**ENVIRONMENTAL PROTECTION**

**CLIMATE AND ENVIRONMENTAL MANAGEMENT**

**AIR QUALITY MANAGEMENT**

**Sulfur in Fuels**

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| **Adopted Amendments:** | **N.J.A.C. 7:27-9.1 and 9.2** |
| **Adopted Repeal:** | **N.J.A.C. 7:27-9.5** |
| Proposed: | November 16, 2009 as 41 N.J.R. 4156(a) |
| Adopted: | _____ , 2010 by Bob Martin, Commissioner, Department of Environmental Protection. |
| Filed: | _____, 2010 as R.2010 d.___, with technical changes not requiring additional public notice and comment (See N.J.A.C. 1:30-6.3). |
| Authority: | N.J.S.A. 13:1B-3(e), 13:1D-9, 26:2C-1 et seq. |
| DEP Docket Number: | 14-09-10/676 |
| Effective Date: | September 20, 2010 |
| Operative Date: | November 20, 2010 |
| Expiration Date: | Exempt |

The Department of Environmental Protection (Department) is adopting amendments to N.J.A.C. 7:27-9, Sulfur in Fuels, to reduce the sulfur content of fuel oils throughout the State. The Department is also repealing an outdated and unused section of the rules (N.J.A.C. 7:27-9.5). The rulemaking is a revision to the State Implementation Plan (SIP). The Department is adopting the amendments, which apply to all liquid fuel oil sold, used, stored, or offered for sale in the State, in order to reduce the amount of sulfur oxides, particulate matter, nitrogen oxides, and other pollutants released into the ambient air from the combustion of fuel oil.

This rulemaking is a part of the Department's statewide efforts to reduce secondary aerosol formation, acid rain, fine particulate matter, ozone, and regional haze. Since the publication of the proposal in the New Jersey Register on November 16, 2009,

three studies concerning sulfur in fuel oils were released that are relevant to this rulemaking.

First, the harmful nature of fuel burning to air pollutant levels was illustrated by a study by the New York City Department of Health. (The New York City Community Air Survey, Results from Winter Monitoring 2008-2009, New York City Department of Health and Mental Hygiene, December 15, 2009, (http://www.nyc.gov/html/doh/html/eode/nyccas.shtml) ("NY Study") In this study, it was found that fuel burning for space heating in New York City significantly contributed to particulate levels in the ambient air. Sampling revealed wide variations in wintertime air quality across New York City, with the highest levels of pollution occurring in areas with heavier traffic and a greater concentration of oil-burning boilers in commercial and residential buildings. Specifically, concentrations of fine particulate matter "were greater in areas where there were more large units burning fuel oil in buildings (including the most polluting types of oil known as 'residual oil,' or #4 or #6 oil), more total traffic and more truck traffic." (NY Study, page 8) The report also noted that "Higher $SO_2$ concentrations were observed in areas with more nearby buildings with units burning #4 or #6 heating oil and in higher population areas." (NY Study, page 8) The study concluded that "shifting use away from more polluting fuels, especially #6 and #4 oil, toward cleaner burning fuels, may help to reduce air pollution in neighborhoods with many large burnings and combustion boilers." (NY Study, page 35) Although New Jersey does not have the magnitude of emissions from No. 4 and No. 6 fuel burning for space heating, the New York Study indicates that like New York, New Jersey's air quality can be expected to improve as a result of combustion of cleaner burning fuels, such as those with lower sulfur content, near where oil is burned and regionally when the sulfur content of oil is reduced.

Second, a study by Hart Consulting in February 2010, entitled "Ultra Low Sulfur Heating Oil Assessment," concluded that production of 15 parts per million (ppm) sulfur content distillate oil, also called ultra-low sulfur distillate, will cost five to nine cents per gallon more to produce than high sulfur diesel. (Ultra Low Sulfur Heating Oil Assessment, page 5, available from Hart Energy Consulting, 1616 S. Voss, Suite 1000,

Houston, TX 77057, Terry Higgins, Director - thiggins@hartenergy.com) ("Hart Study") These additional costs are less than the 11.4 cents per gallon that the Department estimated in its Economic Impact (41 N.J.R. at 4162 and 4163). Among the conclusions of the study were that, given the tight market outlook, higher premiums of 20 to 30 cents per gallon for distillate oil would prevail if sulfur content in heating oil were significantly reduced without sufficient time for installing additional desulfurization capacity at the refineries. The Hart Study's conclusion regarding the need for time for refineries to install desulfurization capacity the four-year and six-year lead-times provided by the amended rules. The Department has provided time for refineries to add additional desulfurization capacity.

Third, a study by Kevin J. Lindemer, LLC, for the Northeast Oilheat Research Alliance ("Lindemer Study"), concluded that the United States refining industry does not currently have the capacity to convert all heating oil demand in the United States to 15 ppm sulfur content fuel; however, the refining industry could have the capacity within a few years. (http://www.nora-oilheat.org/site20/uploads/lowsstudy.pdf) The announced distillate upgrading projects at the refineries to remove sulfur from fuel closely match the amount of off-highway diesel fuel that will be needed in 2012 to meet Federal off-road sulfur in fuel standards. The Lindemer Study stated that refiners will add capacity to remove sulfur from fuel only in response to market or regulatory requirements. Given enough lead-time, suggested as five years in this study, the refiners will be able to meet low sulfur heating oil specifications of 15 ppm fuel sulfur content.

The United States is currently exporting ultra-low sulfur distillate. A short-term shift to using ultra-low sulfur distillate as home heating fuel in some states would cause domestic ultra-low sulfur distillate prices to rise relative to the world market, and domestic heating oil prices to fall relative to the world market. A one to three cents per gallon higher cost for ultra-low sulfur distillate compared to home heating oil containing higher levels of sulfur is expected in the northeast wholesale market during the winter season. Price spikes could occur if insufficient time is provided for implementation of the introduction of ultra-low sulfur distillate into the home heating oil market. The Lindemer Study concluded that, for consumers, the higher cost of 15 ppm heating oil

relative to higher sulfur heating oil at 2,500 ppm sulfur levels will be more than offset by lower furnace maintenance costs and higher fuel efficiency.

**Summary** of Hearing Officer's Recommendations and Agency Responses:

The proposed repeal and amendments to the Sulfur in Fuels rules were published in the New Jersey Register on November 16, 2009 at 41 N.J.R. 4156(a). A public hearing was held on January 5, 2010 in the Department's Public Hearing Room in Trenton. William O'Sullivan, P.E., Director of the Department's Division of Air Quality, served as the Hearing Officer. The comment period was set to close on January 15, 2010. Four commenters provided comments at the public hearing and 14 commenters provided written comments during the public comment period.

On January 20, 2010, Governor Christie issued several executive orders. Executive Order No. 1 suspended for 90 days more than 150 then-pending proposals of various New Jersey agencies, among which was the proposed repeal and amendments to the Sulfur in Fuels rules and 11 other proposals of the Department. Executive Order No. 1 states that one of the Governor's priorities is to establish, under the direction of a Red Tape Review Group, a "commonsense" approach to the promulgation of rules. The commonsense principles are described in Executive Order No. 2, and the Red Tape Review Group was established under Executive Order No. 3. The purpose of the suspension was to afford the Red Tape Review Group the opportunity to examine the suspended rulemakings and make recommendations as to those proposed rules it determined are "unworkable, overly-proscriptive or ill-advised."

On February 3, 2010, the Department filed for publication in the New Jersey Register a notice of the extension or reopening of the comment period on the amendments to the Sulfur in Fuels rules, and the other 11 suspended Department rulemakings, to March 15, 2010. The notice appeared in the March 1, 2010, New Jersey Register (see 42 N.J.R. 642(a)). The Department posted the notice on its website on February 4, 2010. The Department sought through the notice to focus any additional

written comments submitted on the purposes of the rules review set forth in the executive orders. The Department also announced in the notice that it would be scheduling informal stakeholder meetings on the proposals and that the dates for the meetings would be posted on the Department's website. The schedule of the stakeholder meetings was subsequently posted on the website on February 22, 2010.

The stakeholder meeting for the proposal to amend the Sulfur in Fuels rules was held on March 8, 2010. At the stakeholder meeting, the Department specifically sought discussion of the economic analysis, federal standards comparison, process improvement, and compliance and enforcement review for the proposal. Thirty-six persons attended the stakeholder meeting. During the extended comment period the Department received an additional 12 written comments, nine of which were from people who did not comment during the initial comment period.

After reviewing the comments received during the public comment period, the Hearing Officer has recommended that the proposal be adopted with the changes described below in the Summary of Public Comments and Agency Responses. The Department accepts the Hearing Officer's recommendation.

A record of the public hearing is available for inspection in accordance with applicable law by contacting:

Department of Environmental Protection
Office of Legal Affairs
ATTN: Docket No. 14-09-10/676
401 East State Street
PO Box 402
Trenton, New Jersey 08625-0402

This adoption document can also be viewed or downloaded from the Department's website at http://www.nj.gov/dep/rules/adoptions.html

**Summary** of Public Comments and Agency Responses:

The Department received comments on the proposed amendments from the following persons:

1. Randall Abbuhl, Weston Solutions
2. Jim Benton, New Jersey Petroleum Council and API
3. Maria Benyshek, Conoco Phillips
4. Daniel Brusstar, CME Group
5. Keith Buccanan, Sunoco Inc.
6. Gregory M. Cohen, American Highway Users Alliance
7. Christopher Colman, Hess Corporation and Hovensa LLC
8. Eric DeGesero, Fuel Merchants Association of New Jersey
9. Charles T. Drevna, National Petrochemical & Refiners Association
10. Michael A. Egenton, New Jersey Chamber of Commerce
11. Paul Fiore, Service Station Dealers of America and Allied Trades
12. M. Gary Helm, Conectiv Energy
13. Dena Matola Jaborska, NJ Environmental Federation
14. Christopher Len, Hackensack Riverkeeper, NY/NJ Baykeeper
15. Al Mannato, American Petroleum Institute
16. Jason L. Mengel, Buckeye Pipeline Company, L.P.
17. Richard Moskowitz, American Trucking Association
18. Peter J. Pantuso, American Bus Association
19. David Pringle, New Jersey Environmental Federation
20. Richard Siller, Hess Corporation
21. Thomas Sims, United States Department of Defense, Air Force
22. Jeff Tittel, Sierra Club
23. R. Peter Weaver, International Liquid Terminals Association
24. Raymond Werner, U.S. Environmental Protection Agency
25. Sam Whitehead, Colonial Pipeline Company
26. Bill Wolfe, PEER
27. L.M. Ziemba, ConocoPhillips

A summary of the comments and the Department's responses follows. The number(s) in parentheses after each comment identifies the respective commenter(s) listed above.

**General Comments**

**1. COMMENT:** The Department is commended for its working relationship with the regulated community and for soliciting stakeholder input in developing the amendments to the sulfur in fuel rules. The Department should continue this cooperative relationship. (2, 3, 12, 24, 27)

**2. COMMENT:** The State is commended for taking a leadership role in the eastern United States in being the first of many states expected to propose the lower sulfur fuel standards as an important regional strategy to improve air quality. (12, 24)

**RESPONSE TO COMMENTS 1 and 2:** The Department acknowledges the commenters' support.

**3. COMMENT:** The Department should seek a consensus resolution to any outstanding issues with the rules that offers the environmental benefits while providing necessary flexibility to the transportation and refinery sectors. (2, 15, 25)

**4. COMMENT:** The Department should work with the oil industry and the New Jersey Petroleum Council in implementing the second phase of reductions and in the appropriate level of sulfur for No. 2 heating oil. (4)

**RESPONSE TO COMMENTS 3 and 4:** The Department has discussed the sulfur in fuels standards, including appropriate standards for the second phase of reductions, with all interested parties, including the transportation and refinery sectors, over the past five years, most recently at a March 8, 2010 meeting of stakeholders. The Department will

continue to meet with interested parties to discuss implementation of these rules and to seek flexible solutions and a consensus resolution, where possible.

**5. COMMENT:** It is unclear whether the proposed sulfur in fuels and sulfur dioxide emission standards at N.J.A.C. 7:27-9.2 apply to kerosene or gasoline. The proposal states that the rules do not apply to kerosene and gasoline; that is, the proposed rules do not affect the very light fractions of distillate fuels, including gasoline and kerosene. But the proposed rule text itself does not appear to differentiate between the very light fractions. The Department should clarify whether the rules apply to fuel oils already covered by Federal regulation. The Department should add the following to the definition of fuel oil: "Fuel Oil does not include fuels commonly or commercially known or sold as gasoline." (12)

**RESPONSE**: In at least one place in the proposal (41 N.J.R. 4157, for example) the Department did suggest that the sulfur in fuels rules do not apply to kerosene and gasoline. This is an oversimplification that may have caused some confusion. A more accurate and precise explanation of the relationship between those fuels and these rules follows.

The rules do not apply to kerosene and gasoline to the extent that they are specifically exempted at N.J.A.C. 7:27-9.3(a), which provides an exemption for "fuel used by ocean-going vessels or in motor vehicles." The Department intended that statement in the rule proposal to pertain to fuels used in mobile sources where such fuels are already covered by the sulfur in fuel standards of Federal regulation at 41 CFR 80.520(d). In the Federal regulation, the Federal government requires the sulfur content of kerosene be a maximum of 15 ppm if it is used, intended for use, or made available for use in highway vehicles with diesel engines. In N.J.A.C. 7:27-9.2, Table 1A and Table 1B, No. 2 and lighter fuels, which would include kerosene used for other purposes, are defined by their Saybolt Universal Seconds (SSU) viscosity being less than or equal to 45. Any liquid fuel oil having a viscosity of less than 45 that meets the definition of a No. 2 fuel oil and lighter would be subject to the sulfur in fuel standard of 500 ppm in 2014 and 15 ppm in 2016, if not used in a motor vehicle or other mobile source subject to

the Federal sulfur in fuel limits. Kerosene would be considered as a No. 2 or lighter fuel using the viscosity definition in the tables, as kerosene has an SSU of 35 at 68 degrees Fahrenheit. (http://www.engineeringtoolbox.com/kinematic-viscosity-d_397.html) The existing exemption for mobile sources at N.J.A.C. 7:27-9.3(a) excludes any fuel, including gasoline and kerosene, if used in motor vehicles or marine vessels.

The Department intends that the Sulfur in Fuels rules at N.J.A.C. 7:27-9 include the sulfur in fuel limits for kerosene that is not used in motor vehicles or marine vessels and not covered by existing Federal regulation. The level of the sulfur in fuel standards in the State and Federal regulations for diesel fuel and distillate heating oil will then be identical. Setting the State heating oil standards at the same level as in the Federal diesel fuel rule ensures that there will be no confusion as to the applicable level of the standard, regardless of the type of equipment or use of the kerosene.

**6. COMMENT:** If the Department adopts the proposed amendments, it should expedite permit processing for permits required for refineries to comply with these rules, as project implementation will benefit the environment, provide jobs to New Jersey, and add to New Jersey's economy. The Commissioner should issue a directive to assist in the appropriate facility applications and permits to add refining capacity to the State for manufacturing and storing additional quantities of reduced sulfur distillate for use as heating oil. (2)

**RESPONSE:** The Department will reallocate staff as needed to conduct any requested pre-application meetings, to ensure that these permits are given prompt and appropriate attention. The Department will work closely with the regulated community to complete the permitting process as expeditiously as possible.

**7. COMMENT:** The Department should amend the rules to exempt fuel used by military vehicles from the proposed fuel requirements. It should also define "tactical military vehicle" so as to exempt its use of fuel from the rules. The United States Environmental Protection Agency (USEPA) already exempts military vehicles from the Federal distillate fuel standards at 40 CFR 80.606 for JP-8 fuel, the kerosene-based fuel

used to fuel tactical military vehicles. The exemption is necessary because subjecting tactical military vehicles to motor vehicle diesel fuel standards would compromise the military readiness for overseas deployment of tactical military vehicles, as these vehicles must be fueled using the same fuel that is used globally by the Department of Defense. (21)

**RESPONSE:** It is not necessary to specifically exempt the fuel used by tactical military vehicles from the provisions of N.J.A.C. 7:27-9, as fuel used in this manner is already exempted. N.J.A.C. 7:27-9.3(a), for which the Department did not propose amendments, provides that the provisions of this subchapter do not apply to fuel used by ocean-going vessels or in motor vehicles. A "motor vehicle" is defined at N.J.A.C. 7:27-9.1 as "any vehicle propelled otherwise than by muscular power, excepting such vehicles as run only upon rails or tracks." A tactical military vehicle would, therefore, be considered a motor vehicle and the fuel it uses would be exempt from the requirements of N.J.A.C. 7:27-9.

**8. COMMENT:** The Department should not revise New Jersey's SIP to include these rules as that would make it difficult to amend the rules should future implementation or marketplace conditions warrant. (2, 6, 10, 15)

**RESPONSE:** As is discussed at 41 N.J.R. 4160, the Department proposed to amend its regional haze air quality protection plan on June 16, 2008 (SIP for Regional Haze Proposal, September 5, 2008) to include this air pollution control strategy. This strategy is also included in New Jersey's June 16, 2008 Fine Particles Attainment Demonstration SIP to attain and maintain the fine particles national ambient air quality standards (NAAQS). These rules, therefore, are already proposed to be a part of New Jersey's SIP and cannot be changed without publicly proposing a modification to those plans already before the USEPA. Since these rules are an important component of New Jersey's plan for clean air, the Department will be submitting this rule adoption to the USEPA for inclusion in applicable SIPs. Having a rule as part of an approved State SIP means that, by Federal law, the rule cannot be amended without Federal approval and cannot be

amended to increase emissions unless a commensurate decrease in emissions occurs elsewhere.

The Department recognizes the capital investment that refiners are required to make to lower the sulfur content of fuel. The Department also recognizes the potential effect that these rules could have on the trading of futures in the New York Mercantile Exchange (NYMEX) marketplace. Including these rules in New Jersey's SIP gives the marketplace greater certainty. The Department will carefully consider the timing and impact of any changes to these rules in the future, in order to avoid potential disruption to the marketplace from any uncertainty regarding implementation.

**9. COMMENT:** The proposed amendment to require 15 ppm sulfur content fuel oil in 2016 is not warranted, is excessive, cannot be justified, is not needed to improve air quality, is tremendously costly in capital expense or is without well documented cause. The Department should carefully justify or examine this decision. (2-4, 6, 7, 9-12, 15-18, 23, 25)

**RESPONSE:** The Department disagrees with this comment. New Jersey is required by the Federal Clean Air Act to attain the health standard for all criteria air pollutants. In response to Comments 15 and 16 below the Department notes that approximately 8 million New Jersey residents are breathing polluted air in counties not meeting the NAAQS, and that sulfur in fuel oil contributes to New Jersey's non-attainment issues. Also, the Federal Clean Air Act requires New Jersey to make progress towards achieving natural background visibility conditions in Federally designated Class I Areas, as discussed in the proposal at 41 N.J.R. 4159. The requirement to reduce the sulfur content of fuel oil has been determined to be a reasonable measure by the members of the Mid-Atlantic/Northeast Visibility Union (MANE-VU) (including New Jersey) and is a component of New Jersey's SIP for Regional Haze, as discussed at 41 N.J.R. 4159 and 4160. The standards must be implemented to meet these national requirements as soon as practicable. In its Economic Impact (41 N.J.R. at 4164), the Department performed a cost-benefit analysis for these amendments and determined that the benefits exceeded the

costs. See also the Department's response to Comments 47 through 66 below for a further discussion of the costs and benefits of the adopted amendments.

**Regional implementation of low sulfur fuel standards**

**10. COMMENT:** New Jersey should adopt these rules along with other states. While New Jersey may be the first state in the Mid-Atlantic/Northeast United States to propose rules to lower sulfur in fuels, other regional states are expected to propose similar rulemaking. (24)

**11. COMMENT**: The Department should not adopt the proposed 2016 limits in New Jersey, because they would be more stringent than those of any other surrounding state and, therefore, could disrupt the home heating oil marketplace. (10)

**12. COMMENT:** The Department should coordinate these and other related rules with other states, inside and outside of MANE-VU, including the Midwest Regional Planning Organization and the Visibility Improvement State and Tribal Association of the Southeast (VISTAS), so as to not place New Jersey sources at a competitive disadvantage. (10, 12)

**13. COMMENT**: New Jersey should harmonize the implementation schedule in the proposed rules with the State of New York to avoid supply problems and price spikes, as these states share the New York harbor area, an internationally known product hub. (4)

**14. COMMENT**: The Department should adopt the proposed amendments and repeal without delay, as such delay would result in a substantial loss of air pollution reductions region-wide, particularly insofar as any weakening of the proposed standards or delay in their implementation by New Jersey will affect action taken by other states in the region, thus magnifying the loss in pollution reductions. (13, 19)

**RESPONSE TO COMMENTS 10 THROUGH 14:** New Jersey will experience the greatest improvements in air quality and regional haze if all states throughout the eastern United States implement the MANE-VU sulfur reduction strategy. This was the basis for the agreement of the MANE-VU states to pursue this regional reduction strategy, as noted at 41 N.J.R. 4159. The Department agrees that the amendments should be adopted without delay.

