UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
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BOSTON, MASSACHUSETTS 02114-2023

June 26, 2009

Jeff Underhill
Air Resources Division
New Hampshire Department of Environmental Services
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095

Dear Mr. Underhill:

Previously, EPA received two preliminary drafts of New Hampshire's Regional Haze State Implementation Plan (SIP). EPA provided DES written comments on these drafts in letters dated July 10, 2008 and October 24, 2008.

Subsequently, we received New Hampshire's proposed Regional Haze SIP. We have reviewed the proposal and you will the Agency's comments in the Enclosure.

If you have any questions on these comments, please contact Anne McWilliams of my staff at 617-918-1697.

Sincerely,

Anne Arnold, Manager
Air Quality Planning Unit

Enclosure

Enclosure
EPA Comments on New Hampshire's
May 2009 Proposed Regional Haze SIP

General BART Comments

1. New Hampshire indicates it used the CALGRID model for assessing the visibility improvement expected from the installation of Best Available Retrofit Technology (BART) controls for its two BART sources, Merrimack station and Newington Station. The CALGRID modeling results indicated that the installation of a scrubber at Merrimack would only result in a visibility improvement of 0.1 deciview (dv) and switching to lower sulfur fuel at Newington would result in negligible visibility improvement. The reader is directed to Attachment X for additional discussion on this analysis. However, Attachment X does not provide any information regarding the performance or appropriateness of the CALGRID model for this type of application, the Attachment only discusses the use of CALGRID for ozone modeling purposes.

The MANE-VU modeling results indicate that both BART sources are among the top 167 stacks impacting a MANE-VU Class I area. Therefore, it does not seem to make sense that controlling SO_2 emissions by more than 90% at Merrimack would lead to a visibility improvement of only 0.1 dv and that 50% control of SO_2 at Newington would result in negligible visibility improvement. Please include an explanation of how the CALGRID and MANE-VU modeling relate to each other, especially in respect to pre-control visibility impacts.

Furthermore, New Hampshire may want to consider using CALPUFF to assess visibility impacts of potential BART controls. As noted in the BART Guidelines (40 CFR Part 51, Appendix Y Section (IV)(D)(5)):

> "Use CALPUFF, or other appropriate dispersion model to determine the visibility improvement expected at a Class I area from the potential BART control technology applied to the source."

2. Implementation of the selected BART control strategies for each of the three pollutants (SO_2, NOx, and $PM_{2.5}$) at both BART facilities must be federally enforceable. The Regional Haze SIP must clearly indicate how this is being accomplished in each case. Specifically, the relevant rules or permits should be included as part of New Hampshire's Regional Haze SIP revision or the SIP revision should cite specific rules or permits conditions that are already federally enforceable.

BART Determination for PSNH - Newington Station

3. For SO_2, New Hampshire determined that the BART level of SO_2 control for PSNH Newington Station unit NT1 is to switch from 2% sulfur content by weight residual oil to 1% sulfur content by weight residual oil.

PSNH Newington Station unit NT1 is a tangentially-fired steam generating unit. The Title V permit indicates that NT1 can burn crude oil or No. 6 fuel oil at no more than 2% sulfur content by weight, No. 2 fuel oil at no more than 0.4% sulfur content by weight, or natural gas. Based on recent data submitted to EPA's Clean Air Market Division, it appears that changing the enforceable sulfur-in-fuel limit from 2% sulfur No. 6 oil to 1% sulfur No. 6 oil will provide minimal reductions in SO_2 emissions since average SO2 emission rates are near the levels emitted while burning 1% sulfur No. 6 oil. (See Table 1 below which contains 2007 data for PSNH Newington Station.) Thus, other fuel switching options should also be explored. These options include: (1) the use of natural gas, (2) the use of 0.3% sulfur No. 6 oil as recommended by the MANE-VU BART workgroup or (3) the use of No. 2 fuel oil at no more than 0.3% sulfur content by weight.

Currently, the only consideration of natural gas as a primary fuel source shown in the proposal is the statement, "In recent years, there have been sudden and dramatic swings in the price of natural gas relative to fuel oil as supply/demand have shifted. The future price and availability of natural gas are difficult to discern."

Recent data from the Energy Information Administration, however, indicates the Average Cost of Natural Gas and Residual Oil are projected to remain comparable. (See Figure 1, "Historic and Projected Power generation Fuel Costs – National.") Therefore, EPA recommends that greater consideration be given to the use of natural gas as the primary fuel at Newington station, with No. 2 fuel oil and/or No. 6 fuel oil being used as the secondary fuel, with a constraint on the number of gallons burned per year.

