COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Board

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Proposed Rulemaking Regarding a Technology Performance Standard for the Air Emissions from New Electric Generating Facilities

EFSB 98-3

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# ORDER ON RULEMAKING

M. Kathryn Sedor
Hearing Officer
July 17, 1998

On the Decision:
Jeffrey Brandt

I.

## INTRODUCTION

### A. Background

The recently enacted Electric Restructuring Act requires the Energy Facilities Board ("Siting Board") "periodically" to "conduct a rulemaking to establish a technology performance standard ("TPS") for generating facilities emissions . . ." G.L. c. 164, § 69J¼, added by St. 1997, c. 164, § 210. The Electric Restructuring Act contemplates that the TPS will be used to determine the scope of the Siting Board's review of electric generating facility petitions filed for review pursuant to G.L. c. 164, § 69J¼.

Pursuant to G.L. c. 164 § 69J¼, if a petition for approval of an electric generating facility indicates that the expected air emissions from the proposed facility will exceed the levels set in the TPS, the facility proponent must provide the Siting Board with information regarding the cost, reliability and environmental impacts of other fossil fuel generating technologies. The Siting Board then must determine whether "the construction of the proposed facility on balance contributes to a reliable, low-cost, diverse, regional energy supply with minimal environmental impacts." G.L. c. 164, § 69J¼. Conversely, if expected facility emissions meet or are below the levels set forth in the TPS, the facility proponent need not conduct an analysis of alternative generation technologies.

### B. Procedural History

In response to the statutory mandate set forth in G.L. c. 164, § 69J¼, the Siting Board, with input from the Massachusetts Department of Environmental Protection ("MDEP"), began to develop a Technology Performance Standard early in 1998. On April 21, 1998, the Siting Board by unanimous written consent approved promulgation of the Technology Performance Standard at 980 CMR 12.00, as an Emergency Regulation ("Emergency Rule"). As expressly required by G.L. c. 164, § 69J¼, the Emergency Rule set forth pollutant-specific emissions limits for air pollutants. As further provided by § 69J¼, the emissions limits in the Emergency Rule represented the emissions of electric generating facilities with "state of the art environmental performance characteristics," while also incorporating the additional mandate in § 69J¼ that the TPS promote the control and reduction of facility-related water withdrawals. See G.L. c. 164, §69 J¼, second paragraph. These limits were based in large part on air permits issued by MDEP for the three electric generating facilities most recently approved by the Siting Board.

On May 15, 1998, as required by G.L. c. 30A, the Siting Board issued a Notice of Proposed Rulemaking and Notice of Public Hearing with respect to promulgation of the Emergency Rule as a final regulation.[1] The public hearing was conducted on June 9, 1998. A

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[1] In addition to G.L. c. 30A, promulgation of Siting Board regulations is governed by 950 C.M.R 20.00, the regulations implementing G.L. c. 30A, and by the Siting Board's

total of eight persons provided comments on the Emergency Rule.[2] The commenters were: the Sierra Club Massachusetts Chapter ("Sierra Club"), Sithe Energies, Inc. ("Sithe"), US Generating Company ("USGen"), Clean Water Action ("CWA"), Smith & Croyle, LLC ("S&C"), the Conservation Law Foundation ("CLF"), the Massachusetts Public Interest Research Group ("MASSPIRG"), and the Competitive Power Coalition ("CPC").

Based on its review of the public comments received, the Siting Board has modified the Emergency Rule in certain respects. On July 9, 1998, the Siting Board met to determine whether the Emergency Rule, as modified, should be submitted to the Secretary of State for publication as a final regulation.[3]

C. Methodology

The Siting Board developed emission standards for criteria pollutants using baseline data from Prevention of Significant Deterioration ("PSD") permits recently issued by the MDEP for three Massachusetts power plants: the Berkshire Power Development project in Agawam, U.S. Generating Company's Millennium project in Charlton, and the Dighton Power Associates project in Dighton. These power plants use natural gas-fired combined cycle technology, and range in size from 170 to 360 MW.

