfur fuel strategy was also included in the contingency measure section of the SIP revision for the Pennsylvania portion of the Philadelphia-Wilmington, PA-NJ-DE PM_{2.5} nonattainment area as a regulation in development and anticipated to be adopted. Because this strategy is an important component of Pennsylvania's plan for clean air, the Department will be submitting this rule to EPA upon adoption for inclusion in the Commonwealth's SIP. The final-form rulemaking includes the ability for the Department to grant a temporary suspension upon request if there is an insufficient quantity of compliant fuel available in an air basin or non-air basin areas.

One commentator stated that a 15 ppm sulfur content standard for No. 2 fuel oil would exceed Federal requirements, and that a cost benefit analysis is needed. The Department disagrees that there are federal sulfur requirements for No. 2 fuel oil that is not used for transportation purposes. As for a cost-benefit analysis, MANE-VU performed a cost-benefit analysis for sulfur reductions in fuel and determined that the benefits exceeded the costs. The report used by MANE-VU, *Low Sulfur Heating Oil in the Northeast States, An Overview of Benefits, Costs and Implementation Issues*, found that a decrease in No. 2 fuel oil from a sulfur content of 2500 ppm to 500 ppm would produce a net savings, because a slightly higher fuel oil cost would be more than offset by reduced furnace maintenance costs and higher efficiency.

The IRRC commented that the proposed regulation would have direct and indirect effects on a broad range of citizens, businesses and industry. The IRRC noted that several comments were received in support of the regulation, even by those who may have opposed portions of it. The IRRC recognized that the proposed regulation would involve the availability of fuel, the price of fuel, significant economic investment and approval of temporary suspensions by the EPA that may affect the economic interests of all of Pennsylvania. Therefore, the IRRC recommended the Environmental Quality Board (Board) seek the advice of the legislature on whether the regulation represents a policy decision of such a substantial nature that it requires legislative review. The Department responds that this rulemaking is authorized under the Air Pollution Control Act. The proposed rulemaking was, and this final-form rulemaking will be, reviewed by the General Assembly according to the procedures in the Regulatory Reform Act (71 P.S. §§ 745.1-745.14). In reviewing the proposed rulemaking, the House and Senate Environmental Resources and Energy Committees had the opportunity to object, but the committees did not do so. The Department has taken the specific concerns of committee members into account in developing the final-form rulemaking.

Regional Consistency

Several commentators supported an approach consistent with New Jersey's regulation with a 500 ppm sulfur content limit for No. 2 fuel oil in 2014 and a second step reduction to 15 ppm sulfur by 2016, saying this would provide for regional fuel delivery consistency and security while reducing sulfur emissions from these products. Another commentator noted that the New Jersey rulemaking cited the Hart Consulting study, "Ultra Low Sulfur Heating Oil Assessment," that concluded the needed time for refineries to install desulfurization capacity was four years. The Department has considered the two-step approach taken by New Jersey, but concluded that Pennsylvania has a different profile of users and producers. The sulfur content limit for No. 2 fuel oil in the final-form rulemaking is consistent with the first phase of implementation in New Jersey, namely 500 ppm. However, factors such as consideration of the need to install additional desulfurization capacity in Pennsylvania's western refineries make regional consistency a less important consideration than timing and cost-effectiveness in the choice of 500 ppm rather than 15 ppm. The Department revised the compliance date to July 1, 2016 to allow time for refiners to add desulfurization capacity.

Two commentators noted that the timing of Pennsylvania's proposed requirement for 15 ppm sulfur content for No. 2 fuel oil coincides with New York's recently enacted law. New York is the largest consumer of No. 2 fuel oil, consuming approximately 1.4 billion gallons annually. Pennsylvania is the third largest consumer of No. 2 fuel oil, consuming approximately 891 million gallons annually. According to the commentators, this means that, by 2012, approximately 2 billion gallons of No. 2 fuel oil will have to be replaced with ultra-low sulfur diesel. In 2009, the two states combined consumed approximately 3.7 billion gallons of ultra-low sulfur diesel, meaning the amount of ultra-low sulfur diesel supplied to the Central Atlantic region will have to rise by over 50% by 2012. Another commentator noted that Pennsylvania's proposed rulemaking was similar to action recently taken by New York, Connecticut and Maine. The commentator suggested that Pennsylvania require No. 2 fuel oil to meet the 15 ppm sulfur standard in 2012 similar to New York's compliance schedule to allow refiners and the supply network a clearly defined goal in the two largest oilheat fuel markets in the country. The

Department responds that it has revised the sulfur levels and compliance date. The accelerated timeframe in New York is not appropriate for Pennsylvania. The Department revised the compliance date to July 1, 2016 for reducing the allowable sulfur content in commercial fuel oil to allow time for refiners to add desulfurization capacity. In addition, the Department revised the sulfur content level in No. 2 fuel oil, which is most of the commercial fuel oil sold in the Commonwealth, to 500 parts per million.

Furnace Efficiency

Two commentators wrote that the highest efficiency condensing boiler/furnace systems can be fired by either natural gas or heating oil. They did not find equipment manufacturer's specifications that require the use of ultra-low sulfur heating oil or demonstration of the emissions benefits of condensing boiler/furnace systems. The Department agrees that either natural gas or heating oil can be used in high efficiency systems and that it appears that the use of ultra-low sulfur heating oil is not explicitly required.

Price and Cost

Several commentators expressed concern that the proposed 15 ppm sulfur limit for No. 2 fuel oil would impose unnecessary costs on heating oil users. One commentator retained Hart Fuels to study the impact of lowering the heating oil specification by 2012 and provided a copy of the report, "Ultra Low Sulfur Heating Oil Assessment." The report concluded that production of 15 ppm sulfur content No. 2 fuel oil would cost more than high sulfur No. 2 fuel oil, with 20 – 30 cents per gallon premiums to be expected in the short run, and higher premiums and fuel shortages during cold weather. The Department agrees that the cost of fuel would be higher. However, with the final-form rulemaking limit at 500 ppm, the costs will be offset by reduced furnace maintenance costs. Pennsylvania consumers should save money in the operation of existing furnaces due to improved furnace and boiler efficiency by reducing fouling rates of furnace and boiler heat exchangers and other components, leading to an overall savings from reduced sulfur content. In addition, a 500 ppm sulfur content fuel may lead to new, more cost-effective designs and more widespread use of high efficiency condensing boilers or furnaces, reducing pollution and increasing fuel efficiency. One trade group noted that sulfur in fuel oil was the "real obstacle for equipment design." (www.biodieselmagazine.com/article.jsp?article_id=3937&q=&page=2). The 2008 Northeast Heating Oil Assessment estimates that there would be a 6.3 to 6.8 cents per gallon incremental production cost for 500 ppm vs. 2500 ppm sulfur content home heating oil (No.2 commercial fuel oil), including capital costs. Note that this is a cost to the producers; prices to the ultimate consumer will be influenced by additional factors. Furthermore, this is a cost assuming all producers would incur some costs to install additional desulfurization, so this may be an overestimate for Pennsylvania. Assuming that the entire cost of producing 500 ppm fuel oil is passed on to the consumer, the increased cost to the residential customer would be about \$29.00 per year. However, since furnace and boiler maintenance costs for consumers would be lower due to less fouling of their combustion units, NESCAUM reported a median annual savings of \$29.00 per household on furnace vacuuming by using 500 ppm sulfur content commercial fuel oil. This is probably an underestimate because furnace maintenance costs have most likely increased due to inflation since 2005.