If, however, it is not possible to utilize natural gas as the primary fuel type for this unit, then New Hampshire should explain why 1% sulfur No. 6 oil was determined to be BART, rather than the MANE-VU BART workgroup recommended sulfur fuel oil limit of 0.3% sulfur content by weight. This limit is currently required of facilities in Connecticut pursuant to Connecticut's Section 22a-174-19a regulation.

Additionally, New Hampshire should explain why 0.5% sulfur fuel oil is not BART as well. The proposal indicates that the cost effectiveness of using 1% versus 0.5% fuel oil is the same at $1900/ton. This argues <u>for</u> the implementation of 0.5% sulfur fuel oil. Also, other facilities in New England are currently limited to 0.5% for No. 6 fuel oil. (See the Title V permit for Salem Harbor Unit #4.)

In table 1 below is a listing of all of the electric generating steam units in New England that were operational in 2007 and which use residual oil as their primary fuel. As illustrated in the table, most of the units have current SO2 emissions rates well below the emission rate proposed as BART for PSNH Newington Station.

4. For NOx, New Hampshire has determined that BART is met for Newington Unit 1 through use of the current suite of NOx controls; low NOx burners, an overfire air system, and water injection. New Hampshire indicates that the current emission limits are a daily average of 0.35 lb/MMBtu when burning oil and 0.25 lb/MMBtu when burning a combination of oil and gas. The MANE-VU BART workgroup, however, recommended a level of NOx control for non-CAIR EGUs of 0.1 – 0.25 lb/MMBtu, depending on boiler and fuel type. Therefore, New Hampshire should analyze if a more stringent emission limit is appropriate for this unit.

In New England, there is a least one oil-fired electric generating steam unit with selective catalytic reduction installed (Unit #1 at Canal Electric in Sandwich, MA) and at least three oil-fired electric generating steam units with selective non-catalytic reduction installed (Units #1 and #2 at Norwalk Harbor Station in Norwalk, CT and Unit #3 at Middletown Station in Middletown, CT).

5. For $PM_{2.5}$, the proposal indicates that the currently installed electro-static precipitator (ESP) is sufficient for BART, yet only cites a 42% control efficiency. According to the BART analysis, a rebuilt ESP can achieve collection efficiencies of more than 99%. Therefore, the BART determination should include an analysis of the feasibility of an upgraded or rebuilt ESP for this unit. Furthermore, the MANE-VU BART workgroup recommendation for non-CAIR EGUs is a PM emission rate of 0.02 – 0.04 lb/MMBtu. New Hampshire should provide greater detail as to why the state considers its current limit of 0.22 lb/MMBtu as sufficient for BART.

BART Determination for PSNH – Merrimack Station

6. For SO_2, New Hampshire has determined that BART is the installation of flue gas desulfurization (FGD) controls and has issued a temporary permit to the facility which is included in Attachment EE of the submittal. EPA previously reviewed a draft of this permit and submitted comments to the DES in a letter dated March 3, 2009. We have reviewed the version of the permit included in the proposal and note that all of our previous comments have been adequately addressed.

7. For NOx, New Hampshire has determined the year round use of selective catalytic reduction (SCR) is considered BART for Unit MK2. This determination seems reasonable. New Hampshire, however, states that its current federally enforceable limit for this unit is 0.86 lb/MMBtu, while the MANE-VU recommended level of BART control for non-CAIR EGUs is 0.1 – 0.25 lb/MMBtu, depending on the boiler and fuel type. A review of the data in the CAMD database indicates that MK2 is achieving an emission rate well below 0.86 lb/MMBtu. For example, the highest monthly average emission rate in 2008 was 0.30 lb/ MMBtu. Therefore, New Hampshire should impose a more stringent emission limit for this unit.

8. For $PM_{2.5}$, New Hampshire has determined that the use of two currently installed ESPs is considered BART for Unit MK2. This seems reasonable. The proposal, however, indicates that the current air permit imposes a 0.227 lb/MMBtu limit, while the MANE-VU recommended level of BART control for non-CAIR EGUs is 0.02-0.04 lb/MMBtu. Therefore, New Hampshire should analyze if a more stringent emission limit is appropriate for this unit.