The emissions levels in the PSD permits represent Best Available Control Technology ("BACT") for $SO_2$, CO, and $PM_{10}$, and the Lowest Achievable Emission Rate ("LAER") for $NO_x$ and VOCs.[4] Thus, by using the PSD permits as baseline data, the Siting Board complies with the requirements in G.L. c. 164 § 69J¼ that the TPS reflect (1) BACT or LAER,

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"Rules for Adopting Administrative Regulations" at 980 C.M.R 2.00. Both sets of regulations are based on and conform with the statutory requirements of G.L. c. 30A. See, G.L. c. 30A, §§ 2-6A.

2 Four persons provided oral comments on the record at the public hearing, and seven sets of comments were filed during the subsequent ten-day public comment period.

3 Because it was initially promulgated as an Emergency Rule, the TPS, if approved by the Siting Board, must be filed with the Secretary of State no later than August 7, 1998, or the Secretary of State will file a Notice of Expiration. If timely filed, the TPS will become effective upon publication in the State Register on August 21, 1998. See 950 C.M.R. 20.05.

4 LAER, a more stringent standard than BACT, requires the use of the pollution control technology with the lowest achievable emission rate *irrespective* of cost effectiveness. BACT, on the other hand, factors cost effectiveness considerations into the emission standard. Massachusetts is a non-attainment area for ozone; therefore, in order to comply with the National Ambient Air Quality Standards, MDEP requires developers to meet LAER for $NO_x$ and VOCs, which are precursors to ozone formation.

whichever is applicable, and (2) achievable emissions rates as demonstrated by MDEP air permits.

Emission levels in the PSD permits were specified in units of pounds per hour. In order to compare the emissions of facilities with different generating capacities, the Siting Board converted these emissions levels to pounds per megawatt-hour, by dividing the pounds per hour value by the generating capacity of the facility in megawatts. These converted values appear in Table 1, below. The Siting Board determined the TPS level for each pollutant by taking the highest of the three permitted levels and adding a ten percent "safety factor". This safety factor is intended to reflect "the best available and most efficient technology to control and reduce water withdrawals" (G.L. c. 164, § 69J¼) by allowing for minor reductions in plant efficiency due to aggressive measures to control water consumption; it also allows for the potential effects of minor variations in plant configuration or turbine design. The TPS values are shown in the right hand column of the Table 1.

**Table 1**
**Comparison of Plant Emissions and Proposed Technology Performance Standards**
**Criteria Pollutants**

| **Pollutant** | **Berkshire Emission Limits(1)** **lbs per MW-hr** | **Millennium Emission Limits(2)** **lbs per MW-hr** | **Dighton Emission Limits(3)** **lbs per MW-hr** | **Highest MDEP Emission Factors of the Three Most Recently Permitted Power Plants** **lbs per MW-hr** | **Technology Performance Standards with 10% Safety Factor** **lbs per MW-hr** |
|---|---|---|---|---|---|
| $NO_x$ | 0.077 | 0.090 | **0.110** | 0.110 | 0.120 |
| CO | 0.054 | **0.070** | 0.038 | 0.070 | 0.077 |
| VOCs | 0.024 | 0.009 | **0.032** | 0.032 | 0.035 |
| $S0_2$ | 0.015 | 0.016 | **0.019** | 0.019 | 0.021 |
| PM and PM-10 | 0.064 | 0.035 | **0.074** | 0.074 | 0.081 |

Table Notes:

(1) Berkshire Emission Limits are based on MDEP Prevention of Significant Deterioration Air Permit dated 9/22/97, Appendix A-1. Emission limits are based on stack emission limits which are the sum of turbine emission limits plus chiller engine emission limits. Rates are based on burning natural gas at 100% load at 59 degree F ambient temperature.

(2) Millennium Emission Limits are based on MDEP Prevention of Significant Deterioration Air Permit dated 11/26/97. Emission limits are based on burning natural gas at 100% load and 60 degree F. CO and VOCs values are from Attachment B and $SO_2$, $PM_{10}$, and $NO_x$ are from Attachment C of the referenced permit.