A commentator suggested that a 500 ppm sulfur content standard for No. 2 fuel oil would be less likely to result in price spikes because there are more additional sources of supply. The commentator stated that approximately 26 additional countries can provide supply at a 500 ppm sulfur content standard, which can reduce long term costs and supply disruption risks. A 500 ppm sulfur content standard would also allow use of 400 ppm sulfur kerosene as a blendstock to enhance No. 2 fuel oil supplies. The Department agrees and has revised the sulfur content standard to 500 ppm.

Costs for Transportation Fuel

Several commentators expressed concern that the proposed rulemaking could have unintended negative consequences for highway diesel fuel users by creating market competition between highway fuel and home heating oil. Such competition could have a sharp price impact for on-road diesel fuel, create seasonal price spikes for home heating oil, and create year-round supply problems harming both home heating oil consumers and operators of diesel vehicles. Commentators offered price increase estimates. A commentator expressed concern that a 15 ppm sulfur content standard for No. 2 fuel oil would result in the need for additional refiner processing of higher sulfur distillate fuels and would increase the demand for a limited supply of ultra-low sulfur diesel, resulting in a higher price for on-road diesel fuel. This could create a competitive disadvantage for trucking companies based in Pennsylvania.

Referencing such comments, the IRRC suggested the Board provide an analysis of the impact of the regulation on both the fuels directly included in the regulation and other fuels derived from the same sources, including an analysis of the supply and demand for the fuels and the effect of the regulation on the availability and price of these fuels. The IRRC cited comments that expressed concern that homeowners relying on home heating fuel could be impacted by the price and availability of fuel, concern about overall fuel supply disruption, and concern about timing and sulfur limits translating into a higher price for on-road diesel fuel and price spikes for home heating oil.

The Department responds that the final-form rulemaking does not require the same sulfur content in home heating oil as is required by EPA for highway fuel. Because more sulfur will be allowed in heating oil in Pennsylvania than in transportation fuels, off-specification transportation fuel can be used as home heating oil, thus easing supply concerns in both markets. Home heating oil and diesel fuel competed in the same market for many years. It was only with the implementation in 1993 of the first Federal sulfur content standards for highway diesel fuel to 500 ppm that separate markets for low sulfur diesel, meeting a 500 ppm sulfur content standard, and distillate heating oil at higher sulfur limits were created. Requirements for 15 ppm diesel fuel have further separated these markets. Some commentators recommended that a distinct market for heating oil continue to exist in Pennsylvania so that demand for 15 ppm transportation fuel does not adversely affect supply and price of heating oil. The Department agrees. Having separate markets does not necessarily mean large differences in price or a large reduction in the price of home heating oil, even though currently there are less stringent sulfur content standards and, thereby, fewer costs associated with removing sulfur from home heating oil. With the revisions in the final-form rulemaking, the Department does not expect that future competition in the marketplace between the users of home heating oil and the users of ultra-low sulfur distillate

fuel as on or off-road diesel fuel will result in higher prices for either consumer or will adversely impact supply or demand for heating oil.

One commentator wrote that establishing the same 15 ppm sulfur content standard for heating oil as diesel fuel would result in dramatic operating cost reductions for distribution companies, many of which are small businesses. The Department responds that, because refineries and terminals are already handling multiple grades of distillate, the benefit of minimizing the number of tanks due to consistent sulfur content limits in distillate fuels is not significant.

A commentator wrote that a 15 ppm sulfur content standard for No. 2 fuel oil would preserve or create jobs in Pennsylvania because it would enhance and modernize the product to keep the oilheat distribution industry, which employs approximately 7,000 people, competitive in the future. The Department responds that, while the final-form regulation does not require 15 ppm sulfur content in heating oil, the Department understands that because of such requirements in other states, some Pennsylvania suppliers may choose to purchase this fuel in order to reduce operating costs or offer a cleaner product to its customers. Fuel at 15 ppm sulfur would obviously be compliant fuel in Pennsylvania. This would be a business decision on the part of each distribution company.

Credit Banking and Trading

Several commentators suggested consideration of an averaging, banking and trading program to provide flexibility to refineries for the 15 ppm No. 2 fuel oil sulfur limit in the proposed rulemaking. The Department responds that the limits and compliance date have changed in the final-form rulemaking. In addition, banking, averaging and trading programs are more difficult to administer than the regulatory approach that the Department has chosen, in which all refiners must meet a 500 ppm sulfur in fuel level by July 1, 2016. A banking, averaging and trading program would require administrative oversight and costs to the Department and the regulated community, extensive involvement of financial planners and investors, an annual “true-up” of the bank and trading program, and a verification program, through an enforceable fuel sampling program, to guarantee that the sulfur dioxide credits traded are the result of real reductions in air pollution. This verification program could be burdensome, as it would need to ascertain compliance and the number of “credits” generated.

Heating Oil Supply

One commentator noted that during peak heating oil season, a portion of the supply is provided by imports from areas that do not have diesel desulfurization requirements similar to the U.S. and Canada. The Department understands the commentator’s concerns. Although the final-form rulemaking does not adopt fuel content limits equivalent to transportation fuel (ultra-low sulfur diesel), there is a trend in the market toward lower sulfur levels. The Hart Study mentioned above states, “Imports have played a decreasing role in the NY/NJ market coinciding with reductions in the high sulfur off-road distillate market. Peak seasonal winter supplies from imports have declined significantly.” (Hart Study, page 11). Most countries are now undergoing the shift to ultra-low sulfur diesel in their transportation sectors. For example, Russia has just finished its changeover to 10 ppm ultra-low sulfur diesel transportation fuel in 2009, in

accordance with Euro Directive 29V, the European Union's emission regulations for new heavy-duty diesel engines, and may soon be able to provide ultra-low sulfur diesel fuel to the world market. Other European and Asian countries are also completing this shift to ultra-low sulfur diesel, and the world market for this product is expected to return to balance in the near future. (See <http://www.dieselnet.com/standards/eu/fuel.php>.)

