

HEARING REPORT

**Prepared Pursuant to
40 Code of Federal Regulations Section 51.102**

**Regarding a State Implementation Plan Revision concerning
Visibility Protection**

**Hearing Officer:
Merrily A. Gere**

Date of Hearing: August 27, 2009

On July 27, 2009, the Commissioner of the Department of Environmental Protection (CTDEP) published a notice of intent to revise the State Implementation Plan (SIP) for air quality to: (1) address the visibility protection requirements of section 169A of the federal Clean Air Act (CAA); and (2) update RACT requirements, given the promulgation of eleven federal control techniques guidelines (CTGs) in 2006 through 2008. Pursuant to such notice, a public hearing was held on August 27, 2009, with the public comment period closing on August 28, 2009. This report addresses only the visibility protection proposal, comment and recommended final SIP revision.

I. Hearing Report Content

This report describes the revision to the SIP as proposed for hearing; a statement of the principal reasons in support of the SIP revision; all comments made and responses thereto regarding the proposed revision to the SIP; and the final recommendation based on the proposal and comments received.

II. Summary and Purpose of Proposal

The visibility protection SIP revision is a plan to serve the national goal of restoring natural visibility conditions to mandatory Class I Federal Areas by 2064. The proposed SIP revision also satisfies the Regional Haze Rule (40 Code of Federal Regulations (CFR) 51.300-309), which seeks to protect mandatory Class I Federal Areas by addressing the aggregate visibility impact of various air pollution sources over a large geographic region.

The SIP revision includes an assessment of baseline and natural visibility conditions, an air monitoring strategy, an alternative program for Best Available Retrofit Technology (BART), a set of reasonable progress visibility goals and a long-term strategy for achieving those goals.

III. Summary of Comments

Written comments were received from the following persons:

1. Anne Arnold, Manager
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2. Holly S. Salazer
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3. Ralph Perron, Air Quality Specialist
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4. Chuck Carlin (oral comment only)
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All comments submitted are summarized below with CTDEP's responses. Commenters are associated with the individual comments below by the number assigned above.

General

1. Comment: The Department of Interior (DOI), which includes the U.S. National Park Service (NPS) and U.S. Fish and Wildlife Service (FWS), is satisfied that the issues raised in preliminary comment in April 2009 have been addressed in the proposed SIP revision. NPS and FWS were particularly interested in how concerns regarding additional information and analysis on alternatives to BART were addressed. Both DOI agencies are satisfied that the draft SIP revision accurately documents how overall emissions will be decreasing in the near future. For future planning efforts, DOI recommends highlighting even more this important relationship between the change in emissions and the change in visibility in Class I areas. [2]

Response: CTDEP appreciates the commitment shown by DOI staff on the issue of regional haze and notes that DOI's participation is of great value to the interagency process needed to bring about visibility improvements to Class I areas. In response to DOI, CTDEP will take the relationship between emissions and visibility into account in future planning efforts.

2. Comment: The U.S. Department of Agriculture Forest Service (USDA-FS) looks forward to working with CTDEP and MANE-VU in the future. [3]

Response: As is the case with DOI, the CTDEP also appreciates the commitment shown by USDA-FS's staff on the issue of regional haze and welcomes their continued participation in future SIP planning efforts.

3. Comment: Chuck Carlin commends CTDEP's proposal because regional haze is appropriately addressed and fits well within CTDEP's current plans and programs. Mr. Carlin cautions that the Federal government should not adopt a requirement for Connecticut sources to meet the same emissions limits but in a way that it is not now doing, which would create an additional limitation. [4]

Response: CTDEP notes Mr. Carlin's approval and comment of caution.

2.0 Areas Contributing to Regional Haze

4. Comment: The reference to 40 CFR 51.308(3)(iii) should be revised to 40 CFR 51.308(d)(3)(iii). [1]

Response: In the final SIP revision, the reference has been revised as recommended in the comment.

