Decisions and Orders

Massachusetts Energy Facilities Siting Board

VOLUME 11

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COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Board

Proposed Rulemaking Regarding A Technical Performance Standard for the Air Emissions from New Electric Generating Facilities

EFSB 98-3

ACTION BY CONSENT

This Action by Consent is made pursuant to authority granted the Chair of the Energy Facilities Siting Board ("Siting Board") under 980 C.M.R. § 2.06. Section 2.06 provides the Siting Board with authority to render a decision "when it would be a hardship to the public welfare to defer the decision until the next scheduled meeting of the [Siting Board]." 980 C.M.R. § 2.06(1). This Action by Consent authorizes promulgation by the Siting Board of an Emergency Regulation which establishes a technical performance standard for air emissions from new electric generating facilities in the Commonwealth.

1. Introduction

G.L. c. 164, § 69J1/4, added by St. 1997, c. 164 ("Electric Restructuring Act"), requires the Siting Board "periodically" to "conduct a rulemaking to establish a technology performance standard ("TPS") for generating facilities [air] emissions..." St. 1997, c. 164, § 210. Section 210 of the Electric Restructuring Act contemplates that the TPS would be used to determine the scope of the Siting Board's review of generating facility petitions filed for review pursuant to § 69J1/4. Specifically, if expected facility air emissions exceed the levels set in the TPS, facility proponents must provide the Siting Board with information regarding the cost, reliability and environmental impacts of other fossil fuel generating technologies, and the Siting Board 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, § 69J1/4. For those facilities with expected air emissions that will meet or will be lower than the levels set in the TPS, such an alternative technologies analysis will not be required.

In response to the statutory mandate set forth in § 69J1/4, the Siting Board, with input from the Department of Environmental Protection ("DEP"), has developed a TPS in the form of an emergency regulation ("Emergency Regulation"). As expressly required by § 69J1/4, the Emergency Regulation sets forth pollutant-specific emissions limits for air emissions from new generating facilities. The 22 pollutant-specific limits contained in the Emergency Regulation "reflect emission rates that are achievable by state of the art fossil fuel generating and control technologies, as demonstrated by air permits for construction that

have been issued by [DEP]." G. L. c. 164, § 69J1/4.[1] DEP has reviewed the emissions limits in the Emergency Regulation, and agrees with the Siting Board that they represent the emissions of a natural gas-fired electric generating facility with "state of the art environmental performance characteristics" (G.L. c. 164, § 69J1/4) while also incorporating the additional mandate in §69J1/4 that the TPS promote the control and reduction of facility-related water withdrawals. G.L. c. 164, §69J1/4.

2. Promulgation Process

The Siting Board currently has pending before it a petition to construct a generating facility, filed for review pursuant to G.L. c. 164, § 69J1/4.[2] The Siting Board anticipates that additional such petitions will be filed imminently. To prevent any undue delay in Siting Board review of these petitions, or in the review of future generating facility petitions, the Siting Board hereby determines that initial issuance of the TPS as an emergency regulation is warranted. Subject to the receipt of all necessary regulatory approvals, it is anticipated that the TPS will be filed with the Secretary of State on or about May 1, 1998, and will be issued as an emergency regulation on May 15, 1998.

As required by the Siting Board's regulations, and in accordance with Siting Board practice, issuance of the TPS as an emergency regulation must be followed within three months by a public hearing and comment period, and by the promulgation of the TPS as a final regulation. It is anticipated that the public hearing regarding the TPS will be held on or about May 20, 1998 and, therefore, that the required ten-day comment period will end on or about June 1, 1998. If this schedule is met, it is expected that the TPS will be filed with the Secretary of State on or about July 24, 1998, and issued as a final regulation on or about August 7, 1998. The Siting Board hereby directs staff to take all steps necessary to bring about the promulgation of the emergency and final regulations consistent with this schedule.

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1 The limits in the TPS were developed based on the air permits issued by DEP for the three generating facilities most recently approved by the Siting Board. These facilities are the Millennium Power Partners LP generating facility in Charlton, Massachusetts [Air Permit issued November 26, 1997]; the Berkshire Power Development, Inc. generating facility in Agawam, Massachusetts [Air Permit issued September 22, 1997]; and the Dighton Power generating facility in Dighton, Massachusetts [Air Permit issued August 28, 1997].

2 This petition to construct was filed with the Siting Board by Infrastructure Development Corporation ("IDC"), and is docketed as EFSB 97-5.

3. Action by Consent

Now, therefore, the Siting Board by unanimous written consent does hereby approve the promulgation of the attached "Technology Performance Standard" as an emergency regulation at 980 C.M.R. 12.00.

This Action by Consent may be executed in any number of counterparts, each of which shall be an original, but all of which constitute one agreement, and shall be dated and become effective when the copies bearing all of the signatures of the Siting Board members are received by the Chair. 980 C.M.R § 2.06(2).

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Department of Telecommunications and Energy

W. Robert Keating, Commissioner
Department of Telecommunications and Energy

David L. O'Connor
for David A. Tibbetts
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Sonia Hamel
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980 CMR 12.00: TECHNOLOGY PERFORMANCE STANDARDS

Section

12.01: General
12.02: Procedures
12.03: Technology Performance Standards

12.01: General

(1) Purpose. The purpose of 980 CMR 12.00 is to streamline the Energy Facilities Siting Board's review of petitions to construct generating facilities which have state of the art environmental performance characteristics.

(2) Scope. 980 CMR 12.00 applies to any application to construct a generating facility as that term is defined in M.G.L. c. 164, § 69G, filed for review pursuant to M.G.L. c. 164, § 69J¼. These regulations shall not in any way supersede or impair the authority of the Department of Environmental Protection with respect to such facilities.

(3) Statutory Authority. 980 CMR 12.00 is adopted pursuant to M.G.L. c. 164, § 69J¼, added by St. 1997, c. 164, § 210, which requires the Energy Facilities Siting Board to establish a technology performance standard for electric generating facility emissions, including, but not limited to, emissions of sulfur dioxide, nitrogen oxides, particulate matter, fine particulates, carbon monoxide, volatile organic compounds, and heavy metals.

12.02: Procedures

(1) Application of Technology Performance Standards. Any petition for approval to construct a generating facility which is filed for review pursuant to M.G.L. c. 164, § 69J¼ must include an analysis of the proposed facility's expected emissions of the criteria and non-criteria pollutants listed in 980 CMR 12.03. Such analysis shall include a summary of the proposed facility's expected emissions, and a description of the performance guarantees, modelling or other analyses used to derive the expected emissions. If the expected emissions of the proposed generating facility exceed the levels set forth in 980 CMR 12.03 for any pollutant or pollutants, the applicant must provide the information listed in 980 CMR 12.02(2) as part of its petition. The Energy Facilities Siting Board may request copies of guarantees, work papers, or other documents, if necessary to verify the expected emissions.

(2) Additional Information Requirements. An applicant proposing to construct a facility with one or more emissions in excess of the emission levels set forth in 980 CMR 12.03 must provide the following additional information with its petition:

(a) The applicant shall document the reliability of the proposed generation technology throughout the industry and evaluate the reliability of the proposed fuel supply in Massachusetts.

12.02: continued

(b) The applicant shall provide the cost of the technology per megawatt hour (inclusive of capital costs, operating and fuel costs, and decommissioning costs) relative to other fossil fuel generating technologies.
(c) The applicant shall discuss how the proposed facility will enhance New England's energy mix and prevent overdependence on one or more fuel sources.
(d) The applicant shall provide information comparing the overall environmental impacts associated with the proposed facility with the overall environmental impacts of facilities using other fossil fuel generating technologies.

12.03: Technology Performance Standards

(1) Technology Performance Standards for Criteria Pollutants. The following are the technology performance standards for criteria pollutants:

Name of Pollutant	**Technology Performance Standard** (Pounds per Megawatt-Hour Burning Primary Fuel 100% load at 50 degrees Fahrenheit)
Sulfur Dioxide	0.021
Nitrogen Oxides	0.120
Fine Particulates - PM10	0.081
Particulate Matter	0.081
Carbon Monoxide	0.077
Volatile Organic Compounds	0.035

(2) Technology Performance Standards for Non-Criteria Pollutants. The following are the technology performance standards for non-criteria pollutants:

Pollutant	**Technology Performance Standard** (Pounds per Megawatt-Hour Burning Primary Fuel)
Antimony	0.00017
Arsenic	0.00004
Beryllium	0.0000037

12.03: Continued

Pollutant	**Technology Performance Standard** (Pounds per Megawatt-Hour Burning Primary Fuel)
Cadmium	0.000033
Chromium	0.00033
Cobalt	0.00007
Copper	0.01
Lead	0.00045
Manganese	0.0026
Mercury	0.0000074
Nickel	0.0093
Nickel Oxide	0.012
Phosphorus	0.0023
Selenium	0.00004
Vanadium	0.000037
Vanadium Pentoxide	0.00012

The Board will update the technology performance standards as necessary to reflect improvements in pollution control technologies.

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Board

Request of Massachusetts Development Finance Agency for an Advisory Ruling pursuant to 980 CMR, § 3.02(7), regarding jurisdiction of a proposed 69 kV transmission line	)

ACTION BY CONSENT

I. PROCEDURAL HISTORY

This Action by Consent is made pursuant to authority granted the Chairman of the Energy Facilities Siting Board ("Siting Board") under 980 CMR, § 2.06. Section 2.06 provides the Siting Board with the authority to render a decision "when it would be a hardship to the public welfare to defer the decision until the next scheduled meeting of the [Siting Board]." 980 CMR, § 2.06(1).

By letter dated June 23, 2000 ("Request") and signed by its attorneys, Kenneth M. Barna, Robert D. Shapiro, and Christopher J. Pollart, Rubin and Rudman LLP, Massachusetts Development Finance Agency ("MDFA") petitioned the Siting Board for an advisory ruling pursuant to the provisions of 980 CMR, § 3.02(7). The Request seeks the opinion of the Siting Board as to whether the construction of a 69 kV transmission line greater in length than one mile by the MDFA at the former Fort Devens, located within the towns of Ayer, Harvard, and Shirley, is jurisdictional to the Siting Board under G.L. c. 164.

In its Request, MDFA states a reliable source of electricity is required for American Superconductor, which will locate at Fort Devens (Request at 1). In order to meet the energy needs of American Superconductor and future development at Fort Devens, MDFA states it needs to extend a 69 kV transmission line and add a substation (id. at 2). The new 69 kV transmission line would parallel two existing 69 kV transmission lines from the West Main Street Substation, along West Main Street, until a point where the existing transmission lines enter United States Fish and Wildlife ("USFW") land; the new transmission line then would follow a similar path on MDFA land "uphill of the present lines until approximately the Hospital Road area where the new [transmission] line would branch off to follow Hospital Road to the proposed third 69 -- 13.8 kV substation and along the rear of Lot 10 to the Lake George Substation" (id.). In the alternative, MDFA could construct a 13.8 kV upgrade, which MDFA indicates would allow it to serve American Superconductor, but would not provide the long-term reliability and economic advantages of the 69 kV project (id. at 2-3).

MDFA states it needs to make a decision as to which type of transmission facilities to construct approximately forty-five days from June 23, 2000, and requests a ruling issue by August 15, 2000 (id. at 10). The purpose of this advisory ruling is to enable MDFA to determine whether it will proceed to construct a 69 kV transmission line which is greater than one mile in length, or a 13.8 kV upgrade, which would not qualify as a "facility" under G.L. c. 164, § 69G and therefore would not be jurisdictional to the Siting Board (id. at 2).

II. POSITION OF MDFA

MDFA argues it is generally exempt from state regulation because its enabling legislation provides it:

> shall not be subject to the supervision or control of [the executive office of administration and finance] or of any board, bureau, department or other agency of the commonwealth except as specifically provided in this chapter.

G.L. c. 23G, § 2(a) (id. at 8). MDFA interprets this language to mean it is exempt from Siting Board regulation unless c. 23G specifically makes MDFA or the Massachusetts Government Land Bank[1] subject to the Siting Board's jurisdiction (id.). Because c. 23G does not specifically make the MDFA subject to the Siting Board's jurisdiction, MDFA suggests it is exempt (id., citing City of New Bedford v. New Bedford, Woods Hole, Martha's Vineyard & Nantucket S. S. Auth., 329 Mass. 243 (1952)). Moreover, the "Legislature specifically set forth the regulatory obligations which would apply to development at Devens" at St. 1993, c. 498, §§ 9-11, which regulatory obligations do not include the Siting Board (id. at 10).

In addition, MDFA argues it is not a "person," as the term is commonly understood in Massachusetts law, and, therefore, not an applicant over which the Siting Board has general jurisdiction as defined in the Siting Board's enabling legislation (id. at 6, citing G.L. c. 164, § 69H).

III. ANALYSIS

Pursuant to G.L. c. 30A, § 8 and 980 CMR, § 3.02(7), the Siting Board has discretion to issue or to decline to issue advisory rulings on the applicability to any person, property, or factual

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[1] MDFA is the successor to the Massachusetts Industrial Finance Agency and the Land Bank. See G.L. c. 23G, § 1 et seq. The Land Bank was created by St. 1975, c. 212 and given certain powers and responsibilities at Fort Devens pursuant to St. 1993, c. 498, § 12. The MDFA is the successor in interest to the Land Bank and as such acquired all of the Land Bank's rights and obligations pursuant to G.L. c. 23G, § 2(j).

situation of any statute or regulation enforced or administered by the Siting Board. Such rulings are not binding upon the Siting Board in any subsequent formal proceeding. Nor may a petitioner for such an advisory ruling plead estoppel if the Siting Board were later, in an actual adjudication based on an evidentiary record, to adopt a view of the law that differed from an earlier advisory ruling. Phipps Product Assoc. v. Massachusetts Bay Transp. Auth., 387 Mass. 687, 693 (1982); McAndrews v. School Comm. of Cambridge, 20 Mass. App. Ct. 356 (1985). In issuing an advisory ruling, the Siting Board does not find any facts or implicitly sanction or accept any of a petitioner's factual assertions or estimates.

Upon due consideration of MDFA's Request, the Siting Board declines to exercise its discretion to issue an advisory ruling in response to MDFA's Request.