(3) Dighton Emission Limits are based on MDEP Prevention of Significant Deterioration Air Permit dated 8/28/97. Values are from Table II. Ambient temperatures for emissions were 50 degrees F.

As reflected in Table 1, the Dighton facility had the highest permitted level of emissions for all pollutants except CO. Accordingly, the Emergency Rule incorporated these levels, and specified a test temperature of 50 degrees Fahrenheit, the temperature at which the Dighton facility was tested. The highest permitted value for CO came from the U.S. Generating facility, which was tested at 60 degrees F. To ensure consistent testing conditions across all five criteria pollutants, it was necessary to select a single ambient air temperature at which emissions levels will be reported. We selected 50 degrees F, the temperature used for the Dighton facility. Lowering the test temperature ten degrees from the 60 degrees F used in the USGen permit would not affect USGen's reported CO emissions, and doing so allows for use of the 50 degree F testing temperature for all five of the criteria pollutants.

The Siting Board also sought to use recently issued PSD permits to establish TPS emissions levels for non-criteria pollutants. However, only the Berkshire Power Development permit addressed heavy metals, and the levels in that permit applied only to periods when the project was burning oil as a backup fuel (Appendix D of the Berkshire PSD Permit). As the intent of the TPS is to address emissions from the primary fuel source, the Siting Board applied the non-criteria pollutant limits in the Berkshire permit to the primary fuel.

As in the case of the criteria pollutants, the Siting Board converted the permitted values from pounds per hour to pounds per megawatt-hour to allow the application of the TPS emission levels to facilities of all sizes. The TPS test temperature for heavy metals is 0 degrees Fahrenheit, the temperature specified by the U.S. Environmental Protection Agency ("EPA") for determining the pollution emissions in the Berkshire permit. (The information in the PSD permit was derived by MDEP using EPA AP-42 Emission Factors, 1/95 Table 3.1-7, "Trace Element Emission Factors for Distillate Oil Fired Gas Turbines").

## II. COMMENTS AND ANALYSIS

### A. Proposed Changes to Technical Performance Standards

#### 1. Summary of Comments

The Siting Board received comments recommending that standards for carbon dioxide ($CO_2$) be added to the set of criteria pollutants covered by the Emergency Rule, due to its

environmental and health impacts (MASSPIRG Comments at 5; CWA Comments at 1; Sierra Club Comments at 2). A comment also was received recommending that lead be included in the TPS (Sierra Club Comments at 2).

Certain commenters recommended that the Siting Board adopt specific performance standards for water use (MASSPIRG Comments at 4; CWA Comments at 1; Sierra Club Comments at 1). Comment letters acknowledged that the Siting Board's proposed standards incorporate a safety factor to allow for facilities that have slightly higher emissions because of equipment associated with water conservation (id.). However, the comments stated that the Siting Board should include specific water use standards that reflect the use of state of the art cooling technologies which minimize the amount of water a power plant uses (id.).

Finally, one commenter argued that the 10 percent safety factor used in developing the TPS was too high and that it should be reduced to 2 percent for dry cooled facilities and eliminated for facilities employing wet cooling (USGen Comments at 2).

2. Analysis and Findings

The Siting Board notes that the sole purpose of the TPS is to determine which generating facility proposals should be exempted from the portion of the Siting Board's review that focusses on the proponent's choice of generating technology. We therefore will adopt a proposed change to the Emergency Rule only if it will improve the effectiveness of the TPS by allowing it to distinguish between known fossil fuel generating technologies which meet the TPS as promulgated in the Emergency Rule, but which nonetheless have considerably different environmental impacts.

With regard to lead, the Siting Board notes that the Emergency Rule already includes a standard for lead[5].