Maine's Governor signed legislation on April 5, 2010 to require the use of 15 ppm sulfur fuel oil by January 1, 2018 in fulfillment of its MANE-VU commitment. (Public Law Chapter 604, LD 1662, 124th Maine Legislature) This is the first MANE-VU state to complete regulatory or statutory action to achieve the regional reductions that will benefit the air quality in the MANE-VU region, as discussed at 41 N.J.R. 4160. The Department is tracking the progress of other states in implementing similar regulations or legislation. Legislation introduced in New Jersey and other MANE-VU states would require 15 ppm sulfur content distillate oil in 2011 or by 2012. (Bills have been introduced as A1054 and S1414 in New Jersey, S1145C in New York, S1282 in Pennsylvania, H549 in Vermont, and H7653 and S2521 in Rhode Island.) The Department anticipates that other states will soon follow Maine's and New Jersey's lead and will enact legislation or implement regulations with consistent, workable timeframes and standards. Issues of supply, fungibility, costs, distribution and demand would best be avoided if there is regional implementation of this air pollution control strategy.

The proposed 2016 limits for sulfur will not be more stringent in New Jersey than in surrounding states if New York, Pennsylvania and Delaware (all of which are inner zone MANE-VU states, as discussed at 41 N.J.R. 4162) follow through on their signed MANE-VU commitment. The remaining MANE-VU states in the outer zone of the MANE-VU strategy are expected to have similar sulfur in fuels standards in 2018.

**Air quality benefits**

**15. COMMENT:** The Department should adopt the proposed amendments because they will result in air quality and health benefits for millions of New Jersey residents. (24)

**16. COMMENT:** New Jersey has been classified as "contributing" to non-attainment of the fine particulate matter air quality standard in New York City. New Jersey residents are not, themselves, experiencing bad air quality. Therefore, the proposed amendments are not needed . (7)

**17. COMMENT:** The Department should adopt the proposed amendments because they will lead to cleaner air in states surrounding New Jersey, or will directly benefit New Jersey, helping to reduce negative health impacts, acid rain, water nitrification and regional haze within the State, as well as outside it. (13, 19, 24)

**18. COMMENT:** The Department should adopt the proposed amendments, as they would limit or prevent harmful emissions from the combustion of fuel oil containing sulfur, including emissions of fine particles, sulfur dioxide and nitrogen oxides, and they would dramatically limit the harmful health effects of these emissions. (13, 19, 24)

**RESPONSE TO COMMENTS 15 THROUGH 18:** The Department anticipates that New Jersey's air quality and the health of its citizens will improve as a result of adoption of the amendments. Benefits to the public health and welfare are the underlying basis for this adoption. The Department discussed this and interstate contributions to air quality at 41 N.J.R. 4159 and 4160.

New Jersey is contributing to air pollution in surrounding states, and these states are contributing to New Jersey's air pollution. A "non-attainment area" under the Federal Clean Air Act is not only one that exceeds the NAAQS, but also any area that contributes to the exceedance in another area. The USEPA classified 13 counties in New Jersey as being in non-attainment of the fine particulate standard. For some of these counties, the classification was based on the county's contributions to unhealthful levels of air pollutants in New York City, while for others the classification was based on the county's exceedance of the fine particulate standard. The Department discussed this point in the proposal at 41 N.J.R. 4158 and within the June 16, 2008 State Implementation Plan for fine particles that New Jersey submitted to the USEPA.

(http://www.nj.gov/dep/baqp/sip/siprevs.htm) Because of the interstate transport of pollutants, it is important for New Jersey and all other MANE-VU states to adopt similar standards in order to obtain the full extent of air quality benefits to New Jersey and the region.

**19. COMMENT:** Adoption of the proposed rules will result in lower emissions. This will help New Jersey in the future, should the USEPA respond to studies showing that the current NAAQS do not adequately protect public health by promulgating more stringent NAAQS. The promulgation of NAAQS stringent enough to protect public health and the environment would require New Jersey to go beyond the requirements of the rules prior to amendment. The amendments will be useful if that happens. (24)

**20. COMMENT:** The 500 ppm sulfur standard for home heating oil is needed to effectively assist the State in complying with the current Federal NAAQS for fine particulate, sulfur dioxide or ozone air pollutants. (13, 19, 23, 24)

**RESPONSE TO COMMENTS 19 and 20:** The Department acknowledges the commenters' support for the rules. This rulemaking is a vital component of the State's strategy to meet its air quality standards and visibility goals.

Although the Department is not adopting standards under the authority of, or in response to the draft notices of Federal rulemaking to lower the sulfur dioxide NAAQS, the adopted sulfur in fuel standards will benefit the State's air quality and will be useful in meeting both the current and anticipated more stringent Federal NAAQS. On June 2, 2010, the USEPA adopted a substantially more stringent NAAQS for sulfur dioxide. These adopted sulfur in fuel limits of N.J.A.C. 7:27-9 et seq. will be included in future New Jersey SIPs now that the USEPA has made the sulfur dioxide NAAQS more stringent. The adopted standards would also be included in New Jersey's SIP for fine particulate matter if the USEPA makes the NAAQS for fine particulate matter more stringent.

The Department believes that it is important for the State to implement its rules in advance of Federal action on fine particles. Refiners need as much as four years lead

time to add the necessary equipment to desulfurize all fuel oil. If the Department were to wait for the USEPA to finalize a more stringent fine particulate NAAQS before amending its rules, refineries could be left with insufficient time to modify their operations to meet the standard. The modifications to the refineries must be in place well in advance of the operative date of the anticipated more stringent NAAQS, in order that the benefit of reductions is achieved on or before the deadline. The State must be able to demonstrate, through monitoring and measurement, that it is in attainment by the required date. Hence, waiting for the new NAAQS and then promulgating a rule at that time may provide less time for compliance than the four years requested by the refining industry.

**21. COMMENT:** The Department does not need to adopt the proposed amendments in order to attain the NAAQS for sulfur dioxide. As noted in the proposal, all areas of the State are currently in attainment of the NAAQS for sulfur dioxide. (16)

**RESPONSE:** New Jersey has met the former NAAQS for sulfur dioxide in most areas of the State since the 1980s. It is not yet evident if the State is in attainment for the Federal one-hour sulfur dioxide standard of 75 parts per billion that was finalized on June 22, 2010, which the State must meet on or before August 3, 2010. The State's air monitors indicate lower levels than the new Federal sulfur dioxide NAAQS, but air quality modeling of major sulfur dioxide sources will be necessary to determine attainment or non-attainment near these sources.

The adopted amendments may be a useful control measure to attain or maintain levels that comply with the new NAAQS for sulfur dioxide, the Department did not propose the amendments as part of the State's sulfur dioxide SIP or to attain the State or Federal health standards for sulfur dioxide. Rather, the Department is adopting these more stringent sulfur content standards to meet and maintain the health standard for fine particulate matter, and to make progress towards the State's regional haze goals.

**22. COMMENT:** The Department should not adopt the 15 ppm standard as it is not needed for air quality benefits. The Federal fuel standard for sulfur in kerosene, when used in indoor space heating, is 400 ppm. Presumably the USEPA set the sulfur

specification for indoor kerosene use at a conservative level for operability and air quality purposes, suggesting that the Department should set the sulfur content standard for fuel burned in furnaces and boilers at 500 ppm (a similar level). (7)

**RESPONSE:** The primary concern of the Department in setting the sulfur content standard for distillate fuel (the fuel generally used in furnaces and boilers) at 15 ppm is not to address indoor air quality concerns, but to address the formation of secondary aerosols or fine particulate matter in the outside air, as discussed at 41 N.J.R. 4158. The formation of secondary aerosols contributes to the high levels of particulate found in New Jersey's air, and sulfates are the predominant component of this fine particulate matter. The amendments will lower the sulfate component of the fine particulate matter affecting New Jersey's outdoor air quality.

The use of unvented, indoor, kerosene space heaters is of concern, regardless of the sulfur content of the kerosene. The USEPA has stated that "Unvented fuel-fired space heaters that use kerosene or gas are of serious concern to public health officials". (Introduction to Indoor Air Quality, USEPA, Office of Air and Radiation, Doc. ID # 400-391003, July 1991, page 226) It is also recommended by the USEPA in this document that adequate ventilation must be provided when using unvented, indoor kerosene heaters by bringing fresh outdoor air into the living space. This prevents the build-up of the by-products of combustion (potentially harmful air contaminants like sulfur dioxide) in the indoor environment. (page 227). The Department is not aware any finding that 400 ppm sulfur content kerosene is safe to use in indoor, unvented space heaters.

**Removing pollutants other than sulfur from fuel oil**

**23. COMMENT:** The Department should withdraw the proposed amendments and re-propose a 15 ppm sulfur content requirement, while also requiring a lower fuel oil carbon content and inclusion of a bio-fuel component. New Jersey should also work on this with other states and the Northeast States for Coordinated Air Use Management (NESCAUM). (8)

**RESPONSE:** Expanding the scope of this rulemaking beyond what was already agreed to by the MANE-VU members to include a bio-fuels component or a carbon content fuel standard is unnecessary and would delay implementation of the sulfur in fuel standard in New Jersey and throughout the region. The Department does not wish to delay the emissions reduction benefits of these rules. Timely adoption of these amendments provides the other MANE-VU members the assurance that New Jersey will implement a lower sulfur content standard, and will provide refiners with ample lead-time to comply with the adopted standards. Any delay would shorten the necessary lead-time provided to the refineries and to the marketplace.

Carbon content and bio-fuels can be addressed as a separate rulemaking effort if warranted after further evaluation. The NESCAUM states are doing such an evaluation as part of their consideration of a low carbon fuel standard.

**The amount of emissions reduced by the adopted amendments and repeal**

**24. COMMENT:** The Department should adopt the proposed amendments because that will reduce total sulfur dioxide emissions in New Jersey by an appreciable amount. (13, 19, 24, 26)

**25. COMMENT:** The amendments should be adopted because it will affect the combustion of fuel oil that accounts for 10 percent of total sulfur dioxide emissions in New Jersey. (24)

**26. COMMENT:** The Department should adopt the proposed amendments because they would reduce sulfur dioxide from lighter fuels by 97 percent in 2014 and by 99 percent in 2016. The proposed amendments and repeal would also reduce emissions of small particles, nitrogen oxides and carbon monoxide. (13, 19)

**RESPONSE TO COMMENTS 24 through 26:** The Department agrees that these rules will result in significant emissions reductions and acknowledges the commenters'

support. The proposal at 41 N.J.R. 4162 and 4163 stated that the amendments will result in a reduction in sulfur dioxide of 1,030 tons per year starting in 2014 from distillate fuel consumption, 220.4 tons per year starting in 2014 from residual fuel consumption, and an additional 294 tons per year starting in 2016 from the implementation of the ultra-low sulfur fuel standards for distillate oil. The use of fuel oil varies by season and year, by type of use, and by location. Distillate fuel oil is used in the northeastern United States for home heating, and in other parts of the country for on-road diesel fuel. Given these variations, the numbers in the proposal are a reasonable estimate of the typical reductions expected annually in New Jersey from the adoption of these rules.

The Department's review of the Energy Information Agency (EIA) data (available at http://tonto.eia.doe.gov/dnav/pet/pet_cons_821dst_dcu_nus_a.htm) shows that in 2008 75.1 percent of the distillate and kerosene use in the State was covered by Federal motor vehicle fuel regulation. In 2008, 68.6 percent of the distillate and kerosene fuel was for on and off-highway vehicle use, 4.5 percent railroad use, and two percent vessel bunkering use. This leaves approximately 24.9 percent of distillate and kerosene to be regulated by the Sulfur in Fuels rules at N.J.A.C. 7:27-9, rather than Federal regulation. The 24.9 percent of all distillate, residual, and blends of distillate and residual oil includes residential, commercial, and industrial heating and electric power. The adopted amendments are intended to conform the State's sulfur in fuels requirements to the Federal requirements for fuel used in on-road and off-road sources, so that all distillate fuel oil, whatever the ultimate use, will be subject to the same sulfur standards.

**27. COMMENT:** The proposed amendments give only a small incremental benefit from going from 500 to 15 ppm sulfur in fuel in 2016 considering that sulfur dioxide emissions from New Jersey's coal-fired power plants amounted to over 45,000 tons in 2007. The Department should delay adoption of the proposed amendments until after reductions at the coal-fired electric generating units are achieved. (9)

**RESPONSE:** The Department agrees that coal-fired power plants are large contributors to sulfur dioxide levels in New Jersey and within the United States. The Federal Clean Air Act, namely the New Source Review provisions and the sulfur dioxide/Acid Rain

trading program, and New Jersey's Air Pollution Control rules (N.J.A.C. 7:27-10, Sulfur in Solid Fuels) are addressing these emissions in order to achieve significant emission reductions at New Jersey's coal-fired power plants in the near future. The Department expects that all operating coal burning sources in New Jersey will have state-of-the-art sulfur oxides pollution control equipment by 2014, making the emissions from these sources much lower by time of implementation of the adopted amendments.

The benefits of both the adopted sulfur in fuel oil standard and lower emissions from New Jersey's coal burning sources were included in the estimates of the air quality benefits in the NESCAUM study referenced in the proposal at 41 N.J.R. 4162. This study showed that the region would attain the air quality standard in 2018 for fine particulate matter after regional implementation of these control strategies and lowered emissions from New Jersey's coal burning sources. Reducing the sulfur content of fuel oil from 500 ppm to 15 ppm will give smaller, but still major emission reduction benefit. The benefits to New Jersey's air quality will be a result of emission reductions in New Jersey and regionally.

**28. COMMENT:** A limited number of boilers now require fuel that contains 15 ppm (or even 50 ppm) sulfur, and will realize no benefit from the mandated reduction in sulfur content in fuel oil. The marketplace already provides sufficient fuel with reduced sulfur content for these boilers. Therefore, the Department cannot take credit for emissions reductions for those boilers. The reductions are present with or without the proposed amendments to the rules. Owners of other boilers will likely switch to natural gas. In effect, a reduction to 15 ppm or even a more moderate 50 ppm sulfur by New Jersey will require that the vast majority of fuel oil consumers utilize a fuel they do not need, will cost them more, and will increase emissions overall. (7)

**RESPONSE:** To the extent that the adopted amendments result in reductions in sulfur oxides and fine particulate matter, there is a benefit. Although boilers that already use fuel oil with a sulfur content of 15 ppm may not further reduce emissions, those boilers that use fuel with a sulfur content of 50 ppm will experience some reduction. As the commenter suggests, the number of boilers that already use the ultra-low sulfur fuel is

relatively small. The anticipated emission reductions from the adopted 15 ppm sulfur content standard are discussed in the Environmental Impact, 41 N.J.R. at 4163, 4164.

Although some homeowners may switch from fuel oil to natural gas, it is not mandatory in New Jersey that they do so, either as a result of the adopted amendments or otherwise. Moreover, there are consumers in parts of the State that do not have access to natural gas pipelines or supply, so they cannot switch from fuel oil to natural gas. It is important that all consumers have access to low sulfur fuels. Some consumers consider distillate home heating oil to be "dirtier" than natural gas, due to the greater sulfur dioxide and particulate emissions from combustion. As a result of the adopted amendments, the sulfur content of fuel oil and sulfur dioxide and particulate emissions from fuel oil will be approximately equal to the sulfur content and sulfur dioxide and particulate emission from natural gas, providing consumers a "clean" alternative to natural gas.

**Fuel supply issues**

**Studies concerning supply**

**29. COMMENT:** Before the Department adopts the 15 ppm sulfur in fuel standard for 2016, the Department should do a study to ensure that an adequate supply of ultra-low sulfur fuel oil (that is, 15 ppm) will be available in the future. (2-4, 6, 8-12, 15-17, 20, 23)

**30. COMMENT:** The Department relies on studies to show that fuel supply will be adequate. These studies are no longer valid, as many of the projects to lower the sulfur content of fuel used in the studies have been canceled by major refining entities. One refiner could not produce additional quantities of ultra-low sulfur diesel beyond its current supply. The refiner has one refinery in New Jersey that does not produce low or ultra-low sulfur diesel; its other refinery does not have the capacity to produce ultra-low sulfur diesel beyond its current supply that is used in the transportation market. (7)

**31. COMMENT:** The amendments, if adopted, will not lead to supply shortages, based on a soon-to-be released study of the National Oilheat Research Alliance (NORA) that shows that the United States is currently exporting 80 million barrels a year (equal to three billion gallons) of ultra-low sulfur heating oil to Europe and South America. This amount, if not exported, would more than cover the 400 million gallons of heating oil used in New Jersey annually. (8)

**RESPONSE TO COMMENTS 29 THROUGH 31:** A Department-initiated study of future supply and availability issues is not warranted, based on the availability of studies that have already been conducted, the adequacy of the current supply of ultra-low sulfur oil to meet the fuel oil demands of New Jersey, and the projection that oil demand will decrease in the future. Given the long lead-time provided for implementation, supply and availability issues should not be of concern in New Jersey. Four years allows adequate time for the marketplace to avoid any supply and availability issues, as was suggested by the comments submitted by representatives of the NYMEX marketplace.

Recent experience with implementation of Federal rules requiring 15 ppm diesel fuel in all on-road and off-road vehicles has not presented significant issues of fuel supply or availability within New Jersey or elsewhere. Actual experience with production, availability and distribution of the ultra-low sulfur (15 ppm) fuel, therefore, supports the conclusions of the NORA study. The NORA study concluded that the supply of both 500 and 15 ppm sulfur content distillate will be available in the proposed timeframe to cover the remaining 17 percent of the distillate fuel usage. (See 41 N.J.R. at 4162.) The Department knows of no additional studies that have been performed showing that the future supply of ultra-low sulfur diesel will not be adequate. By all accounts, the implementation of the Federal ultra-low sulfur diesel standards has occurred without causing disruption or supply issues. Oral statements and written comments on the rule proposal, and a recently released study by Hart Consulting, Inc., all indicate that disruption of supply and price spikes can be avoided if refiners are afforded a three to four-year lead-time to plan and install the desulfurization equipment needed to remove sulfur from the remaining part of the fuel stream. This rulemaking provides sufficient lead-time for refineries to install additional desulfurization equipment to meet demand.

In addition to the 2008 NORA study, studies by the American Petroleum Institute (API) (discussed at 41 N.J.R. 4162) also concluded that an adequate supply of low sulfur oil would exist if sufficient lead-time were given for the change. While these studies are dated, they are not necessarily outdated. The conclusions of these reports have been borne out by the experience with implementing the Federal on-road and off-road sulfur in fuel requirements. The recently-released Lindemer Study, discussed above, also concluded that adequate supply will be available if refiners are given enough lead-time to implement the ultra-low sulfur fuel requirements. The Department knows of no shortages or price spikes that have resulted in the transportation fuel market or the home heating oil market due to implementation of the Federal ultra-low sulfur fuel requirements, nor have the commenters provided any evidence that shortages or price spikes occurred as a result of implementing the Federal sulfur in fuels rules.

**Ultra-low sulfur fuel supply issues**

**32. COMMENT:** Adoption of the 15 ppm sulfur content standard for distillate fuel oil in 2016 may result in fuel supply and availability concerns, leading to price disruption and price spikes, especially from U.S. and foreign sources. (2-4, 15)

**33. COMMENT:** Adoption of the proposed amendments will likely cause 15 ppm or ultra-low sulfur distillate fuel to be in short supply because a step-change increase in demand for lower sulfur diesel will likely occur in 2015 when ocean-going vessels calling on U.S. ports will be required to use fuel meeting a 1,000 ppm sulfur content standard; and during the peak heating season, a percentage of heating oil supply is reliant on imports from areas that do not have the diesel desulfurization requirements of the U.S. and Canada. (2, 15)

**34. COMMENT:** The Department should not adopt the 15 ppm sulfur content standard based on an assumption that the availability of fuel in the Gulf or Midwest will mean low sulfur fuel will also be available in New Jersey. Pipeline constraints and the

requirements of Jones Act shipping laws (that only U.S. vessels can be used in shipments between United States ports) can affect availability in New Jersey. (7)

**35. COMMENT:** The Department should not adopt the proposed amendments because it did not take into account all factors concerning New Jersey's refineries and supply. These factors include lack of refinery capacity in the northeast and an inability of existing refineries to be readily converted to make ultra-low sulfur diesel. Distillate fuel used for on-road transportation accounts for nearly all of the demand for number 2 fuel in some states, so that those refiners make a higher proportion of ultra-low sulfur diesel for sale in those states. At one New Jersey refinery, Hess's Port Reading Refinery, 100 percent of all distillate output is used as heating oil, and at the parent company's offshore refinery distillate output is about 50 percent heating oil. (7)

**36. COMMENT:** The Department should adopt the sulfur content standard of 15 ppm in 2016, based on the positive experience of the Federal government in setting the 2006 on-road diesel fuel standards. Ultra-low sulfur diesel was introduced in all states for on-road use with little or no supply or price disruption, because all parties worked together to identify and fix problems early in the process. (2, 15)

**37. COMMENT:** The amendments and repeal should be adopted because they will affect the remaining component of the distillate fuel market, which is a 59 billion gallon market, excluding jet fuel. Of this total, 76 percent must have a sulfur content of 15 ppm or less by later this year as a result of the Federal fuel requirements. In 2012, this will increase to 83 percent of total distillate use being covered by Federal regulation requiring a 15 ppm sulfur in fuel standard. The USEPA reports significant compliance with the 15 ppm Federal sulfur in fuels standard with 99 percent of all diesel pumps distributing ultra-low sulfur on-road diesel fuel through the third quarter of 2009. This provides a large source of supply of 15 ppm sulfur content distillate fuel, which is available to the home heating oil market. (8, 22)

**RESPONSE TO COMMENTS 32 THROUGH 37:** As the Department has provided nearly six years for the regulated community to implement the 15 ppm sulfur in fuel standards, an adequate supply of ultra-low sulfur fuel should be available to meet demand. As part of its comments, the New Jersey Fuel Merchants Association provided data on the currently available supplies and usage of ultra-low sulfur oil used as on-road diesel fuel and home heating oil in the New York harbor area. The Lindemer Study included data of the current exports of ultra-low sulfur heating oil showing that adequate supplies of ultra-low sulfur diesel fuel currently exist to cover New Jersey's annual use of heating oil. Both sources of data show that current supplies of ultra-low sulfur fuel oil would be adequate to meet New Jersey's demand if New Jersey alone had a current standard for distillate oil of 15 ppm. Additional ultra-low sulfur fuel capacity will be needed to meet the MANE-VU regional need.