The Request poses complex questions of law subject to varying interpretations which are better explored in the context of an adjudicatory (or judicial) proceeding rather than an advisory ruling. MDFA's first argument, that the language in its enabling statute is intended to exempt it from all general regulation not specifically enumerated in its statute, raises vexing questions of law for which relatively little relevant precedent has been established. See City of Boston v. Massachusetts Port Auth., 364 Mass. 639 (1974); see also Secretary of Envtl. Affairs v. Massachusetts Port Auth., 366 Mass. 755 (1975). MDFA's second argument turns on the interpretation of the word "person" as it is used in the Siting Board's statute, and whether there is an intent that it be construed to include agencies such as MDFA. See G.L. c. 4, § 7. Because the intent of the Siting Board's legislative framework is to adjudicate facilities proposed by any public or private entity, and particularly given the Siting Board's long-standing jurisdiction over facilities proposed by municipal electric companies, the Siting Board concludes that the issue is not as clear-cut as MDFA suggests. Id. We conclude this matter also is too complex to rule on in an advisory ruling.

The Siting Board recognizes that its decision not to issue an advisory ruling leaves open the question of what steps MDFA should take to serve American Superconductor. We note that MDFA has at least three courses of action open to it, any of which would allow it to meet American Superconductor's requirements. With respect to the course of action MDFA may pursue regarding the construction of a transmission line to serve American Superconductor without the benefit of an advisory ruling, it may: (1) construct a 13.8 kV transmission line which is clearly not jurisdictional to the Siting Board; (2) construct the 13.8 kV transmission line and file with the Siting Board for an adjudication of the proposed 69 kV transmission line; or (3) seek the advice of counsel as to its regulatory status with the Siting Board and build accordingly.

IV. ORDER

Accordingly, after review and consideration, it is:

ORDERED: That the Request for an Advisory Ruling to determine whether the construction of a 69 kV transmission line greater in length than one mile by the Massachusetts Development Finance Agency is jurisdictional to the Energy Facilities Siting Board, filed June 23, 2000, by the Massachusetts Development Finance Agency, is hereby denied.

This Action by Consent is hereby issued within the required sixty days. 980 CMR, § 3.02(7). This Action by Consent may be executed in any number of counterparts, each of which shall be an original, but all of which constitute one agreement, and shall be dated and become effective when the copies bearing all of the signatures of the Siting Board members are received by the Chairman. 980 CMR, § 2.06(2).

Signed:

James Connelly
Chairman
Energy Facilities Siting Board/
Department of Telecommunications and Energy

Sonia Hamel
For Robert Durand
Secretary of Environmental Affairs

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Commissioner
Department of Telecommunications and Energy

Louis Mandarini, Jr.
Public Member

Deirdre K. Manning
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Joseph Donovan
For Dean Serpa, Acting Director
Department of Economic Development

David L. O'Connor
Commissioner
Division of Energy Resources

IV. ORDER

Accordingly, after review and consideration, it is:

ORDERED: That the Request for an Advisory Ruling to determine whether the construction of a 69 kV transmission line greater in length than one mile by the Massachusetts Development Finance Agency is jurisdictional to the Energy Facilities Siting Board, filed June 23, 2000, by the Massachusetts Development Finance Agency, is hereby denied.

This Action by Consent is hereby issued within the required sixty days. 980 CMR, § 3.02(7). This Action by Consent may be executed in any number of counterparts, each of which shall be an original, but all of which constitute one agreement, and shall be dated and become effective when the copies bearing all of the signatures of the Siting Board members are received by the Chairman. 980 CMR, § 2.06(2).

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COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Board

Request of UAE Lowell Power LLC for an Advisory Ruling pursuant to 980 CMR 3.02(7), regarding jurisdiction of a proposed 96 MW peaking facility	)

ACTION BY CONSENT

This "Action by Consent" is made pursuant to authority granted the Chairman of the Energy Facilities Siting Board ("Siting Board") under 980 CMR 2.06. Section 2.06 provides the Siting Board with the authority to render a decision "when it would be a hardship to the public welfare to defer the decision until the next scheduled meeting of the [Siting Board]." 980 CMR 2.06(1).

By letter dated May 23, 2000 ("Request") and signed by its attorney, Steven Ferry, UAE Lowell Power LLC ("UAE") petitioned the Energy Facilities Siting Board ("Siting Board") for an advisory ruling pursuant to the provisions of 980 CMR 3.02(7). The Request sought the opinion of the Siting Board whether the construction of a 96 MW peaking generation facility ("proposed facility") on land close to or adjacent to an existing 82 megawatt ("MW") plant would be jurisdictional to the Siting Board under G.L. c. 164.

In the Request, UAE states that the existing 82 MW plant in Lowell, Massachusetts is a combined cycle, base load facility that went into commercial operation in 1993 under the ownership of L'Energia Limited Partnership ("L'Energia") (Request at 1). UAE states that, as part of a voluntary restructuring in 1999, UAE assumed ownership of the L'Energia project and the project is now called UAE Lowell Power LLC ("UAE Lowell project") (id. at 2). Further, according to UAE, as part of the restructuring, the L'Energia project was no longer required to maintain its qualifying facility ("QF") status and currently operates as a merchant plant in the New England market (id.).[1]

UAE is contemplating the construction of a 96 MW peaking power generating unit on land close to or adjacent to the exiting 82 MW plant (id. at 2). The proposed facility would be

[1] UAE states that in 1999, L'Energia terminated its QF power sale agreement with Boston Edison, its gas transportation agreement with Colonial Gas Company, and other agreements (Request at 1). UAE states that the Boston Edison and Colonial Gas contract terminations were formally approved by the Department of Telecommunications and Energy approximately one year ago (id.).

fueled only by natural gas and would operate as a merchant facility (id. at 3). UAE asserts that the proposed facility is not jurisdictional to the Siting Board (id. at 4). In support, UAE states that the proposed facility would be less than 100 MW and would not be a segmented element of the existing plant (id.). Specifically, UAE states that the proposed facility would be distinct from the original L'Energia project in that the new facility would enter service approximately eight years after the start of operation at the existing plant, the proposed facility is conceived as a merchant facility, and there would be no integral relationship between the existing plant and the proposed facility (id.).

UAE states that the proposed 96 MW facility, which would employ General Electric simple cycle aero-derivative jet turbines, could be constructed at a variety of locations (id. at 3).[2] UAE states that it seeks to place the proposed facility near the existing plant, which is staffed around the clock (id. at 3). UAE states that the City of Lowell is "extremely supportive" of the proposed facility (id.). UAE states that National Grid/New England Power recommended that UAE reduce its request for interconnection to less than 100 MW in order to use the existing transmission infrastructure (id.). In addition, UAE states that the existing Boston Gas Company natural gas pipeline could provide enough natural gas to power approximately 100 MW (id.).

UAE estimates that the requisite air permit, as well as all local building and land use permits, can be obtained in final form in a "few months" (id. at 4).[3] UAE intends to have the proposed facility operational in a short period of time to meet the existing need for peaking capacity in the New England region (id.).

II. ANALYSIS

G.L. c. 164, § 69G defines a generating facility that is jurisdictional to the Siting Board as "any generating unit designed for or capable of operating at a gross capacity of 100 Megawatts or more, including associated buildings, ancillary structures, transmission and pipeline interconnections that are not otherwise facilities, and fuel storage facilities."[4] Based on the information presented, the proposed project itself would be under the 100 MW threshold and

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2 According to UAE, these turbines are manufactured and designed in increments of 48 MW per turbine (Request at 3).

3 UAE states that the proposed facility will be a minor air source with the potential to emit less than 25 tons per year of nitrogen oxides (Request at 4). UAE states that it will be required to obtain a minor source air permit from the Massachusetts Department of Environmental Protection (id.).

4 We note that as a separate generating unit, the proposed facility is not an ancillary structure associated with the existing plant.

therefore, on its face, not subject to the jurisdiction of the Siting Board.[5]

However, before concluding that the proposed facility is not within its jurisdiction, the Siting Board must consider whether the construction of the 82 MW L'Energia project, followed approximately eight years later by the construction of the proposed facility at a proximate site, may constitute the segmented construction of a single, jurisdictional 178 MW generating facility. The Siting Board notes that, in order to fulfill its mandate to provide for a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost, it must review and approve the construction of all facilities that meet its jurisdictional thresholds, even if such facilities are constructed in several sub-jurisdictional stages. To do otherwise would create an incentive to segment projects for the purpose of avoiding the Siting Board's environmental review.

The Siting Board's statute and regulations provide no direct guidance as to the factors it should consider when assessing whether two or more proximate, non-jurisdictional facilities together constitute a single jurisdictional facility. However, it is the Siting Board's opinion that such a determination must be made on a case-by-case basis, taking into account all relevant circumstances. In this instance, the only factors which suggest the possibility of project segmentation are a commonality of ownership and the physical proximity of the proposed facility site to the site of the existing UAE Lowell project. Set against this, we note that the two projects would be developed approximately eight years apart, and by different developers; that the L'Energia project was conceived as base load cogeneration facility, while the proposed facility would be a merchant peaking facility; and that, while the proposed facility would share some electric and natural gas infrastructure with the UAE Lowell project, the development of the proposed facility would not require any alteration to the UAE Lowell project. In addition, we note that UAE's assertion that the proposed facility could be built in any of a number of locations suggests that it is a stand-alone facility, rather than a segment of a larger, integral project. Based on all of the facts presented, the Siting Board concludes that the UAE Lowell project and the proposed facility are separate generating facilities, and not two parts of an integral project. Our determination of jurisdiction therefore properly is based on the size of the proposed facility alone, and not on the combined size of the existing UAE Lowell project and the proposed facility.

III. ADVISORY RULING

Accordingly, after due consideration of the averments of fact and the foregoing analysis, the Siting Board hereby advises that UAE's proposed 96 MW simple cycle gas generating unit,

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[5] In rendering the requested Advisory Ruling, the Siting Board assumes, but does not expressly find, that all material facts are stated and that the facts are as represented by UAE's attorney in the May 23, 2000 letter.

as described in the request of May 23, 2000, would not be jurisdictional to the Siting Board under G.L. c. 164.

This Action by Consent may be executed in any number of counterparts, each of which shall be an original, but all of which constitute one agreement, and shall be dated and become effective when the copies bearing all of the signatures of the Siting Board members are received by the Chairman. 980 CMR 2.06(2).

Signed:

James Connelly
Chairman
Energy Facilities Siting Board/
Department of Telecommunications and Energy

Sonia Hamel
for Robert Durand
Secretary of Environmental Affairs

W. Robert Keating
Commissioner
Department of Telecommunications and Energy

Louis Mandarini, Jr.
Public Member

Deirdre K. Manning
Commissioner
Department of Telecommunications and Energy

Joseph Donovan
For Dean Serpa, Acting Director
Department of Economic
Development

David L. O'Connor
Commissioner
Division of Energy Resources

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COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Board

In the Matter of the Petition of IDC Bellingham LLC, for Approval to Construct and Operate a 525-MW Bulk Generation Facility in the Town of Bellingham, Massachusetts	)	EFSB 97-5A

FINAL DECISION ON COMPLIANCE

Jolette A. Westbrook
Hearing Officer
September 12, 2000

On the Decision:
Jenna L. Ide

APPEARANCES: John A. DeTore, Esq.
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LIST OF ABBREVIATIONS

Abbreviation	Explanation
AALs	Allowable Ambient Limits
ACC	Air Cooled Condenser
ANP Blackstone Decision	ANP Blackstone Energy Company, EFSB 97-2/98-2 (1999)
Approved configuration	Proposed project using the SW 501G turbines and other components approved in the Final Decision
Bellingham	Town of Bellingham
Bellingham parcel	156 acre parcel in Bellingham where the proposed facility would be located
Berkshire Compliance Decision	Berkshire Power Development, Inc., 7 DOMSB 423 (1997)
BACT	Best available control technology
BECo	Boston Edison Company
BPA	The Box Pond Association
Cavanaugh	Cavanaugh Tocci Associates, Inc.
cfs	Cubic feet per second
CO	Carbon monoxide
CO_2	Carbon dioxide
Company	IDC Bellingham, LLC
Compliance configuration	Proposed project using the GE 7FA gas turbines as discussed in the Compliance Filing
Compliance Filing	March 3, 2000 filing submitted by IDC regarding a change in the Company's choice of turbine for the prosed facility
CTGs	Combustion Turbine Generators
dBA	Decibel
DEIR	Draft Environmental Impact Report
Dighton Power Decision	Dighton Power Associates, EFSB 96-3 (1997)
EMF	Electric and magnetic fields

EPC	Engineering, procurement, and construction
Epsilon	Epsilon Associates. Inc.
FEIR	Final Environmental Impact Report
Final Decision	IDC Bellingham LLC, 9 DOMSB 225 (1999)
GE	General Electric
gpd	Gallons per day
gpy	Gallons per year
HRSG	Heat recovery steam generator
IDC	IDC Bellingham, LLC
Joint Intervenors	The Box Pond Association, Inc., The Concerned Citizens of Bellingham, Inc., and Joan Eckert
L_{90}	The level of noise that is exceeded 90 percent of the time
LAER	Lowest Achievable Emission Rate
lbs/MMBtu	Pounds per million British thermal units
lbs/MW-hr	Pounds per megawatt hour
MDEP	Massachusetts Department of Environmental Protection
Mendon Parcel	65 acre parcel in Mendon abutting the Bellingham parcel
mG	Milligauss
mgd	Million gallons per day
MW	Megawatt
NAAQS	National ambient air quality standards
NEA	Northeast Energy Associates
NEA plant	NEA's existing 300 MW facility in Bellingham
NEPCo	New England Power Company
NHESP	Natural Heritage and Endangered Species Program
1985 MECo/NEPCo Decision	Massachusetts Electric Company et al., 13 DOMSC 119 (1985)
NOx	Nitrogen oxides

O_3	Ground-level ozone
Pb	Lead
PM	Particulates
PM-10	Particulates under 10 microns in size or under
ppm	Parts per million
ROW	Right-of-way
SCR	Selective Catalytic Reduction
SW	Siemens Westinghouse
SILs	Significant Impact Levels
Siting Board	Energy Facilities Siting Board
SO_2	Sulfur dioxide
SOx	Sulfur oxides
STG	Steam Turbine Generator
TEL	Threshold effects exposure limit
Town	Town of Bellingham
TPS	Technology Performance Standards
tpy	Tons per year
USEPA	United states Environmental Protection Agency
VOCs	Volatile organic compounds

The Energy Facilities Siting Board hereby APPROVES subject to conditions the petition of IDC Bellingham LLC to construct a 525-megawatt bulk generating facility at the proposed site in Bellingham, Massachusetts.