With regard to $CO_2$, the Siting Board is not aware at this time of any two generating technologies, both of which meet the TPS emissions levels as promulgated, but which are distinguishable by their $CO_2$ emissions. The Siting Board asked MASSPIRG and CWA to address this precise issue in written comments. They also were unable to identify two such generating technologies. We therefore do not add $CO_2$ to the list of criteria pollutants covered by the TPS at this time. We will, however, continue to require proponents of all generating

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[5] The emission standard for lead is at Table 2 of the Emergency Rule.

facilities filed with the Siting Board to offset a percentage of their $CO_2$ emissions. We will continue to explore whether more than one generating technology exists that will satisfy the remaining TPS requirements but differs in levels of $CO_2$ emissions.

The Siting Board sees no benefit to reducing the "safety factor" incorporated into the TPS, as advocated by USGen. The safety factor was set at 10 percent to ensure consistent regulatory treatment of all facilities employing the generating technology on which the TPS was based.[6] As USGen has not identified any other inferior generating technology that could pass the TPS as promulgated in the Emergency Rule, we see no need to alter the emissions levels in the TPS.

With regard to water use, the Siting Board did not include a specific water use standard in the TPS for several reasons. First, G. L. c. 164 § 69J¼ does not authorize specific water standards; it clearly states that the TPS is a set of emission standards for certain criteria pollutants and heavy metals. Second, the adoption of a water consumption standard as part of the TPS would not assist the Siting Board in distinguishing between two known generating technologies, both of which meet the TPS as promulgated but which are distinguishable by their water consumption. While certain oil or coal fired generating technologies may consume more water than gas-fired technologies, their air emissions do not pass the TPS; and while the water consumption of gas-fired combined cycle plants varies considerably from project to project, this variation is due primarily to decisions regarding cooling technology and backup fuel use, not generating technology. Third, the Siting Board believes that it is not possible to determine an appropriate level of generating facility water use without considering site-specific issues including: whether the project is going to use potable water, industrial water, or cleaned effluent; whether the project is a new use, or will be operating pursuant to a water permit issued for a previous similar use; and the acceptability of increased noise, visual, and land use impacts associated with cooling technologies that reduce water consumption.[7]

Finally, the Siting Board notes that it already conducts an in depth review of water use

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[6] The purpose of the TPS is not to induce the proponent of a clean technology to be marginally cleaner by incorporating either added pollution control performance or added operating efficiency. Such a pollution reduction is, instead, the purpose of other elements of the Siting Board review, and reviews by other agencies, notably the MDEP.

[7] Commenters also suggested establishing dual sets of air emission criteria based on water use, in order to avoid applying the "safety factor" to reflect water-saving technologies in cases where a project in fact would incorporate no such technology. As discussed above in response to USGen's comments relating to the safety factor, the Siting Board sees no benefit in further restricting the safety factor, which was intentionally set at ten percent to assure the consistent regulatory treatment of each generating technology.

issues as part of its review process, and will continue to do so regardless of whether water use is made a part of the TPS. In a case where a high water use project is proposed, the Siting Board believes that applicant and Siting Board resources should be devoted to examining options to reduce the project's water consumption, including cooling technologies and other water-related design options, rather than to examining hypothetical (and potentially less clean) generating technology options.

B. Measurement and Testing

1. Summary of Comments

The Siting Board received comments recommending that: (1) the Siting Board set the emissions testing temperature at 59 degrees Fahrenheit, which is an industry standard, rather than at 50 degrees Fahrenheit (S&C Comments at 1); (2) the Siting Board specify testing protocols (id.; USGen Comments at 2); (3) the TPS specify that testing be conducted for base load operations (S&C Comments at 1); (4) the Siting Board exempt gas facilities from the need to test for heavy metals (CLF Comments at 2; S&C Comments at 1); and (5) the Siting Board require emission guarantees only when available from the equipment manufacturer (S&C Comments at 1; Sithe Comments at 3; USGen Comments at 3).