The same commentator noted that demand for low sulfur diesel will likely increase in 2015 when ocean-going vessels in U.S. ports will be required to use 1000 ppm sulfur fuel. The Department agrees. The EPA, through the International Maritime Organization (a specialized agency of the United Nations), finalized plans on March 26, 2010, that would subject ships within a 200 nautical mile buffer zone around the United States and Canadian coastlines to stricter air pollution regulations. As part of this effort, the EPA will require ships to use fuel oil meeting a lower sulfur content standard of 1,000 ppm by January, 2015 within the 200 nautical-mile zone. The ships now use fuel with as much as 40,000 ppm sulfur. The EPA standard for ships would provide a place for the refiners to market off-specification fuel after the 500 ppm sulfur content standard is in effect.

Two commentators stated that ultra-low sulfur diesel demand is expected to rebound as the U.S. and European economies recover and strengthen. One commentator noted that demand for low sulfur distillates has been rising quickly in rapidly growing countries such as China and India and in some new markets, such as Chile, that have recently begun using ultra-low sulfur diesel for transportation fuel. The result has been a surge in exports of distillate and rising ultra-low sulfur diesel prices as the market becomes tighter. Diesel has risen 30 cents per gallon since November 2009 versus 26 cents per gallon for gasoline and about 20 cents per gallon for crude oil prices. The Department agrees that ultra-low sulfur diesel demand is likely to rebound when the global economy recovers and strengthens. The final-form rulemaking does not require heating oil to meet ultra-low sulfur diesel limits.

Pipeline Interface

Several commentators suggested that a 500 ppm sulfur content standard for No. 2 fuel oil would allow flexibility to handle jet fuel/ultra-low sulfur diesel pipeline interfaces after 500 ppm diesel is phased out in 2014. Colonial Pipeline Company's system generates an estimated 6,000,000 barrels of jet fuel/ultra-low sulfur diesel interface per year. A 15 ppm sulfur content limit in No. 2 fuel oil would eliminate the flexibility for blending the interface into No. 2 fuel oil. This would create inefficiencies in the system, resulting in the interface having to be returned to a refinery for reprocessing. One of these commentators stated that pipeline interfaces between higher sulfur products like jet fuel or kerosene and ultra-low sulfur diesel would no longer be able to be marketed as a high value fuel and would have to be downgraded to much lower value fuel. One of the commentators stressed the need for justification of the 15 ppm sulfur content standard for No. 2 fuel oil and recommended a 500 ppm sulfur standard to allow handling of jet fuel/ultra-low sulfur diesel pipeline interface. Another commentator suggested that a sulfur limit phased in over several years similar to the New Jersey rule would allow pipeline systems and distribution terminals to adjust their facilities and operations to ensure the most efficient operations. The Department acknowledges these concerns and has revised the sulfur content limit to 500 ppm, which should significantly reduce reprocessing and downgrading of fuel oil.

Furthermore, not all outlets for off-specification fuel would be foreclosed. The EPA will require ships to use fuel oil meeting a 1000 ppm sulfur content limit by January 2015 within the 200 nautical mile zone. Ships now use fuel with as much as 40,000 ppm sulfur.

Emission Reductions and Energy Savings

One commentator stated that the estimated emission reduction of 29,000 tons of SO₂ per year from the proposed rulemaking was a substantial decrease in local emissions. Another commentator noted that this estimated emission reduction was not significant when compared to SO₂ emissions of 780,000 metric tons from power plants in Pennsylvania in 2008. A third commentator believed the benefits of the rule were overstated and did not justify its adoption at this time. The Department responds that the allowable sulfur content limits in the final-form rulemaking are now estimated to reduce emissions by 25,000 tons of SO₂. The Department evaluated this rulemaking as part of the regional haze strategy and determined that this reduction is necessary and appropriate.

One commentator believed it would be better to obtain SO₂ emissions reductions from coal-fired electric generating units before requiring a 15 ppm sulfur content limit for No. 2 fuel oil. The Department notes that reductions from coal-fired electric generating units are being made; additional reductions are expected as a result of federal regulatory requirements such as the Mercury and Air Toxics Standards, the 2010 one-hour standards for SO₂ and nitrogen dioxide, and programs addressing interstate transport in the Eastern United States to reduce PM_{2.5} and ozone concentrations. The final-form rulemaking has considered the overall reduction of SO₂ from various sources needed to meet the Commonwealth's Regional Haze obligations and no longer contains requirements for 15 ppm sulfur content.

A commentator wrote that EPA's proposed area source NESHAPS rule imposes low PM and CO standards on new oil-fired boilers. If finalized, this rule would eliminate potential energy savings in oil-fired boilers from use of lower sulfur fuels. The Department disagrees. The NESHAPS rule does not affect residential furnaces, which constitute a large use of commercial fuel oil in the Commonwealth. Therefore, additional energy savings from increased efficiency from use of lower sulfur fuels in these furnaces will be realized.

A commentator stated that a standard lower than 500 ppm sulfur for No. 2 fuel oil would have unintended negative environmental consequences and would probably raise greenhouse gas emissions and will not increase boiler efficiency. The commentator stated that the desulfurization process is energy intensive and will emit GHGs in a larger amount than would be offset by the theoretical increased boiler efficiency. The Department responds that the final-form rulemaking does not require a standard lower than 500 ppm.