Other Comments

9. We recommend the 5th paragraph on page 6 be revised as follows:

> "About half of the worst visibility days in the New Hampshire Class I Areas occur in the summer when meteorological conditions are more conducive to the formation of sulfate from SO_2 and to the oxidations of organic aerosols. ~~In addition, winter and summer transport patterns are different, possibly leading to different contributions from upwind source regions. As a result,~~ The remaining worst visibility days are divided nearly equally among spring, winter and fall. In addition, winter and summer transport patterns are different, possibly leading to different contributions from upwind source regions."

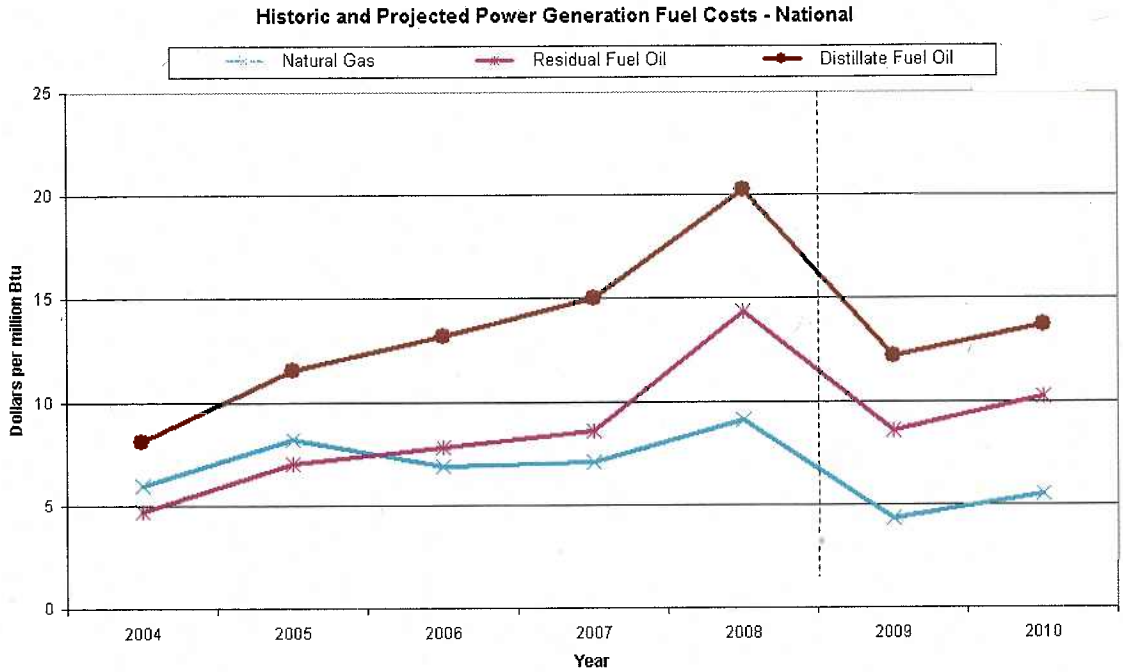
10. In Section 6.1.2, the Beyond-on-the way (BOTW) emissions scenario is described as "accounting for controls from potential regulations that may be necessary to meet attainment and other air quality goals, mainly for ozone." Based on the list of measures provided on page 123, it is unclear how New Hampshire expects to reduce area source emissions by 4,303 tons per year, as depicted in Table 6.3 2018 BOTW Emissions Inventory Summary for New Hampshire.

11. The MANE-VU "Ask" includes a low sulfur fuel oil strategy. With regard to this strategy, on page 141 of New Hampshire's proposal, the state indicates that it plans to revise its Env-A 1604 regulation and a draft of the revised rule is provided in Attachment FF. These revised provisions will need to be adopted and submitted to EPA as a SIP revision so they may become a federally enforceable part of New Hampshire's Regional Haze SIP. The proposal currently indicates that New Hampshire commits to revising this rule "at the earliest practicable date." New Hampshire should include a schedule for adoption of the revised regulation.

In addition, the discussion of the low sulfur fuel oil strategy in Section 10.2.3 (page 98) of the proposal notes a concern for potential supply disruptions for residual fuels in northern states. This discussion also states, "MANE-VU has identified several mechanisms that could be implemented to address disruptions, including seasonal averaging and emergency waivers. A seasonal averaging approach would reduce potential supply constraints by allowing the use of higher-sulfur during periods of peak demand." The proposal, however, does not further elaborate on whether or not New Hampshire plans to allow seasonal averaging and emergency waivers. If such provisions are allowed, then there should also be a mechanism to ensure that the use of higher-sulfur

oil during peak demand times does not correspond with meteorological conditions leading to the 20% worst visibility days.