9.0 Best Available Retrofit Technology

5. Comment: EPA asks that CTDEP provide some discussion of how costs were considered in establishing the BART benchmark for SO₂ and NO_x. [1]

Response: To Section 9.2.3 of the final SIP revision, CTDEP has added a subsection that specifically addresses the costs of SO₂, NO_x and PM controls for electric generating units and industrial boilers as well as a subsection that addresses costs of compliance with Connecticut's existing NO_x and SO₂ regulations. The text of the new material is as follows:

Costs of SO₂, NO_x and PM Controls for EGUs and Industrial Boilers

According to NESCAUM's Assessment of Control Options for BART-Eligible Sources (Attachment Z), SO₂ control for previously uncontrolled EGU boilers is highly cost effective with operational costs in the range of \$100-200 per ton of SO₂ removed. Costs for NO_x removal range from \$200-500/ton for some of the low yield techniques to \$1000 to \$1500/ton for SCR with 90-95 percent removal efficiency. A cost-effectiveness indicator (e.g., \$/ton) is difficult to address for PM control because the range of PM reductions for different fuels and processes is very wide. One of the main parameters dictating the "sizing" and hence, costs of a PM control device, is the quantity of flue gas it must handle. As a result, it is more appropriate to generalize capital costs per actual cubic feet per minute (ACFM) of gas flow and is given on a "\$/ACFM" basis. PM control costs range from \$1-\$40/ ACFM of gas flow.

Many of the same control technologies for EGUs are applicable to industrial boilers, but industrial boilers have a wider range of sizes than EGUs and often operate over a wider range of capacities. Cost estimates for the same technologies will generally range, depending on the capacity of the boiler and typical operating conditions, with high end cost estimates for NO_x removal going over \$10,000/ton.

Costs of Compliance with Connecticut's Existing Regulations: RCSA section 22a-174-19a (Control of SO₂ Emissions from Power Plants and other large stationary

sources of air pollution), RCSA section 22a-174-22 (Control of NO_x Emissions) and RCSA section 22a-174-22c (CAIR NO_x Ozone Season Trading Program)

Residual oil is a byproduct of the refining process and is produced in several grades that can be blended to meet a specified fuel sulfur content limit. The premium cost for lower sulfur residual fuel oil (<1%S) has averaged approximately 15 % over the past three years, however, on occasion, the price for low and higher sulfur residual fuel has been minimal. For example, according to the U.S. Energy Information Administration, the August average U.S. wholesale price of lower sulfur residual fuel oil was \$66.61 /barrel while the higher sulfur residual fuel oil (>1%) was priced at \$65.81 /barrel (http://tonto.eia.doe.gov/dnav/pet/pet_pri_spt_s1_d.htm).

For NO_x, sources complying with RCSA Section 22a-174-22 and RCSA Section 22a-174-22c through emissions trading, costs of compliance are directly related to costs of NO_x discrete emission reduction credits (DERCs) and/or allowances. NO_x DERC and allowance prices vary because they are currencies of market-based programs. In March 2004 NO_x allowance prices were approximately \$2000/ton; CAIR NO_x Ozone Season allowance prices as of November 2009 are approximately \$130/ton.

6. Comment: CTDEP should include a table to accompany Figure 9.6 quantifying the tons of NO_x reduced by Connecticut's BART alternative versus BART-eligible sources alone, similar to Table 9-8 provided for SO₂ reductions. [1]

Response: To the final SIP revision, CTDEP has added Tables 9.16 and 9.17 and accompanying text, comparing NO_x emissions reductions (actual and potential) for the NO_x Budget Program sources versus the BART-eligible sources, as follows:

Table 9.16 shows the NO_x reduction in potential emissions between 2002 and 2006 from all Post-2002 NO_x Budget Program sources as compared with the reduction in NO_x potential emissions from BART-eligible sources alone. The "low end" and "high end" numbers referenced in the "Year-2012" column in Table 9.16 are based on the MANE-VU BART workgroup's recommended emission limit range of 0.1 lb/MMBtu (low end) to 0.25 lb/MMBtu (high end) for non-CAIR EGUs and 0.1 lb/MMBtu (low end) to 0.4 lb/MMBtu (high end) for industrial boilers, depending on coal and boiler type.