I. INTRODUCTION

A. Background

On December 21, 1999, the Energy Facilities Siting Board ("Siting Board") conditionally approved the petition of IDC Bellingham LLC ("IDC" or "Company") to construct a natural gas-fired combined-cycle, electric generating facility with a net nominal electrical output of 700 megawatts ("MW") in Bellingham, Massachusetts ("Bellingham" or "Town").[1] IDC Bellingham, LLC, 9 DOMSB 225, 236 (1999) ("Final Decision"). After the close of evidentiary hearings, but prior to the Siting Board issuing the Final Decision, IDC informed the Siting Board of the possibility that the Company would have to change turbine manufacturers. Id. at 242. The Siting Board concluded that the possibility of a change in turbine manufacturers was not an impediment to the Siting Board issuing a decision, particularly since IDC had indicated that it would change turbines, if necessary, in order to meet the environmental commitments it had made in the underlying proceeding. Id. at 243. Consequently, the Siting Board directed IDC to make a compliance filing regarding the Company's choice of turbine. Id. The Siting Board stated that if the Company's choice of turbine changed, the Siting Board would determine based on the compliance filing whether additional discovery and hearings would be necessary. Id. The Siting Board stated that if additional proceedings were necessary, they would be an extension of the underlying proceeding. Id.

On March 3, 2000, IDC submitted its compliance filing ("Compliance Filing") to the Siting Board. IDC stated that instead of the two Siemens Westinghouse ("SW") 501 G gas turbines it had anticipated using, IDC now intends to use two General Electric ("GE") 7FA gas turbines which, according to the Company, would meet the environmental performance

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[1] The original petition was filed in this case on November 18, 1997 by Infrastructure Development Corporation. On March 10, 1998, Counsel for the petitioner informed the Siting Board that the name of the petitioner had been changed to IDC Bellingham LLC.

commitments IDC made in the underlying proceeding (Exh. CF-IDC-1). IDC stated that the primary reason for the turbine change is that the SW 501 G turbines cannot be purchased with manufacturer guarantees that they would meet the proposed facility's emissions limits, particularly with respect to nitrogen oxide and ammonia slip (id.; Tr. 4, at 384). The Company also stated that in addition to changing to the GE 7FA turbines, it would reconfigure the proposed facility so that the net nominal capacity would be reduced from 700 MW to 525 MW (Exh. CF-IDC-1).

B. Description of Project with GE Turbines

The proposed project using the GE 7FA gas turbines ("compliance configuration") would be located on an approximately 14.5-acre footprint of a 156-acre industrially zoned site ("Bellingham parcel") off Depot Street in Bellingham, Massachusetts.[2,3] The generating facility in the compliance configuration would include the following major components and structures: two GE 7FA gas turbine generators, two heat recovery steam generators ("HRSGs"), one steam turbine generator ("STG"),[4] one air-cooled condenser ("ACC") and a 190-foot dual-flue stack (Exh. CF-IDC-2, at 2-1 to 2-2).[5] All other equipment, including the enhanced selective catalytic reduction ("SCR") unit and oxidation catalyst used for emissions control, would remain

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2 The project using the SW 501 gas turbines ("approved configuration") would have required 17 acres of the same 156-acre site (Exh. CF-IDC-2, at 2-2).

3 As part of the compliance configuration, the Company will maintain an approximately 65-acre parcel of land in the Town of Mendon abutting the Bellingham parcel to serve as permanent buffer between the facility and neighboring businesses and residences to the north and west of the facility ("Mendon parcel") (Exh. CF-IDC-2, at 2-1). The Company stated that it has acquired a purchase option for this land (id.).

4 The shared steam turbine allows for a side-by-side configuration of the two gas turbine/HRSG units as opposed to the end-to-end layout used in the approved configuration (Exh. CF-IDC-2, at 2-1 to 2-2).

5 The generating facility in the approved configuration included: two SW 501G turbine generators, two HRSGs, two STGs, two ACCs and a 190-foot dual flue stack. Final Decision at 236-237.

substantially the same (id. at 2-2). Additional project components, including the water treatment building, the water storage tanks, and the administrative/control room/maintenance building, also would remain essentially the same under either configuration (id. at 2-1 to 2-2; Tr. 3, at 285).[6] In addition, the ammonia storage tank would continue to be surrounded by a dike enclosed by a secondary containment building (Exh. CF-IDC-2, at 2-2; Tr. 3, at 286).

IDC stated that the access point to the proposed site would remain the same with the compliance configuration, but that the access road would be altered slightly to conform to the new site layout (Exh. CF-IDC-2, at 2-1). The Company also stated that the planned interconnection with the 345 kV transmission line on the western side of the site would be unchanged in the compliance configuration, although the swithchyard would be slightly larger (id.; Tr. 3, at 287). Further, the planned interconnection with the Algonquin Gas Transmission Company natural gas transmission pipeline would be unchanged; the proposed facility in the compliance configuration, as in the approved configuration, would burn only natural gas (Exh. CF-IDC-2, at 2-1).

C. Procedural History

On March 3, 2000, IDC submitted its Compliance Filing in accordance with a directive issued by the Siting Board in the Final Decision. Final Decision at 243-244. On March 31, 2000, the Hearing Officer issued a ruling defining the scope of the compliance proceeding and established a procedural schedule (Hearing Officer Ruling, March 31, 2000, IDC Bellingham, LLC, EFSB 97-5). Parties to the underlying case, EFSB 97-5, were made parties to this proceeding.

The Siting Board conducted four days of evidentiary hearings, commencing on June 20, 2000 and ending on June 28, 2000. The Company presented the testimony of the following witnesses: Theodore A. Barten, P.E., Managing Principal of Epsilon Associates, Inc. ("Epsilon"), who testified as to safety, water, and general issues; Donald C. DiCristofaro, Vice

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[6] The facility in the compliance configuration would have one as opposed to two water-glycol coolers (Exh. RR-CF-EFSB-3; Tr. 3, at 286).

President of Environmental Affairs for Infrastructure Development Corporation, LLC, who testified as to air and general issues; David N. Keast, P.E., Consultant in Acoustics, who testified as to noise issues; Samuel G. Mygatt, Principal of Epsilon who testified as to visual and traffic impacts; Stephen R. Pritchard, Vice President of Project Development for Infrastructure Development Corporation, LLC, who testified as to water, project management, engineering, construction, safety, and general issues; and Dale T. Raczynski, P.E. Principal of Epsilon, who testified as to air quality issues. The Box Pond Association, Inc., the Concerned Citizens of Bellingham, and Joan Eckert (collectively "Joint Intervenors") presented the testimony of the following witnesses: Gregory C. Tocci, Cavanaugh Tocci Associates, Inc. ("Cavanaugh"), who testified as to noise issues; and Brion G. Koning, Senior Consultant with Cavanaugh, who testified as to noise issues.

Initial Briefs were submitted by IDC and the Joint Intervenors. Reply briefs were filed by IDC, the Joint Intervenors and East Acres Recreational Vehicles. The record consists of 129 exhibits consisting primarily of information request responses and record request responses.

D. Standard and Scope of Review

1. Standard of Review

In a March 31, 2000 Procedural Order, the Hearing Officer ruled that the standard of review to be used in this proceeding would be the one articulated by the Siting Board in the Berkshire Power Decision on Compliance ("Berkshire Compliance Decision"), 7 DOMSB 423, at 437 (1997). In the Berkshire Compliance Decision, the Siting Board declined to make further inquiry regarding certain project changes if the change did not alter in any substantive way either the assumptions or conclusions reached in its analysis of the project's environmental impacts in the underlying proceeding. Id. at 437. We find no reason to depart from that basic standard in this compliance proceeding. We note that the standard set forth in the Berkshire Compliance Decision is consistent with language in the Final Decision where the Siting Board stated that any additional proceedings held because of a change in IDC's choice of turbine, "would be limited to the issues raised by the changes to IDC's proposal." Final Decision at 244. Further, to expand the scope of review to matters other than the changes to the proposed facility presented in the

Compliance Filing would raise administrative efficiency concerns, and could result in the relitigation of issues decided in the underlying case.

Here, IDC has proposed changes to the configuration of the proposed facility which would result in changes in the levels of a number of the environmental impacts reviewed by the Siting Board in the underlying decision. In order to assess whether the changes alter the assumptions or conclusions reached in the Siting Board's analysis of environmental impacts, the Siting Board must compare the environmental impacts of the facility as approved by the Siting Board with the environmental impacts of the proposed facility in the compliance configuration. The Siting Board then must determine whether the changes alter the balance of environmental considerations reached in the underlying decision. Consequently, for each class of environmental impacts reviewed in the underlying decision, the Siting Board reviews the information provided by the Company and the Joint Intervenors in this proceeding to determine whether the impacts of the proposed facility in the compliance configuration would be greater than, less than, or substantially similar to the impacts reviewed in the underlying decision.

2. Scope of Review

a. Position of the Joint Intervenors

In their Brief and Reply Brief, the Joint Intervenors request that the Siting Board also address in this proceeding certain issues regarding the appropriate methodology for measuring ambient noise. Specifically, the Joint Intervenors argue that it is within the scope of review for this case for the Siting Board to determine whether the proposed project in the compliance configuration is able to meet Condition D of the Final Decision, which requires that noise increases at a specific monitoring point, Receptor R-4, be limited to five decibels ("dBA") above ambient levels (Joint Intervenors' Reply Brief at 1). The Joint Intervenors state that as a threshold matter, the Siting Board must determine how IDC should ascertain this ambient sound level (Joint Intervenors' Brief at 2). The Joint Intervenors submit that it is appropriate to determine in this proceeding how ambient levels should be measured, and allege that the Siting Board did not specify a particular ambient for the basis of the five dBA increase limit in the Final Decision, but rather "understood that the ambient would be developed in the future, based on

more rigorous data collection" (id. at 11). The Joint Intervenors argue that if the Siting Board had intended to limit noise increases to no more than five dBA above the ambient presented for receptor R-4 in the underlying proceeding, the Siting Board could have established absolute noise limits for the proposed facility at that receptor (Joint Intervenors' Reply Brief at 2). The Joint Intervenors assert that in determining ambient levels, the Siting Board should give deference to the technical expertise of its sister agency, the Massachusetts Department of Environmental Protection ("MDEP") and calculate ambient in the same manner as the MDEP (id. at 3). The Joint Intervenors argue that the five dBA increase limit was an essential basis for the Siting Board's finding that the project would minimize environmental impacts (id. at 9-10). Therefore, the Joint Intervenors submit that the Siting Board must either deny approval of the proposed project in the compliance configuration (which they assert does not comply with Condition D) or order the Company to impose additional noise mitigation measures to meet the five dBA limit at receptor R-4 using the methodology preferred by the Joint Intervenors (id. at 1-2, 9-11).

b. IDC's Response

IDC argues that the noise testimony presented by the Joint Intervenors in this proceeding is outside the proper scope of review for this proceeding insofar as the Joint Intervenors seek to introduce testimony regarding new ambient noise measurements (IDC Brief at 23). IDC asserts that it has designed noise mitigation measures to limit noise increases to five dBA over the "already-established ambient L_{90}, as directed by the Siting Board" in the Final Decision (id. at 25). IDC argues that to now apply this five dBA standard to a different ambient is tantamount to re-opening the record and relitigating the issue of noise (id.). Further, IDC disputes the Joint Intervenors' assertion that the Siting Board "understood" that the ambient referenced in Condition D would be developed in the future, arguing that this assertion "ignores the relationship between the five dBA increase and the ambient noise levels established in the underlying case" (IDC Reply Brief at 17). IDC states that the March 31, 2000 Hearing Officer Ruling in this case, which defined the scope of review for the Compliance Filing, is consistent with the Final Decision, which "can only be construed to permit further proceedings related

exclusively to changes resulting from a change in turbines" (IDC Brief at 24).

3. Analysis

As an initial matter, the Siting Board notes that this proceeding was undertaken in compliance with Condition A of the Final Decision,[7] which directs IDC to "make a compliance filing with the Siting Board regarding the Company's choice of turbines." Final Decision at 359. Condition A clearly states that "... any such additional proceedings [in response to the compliance filing] would be limited to the issues raised by changes to IDC's proposal." Id. Issues which could have been, but were not, raised in the underlying proceeding are not appropriate topics for review in this proceeding; neither is this proceeding an appropriate forum for relitigating issues decided in the underlying proceeding.

The Siting Board has reviewed the methodological arguments raised by the Joint Intervenors, and concludes that they are not "issues raised by changes to IDC's proposal", and therefore are not properly before the Siting Board at this time. Instead, the arguments of the Joint Intervenors consist of (1) arguments regarding the proper interpretation of Condition D[8] of

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[7] This proceeding is not a generalized compliance proceeding, in which IDC must demonstrate compliance with all conditions in the Final Decision (see Joint Intervenors' Reply Brief at 2). Such an inquiry would be premature, as most of the conditions set forth in the Final Decision are not preconstruction conditions, but rather are to be undertaken either during the construction of the proposed facility, or after it enters into commercial operation.

[8] While the Joint Intervenors focus primarily on Condition D of the Final Decision, their brief also discusses a Siting Board requirement for "more rigorous data collection" to be conducted in the future, in an apparent reference to Condition E. We note that Condition E of the Final Decision requires IDC to develop a post-construction noise monitoring protocol, baseline noise measurements, and noise monitoring schedule in consultation with the Bellingham Board of Selectmen and MDEP, and after comment by intervenors in this case. Final Decision at 360-361. To the extent that the Joint Intervenors are seeking to develop the protocol and baseline noise measurements referenced in Condition E as part of this proceeding, we note that such efforts are misplaced. Condition E clearly requires that the protocol be developed through consultation among the Board of Selectmen, MDEP and IDC, and only then provided to the Siting Board. There is no

(continued...)

the Final Decision (specifically with regard to the ambient noise level assumed when IDC was required to limit noise increases at Receptor R-4 to 5 dBA above ambient), and (2) arguments regarding noise measurement methodology. These are both general concerns which could be raised regardless of plant configuration, and which are unrelated to the proposed change in plant configuration which is the subject of this proceeding.