The Department also verified the data of the New Jersey Fuel Merchant Association and the data included in the Lindemer Study by reviewing the data currently available on the website of the United States Department of Energy. This review indicates that current stocks of ultra-low sulfur diesel oil are shown to be at their highest levels ever. (See http://tonto.eia.doe.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MD0S3_SNJ_1&f=M.) Stocks of ultra-low sulfur diesel oil in New Jersey for January 2010 were reported at 3,903,000 barrels or 163,926,000 gallons. The same website lists refiner sales of all other petroleum products in New Jersey at 437,000 gallons of distillate fuel oil per day in January 2010 or about 13,547,000 gallons for the month of January 2010 (calculated as 437,000 gallons a day times 31 days equals 13,547,000 gallons for January sales). This supports the Department's conclusion that the current supplies of ultra-low sulfur diesel fuel exceed the current demand in New Jersey for all distillate fuel, including home heating oil. This excess capacity would cover New Jersey's future demands for distillate fuel if no other state or Federal requirements for ultra-low sulfur distillate fuel were present.

New Jersey needs to implement this type of regulation in concert with neighboring states, as evidenced by the results of the Lindemer Study. To ensure that adequate supplies exist in the future to meet the demand of all northeastern states, the

Department is affording adequate lead-times to ensure that sufficient capacity can be installed to remove sulfur from the entire distillate and residual fuel stream to cover the northeastern United States market.

The Department was provided no data during the comment period to suggest that the future demand for distillate fuel oil, used as home heating oil, in New Jersey will increase, or that the ability of the refiners to produce 15 ppm sulfur-content fuel oil will decrease from current levels. In fact, it was suggested by the Lindemer Study that demand for home heating oil may decrease in the future due to new and more demanding energy efficiency standards and a shift of homeowners to natural gas. It was suggested by this study that if the standards for an ultra-low sulfur fuel were not applied to the sector of distillate fuel used as home heating oil, the decline in the use of distillate fuel oil as home heating fuel would be greater in future years. The adopted amendments also provide for sufficiently long lead-time for implementation, providing approximately six years from publication of the adoption until July 1, 2016, when the 15 ppm standard will be operative. This provides sufficient time for refineries to plan for the capacity and infrastructure changes needed to desulfurize the remaining distillate component of the fuel stream, after removing sulfur from the fuels used in mobile sources, to adequately meet future demand.

In the proposal, the Department addressed the issue of whether supply and availability may be issues in the future. (See 41 N.J.R. at 4162.) The successful implementation of the low sulfur fuel standard without supply disruption is dependent upon the refiners adding desulfurization capacity to their facilities. The adopted amendments and repeal provide the lead-time that most refiners indicated to the Department in their comments to this rule proposal would be necessary to avoid disruption, issues with supply or to complete capital projects.

**Global supply issues**

**38. COMMENT:** The Department should not lower the distillate fuel oil standard to 15 ppm as that will create global supply issues. In contrast, maintaining a sulfur content standard of 500 ppm for heating oil, or adopting a sulfur content standard of 50 ppm, as

some countries have done for highway fuel, will increase sources of supply. Worldwide demand for distillate continues to grow, especially for ultra-low sulfur distillates used as transportation motor fuels. (2, 7, 15, 27)

**39. COMMENT:** The Department should not lower the sulfur content standard of distillate fuel oil to 15 ppm as that would create global supply issues. At even a 500 ppm standard, New Jersey's sulfur standard would be the lowest mandatory standard in the world. At 15 ppm, New Jersey would be out of step with the rest of the globe. The proposed reduction of sulfur content in heating oil to 15 ppm is by far the most restrictive standard for heating oil in the entire world and is thus needlessly burdensome. (The commenter provided a table showing sulfur content requirements in different fuel types in several countries. In this table, the regulatory sulfur content limits range from 50 to 20,000 ppm, depending on the country.) A 15 ppm sulfur content standard for heating oil drastically limits worldwide supply sources, with two predictable effects: higher long-term prices and much more limited ability to obtain supply quickly in case of a cold winter. In the winter of 1999 to 2000, shortages were avoided in the United States by imports of higher sulfur material, mostly from Russia and Eastern Europe. (7)

**40. COMMENT:** The Department should not adopt the distillate fuel oil standard of 15 ppm, as it will lessen the ability of New Jersey to import compliant fuel in periods of distress. A 2000 report by the EIA, "The Northeast Heating Fuel Market: Assessment and Options," highlighted the importance of imports in addressing serious shortages caused by unusual cold periods in the northeast. During recent Gulf Coast hurricanes, the 15 ppm diesel standard caused substantial hardship, including fist fights over supply, because of limited options for supply. (7)

**41. COMMENT:** The Department should adopt the proposed sulfur in fuels standard of 500 ppm (but not the proposed 2016 sulfur in fuels standard of 15 ppm) because approximately 26 additional countries can provide distillate supplies meeting the 500 ppm standard. (7)

**RESPONSE TO COMMENTS 38 THROUGH 41:** The Department recognizes that the adopted sulfur content standards for distillate fuel oil differ somewhat from those in some other countries. Germany, for example, specifies a sulfur in fuel limit for home heating oil at 50 ppm for the purpose of fostering the use of condensing furnaces. The Department's actions are consistent with the sulfur in fuel requirements for on-road transportation fuel in Canada and the U.S. Virgin Islands, which will have a 15 ppm sulfur in fuel requirement for diesel fuel. These two countries are the largest recent suppliers of imports to the ultra-low sulfur diesel market.

The European Union countries and Russia have recently lowered the sulfur content standard of their on-road transportation fuel to 10 ppm (http://www.dieselnet.com/standards/eu/fuel.php), lower than the standard of 15 ppm in the United States. Because of the shift to ultra-low sulfur levels in transportation fuels throughout the world, the ability of the refiners to meet ultra-low sulfur diesel demand throughout the world has shifted the market to those countries that have installed the capacity to provide ultra-low sulfur diesel fuel. Other countries are now importing ultra-low sulfur fuel oil from the United States because of those countries' increased demand for ultra-low sulfur fuel oil and the United States' ability to provide it. (http://oilspot2.dtnenergy.com/e_article001711850.cfm?x=b11,0,w) Imports of distillate fuel to the United States will most likely come from Canada and the U.S. Virgin Islands in the near future, according to EIA data on current importing countries to the United States and the Hart Study. (Hart Study, page 11) (See EIA data at http://tonto.eia.doe.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MD0S3_SNJ_1&f=M.)

The results of the 2000 EIA study on the importance of imports, particularly from Russia and Venezuela, to avoid northeast heating oil disruptions are no longer valid. (See Comment 40.) Specifically, the Hart Study 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

V, 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.)

Refiners have expressed concern that if New Jersey adopts the ultra-low sulfur diesel standard, they will have no market for diesel fuel that is off-specification (or off-spec), or does not meet the 15 ppm standard. Prior to the operative date of the 15 ppm standard, the refineries are able, for example, to market off-spec on-road diesel fuel (which has a USEPA standard of 15 ppm) as Number 2 heating oil. But for the applicable sulfur content standards, the fuels are the same. The refiners can also blend the off-spec oil into other oils subject to a higher sulfur content standard. Once all fuels sold for use in New Jersey must meet the 15 ppm standard, such blending or relabeling for the New Jersey heating oil market will not be possible.

However, not all outlets for the off-spec fuel will be closed. The USEPA, 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 USEPA 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 USEPA standard for ships would provide a place for the refiners to market off-specification fuel after the 15 ppm sulfur content standard is in effect. This would also create new demands on the distillate oil market, and some refineries may choose to supply this market, rather than invest in lower sulfur equipment for the home heating oil market.

**Winter-time sulfate formation**

**42. COMMENT:** The Department does not need to adopt the proposed amendments in order to address ozone levels and regional haze, because heating oil is a winter fuel.

Heating oil emissions do not occur in the summer when there are elevated levels of ozone and haze. (7, 16)

**43. COMMENT:** Visibility impairment should not serve as the basis for the proposed amendments because heating oil is a winter fuel. Information published by NESCAUM and MANE-VU indicates that during the wintertime very local emissions, trapped by inversions, are the main causes of the visibility diminishments in New Jersey's Class I area (a small parcel of land in the area of Atlantic City). The long-term increase in particulate matter in these Class I areas is due to the increased use of coal-fired power generation in regions far from New Jersey, which has caused winter and summer levels of particulate matter to nearly equalize over several decades. Sulfur dioxide emissions in New Jersey play a limited or no role in localized visibility diminishments in the area of concern. (7)

**RESPONSE TO COMMENTS 42 AND 43:** The adopted amendments apply 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 during 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.

It is incorrect to characterize the Brigantine Wilderness Area of the Edwin B. Forsythe National Wildlife Refuge, New Jersey's Federally designated Class I Area, as a "small parcel of land." By definition and listing under the Federal Clean Air Act, a Class I area is a national park or wilderness area greater than 5,500 acres in size. The Brigantine Wilderness Area covers approximately 46,000 acres in three New Jersey counties, including Atlantic, Ocean and Burlington counties (www.fws.gov/refuges/profiles/index.cfm). This is the only Class I area in the mid-Atlantic region of the United States and its borders are completely within the confines of the State of New Jersey. Improving visibility in the Class I area also improves visibility and lowers particulate levels throughout New Jersey because only by improving the air

quality within New Jersey, and within the air being transported through New Jersey, will an improvement result in the air quality within the Class I area itself. The MANE-VU and NESCAUM studies of visibility impairment do not conclude that localized emissions are the only contributor to the visibility levels found in New Jersey's Class I area. In fact, these studies and others conclude that the regional transport of emissions plays a predominant role in the air pollutant levels found at the Class I area. 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." (italics in original)

According to the MANE-VU report, an "effective emissions management approach would rely heavily on broad-based regional $SO_2$ 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 sulfur dioxide control effort.

The MANE-VU studies cited in the proposal at 41 N.J.R. 4159 show that the predominant air contaminant in New Jersey's Class I area, regardless of season, is sulfate. Sulfate forms from the sulfur in fuels combining with oxygen during combustion to form sulfur dioxide 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 sulfur dioxide to sulfate on a typical July day as 0.8 percent per hour. The transformation rate of sulfur dioxide 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 sulfur dioxide released in New Jersey, this transformation could and does have a localized effect upon New Jersey's air quality, even in winter.

Data collected as part of an on-site monitoring program for air pollutants at the Brigantine Wilderness Area, called the IMPROVE monitoring network, show that sulfates are the predominant pollutant comprising particulate matter in both the winter and summer. These data are sorted by days of the best regional haze visibility levels, where a person can more clearly see objects at a distance, to the days of worst regional haze visibility levels, where a person cannot clearly see objects at a distance. A review of the data collected by the IMPROVE monitoring network show that between 34 to 47 percent of the 20 percent worst regional haze visibility days occur during the seven coldest months (October through April) at the MANE-VU Class I areas. (http://vista.cira.colostate.edu/IMPROVE) These are not the five summer months associated with high ozone levels. Fifty-seven to 61 percent of all haze is attributable to sulfates in the winter months at the MANE-VU sites in the northeast, meaning that sulfate is the largest contributor to haze and fine particulate matter during the winter. As stated previously, sulfates are the largest contributor to haze and fine particulate matter in all seasons and adopting these sulfur in fuel standards will result in lower sulfate levels within New Jersey and New Jersey's Class I area. An analysis of MANE-VU data, performed by Tom Downs, Chief Meteorologist for Maine's Department of Environmental Protection using data from 2000 to 2003, shows that the days of worst case visibility impairment occurred on 39 days in the summer, 15 days in the winter, and 36 days in the fall and spring. The pollutant adversely affecting visibility levels the most, and increasing fine particulate levels during these worst days of visibility impairment, was sulfate.

The contribution of emissions from heating oil is much more substantial during winter months than the annual average contribution would suggest. For example, in New Jersey home heating oil contributes seven percent of the sulfur dioxide emissions annually from all sources, but contributes 25 percent of the sulfur dioxide emissions during winter. This is consistent with the contribution of sulfur dioxide emissions in other states with Class I areas that are affected by New Jersey's air pollution, as shown in

Table 1, below. The table shows the emissions from home heating oil in cold months compared to emissions from all sulfur dioxide sources, including emissions from coal-fired power plants.

**Table 1**

**Percent of Seasonal Sulfur Dioxide Emissions from Home Heating Oil (HHO)**

| State Name | Contribution of HHO to all sulfur dioxide emissions on an annual average basis (%) | Contribution of HHO to all sulfur dioxide emissions in winter (%) |
|---|---|---|
| Maine | 15 | 25 |
| Vermont | 19 | 32 |
| New Hampshire | 7 | 12 |
| New Jersey | 7 | 12 |

This percentage of the contribution of sulfur dioxide emissions from home heating oil would increase as power plants install sulfur dioxide controls to meet Federal and State requirements, unless fuel oil sulfur content is also reduced. As sulfur dioxide emissions from other sources, such as coal-fired power plants, decreases, the relative importance of sulfur dioxide emissions from combustion of home heating oil increases.

The adopted amendments will not only improve air quality in New Jersey, but also in the region. New Jersey is setting its standards in cooperation with surrounding states, meeting Federal Clean Air Act requirements to lessen New Jersey's impact on the downwind Class I areas affected by New Jersey's emissions. For further discussion, see the proposal Summary, 41 N.J.R. at 4160.

**44. COMMENT:** The rule proposal misstates the cost-effectiveness of the amendments because cost-effectiveness for sulfur controls is typically expressed in terms of sulfur dioxide, not $PM_{2.5}$. It is not accurate to express cost-effectiveness for sulfur in terms of particulate, particularly for a wintertime fuel in which localized transformation of sulfur to particulate is limited. (7)

**RESPONSE:** Sulfur dioxide gas is converted in the atmosphere to ammonium sulfate, which is a liquid aerosol and a fine particulate. Depending on weather conditions, part of the sulfur dioxide released in the State would be converted into fine particulate matter by the time it reaches New Jersey's borders. Eventually, all of the sulfur dioxide released into the atmosphere as a gas will be converted into fine particulate. This is discussed in the proposal Summary, 41 N.J.R. at 4158, and the Social Impact, 41 N.J.R. at 4161. It is, therefore, appropriate to discuss the cost-effectiveness of controls for sulfur dioxide, not only in terms of sulfur dioxides effect as a gas, but also in terms of sulfur dioxides effect as an intermediate product, including sulfuric acid, and as a fine particulate (for example, ammonium sulfate). Also, sulfur dioxide has synergistic effects on health and welfare, when exposure to humans and plants occur with other pollutants.

The estimated economic benefit of the adopted amendments that will result from avoided adverse health care episodes, as stated in the Economic Impact (41 N.J.R. at 4162) was developed from a NESCAUM study of the projected health benefits in 2018 using the USEPA's BENMAP model. The BENMAP model, in turn, uses the results from a regional atmospheric photochemical dispersion model, called CMAQ, to develop these economic benefits. In other words, to use the BENMAP model one needs to know the modeled air quality benefits of a given air pollution control strategy in terms of its reduction in specific air pollutants for some future year.

The NESCAUM study used a 2018 CMAQ modeling run that assumed the emissions of sulfur dioxide from all liquid fuel burning sources in the eastern United States would be lowered to a level similar to those in New Jersey's adopted rule. This assumption resulted in a lowering of sulfur dioxide emissions in the eastern United States of 180,000 tons. The CMAQ modeling used equations of photochemical reactivity to predict the conversion of sulfur dioxide gas into fine particulate matter, also called $PM_{2.5}$,

at locations downwind of where the sulfur dioxide gas is emitted. The $PM_{2.5}$ predicted 24-hour concentrations for 2018 from the CMAQ model were used in the BENMAP study to predict the economic benefits of the regional ultra-low sulfur fuel strategy. The Department, therefore, relied only upon the economic benefit to health that will result from the adopted amendments' lowering of fine particulate matter because of the reduction in sulfur within fuel oil.

The Department is not aware of any additional studies of the economic benefit that the adopted amendments will have from the reduction in ambient air sulfuric acid levels or from the reduction in the synergistic health effects between sulfur dioxide gas and particulates. The inclusion of these benefits would add to the already positive economic benefits of the amendments.

See response to Comment 43 for a discussion of seasonal effects of emissions from burning of fuel oil.

**Technical difficulty of the adopted sulfur content standards**

**45. COMMENT:** The Department should not adopt the proposed 2016 sulfur in fuels standard of 15 ppm because it did not consider the costs relating to the technical difficulty of removing sulfur from different crude oils, as unequivocally documented in the USEPA's Regulatory Impact Analysis for the off-road sulfur in fuels rule (40 CFR 80.510(b) and (c)). (7)

**RESPONSE:** The technical difficulty of removing sulfur from different crude oils to meet a sulfur content standard of 15 ppm has been documented in the USEPA's Regulatory Impact Analysis for the off-road sulfur in fuels rule (40 CFR 80.510 (b) and (c)). The USEPA specifically addressed these difficulties when it developed a cost analysis for the Federal off-road fuel rule. Despite the acknowledged difficulties, USEPA adopted the final rule. In response to comments concerning the technical difficulty in removing sulfur from fuel, the USEPA indicated that it had "included the cost of improved distributors, heat exchangers and other ancillary items associated with successful diesel fuel hydrotreating in our cost estimates." The USEPA assumed, as the

Department does, that all fuel produced to meet the within adopted sulfur content standards would be produced using new desulfurization equipment. These new units could be designed with a higher hydrogen pressure and take advantage of more advanced catalysts, according to the USEPA. Refiners then would have the ability to design the new equipment to address the fuel compositions that they anticipate producing from their crude oils. (Summary and Analysis of Comments: Control of Emissions from Nonroad Diesel Engines, EPA420-R-04-008, May 2004, Page 6-13 and 6-14)

Given that both the Department and USEPA analyses of costs assume that new desulfurization equipment will be added to the refineries, the USEPA-projected costs for the removal of sulfur from crude oil are within the Department's estimated range for removal of sulfur, as the Department discussed in the Economic Impact. (41 N.J.R. at 4162 and 4163) In the USEPA analysis (Summary and Analysis of Comments: Control of Emissions from Nonroad Diesel Engines, EPA 420-R-04-008, May 2004), the USEPA estimated that the cost to produce a 15 ppm distillate fuel was seven cents a gallon. The Department estimated that the cost to produce a 15 ppm distillate fuel was 11.4 cents per gallon. The Department's use of 11.4 cents per gallon to remove sulfur from fuel oil also assumed that new equipment would be added to the refinery to desulfurize crude oil and this new equipment would be designed with the ability to remove sulfur from the refiner's feedstock (or crude oil supply). Also, the Hart Study, discussed above, estimated costs at five to nine cents per gallon to produce ultra-low sulfur fuels. This is also lower than the 11.4 cents estimated by the Department.

**An averaging, banking and trading program**

**46. COMMENT:** The Department should have proposed an averaging, banking, and trading program providing refinery flexibility, because there will be no remaining markets for the distillate product that may be slightly above a ultra-low sulfur diesel level. This would have allowed for a more cost-effective implementation of the new standards. (2, 15)

**RESPONSE:** Banking, averaging and trading programs are more difficult to administer than the regulatory approach that the Department has chosen, wherein all refiners must meet a 15 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 rely upon sampling and testing the sulfur content of each shipment or with each use of the regulated fuels to ascertain compliance and the number of "credits" generated. The Department did not propose a banking, averaging, or trading program due to these complexities. The Department anticipates that refiners will invest the financial capital to install the needed desulfurization equipment to meet the lower sulfur standards of the adopted amendments, and will forward this cost to consumers over time. (See Economic Impact, 41 N.J.R. at 4163.)