Residual Fuel Oil

Several commentators opposed the sulfur limits for residual fuel oils. Two commentators stated that the proposed 0.5% sulfur content standard for No. 5 and No. 6 residual fuel oil is too stringent. They wrote that sulfur removal from residual fuels is technologically difficult, very costly and usually economically prohibitive; and that the proposed standard would potentially

lead to export of these fuels instead of treatment to remove sulfur. They said that alternatively refiners could upgrade the residual oil to lighter distillates. The Department disagrees that the 0.5% or 5,000 ppm sulfur content standard is too stringent. Refiners are currently providing residual fuel oil with a 5,000 ppm sulfur content for sale in the Southeast Pennsylvania air basin, as well as several counties in New Jersey (and 3,000 ppm in some New Jersey counties). The MANE-VU states chose the 5,000 ppm residual oil standard as a goal, for a regionally consistent level to reasonably reduce SO₂ emissions from this fuel. New Jersey, Vermont, Maine and Massachusetts have already adopted a 5,000 ppm maximum sulfur content. A market for off-specification residual oil, above a 5,000 ppm sulfur content standard, exists in the marine vessel market. Marine vessels, located in the ocean and away from the United States and Canadian coast, will still be able to be use residual fuel oil with a sulfur content greater than 5,000 ppm. According to the U.S. Energy Information Administration State Energy Data System, in 2010 almost half of all residual oil is used for vessel bunker purposes (residual oil by its nature and by EPA regulation cannot be used in on-road vehicles or most off-road uses). Furthermore, existing provisions regarding emissions of SO₂ from installations where equipment or processes are used to reduce the emissions from burning fuels with a higher sulfur content than specified in the final-form rulemaking, allow higher sulfur content in commercial fuel oil as long as the emissions do not exceed those that would result from the use of commercial fuel oil that meets the applicable maximum allowable sulfur content of this final-form rulemaking. The use of residual oil has declined nationally due to a variety of factors; given the relatively small amount of residual oil in use in the Commonwealth for non-transportation purposes, it is unlikely that demand could not be met.

Another commentator opposed the proposed 0.5% sulfur content standard for No. 5 and No. 6 residual fuel oil, writing that there is a very limited supply of residual fuels nationally, and no refiner will make capital investments or use higher cost low sulfur crudes to produce lower sulfur residual fuel oils because each gallon of residual fuel oil is worth less than the crude oil from which it is refined. The commentator stated that the requirement is unsustainable economically and environmentally, and will place users of this fuel in Pennsylvania at a severe competitive disadvantage, and that the size of this market in Pennsylvania means that any reduction has a miniscule impact. The Department agrees that most of the emission reduction in the final-form rulemaking comes from lowering sulfur content in No. 2 rather than from reducing sulfur in residual fuel oils. However, the emission reductions will nonetheless be helpful for reducing regional haze and achieving the other co-benefits of the final-form rulemaking. Because of the small size of the market in Pennsylvania and the number of states that have adopted (or are anticipated to adopt) the MANE-VU limits for residual fuel oil, the Department believes that regional consistency is an important consideration for this fuel. Therefore, the residual fuel content limits in the final-form rulemaking have not changed from those in the proposed rulemaking.

One refinery commentator stated that its No. 6 fuel oil production currently meets or exceeds the proposed 0.5 % sulfur content standard and could be used as a blend stock by others to satisfy the proposed No. 4 and No. 5 oil sulfur standards. The Department thanks the commentator for its support of the sulfur content requirements for No. 4 and No. 5 fuel oil.

Another refinery commentator expressed concern because it has no hydrotreating capacity to treat Nos. 4, 5 and 6 commercial fuel oil. The Department acknowledges the concern and notes that the Department revised the compliance date for reducing the allowable sulfur content in commercial fuel oil to allow time for refiners to add hydrotreating capacity.

The IRRC commented that two refinery commentators stated that sulfur removal from heavy fuel oils is technologically difficult, very costly and usually economically cost prohibitive. The IRRC noted that these commentators stated that the market reality of the limit to 0.5% sulfur for these fuels is that these refiners will export the fuels rather than make the investments required to meet the 0.5% limit. The IRRC stated that it was concerned that the regulation may disrupt the supply of these fuels in Pennsylvania. The IRRC recommended that the Board review the 0.5% sulfur content standard for No. 5, No. 6 and heavier oils and explain why the limits in the final-form regulation are needed, reasonable and cost-effective. The IRRC requested the same evaluation of, and explanation regarding, the 0.25% limit for No. 4 fuel oil.

The Department responds that it determined that the 0.25% content standard for No. 4 fuel oil and the 0.5% sulfur content standard for No. 5, No. 6 and heavier oils are needed, reasonable and cost effective for a number of reasons. As explained above in responses to comments under “General Opposition,” the Department is required by the Clean Air Act to make progress toward achieving natural background visibility conditions at Federal Class I areas. See 42 U.S.C.A. § 7491 and 40 CFR Part 51, Subpart P (relating to protection of visibility). Reduction of allowable sulfur content of fuel oil has been identified as a reasonable strategy by MANE-VU, of which Pennsylvania is a member. The Department indicated in its Regional Haze SIP revision that the Commonwealth would pursue adoption of reduced sulfur content in commercial fuel oil and other emission management strategies, as appropriate and necessary, as part of its long-term strategy to meet the reasonable progress goals contained in the SIPs of states with Class I areas that may be affected by emissions from the Commonwealth. MANE-VU modeling identified SO₂ as the primary source of visibility impairment in the region. MANE-VU performed a cost-benefit analysis for lowered sulfur limits and determined that the benefits exceed the costs. In addition, reducing SO₂ levels will assist the Commonwealth in meeting current and anticipated NAAQS for fine particulate matter (PM_{2.5}) and SO₂.

The Department further responds that these sulfur content limits are consistent with the levels the Department agreed to pursue, as necessary and appropriate, in the Commonwealth’s regional haze SIP. Refiners are currently providing residual fuel oil meeting the 0.5% sulfur content for sale in the inner zone of Philadelphia as well as in several counties in New Jersey, as this (or an even lower standard) has been the existing sulfur in fuel standard for those counties. See, 25 Pa. Code §123.22(e)(2); and N.J. Admin. Code § 7:27-9.2. The MANE-VU states chose to pursue the 0.25% content standard for No. 4 fuel oil and the 0.5% sulfur content standard for No. 5, No. 6 and heavier oils as a regionally consistent level to reasonably reduce SO₂ emissions. The Department revised the compliance date for reducing the allowable SO₂ content in commercial fuel oil to allow time for refiners to add desulfurization capacity. Other options exist, too, to reduce the sulfur content of residual fuel oil, including reprocessing the fuel oil to remove more sulfur and blending lower sulfur fuel oil with higher sulfur fuel oil to meet the 0.25% and 0.5% standards.

Sell-Through Provisions

Several commentators thanked the Department for clarifying that the ultimate consumer is able to use fuel oil purchased prior to the compliance date of the rulemaking. The Department thanks the commentators for their comments.

Temporary Suspension Mechanism

One commentator supported the exemptions provided in the proposed rulemaking as these appropriately recognize extenuating circumstances which could affect the production and/or availability of compliant fuel oil. The Department agrees and is retaining the provision, with revisions, to ensure that residents of the Commonwealth using heating oil are not without the capacity to heat their homes, offices and places of employment in the winter.