The Joint Intervenors contend that the Siting Board must, in this proceeding, determine whether the proposed facility in the compliance configuration would comply with Condition D of the underlying decision. The Siting Board agrees, and addresses this issue in Section II. F, below. However, the Joint Intervenors' methodological arguments constitute an attempt to reopen an issue already decided in the underlying proceeding, namely the level of noise mitigation to be incorporated into the design of the proposed facility. In Condition D of the Final Decision, the Siting Board directed IDC "to implement additional noise mitigation that would limit L_{90} noise increases at receptor R-4 to 5 dBA." Final Decision at 315. A reading of the analysis leading up to Condition D makes it clear that this increase was to be above the ambient presented by IDC in the underlying proceeding. In the Final Decision, the Siting Board first reviewed evidence presented by intervenors which challenged the ambient levels presented by IDC,[9] and concluded that the evidence "[did] not cast doubt upon the accuracy of IDC's measurements." Id. at 312. The Siting Board recognized that future ambient noise levels in the Box Pond area could be slightly lower than those monitored by IDC, and determined that it was important to take "all cost-effective measures to limit noise increases" in the Box Pond area. Id. at 314-315. Based on its acceptance of IDC's measurement of existing ambient noise, the Siting Board then found the alternative of limiting increases at R-4 to 5 dBA at a cost of approximately

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8 (...continued)
indication in the record that such consultation has taken place, and we do not intend in this decision to preempt such consultation in a proceeding closed to both the Board of Selectmen and MDEP.

9 The Siting Board notes that issues of noise measurement methodology were raised in the underlying proceeding, and that much of the evidence presented here by the Joint Intervenors with respect to noise measurement methodology could, and should properly, have been presented in the underlying proceeding.

$1.4 million to be cost-effective "in light of the uncertainty regarding future ambient noise levels and our concern about the residences along Box Pond Road. . . ." Id. at 315. The Siting Board did not require the adoption of more extensive noise mitigation packages costing approximately $2.66 million and $8.08 million. Id. at 305.

Thus, a careful reading of the Final Decision makes it clear that: (1) the Siting Board used the ambient noise measurements presented by IDC in determining whether to require noise mitigation measures beyond those initially proposed by the Company; and (2) in Condition D, the Siting Board required IDC to incorporate in its facility design additional noise mitigation which was specifically designed to limit noise increases to 5 dBA above the ambient presented in the underlying proceeding.[10] In doing so, the Siting Board implicitly accepted the ambient noise measurements presented by IDC for the purpose of setting Condition D. The Final Decision also shows that the Siting Board addressed the uncertainty regarding future ambient noise levels, not by calling for additional evidentiary hearings on the subject,[11] but by holding the increases over existing ambient levels to a relatively conservative 5 dBA. Further, the Final Decision makes it clear that, consistent with its statutory mandate to minimize both the environmental impacts of the proposed facility and the cost of environmental mitigation, the Siting Board imposed Condition D after determining, based on the record, that this specific level of noise mitigation

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[10] At the December 17, 1999 Siting Board meeting, staff stated, in response to a question from the Siting Board, that Condition D "is directed at the proposal the company has made to limit noise based on monitoring that was done before. So it's done in the context of a 5 decibel increase above the baseline levels set forth in [IDC's] applications." (December 17, 1999 Siting Board Transcript at 27.) Staff also stated that "The record indicates that the baseline would be set – the number that is set as baseline is 35 decibels." (Id. at 28.)

[11] Condition D does not call for further hearings on ambient noise levels. In cases where the record is inadequate to determine whether costs and environmental impacts have been appropriately balanced, it is the Siting Board's practice to explicitly require the filing of additional information and to specify the need for additional review before a final approval is issued. See, e.g., Eastern Energy Company, 22 DOMSC at 188, 361-362 (1991) (Siting Council required the submission of additional data on the minimizing of SO_2 emissions and offsetting of CO_2 emissions, and specified the need for further review in a compliance filing).

was cost-effective. The Siting Board would not have made such a finding if it had anticipated developing a further evidentiary record on noise mitigation. Thus, this matter has been adjudicated in the underlying proceeding; the Joint Intervenors have stated no basis for its reopening in this proceeding.

In summary, we find that the question of whether the proposed facility in the compliance configuration complies with Condition D of the Final Decision is within the scope of this proceeding. Consequently, in Section II. F, below, we examine whether the proposed facility in the compliance configuration would limit noise increases at Receptor R-4 to 5 dBA above the ambient presented in the underlying proceeding. However, the methodological evidence and argument presented by the Joint Intervenors should properly have been raised in the underlying proceeding, and represents an attempt to relitigate issues decided in the underlying proceeding. This evidence and argument therefore is outside the scope of this compliance proceeding, and will not be addressed further in this decision.

II. ENVIRONMENTAL IMPACTS

A. Air Impacts

Under the approved configuration, the Company had proposed to achieve Best Available Control Technology ("BACT") for carbon monoxide ("CO"), particulate matter ("PM-10"), sulfur dioxide ("SO_2"), lead ("Pb"), and volatile organic compounds ("VOCs") (Exh. CF-EFSB-EA-8-R3, at 4-11). Since the Massachusetts region is out of compliance with air quality standards for ozone, the Company was required to meet Lowest Achievable Emission Rate ("LAER") for nitrogen oxide ("NO_X"), a precursor of ozone, and to secure offsets for NO_X at a ratio of 1.26 to 1 (id. at 3-1 to 3-2).[12]

In the underlying case, the Siting Board reviewed the proposed facility's expected emissions of criteria and non-criteria pollutants and found that the proposed facility would meet the Siting Board's Technology Performance Standards ("TPS") for both criteria and non-criteria

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12 IDC indicated that its anticipated VOCs emissions were not high enough to trigger LAER or offset requirements (Exh. CF-EFSB-EA-8-R3, at 3-1 to 3-2).

pollutants, and that consequently no alternative technologies assessment was required for the proposed facility. Final Decision at 268. The Siting Board also found that the maximum modeled concentrations of all criteria and non-criteria pollutants were below regulatory thresholds.[13] Id. at 269. In addition, the Siting Board reviewed an analysis of the cumulative air quality impacts of the proposed facility and other existing or proposed facilities and determined that the maximum combined concentrations of criteria pollutants were between 21 and 63 percent of the National Ambient Air Quality Standards ("NAAQS"), and that IDC's contribution at the point of maximum cumulative impact was less than one percent of the cumulative pollutant concentrations. Id. Further, the Siting Board found that the incorporation of a 190-foot stack height would minimize air quality impacts consistent with minimizing visual impacts. Id. Finally, the Siting Board found that, with implementation of NO_X and carbon dioxide ("CO_2") offset measures, the environmental impacts of the proposed facility at the proposed site would be minimized with respect to air quality. Id. at 275.

In its Compliance Filing, IDC compared the expected emissions of the proposed facility in the approved configuration and the compliance configuration, and asserted that annual emissions of all criteria pollutants would be reduced using the compliance configuration (Exh. CF-IDC-2, at 3-1). Table 1, below, shows the expected emissions for criteria pollutants for each configuration. The Company explained that annual PM-10 emissions would not be significantly reduced using the compliance configuration because the vendor guarantees in lbs per MMBtu for PM-10 emission rates are higher for the GE turbines than for the SW turbines (Exh. CF-EFSB-A-3). IDC noted that the GE turbines have been in operation since the early 1990's, and that consequently the vendors were able to provide emissions data based upon actual use over a number of years (Exh. CF-BPA-1; Tr. 4, at 371-371).

IDC asserted that, even though the GE turbine is slightly less efficient, emissions of both

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[13] The Siting Board compared the maximum concentrations of the proposed facility's emissions to significant impact levels ("SILs") for criteria pollutants set by the United States Environmental Protection Agency ("USEPA"), and toxic effect exposure limits ("TELs") and allowable ambient levels ("AALs") for non-criteria pollutants set by the MDEP. Final Decision at 269.

criteria and non criteria pollutants from the proposed facility in the compliance configuration would be well within the limits set by the Siting Board in its TPS (Exh. CF-EFSB-A-1; Tr. 4, at 340-341).[14] The Company stated that the proposed facility would meet BACT for all criteria pollutants and LAER for NO_X using either configuration (Exh. CF-BPA-A-5 (att.) at 4-1, 4-13).[15]

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[14] The Company testified that the GE turbine's lower efficiency affected the emission rates of all pollutants, but only NO_X and PM-10 had quantifiable increases in emission rates, increasing by .003 pounds per megawatt hour ("lbs/MW-hr") and .01 lbs/MW-hr, respectively (Exhs. CF-EFSB-A-1; CF-EFSB-EA-3-R2; Tr. 4, at 340-343).

[15] The Company testified that the regulatory requirements are similar for both facility configurations (Tr. 4, at 364). However, the Company noted that with the compliance configuration, the proposed facility's emissions of SO_2 and CO would be under the federal regulatory thresholds for BACT (id.). IDC further testified that Massachusetts BACT still applies to all criteria pollutants, and thus there is no difference in the air quality controls being applied in this case (id. at 365).

Table 1: Annual Emissions of Criteria and Non-Criteria Pollutants, in Tons Per Year ("tpy")

Pollutant	Approved Configuration	Compliance Configuration
Nitrogen Oxides	160	122
Carbon Monoxide	270	86
Volatile Organic Compounds	49	22
Total Particulate Matter	87	86
Sulfur Dioxide	50	37
Lead	0.34	0.26
Sulfuric Acid Mist	19	12
Ammonia	60	45
Formaldehyde	29	10
Arsenic	0.00104	0.00079
Cadmium	0.0179	0.0136
Chromium (IV)	0.0276	0.0209
Mercury	0.00936	0.00710

Source: Exh. CF-IDC-2 (tabs. 3.1-1, 3.1-2).

IDC provided a comparison of maximum pollutant concentrations using the worst-case operating scenarios for each configuration (Exh. CF-IDC-2, at 3-3 to 3-4).[16] The Company indicated that the compliance configuration resulted in lower worst-case concentrations for all

[16] The Company analyzed plant operation at 100, 75, and 50 percent of plant capacity under a variety of ambient temperatures (Exh. CF-EFSB-A-5). The Company explained that the worst-case operating and ambient conditions used to produce the maximum impacts of the compliance configuration were different from those used to evaluate the approved configuration (id.). The Company also testified that the number of start-ups and shut-downs and the capacity at which the plant would operate are primarily determined by market conditions and maintenance requirements and should not differ between the two configurations (Tr. 4, at 346-348).

measures of criteria pollutants except 3-hour and 24-hour SO_2 and 24-hour and annual PM-10 (id. at 3-4). The Company also calculated the worst-case impacts of the compliance configuration using the same operating and ambient conditions that it used to evaluate the approved configuration and determined that all pollutant concentrations would decrease, except for annual PM-10, which would remain the same (Exh. CF-EFSB-A-4).[17] The Company provided data showing that the ambient levels of PM-10 and SO_2 in Massachusetts are well below NAAQS (Exh. CF-BPA-A-5, at 5-13). The Company found that the change from the approved to the compliance configuration would reduce the maximum annual concentrations of all air toxics, would reduce maximum 24-hour concentrations of sulfuric acid, ammonia, and formaldehyde, and would increase maximum 24 hour concentrations of arsenic, cadmium, chromium, lead and mercury (Exh. CF-IDC-2, at 3-5 to 3-6).[18] The Company noted that all annual and 24-hour air toxic concentrations would be below Massachusetts TELs and AALs (id.).

IDC also recalculated the "cumulative impacts" of existing and proposed facilities (calculated as the sum of existing worst-case ambient conditions, worst-case concentrations of pollutants emitted from existing and proposed sources, and IDC's contribution) for the compliance configuration (Exhs. RR-CF-EFSB-12; CF-BPA-A-5, at 6-22 to 6-27). The Company provided tables that showed that for criteria pollutants, the modeled cumulative impacts of the proposed facility in the compliance configuration differed by less than one percent from those with the approved configuration (Exhs. RR-CF-EFSB-12; CF-EFSB-EA-8-R3, at 6.6-3a).

Finally, the Company stated that annual emissions of CO_2 using the compliance

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17 IDC indicated that the locations of maximum impact differed somewhat, but were generally similar for the two configurations (Exhs. CF-EFSB-EA-8-R3, at tab. 6.5-2a, App. G; CF-BPA-A-5 (att.) at tab. 6.5-2, App. G).

18 IDC indicated that the maximum modeled concentration of these toxics and of SO_2 and PM-10 were higher, because the proposed facility's worst-case impacts in the compliance configuration were during 50 percent plant capacity, rather than 100 percent capacity, thus resulting in lower plume buoyancy (Exh. CF-BPA-A-8; Tr. 4, at 358).

configuration would be reduced to 1,845,086 tpy.[19] The Company explained that CO_2 emissions were not reduced in proportion to the reduction in plant output, because the GE turbine is slightly less efficient than the SW turbine (Exhs. CF-IDC-2, at 3-1, n.1; CF-EFSB-A-1).

IDC has provided the Siting Board with a comprehensive comparison of the air quality impacts of its proposed facility in the approved configuration and in the compliance configuration. The record shows that, although the GE turbine is somewhat less efficient than the SW turbine, the proposed facility in the compliance configuration meets the Siting Board's TPS for both criteria and non-criteria pollutants.[20] Consequently, the reconfiguration of the proposed facility does not trigger a requirement for the further analysis of alternative generating technologies.

The record demonstrates that the proposed facility would produce approximately 24 percent less power in the compliance configuration than it would in the approved configuration. The Company's analysis demonstrates that, with the use of the compliance configuration in place of the approved configuration, annual emissions, in tpy, of PM-10 would be reduced by 1 percent, annual emissions of CO, VOCs, sulfuric acid mist, and formaldehyde would be reduced by 37 to 68 percent, and annual emissions of all other pollutants would be reduced in approximate proportion to the reduction in proposed output. On balance, the Siting Board finds that the overall reduction in annual emissions resulting from the change in configuration would be proportionately greater than the reduction in output.