For a discussion of alternative markets for off-spec fuel oil, see response to Comments 38 to 41

**Costs due to increased competition**

**47. COMMENT:** The Department should not adopt the proposed amendments because lowering the distillate fuel sulfur content standard to 15 ppm by 2016 would place the users of distillate fuel for home heating in direct competition with the highway and off-road diesel fuel users. A separate sulfur in fuel standard for home heating oil, distinct from the transportation diesel fuel standard, is needed to do this. (2, 6, 7, 10, 11, 15, 17, 18, 27)

**48. COMMENT:** The Department should not adopt the proposed amendments because the amendments would drive up prices for the home heating oil users, cause sharp price impacts, cause seasonal price spikes, or create year-round supply problems that would harm both residents of oil-heated homes and the operators of diesel vehicles. (4, 6, 7)

**49. COMMENT:** The Department should not adopt the proposed amendments and repeal until it has calculated the impact upon diesel prices and supply that would result from the elimination of a distinct heating oil market from the on-road ultra-low sulfur diesel market. (2, 11, 17, 18)

**50. COMMENT:** The Department should adopt the proposed amendments. The proposed amendments will not create unfair competition between the home heating oil and transportation diesel fuel sectors as this competition already exists. Prior to 1993, heating oil and diesel fuel competed in the same market and were the same product. Although heating oil and diesel fuel are different in their sulfur content due to Federal regulation, they are traded as the same fuel on the New York Mercantile Exchange (NYMEX). Because they are traded by NYMEX as the same product, in July 2008 prices for retail home heating oil approached $5.00 per gallon, an all-time record, despite it being a summer month when heating oil demand is low. Heating oil consumers already pay the price for competing with on-road diesel fuel; they just do not get the added benefits of the reduced sulfur content fuel. (8, 10)

**51. COMMENT:** The Department should not be dissuaded from adopting the proposed amendments based on the negative comments concerning costs, supply, and marketability. These same negative comments were made in opposition to the USEPA's proposed ultra-low sulfur in fuel standard of 15 ppm for highway diesel use. (8)

**52. COMMENT:** Adoption of the proposed rulemaking could negatively impact New Jersey's share of Federal highway and public transit funds. The Federal distribution for highway and public transit funding is based on total fuel sales in the State which would drop as a result of this rulemaking. Drivers would buy less expensive, higher sulfur content fuel out of State, which could negatively impact New Jersey's businesses and economy. (6)

**53. COMMENT:** The Department should not adopt the proposed amendments until it has done another cost-benefit analysis specifically to assess the effect of this rulemaking will have on the price of on-road diesel fuel. Diesel fuel price increases will affect small business trucking firms, who will have difficulty in passing these costs on to the consumer. (6, 17)

**RESPONSE TO COMMENTS 47 THROUGH 53:** Home heating oil and on and off-road diesel fuel are essentially the same fuel, called distillate fuel. They may have a different sulfur content, and on and off-road diesel fuel are taxed by the Federal government; however, the two fuels are essentially the same. The Department does not expect that future competition in the marketplace between the users of ultra-low sulfur distillate fuel for home heating and the users of ultra-low sulfur distillate fuel as on or off-road diesel fuel will result in higher prices for either consumer. Home heating oil and diesel fuel competed in the same market for many years. All distillate fuel, regardless of its ultimate use, was marketed and traded together. 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. Prior to 1993, distillate fuel could be used interchangeably between markets for its uses as a motor vehicle fuel and as a home heating oil. Making the sulfur content of all distillate fuel consistent again will allow for the interchange of fuel between markets. This interchange can be used to avoid shortages in the marketplace. Distillate fuel of consistent sulfur content, regardless of its final intended use, could be moved between markets or imported from foreign sources to meet spikes in demand or otherwise increase fungibility of the fuel.

Having separate markets, as currently exists for the distillate oil used for home heating and for on and off-road diesel fuel, 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, less costs associated with removing sulfur from home heating oil. A review of EIA data for fuel oil meeting varying sulfur content standards for the past six years shows decreasing price differentials over the last four years when annual average prices are reviewed. The data in the Table 2 below were

obtained from the EIA website. (http://www.eia.doe.gov/oil_gas/petroleum/info_glance/petroleum.html)

**Table 2**

**Average Annual Spot Price of Differing Sulfur Content Distillate Fuel - 2004 to 2009**

New York Harbor Prices in Cents per Gallon (not including taxes)

| Year | No. 2 Heating Oil with High Sulfur Content | Ultra-Low Sulfur No. 2 Diesel Fuel | Average Difference (in cents) |
|---|---|---|---|
| 2004 | 111.7 | 115.2 | 3.5 |
| 2005 | 162.6 | 167.8 | 5.2 |
| 2006 | 180.6 | 194.5 | 13.9 |
| 2007 | 203.2 | 212.4 | 9.2 |
| 2008 | 285.5 | 292.2 | 6.7 |
| 2009 | 164.6 | 166.2 | 1.6 |

This table, using the real price differences in the New York harbor market, shows that the price of ultra-low sulfur diesel was only 1.6 cents more, on average annually, than the price of higher sulfur content Number 2 heating oil in 2009. It can be presumed that, since both fuels are essentially the same except for their sulfur content, the only difference in price should be due to the varying sulfur content. As Table 2 indicates, significant differences in price do not necessarily follow differences in fuel sulfur content. In 2006, when the first Federal sulfur in on-road diesel fuel standards went into effect, the difference in price between high and low sulfur fuels was the greatest with the difference in price dropping steadily each year. The difference in price between ultra-low sulfur and higher sulfur content fuel in 2009 was only 1.6 cents. This steady decline in price can be attributed to the extra capacity of the refiners to remove sulfur from fuel oils such that the U.S. is now producing ultra-low sulfur fuel oils beyond its current

national demand as on and off-road diesel fuel. This excess supply of ultra-low sulfur distillate oil is currently being exported to other countries. The ability of the refiners to produce this extra supply of ultra-low sulfur fuels has been attributed to the long lead-time afforded by the USEPA to implement the Federal on and off-road diesel fuel standards, giving the refiners enough time to add the equipment to remove sulfur from fuel oil. (See response to Comments 38 through 41.) According to the Hart Study, this excess capacity to produce ultra-low sulfur distillate fuel will disappear in 2012, when the first phase of the Federal sulfur in locomotive and marine vessel fuel rules go into effect.

New Jersey is providing close to a four-year lead time to meet the 500 ppm standard and a six-year lead-time to meet the 15 ppm sulfur in distillate fuel standard with this rule adoption. This lead-time is appropriate in order to allow the refiners to add the desulfurization equipment to remove sulfur from the remaining part of the distillate stream not being produced as on or off-road diesel fuel. As New Jersey is providing this sufficient lead-time, similar to the length of lead-time provided by the Federal sulfur to meet the Federal diesel fuel sulfur standards, the Department is confident that sufficient supply of ultra-low sulfur distillate can be available to avoid price spikes or disruptions in the marketplace.

The Department does not agree that New Jersey will lose sales of distillate or residual fuels to other states and, as a result, a commensurate share of Federal highway funding. The Federal highway funding is based on the sales of motor fuel, not sales of all distillate fuel oils. The Federal sulfur in fuel standards for on and off-road vehicle use are consistent across state lines and do not vary between States. (40 CFR 80.50 and 40 CFR 80.510(b) and (c)) Whether New Jersey requires a lower sulfur standard in distillate or residual fuels in accordance with the adopted standards should not have an impact on sales of on and off-road diesel fuel in the State.

New Jersey also will not lose sales to other States because all MANE-VU states are expected to adopt similar sulfur in fuels standards for both distillate and residual fuels. Consequently, there should be no price differential based solely on differences in the sulfur content of fuels and a regional market for higher sulfur content fuels will not exist. If all States surrounding New Jersey implement similar sulfur content standards as New Jersey, consumers will be able to purchase only distillate fuel of 15 ppm sulfur

content and a residual fuel of 5,000 ppm sulfur content or less, regardless of the State of purchase. Fuel purchases in a given State will then be based upon other factors, like final sales price, proximity of the supplier to a consumer's home, or prior business relationships with the seller. Differences in price among states will not be based upon any difference in the sulfur content of the fuel. (See 41 N.J.R. at 4157.)

**Cost of reducing the sulfur in fuels standard from 500 ppm to 15 ppm**

**54. COMMENT:** The Department should not adopt the proposed amendments until it has adequately evaluated the costs of the rule and done another cost-benefit analysis. (2, 7, 17, 18, 27)

**55. COMMENT:** The Department should not adopt the proposed 15 ppm sulfur content standard based on its projection that going from a 500 ppm to the 15 ppm sulfur content standard will save the consumer money. The Brookhaven National Laboratories study (referred to in the proposal as the NYSRDA Report) (41 N.J.R. at 4163) considered and evaluated the benefits of 500 ppm heating oil versus 2,000 ppm heating oil, not the benefits of using 15 ppm heating oil. (13, 19)

**56. COMMENT:** The Department should adopt the proposed amendments and repeal because their adoption is cost-effective and will result in an annual health benefit of $32 million in reduced health costs, which exceeds compliance costs. (13, 19)

**57. COMMENT:** The Department's analysis of costs is flawed. The NYSERDA Report, cited by the Department (41 N.J.R. at 4163), posited that the lower sulfur content level would reduce cleaning intervals from annually to once every five years and to a very limited extent, improve heat-transfer efficiency. It is not plausible, though, to assume that cleaning intervals would rise to 15 or 20 years at the lower 15 ppm sulfur content level. The NYSERDA Report's Figure 6-2a, which shows cost savings by fuel oil sulfur content, bears this out, as the savings curve flattens out at lower sulfur levels. The study also questioned whether the savings would actually materialize, as people may

annually clean their furnaces anyway, a new visual inspection would be needed, and fire codes and manufacturers' warranties may continue to require annual cleanings. (7)

**58. COMMENT:** The Department should not adopt the 15 ppm sulfur content standard because its cost-benefit analysis did not adequately consider the cost difference from reducing the sulfur in fuel standard from 500 ppm to 15 ppm. The USEPA estimated that the cost of going to a sulfur content standard of 500 ppm was about two cents per gallon, but that the cost of the next step to 15 ppm was an additional five cents per gallon. Based on the USEPA's estimate of sales of 332 million gallons of No. 2 oil in New Jersey in 2008, the reduction from 2000 ppm to 500 ppm would annually cost about $6.6 million dollars to achieve a 75 percent reduction in sulfur content. The reduction from 500 ppm to 15 ppm sulfur content standard would cost about $16.6 million dollars per year to achieve an additional 24 percent reduction. The Department did not consider these costs. (7)

**59. COMMENT:** The Department's analysis of costs overestimates the real costs to manufacture ultra-low sulfur fuels. The NORA study referenced in the rule proposal (41 N.J.R. at 4162) stated that it will cost up to 8.9 cents per gallon more to manufacture ultra-low sulfur heating oil than the current high sulfur product. This estimate was made shortly after the implementation of the Federal ultra-low sulfur diesel rules. The study's author is in the process of deciding whether to revisit the study in light of the changed market since the ultra-low sulfur diesel rules went into effect. The real difference in costs associated with the manufacture of ultra-low sulfur fuel has not been as great as the NORA study anticipated. (8)

**60. COMMENT:** The Department should not adopt the proposed amendments because a mandated ultra-low sulfur content standard is costly and not needed. Distillate fuel with ultra-low sulfur content is already available for those that want to use it and pay the additional cost. It is not necessary to mandate that all heating oil be ultra-low sulfur diesel to support such discretionary fuel choices by customers. Labeling requirements could differentiate among the fuels of differing sulfur content levels and the fuel-oil

providers assistance could occur. The NYSERDA Report supported this voluntary-type approach. (2, 7, 9, 15, 25)

**61. COMMENT:** The Department should not adopt the 500 ppm sulfur in fuel standard in 2014 but instead adopt the 15 ppm sulfur in fuel standard as soon as possible. Currently, not many terminals in New Jersey even offer 500 ppm fuel. One of South Jersey's largest heating oil suppliers only supplies a fuel meeting a 15 ppm sulfur content standard and has for the past two years. (8)

**62. COMMENT:** The Department should not adopt the 15 ppm sulfur content standard as it is not needed to allow for the operation of additional air pollution controls. Ultra-low sulfur fuel (15 ppm) is needed to enable the operation of nitrogen oxides ($NO_x$) and particulate controls on highway diesel engines and to avoid "poisoning" the catalyst in the control devices. This is not the case for furnaces and boilers in which heating oil will be used, as there are no required control devices for these units. (2, 6, 7, 9, 15)

**63. COMMENT:** The Department should adopt the proposed 15 ppm sulfur content standard because ultra-low sulfur content fuel will result in increased fuel efficiency and better heating system performance, resulting in increased consumer savings, both on system maintenance and reduced fuel costs. This will increase service intervals and decrease fuel consumption, saving the consumer more than the projected three to five cent average difference between the two fuels. (8, 13, 19, 22)

**64. COMMENT:** The Department should adopt the 15 ppm sulfur content standard because there currently is little difference in price between ultra-low sulfur fuel and higher sulfur fuels, usually only three to five cents. Regardless of the cost to manufacture the fuel, there has been a near parity in the price of fuel oil meeting either the 15 ppm or 2,000 ppm sulfur content standard. However, from the fall of 2009 until January 2010, the difference in price for these two fuels has been almost zero and, at times, it has been more expensive to purchase the higher sulfur, 2,000 ppm sulfur content fuel. (8)

**RESPONSE TO COMMENTS 54 THROUGH 64:** The Department's Economic Impact (41 N.J.R. at 4162-4163) included an analysis of the costs and benefits associated with both the 500 ppm and 15 ppm sulfur content standards. The Department used a cost estimate from NORA of 4.6 cents per gallon to convert 500 ppm sulfur content fuel to a fuel meeting a 15 ppm sulfur content standard. The total cost per gallon to remove sulfur from fuels to meet a sulfur content standard of 15 ppm was 11.4 cents per gallon (6.8 cents plus 4.6 cents equals 11.4 cents per gallon). This maximum cost, discussed in the proposal, is within all of the ranges provided by the commenters, and within the range of all studies done to date on the costs associated with lower sulfur content fuels. Using these figures, the Department concluded that the benefits associated with the amendments and repeal outweigh the costs.

A review of the EIA data indicates that the current cost to remove sulfur from fuel and the current marketplace price are not correlated. Rather, market forces beyond the operational costs of the refineries to remove sulfur from fuel are currently influencing the price of ultra-low sulfur diesel (that is, transportation) fuel. The daily price of ultra-low sulfur diesel transportation fuel was at times in the past several years less expensive than heating oil. Usually, the price of fuels rises and falls with the cost per barrel for crude oil. For several months in early 2010, the relative cost of gasoline and ultra-low sulfur diesel fuel has not risen or fallen with the cost of a barrel of oil, which points to the difficulty in predicting future impacts on consumers.

The NYSERDA Report, on which the Department relied in its Economic Impact, calculated savings to consumers based on consumption of fuel with 500 ppm sulfur compared to 2,500 ppm sulfur. (41 N.J.R. at 4163) The NYSERDA Report assumed that the consumer would save only one percent from an increase in fuel oil efficiency. The savings to a consumer because of increased fuel efficiency, reduced maintenance and less corrosive exhaust gases could be in the three to five cents per gallon range, thereby offsetting the cost of the ultra-low sulfur heating oil. The Department relied on the NYSERDA Report for the estimate of cost savings associated with furnace cleaning at a 58-month (approximately five year) interval. The Department did not base its analysis on a less frequent interval. Because the NYSERDA Report provided figures based on a 500 ppm standard in its cost-benefit analysis, the Department did not rely on savings to home

heating oil consumers that would result from a further reduction to 15 ppm. Consumers could potentially save more on avoided cleanings of boilers and furnaces and increased fuel burning efficiency from using 15 ppm sulfur content fuel; however, there are no data to quantify these savings.

The present cost of high-efficiency condensing furnaces make these furnaces cost prohibitive for some. Because of the high sulfur content in fuel oil, resulting in a highly acidic and corrosive condensate, the furnaces must be constructed of more expensive stainless steel. The wide-spread availability of ultra-low sulfur fuel for home heating oil use will do away with the need for stainless steel construction, making condensing furnaces more economical, and resulting in increased use of such furnaces and significant additional benefit of ultra-low sulfur heating oil over time. The Department is not aware of any available data on the rate of replacement of home furnaces with condensing furnaces or what that rate would be in the future if ultra-low sulfur fuel were mandated for home heating purposes. The benefits to the consumer could be greater than calculated by the Department in the rule proposal. The Department showed the benefits from the amendments outweigh the costs, even in the absence of such data. For further discussion of existing high-efficiency condensing furnaces, see response to Comments 76 to 86 below.

The annual average price difference between ultra-low sulfur on-road diesel fuel and home heating oil was 1.6 cents in 2009. (See Table 2 above.) On-road diesel fuel and home heating oil are functionally interchangeable. (Additional taxes are charged for on-road diesel fuel, precluding the sale of home heating oil as transportation fuel.) This means that it would have cost the homeowner 1.6 cents per gallon more in 2009 on average to buy ultra-low sulfur home heating oil, rather than higher sulfur oil. This is much less than the 11.4 cents difference that the Department relied upon in its cost-benefit analysis. (See 41 N.J.R. at 4163.)

The dollar per ton cost ratio for pollutants removed will be greater during the second phase of reductions to 15 ppm in 2016 than in the first phase of reductions to 500 ppm. Nevertheless, the second phase of reductions is still cost-effective. Using the data provided by the commenter, the cost of reducing the sulfur content in fuel oil from 2,000 ppm to 500 ppm would be $1,866 per ton of reduction ($6.6 million divided by 3,536

tons of sulfur reduced). The cost per ton to reduce the sulfur content of fuel from 500 ppm to 15 ppm would be $14,523 per ton ($16.6 million divided by 1,143 tons of sulfur reduced). The total cost to go from 2,000 ppm to the final level of 15 ppm would be $4,679 per ton ($23.2 million divided by 4,679 tons of sulfur reduced). These costs are less than the calculated benefits to health from the NESCAUM study of $20,000 per ton benefit. (See 41 N.J.R. at 4162). Additional benefit would result from higher efficiency furnaces and reduced cleaning intervals.

The NYSERDA Report suggested a voluntary approach to lowering sulfur content in home heating oil, as Comment 61 recommends. The NYSERDA Report predates the Federal requirement for ultra-low sulfur fuels in on-road and off-road engines. Accordingly, ultra-low sulfur fuels were not in widespread use as they are now. The three-year study was begun in 2001, when on-road diesel fuel had a Federally required sulfur content of 500 ppm, and the results were reported in June 2005. The first Federal milestone year for lowering the sulfur content of on-road diesel fuel was 2006; 15 ppm low sulfur fuel was not available to be evaluated in the study. At the time of the study there were no other requirements in the United States for ultra-low sulfur fuels that would have made low sulfur oil at 15 ppm readily available in sufficient supply for use as home heating fuel by any one northeastern State. Consequently, the authors could not have practically included an evaluation of ultra-low sulfur fuels when the study started, and could not have included any recommendations for ultra-low sulfur fuels in that report as it was beyond the scope of the study. A voluntary approach was, necessarily, the only option.

As to the recommendations for voluntary use of 500 ppm sulfur content fuel, the authors suggested that “state mandates not be enacted until normal market forces expand the use of low sulfur heating oil without mandates that could cause price instability and supply shortages.” In this case, the NYSERDA Report’s authors were referring to low sulfur heating oil as 500 ppm sulfur content fuel, as this was the only fuel available on the market at that time as transportation or diesel fuel. The authors, therefore, were cautioning against individual state action, in light of the fact that the Federal regulation to lower sulfur in on-road and off-road fuel had not yet taken effect and 15 ppm sulfur content fuel was not available in all areas. The study does not address the case in which

many states agree to conduct a simultaneous, mandatory lowering of fuel sulfur content, such as the MANE-VU states have done.

New Jersey and other MANE-VU states knew of these potential negative economic effects of state-by-state mandates when MANE-VU proposed a lead-time for implementation of the regional agreement and for many states to implement a similar rule along the same timeframes. The lead-time ensures that industry will have adequate time to prepare for the adopted standards.