Figure 1.



Source: Energy Information Administration (EIA) Official Energy Statistics Short-Term Energy Outlook. Release Data: June 09, 2009 (http://tonto.eia.doe.gov/cfapps/STEO_TableBuilder/index.cfm)

Historical data: Latest data available from EIA databases supporting the following reports: Petroleum Marketing Monthly, DOE/EIA- 0380; Weekly Petroleum Status Report, DOE/EIA-0208; Natural Gas Monthly, DOE/EIA-0130; Electric Power Monthly, DOE/EIA-0226; and Monthly Energy Review, DOE/EIA-0035. Natural gas Henry Hub spot price from NGI's Daily Gas Price Index (http://Intelligencepress.com); WTI crude oil price from Reuter's News Service (http://www.reuters.com).

Projections: Generated by simulation of the EIA Regional Short-Term Energy Model.

Table 1 – SO2 Emissions and Emission Rate for All Residual Oil Burning Electric Generating Steam Boilers in New England

State	Facility Name	Unit ID	2007 Operating Hours	2007 SO2 MASS (TPY)	2007 SO2 RATE (lbs/mmBtu)	2007 HEAT INPUT (lbs/mmBtu)	Boiler Type	Primary Fuel Type	Secondary Fuel Type	BART Eligible
CT	Middletown	2	2,828.0	99.4	0.098	2,030,305	Dry bottom wall-fired	Residual Oil	Natural Gas	
CT	Montville	5	912.0	46.9	0.179	523,358	Tangentially-fired	Residual Oil	Natural Gas	
CT	Middletown	3	2,069.4	272.4	0.182	2,989,410	Cyclone	Residual Oil	Natural Gas	Yes
CT	New Haven Harbor	NHB1	2,634.0	815.0	0.237	6,890,274	Tangentially-fired	Residual Oil	Diesel Oil, Natural Gas	Yes
CT	Montville	6	423.7	80.1	0.253	633,758	Tangentially-fired	Residual Oil		Yes
CT	Middletown	4	568.0	142.2	0.257	1,107,873	Tangentially-fired	Residual Oil		Yes
CT	Bridgeport Harbor	BHB2	802.3	52.2	0.281	371,551	Cyclone	Residual Oil	Diesel Oil	
CT	Norwalk Harbor	1	2,584.5	222.4	0.293	1,518,125	Tangentially-fired	Residual Oil		
CT	Norwalk Harbor	2	3,184.1	338.0	0.295	2,291,675	Tangentially-fired	Residual Oil		Yes
MA	Mystic	7	6,687.7	1,922.4	0.314	12,251,958	Tangentially-fired	Residual Oil	Natural Gas	Yes
MA	Salem Harbor	4	729.1	164.4	0.492	668,060	Dry bottom wall-fired	Residual Oil		Yes
MA	Canal	2	3,463.1	1,506.2	0.498	6,050,203	Dry bottom wall-fired	Residual Oil	Natural Gas	Yes
MA	Canal	1	7,599.8	5,169.0	0.545	18,976,807	Dry bottom wall-fired	Residual Oil		Yes
MA	West Springfield	3	1,858.8	366.1	0.609	1,202,764	Tangentially-fired	Residual Oil	Natural Gas	
ME	Wyman	4	1,439.2	1,050.2	0.654	3,212,458	Dry bottom wall-fired	Residual Oil		Yes
MA	Cleary Flood	8	127.2	14.4	0.815	35,436	Dry bottom wall-fired	Residual Oil	Diesel Oil	Yes
MA	Brayton Point	4	1,018.3	741.3	0.901	1,645,406	Dry bottom wall-fired	Residual Oil	Natural Gas	Yes
NH	Newington	1	1,503.1	2,269.2	1.054	4,303,867	Tangentially-fired	Residual Oil	Natural Gas	
ME	Wyman	1	977.9	96.2	1.228	156,729	Dry bottom wall-fired	Residual Oil		
ME	Wyman	3	1,073.0	452.5	1.313	689,029	Tangentially-fired	Residual Oil		Yes
ME	Wyman	2	421.5	55.0	1.346	81,691	Dry bottom wall-fired	Residual Oil		

Source: EPA's Clean Air Markets Acid Rain Database (http://camddataandmaps.epa.gov/gdm/)