Several commentators expressed concerns with the waiver provision. In addition, the IRRC requested explanation of how the temporary suspension mechanism would be effective in addressing a shortage of compliant fuel. The IRRC stated that the proposed regulation was not clear regarding the process to be followed, when EPA would complete its review, content required by EPA to grant the request or whether EPA was required to entertain the request. The IRRC questioned how an excessive price for compliant fuel would be considered in the determination of whether compliant fuel is “available” and whether the Department has alternatives if EPA refuses to entertain or denies the request. The IRRC requested an explanation of how the temporary suspension mechanism is feasible, reasonable and in the best interest of Pennsylvania.

The Department is retaining the temporary suspension provision, with revisions, to ensure that residents of the Commonwealth using heating oil are not without the capacity to heat their homes, offices and places of employment in the winter. The granting of any temporary suspension has a high threshold of proof and will be used sparingly. The Department has had operational experience in the multiple factors that must be taken into account in exercising enforcement discretion for fuel requirements in the gasoline program in 25 Pa. Code Chapter 126 Subchapter C (relating to gasoline volatility requirements). In that program, price is not considered to be a direct factor in determining availability; excessive prices, however, can be symptomatic of a significant fuel shortage.

The Department agrees that the temporary suspension provisions needed to be more specific. The final-form rulemaking adds additional criteria for granting a temporary suspension and a 60-day time limit. The additional criteria parallel criteria in the federal Clean Air Act regarding EPA waivers for certain motor vehicle fuel requirements (see 42 U.S.C.A. §7545(c)(4)(C)(ii) and (iii)), to ensure that the suspension is not used to address the lack of prudent planning on the part of fuel suppliers. Additional provisions could hamstring the decision-making process since, in the Department’s experience with motor vehicle gasoline, each situation will likely differ. The 60-day time limit was chosen to be roughly equivalent to a typical homeowner’s frequency of refilling a heating oil tank. A 60-day suspension would allow a homeowner to refill a tank with noncompliant fuel. The final-form rulemaking requires the Department to limit a suspension or increase in maximum allowable sulfur content to the shortest duration in which adequate

supplies of compliant fuel oil can be made available. The Department removed language requiring EPA approval from the final-form rulemaking. For all of these reasons, the temporary suspension provision is feasible, reasonable and in the best interest of Pennsylvania.

Sampling and Testing Requirements

Two commentators stated that re-testing in the terminal is an unnecessary burden and should not be required because refineries must test and certify that their products meet applicable specifications prior to leaving the refinery, and pipelines maintain the integrity of the product while transporting the product to terminals. Similarly, the IRRC requested an explanation of why the sampling and testing requirements are needed and would not result in excessive or repetitive sampling and testing of fuels. The Department responds that it revised the sampling and testing requirements to eliminate excessive or repetitive sampling and testing provisions. Sampling and testing will be necessary only if the shipment lacks records regarding sulfur fuel content

One commentator stated that the proposed Section 123.22(f)(2) would require “a refinery owner or operator who produces fuel oil intended for use or used in the Commonwealth... to sample, test and calculate the sulfur content of each batch of commercial fuel oil.” The commentator stated that Pennsylvania cannot require sampling and testing for out-of-state parties. The Department disagrees. The final-form regulation regulates only a refinery owner or operator selling or transferring product in or into the Commonwealth for use in the Commonwealth. If the refiner wants to ship its product to Pennsylvania, then it is subject to these requirements. The regulated consumers in Pennsylvania require accountability of the sulfur content via the sampling and testing requirements in subsection (f) and the recordkeeping and reporting requirements in subsection (g). Given the revision to the sampling and testing provisions in the final-form rulemaking, Pennsylvania customers are unlikely to accept shipment without documentation of sampling and testing because they would have to conduct their own sampling and testing.

A commentator supported the Department’s addition of sampling, recordkeeping and reporting requirements, as the provisions would enhance the Department’s ability to determine that only compliant fuels are being used and give the Department the ability to track batches of fuel oil from refinery production to end usage. The Department agrees that both current industry practices and the final-form rulemaking provide the Department with the ability to track fuel batches.

The commentator believed that the recordkeeping requirements are practical because no requirements are imposed on residential end users. The Department agrees.

Major Comments and Responses on the ANFR

As previously noted, an ANFR was published at 42 Pa.B. 3596. The comment period closed July 23, 2012. The draft final-form rulemaking contained significant changes in several areas, and the Department believed that, while not legally required, further discussion and an additional comment period would serve the public interest. The most significant changes made in the draft

final-form rulemaking included the following: (1) an increase in the sulfur limit for No. 2 and lighter commercial fuel oil from 15 parts per million (ppm) to 500 ppm; (2) a postponement of the compliance date for revised sulfur limits from May 1, 2012, to July 1, 2016; (3) changes in the temporary suspension provision to remove EPA concurrence and to remove the maximum allowable sulfur content of 500 ppm for a temporary increase; (4) changes in the sampling and testing requirements to require sampling, testing and calculating of sulfur content by a transferor only if records are not otherwise provided with the shipment; and (5) a change to allow sulfur content to be recorded as either ppm by weight or weight percent and to clarify that the actual sulfur content (not the regulated maximum allowable sulfur content) must be in the record.

Eight commentators submitted comments on the ANFR: three corporations (a wholesale electricity generator, a refinery owner and operator, a pipeline and terminal company), three industry trade associations, an environmental organization and an environmental consulting company.

Several industry commentators felt the draft final rulemaking provided cost-effective environmental benefits and sufficient lead time for companies to make changes to refining and distribution operations.

The Pennsylvania Petroleum Marketers and Convenience Store Association (PPMCSA) supported a more aggressive schedule for reducing sulfur in heating oil, and recommended that the Department adopt 15 ppm effective as early as practicable, at the very least no later than the New Jersey schedule (July 1, 2016). The PPMCSA stated that use of ultra-low sulfur heating oil results in improvements in the environment. While the Department agrees that the use of 15 ppm would provide a small additional environmental benefit, the benefit is not cost-effective at this time. Most of the benefit in the change in sulfur levels comes from reducing sulfur from existing levels (2000 to 2500 ppm) to 500 ppm.