**Impact on the refinery sector**

**65. COMMENT:** The Department should not adopt the proposed amendments. This proposal would have economically devastating consequences for the petroleum refining industry, including potential closures of the refineries. In the case of a relatively small New Jersey refinery that does not process crude oil, its limited processing configuration means it has few, if any, options to produce petroleum products and remain competitive. It is highly unlikely that it could or would make the more than $100 million investment to produce these fuels. Adoption of the proposed 15 ppm sulfur content standard would eliminate highly skilled jobs in New Jersey and would not create any off-setting construction jobs. (7)

**66. COMMENT:** The Department should adopt the proposed amendments. Others have intimated that refineries may close as a result of having to reduce the sulfur content of heating oil. These refineries may well close, but not because of these new sulfur in fuel rules. Heating oil is simply too small a product pool for refiners to make the big decision on whether to keep a refinery running. In the last generation, the number of U.S. refineries has fallen by more than half, from 324 in 1981 to 150 in 2008. Yet the total daily output of United States refining industry has increased from 12.8 million gallons a day in 1981 to 15 million gallons a day today. The decision on whether or not to operate a marginal refinery will not be made based upon the sulfur content of home heating oil. (8)

**RESPONSE TO COMMENTS 65 AND 66**: The Department recognizes that refiners are competing in a very tight marketplace and a few may close due to market forces, including the closing of two area refineries, one in New Jersey and another in Delaware (Valero). It was recently reported that the former Valero refinery in Delaware City, Delaware, will be re-opened and operated by new owners, PBF Energy Partners. According to a Los Angeles Times article, the profitability of all refineries has decreased in recent years due to a variety of factors, including decreasing gasoline use that is a product of the economic downturn and changing consumer habits and preferences. This has led to the closing of the smaller, less profitable refineries. (Ronald D. White, "Oil companies look at permanent refinery cutbacks," Los Angeles Times, March 11, 2010, http://articles.latimes.com/2010/mar/11/business/la-fi-refineries11-2010mar11; Jeff Montgomery, "Bright new start for old refinery in Delaware City," The News Journal, June 2, 2010, http://www.delawareonline.com/article/20100602/BUSINESS/6020358?GID=wU5HLs5ofC477yDWcAEDj9/sCSeIyqYsx2a67oS8ZZk%3D)

Not all refiners are opposed to the ultra-low sulfur fuel standards. The new owner of the Delaware refinery stated, "We're going to come out publicly as the first refining company to support low-sulfur heating oil." The owner expects to spend about $500 million on construction of a new hydrocarbon treatment system that will help the Delaware plant produce low-sulfur home heating oil. (http://www.delawareonline.com/article/20100602/BUSINESS/6020358?GID=wU5HLs5ofC477yDWcAEDj9/sCSeIyqYsx2a67oS8ZZk%3D) Similarly, Sunoco Inc., which has a refinery in Pennsylvania, wrote to the Department in support of the 15 ppm standard.

As stated in the Jobs Impact, the net impact on jobs in this State will be neutral. (See Jobs Impact, 41 N.J.R. at 4165.) The Department expects that New Jersey refineries and other refineries that supply products to the State, such as in the Gulf Coast, will employ new workers to manufacture, install and operate the desulfurization equipment at the refineries. New Jersey is also expected to gain jobs in the manufacture of new, more fuel-efficient oil boilers and furnaces as a result of the adopted amendments.

**Fuel for out-of-State use**

**67. COMMENT:** The Department should clarify the N.J.A.C. 7:27-9.2(a) so that there is no confusion regarding the intended meaning of the regulation as it pertains to fuel oil stored or blended in the State. As proposed, it may appear that the phrase "for use in New Jersey" only applies to the "delivered or exchanged in trade" portion of the sentence, and not to fuel that is "stored, offered for sale, or sold." This would prohibit (albeit unintentionally) the storage, offering for sale, or sale, or blending of fuel with higher sulfur levels for sale to users outside of New Jersey. To clarify any possible misunderstanding of the intent of the regulation, the Department should insert a comma in the first and second sentences of N.J.A.C. 7:27-9.2(a) after the word "trade" and after "Jersey." These suggested modifications would clarify that the rule would not apply to fuel that is stored, offered for sale, sold, delivered or exchanged in trade, and ultimately used outside of New Jersey. (20)

**RESPONSE:** The amended rule applies only to fuel oil used, stored, offered for sale, delivered, exchanged in trade, or sold for ultimate use in the State of New Jersey. The phrase with which the commenter has concerns is in the rule prior to these adopted amendments, and has not been changed. The Department is not aware of the regulated community's having difficulty interpreting the language, and knows of no enforcement action concerning the sulfur content of fuel oil stored in New Jersey but intended for use elsewhere. Nevertheless, the Department is modifying N.J.A.C. 7:27-9.2(a) on adoption to add the commas suggested by the commenter, to ensure that the intended meaning is clear and unambiguous.

**Unintended consequences of the amendments**

**68. COMMENT:** The Department should not adopt the proposed amendments. The amendments will adversely affect climate change because the refining process to achieve 15 ppm is more energy-intensive, releases greenhouse gases and increases the carbon

footprint of the process. It will raise, rather than lower greenhouse gas emissions. (7, 9, 15)

**69. COMMENT:** The Department should not adopt the proposed amendments as they would also increase nitrogen oxide emissions in the ozone season. (7)

**70. COMMENT:** The Department should not adopt the proposed amendments because implementing them is less environmentally friendly than the current sulfur in fuel standards. Extra emissions will result from the construction of equipment and storage facilities, from re-processing off-specification fuel, and from other sources, such as the increased use of fuel. (16)

**71. COMMENT:** The Department should not adopt the proposed amendments because adoption would require the importing of additional quantities of distillate fuel into New York harbor, causing additional emissions and environmental impacts from shipping and distribution, in part because of the closure of regional refineries. (7)

**72. COMMENT:** The Department should not adopt the proposed amendments as the emission increases at refineries and elsewhere will be only partially offset by the use of newer, higher-efficiency fuel oil furnaces. This is because of the slow turn-over rate in space-heating systems, which is usually a 20- to 25-year timeframe. Emissions benefits will not accrue in the short term. (7, 9)

**73. COMMENT:** The Department should not adopt the proposed amendments because they will double the amount of carbon dioxide ($CO_2$) from a highly efficient refinery, raise nitrogen oxide emissions in the summertime by 92 tons, increase carbon monoxide (CO) emissions by 114 tons per year, and increase water use by 75 million gallons a year at the Hess/Hovensa refinery in New Jersey. This would annually increase carbon dioxide emissions at two of Hess's refineries by 1,181,000,000 pounds annually and other refineries would have similar increases in emissions. (7)

**74. COMMENT:** The Department should not adopt the proposed sulfur in fuel standards because these regulations are too stringent and will ultimately be counterproductive to the goals and intent of the sulfur in fuels rules to lower emissions. (7, 16, 25)

**RESPONSE TO COMMENTS 68 THROUGH 74:** Although refining fuels to low sulfur grades requires more energy than refining fuels to a sulfur content of 2,000 ppm, the additional greenhouse gas emissions associated with processing can be offset by reductions that accrue from the introduction of more efficient heating equipment made possible by the availability of low sulfur fuel. The Department calculates that long-term reductions in greenhouse gases and other pollutants will more than offset the increase in emissions at the refinery. The Department calculated that, for the same heat output, a traditional home furnace with 80 percent efficiency and consuming 1,000 gallons of fuel oil annually would generate 2,520 lbs of additional $CO_2$, compared to a condensing furnace with 90 percent efficiency. Existing condensing furnaces achieve an even higher than 90 percent fuel efficiency, so 90 percent is a conservative estimate.

The NYSERDA Report indicated fuel efficiency would increase in existing furnaces by one percent over the heating season if the sulfur content of heating oil were reduced to 500 ppm from current sulfur in fuel levels of 2,500 ppm. (41 N.J.R. at 4163) The NYSERDA Report did not evaluate the fuel efficiency that would result from using a fuel that meets a 15 ppm sulfur content standard, as this fuel was not readily available at the time of the study. The authors did indicate that fuel efficiency should increase further with the use of a fuel that meets a sulfur content standard lower than 500 ppm, but did not quantify what that increase would be. Even conservatively assuming the efficiency of the traditional furnace would increase from 80 to 81 percent by using a 15 ppm sulfur content fuel oil due to less fouling of the heat exchanger and consistent with the increase in efficiency from using a 500 ppm sulfur content fuel, the furnace using 15 ppm sulfur content fuel oil will emit 280 fewer pounds of $CO_2$ than the furnace using 2,500 ppm sulfur content fuel oil.

The Department estimates that the additional $CO_2$ generated at a refinery per 1,000 gallons of low sulfur fuel oil to meet lower sulfur content standards is 39 and 35

pounds for 15 ppm and 50 ppm fuel content standards, respectively. The 280 pounds of $CO_2$ saved by the more efficient fuel burning in existing furnaces will more than offset the increase in $CO_2$ of 39 pounds of $CO_2$ per 1,000 gallons to achieve the 15 ppm standard. Over the long-term, as condensing furnaces are used more the benefits would be substantially higher.

The Department does not anticipate that additional emissions will occur from having to ship additional fuel into New York harbor when the sulfur content of fuel oil changes. Fuel oil is currently being shipped into New York harbor and will still need to be transported from other sources out-of-state or via pipeline, to meet demand. The overall demand for home heating oil is not expected to increase as a result of a change to ultra-low sulfur fuel. Rather, it will decrease because the furnaces will be more efficient. Also, any short-term emission increases due to localized construction activities will be more than offset by long-term regional reductions in sulfur dioxide and particulate.

The Department also does not anticipate that higher emissions of nitrogen oxides in summer or any other season will occur as a result of the adopted amendments. The process to remove sulfur from fuel also removes the fuel-bound nitrogen compounds contained in the fuel. The lower fuel-bound nitrogen results in lower emissions of nitrogen oxide when ultra-low sulfur diesel fuel is burned, compared to higher sulfur fuels. Fuel-bound nitrogen will be reduced five to 10 percent in low sulfur fuels, resulting in proportionately lower nitrogen oxide emissions from combustion of low sulfur fuels ("Low Sulfur Heating Oil: Evaluating the Impact on Consumers," Consumer Energy Council of America, Bookhart and Zien, September, 2003, page 8, available at http://www.dbrothers.com/pdf/CECALowSulfurWhitePaper9-12-03.pdf). This reduction in fuel-bound nitrogen, as well as fuel savings due to increased combustion efficiencies, is expected to result in greater reductions in nitrogen oxides during all seasons of the year, including summer.

**Fuel efficiency and condensing furnaces**

**75. COMMENT:** The Department need not adopt the proposed 15 ppm sulfur content requirement because no study has shown that furnaces require 15 ppm sulfur content fuel

oil to operate efficiently, to work properly, or to enable improved emission control technology. (7, 23, 27)

**76. COMMENT:** The Department need not adopt the proposed 15 ppm sulfur content requirement because condensing furnaces or other, newer high efficiency fuel oil furnaces such as the Monitor FCX, Peerless Pinnacle, or equipment by the one condensing boiler manufacturer (Viessmann) can operate efficiently on 50 ppm sulfur fuel oil, with some existing condensing furnaces and boilers operating on existing levels of 2,000 ppm sulfur in fuel. These furnaces and boilers can be used today without all users incurring the additional cost of lower sulfur fuel. (2, 6, 7, 9, 15, 23, 27)

**77. COMMENT:** The Department need not adopt the proposed 15 ppm sulfur content requirement to improve boiler or furnace efficiency. The reported manufacturer efficiencies of the high-efficiency boilers were typically between 85 and 89 percent, with condensing boilers sometimes reporting operations at 93 percent efficiency. Existing high-efficiency boilers were reported to have serious drawbacks and limitations. Also, replacement of a non-condensing boiler with a condensing boiler may require replacement of the entire heating system and may require side-venting, rather than use of the existing vertical chimney, which may violate building codes. Other problems noted include the emission of a "visible plume," which may cause moisture and nuisance issues, unsuitability of existing stacks, incompatibilities of sharing the stack with any non-condensing appliances, and drainage of liquid condensate. Even with ultra-low sulfur or 50 ppm fuel, condensing furnaces may not work in many applications in New Jersey so that projected efficiency gains will not be realized. The USEPA reports that increasing industrial boiler thermal efficiency from 86 to 92 percent, the typical condensing boiler performance, would only reduce emissions from 85.1 to 79.5 kilograms of $CO_2$ per million BTU output, or about 1,000 pounds per home, annually. (7)

**78. COMMENT:** The Department should not adopt the 15 ppm sulfur content standard in order to get improvements in fuel efficiency in boilers. Ireland and the United

Kingdom currently set a minimum efficiency standard for new boilers at 86 percent without setting a sulfur in fuel standard of 15 or 50 ppm, so no "gain" in fuel efficiency will result from requiring the use of low sulfur fuel. These countries set the fuel efficiency level at 86 percent so as to not compel the use of condensing boilers. (7)

**79. COMMENT:** The Department should not adopt the proposed amendments as their promulgation will lead to less reliable heating systems. Improvements in fuel efficiency will come at a cost of reliability, because more complex combustion systems require additional maintenance. (7)

**80. COMMENT:** The Department should not adopt a lower sulfur content standard for all distillate oil. People can voluntarily purchase and use an ultra-low sulfur fuel now for use in a condensing boiler. Given the long turn-over time of 20 to 25 years for typical boiler replacement, the market would slowly adjust to the increased demand for ultra-low sulfur fuel in condensing boilers if done voluntarily, without requiring all distillate fuel to meet a lower sulfur content standard. (7)

**81. COMMENT:** The Department should adopt the proposed amendments as they are needed to make improvements in fuel efficiency and for oil-fired condensing furnaces. While it is true in a technical sense that ultra-low sulfur fuel is not needed to make an oil-fired condensing furnace work, the newer higher-efficiency equipment is even better served with fuel meeting a 15 ppm sulfur content standard, as the less sulfur in the fuel oil, the better. Less sulfur in fuel will reduce the scaling on the heating system component parts that adversely impacts heating system efficiency and performance. (8, 22)

**82. COMMENT:** The Department should adopt the proposed 15 ppm sulfur content standard to get improvements in fuel efficiency in boilers. The next generation of heating oil equipment will dramatically reduce fuel consumption beyond what industry has already done. This next generation of heating oil equipment will need to run on a fuel with a sulfur content well below 500 ppm. (8, 13, 19)

**83. COMMENT:** The Department should adopt the proposed 15 ppm sulfur content standard for the good of the retail heating oil industry. Since the rest of the distillate pool users will be required to meet the 15 ppm sulfur content standard, there is no reason for heating oil not to be required to meet the 15 ppm standard, too. The retail heating oil industry would become the sulfur sink for the rest of the industry, would be provided no benefit, and would be needlessly harmed in its ability to be competitively positioned against other fossil-fueled heating sources. (8)

**84. COMMENT:** The Department should adopt the proposed 15 ppm sulfur content standard to allow for the use in this country of high-efficiency, foreign-designed boilers, designed for low-sulfur content fuel use. If a 15 ppm sulfur content fuel were used, an increased system efficiency would result from the introduction in the United States of smaller heating systems with lower firing rates. European style wall-hung boilers have not been introduced in the United States, since their manufacturers require the use of fuel with a lower sulfur content than is currently available in the United States. (8, 13, 19)

**85. COMMENT:** The Department should not adopt the proposed 15 ppm sulfur content standard. Consumers who want cleaner fuels or wish to use a high-efficiency condensing furnace can switch to natural gas. New Jersey has been steadily switching to natural gas from fuel oil for the past several decades and an ample supply of natural gas is available in New Jersey. (7)

**RESPONSE TO COMMENTS 75 TO 85:** Some existing condensing furnaces can operate efficiently on fuel oil with sulfur at levels higher than the adopted standards. High efficiency, oil-fired condensing furnaces and boilers, however, are not commonly purchased today by the average consumer due to their relatively high cost. The cost of oil-fired condensing furnaces remains prohibitively expensive due to the need for stainless steel or other corrosion resistent metal parts to accommodate the sulfuric acid effects of the existing high sulfur content in fuel oil. Also, the heat exchanger needs to be larger because of the fouling caused by high sulfur oil. The sulfur in fuel oil, when

burned, converts into sulfur oxides. Sulfur oxides readily combine with liquid water in condensing furnaces to form sulfuric acid. A low sulfur fuel will eliminate the creation of sulfuric acid in the flue gas and eliminate approximately half of all particulate matter created in the heat exchanger. One source has estimated that the need for stainless steel components in oil-fired condensing furnaces using existing high sulfur oil adds more than $800.00 to the average price of a new condensing furnace. Using ultra-low sulfur fuel oil will enable manufacturers to use less expensive steel to design less costly, more efficient and smaller appliances. If the costs to purchase condensing furnaces were lower, more would be purchased and more fuel savings and emission reductions would occur.

European manufacturers have developed several models of condensing furnaces and boilers using ultra-low sulfur oil. Germany passed a resolution calling for a maximum sulfur content in home heating oil of 50 ppm specifically to foster the use of oil-fired condensing furnaces. It would follow that 15 ppm sulfur fuel will increase the life of the materials within the furnace, as even lower amounts of sulfuric acid would be formed. Although the Department is not aware of studies evaluating the durability of materials using 50 ppm versus 15 ppm sulfur content fuel, it would make sense that the lower sulfur content fuel would result in the lower formation of sulfuric acid and result in lower deterioration within the furnace. It would also follow that 15 ppm sulfur fuel oil will allow for less costly materials to be used in the design of oil-fired condensing furnaces. The Department anticipates that as more ultra-low sulfur oil is available in the State, more models of condensing furnaces and boilers will become available. Increased availability and lower prices will encourage consumers to replace inefficient, older units with efficient ones that use ultra-low sulfur oil.

Not all areas of the State have access to natural gas pipelines or supply, so consumers in these areas cannot readily switch from fuel oil to natural gas. These consumers are left with the option of spending a large sum on a (stainless steel) high efficiency furnace, or purchasing a low efficiency and higher emitting furnace. Some consumers who have access to both oil and natural gas are switching from home heating oil to natural gas because there are higher-efficiency condensing furnaces available for gas in an accessible price range. The adopted amendments will result in home heating oil having the same sulfur content and sulfur dioxide emissions as natural gas for home

heating. Consumers who desire an "environmentally friendly" fuel will have the choice of using distillate oil or natural gas.

**The proposed 500 ppm sulfur standard in 2014**

**86. COMMENT:** The Department should adopt the proposed 500 ppm sulfur in fuel standard effective July 1, 2014. (2-4, 7, 9, 10, 15, 16, 23, 25, 27)

**87. COMMENT:** The Department should not at this time adopt a sulfur in fuel standard that is lower than 500 ppm, because staying at the proposed 500 ppm sulfur content standard would reduce the capital investment necessary to meet the standard and would make it more likely that refiners would make the investments to assure a stable and competitively priced supply of heating oil. (7)

**88. COMMENT:** The Department should expedite the adoption of the 500 ppm sulfur in fuel standard. The Department can do this quickly, as the Department has already met the Administrative Procedure Act notice requirements with this rule proposal. Hastening the adoption of this standard meets the test of commonsense administrative rulemaking, serves to meet the goal of stimulating New Jersey's economy, improves the quality of life, and creates new investment and jobs. (2)

**89. COMMENT:** The Department should delay the implementation of the 15 ppm sulfur in fuel standard in 2016 (that is, adopt, but not go more stringent than the 500 ppm sulfur content standard) and seek broad consensus on the appropriate level of the second-phase standard that would offer significant environmental benefit while providing necessary flexibility to the transportation and refining sector. (4, 23)

**90. COMMENT:** The Department should not adopt a more stringent sulfur content standard for heating oil effective 2016, but rather continue the sulfur content standard of 500 ppm. This would provide increased flexibility for the supply and distribution system by allowing efficient disposition of pipeline interface from jet to diesel fuel, a longer life

of the catalysts used in the refining process, and reduced competition with transportation for supplies of home heating fuel. (27)

**91. COMMENT:** The Department should adopt the proposed ultimate sulfur content standard of 15 ppm and not stop at the proposed 500 ppm sulfur content standard, because refiners will be responding to the greater demand for lower sulfur content fuel, anyway. In 2008, residential and commercial heating oil accounted for only about 12 percent of the total U.S. distillate use, excluding jet fuel (http://tonto.eia.doe.gov/dnav/pet/pet_cons_821dst_dcu_nus_a.htm). Since there will be no other use for Number 2 fuel oil meeting the sulfur content standard of 500 ppm, no refiner is going to make the significant capital investment based on the small demand of a largely regional and seasonal fuel to produce 500 ppm fuel. (8)

**92. COMMENT:** The Department should adopt the proposed sulfur content standard of 500 ppm for distillate oil. Kerosene meeting a sulfur content standard of 400 ppm can be used as a blend stock to enhance distillate heating oil supplies if the sulfur content standard were set at 500 ppm. A 500 ppm standard allows for a much greater diversity of supply, which can reduce long-term costs and supply disruption risks. (7)

**RESPONSE TO COMMENTS 86 TO 92:** The Department acknowledges the commenters' support for the first phase of sulfur in fuel reduction to a 500 ppm sulfur content fuel in 2014. Staying at a 500 ppm sulfur in fuel level is not justified because further reduction in the sulfur content of fuel is reasonable, as discussed in the proposal at 41 N.J.R. 4160. The 15 ppm sulfur in fuel limit is appropriate to achieve reasonable reductions in sulfur dioxide, based on the overall costs and benefits. The lower limit of 15 ppm is a proven, cost-effective control strategy that provides the greatest environmental and health benefits. Maine has already enacted legislation to lower the sulfur content of distillate oil to 15 ppm consistent with the MANE-VU agreement. Other states also have pending actions to lower the home heating oil sulfur content to 15 ppm.

The sulfur content of kerosene for other than motor vehicle use is being lowered as a result of the adopted amendments. See the response to Comment 5 above for further discussion of the applicability of the adopted amendments to kerosene. Although kerosene will have a standard of 400 ppm sulfur content pursuant to Federal regulation, the majority of kerosene, which is used for space heating or other non-mobile source uses, would be required to have a sulfur content of 15 ppm. Kerosene with a 400 ppm sulfur content could not be used as a blend stock to meet the need for heating fuel with a 15 ppm sulfur content limit.