Table 9.16: Comparison of NO_x Potential Emissions and Reductions since 2002 from all Post-2002 NO_x Budget Program sources vs. BART-eligible sources alone (tpy)*			
NO _x potential emissions from all Post-2002 NO _x Budget Program sources	Year=2002	Year=2006	Reduction in potential emissions
	46,188	34,833	11,355
NO _x potential emissions from BART-eligible sources alone		Year=2012	
	27,554	High end- 24,434 Low end- 9,701	3,120 17,853

*It should be noted that between 1994 and 2006 NO_x potential emissions from all sources included in the Post-2002 NO_x Budget Program were reduced from 89,812 tons to 34,833 tons (a difference of 54,979 tons). Assuming the high end and low end levels of control referenced above in 2012, NO_x potential emissions from BART-eligible sources alone since 1994 would be reduced from 43,659 tons to 24,434 tons for the high end level of control (a difference of 19,225 tons) and to 9,701 tons for the low end level of control (a difference of 33,958 tons).

Table 9.17 shows the reductions in actual NO_x emissions from all Post-2002 NO_x Budget Program sources and BART-eligible sources since 1994. Again, Connecticut's existing NO_x program has resulted in considerably more NO_x reductions (3,114 tons) than BART control alone.

Table 9.17: Comparison of NO_x Actual Emissions and Reductions since 1994 from all Post-2002 NO_x Budget Program sources vs. BART-eligible sources alone (tpy)				
NO _x actual emissions from all Post-2002 NO _x Budget Program sources	Year=1994	Year=2002	Year=2006	Reduction in actual emissions since 1994
	13,411	6,150	5,346	8,065
NO _x actual emissions from BART-eligible sources alone	8,594	4,054	3,643	4,951
Additional reductions beyond BART-eligible sources alone				3,114

7. Comment: EPA notes that the asterisk on Table 9-14 indicates that the NO_x potential emissions are “based on the lower of RCSA section 22a-174-22 regulatory limits or federally enforceable permit conditions.” CTDEP should specify the mechanism by which the referenced permit is federally enforceable (for example, New Source Review). [1]

Response: CTDEP has two federally approved air quality permitting programs, new source review and Title V. EPA's request for specificity in identifying the source of

the NO_x emissions limit in Table 9.14 has been addressed by identifying the new source review program in the footnote, and CTDEP has made the same addition to Tables 9.5 and 9.13, which include the same footnote. In addition, the footnote language in Table 9.6 regarding this issue has been made consistent with the language in Tables 9.5, 9.13 and 9.14:

Table 9.5: SO₂ Annual Potential Emissions @ 8760 Hours (tpy)

BART-eligible Unit/Location	2001*	2002*	2006*	MANE-VU BART workgroup presumptive BART 2012	EPA presumptive BART 2012
Middletown Unit 3, Middletown	5709**	5709	3426	3426	11419
Middletown Unit 4, Middletown	11284**	11284	6770	6770	22568
Montville Unit 6, Montville	22442	11221	6733	6733	22442
Norwalk Unit 2, Norwalk	8557	4278	2567	2567	8557
Bridgeport Harbor Unit 3, Bridgeport	18212	9877	5926	2694	2694***
New Haven Harbor Unit 1, New Haven	20508	10282	6169	6169	20508
Cascades Boxboard Group PFI Boiler, Versailles	1325	662	662	662	1325
Total	88037	53313	32253	29021	89513

*Based on the lower of RCSA section 22a-174-19a regulatory limits or federally enforceable permit (New Source Review) conditions.

**Fuel sulfur limited to 0.5% in Consent Order no. 7024.

***While this level of control (95% removal or 0.15 lb SO₂/MMBtu) is not required by EPA guidelines, it is recommended that such level of control be considered when determining BART.