2. Analysis and Findings

With regard to the test temperature, the Siting Board notes that MDEP PSD permits vary in the test temperature specified, and that the "industry standard" of 59 degrees referenced in the S&C comment letter is by no means a mandatory temperature requirement for adequate test results. As noted previously, the Siting Board chose the test temperature of 50 degrees Fahrenheit to coincide with the temperature on which the emission limits in the MDEP PSD permit issued for the Dighton Power Project are based. The Siting Board believes that maintaining this consistency is important, and thus will retain a test temperature of 50 degrees Fahrenheit.[8]

With regard to testing protocols, the Siting Board agrees that the TPS should specify testing methods. Accordingly, the Siting Board amends Section 12.02 (1) of the Emergency Rule to read as follows: "Emission testing shall be conducted in accordance with the Massachusetts Department of Environmental Protection's "Guideline for Source Emission Testing" and in accordance with the U.S. Environmental Protection Agency tests as specified in 40 CFR Part 60, Appendix A; 40 CFR Part 60, Subpart GG; 40 CFR Parts 72 and 75; or in accordance with another methodology approved by the Massachusetts Department of

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[8] The TPS does not prohibit applicants from converting test results from another temperature to that of 50 degrees F provided this is done in accordance with appropriate industry conversion procedures.

Environmental Protection."

With regard to the comment that the TPS should be based on emissions at "base load", the Siting Board assumes that this means 100% load during ordinary operations. The Siting Board notes that Table I (criteria pollutant emission limits) already states this. The Siting Board will add this note to Table II (non-criteria pollutants).

With regard to testing for heavy metals, the Siting Board does not intend to require a generating facility proponent to test for, model, or otherwise calculate emissions levels for pollutants which cannot, as a matter of chemistry, result from the combustion of the primary fuel proposed for that facility. We therefore revise the Emergency Rule to add the following language at the end of 980 CMR 12.02(1): "The Energy Facilities Siting Board may request copies of guarantees, work papers, or other documents to verify expected generating facility emissions; however, applicants proposing the use of fuel types that do not contain pollutants specified in the TPS and that when burned do not result in pollutants specified in the TPS, will not be required to provide modelling or testing results, guarantees, work papers or other similar documents with respect to those pollutants."

With regard to emission performance guarantees, the Siting Board revises the Emergency Rule at 980 CMR 12.02(1) to ensure that such performance guarantees need only be provided when available. The revision is as follows: "Such analysis shall include a summary of the proposed facility's expected emissions, a description of the modelling or other analyses used to derive the expected emissions, and where performance guarantees are available from the equipment manufacturer, a description of the performance guarantees".

C. Prospective versus Retroactive Application of the TPS

1. Summary of Comments

Three of the commenters, Sithe, S&G, and USGen, recommended that the language of the Emergency Rule be modified to provide that any future changes to the pollutant-specific emissions levels set forth in the TPS will not be applied retroactively. Sithe Comments at 3-4; USGen Comments at 3-4; S&C Comments at 1. In their comments, both Sithe and USGen offered proposed language to implement Sithe's suggestion that "a project's compliance with [the] TPS should be based on the TPS in effect at the time the petition is filed, regardless of future changes in the TPS." Sithe Comments at Appendix A; USGen Comments at 4.

2. Analysis and Findings

With respect to the application of the TPS to petitions filed with the Siting Board, G.L. c. § 69J¼ expressly provides that:

. . . nothing in this chapter shall be construed as requiring the board to make

> findings regarding alternative generating technologies for a proposed generating facility whose expected emissions meet the technology performance standard in effect at the time of filing. (emphasis added).

The Siting Board agrees that including language in the TPS which tracks the statutory language of G.L. c. 164, § 69J¼ would be consistent with the Legislative intent that the TPS be applied prospectively, not retroactively. Inclusion of such language in the final regulation

also would serve to prevent any potential confusion on this issue. Accordingly, the Siting Board hereby modifies the Emergency Rule at 980 C.M.R 12.03(3) to read as follows:

> 12.03: Technology Performance Standards
>
> (3) Updating to the Technology Performance Standards. The Energy Facilities Siting Board will update the technology performance standards as necessary to reflect improvements in fossil fuel generating and control technologies. Any such updates or new technology performance standards will not apply retroactively to a proposed generating facility with expected emissions that satisfied the technology performance standards in effect on the date the applicant filed its petition for approval to construct the facility.