The Clean Air Council (CAC) urged the adoption of a standard more protective of public health. The commentator explained that heating oil burners emit particulate matter (PM), NO_x, SO₂, mercury, and carbon dioxide have a major impact on public health, ozone formation, fine particulate, regional haze and acid precipitation, and that the change from 15 ppm to 500 ppm results in nearly a 20% increase in SO₂ emissions. The commentator stated this has real and measurable impacts on human health, including a change from the estimated 85 lives saved in Pennsylvania to 77 lives saved, and an additional \$7.4 million in avoided medical costs in 2018. Health and welfare co-benefits include reductions in NO_x, CO₂, ozone, PM_{2.5} and acid rain. The Department agrees that heating oil emits these pollutants, and is reducing sulfur in commercial fuel oil primarily to reduce regional haze. Sulfur dioxide and NO_x are significant contributors to regional haze, and their reduction also has health co-benefits. For environmental benefit, please see the preceding response.

The PPMCSA and CAC stated that the use of ultra-low sulfur heating oil (15 ppm) results in cleaner, more efficient combustion processes in oilheating equipment, resulting in cost savings to consumers. While the Department agrees that cleaner combustion results in cost savings to consumers, most of the benefit results from the reduction from existing levels to 500 ppm. Furthermore, the use of advanced efficiency furnaces does not require the use of 15 ppm fuel.

These two commentators also stated that having on-road, off-road and heating oil at the same sulfur level would result in significant operational efficiencies, through storage in the same containers, and thus cost savings for marketers who distribute these products. The Department agrees there would be some efficiency in storage and transportation but, as indicated by comments on the original proposal, mandating fuel sulfur levels at 15 ppm also carries the risk of higher prices for both heating oil and transportation fuels.

PPMCSA commented that announcements indicating continued operation of two refineries in Southeast Pennsylvania and previously announced capacity enhancements of the Colonial Pipeline signal a stable source of ultra-low sulfur fuel for the region. The Department agrees that the potential for stable fuel supply has improved in the last few months. However, one refinery has shut down and will be repurposed. It is still uncertain whether the types of fuels to be supplied into the market from the other refineries will change.

The CAC commented that the concerns of refineries are overstated because the small increase in refining costs will be able to be absorbed by the consumer through savings in other areas, and with adequate notice, there will be enough supply to meet the demand. There will be costs to reducing sulfur from existing levels to 500 ppm, but only a small additional cost to reduce sulfur further to 15 ppm. The commentator felt that the concern with all Northeast states moving to a 15 ppm standard, namely that there will not be enough supply, was overstated. The Department disagrees with the characterizations on cost and supply. The commentator appears to be confusing the incremental cost difference to the consumer with the cost incurred by any individual owner or operator of a refinery to install sufficient desulfurization to meet the 15 ppm level. Desulfurization capacity is very expensive, and is not cost-effective for the additional environmental benefit. The supply aspect is answered in the preceding response.

The CAC commented that refineries commented during the proposed rulemaking that given adequate time (to 2018), a 15 ppm standard would be a more feasible standard. The commentator therefore supports the stepped approach used in several other states (500 in 2014, 15 in 2018) as reasonable and as being similar to the incremental stepped approach in transportation fuels. The commentator suggested a compliance date for 500 ppm sulfur of 2014 and a 15 ppm sulfur limit, to provide refiners with four years notice from when they reasonably should have been on notice known of a change in the sulfur standard, noting that New York successfully transitioned to 15 ppm in a two year time frame. The Department has not adopted the suggested phased-in schedule, since allowing refiners the time to develop adequate desulfurization capacity is important to ensuring supplies of commercial fuel oil in the Commonwealth. New York's transition to 15 ppm in 2012 creates additional demand for 15 ppm fuel, and New Jersey will add to that demand in 2014.

Two industry commentators suggested that the Department revise the definitions of "ultimate consumer" and "retail outlet" by deleting "a combustion unit" and substituting "fuel oil-burning equipment" so that these definitions would be consistent with the definition of "commercial fuel oil." The Department agreed that the terms should be consistent, and has changed "fuel oil-burning equipment" to "combustion unit" in the definition of "commercial fuel oil"

These commentators requested that language be added to the definition of “ultimate consumer” to ensure that facilities with the same owner or operator that engage in the non-resale transfer of commercial fuel oil are included in the definition. The Department does not agree that the additional language is necessary because the definition in the final-form rulemaking already includes these non-resale transfers.

Phillips 66 commented that the sulfur levels for No. 5 and No. 6 fuel oils (residual oils) are too stringent and could result in significant loss of supply. The company stated that sulfur removal from these heavier fuels is technologically difficult, very costly, and usually economically prohibitive. The company explained that dilution is not a viable solution because blending may lead to not meeting other parameters and dilution with lighter, more valuable product is unlikely to be undertaken by refiners. Phillips 66 explained that dilution would yield more product than is needed by the market so there would be no outlets except export. The company suggested a fuel sulfur level for No. 5 and 6 of 1.0 percent, and leaving the existing standard for the Southeast Pennsylvania air basin (0.5 percent) in place.

The Department respectfully disagrees. As the commentator points out, refiners are currently providing residual fuel oil with a 5,000 ppm sulfur content for sale in the Southeast Pennsylvania air basin, as well as several counties in New Jersey (and 3,000 ppm in some New Jersey counties). The MANE-VU states chose the 5,000 ppm residual oil standard for a regionally consistent goal level to reasonably reduce SO₂ emissions from this fuel. New Jersey, Vermont, Maine and Massachusetts have already adopted a 5,000 ppm maximum sulfur content. A market for off-specification residual oil, above a 5,000 ppm sulfur content standard, exists in the marine vessel market. According to the U.S. Energy Information Administration State Energy Data System, in 2010 almost half of all residual oil is used for transportation purposes (residual oil by its nature and by EPA regulation cannot be used in on-road vehicles or most off-road uses, but can be used in large marine vessels). Furthermore, fuels with a higher sulfur content than those specified in the final-form rulemaking can be used in combustion units if control equipment or processes ensure that the existing SO₂ limits in pounds of SO₂ per million Btu of heat input over a 1-hour period are not exceeded.

The CAC commented that establishing a suspension policy for the rare times that compliant commercial fuel oil is legitimately unavailable is a reasonable and prudent measure. The Department agrees, as ensuring that customers have enough fuel for home heating is essential.

The CAC also commented that the specific requirements of the suspension policy have not been codified, which could leave it open for abuse from commercial fuel oil refiners. The two major flaws are: 1) it is not clear under what limited circumstances DEP can grant a suspension and 2) it includes no time limit for how long a suspension can last. In particular, the provision could allow a suspension of the limits due to poor planning or refusal of the refiners to make enough compliant fuel. The Department agrees that the temporary suspension provisions should be made more specific. The final-form rulemaking adds additional criteria for granting a temporary suspension and a time limit.