The record also contains information on expected maximum pollutant concentrations under "worst-case" conditions.[21] The record indicates that modeled maximum annual

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19 In the underlying decision, the Siting Board found that the proposed facility in the approved configuration would emit 2,340,000 tpy of CO_2. Final Decision at 273.

20 The Siting Board notes that the emissions estimates for the GE turbine are based on nearly a decade of operating experience, and may therefore be more accurate than the emissions estimates for the newer SW turbine.

21 The Siting Board notes that the Company used different "worst-case" assumptions for the compliance configuration than it did for the approved configuration. When the same

(continued...)

concentrations of PM-10 and maximum short-term concentrations of SO_2 and PM-10 would be greater using the compliance configuration, while all modeled maximum concentrations of NO_x and CO, and maximum annual concentrations of SO_2 would be reduced. Similarly, use of the compliance configuration in place of the approved configuration would increase maximum short-term concentrations of certain air toxics and reduce others, while the maximum annual concentrations of all air toxics would be reduced. The record demonstrates that "worst-case" maximum concentrations of all pollutants would remain well below applicable SILs, TELs, or AALs, and that current levels of PM-10 and SO_2 are well below non-attainment levels in Massachusetts. In addition, the record indicates that the cumulative impacts have not changed significantly as a result of using the compliance configuration. Given that more maximum pollutant concentrations go down than up, on balance, the Siting Board concludes that the variations in modeled maximum and cumulative concentrations suggest that air quality impacts would be slightly less as a result of using the compliance configuration.

Finally, the record demonstrates that use of the compliance configuration in place of the approved configuration would lower estimated CO_2 emissions by approximately 21 percent from 2,340,000 tpy to 1,845,086 tpy. The Siting Board notes that, in the underlying case, we required IDC to offset 1 percent of its CO_2 emissions by making a contribution of $745,402, to be paid in five annual installments, to a cost-effective CO_2 offset program or programs to be selected upon consultation with Staff of the Siting Board.[22] Final Decision at 273-274. Because the proposed facility's expected CO_2 emissions have been reduced, we hereby amend Condition B. Now, in

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21 (...continued)
assumptions were used, maximum concentrations of all pollutants were reduced under the compliance configuration, except for annual PM-10 which was unchanged. The record does not suggest that the GE turbines will have more start-ups and shut-downs than the SW turbines, or run at different loads or more often than the SW turbines; these operating characteristics appear to be determined by standard maintenance requirements and market conditions, respectively. Thus, assuming both configurations would run at full load, it is likely that the change in configuration might result in even fewer air impacts in the future.

22 The Siting Board also required IDC to make an additional first year offset contribution of $5,549 to a selected CO_2 offset program or programs to offset the clearing of woodlands for the proposed project. Final Decision at 359.

order to minimize CO_2 emissions, the Siting Board requires the Company to provide CO_2 offsets through a total contribution of $587,749[23] to be paid in five annual installments during the first five years of facility operation, plus a contribution of $5249[24] in the first year of facility operation as an offset for on-site tree clearing, to a cost-effective CO_2 offset program or programs to be selected upon consultation with the Staff of the Siting Board. If the Company in consultation with the Staff of the Siting Board selects a CO_2 offset program or programs with an overall projected cost to the Company of less than $1.50 per ton, a different cost commitment may be set which will provide offsets for more than 1 percent of facility CO_2 emissions with a cost commitment of less than $587,749 (not including the additional offsets required above for on-site tree clearing, at a cost of $5249). Alternatively, the Company may elect to provide the entire contribution within the first year of facility operation. If the Company so chooses, the CO_2 offset requirement would be satisfied by a single first-year contribution, based on the net present value of the five-year amount, to a cost-effective CO_2 offset program or programs to be selected upon consultation with the Staff of the Siting Board.[25]

Accordingly, the Siting Board finds that, with the revised condition concerning CO_2 offsets, the air quality impacts of the proposed facility in the compliance configuration would be

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23 The contribution is based on offsetting 1 percent of facility CO_2 emissions, over 20 years of operation, at $1.50 per ton. The 20-year amount of $553,526 is first distributed as a series of payments to be made over the first five years of project operation, then adjusted to include an annual cost increase of 3 percent. Annual contribution amounts would be distributed as follows: year one $110,705; year two $114,026; year three $117,447; year four $120,971; year five $124,971. See ANP-Blackstone Decision, EFSB 97-2, at 114; Cabot Power Decision, EFSB 91-101A; ANP-Bellingham Decision, EFSB-97-1, at 104; Millennium Power Decision, EFSB 96-4, at 114, 117-118.

24 Because of a typographical error, Condition B in the Decision Section in the underlying decision erroneously tracked the amount of tree clearing offset. In Section III. B of the underlying decision, the air analysis, the Siting Board calculated that the contribution to compensate for tree clearing would be $5249; in this decision, we use the correct $5249 figure rather than the $5549 figure used in the Decision Section.

25 The net present value amount is based on discounting, at ten percent, the five annual payments totaling $587,749. The single up-front payment of $483,647, which includes the $5249 offset for tree clearing, would be due by the end of the first year of operation.

less than those reviewed by the Siting Board in the underlying case.

B. Water Resources

In the underlying case, IDC stated that its primary water source would be the Bellingham municipal water supply, which obtains its water from wells in the Blackstone and Charles River watersheds. Final Decision at 277-278. The Company described three water use scenarios: "Case 1", which would occur during initial operation when the proposed facility would not have access to the Town's sewer system; "Case 2", which assumes connection to a new Town sewer system and construction of an on-site water treatment system; and "Case 3", which assumes use of a reverse osmosis filtering system. Id. at 275. In the compliance proceeding, the Company stated that it is no longer considering Case 3 (Exh. CF-IDC-2, at 3-7 to 3-8). The Company provided the proposed facility's water requirements for Case 1 and Case 2 under both the approved and compliance configurations (id.). This comparison is set forth in Table 2, below.

Table 2: Water Use of the Proposed Facility, in Gallons Per Day ("gpd") Under the Approved and Compliance Configurations

Water Use Scenario		Approved Configuration	Compliance Configuration
Case 1	Annual Average	20,971	20,228
	Baseload	10,300	12,900
	Evaporative Cooling	46,700	37,900
Case 2	Annual Average	27,046	26,147
	Baseload	16,375	17,922
	Evaporative Cooling	52,775	45,978

Source: See exhibits CF-IDC-2, at 3-8; CF-EFSB-W-1; CF-IDC, figs. 3.3-2a to 3.3-3b.

IDC testified that in the compliance configuration it would still obtain its water from the Town of Bellingham (Tr. 3, at 308-309). The Company stated that the annual average water use would decrease under the compliance configuration, assuming 107 days of evaporative cooling (Exh. CF-IDC-2, at 3-8; Tr. 3, at 295-296).[26] IDC noted that water use during evaporative cooling would be lower using the compliance configuration, but that water use during baseload operation would increase (Exh. CF-IDC-2, at 3-8; Tr. 3, at 295-296). The Company explained that the expected increase in water use during base operation was the result of higher vent and miscellaneous losses and more HRSG blowdown (Tr. 3, at 295-296). The Company stated that it had incorporated a number of water conservation strategies into the proposed facility, and argued that there were no additional feasible water mitigation measures that would further reduce the plant's water use (Exh. RR-CF-EFSB-7; Tr. 3, at 297-298).[27]

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26 The Company also provided estimates of average annual water use for the proposed facility in the compliance configuration based upon the assumption of fewer evaporative cooling days (Exh. RR-CF-EFSB-9).

27 The Company noted that it had incorporated a number of strategies to decrease water use, including but not limited to recycling HRSG blowdown and forgoing steam augmentation (Exh. RR-CF-EFSB-7).

IDC stated that the Case 2 sewage discharge from the proposed facility in the approved configuration would be 6575 gpd (Exh. CF-IDC-8, figs. 3.3a, 3.3b).[28] The Company indicated that the proposed facility in the compliance configuration would discharge 5522 gpd of sewage during base operation and 8578 gpd during evaporative cooling (Exh. CF-EFSB-W-1; Tr. 3, at 303). The Company explained that greater discharge of sewage during evaporative cooling with the compliance configuration resulted from the need to clean the demineralizers more often (Tr. 3, at 305-306). The Company testified that it had agreed with the Town to have a holding tank for sewage so that the flow would be more steady state (id. at 304).

The Company stated that the required impervious surface for the proposed facility would be reduced from approximately 7.11 acres under the approved configuration to approximately 4.92 acres under the compliance configuration (Exh. RR-CF-EFSB-8). The Company testified that the reduction in impervious surface resulted in lower estimated total stormwater discharges, but that the levels of water quality and peak discharge would be the same as under the approved configuration (Tr. 3, at 300-301).

In the Final Decision, the Siting Board reviewed the potential impacts of IDC's water use on the Town of Bellingham municipal system and on the Charles River and Peters Brook watersheds. Final Decision at 286-287. The Siting Board concluded that the permitted capacity of Town wells could accommodate worst-case water use for the proposed facility. Id. at 286. The Siting Board noted that the basin-wide water use as a percentage of low flow was relatively high for both the Charles River and Peters Brook; however, we indicated that water use concerns were partially offset by: (1) a high groundwater recharge rate in relation to water use; (2) the expectation that future water demand would grow at significantly lower rates than earlier identified, and well below limits set in MDEP permits; and (3) IDC's success in minimizing the proposed level of the facility's water consumption, which, on a per megawatt basis, was the lowest approved to date. Id. at 285, 288-289. The Siting Board found that the Company had minimized the impacts of the proposed facility with respect to water supply, wastewater and

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28 The Company provided water balances showing that during all Case 1 operations for both configurations, 500 gpd of sewage would be trucked offsite (Exhs. CF-IDC-8, figs. 3.3-2a, 3.3-4b; CF-EFSB-W-1).

stormwater discharges and directed IDC to submit a report to the Siting Board concerning water use during the first two years of operation. Id. at 289.

The record shows that a change from the approved to the compliance configuration would increase Case 2 water use by 1547 gpd during baseload operations, but decrease water use by 6797 gpd during the more water intensive evaporative cooling operations. Overall, the average annual water use would be approximately 899 gpd lower under the compliance configuration than under the approved configuration, assuming 107 days per year of evaporative cooling. This benefit would be reduced or eliminated for scenarios in which the number of evaporative cooling days is less; however, under these scenarios yearly water consumption also decreases, lessening our concern about water use. The Siting Board notes that, in the underlying decision, it relied in part on the proposed facility's lower per-MW water consumption in finding that the proposed facility's water use impacts had been minimized. In this proceeding, IDC did not provide new "worst-case" water use figures; however, even assuming no reduction in worst-case water requirement under the compliance configuration, the proposed facility's per-MW water consumption remains the lowest approved by the Siting Board to date for a combined-cycle generation facility (25,665 gpy per megawatt).[29] The Siting Board notes that the record indicates that the Company has employed all feasible means to reduce water use by the proposed facility in the compliance configuration.

The record shows that the change from the approved to the compliance configuration would result in lower sewer discharges during base operation, but higher sewer discharges during evaporative cooling. However, the record indicates that sewage would be held on-site for gradual release, and that the increase in sewage therefore would not significantly affect the sewerage system. The record demonstrates that the total stormwater discharges from the proposed site with the compliance configuration would be less than with the approved configuration. The record does not indicate any other changes with respect to water resource

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[29] In EFSB 97-5, the Siting Board approved a worst-case average annual water use of 36,915 gpd. Final Decision at 286. Since the Company did not update the worst-case average annual water use, the Siting Board will use the estimate in the underlying decision in its review of Condition H of the underlying decision.

impacts.

Based upon the review of water use, sewer, and stormwater impacts, the Siting Board finds that, as a result of using the compliance configuration, the water quality impacts of the proposed facility in the compliance configuration would be substantially similar to those reviewed by the Siting Board in the underlying case.

C. Wetlands

In the Final Decision, the Siting Board found that the Company had designed the facility layout so that no portion of the power plant, parking areas, or utility lines would be located in wetlands, buffer zone, or land subject to the Wetlands or Rivers Protection Act, and consequently found that the impacts to wetlands had been minimized. Final Decision at 291. The Company stated that the power plant, parking areas, and utility lines would remain outside wetlands, buffer zone, and lands subject to the Wetlands or Rivers Protection Act under the compliance configuration (Exhs. CF-IDC-2, at 3-9; CF-IDC-2 (fig. 2.1-2)). The Company added that the proposed facility would remain outside the 200 foot wetlands buffer zone requested by the Town (Exh. CF-IDC-2, at 3-9).[30] The record does not indicate that the change in configuration would result in any other changes to wetland impacts. Consequently, the Siting Board finds that the wetlands impacts of the proposed facility in the compliance configuration would be substantially similar to those reviewed by the Siting Board in the underlying case.

D. Solid and Hazardous Waste

In the underlying case, the Company stated that hazardous and non-hazardous waste would be produced during construction and operation of the proposed facility, and where possible and cost-effective, waste would be recycled, reclaimed or reused. Final Decision at 291-292. In addition, the Company stated that it would ensure that all hazardous and solid waste would be properly handled in compliance with all applicable laws and regulations. Id. at 292. In

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30 IDC testified that it had notified the Bellingham Conservation Commission of the proposed changes, but had not received a reply (Tr. 3, at 258).

the underlying decision, the Siting Board found that the solid waste impacts of the proposed facility would be minimized. Id.

IDC stated that the expected production of solid waste would decrease by approximately 10 percent during construction and 5 percent during operation using the compliance configuration (Exhs. CF-IDC-2, at 3-9; CF-EFSB-S-1). The Company stated that the production of hazardous waste during operation would decrease slightly under the compliance configuration, but noted that the proposed facility would produce 52 percent less spent SCR using the compliance configuration rather than the approved configuration (Exh. CF-EFSB-S-1; Tr. 3, at 316). The Company did not anticipate any other changes to solid or hazardous waste impacts due to the change in configuration.