**Support for the 500 ppm standard**

**93. COMMENT:** There is general consensus within all stakeholder communities to support the Department's proposed transition rule to a fuel sulfur content standard of 500 ppm effective in 2014, including among those who would like the Department to adopt a more stringent standard in an even shorter timeframe. Adoption of this sulfur content in fuel standard of 500 ppm effective 2014 will establish economic certainties, establish the need for project financing and provide the necessary construction lead-time associated with refining, transportation and storage of products required by these rules. It would also coincide well with the Federal requirements for diesel fuel and marine vessels in 2015. (2)

**94. COMMENT:** If the Department adopted only the 500 ppm sulfur content in fuel standard and did not implement a 15 ppm sulfur content in fuel standard, this refiner would save $100 to $150 million in capital costs or 50 percent less in annual costs, which is a significant savings. (7)

**RESPONSE TO COMMENTS 93 AND 94:** Although stakeholders have agreed that a lower sulfur in fuel standard is needed or acceptable, not all stakeholders have agreed on the level of the standard or the timing of its implementation. Some have commented that earlier implementation of a 15 ppm sulfur content in fuel standard is both practicable and necessary.

The Department's analysis shows that 15 ppm sulfur in fuel standard is cost-effective, as discussed in the Economic Impact, 41 N.J.R. at 4162. The Department has determined that an earlier implementation date is not appropriate, as discussed in response to Comments 108 through 113 below. The Department's analysis further shows that the capital savings from not implementing the second phase of sulfur in fuel oil reductions to 15 ppm are lower than the benefits to society of the 15 ppm standard. For further discussion of the capital costs and societal benefits, see the Economic Impact (41 N.J.R. at 4162).

**The sulfur in fuel levels for residual fuel oil**

**95. COMMENT:** The Department should not adopt the proposed sulfur content standard for residual fuel oil of 0.5 percent (5,000 ppm), because Europe, and maybe Canada, will have standards for these fuels at 1.0 percent (10,000 ppm). Refiners do not make extremely low sulfur residual fuels unless it is economical to use very low sulfur crude oil because they would lose money on the fuel. Thus, refiners will not invest to make a lower residual fuel oil that meets a sulfur specification of 0.5 percent when they cannot export the product to Europe or Canada. They may invest instead to make the lighter distillates out of the distillate fuel. (3)

**96. COMMENT:** The Department should adopt the proposed amendments to lower the sulfur content of residual fuel oil to 5,000 ppm or less. (5, 8, 12, 21, 22, 24)

**RESPONSE TO COMMENT 95 AND 96:** The Department acknowledges the commenter's support for the proposed sulfur content standard of 5,000 ppm for residual fuel oils by 2014, for those counties for which there is not already a lower sulfur content in fuel standard. While a 10,000 ppm residual fuels sulfur content standard may be acceptable for parts of Europe or Canada, New Jersey has had a lower standard in its urban counties for many years. The adopted amendments lowers the sulfur content standard for residual fuel oil to 5,000 ppm in some counties in New Jersey. The residual fuel oil sold in the remaining counties remains unchanged if the county already has a residual fuel sulfur content standard of 3,000 ppm or 5,000 ppm.

Fuels with a sulfur content meeting the adopted standards are currently available in the marketplace. Hence, a sulfur content standard of 3,000 to 5,000 ppm for residual fuel is feasible. The Department's analysis at 41 N.J.R. 4163 shows that the average price difference between 10,000 and 5,000 ppm sulfur content residual fuel oil was 5.05 cents per gallon. A regionally consistent sulfur content standard for residual oils will improve the market for this fuel oil.

Other countries, such as parts of Europe and Canada, with higher residual fuel sulfur content standards than these adopted by New Jersey are considering lowering the sulfur content of these residual fuels, as well. Regardless of whether these countries lower their sulfur content standard for residual fuels, and depending on the economics of the time, because New Jersey's sulfur standards for residual fuel are more stringent than those of these other countries, residual fuels meeting New Jersey's sulfur content standards could be exported to those countries. Lower sulfur content residual fuel meeting New Jersey's standards could also be blended with higher sulfur residual oil to make a fuel for export near the sulfur content standards of the receiving country.

**Options for meeting or not meeting the 5,000 ppm sulfur in residual fuel level**

**97. COMMENT:** The Department should not adopt the proposed sulfur in fuel standard for residual oil (Numbers 5 and 6) of 0.5 percent (5,000 ppm), as it would leave New Jersey refiners with no viable option other than export of higher sulfur residual oil. (3)

**98. COMMENT:** The Department should not adopt the proposed sulfur in fuel standard for residual oil of 0.5 percent (5,000 ppm) because removing sulfur from residual fuels is technologically difficult, very costly, and usually economically prohibitive. As a result, refiners may upgrade heavy fuel oils to lighter distillates, such as highway diesel fuel or home heating oil, instead of investing the capital to desulfurize heavy fuel oil. Dilution through blending is not a viable option as other properties of the fuel oil, like density, flash point and viscosity, may be affected, in which case the fuel would be considered to be off-specification. Also, dilution would swell the volume of residual fuel oil to a level that far exceeds the size of the market, making export the only viable option. (3)

**99. COMMENT:** The Department should not adopt the proposed sulfur in fuel standard for residual oil of 0.5 percent (5,000 ppm). Blending high-valued distillate fuel with low-valued residual fuel to meet the sulfur in fuel specification will result in greater supply-demand tightness in the heating oil and transportation diesel market. (3)

**100. COMMENT:** The Department should not adopt the proposed sulfur in fuel standard for residual oil of 0.5 percent (5,000 ppm). Residual fuel oil use has declined steeply and reducing the sulfur content of this fuel does not appear to be a control measure that would be effective in helping the State attain the national health standard for $PM_{2.5}$, particularly in the long run. (3)

**101. COMMENT:** The Department should not adopt the proposed sulfur in fuel standard for residual oil of 0.5 percent (5,000 ppm) as it did not provide sufficient information to support adopting this standard and additional review is needed for feasibility and cost analysis. (7)

**RESPONSE TO COMMENTS 97 THROUGH 101:** Refiners are currently providing residual fuel oil with a 3,000 ppm and 5,000 ppm sulfur content for sale in several counties in New Jersey, as this has been the sulfur in fuel standard for those counties since 1982. The MANE-VU states chose the 5,000 ppm residual fuel oil standard for a regionally consistent level to reasonably reduce sulfur dioxide emissions from this fuel. The Department's analysis at 41 N.J.R. 4163 shows that the average price difference between 10,000 and 5,000 ppm sulfur content residual fuel oil was 5.05 cents per gallon. Inasmuch as actual figures for the price difference among various residual fuels are currently available, a study to determine future costs is not needed. The actual price difference between the purchase price of 10,000 ppm and 5,000 ppm residual fuel can be used to determine future costs to affected parties.

The adopted amendments allow the use of residual oil with sulfur in excess of 5,000 ppm, provided sulfur dioxide emission rates in Tables 2A and 2B are met. Emission rates will depend on the use of control devices, such as an acid-gas scrubber. In

addition, viable options exist to lower the sulfur content of residual oil and still maintain fuel oil specifications. These include reprocessing the residual oil to remove more sulfur and blending lower sulfur residual oil with higher sulfur residual oil to meet the 5,000 ppm limit.

The use of residual oil use has declined nationally due to a variety of factors, including ease of use and environmental considerations. The Department has adequately evaluated and justified the lowering of the sulfur content of residual oil, as reflected at 41 N.J.R. 4160 and 4163. The reasons for lowering the sulfur content standard for residual fuel to 5,000 ppm include consistency with the MANE-VU agreement and regional haze goals, attainment of the fine particulate NAAQS, attainment of the ozone NAAQS, and maintenance of the existing sulfur dioxide NAAQS.

A market for off-specification residual oil, above a 5,000 ppm sulfur content standard, exists in the marine vessel market. New Jersey, being a coastal state, has a large market for bunker or marine vessel fuel oil that is mainly residual oil. Ocean-going 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.

**102. COMMENT:** The Department should propose more stringent sulfur standards for residual oil in Zones 3, 4 and 6 than it has in this proposed rulemaking. These areas of the State are monitoring exceedances of the Federal particulate standard. Adoption of a more stringent sulfur in fuel standard of 500 ppm would result in the accrual of additional emission reductions, doubling the emissions savings and public health benefits. (13, 19)

**RESPONSE:** New Jersey already has requirements for the lowest levels of sulfur in Number 5 and heavier residual fuel oil at 3,000 ppm in Zones 3, 4 and 6 and has not proposed a change to these sulfur in fuel limits. The Department determined that a 5,000 ppm sulfur in residual fuel level for all other counties not already having a 3,000 ppm sulfur content standard in residual fuel oil is a reasonable regional control measure, as discussed in the proposal at 41 N.J.R. 4160 and 4163. The Department has not evaluated removing sulfur from residual fuel oil to a lower level. The Department will continue to

monitor New Jersey's air quality to determine if further measures are needed to attain the fine particulate and sulfur dioxide health standards in New Jersey.

**103. COMMENT:** The Department should not adopt the proposed sulfur content standard for residual oil of 0.5 percent (5,000 ppm) as adoption of such a stringent standard will leave refineries with no viable options for disposition of these fuels other than for export. The Department should adopt instead a sulfur content standard of 7,000 ppm for residual oil by 2014, as this still represents a significant sulfur in fuel reduction from today's levels. This level would provide flexibility in the Northeastern United States fuel market and would only marginally increase the need to export these fuels. This level should be set by all the MANE-VU states by 2014, unless a sulfur content standard of less than 7,000 ppm has already been established, in which case the lower level should be maintained. (3)

**RESPONSE:** Adoption of a residual fuel oil sulfur content standard of 7,000 ppm sulfur level would be inconsistent with the MANE-VU agreement and the sulfur content standards recently established legislatively by Maine. A market does and will exist for residual fuel meeting a 5,000 ppm sulfur content standard, as discussed in the response to Comments 97 through 101.

**Sell-through**

**104. COMMENT:** The Department should adopt the proposed "sell-through" provisions at N.J.A.C. 7:27-9.2(a) and 9.2(b). This would allow fuel oil that was already sold or stored in the State, and that met the sulfur in fuel standard in effect at the time of sale, to be used-up, rather than made to meet the new lower sulfur content standards. (5, 9)

**105. COMMENT:** The Department should not adopt the proposed "sell-through" provisions at N.J.A.C. 7:27-9.2(a) and 9.2(b). These provisions would allow the compliance deadline to be dragged out and would provide industry an opportunity to

intentionally use non-compliant fuel beyond the six-year lead-time already afforded it by the rules. (13, 19)

**RESPONSE TO COMMENTS 104 AND 105:** These sell-through provisions are needed to avoid potentially severe negative economic consequences to the regulated community, such as the Northeast Heating Oil Reserve run by the U.S. Department of Energy. The Department also wishes to avoid potential enforcement issues with persons, including individual home owners, purchasing compliant fuel prior to the deadlines, as listed in Table 1B, and having that higher sulfur fuel in their possession after the implementation date of the lower sulfur fuel standards.

Fuel oil does not have an infinite storage-life, meaning that fuel oil will degrade and become unusable with time. It must be timely used or become useless to its owner. Therefore, industry would not intentionally purchase higher sulfur content oil prior to implementation of the lower sulfur content standards to have ample supplies of the higher sulfur content oil for long-term use. New fuel oil meeting the lowest sulfur in fuel standards will eventually be purchased to replace the existing stocks and the full benefit to air quality will be seen over time.

**106. COMMENT:** The Department should not adopt the proposed amendments and repeal because it will be extremely costly to the Northeast Heating Oil Reserve, as the fuel in the reserve currently does not meet either the 15 ppm or 500 ppm standard. Without this fuel stored in the reserve, there is an increased threat of price spikes and prolonged heating oil shortages. (7)

**RESPONSE:** The Department recognizes that the new, lower sulfur content standards will apply to fuel in the Northeast Heating Oil Reserve and that the lower sulfur content fuel may cost more. However, the adopted sell-through provisions allow the Northeast Heating Oil Reserve to replace the fuel stored in the reserve as part of the normal replacement schedule. A representative of the United States Department of Energy (DOE), the Federal agency that runs the reserve, indicated to the Department that the DOE sells all of the fuel in the reserve at a set schedule and replaces it with “fresh” fuel.

The sell-through provisions allow the DOE to keep the non-compliant fuel in the reserve until its normal replacement schedule, at which time the non-compliant fuel will be replaced with compliant fuel. The cost for the DOE to purchase replacement fuel was included in the Department's Economic Impact analysis, since certain percent of the reserve is replaced annually to maintain the reserve's readiness. The cost to replace the fuel would be in the total Statewide fuel usage figures in the Economic Impact at 41 N.J.R. 4163. This analysis showed that the adoption of the amendments will have a positive benefit to New Jersey. The Department would characterize the resulting cost increase to the Northeast Heating Oil Reserve to be slight, rather than extremely costly.

**Timing of the implementation of the sulfur content standards**

**A shorter timeframe for implementation is needed**

**107. COMMENT:** The Department should not adopt the proposed 2016 implementation deadline for the 15 ppm sulfur content standard. Instead, the Department should shorten the timeframe to two years or earlier than the proposed 2016 date so that fuel oil would be required to meet the 15 ppm sulfur in fuel standard by 2014, by June 2012, or by 2011, because of the extremely positive benefits that would result. This would result in earlier realization of emission reductions and air quality benefits. (8, 13, 19, 22)

**108. COMMENT:** The Department should amend the rules on adoption to eliminate altogether the step to a sulfur content standard of 500 ppm, as this standard will be rendered moot by market conditions well before 2014. Instead, the Department should implement a 15 ppm sulfur in fuel standard effective 2014 or earlier. (8)

**109. COMMENT:** The Department should not adopt the proposed timing for implementation, because New Jersey's Legislature and the legislatures of some other states, such as New York, are considering legislation that would enact earlier implementation dates for a sulfur content standard of 15 ppm sulfur for fuel oil, such as 2011. These bills also create standards in fuel oil, regulating the amounts of carbon in

fuel and requiring fuels to have a bio-fuels component. New Jersey should follow the lead of these states. (8, 13, 19)

**110. COMMENT:** The Department should adopt the proposed 15 ppm sulfur in fuel standard effective in June 2012, because it would also better coincide with the timing of implementation for the Federal standards for fuel used in marine vessels, locomotives and farm equipment. (13, 19)

**111. COMMENT:** If the Department were to accelerate the implementation of the first phase of the proposed schedule to lower the sulfur in fuels standard, it would produce supply hardships in the marketplace, with the potential for disruptive price spikes in the short term. (4)

**112. COMMENT:** The Department should not provide the lead-time given to the refineries by the proposed phased-in implementation of the new sulfur fuel content standards beginning in 2014. Industry has not made a valid argument for such a long lead-time and is being afforded an eight-year lead-time, far exceeding the average lead-time for industry to comply with new regulatory standards. (13, 19)

**RESPONSE TO COMMENTS 107 THROUGH 112:** An earlier implementation date for the 15 ppm standard is not practicable for the entire region. The Hart Study analyzed the ability of the refiners to almost immediately begin supplying the entire market, including the home heating oil sector, with ultra-low sulfur fuel. The study concluded that the regional demand for ultra-low sulfur fuel could not be met without an increase in the ability of refiners to desulfurize fuel, which would take time to accomplish. The Department is persuaded by this and other earlier studies, as discussed in the proposal at 41 N.J.R. 4160. The Department discussed the possibility of an earlier implementation date of 2012 with the refiners, consistent with the signed MANE-VU agreement, and concluded that successful implementation of the proposed new standards requires a lead-time of four years. The Department is, therefore, providing a four-year lead-time to implement the first phase of sulfur in fuel reductions. Although there could be added

environmental benefit to implementing the lower sulfur content standards sooner, the lead-time is needed to allow for installation of adequate capacity at the refineries to remove sulfur from distillate and residual oils, avoid price spikes, and avoid disruptions to the supply and distribution network. Phasing in the more stringent standards by starting with a reduction of the standard to 500 ppm is reasonable to ease the transition to the 15 ppm standard in 2016, particularly as this lowering of the sulfur content is expected to take place over a large region of the northeastern United States.

As discussed in the response to Comment 23 above, expanding the scope of the sulfur in fuels amendments beyond what was already agreed to by the MANE-VU states to include a bio-fuels component or a carbon content fuel standard would delay implementation of the sulfur in fuel standard in New Jersey and throughout the region. The Department does not wish to delay the sulfur dioxide emissions reduction benefits of the amendments. Further, timely promulgation of these amendments provide the other MANE-VU states the assurance that New Jersey will implement a lower sulfur content standard, and will provide refiners with ample lead-time to comply with the proposed rule amendments. Any delay would shorten the lead-time provided to the refineries and to the marketplace. The Department will not, therefore, withdraw or repropose the amendments, but will consider the issues of carbon content and bio-fuels separately.

**The date for implementation of the amended standards**

**113. COMMENT:** The proposed implementation of the first phase of the sulfur in fuel reductions in 2014 would give refiners of fuel oil the lead-time that they need. The refining industry needs at least a three to four-year lead-time, or until 2014, to implement this rulemaking. This lead-time is needed to be able to complete capital projects and investments necessitated by a new standard and for the marketplace to avoid price spikes and for completion of the project phases, include planning, engineering, permitting, procurement, construction and start-up. The proposed time frames for implementation (that is, 2014 and 2016) provide sufficient lead-time to comply with the new standards. (2, 4, 5, 7, 10, 15, 27)

**114. COMMENT:** The Department should not implement the proposed 15 ppm sulfur content standards until 2018 at the earliest, as it should evaluate the market's response to the first reduction (effective 2014), and ensure more reliable capability across the regional supply chain. (2, 15, 16, 23)

**115. COMMENT:** The Department should adopt the proposed 2014 implementation date as it is adequate to avoid marketplace disruption. The Department should provide this adequate lead-time and certainty to allow the marketplace to adjust to the lower sulfur requirements without disruptive price spikes. (4)

**RESPONSE TO COMMENTS 113 THROUGH 115:** The Department has determined, based on its discussions with the refiners, that a three to four-year lead-time is needed for the regulated community to implement the first phase of the reductions in sulfur content. Current studies, including the February 2010 Hart Study indicate that immediate implementation (by 2011) of an ultra-low sulfur in fuel standard for home heating fuel would lead to price spikes and economic disruption of the marketplace. Specifically the Hart Study states, "Given the tight market outlook, higher market premiums, 20 to 30 cents per gallon, should be expected to prevail, *until additional desulfurization capacity can be brought on line.*" (emphasis added) (Hart Study, page 24) Given the scope of the amendments to remove sulfur from the remaining fuel stream, a four-year lead-time is reasonable to implement the design, engineering, and construction work to add additional desulfurization capacity.

The Department has determined that four years is adequate advance notice for a reduction to 500 ppm fuel. Another four years is not required for refineries to implement the 15 ppm sulfur in fuel standard. The total of six years for the 15 ppm fuel to take effect (an additional two years from 2014) is reasonable for phasing in the 15 ppm fuel standard in the inner zone MANE-VU states.

The Department did not extend the 2016 final deadline to comply with the 15 ppm sulfur in fuel standard and is not changing the level of the final standard of 15 ppm sulfur content distillate oil in 2016. The Department proposed to phase in these new standards by implementing an initial step of a 500 ppm sulfur content standard in 2014 as an

interim measure to achieve the final goal of a 15 ppm standard in 2016. The Department's reasons for a transition step to a 500 ppm sulfur content distillate oil in 2014 were discussed in the proposal Summary. (41 N.J.R. at 4160) As stated at 41 N.J.R. 4160, the Department chose to phase in these requirements in order "to ensure sufficient time for production and distribution of lower sulfur fuel oil." The Department recognizes that refiners needed enough lead-time to install sufficient desulfurization capacity to avoid disruptions in supply, to prevent potential shortages of distillate fuel oil, and commensurate price spikes and cost increases in the home heating oil and distillate market.

**Extensions/variances**

**116. COMMENT:** The Department should amend the rules to allow smaller refineries a one- to two-year extension of the effective date of the proposed 500 ppm sulfur in fuels standard. (7)

**RESPONSE:** The Department did not extend the deadline for small refineries to comply with the 500 ppm sulfur in fuels standard. To do so would place larger refineries at a competitive disadvantage. Smaller refineries whose owners have already made the capital investment to add extra capacity to remove sulfur from fuel would also be placed at a disadvantage. The Department wishes to avoid this situation and did not extend the deadline based on the size of the refinery producing fuel.