Table 9.6: SO₂ Daily Potential Emissions @ 24 Hours (tpd)

BART-eligible Unit/Location	2001*	2002*	2006*	MANE-VU BART workgroup presumptive BART 2012	EPA presumptive BART 2012
Middletown Unit 3, Middletown	15.6	15.6	9.4	9.4	31.3**
Middletown Unit 4, Middletown	30.9	30.9	18.5	18.5	61.8**
Montville Unit 6, Montville	61.5	30.7	18.4	18.4	61.5
Norwalk Unit 2, Norwalk	23.4	11.7	7.0	7.0	23.4
Bridgeport Harbor Unit 3, Bridgeport	49.9	27.1	16.2	7.4	7.4***
New Haven Harbor Unit 1, New Haven	56.2	28.2	16.9	16.9	56.2
Cascades Boxboard Group PFI Boiler, Versailles	3.6	1.8	1.8	1.8	3.6
Total	241.1	146	88.2	79.4	245.2

*Based on the lower of RCSA section 22a-174-19a regulatory limits or federally enforceable permit (New Source Review) conditions.

**Fuel sulfur limited to 0.5% in Consent Order no. 7024.

***While this level of control (95% removal or 0.15 lb SO₂/MMBtu) is not required by EPA guidelines, it is recommended that such level of control be considered when determining BART.

Table 9.13: NO_x Potential Emissions* (tpy)

BART-eligible Unit/Fuel	1994 (tpy)	2002 (tpy)	2006 tons per ozone season	2006 tons per non-ozone season	2006 annual tons
Middletown Unit 3/No. 6 oil	8329	3980	1668	806	2474
Middletown Unit 4/No. 6 oil	5691	4742	1988	1653	3641
Montville Unit 6/No. 6 oil	6121	5101	2138	1778	3916
Norwalk Unit 2/No. 6 oil	2334	1945	815	678	1493
Bridgeport Harbor Unit 3/coal	16162	6824	2860	1565	4425
New Haven Harbor Unit 1/No. 6 oil	4661	4661	1959	1629	3588
Cascades Boxboard PFI Boiler/No. 6 oil	361	301	126	105	231
Total	43659	27554	11554	8214	19768

*Based on the lower of RCMA section 22a-174-22 regulatory limits or federally enforceable permit (New Source Review) conditions.

Table 9.14: NO_x Potential Emissions (tons per day)*

BART-eligible Unit/Fuel	1994	2002	2006 Ozone Season	2006 Non-ozone Season
Middletown Unit 3/No. 6 oil	22.8	10.9	10.9	3.80
Middletown Unit 4/No. 6 oil	15.6	13.0	13.0	7.80
Montville Unit 6/No. 6 oil	15.9	13.3	13.3	7.97
Norwalk Unit 2/No. 6 oil	6.48	5.40	5.40	3.24
PSEG Bridgeport Unit 3/coal	44.3	18.7	18.7	7.38
PSEG New Haven Unit 1/No. 6 oil	12.8	12.8	12.8	7.68
Cascades PFI Boiler/No. 6 oil	0.989	0.84	0.84	0.495
Total	119.7	75.2	75.2	38.6

*Based on the lower of RCSA section 22a-174-22 regulatory limits or federally enforceable permit (New Source Review) conditions.

8. Comment: At page 9-34, EPA suggests that CTDEP elaborate on the lack of significant visibility impact on any Class I area due to PM emissions from BART-eligible sources. CTDEP should include a table of the PM visibility impacts from the BART-eligible sources. The table will help to demonstrate that, although the PM emission limits imposed by CTDEP are less stringent than the MANEVU recommended emission limits, the Connecticut limits can be considered reasonable since the highest PM visibility impact from any one BART unit is so low (0.0035 deciviews) compared to the 0.1 deciview impact considered in the MANEVU recommended limits. [1]

Response: In the final SIP revision, CTDEP has enhanced the discussion in Section 9.3.3 of the visibility impact reasonably expected from the BART-eligible sources as recommended in the comment. CTDEP has added Table 9.19, which sets out the modeled PM₁₀ impact on Class I areas from seven BART-eligible units and expanded the discussion to take into account Table 9.19, as follows:

Table 9.19: MANE-VU modeling of individual unit emissions for 2002

Federal Class 1 area with maximum simulated impact	Highest simulated PM₁₀ impact on 20% best days (delta-deciview) with impacting BART-eligible unit
Brigantine Wilderness	0.0000 (Middletown Unit 3)
Lye Brook Wilderness	0.0025 (Middletown Unit 4)
Acadia National Park	0.0005 (Montville Unit 6)
Brigantine Wilderness	0.0002 (Norwalk Unit 2)
Brigantine Wilderness	0.0035 (PSEG Bridgeport Unit 3)
Brigantine Wilderness	0.0012 (PSEG New Haven Unit 1)
Acadia National Park	0.0004 (Cascades PFI Boiler)

The PM emission limits in RCSA section 22a-174-18 and Connecticut's BART-eligible source permits (Middletown Unit 4, PSEG Bridgeport Unit 3 and PSEG New Haven Unit 1) are less stringent than the MANE-VU BART workgroup's recommended BART emission limits for PM. However, as can be seen in Table 9.19, the highest individual PM visibility impact (0.0035 delta-deciview) is significantly less than the 0.1 deciview individual impact MANE-VU warrants worthy of consideration of BART controls (see Section 4.1 of the MANE-VU Five-Factor Analysis of BART-Eligible Sources, Attachment W).

11.0 Long-Term Strategy

9. Comment: The MANE-VU long-term strategy recommends the following fuel sulfur limitations for an "outer-zone" state such as Connecticut:

- #2 distillate oil to 0.05 percent (500 ppm) sulfur, by weight, by no later than 2014;
- #4 residual oil to 0.25 percent sulfur, by weight, by no later than 2018;
- #6 residual oil to 0.5 percent sulfur, by weight, by no later than 2018;
- Further reduction of the sulfur content of distillate oil to 15 ppm by 2018, contingent on supply and availability.

With respect to the reduction of sulfur in #2 distillate by 2014, CTDEP's proposed SIP revision references Connecticut General Statute section 16a-21a, which limits the fuel sulfur content of heating distillate oil and off-road diesel oil to 500 ppm as of the date on which the last of the states of New York, Massachusetts and Rhode Island limit the sulfur content of such fuels. EPA asks that CTDEP also explain the mechanism by which the state plans to make this fuel sulfur content limit federally enforceable. Also, CTDEP should work closely with the named states to ensure that the 2014 milestone is met. [1]

Response: To make the referenced statute federally enforceable, CTDEP will submit the statute with the final SIP revision as Attachment GG (*See* Section 11.11 of the SIP revision). CTDEP will continue to work closely with NY, MA and RI in seeking to realize the fuel sulfur standards of the MANE-VU strategy.

10. Comment: Page 11-27 states: "Connecticut intends to adopt all reasonable control measures as expeditiously as practicable, in a manner consistent with state law, so that they may be in place by the end of the ten-year planning period." Connecticut's SIP revision submittal should include a schedule for adoption of these measures. [1]

Response: CTDEP has added the following two sentences to the second paragraph of Section 11.10 of the proposed SIP revision:

In terms of a state-wide limitation of #4 residual oil to 0.25-0.5% by weight and of #6 residual oil to no greater than 0.5% sulfur by weight, CTDEP commits to pursue adoption of a regulation by 2012 with an implementation date of no later than 2014. Regarding reduction of distillate fuel sulfur content to 15 ppm by 2018, CTDEP commits to pursue adoption of legislation that will implement this measure by no later than 2018.

The regulatory adoption and legislative adoption processes are beyond the direct control of CTDEP, and, therefore, CTDEP cannot be more specific about the adoption schedule at this time.

IV. Hearing Officer Comments

Since July 2009, when the SIP revision was proposed, MANE-VU has issued the final version of the report *Documentation of 2018 Emissions from Electric Generating Units in the Eastern United States for MANE-VU's Regional Haze Modeling* (August 31, 2009). That final version of the report should replace the “revised final draft” that was proposed as Appendix H.

Also, CTDEP has made minor editorial revisions throughout Section 9 of the SIP revision to incorporate the new elements added in response to comments.

V. Conclusion

Based upon the comments submitted by interested parties and addressed in this Hearing Report, I recommend that the SIP revision, revised as recommended in this report, be submitted to EPA for approval.

/s/Merrily A. Gere
Hearing Officer

November 10, 2009
Date