The record indicates that the proposed facility in the compliance configuration would generate less solid and hazardous waste than the proposed facility in the approved configuration. The record does not indicate that the change in configuration would result in any other changes to solid and hazardous waste impacts. Accordingly, the Siting Board finds that the solid and hazardous waste impacts of the proposed facility in the compliance configuration would be less than those reviewed by the Siting Board in the underlying case.

E. Visual

In the underlying proceeding, the Siting Board reviewed a visual analysis of 14 representative viewsheds and noted that the proposed facility would be somewhat screened from view in most directions as a result of its proposed wooded buffer, and that from the majority of viewshed locations, views of the proposed facility likely would be limited to the upper portions of the stack as seen above existing trees. Final Decision at 293-298. The Siting Board concluded that even with the 190 foot stack, the viewshed analysis indicated the potential for

visual impacts in certain areas.[31, 32] Final Decision at 298. The Siting Board found that, with the implementation of a condition concerning reasonable off-site mitigation of visual impacts, including shrubs, trees, window awnings or other mutually-agreeable measures, the environmental impacts of the proposed facility with a stack height of 190 feet at the proposed site would be minimized with respect to visual impacts. Id. at 300.

In the compliance proceeding, IDC stated that the change in configuration would require a change in facility layout and components (Exh. CF-IDC-2, at 2-1 to 2-2 (fig. 2.1-2)). Specifically, the proposed facility in the compliance configuration would have only one steam turbine and one ACC instead of two as in the approved configuration. In addition, the stack would be relocated 200 feet to the north, and although its height would be unchanged at 190 feet, it would be built at a six foot higher ground elevation (Exhs. CF-IDC-2, at 2-1, 3-10 (fig. 2.1-2); CF-IDC-8 (fig. 2.1-3); CF-BPA-V-1-C; Tr. 3, 278-281). IDC also noted that the ACC would be 25 feet higher and the turbine buildings would be between 15 and 40 feet lower (Exh. CF-BPA-V-1-C; Tr. 3, at 281). The Company estimated that the total mass of the proposed facility would be reduced from 12,006,000 cubic feet to 11,883,000 cubic feet as a result of the change in configuration (Exh. RR-CF-EFSB-6).

The Company presented a revised viewshed analysis for the proposed facility in the compliance configuration, using photographs and viewshed locations developed during the underlying case, onto which the proposed facility in the compliance configuration was digitized.[33] The Company asserted that the change in configuration would reduce visual impacts

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31 The Siting Board concluded that visual impacts would occur along Hartford Street, areas of Route 140, and in nearby residential areas located primarily to the east of the proposed site. Final Decision at 298.

32 In addition, the Siting Board noted that the visual impacts would be greater, overall, with the GEP 225-foot stack than with IDC's preferred 190 foot stack. Final Decision at 298.

33 In the Final Environmental Impact Report ("FEIR") for the underlying case, the Company stated that it used survey and photographic instrumentation and other techniques to establish the correct position of the proposed facility at each of the viewsheds (Exh. CF-IDC-8, at 4.3-5). The Company indicated that it did not conduct the (continued...)

from four viewsheds (#'s 2, 9, 11, and 14), increase visual impacts for viewshed 5, and would not significantly change for the remaining nine viewsheds (#'s 1, 3, 4, 6, 7, 8, 10, 12, and 13) (Exh. CF-IDC-2, at 3-10, (App. B)). The Company stated that the viewshed photographs previously used for the analysis of the proposed facility in the approved configuration were applicable to the proposed facility in the compliance configuration, because (1) the viewsheds selected are the best representations of the visual impacts that would result from the proposed project in all directions; and (2) a simple shift in the location from which the photograph was taken would not result in a different view of the facility (Exhs. CF-BPA-V-3; CF-EFSB-V-1; Tr. 3, at 278-279). At the request of the Joint Intervenors, IDC also submitted six new viewshed analyses, taken from points to the east and southeast of the proposed facility, which indicate that the proposed facility in the compliance configuration would be visible from at least two other locations (#'s 15 and 19).[34] IDC testified that any improvement in visual impacts resulting from the change in configuration would be minor (Tr. 3, at 280).

The Company indicated that, in the underlying case, it had not found any noteworthy landscape or historic areas within five miles of the proposed facility, and argued that the proposed facility in the compliance configuration therefore would not have an impact on historic or landscape areas (Tr. 3, at 287-289). In addition, the Company asserted that the proposed facility's plume frequency and size would not change as a result of the change in configuration (Exh. CF-IDC-2, at 3-11).

The record indicates that the reconfiguration of proposed facility would reduce the mass of the proposed facility, increase the height of certain elements while lowering the height of others, and relocate the stack to the north by 200 feet. The Siting Board has reviewed the viewshed photographs submitted by the Company and concludes that views from most points are essentially unchanged by the change in configuration, although the proposed facility in the

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33 (...continued)
same level of viewshed documentation for the proposed facility with the compliance configuration (Tr. 3, at 272-274).

34 The Siting Board notes that the Company did not provide views from these locations for the proposed facility in the approved configuration.

compliance configuration may be somewhat less visible in three viewsheds (#'s 2, 11, and 14) and somewhat more visible from two viewshed (#'s 5 and 6). The Siting Board notes that the Company's visual analysis is only representative, and that the record shows that the proposed facility would be visible from two other locations (#'s 15 and 19), for which comparative viewshed analyses with the approved configuration are not available.

In the underlying decision, the Siting Board found that the visibility of the proposed facility was primarily dependant upon stack height and vegetative buffer. Nothing in the record indicates that the slight movement of the stack, in itself, is likely to cause a significant increase or decrease in visual impacts. Although the record indicates the compliance configuration would result in a minor increase in stack elevation and a small change in vegetative buffer, these changes are not likely to significantly affect visual impacts. Thus, the Company's updated viewshed analysis adequately demonstrates the extent of visual impacts based on representative views of the proposed facility in the a compliance configuration. In addition, in the underlying decision the Siting Board conditioned the proposed facility upon the Company providing adequate screening to residences and roadways or other crossings visually affected by the proposed facility. This condition still applies, and any slight variation in facility visibility upon residences can be addressed by this condition. Accordingly, the Siting Board finds that the visual impacts of the proposed facility in the compliance configuration would be substantially similar to those reviewed by the Siting Board in the underlying case.

F. Noise

In the Final Decision, the Company provided ambient noise measurements from ten monitoring locations representing various property line and residential receptors surrounding the proposed site (Exh. CF-EFSB-EA-R3, Section 7, App. D). Final Decision at 301. Using twenty minute continuous noise monitoring intervals, the Company presented L_{90} measurements for six residential receptor locations and four property line locations, with nighttime ambient levels ranging from 36 to 40 dBA and daytime ambient levels ranging from 36 to 42 dBA (Exhs. RR-

CF-EFSB-2).[35] Final Decision at 302. In addition, the Company modeled the expected noise levels from the plant, and estimated daytime and nighttime increases in ambient noise levels caused by the operation of the proposed facility in the approved configuration (Exhs. RR-CF-EFSB-EN-48; CF-EFSB-EA-8-R3, at 7-16). The Siting Board found that if the facility were constructed as proposed, daytime and nighttime L_{90} increases at property lines would range from 3 to 8 dBA and that daytime and nighttime L_{90} increases would be 4 dBA or less at all residential receptors except receptor R-4.[36] Final Decision at 314.

In the Final Decision, the Siting Board directed IDC to implement additional noise mitigation that would limit L_{90} noise increase at receptor R-4 to 5 dBA. Id. at 315. In addition, the Siting Board directed the Company, in consultation with the Bellingham Board of Selectmen and MDEP and with comment from intervenors to the underlying proceeding, to develop a noise compliance monitoring protocol and baseline noise measurements, taken on a schedule chosen in consultation with MDEP, that would allow for the implementation of an on-going periodic noise monitoring program to begin within six months of the commencement of commercial operation. Id. Finally, the Siting Board found that with the implementation of the foregoing conditions, the environmental impacts of the proposed facility would be minimized with respect to noise. Id. at 316.[37]

In its Compliance Filing, the Company compared the calculated noise impact of the

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35 The Siting Board notes that in the underlying case, the Company had testified that the nighttime ambient at PL-4A was 36 dBA (Exh. CF-EFSB-N-5). In this proceeding the Company stated that 36 dBA was an error and 34 dBA is the correct number (id.; Exh. RR-CF-EFSB-2; Tr. 1, at 9-14). Therefore, the Siting Board will use the more conservative 34 dBA number as the nighttime ambient for PL-4A for comparison purposes.

36 The Siting Board noted that at receptor R-4, the closest residence to the proposed site on Box Pond Road, the maximum daytime L_{90} increase would be 7 dBA, and the maximum nighttime increase would be 8 dBA. Final Decision at 314.

37 This finding was based upon the Siting Board making an initial finding of fact that the construction noise impacts of the proposed facility had been minimized. Final Decision at 316.

proposed facility in the two configurations and asserted that the noise impacts of the proposed facility in the compliance configuration would be the same as or less than the noise impacts of the proposed facility in the approved configuration (Exh. CF-IDC-2, at 3-13). Using the ambient measurements presented in the original proceeding, the Company compared the calculated noise impacts of the two configurations, as shown in Table 3, below.

Table 3: Comparison of the Calculated Noise Impacts in dBA of the Proposed Facility in the Approved and Compliance Configurations

Receptor Location	Nighttime Ambient, L_{90}	Daytime Ambient, L_{90}	Calculated Approved Configuration Noise/Leq	Calculated Compliance Configuration Noise/Leq	Final Nighttime Ambient Increase		Final Daytime Ambient Increase	
					Approved Config.	Compliance Config.	Approved Config.	Compliance Config.
R-2 Taunton St., E	38	38	34	33	1	1	1	1
R-3 Box Pond Rd., SE	40	38	39	37	3	2	4	3
R-4 Closest House, SW	35	36	42	38	8	5	7	4
R-5 Barrows Rd., SW	39	38	34	32	1	1	1	1
R-6 Rt. 140 Residence, W	34	42	33	30	2	1	0	0
PL-1A Property Line, NW	38	36	43	43	6	6	8	8
PL-2 Property Corner, N	38	36	40	40	4	4	6	5
PL-3 Across Depot Street, E	40	40	46	44	7	6	7	6
PL-4A Property Line, W	34	39	38	35	5	3	3	1

Source: Exhs. CF-IDC-2, tab. 3.6-2 and RR-CF-EFSB-2.

IDC explained that three factors contributed to the reduction in noise associated with the change to the compliance configuration: (1) the changes in layout; (2) the reduction in the

number of components; and (3) the use of different mitigation techniques (Exh. RR-CF-EFSB-3; Tr. 1, at 84-89).[38]

The Company stated that it was proposing to use a similar noise mitigation package under the compliance configuration as under the approved configuration, but noted a few differences including quieter transformers, acoustic treatment of the turbine and HRSG building walls and vents, and muffling for the turbine and HRSG vent fans (Exhs. CF-BPA-A-5 (Att.) App. D at 42); CF-CF-EFSB-EA-8-R3 (App. D at 49); RR-CF-EFSB-3). IDC testified that the type of noise guarantees are essentially the same for the two different configurations, and stated that the Engineering, Procurement, and Construction ("EPC") contractor would be required to construct the facility to meet the noise limits set in its permits (Tr. 1, at 83). The Company provided a Best Available Noise Control Technology analysis for the proposed facility in the compliance configuration, and testified that the only way to further reduce noise at receptor R-4 would be to incorporate the design with the lowest achievable impact, which would cost approximately 16 million dollars and hold the increase in noise levels at receptor R-4 to 2 dBA (Exh. CF-BPA-A-5 (att.) App. D at 13).[39]

The Joint Intervenors provided additional noise monitoring data, asserting that existing ambient noise levels are lower than those presented by the Company in either the underlying case or in its Compliance Filing (Exhs. CF-BPA-GT-1; CF-EFSB-GT-2). The Joint Intervenors also provided a noise impact analysis based on their own monitoring data and calculated the increases in daytime and nighttime ambient noise levels for both the approved and compliance configurations (Exhs. CF-BPA- GT-1; CF-EFSB-GT-2; CF-EFSB-GT-3). Mr. Tocci, a witness

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38 For example, the Company explained that, overall, the compliance configuration's ACC would have a higher sound rating, but since there is only one and it is further from the closest residence, it contributes less to overall sound levels than the two ACCs in the approved configuration (Exh. RR-CF-EFSB-3; Tr. 1, at 95). Similarly, as discussed in earlier sections, the compliance configuration will only have one steam turbine and one water-glycol cooler (Exhs. RR-CF-EFSB-3; CF-BPA-A-5 (att.) App. D at 20-34).

39 The Company explained that this cost estimate includes nearly 13 million dollars in losses due to lower plant efficiency and increased fuel use (Exh. CF-BPA-A-5 (att.) App. D at 13).

for the Joint Intervenors, testified that the proposed facility with the compliance configuration would have less noise impacts than the proposed faculty in the approved configuration (Tr. 2, at 224-227). Mr. Tocci also stated that the noise level estimates presented by the Company for the compliance configuration were reasonable based upon his experience with levels for other such projects (id. at 227-228). Table 4, below, compares the noise impacts of the two configurations using ambient data provided by the Joint Intervenors.

Table 4: Comparison of Calculated Noise Impacts (in dBA) of the Proposed Facility With Ambient Levels[40] Presented by the Joint Intervenors

Receptor Location	Nighttime Ambient, L_{90}	Daytime Ambient, L_{90}	Calculated Approved Configuration Noise/Leq	Calculated Compliance Configuration Noise/Leq	Final Nighttime Ambient Increase		Final Daytime Ambient Increase	
					Approved Config.	Compliance Config.	Approved Config.	Compliance Config.
Rovedo (PL-2)[41]	31.0	40.5	40	40	10	9.5	3	2.8
Eckert (R-6)	25.5	32.0	33	30	8.2	5.8	3	2.1
62 Box Pond Road (R-4)	29.0	33.0	42	38	13.2	9.5	9.5	6.2

Source: Exhibits CF-BPA-1; CF-EFSB-GT-2; CF-EFSB-GT-3.