**117. COMMENT:** The Department should amend the rules to issue a temporary waiver of the sulfur in fuel standards, allowing the refinery to produce high sulfur Number 2 fuel oil until the next scheduled closing of the facility for maintenance (also known as a "turn-around"). At a minimum, the Department should allow in-State refineries with a turn-around scheduled within one year of July 1, 2014, to comply with the current standard, as opposed to the 500 ppm sulfur content standard, until restart after a turn-around. Currently, one refinery has a planned turn-around in the 2015 time-frame. The timing of the proposed operative date of the new standards will necessitate two facility shut-downs,

which is extremely costly and may result in increased air emissions. An extra shut-down would mean that the entire refinery would be shut-down for one week and cost in the low millions of dollars. Allowing refiners additional time within which to comply with the new standards would require the tracking of high sulfur distillate fuel down-stream to ensure that only those refineries with waivers produce and distribute the otherwise non-compliant fuel. Chain of custody requirements for all downstream users, similar to the requirements of USEPA's Tier II Low Sulfur Gasoline program, could be implemented. (7)

**RESPONSE:** The Department desires to implement the standards with the least disruption to the market as possible, and to avoid refineries' having to undergo two shutdowns within a year. However, the requested modification is too substantial to make on adoption. Therefore, in a separate rulemaking the Department will propose an amendment to the rule to extend the deadline for compliance to meet the interim July 1, 2014 sulfur in fuel standard (500 ppm) for up to one year. The amendment would allow a qualifying refinery to continue to sell fuel oil that does not meet the July 1, 2014 standard, and others to continue to "store, offer for sale, sell, deliver or exchange in trade for use in New Jersey" otherwise non-complying fuel from that refinery. (N.J.A.C. 7:27-9.2(a)) Similarly, persons could use otherwise non-complying fuel from that qualifying refinery. (N.J.A.C. 7:27-9.2(b)) The extension would apply to a qualifying refinery in any state.

**118. COMMENT:** The Department should amend N.J.A.C. 7:27-9 to provide for a variance to meet alternative sulfur content standards on a case-by-case basis, if fuel that meets the more stringent sulfur content standards becomes unavailable. This would provide an appropriate compliance mechanism in the event of supply disruptions, or if supplies fall short of forecasts in terms of quantities, timing, geographic location, or other factors. (12)

**RESPONSE:** There is no need to amend the sulfur in fuels rules at this time to handle transient or emergency situations that result in the unavailability of fuel oil. The

Department does not envision future shortages of fuel, since sufficient time is provided for adequate supplies and refining capacity to provide ultra-low sulfur fuel to the marketplace. This is evidenced by the currently available supplies of ultra-low sulfur fuel (www.eia.gov), studies of the future supplies of ultra-low sulfur fuel at 41 N.J.R. 4162, and the comments offered in response to this rule proposal that adequate lead-time will ensure timely compliance.

**119. COMMENT:** The Department should amend N.J.A.C. 7:27-9 to allow for other averaging times for the proposed sulfur dioxide emission standards. In the proposed Tables 2A and 2B, the emission limits are expressed in pounds per million British Thermal Units (lbs/mmBTU). However, no averaging period is specified for the lb/mmBTU sulfur dioxide emission standard. The rules should be amended to specify an averaging period that is no shorter than one calendar day. (12)

**RESPONSE:** Specific averaging time periods are not specified in the previous, or adopted revisions to, N.J.A.C. 7:27-9. Where a rule does not specify an averaging time, a maximum 1-hour emission rate is typically used, along with a corresponding stack testing method and requirement. The appropriate averaging time is specified during the permitting process based on a case-by-case review for any control device proposed to comply with these alternate provisions. The USEPA's new 1-hour sulfur dioxide NAAQS reinforces the use of a 1-hour averaging time for SO2 emission limits.

**120. COMMENT:** The Department should amend N.J.A.C. 7:27-9 to allow for other sulfur dioxide emission limits during transient periods of operation, such as start-up and shutdown periods. For sources that choose to use sulfur dioxide emission controls to meet the requirements of N.J.A.C. 7:27-9 instead of the sulfur in fuel content standards, the Department should provide reasonable exemptions from the sulfur dioxide emission limits during unit start-up, shutdown or other transient periods. (12)

**RESPONSE:** The Department provides provisions for start-up, shutdown, or other transient periods under the Title V permitting provisions at N.J.A.C. 7:27-22.6(i). The

Department will consider provisions for these transient periods during the permitting process for any proposed control device.

**The 15 ppm sulfur in distillate fuel standard**

**121. COMMENT:** The Department should adopt the proposed 2016 sulfur content standard of 15 ppm. Refiners currently consistently produce ultra-low sulfur diesel fuel at 7 ppm with few, if any, mistakes that would cause there to be a large amount of off-spec fuel. Refiners can consistently make heating oil to the ultra-low or 15 ppm standard. (8)

**122. COMMENT:** The Department should not adopt the proposed step from a sulfur content standard for distillate fuel of 500 ppm to a sulfur content standard of 15 ppm because, in the case of unexpected operating problems, a refinery's only alternative may be to reduce throughput or shutdown some portion of the refinery operations. (2, 15, 27)

**123. COMMENT:** The Department should not adopt the proposed step from a sulfur content standard for distillate fuel of 500 ppm to a sulfur content standard of 15 ppm because having an outlet for fuels meeting a 500 ppm sulfur content standard can prevent even larger impacts on other products, including loss of gasoline, jet fuel and transportation diesel production. (27)

**124. COMMENT:** The Department should not adopt the 15 ppm sulfur in distillate fuel standard because the existence of multiple sources of distillate in the region is likely to cause exceedances of the sulfur in fuel standards. A sudden catalyst breakthrough in manufacturing will result in small sulfur spikes. Any of several complications would require ongoing reprocessing, resulting in several inefficiencies, increased costs, and limited supply across an already constrained manufacturing and logistics channels. (23)

**125. COMMENT:** The Department should adopt the proposed amendments to lower the sulfur content of distillate fuel oil to 15 ppm by 2016 or earlier. (5, 8, 12, 21, 22, 24)

**RESPONSE TO COMMENTS 121 THROUGH 125:** The Department acknowledges the support for the sulfur content standard of 15 ppm for distillate fuel by 2016. Ultra-low sulfur fuel can be made consistently with small amounts of off-spec fuel that would need to be re-refined. The refiners' experience of operating their refineries with minimal operating issues after implementation of the Federal rules to lower on-road and off-road diesel fuel proves that the 15 ppm sulfur content in fuel standard can be successfully met with little disruption to refinery operations. If an operational issue does arise, the refiners have the option to blend the off-spec fuel into fuel used in the marine vessel market, or reprocessing the fuel to meet the more stringent standards. Also, until all outer zone, MANE-VU states lower the sulfur content of distillate fuel to 15 ppm in 2018, off-spec 15 ppm distillate oil could be sold in those states, or blended with higher sulfur fuel to meet a 500 ppm sulfur in fuel standard, as these states may still be allowing a 500 ppm distillate fuel sulfur level until 2018.

**A 50 ppm sulfur content in distillate fuel standard is needed**

**126. COMMENT:** The Department should not adopt the 15 ppm sulfur in distillate fuel standard, but should set the second phase of the reduction of sulfur in fuel to 50 ppm or a more reasonable standard, if the State does move to a sulfur content standard more stringent than 500 ppm. This will ensure that fuel that does not meet the Federal ultra-low sulfur requirements for diesel fuel can be placed into an allowable, though limited, cost-effective market. (2, 6, 7, 15, 16, 23, 25)

**127. COMMENT:** The Department should not adopt the proposed 15 ppm sulfur content standard, but should instead repropose a 50 ppm standard for distillate oil. Even a 50 ppm standard would impose a lesser burden than a 15 ppm standard. While it would not reduce the capital expenditure needed to produce the fuel, it would significantly reduce refinery operating costs and waste generation as the catalyst would need to be changed less frequently. The catalyst would only need to be changed every two or three

years, rather than annually, saving one refiner $2 million per year and another between $0.6 and $1 million. (7)

**128. COMMENT:** Instead of adopting the proposed sulfur content standard of 15 ppm for the second phase of sulfur in fuel reductions, the Department should stay at 500 ppm and propose a different, less stringent level, such as 50 ppm. This could save the refining industry a lot of money compared to adoption of a sulfur content standard of 15 ppm. The refinery operating costs are significantly lower with a 500 ppm sulfur content standard than a 15 ppm sulfur content standard for three primary reasons: longer catalyst life, lower hydrogen consumption, and product downgrade capability. Shutdowns for catalyst change-out results in lost economic opportunity. (2, 7, 23, 27)

**129. COMMENT:** The Department should not adopt the proposed amendments and repeal but should instead adopt a 50 ppm sulfur in fuel level. If the Department did adopt the rule with a 50 ppm sulfur in fuel standard, the same reasons that support maintaining a 500 ppm standard would still be applicable to this standard, but to some lesser degree. These reasons include having more markets to sell the fuel and greater ability to place off-specification fuel. (27)

**RESPONSE TO COMMENTS 126 THROUGH 129:** The Department evaluated the 50 ppm sulfur content standard versus the 15 ppm sulfur content standard and determined that the 15 ppm sulfur content standard is more appropriate for the following reasons.

The 15 ppm sulfur content standard is consistent with the MANE-VU agreement, with the recently passed legislation in Maine, New York and Connecticut, and with the Federal regulations for sulfur content in on and off-road diesel fuel. The Department will gain additional Statewide reductions in sulfur dioxide from adopting a 15 ppm sulfur content in fuel standard, rather than a 50 ppm sulfur in fuel standard. The Department estimates that a 96 ton per year reduction in sulfur dioxide will occur annually from using a 15 ppm sulfur content fuel, rather than a 50 ppm fuel. More reductions in the ambient air levels of sulfur dioxide and particulate will occur if surrounding MANE-VU States also adopt the 15 ppm sulfur in distillate fuel standard.

The 15 ppm sulfur content standard is consistent with the Federal Clean Air Act requirement to adopt reasonable measures for regional haze and fine particulate, as discussed in the proposal Summary. (41 N.J.R. at 4159) New Jersey, by adopting the standard at 15 ppm, is carrying out the Federal requirement to adopt all air pollution control measures determined to be reasonable.

A 15 ppm sulfur content fuel may lead to new, more cost-effective designs 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." An ultra-low sulfur content standard is expected to lead to the design in the United States of high-efficiency boilers and furnaces using less costly materials than needed with higher sulfur content fuels. (http://www.biodieselmagazine.com/article.jsp?article_id=3937&q=&page=2) This would lead to a more widespread use of high efficiency or condensing oil-fired furnaces.

Lowering the sulfur content of fuel oil to 15 ppm sulfur content will also be advantageous to the fuel oil distribution industry and the furnace manufacturing industry. They would be able to market fuel oil as clean burning as natural gas. The fuel oil distribution industry will benefit from having identical standards for sulfur in distillate fuels regardless of use, from a storage and transportation perspective. A standard other than 15 ppm is inconsistent with the existing Federal standards for on and off-highway vehicles and would be more costly to store and distribute, as two different sulfur content fuels would need to be handled and stored separately. If the transportation diesel fuel and Number 2 fuel oil have the same sulfur standards, they can be stored in the same tank, with the required dye added to the transportation diesel fuel only when the fuel is distributed. The issues with handling off-specification product are addressed in response to Comments 131 through 134.

The Department's cost-benefit analysis in the proposal's Economic Impact (41 N.J.R. at 4163) was based on the 2016 sulfur content in fuel at 15 ppm. This cost-benefit analysis showed that the amendments would be more beneficial to the health of New Jersey's population and the environment than it would cost industry to implement. Although a less stringent sulfur content standard of 50 ppm would save the refining industry money on purchasing and disposing catalyst and on otherwise producing a 15

ppm sulfur content compliant fuel, the analysis showed that a 15 ppm sulfur content standard is cost effective.

**130. COMMENT:** The Department should not adopt the proposed sulfur content standard for distillate fuel oil of 15 ppm because implementation of this more stringent standard will create less-expensive, off-specification fuel oil. Implementation of the 15 ppm sulfur content standard will cause the downgrading of high quality distillate to less valuable product by stranding slightly off-spec material. (7)

**RESPONSE:** There will be sufficient alternatives for the placement of off-specification fuel oil. These alternatives include blending or selling fuel for ocean-going vessels to the large marine fuel market in New Jersey or sending the off-specification fuel for reprocessing. The marine fuel market comprised two to five percent of the distillate fuel and 87 to 94 percent of the bunker or residual fuel sold in New Jersey in 2007 to 2008. This market will continue to provide a repository for the disposition of off-specification distillate and residual fuel oil. The lowering of the sulfur content of marine fuel, used within 200 nautical miles of the United States coastline, by 2015 will also be a new outlet for the off-specification 15 ppm fuel.

**Pipeline interface issues with 15 ppm fuel**

**131. COMMENT:** The Department should adopt a 50 ppm sulfur in distillate fuel standard instead of the proposed 15 ppm sulfur in distillate fuel standard. The pipeline interface that creates the transition material between ultra-low sulfur diesel and higher sulfur jet fuel will result in off-specification fuel, unless the Department adopts a less stringent sulfur content standard, such as 50 ppm. (2, 7, 15, 16, 25)

**132. COMMENT:** The Department should not adopt the proposed 15 ppm sulfur in distillate fuel standard, but should keep the sulfur in distillate fuel standard at 500 ppm instead. Fuel coming from the interface of high sulfur jet fuel and ultra-low sulfur distillate after pipeline transfers could be used as home heating fuel if the standard for

sulfur in fuel were set at 500 ppm. This fuel could not be used as a lower sulfur content jet fuel because of other specifications that the jet fuel must meet. (27)

**133. COMMENT:** The Department should not adopt the proposed 15 ppm sulfur in distillate fuel standard because on just one pipeline system an estimated six million barrels of off-specification jet fuel/ultra-low sulfur diesel interface will be generated per year, adding a significant burden to the distributing and refining industry. Off-specification fuel will be generated with every interstate pipeline receipt and will have no outlet, especially once the USEPA fully implements the ultra-low sulfur diesel program in 2014. This off-specification product is being marketed as 500 ppm diesel or heating oil, with the majority being distributed as heating oil. With the phase-out of fuel meeting the 500 ppm sulfur content standard, a 15 ppm sulfur content standard for heating oil would force the segregation of this interface material in tankage and its transporting back to the refinery, where it would have to be re-refined to a lower sulfur content level. This will result in lost value, unnecessary transportation costs, ineffective pipeline capacity, and redundant refinery utilization. (2, 8, 15, 16, 23, 25)

**134. COMMENT:** The Department should adopt the proposed 15 ppm sulfur in distillate fuel level because off-specification fuels or the pipeline interface materials can be blended into heavier oils or bunker fuel. (8)

**RESPONSE TO COMMENTS 131 THROUGH 134:** The off-specification material can be used in ocean-going vessels as marine fuel and a suitable market for these fuels exists in New Jersey. Off-specification fuels or the pipeline interface materials can be blended into heavier oils or bunker fuel. Given the availability and access to ports in and around New Jersey and the large number of marine vessels in those ports, a ready outlet for off-specification fuel exists. The issue of off-specification pipeline interface material exists in the marketplace, as there are many differing sulfur content fuels currently on the market. The establishment of a sulfur content standard for fuels that is consistent from use to use and from state to state may reduce pipeline interface issues, as a reduction in the number of fuels with differing sulfur content standards will occur.

**Comments on the Governor's Executive Orders**

**135. COMMENT:** The Department should not adopt the proposed rulemaking as it is not consistent with the Governor's Executive Orders of January 15, 2010. Reducing the sulfur content standard to 15 ppm exceeds Federal requirements and the proposal must, therefore, include a cost-benefit analysis. (7)

**136. COMMENT:** The Department should adopt the proposed amendments and repeal because it does not add red tape or additional paperwork requirements to business. (13, 19)

**137. COMMENT:** The proposal provided very little analysis of the cost-benefit of the additional reduction in the sulfur content standard from 500 ppm to 15 ppm and whether this step-down imposes the "least burden and costs to business," in accordance with Governor Chris Christie's Executive Order 2, ¶ 3d. (7)

**RESPONSE TO COMMENTS 136 AND 137:** The Department performed a cost-benefit analysis, which it included in the Economic Impact (41 N.J.R. at 4160). The sulfur content standards for the fuels covered by this rulemaking are not covered by Federal regulation; therefore, the adopted amendments do not exceed a Federal requirement.

The Department is adopting the amendments to meet several Federal requirements, including requirements to attain all health standards for New Jersey's air for all pollutants, as discussed at 41 N.J.R. 4158. New Jersey is required to include rules as part of the State Implementation Plan in order to ensure that Federal requirements for regional haze and fine particulate are met, as discussed in the proposal Summary (41 N.J.R. at 4157, 4159). While Federal law does not specifically require the State to adopt this sulfur in fuels strategy, it does require it to evaluate and adopt reasonable measures to meet progress goals for regional haze and to attain all health and welfare standards. This measure was determined to be a reasonable air pollution control strategy by the

NESCAUM states and the Department as discussed in the proposal Summary. ( 41 N.J.R. at 4160) The Department, therefore, is adopting this as part of its regional haze and fine particulate SIPs.

The Department agrees with the commenters that the adopted rules do not add paperwork requirements upon the users of the oil or add new paperwork requirements upon the refiners.

**138. COMMENT:** The Governor's Red Tape Review executive orders have raised potentially troublesome issues for the Department's rulemaking and enforcement process. Considering the economic impacts of environmental regulation is a fraught process. Even the best economists struggle to quantify environmental benefits in dollar terms; their best efforts, with the benefit of hindsight, tend to underappreciate environmental value at the time of quantification tragically and repeatedly. Economists struggle with correctly finding and valuing the external impacts of economic transactions, discount rates and contingent values for natural resources; most ecosystem services are not captured in market transactions and are thus of indeterminate value. There is simply no economically viable way for the Department to say, for example, that 15 shopping malls are of equal value to New Jersey as a self-sustaining osprey population.

Cost-benefit analyses of environmental regulation, when attempted, are invariably wrong, invariably non-confirmable and invariably minimize the benefit, while maximizing the cost. Including such cost-benefit analyses in the regulatory process is an important decision for any statute, and legislatures are well aware of the importance of deciding on whether particular legislation will impel or forbid such a process.

Inappropriately applying cost-benefit analyses is a common and fatal mistake many levels of government make; one that often puts them on the wrong end of an environmental lawsuit.

While true benefit analysis is probably not possible, only a highly trained economist can be expected to wade through analysis of contingent valuation, externalities and discount rates. Reasonable analysis, let alone accurate analysis, is not possible for a layperson to produce. The commenter's understanding is that the Department has not used any particular economic theory to generate its benefits analysis, has no methodology

to quantify benefits, has not used economists to review the effects of these rules and has only one economist on staff for the entire department. Although it is good that the Department concludes that its rules are justified by their benefits, a qualified economist is likely to find far greater benefit than the Department has. (14)

**RESPONSE**: Governor Christie's Executive Order No. 2 delineates "common sense principles" for rulemaking that are intended to provide the "opportunity to energize and encourage a competitive economy to benefit business and ordinary citizens." At section 1a, the Executive Order directs all State agencies to solicit the advice and views of knowledgeable persons from outside of New Jersey State government, including the private sector and academia, in advance of any rulemaking. At section 1d, the Executive Order directs State agencies to "employ the use of cost/benefit analyses, as well as scientific and economic research from other jurisdictions, including but not limited to the federal government when conducting an economic impact analysis on a proposed rule."

The Administrative Procedure Act (APA) at N.J.S.A. 52:14B-23 and 24 (P.L. 1995, c.65, effective June 5, 1995, which codified the substance of Governor Whitman's Executive Order No. 27(1994) into the APA) requires State agencies that adopt, readopt or amend State regulations that exceed any Federal standards or requirements to include in the rulemaking document a comparison with Federal law. The analysis must include a cost-benefit analysis that "supports the agency's decision to impose the standards or requirements and also supports the fact that the State standard or requirement to be imposed is achievable under current technology, notwithstanding the Federal government's determination that lesser standards or requirements are appropriate." Therefore, since 1994, in accordance with State law, the Department has included a cost-benefit analysis in all of its rulemakings where the rules or standards exceed Federal law.

The APA at N.J.A.C. 7:52-14B-4(a)2 requires State agencies to include in each rulemaking a "description of the expected socio-economic impact of the rule." The Office of Administrative Law's Rules for Agency Rulemaking implement the APA and require at N.J.A.C. 1:30-5.1(c)3 that a notice of proposal include "an economic impact statement which describes the expected costs, revenues, and other economic impact upon

governmental bodies of the State, and particularly any segments of the public proposed to be regulated." Each of the Department's rule proposals contains such a statement.

As required by the APA and the Rules for Agency Rulemaking, the Department's rule proposals also contain statements of social impact, jobs impact, agriculture industry impact, impact on small business (regulatory flexibility analysis); and statements addressing the proposed rules' impact on smart growth and the cost of housing. The Department in addition includes an environmental impact statement, describing the impact that its proposed rules will have on the environment.

The Department acknowledges that it has not historically provided as much detail in its impact analyses as an economist might. The Department endeavors to employ a practical approach to its determination of the costs and benefits of its rulemakings, and necessarily relies to a certain extent on information developed by other sources. For instance, the Department may adapt and tailor to the circumstances in New Jersey the economic analysis for a rule performed by another state or the Federal government. In addition, the Department conducts informal and formal outreach to regulated communities, environmental interest groups, the U.S. Environmental Protection Agency, other Federal and State agencies, agencies of other states, and the general public in the early stages of rulemaking. This is particularly the case for larger, more complex rulemakings. The Department will publish notice on its website or in the New Jersey Register, and/or use mail and electronic mail to known stakeholders, providing a description of the rules anticipated to be changed and the timeframe and means by which input will be gathered, for instance, at informal meetings or by written submissions, or both. Through outreach such as this, the Department obtains information on possible costs and benefits of rules that it is developing, as well as suggestions for the approach the Department should take in pursuing its regulatory goals.