The CAC suggested that DEP adopt the language of section 211(c) of the Clean Air Act that sets a suspension limit of 20 days. The Department has included language similar to section

211(c) as it relates to planning, but has included a 60-day limit rather than 20 days, as many heating oil customers fill their tanks about every two months during the heating season.

Various industry commentators commented that the proposed amendments are not consistent with current industry practice and should be modified. They stated that current practices for testing, transporting and documenting heating oil are sufficient to ensure product delivered and sold in Pennsylvania will meet standards. They said it is impractical and unworkable to require each heating oil custody or title transfer to identify the actual sulfur content on the product transfer document because of the fungibility of the product, and that many transfers within a company or to a bulk distributor often do not test for the exact sulfur level. They called the requirement for specifying actual sulfur content for each sale or transfer impractical. They recommended that recordkeeping and reporting requirements be amended to specify that the requirement could be met by properly classifying the fuel by sulfur content as being below 15 ppm, between 15 and 500 ppm and over 500 ppm. They suggested that the practical implication of compliance with the regulation would significantly complicate distribution and slow the system. One of the commentators stated that companies should be able to maintain compliance with the regulation through the current practice of ensuring that a distillate fuel of less than 500 ppm sulfur does not come into contact in a tank or pipeline with another batch exceeding the 500 ppm sulfur standard. That commentator suggested the state allow the use of product codes to convey required transfer document information, as EPA does. The commentator stated that fuels are commonly bought and sold per pipeline specifications or “codes,” which are widely used throughout the industry. The commentator provided specific revisions to the draft final-form rulemaking to restore the proposed language requiring refiners to sample, test and calculate the sulfur content of each batch of fuel; add requirements for testing if records are missing; confine the information to a determination of meeting the 500 ppm level rather than the specific sulfur level; and enable product transfer documents not to specify actual sulfur level.

In response to these comments, the Department revised the sampling and testing requirements to eliminate duplicate testing and to mirror current practices for ensuring product sold in Pennsylvania will be compliant, while ensuring that the Department can adequately enforce compliance and that the ultimate consumer knows that the fuel is compliant. The Department has removed the requirement to record the actual sulfur content and instead only requires the information reflect the maximum sulfur level of the commercial oil fuel shipment. The Department has also allowed the use of product codes, under similar conditions as those described by the US EPA for gasoline and diesel fuel (see 40 CFR 80.77, 80.106 and 80.590), in transfers from refiners up to the point that the fuel transfers to a truck carrier.

All4, an environmental consulting company, suggested that 25 *Pa Code* §123.46(a)(1)(i) be amended to remove the requirement for continuous opacity monitoring systems (COMS) if natural gas, liquid fossil fuel or a combination thereof is used. The commentator stated that this revision is similar to a federal requirement in 40 CFR Section 60.45(b)(1) (relating to standards of performance for fossil-fuel steam generators). The commentator stated that the cost of a COMS is overly burdensome for minimal environmental benefit, especially for natural gas fired sources that may only combust low sulfur fuel oil as a backup or as secondary fuel. The Department has not made this change. For fuel oil, opacity is much more a function of combustion characteristics. Simply limiting fuel sulfur content for oil-fired units does not, in

itself, negate the need to continuously monitor opacity. Subsection, 25 Pa. Code §123.46(a)(1)(ii), does not require COMS for oil-fired combustion units if the units can meet particulate and opacity requirements without particulate control and have not had an opacity violation in the previous five years. For a new source, if the units do not have particulate matter control, COMS do not have to be installed unless and until they have an opacity violation. In addition, §123.46(c) provides the unit with a possible full exemption from the COMS requirement.

G. *Benefits, Costs and Compliance*

Benefits

Implementation of the final-form rulemaking will benefit the health and welfare of the approximately 12 million human residents and numerous animals, crops, vegetation and natural areas in this Commonwealth by reducing the ambient levels of SO₂, resulting in reductions in regional haze and PM_{2.5}. There are also important cobenefits of this rulemaking. Emissions of NO_x, which contribute to unhealthy levels of PM_{2.5} and ground-level ozone, will also decrease with the use of low-sulfur content commercial fuel oil due to furnace and boiler efficiency improvements. Emissions of carbon dioxide, a greenhouse gas, should also decrease due to improved furnace and boiler combustion efficiency. SO₂ emissions also contribute to the formation of acid rain. Both acid rain and PM_{2.5} contribute to agricultural crop and vegetation damage, and degradation of the Chesapeake Bay. Combustion of low-sulfur content commercial fuel oil will contribute to reducing the incidences of these adverse effects in this Commonwealth.

Commercial fuel oil users benefit, too. According to the United States Energy Information Administration (EIA), State Energy Profiles, approximately 26% of the households in this Commonwealth use No. 2 commercial fuel oil for space heat. Low-sulfur content commercial fuel oil has the potential to improve furnace and boiler combustion efficiency by reducing fouling rates of furnace and boiler heat exchangers and other components. Reduced boiler and furnace fouling rates translate directly into lower vacuum-cleaning costs for fuel oil companies and homeowners by extending the service intervals. For example, according to a NESCAUM study, using a median hourly service cost of \$72.50 per hour for vacuum-cleaning a furnace and changing No. 2 commercial fuel oil from a sulfur content of 2,500 ppm to 500 ppm would save \$29,000 a year per 1,000 homes, or \$29 annually per home in the United States. (See NESCAUM report: *Low Sulfur Heating Oil in the Northeast States: An Overview of Benefits, Costs and Implementation Issues*, December 2005, p. 3-2 and 3-3.) Further, the availability of low-sulfur content commercial fuel oil will enable the introduction of highly efficient advanced technology condensing furnaces. A lower sulfur content commercial fuel oil will also increase the number of clean fuel types available to consumers.

The commercial fuel oil industry also benefits. A requirement for lower sulfur content No. 2 commercial fuel oil benefits distributors of commercial fuel oil by increasing their ability to compete with natural gas, a cleaner fuel than today's No. 2 commercial fuel oil.

Compliance Costs

The final-form rulemaking will affect the owners and operators of refineries, distributors and carriers of commercial fuel oils; owners and operators of commercial fuel oil terminals; ICI boiler owners and operators; and anyone who uses commercial fuel oils in this Commonwealth.

There are four refineries in this Commonwealth owned by four companies. The products of the refineries will be affected by the final-form rulemaking. Owners and operators of refineries outside this Commonwealth will be indirectly affected if they supply distributors that sell commercial fuel oil in this Commonwealth. The Department believes that this sophisticated industry has the technical capacity for implementing the program because sulfur limits have been established in motor fuels for 30 years.