D. Other Comments

1. Summary of Comments

A number of commenters encouraged the Siting Board to expand the scope of the TPS emergency rulemaking to include matters other than the establishment of generating facility emissions levels for the purpose of streamlining the review of facility petitions filed with the Board. MASSPIRG, CWA, and the Sierra Club, for example, suggested that the emergency rulemaking be expanded to include the promulgation of "guidelines which spell out the criteria by which the Board will review the regional cumulative health and environmental impacts" of proposed generation facilities (CWA Comments at 2; MASSPIRG Comments at 1, 3-4; Sierra Club Comments at 1-2). MASSPIRG noted in its comments that it "is particularly troubled that the Siting Board omitted [these] statutorily-mandated guidelines . . . from this rulemaking" (MASSPIRG Comments at 1). MASSPIRG and the Sierra Club also suggested that the TPS be expanded to include specific criteria for evaluating facilities whose expected air emissions will exceed the levels set forth in the TPS, "which ensure that dirty power plants . . . are substantially disfavored . . ." and which would ameliorate "the comparatively vague statutory language which allows for an overly large amount of discretion by the Siting Board." Sierra Club Comments at 1; see also, MASSPIRG Comments at 1, 3-4.

2. Analysis and Findings

MASSPIRG's suggestion that the Siting Board has failed to include statutorily-mandated matters within its TPS rulemaking is not supported by the statutory language of G.L. c. 164, § 69J¼, the section of the Electric Restructuring Act to which MASSPIRG points in support of its position.

As noted earlier, the Electric Restructuring Act mandates that the Siting Board promulgate a TPS. G.L. c. 164, § 69J¼, second paragraph. Section 69J¼ also includes a sub-section authorizing (but not requiring) the Siting Board to establish petition filing guidelines, for the purpose of eliciting data from project applicants regarding the local and regional health and environmental impacts, including the cumulative impacts, of proposed generating facilities. G.L. c. 164, § 69J¼, fourth paragraph. While the Siting Board could have chosen to embark on a rulemaking that encompassed all of its authority under § 69J¼, or under the Restructuring Act as a whole,[9] the Board has elected instead to proceed at this time, by means of an emergency rulemaking, with promulgation of those regulations mandated by the Act.

The suggestion by MASSPIRG and Sierra Club that the Siting Board establish in this rulemaking new criteria for evaluating proposed facilities with emissions that will exceed the levels in the TPS, would have the Board expand the rulemaking beyond its noticed scope, a result that is incompatible with the requirements of Chapter 30A and with principles of due process. Moreover, such criteria were not included in the Emergency Rule, and thus were not noticed, because their inclusion was unnecessary. As discussed above, the sole purpose, and effect, of the TPS is to exempt those facilities whose emissions will satisfy the TPS, from the need to conduct an alternative technologies analysis. Upon promulgation of the TPS as a final rule, those facilities which cannot meet the TPS emission levels will remain subject to full Siting Board review, including an alternative technologies review, pursuant to G.L. c. 164, § 69J¼.

## IV. DECISION

The Energy Facilities Siting Board hereby approves the Emergency Rule, as amended herein, for filing with the Secretary of State as a final regulation at 980 C. M. R. 12.00 ("Final Rule"). A copy of the Final Rule is attached hereto as Appendix A.

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[9] The Electric Restructuring Act also provides the Siting Board with new authority to conduct a rulemaking to establish a minimum threshold for its jurisdiction over natural gas storage facilities. G.L. c. 164, § 69H.

APPROVED by the Energy Facilities Siting Board at its meeting of July 9, 1998, by the members and designees present and voting: Sonia Hamel, Acting Chair (for Trudy Coxe, Secretary of Environmental Affairs); James Connelly (Commissioner, DTE); Anna Blumkin (for David A. Tibbetts, Director of Economic Development); Nancy Brockway (Public Member).

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Sonia Hamel, Acting Chair
Energy Facilities Siting Board