The Company and the Joint Intervenors each have presented technical analyses comparing the operational noise impacts of the proposed facility in the approved configuration with the operational noise impacts of the proposed facility in the compliance configuration. While the parties disagree as to how ambient noise levels should be calculated or monitored, they are in agreement that the change from the approved configuration to the compliance configuration would reduce the operational noise impacts of the proposed facility to levels below those

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40 The Joint Intervenors presented three methods to calculate L_{90} levels (Exh. CF-BPA-1). The above table shows ambient levels calculated by what the Joint Intervenors refer to as the lowest monitored L_{90} method, because this method resulted in the lowest L_{90} levels.

41 The Company agreed with the Joint Intervenors that receptor locations Rovedo, Eckert, and 62 Box Pond Road are essentially the same as its own noise receptor locations PL-2, R-6, and R-4 respectively for the purposes of establishing the minimum ambient noise levels in the vicinity of the proposed facility (Tr. 1, at 16, 21, 23).

accepted in the underlying decision.[42] The record shows that the proposed facility in the compliance configuration would not increase the operational noise impacts of the proposed facility at any receptor and could reduce the noise impacts of the proposed facility by 1 to 3 dBA at certain receptors. In addition, the noise analysis presented in Table 3 above demonstrates that IDC has designed the proposed facility in the compliance configuration to meet Condition D of the underlying decision -- that is, to limit noise increases at receptor R-4 to 5 dBA over the ambient level presented in the underlying decision. The record also indicates that noise levels associated with the construction of the proposed facility would not change with the change in configuration, but that the construction period would be shortened, thus reducing the period of time during which neighbors are affected by construction noise. Accordingly, the Siting Board finds that the noise impacts of the proposed facility in the compliance configuration would be less than the noise impacts of the proposed facility in the approved configuration.

G. Safety

In the underlying decision, the Siting Board concluded that IDC had taken all feasible steps to minimize the safety risks from ammonia. Final Decision at 321. In addition, the Siting Board found that there would be no ground level fogging or icing resulting from the operation of the proposed facility. Id. at 322. Finally, the Siting Board found that, with the implementation of the proposed mitigation and a condition concerning chemical storage and handling, the environmental impacts of the proposed facility would be minimized with respect to safety. Id.

In the compliance proceeding, the Company asserted that the change in configuration would reduce safety concerns associated with ammonia delivery and storage (Exh. CF-IDC-2, at 3-13 to 3-14). The Company stated that because the GE turbine has lower uncontrolled NO_X

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42 Condition D of the underlying decision requires IDC to implement additional noise mitigation as necessary to limit L_{90} increases at receptor R-4 to 5 dBA. The record of the underlying case does not contain an analysis of whether this additional noise mitigation would have reduced noise impacts at other receptors. Therefore, the Siting Board's assessment of noise level changes for these receptors is based on a comparison to the calculated noise levels for the approved configuration in the underlying decision.

emissions than the SW turbines, less ammonia would be required for NO_x control (id. at 3-14).[43] The Company estimated that weekly deliveries of ammonia would be reduced from five to one due to the change in configuration (id. at 3-14). The Company testified that it considered reducing the size of the ammonia tank[44] so that less ammonia would be stored on-site, but determined that reducing the number of weekly deliveries would more effectively minimize safety impacts (Tr. 3, at 317-318). The Company also stated that the change to the compliance configuration would result in lower ammonia concentrations off-site in the event of a spill, because the ammonia would be located further from the closest residence (Exhs. IDC-2, at 3-12, (fig. 2.1-2); CF-IDC-8 (fig. 2.1-3)).[45] The Company indicated that there would be a small reduction in the use of other hazardous chemicals as a result of the reduction in the size of the plant (Tr. 3, at 316-317). The Company stated that there would be no other changes to safety impacts as a result of switching to the compliance configuration (Exh. CF-IDC-2, at 3-14).

The record indicates that a change in configuration would reduce potential safety issues associated with ammonia, because there would be fewer ammonia truck trips and because the off-site concentrations, in the event of a spill, would be lower at the nearest residences. In addition, the record indicates that other safety impacts would remain the same or be reduced as a result of switching to the compliance configuration. Accordingly, the Siting Board finds that the safety impacts of the proposed facility in the compliance configuration would be less than those reviewed by the Siting Board in the underlying case.

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43 The Company stated that the proposed facility in the compliance configuration has an ammonia slip of 9 parts per million ("ppm") versus 40 ppm for the proposed facility in the approved configuration (Exh. CF-IDC-2, at 3-13 to 3-14).

44 In the underlying decision, the Company proposed to store aqueous ammonia on site in a 40,000 gallon tank surrounded by a 110 percent capacity concrete dike. Final Decision at 317.

45 The Company stated that the ammonia concentration would be .30 ppm at the closest residence under the compliance configuration (Exh. CF- BPA-A-5 (att.) at 6-29), whereas it would be .49 ppm under the approved configuration. Final Decision at 318.

H. Traffic

In the underlying decision, the Company stated that up to 500 workers could be employed on the site at any one time during peak construction periods. Final Decision at 323. The Company also stated that the construction period would run for 24 months. Id. IDC stated that construction shifts would start between 6 a.m. and 7 a.m. and end between 2:30 p.m. and 3:30 p.m and indicated that it would stagger the arrival and departure of workers in order to reduce traffic impacts. Id. at 322-323. The Siting Board analyzed the evidence presented, including level of service studies, and found that, with the implementation of a condition relating to the development and implementation of a construction traffic mitigation plan, the environmental impacts of the proposed facility would be minimized with respect to traffic. Id. at 329.

The Company asserted that the traffic impacts of the proposed facility would be reduced as a result of the change in configuration (Exh. CF-IDC-2, at 3-14). IDC testified that construction of the proposed facility in the compliance configuration would take only 21 months and would require a peak workforce of 475 workers (Exh. RR-CF-EFSB-1, at 2-2; Tr. 3, at 261). The Company stated that the delay in the start of construction, from August of 2000 to spring of 2001, would not alter its analysis of traffic impacts (Tr. 3, at 262-263). IDC noted that it submitted traffic analyses that assumed the compliance configuration to the Town of Bellingham as part of a permit application, and asserted that the analyses show that traffic impacts would be at or below impacts previously reviewed by the Siting Board (id. at 264). The Company indicated that it would not change the shift schedules from those presented in the underlying case (id. at 265). Further, IDC testified that it would need fewer operational staff for the proposed facility in the compliance configuration than for the proposed facility in the approved configuration (id. at 262).[46]

The record indicates that construction of the proposed facility in the compliance configuration rather than the approved configuration would slightly reduce the number of

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[46] The Company stated that the operational workforce would be reduced from 35 to 28 employees (Tr. 3, at 262). We note that the Final Decision states that once the facility is fully operational, 18 employees would be on site in three shifts over a typical 24-hour period. Final Decision at 327.

construction workers arriving and leaving the site, and reduce total construction time by approximately three months. While these changes may slightly reduce the construction traffic impacts of the proposed facility, it is not clear that the reduction would be significant, given the relatively small reduction in peak construction traffic and uncertainty within the record whether the 3 month reduction in construction time would affect peak construction periods where expected traffic impacts are significant or off-peak periods when traffic impacts are already expected to be minimal. The record does not indicate that the change in configuration would result in any other changes to traffic impacts. Accordingly, the Siting Board finds that the traffic impacts of the proposed facility would be substantially similar to those reviewed by the Siting Board in the underlying case.

I. Electric and Magnetic Fields ("EMF")

In the underlying decision, the Siting Board concluded that off-site electric and magnetic fields would remain below the levels found acceptable in the 1985 MECo/ NEPCo Decision, where the Siting Board accepted edge-or-right of way levels of 1.8 kV/meter for electric fields and 85 mG for the magnetic fields.[47] Final Decision at 332. The Siting Board stated that the estimated worst-case maximum magnetic fields along the right-of-way ("ROW") from IDC's proposed interconnect to the West Medway substation would range between 58 milligauss ("mG") at road crossings and 74 mG at the lowest transmission line heights, representing an increase above the existing maximum level of approximately 4.7 mG at the eastern edge of the ROW. Id. at 332. The Siting Board found that with the Company's pursuit of cost effective designs for decreasing magnetic fields along the affected transmission lines that require upgrades, the environmental impacts of the proposed facility would be minimized with respect to EMF. Id. at 333.

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47 In the underlying case, the Company stated that the proposed facility would interconnect with an existing BECo line. Final Decision at 330. Further, the Company stated that because BECo did not propose to change the line voltage, existing electrical fields would remain unchanged. Id. In the compliance proceeding, IDC stated that there would be no change in the voltage of the interconnection under the compliance configuration (Exh. CF-IDC-2, at 3-14).

In the compliance proceeding, the Company stated that the reduction in plant size from 700 to 525 MW would reduce EMF impacts (Exh. CF-IDC-2, at 3-14). IDC presented testimony that the location of electrical interconnects and the switchyard would not change significantly with the change in configuration (Tr. 3, at 266). The Company anticipated that the new system impact study being conducted for the proposed facility in the compliance configuration would conclude that fewer electrical upgrades were needed to accommodate the facility than would have been required using the approved configuration (id. at 266-268).

Although the Company did not provide new estimates of EMF impacts, the record indicates that the reduction in plant size will probably reduce EMF impacts by nearly a third, since for lines of a given voltage magnetic fields are directly proportional to the amount of power a line carries.[48] In addition, the proposed facility in the compliance configuration may have fewer interconnection impacts. The record does not indicate that the change in configuration would result in any other changes to EMF impacts. Accordingly, the Siting Board finds that the EMF impacts of the proposed facility in the compliance configuration would be less than those reviewed by the Siting Board in the underlying case.

J. Land Use

In the underlying decision, the Company stated that it would construct the proposed facility on a small portion of a 156 acre industrial zoned site, that had been rezoned from agricultural/suburban to industrial in anticipation of the proposed project. Final Decision at 334, 341. The Siting Board noted that IDC's proposal, taken as a whole, created a new industrial use in a primarily undeveloped and residential area, but also contributed to the long-term preservation of the primarily undeveloped character of the area surrounding the proposed facility. Id. at 342. The Siting Board also noted that the Company's commitment to dedicating a significant portion of the Bellingham parcel (123 acres), and all of the Mendon parcel (65 acres), to serve as conservation land, open space or permanent undeveloped buffer contributed

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[48] In the underlying decision and in previous cases, the Siting Board has recognized that magnetic fields are directly proportional to line current, although other mitigating factors can reduce the magnetic field levels.

significantly to the minimization of the land use impacts of the proposed facility. Id. The Siting Board found that, with the condition that the Company provide the Siting Board with copies of local permit applications and approvals and copies of any document that formalize the disposition of the Mendon parcel to serve as conservation land, open space or permanent undeveloped buffer, the environmental impacts of the proposed facility at the proposed site would be minimized with respect to land use impacts. Id. at 342-343.

The Company asserted that the change to the compliance configuration would reduce the proposed facility's land use impacts, because the total area of the site would be reduced from 41 to 38 acres and the facility footprint would be reduced from 17 to 14.5 acres, which would result in the permanent preservation of additional acreage (Exhs. CF-IDC-8, at 3-1; CF-IDC-2, at 3-14). The Company stated that impacts to wildlife species and habitats would be unchanged (Exh. CF-IDC-2, at 3-15).

The record indicates that the change in plant configuration would slightly reduce the size of the plant footprint and the active site, without causing any change in impacts to wildlife species and habitats, historical or archeological resources, or other resources examined by the Siting Board in its review of land use impacts. The Siting Board finds that the slight reduction in plant size would have minimal impact on land use issues, given that a significant portion of the proposed site had been dedicated for buffer. In addition, the record does not indicate that the change in configuration would result in any other changes to land use impacts. Accordingly, the Siting Board finds that the land use impacts of the proposed facility in the compliance configuration are substantially similar to those reviewed by the Siting Board in the underlying case.

K. Health

In the underlying decision, the Siting Board reviewed the baseline health conditions in the Bellingham area and analyzed the health impacts associated with criteria pollutants, air toxics, discharges to ground and surface waters, handling and disposal of hazardous materials, EMF, and noise. Final Decision at 343-344. In the underlying case, the Company provided reports concerning baseline health conditions in Bellingham and surrounding communities, none

of which showed statistically significant elevations of cancer hospitalizations. Id. at 344. Based on its compliance with MDEP air quality standards, the Siting Board found that the cumulative health impacts of criteria pollutant emissions from the proposed facility would be minimized. Id. at 348. In addition, the Siting Board found that the air toxics emissions from the proposed project would have no discernable public health impact. Id. at 349.

In the underlying decision, the Siting Board also found that the proposed project posed no health risks related to the contamination of potable groundwater or the disposal of wastewater and that the health risks of the proposed project related to the handling and disposal of hazardous materials would be minimized. Id. at 350. In addition, the Siting Board found that the health effects, if any, of magnetic fields associated with the proposed project would be minimized. Id. at 353. Finally, the Siting Board found that the health impacts of noise from the proposed project would be minimized, since noise increases at the residences, with the mitigation imposed by the Siting Board, would be 5 dBA or less. Id. at 354.

In the compliance proceeding, IDC asserted that the cumulative health impacts of proposed facility in the compliance configuration would be less than or no different from those associated with the proposed facility in the approved configuration (Exh. CF-IDC-2, at 3-15).

In Section II. A above, the Siting Board found the overall reduction in annual emissions resulting from the change in configuration would be proportionately greater than the reduction in output. The Siting Board also concluded that the variations in modeled maximum and cumulative concentrations suggest that air quality impacts would be slightly less as a result of using the compliance configuration.

As discussed in Sections II. B, D, and G above, the record demonstrates that there would be no change in the discharges to ground and surface waters as a result of the change in configuration and that the amount of ammonia and other hazardous chemicals used and disposed of would be reduced. In Section II. I above, the Siting Board found that the EMF impacts would be reduced as a result of using the compliance configuration. Finally, in Section II. F, the Siting Board found the noise impacts of the proposed facility would be reduced as a result of using the compliance configuration. Accordingly, the Siting Board finds that the cumulative health impacts of the proposed facility in the compliance configuration would be less than those

reviewed by the Siting Board in the underlying case.