There are 92 fuel oil terminal operations operated by 38 different companies and 737 distributors of petroleum products in this Commonwealth. Not all of these operations handle commercial fuel oil. Major distributors in this Commonwealth also operate terminals. While the size of distributor operations ranges from large to small, members of the petroleum distribution industry as a whole have been regulated for many years. Existing systems to track the quantity and composition of fuel are of long standing for purposes of compliance with both environmental and tax regulations.

End-users of commercial fuel oil range from large industrial users to homeowners. There are approximately 1.32 million households in this Commonwealth that may use commercial fuel oil for residential heating (5.08 million households × 26% of households). The EIA State Energy Profile estimates that 26% of homes in this Commonwealth use commercial fuel oil for space heat.

Fuel combustion at many ICI sources is already regulated by the Department under its permit program; these sources will be required to comply with the final-form rulemaking, which retains (with modification) the equivalency provisions of the existing regulation as an alternative compliance mechanism. The equivalency provisions allow the use of equipment or a process to control emissions to the same level as would result from the use of a compliant commercial fuel oil. This choice would most likely only occur if the cost of control were less than the cost of the purchase of compliant commercial fuel oil.

In a 2008 report entitled "Northeast Heating Oil Assessment," the National Oilheat Research Alliance (NORA) estimated that there would be a 6.3¢ to 6.8¢ per gallon incremental production cost for 500 ppm versus 2,500 ppm sulfur content home heating oil (No. 2 commercial fuel oil), including capital costs. Note that these are costs to the producers; prices to the ultimate consumer will be influenced by factors in addition to the cost of reducing the sulfur content in the fuel oil.

Furnace and boiler maintenance costs for consumers should be lower due to less fouling of their combustion units. According to NORA, although low-sulfur content commercial fuel oil may cost a few cents per gallon more, savings on maintenance costs will help defray that impact. Decreased fouling improves efficiency of the combustion unit, which results in lower fuel usage.

Compliance Assistance Plan

The Department plans to educate and assist the public and regulated community in understanding the newly revised requirements and how to comply with them. This will be accomplished through the Department's ongoing compliance assistance program.

Paperwork Requirements

The final-form rulemaking requires that, beginning with the refinery owner or operator who sells or transfers commercial fuel oil and ending with the ultimate consumer, each time the physical custody of or title to a shipment of commercial fuel oil changes hands the transferor must provide the transferee with an electronic or paper record of the transaction. Each affected person must keep the records in electronic or paper format for 2 years, except those ultimate consumers located at a private residence. Recordkeeping or reporting is not required of ultimate consumers at private residences or apartment complexes and condominiums; they only need to buy and use compliant commercial fuel oil. The Department conferred with industry on normal industry practices and took those practices into account in crafting the paperwork requirements.

H. Pollution Prevention

The Pollution Prevention Act of 1990 (42 U.S.C.A. §§ 13101—13109) established a National policy that promotes pollution prevention as the preferred means for achieving state environmental protection goals. The Department encourages pollution prevention, which is the reduction or elimination of pollution at its source, through the substitution of environmentally friendly materials, more efficient use of raw materials and the incorporation of energy efficiency strategies. Pollution prevention practices can provide greater environmental protection with greater efficiency because they can result in significant cost savings to facilities that permanently achieve or move beyond compliance.

This final-form rulemaking reduces emissions of SO₂ and NO_x air pollutants by requiring a lower amount of sulfur in commercial fuel oil used in this Commonwealth, thereby reducing regional haze and ambient levels of PM_{2.5} in this Commonwealth and throughout the northeast. The rulemaking does not require add-on controls, although existing provisions allow the use of noncompliant fuel if the emissions are equivalent to those obtained with compliant commercial fuel oil.

I. Sunset Review

This proposed rulemaking will be reviewed in accordance with the sunset review schedule published by the Department to determine whether the regulations effectively fulfill the goals for which they were intended.

J. Regulatory Review

Under section 5(a) of the Regulatory Review Act (71 P. S. § 745.5(a)), on September 13, 2010, the Department submitted a copy of this proposed rulemaking and a copy of a Regulatory

Analysis Form to the Independent Regulatory Review Commission (IRRC) and to the House and Senate Environmental Resources and Energy Committees. A copy of this material is available to the public upon request.

Under section 5(c) of the Regulatory Review Act, IRRC and the Committees were provided with copies of the comments received during the public comment period, as well as other documents when requested. In preparing the final-form rulemaking, the Department has considered all comments from IRRC, the Committees and the public.

Under section 5.1(j.2) of the Regulatory Review Act (71 P. S. § 745.5a(j.2)), on _____, 2012, the final-form rulemaking was deemed approved by the Committees. Under section 5.1(e) of the Regulatory Review Act, IRRC met on _____, 2012, and approved the final-form rulemaking.

K. *Findings*

The Board finds that:

(1) Public notice of proposed rulemaking was given under sections 201 and 202 of the act of July 31, 1968 (P.L. 769, No. 240) (45 P. S. §§ 1201 and 1202) and regulations promulgated thereunder at 1 Pa. Code §§ 7.1 and 7.2.

(2) At least a 60-day public comment period was provided as required by law and all comments were considered.

(3) This final-form rulemaking does not enlarge the purpose of the proposal published at 40 Pa.B. 5456.

(4) These regulations are necessary and appropriate for administration and enforcement of the authorizing acts identified in Section C of this order.

(5) These regulations are necessary and appropriate to implement provisions of the Clean Air Act.

L. *Order*

The Board, acting under the authorizing statutes, orders that:

(a) The regulations of the Department, 25 Pa. Code Chapters 121, 123 and 139, are amended by amending § 121.1, 123.22, 139.4 and 139.16_ to read as set forth in Annex A, with ellipses referring to the existing text of the regulations.

(b) The Chairperson of the Board shall submit this order and Annex A to the Office of General Counsel and the Office of Attorney General for review and approval as to legality and form, as required by law.

(c) The Chairperson of the Board shall submit this order and Annex A to IRRC and the Committees as required by the Regulatory Review Act.

(d) The Chairperson of the Board shall certify this order and Annex A and deposit them with the Legislative Reference Bureau as required by law.

(e) This final-form rulemaking will be submitted to the EPA as an amendment to the Pennsylvania SIP.

(f) This order shall take effect immediately upon publication in the *Pennsylvania Bulletin*.

MICHAEL L. KRANCER
Chairperson