Through the impact statements and Federal standards analyses for its rulemakings, the Department attempts to identify the anticipated costs and benefits that will result from the proposed rules, including reasonably foreseeable indirect or secondary costs and benefits. The Department does attempt to identify and describe, even if it cannot always quantify in dollar terms, the proposed rules' costs and benefits in

order to provide the public with as complete a picture and/or rationale as possible regarding the positive and negative economic impacts of the rulemaking.

Going forward the Department anticipates looking to the scientific and economic research of other jurisdictions and conducting advance outreach for its rulemakings in order to obtain enhanced insight into the costs and benefits that will flow from its rules and help accomplish the regulatory balance contemplated by Governor Christie's Executive Orders.

**139. COMMENT:** The Governor's concern that Department standards may, in some instances, exceed Federal standards is misplaced. The Federal law in most environmental matters acts as a basement, below which states cannot fall, but above which they may build. The Congress and the USEPA are aware that they are setting national minimums, just as they are aware that the states are very different. A minimum that makes sense in a relatively unpopulated state such as Montana, will not necessarily make sense in New Jersey, the most densely populated state in the country. A minimum in a relatively virgin state such as Oregon will not necessarily make sense in New Jersey, a state with legacy of toxic industrial pollution. In this context, it is not only appropriate that New Jersey's regulations would exceed Federal standards in a number of instances, it is essentially mandatory. Any state's environmental protection agency that is doing its job will find instances where the peculiarities of the particular state make Federal regulation inadequate.

New Jersey's regulations, because of the State's population density, industrial legacy and proximity to several huge metropolitan areas, should probably exceed Federal standards in many and diverse ways. The Department is uniquely positioned to use Federal standards as a starting point to create regulations that specifically address the unique problems facing New Jersey and its citizens. The Department, therefore, should not hesitate to exceed Federal standards when the health, safety, and welfare of New Jersey's citizens and its environment require it. (14)

**RESPONSE:** The APA at N.J.S.A. 52:14B-23 and 24 requires State agencies to include in their Federal standards analysis a discussion of the policy reasons that support the

agency's decision to impose a standard that is more stringent than a comparable Federal standard. This is in addition to the cost/benefit analysis that the APA requires, as discussed in the immediately preceding response. The Legislature stated, at N.J.S.A. 52:14B-22, "[i]t is the declared policy of the State to reduce, wherever practicable, confusion and costs involved in complying with State regulations. Confusion and costs are increased when there are multiple regulations of various governmental entities imposing unwarranted differing standards in the same area of regulated activity. It is in the public interest that State agencies consider applicable federal standards when adopting, readopting or amending regulations with analogous federal counterparts and determine whether these federal standards sufficiently protect the health, safety and welfare of New Jersey citizens."

Governor Christie's Executive Order No. 2, section 1e, requires State agencies to "[d]etail and justify every instance where a proposed rule exceeds the requirements of federal law or regulation. State agencies shall, when promulgating proposed rules, not exceed the requirements of federal law except when required by State statute or in such circumstances where exceeding the requirements of federal law or regulation is necessary in order to achieve a New Jersey specific public policy goal." This directive establishes a focus and approach to the comparison with Federal law that the APA requires all State agencies and the Department to conduct for rulemaking.

As the commenter points out, the conditions and circumstances of New Jersey and its citizens can be unique to the State. Consequently, both the APA and Executive Order No. 2 acknowledge that there will be times when it is absolutely appropriate for the Department to promulgate standards that are more stringent than Federal standards, either because New Jersey law so requires or because doing so is necessary in order to achieve important public policy goals for the State.

**140. COMMENT:** There are probably many instances where Department procedures could be more clear. For example, Department forms may have increased in complexity over the years, some information may be requested redundantly and some permits could, perhaps, be merged. The Department, however, should keep in mind that it is not a "Department of Environmental Permitting," and its mission should not be to smooth the

path from developmental permit applications to development. Central to the idea of protection is that one must often say "no." The Department should not look at "process improvement" as making it easier to get to "yes." (14)

**RESPONSE:** The Department undertakes various efforts to assist the regulated community in the permit application and review process. For example, in accordance with N.J.S.A. 13:1D-111, the Department develops and makes available technical manuals relating to its various environmental permits. The Department also provides checklists, identifying the application steps and submissions required under the respective permitting program rules. Checklists and applications are made available through the Department's website. The Department often assigns case managers to assist applicants with the permit process, and to coordinate permitting across various Department programs.

The Department convened the Permit Efficiency Review Task Force in 2008 and, in response to its recommendations (see http://www.state.nj.us/dep/permittf/documents.html), has undertaken various initiatives to improve outreach for rulemaking and to streamline and improve the permit application and review process. The Department is committed to upgrading its information technology infrastructure to support electronic submission and processing of permit applications and associated reports. The Department is in the process of increasing its network capacity, and is accelerating its efforts to design and develop electronic permitting and reporting services. Recent efforts include, for instance, implementation of an electronic water use and transfer reporting program by the water supply program to facilitate data management, eliminate the use of paper forms, reduce data errors, improve tracking and reporting of data, and make data available in a more timely fashion.

Process improvements that facilitate the issuance of permits that are consistent with the applicable standards and that are issued in a coordinated and timely fashion are beneficial to the regulated community, the Department, and the environment. Streamlining permitting will conserve the resources of all involved and maintain proper focus on achieving substantive environmental protections. As the Permit Efficiency Review Task Force's recommendations and Governor Christie's Executive Orders

recognize, the process of obtaining a permit from the Department should not stand in the way of development that is otherwise allowable under applicable environmental protection law and standards.

**141. COMMENT:** Although many of the State's environmental regulations could be improved, the Department ought not curtail any protections or delay any rules based on the Governor's Executive Orders. (14)

**RESPONSE:** The Department, in order to inform the reviews of pending proposed rules being conducted by the Department and the Red Tape Review Group established under Executive Order No. 3 issued by Governor Christie on January 20, 2010, extended or reopened the public comment period for certain pending proposals. (See Notice of extension or reopening of comment periods and informal stakeholder meetings for pending Department of Environmental Protection proposals suspended under Executive Order No. 1 (2010), http://www.nj.gov/dep/rules/notices.html, 42 N.J.R. 642(a).) In accordance with Executive Order Nos. 1 and 3, the Red Tape Review Group's task is, among other things, to examine various proposed administrative rules and regulations by a number of State agencies prior to their adoption and make detailed recommendations to the Governor to rescind, repeal or amend those rules. Based on those recommendations, the Commissioner of the Department will determine whether or not to proceed with adoption or amendment of the Department's affected proposals.

The Executive Orders and the Red Tape Review process expressly recognize that some rules must be adopted in order to prevent an adverse impact to public safety or security or public health; prevent prejudice to the State with regard to receipt of funding or certifications from the Federal government; allow State agencies to exercise their essential powers, duties and functions; and comply with any judicial deadline. Rule proposals that would result in such adverse impacts if adoption were delayed therefore were not suspended. Executive Order No. 2 also directs State agencies to implement the "common sense principles" in all rulemaking while keeping in mind the core missions of the agency; public health, safety, welfare and the environment; and the agency's underlying regulatory objectives. In determining whether to proceed with its rule

proposals and for all future rulemaking, the Department will necessarily take all of these factors into consideration.

**142. COMMENT:** The Department's notice and comment procedure, the informal stakeholder process, and the Red Tape Review Group process created by Governor Christie's Executive Order No. 2 do not comply with the rulemaking requirements of the New Jersey Administrative Procedure Act (APA). Web posting and reliance on the authority of Governor Christie's Executive Order Nos. 1 through 3 cannot supersede or replace APA requirements. All 12 proposals were proposed pursuant to and in accordance with the APA requirements. The Department may not - after the fact - revise these procedures. (26)

**RESPONSE:** As the commenter acknowledges, this rulemaking, as well as the other proposals to which the commenter referred, were proposed in accordance with the Administrative Procedure Act (APA), N.J.S.A. 52:14B-1 et seq. On January 20, 2010, Governor Christie issued a number of executive orders. Executive Order No. 1 (EO1) suspended for 90 days more than 150 then-pending proposals of various New Jersey agencies, including 12 proposals of the Department. EO1 states that one of the Governor's priorities is to establish, under the direction of a Red Tape Review Group, a "commonsense" approach to the promulgation of rules. The commonsense principles are described in Executive Order No. 2 (EO2), and the Red Tape Review Group is established under Executive Order No. 3 (EO3). The purpose of the suspension was to afford the Red Tape Review Group the opportunity to examine the suspended rulemakings and make recommendations as to those proposed rules it determines are "unworkable, overly-proscriptive or ill-advised" (see EO1, 4th whereas clause). EO1 directed that the suspension be undertaken in a manner consistent with APA rulemaking requirements, and specifically exempted from suspension any proposed rulemaking for which the failure to adopt would adversely impact public safety or security; adversely impact public health; prejudice the State with respect to receipt of monies from the Federal government or the ability to obtain any certifications from the Federal government; prevent the application of powers, functions and duties essential to the

operations of the relevant State agency; or adversely impact compliance with any judicial deadline.

Both EO2 and EO3 stress transparency and the involvement of stakeholders and the public in agency rulemaking, which is a fundamental tenet of the APA. Accordingly, the Department determined it was appropriate both to extend the formal comment period on its suspended proposals and to also hold stakeholder meetings to facilitate informal discussions of the rulemakings in consideration of the purposes of the executive orders.

On February 3, 2010, the Department filed for publication in the New Jersey Register a notice of the extension or reopening of the comment period on the 12 suspended rulemakings to March 15, 2010. The notice appeared in the March 1, 2010, New Jersey Register (see 42 N.J.R. 642(a)). The Department posted the notice on its website on February 4, 2010.

The notice provided an additional period for public comment on each of the rulemakings beyond that required by the APA. The notice did not change the content of the original proposals in any way. While not precluding additional comment on any aspect of the pending proposals during the extended/reopened comment period, the Department sought through the notice to focus any additional comments submitted on the purposes of the rules review set forth in the executive orders. The Department also announced in the notice that it would be scheduling stakeholder meetings on the proposals and that the dates for the meetings would be posted on the Department's website. The schedule of the stakeholder meetings was subsequently posted on the website on February 22, 2010. The first of the stakeholders meetings was held on March 2, and the last on March 11, 2010.

The stakeholder meeting regarding this rulemaking is described above in the introductory section of this adoption. Public comments for the administrative record were accepted in writing during the original public comment period and during the additional comment period that ended March 15, 2010. As with any rulemaking, and as contemplated by the APA, the Department has reviewed, considered, summarized and is responding in this adoption to all formally submitted comments received during the entirety of the public comment period. In conclusion, DEP did not "revise the procedures after the fact" but, rather, supplemented the statutorily required rulemaking

procedures in order to facilitate public input into the review of the rules required by the executive orders.

**143. COMMENT:** The Department's web post states the following: "[Note: The Department prefers electronic submissions in order to facilitate timely review of comments to meet the timeframes for action in the Executive Orders.]"

The time restriction (in other words, the timeframe for action pursuant to Executive Order Nos. 1 through 3 and the Red Tape Review Group review process) cannot replace or supersede the requirements of the APA. The March 15 deadline is arbitrary and not in accordance with APA requirements. (26)

**RESPONSE:** The Administrative Procedure Act prescribes minimum notice requirements to ensure that adequate opportunity for public input on a proposed rule is provided. As indicated in response to comment 147 above, the proposals for which the Department extended or reopened the comment period for purposes of the review initiated by the executive orders satisfied the notice and public comment requirements of the APA at the time they were originally proposed. The notice provided an additional period for public comment on each of the rulemakings beyond the minimum required by the APA. The March 15, 2010 close of the additional comment period was established so that comments related to the purposes of the executive orders would be received within the 90-day timeframe (ending April 20) established by Executive Order No. 1 for the Red Tape Review Group to conduct its review of the suspended proposals so that it might thereafter make its recommendations.

**144. COMMENT:** The substantive requirements of Executive Order Nos. 1 through 3, particularly the requirements to conduct cost/benefit analysis and to consider cost/benefit analysis as a basis for regulatory decisions, is ultra vires and not authorized by either the APA or the enabling authorities pursuant to which each of the 12 rules were proposed. (26)

**RESPONSE:** The Administrative Procedure Act requires that each proposed rulemaking include a description of the expected socio-economic impact of the rule, as well as a regulatory flexibility analysis of impacts on small businesses, a jobs impact statement, an agriculture industry impact statement, a housing affordability impact statement, and a smart growth development impact statement. See N.J.S.A. 58:14B-4. See also the Rules for Agency Rulemaking, N.J.A.C. 1:30-5.1. In addition, the APA requires that a Federal standards analysis must be included in each proposal and adoption. See N.J.S.A. 52:14B-23, and N.J.A.C. 1:30-5.1. Neither the APA nor the enabling authority for this rulemaking preclude an analysis of the costs and the benefits of a proposed rule as part of the APA-required impact analyses.

**145. COMMENT:** The "reopening" of the public comment period and retroactive application of new procedures, standards, and decision criteria established by Executive Order Nos. 1 though 3 is ultra vires, not authorized by law, and inconsistent and in violation of law. This includes the APA requirements as well as the enabling statute for each rule proposal. (26)

**RESPONSE:** As indicated in prior responses, the procedure followed for this rulemaking, including the reopening of the comment period to provide additional opportunity for public comment and the request to focus the additional public comments on the purposes of the rules review set forth in the executive orders, is consistent with the rulemaking requirements of the Administrative Procedure Act. Seeking additional public input on, for example, the potential costs and benefits of the rulemakings in a more focused way as contemplated by the executive orders did not result in new procedures, standards, and decision criteria being imposed. Rather, the extended comment period and stakeholder meetings supplemented the statutorily required rulemaking procedures for public comment and participation in rulemaking. The commenter has not explained how providing an opportunity for additional public comment, or having the Department consider those additional comments, violates the APA or the enabling statutes for this or any of the affected rulemakings. Consequently, the Department is not able to further specifically address this aspect of the comment.

**146. COMMENT:** The Department's application of the provisions of Executive Order Nos. 1 through 3 to the subject rule proposals would violate the procedural and substantive requirements of Federal environmental laws and the delegation agreements under which New Jersey implements Federal laws. These laws include, but are not limited to the Safe Drinking Water Act, the Coastal Zone Management Act, the Resource Conservation and Recovery Act (RCRA), the Clean Water Act, and the Clean Air Act. The same violations arise by the Department's after the fact "reopening" of the public comment procedure, as part of which this comment is submitted. (26)

**RESPONSE:** Several of the programs for which proposals were suspended under Executive Order No. 1 and for which the Department reopened or extended the comment period are administered by the Department in conjunction with equivalent Federal programs under independent State statutory authority, as allowed by the applicable Federal statute. Others are programs that have been delegated to the Department by the Federal government, again in accordance with the applicable Federal statute. The Department's decision to allow further opportunity for public comment in order to obtain comments focused on the directives contained in the executive orders is not barred by the New Jersey Administrative Procedure Act and does not violate any Federal environmental law related to any of the Department's programs that implement the affected rules. The Federal statutes and delegation agreements do not preclude the Department from seeking public input determined to be appropriate before taking regulatory action. Similarly, the Federal statutes and delegation agreements do not preclude the Department from considering the impacts of the rulemaking on the regulated public for purposes of determining the best way to implement the required standards.

**147. COMMENT:** The "reopening" process and the provisions of Executive Order Nos. 1 through 3 violate Federal funding agreements and the National Environmental Partnership Performance Agreement (NEPPS). The Department may not substitute the provisions of the Executive Orders and the Red Tape Review Group review process for the requirements of Federal law, regulation and funding agreements. (26)

**RESPONSE:** Federal funding agreements and the National Environmental Partnership Performance System (NEPPS) do not establish requirements for the rulemaking process. NEPPS has two major components, the Performance Partnership Agreement (PPA) and the Performance Partnership Grant (PPG). The PPA focuses mainly on activity commitments that the Department makes to earn the overall PPG from the U.S. Environmental Protection Agency. While some of the commitments may relate generally to the development of rules and expected timeframes, neither the PPA nor PPG deals with the procedures for rulemaking. Accordingly, the PPA and PPG do not preclude the Department from seeking and considering public comments related to the purposes of the rules review set forth in the executive orders.

**148. COMMENT:** Based on the concerns expressed by the commenter in comments 147 through 153 above, the Department should withdraw this sham "reopening of the public comment process." This "reopening" process is not in compliance with procedural notice/comment requirements of applicable law. (26)

**149. COMMENT:** The "common sense principles," standards, criteria, and informal process established by Executive Order Nos. 1 through 3 are not authorized by law, can have no legally binding effect, and expressly violate State and Federal law. Accordingly, this "proposal" must be withdrawn. (26)

**RESPONSE TO COMMENTS 148 AND 149:** As explained in the responses to Comments 147 through 153 above, the Department's actions to propose and adopt this rulemaking meet the requirements of the APA, and do not violate the enabling statutes or applicable Federal law.

**150. COMMENT:** The "Red Tape Review" process is an informal process that is not on the record. This process is not transparent and not authorized by law. It may not be considered or relied upon in any way for final agency regulatory decisions regarding the subject rule proposals. No information considered or decisions reached during that

process may be considered as part of the administrative record of the subject rule proposals, and none of it can be relied on as a basis for final regulatory decisions by the Department. (26)

**151. COMMENT:** The stakeholder process announced for this proposal is an informal process that is not on the record. This process is not transparent and not authorized by law. It may not be considered or relied upon in any way for final agency regulatory decisions regarding the subject rule proposals. No information considered or decisions reached during that process may be considered as part of the administrative record of the subject rule proposals, and none of it can be relied on as a basis for final regulatory decisions by the Department. The Department should withdraw this proposal and abandon this process. (26)

**RESPONSE TO COMMENTS 150 AND 151:** As indicated in the response to comment 147, the process followed by the Department in this rulemaking, including the additional public comment period, meets the requirements of the Administrative Procedure Act. The extended/reopened comment period and the informal stakeholder meetings were intended to facilitate receipt of additional public input on the 12 Department proposals suspended under Executive Order No. 1 in consideration of the purposes of the executive orders as enumerated therein. The notice extending and/or reopening the comment period on the suspended rulemakings specifically noted that the stakeholder meetings were not public hearings and that testimony on the proposals was not going to be accepted at them. The stakeholder meetings were open to all, and their purpose was to facilitate informal discussion of the rulemakings. The stakeholder meeting regarding this rulemaking is described above in the introductory section of this adoption. Public comments for the administrative record were accepted at the formal public hearing, and in writing during the original public comment period on each of the proposals, and in writing during the additional comment period that ended March 15, 2010. As with any rulemaking, and as contemplated by the APA, the Department has reviewed, considered, summarized and is responding in this adoption to all formally submitted comments received during the entirety of the public comment period.

## Federal Standards Statement

Executive Order No. 27(1994) and N.J.S.A. 52:14B-1 et seq. (P.L. 1995, c. 65) require State agencies that adopt, readopt or amend State regulations that exceed any Federal standards or requirements to include in the rulemaking document a Federal standards analysis. No Federal law establishes standards or requirements regarding the contents of sulfur in the fuel oil regulated by N.J.A.C. 7:27-9. Although the Department's sulfur content standards for fuel oil are Federally enforceable as part of New Jersey's State Implementation Plan, the amendments to N.J.A.C. 7:27-9 and repeal of N.J.A.C. 7:27-9.5 are not promulgated under the authority of, or in order to implement, comply with or participate in any program established under Federal law or under a State statute that incorporates or refers to Federal law, Federal standards or Federal requirements. Moreover, there is no comparable Federal standard exceeded by this rulemaking and no Federal regulatory scheme that might be perceived to be duplicated or overlapped by this rulemaking. Accordingly, Executive Order No. 27(1994) and P.L. 1995, c. 65 do not require a Federal standards analysis.

Full text of the adoption follows (additions to the proposal indicated in boldface with asterisks *__thus*__; deletions from the proposal indicated in brackets with asterisks *[thus]*):

SUBCHAPTER 9. SULFUR IN FUELS

7:27-9.2 Sulfur content standards

(a) No person shall store, offer for sale, sell, deliver or exchange in trade__*,*__ for use in New Jersey__*,*__ fuel that contains sulfur in excess of the applicable parts per million by weight set forth in Tables 1A and 1B of this section, except as provided in (c), (d) and (e) below. Fuel stored in New Jersey that met the applicable maximum sulfur content

standard of Tables 1A or 1B of this section at the time the fuel was stored in New Jersey may be stored, offered for sale, sold, delivered or exchanged in trade***,*** for use in New Jersey***,*** after the effective date of the applicable standard in Table 1B.

Based on consultation with staff, I hereby certify that the above statements, including the Federal Standards Analysis addressing the requirements of Executive Order No. 27 (1994) and N.J.S.A. 52:14B-23, permit the public to understand accurately and plainly the purposes and expected consequences of this adoption. I hereby authorize this adoption.

Date:_____ _____

Bob Martin, Commissioner
Department of Environmental Protection