L. Conclusions

The Siting Board has found in Sections II. A, D, F, G, I, and K above, that the air, solid and hazardous waste, noise, safety, EMF, and cumulative health impacts of the proposed facility in the compliance configuration would be less than those reviewed by the Siting Board in the underlying case. The Siting Board found in Sections II. B, C, E, H, and J above, that the water resource, wetland, visual, traffic, and land use impacts of the proposed facility in the compliance configuration would be substantially similar to those reviewed by the Siting Board in the underlying decision. Accordingly, the Siting Board finds that, with the implementation of the above-listed condition relative to air quality, the change from the approved configuration to the compliance configuration would not alter the balance of environmental considerations reached in the underlying decision. Therefore, the Siting Board finds that with the implementation of the conditions set forth in II. A. above, and the standing conditions from the Final Decision, the Company's plans for the construction of the proposed generating facility in the compliance configuration would minimize the environmental impacts of the proposed facility consistent with the minimization of cost associated with the mitigation, control, and reduction of the environmental impacts of the proposed generating facility.

III. CONSISTENCY WITH THE POLICIES OF THE COMMONWEALTH

A. Standard of Review

G.L. c. 164, § 69J¼ requires the Siting Board to determine whether the plans for construction of a proposed generating facility are consistent with current health and environmental protection policies of the Commonwealth and with such energy policies of the Commonwealth as are adopted by the Commonwealth for the specific purpose of guiding the decisions of the Siting Board. The health and environmental protection policies applicable to the review of a generating facility vary considerably depending on the unique features of the site and technology proposed; however, they may include existing regulatory programs of the Commonwealth relating to issues such as air quality, water-related discharges, noise, water

supply, wetlands or river front protection, rare and endangered species, and historical or agricultural land preservation. Therefore, in this section, the Siting Board summarizes the health and environmental protection policies of the Commonwealth that are applicable to the proposed project and discusses the extent to which the proposed project complies with these policies.

B. Analysis

In the Final Decision, the Siting Board reviewed the process by which IDC sited and designed the proposed project, and the environmental impacts of the proposed project as sited and designed. Final Decision at 122-123. As part of that review, the Siting Board identified a number of Commonwealth policies applicable to the design, construction, and operation of the proposed project. Id. The Siting Board found that plans for construction of the proposed project were consistent with current health and environmental protection policies of the Commonwealth and with such energy policies of the Commonwealth as have been adopted by the Commonwealth for the specific purpose of guiding the decisions of the Siting Board. Id. at 123.

In Section II. above, the Siting Board reviewed the environmental and health impacts of the proposed project in the compliance configuration to determine whether the change in configuration would alter the balance of environmental considerations reached in the underlying decision. We found that air, solid and hazardous waste, noise, safety, EMF, and cumulative health impacts, would be less than those reviewed by the Siting Board in the underlying decision, and water resource, wetland, visual, traffic and land use impacts would be substantially similar to those reviewed by the Siting Board in the underlying case. The Siting Board concludes that changes that would result from the compliance configuration would not alter the proposed facility's consistency with the identified policies of the Commonwealth. Accordingly, we find that IDC's plans for construction of the proposed project in the compliance configuration are consistent with current health and environmental protection policies of the Commonwealth and with such energy policies of the Commonwealth as have been adopted by the Commonwealth for the specific purpose of guiding the decisions of the Siting Board.

IV. DECISION

In the Final Decision for this matter issued on December 21, 1999, the Siting Board approved the petition of IDC Bellingham LLC to construct a 700 MW bulk generating facility in Bellingham, Massachusetts subject to conditions. Final Decision at 124. The Siting Board found that, upon compliance with the conditions set forth in that decision, the construction and operation of the proposed facility would provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. Id.; see G.L. c. 164, § 69J¼. Here, based on the Company's change in its choice of turbine and configuration, the Siting Board has examined whether the proposed changes to the facility alter the environmental balance we reached in the Final Decision.[49] In Section II, above, the Siting Board found that with the implementation of the listed condition relative to air impacts, the environmental balance we reached in the Final Decision would not be altered with the use of the compliance configuration.

Accordingly, the Siting Board finds that, upon compliance with the condition set forth in II. A, above, and the standing conditions from the Final Decision, listed below, the construction and operation of the proposed facility will provide a reliable energy supply for the Commonwealth with a minimum impact on the environmental at the lowest possible cost.

Accordingly, the Siting Board APPROVES the petition of IDC Bellingham LLC to construct a 525 MW bulk generating facility in Bellingham, Massachusetts subject to the following conditions:

Prior to the commencement of construction:

(A) The Siting Board finds that Condition A, directing the Company to make a compliance filing with the Siting Board regarding the Company's choice of turbines, has been satisfied.

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[49] Matters that were addressed in the IDC Decision and which are unchanged by the Compliance Filing are not at issue in this case.

During construction and operation of the proposed facility:

(B) In order to minimize CO_2 emissions, the Siting Board requires the Company to provide CO_2 offsets through a total contribution of $587,749 to be paid in five annual installments during the first five years of facility operation, plus a contribution of $5249 in the first year of facility operation as an offset for on-site tree clearing, to a cost-effective CO_2 offset program or programs to be selected upon consultation with the Staff of the Siting Board. If the Company in consultation with the Staff of the Siting Board selects a CO_2 offset program or programs with an overall projected cost to the Company of less than $1.50 per ton, a different cost commitment may be set which will provide offsets for more than 1 percent of facility CO_2 emissions with a cost commitment of less than $587,749 (not including the additional offsets required above for on-site tree clearing, at a cost of $5249). Alternatively, the Company may elect to provide the entire contribution within the first year of facility operation. If the Company so chooses, the CO_2 offset requirement would be satisfied by a single first-year contribution, based on the net present value of the five-year amount, to a cost-effective CO_2 offset program or programs to be selected upon consultation with the Staff of the Siting Board.

(C) In order to minimize visual impacts, the Siting Board directs the Company to provide reasonable off-site mitigation of visual impacts, including shrubs, trees, window awnings or other mutually-agreeable measures, that would screen views of the proposed generating facility and related facilities at affected residential properties and at roadways and other locations within one mile of the proposed facility, as requested by individual property owners or appropriate municipal officials consistent with the guidelines specified in Section III. F.2 of the Final Decision.

(D) In order to minimize noise impacts, the Siting Board directs the Company to implement additional noise mitigation that would limit L_{90} noise increases at receptor R-4 to 5 dBA.

(E) In order to minimize noise impacts, the Siting Board directs the Company in consultation with the Bellingham Board of Selectmen and MDEP to develop a noise compliance monitoring protocol and baseline noise measurements, taken on a schedule chosen in consultation with MDEP, that allow for the implementation of an on-going periodic noise monitoring program to begin within six months of the commencement of commercial operation. IDC shall submit a copy of the noise compliance monitoring protocol to the Siting Board prior to the commencement of commercial operation. In the process of developing this protocol the Company, the Board of Selectmen and MDEP should provide to the intervenors in this proceeding an opportunity to comment on their proposed protocol.

(F) In order to minimize safety impacts the Siting Board directs the Company to: (1) complete the construction section of its emergency response plan and file it with the Towns of Bellingham and Mendon before construction begins in order to cover possible contingencies related to construction accidents; (2) have trained personnel and equipment ready to address construction-related contingencies; (3) work with a local emergency planning committee or other appropriate entity or official selected by the Town to conduct an inventory of the equipment available and the ability of Bellingham, and cooperating communities to respond to operational emergencies at the proposed facility either alone, or in conjunction with a simultaneous emergency at another major commercial or industrial facility in the area; and (4) based on the inventory, agreed upon by a local emergency planning committee or other appropriate entity or official selected by the Town, to provide to the Town of Bellingham and to other towns that would provide

emergency assistance to Bellingham, an appropriate share based on the number of other industrial uses that could place similar demands on communities' emergency response capabilities of the equipment and/or resources necessary to handle such an event.

(G) In order to minimize traffic impacts, the Siting Board directs the Company to work with its EPC contractor and the Town of Bellingham to develop and implement a traffic mitigation plan which addresses scheduling and any necessary roadway construction or improvements consistent with the guidelines specified in Section III. I.2 of the Final Decision.

In addition, the Company must submit the following information to the Siting Board:

(H) In order to verify that the proposed project's water supply impacts are as set forth in this record, the Siting Board directs the Company to provide the Siting Board with a report at the end of its second year of operation setting forth the facility's monthly water use for the preceding two years. If the proposed facility's water use significantly exceeds the projections in this record, the Siting Board may direct the Company to participate in a water conservation program similar to that funded by ANP as a condition of its approvals, or to develop another cost effective approach to mitigate its water use. ANP-Bellingham Decision, EFSB 97-1, at 120; ANP-Blackstone Decision, EFSB 97-2, at 135.

(I) The Siting Board directs the Company to provide the Siting Board with an update on the extent and design of required transmission upgrades, and the measures incorporated into the transmission upgrade designs to minimize magnetic field impacts, at such time as IDC reaches final agreement with all transmission providers regarding transmission upgrades.

(J) The Siting Board directs the Company to (1) provide the Siting Board with copies of its special permit application and approval, and the site plan submission and approval; and (2) provide the Siting Board with a copy of any document (e.g., deed restriction, agreement, etc.) that formalizes the disposition of the Mendon parcel to serve as conservation land, open space or permanent undeveloped buffer.

Findings in this Compliance Decision are based upon the record developed during the compliance proceeding examined in light of findings we made in the Final Decision. Since the compliance proceeding is an extension of the underlying case, the Company must construct and operate its facility in conformance with its proposal presented in the underlying case as modified by the information provided in the compliance proceeding. Therefore, the evidence the Company presented in the compliance proceeding supercedes corresponding evidence presented by the Company in the underlying proceeding; if no new evidence was presented, the evidence presented in the underlying case stands. The Siting Board requires the Company to notify the Siting Board of any changes other than minor variations to the proposal so that the Siting Board may decide whether to inquire further into a particular issue. The Company is obligated to provide the Siting Board with sufficient information on changes to the proposed project to enable the Siting Board to make these determinations.

Jolette A. Westbrook
Hearing Officer

Dated this 12th Day of September, 2000

APPROVED by the Energy Facilities Siting Board at its meeting of September 11, 2000, by the members and designees present and voting: James Connelly, Chairman, EFSB/DTE); W. Robert Keating (Commissioner, DTE); Deirdre K. Manning (Commissioner, DTE); Joseph Donovan (for Dean Serpa, Acting Director of Economic Development); and David O'Connor (Commissioner, Division of Energy Resources)

James Connelly, Chairman
Energy Facilities Siting Board

Dated this 11th day of September, 2000

Appeal as to matters of law from any final decision, order or ruling of the Siting Board may be taken to the Supreme Judicial Court by an aggrieved party in interest by the filing of a written petition praying that the order of the Siting Board be modified or set aside in whole or in part.

Such petition for appeal shall be filed with the Siting Board within twenty days after the date of service of the decision, order or ruling of the Siting Board, or within such further time as the Siting Board may allow upon request filed prior to the expiration of the twenty days after the date of service of said decision, order or ruling. Within ten days after such petition has been filed, the appealing party shall enter the appeal in the Supreme Judicial Court sitting in Suffolk County by filing a copy thereof with the clerk of said court. (Massachusetts General Laws, Chapter 25, Sec. 5; Chapter 164, Sec. 69P).

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Board

In the Matter of the Petition of Nickel Hill Energy, LLC, for Approval to Construct a Bulk Generating Facility in the Town of Dracut, Massachusetts	)))))	EFSB 99-3

FINAL DECISION

Denise L. Desautels
Hearing Officer
November 13, 2000

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FIGURE 1: SITE LOCUS MAP
FIGURE 2: PRELIMINARY LAYOUT OF GENERATING AND ANCILLARY EQUIPMENT

LIST OF ABBREVIATIONS

Abbreviation	Explanation
AALs	Allowable Ambient Levels
ACGIH	American Conference of Governmental Industrial Hygienists
Ammonia slip	Emission of added ammonia
Andover	Town of Andover
Andover Breast Cancer Report	Evaluation of Breast Cancer Incidence in Andover, MA: 1987-1994 (1998)
ANP Bellingham Decision	ANP Bellingham Energy Company, 7 DOMSB 39 (1998)
ANP Blackstone Decision	ANP Blackstone Energy Company, 8 DOMSB 1 (1999)
AOD	Ammonia-on-demand
APCD	Air Pollution Control District
ATR	Automatic traffic recorder counts
BACT	Best available control technology
background	Ambient concentrations in air as measured at representative MADEP monitoring locations
BG&E	Baltimore Gas and Electric Company
BLSF	Bordering Land Subject to Flooding
Board of Selectmen	Board of Selectmen of the Town of Dracut
Brockton Power Decision	Brockton Power LLC, 10 DOMSB 157 (2000)
Brox	Brox Industries, Inc.
Brox Industries	Brox Industries, Inc.
Brox properties	450-acre contiguous lots owned by Brox Industries, Inc.
Bruton/Vrountas	Catherine M. Bruton and Christopher T. Vrountas, Interested Person
BVW	Bordering Vegetated Wetlands
c.	Chapter
cfs	Cubic feet per second
CMR	Code of Massachusetts Regulations
CO	Carbon monoxide

CO_2	Carbon dioxide
Company	Nickel Hill Energy, LLC
Company Brief	Nickel Hill's Brief
Company Reply Brief	Nickel Hill's Reply Brief
Company Supplemental Brief	Nickel Hill's Supplemental Brief
Company Supplemental Reply Brief	Nickel Hill's Supplemental Reply Brief
Constellation	Constellation Power, Inc.
dBA	Decibels, A-weighted
DEIR	Draft Environmental Impact Report
Devens	Devens Commerce Center
Devens site	Candidate site at the Devens Commerce Center
Dighton Power Decision	Dighton Power Associates, 5 DOMSB 193 (1997)
DOMSB	Decisions and Orders of Massachusetts Energy Facilities Siting Board
DOMSC	Decisions and Orders of Massachusetts Energy Facilities Siting Council
Dracut	Town of Dracut
EMF	Electric and magnetic fields
EPA	The United States Environmental Protection Agency
EPC	Engineering, procurement, and construction
Epsilon	Epsilon Associates, Inc.
F	Fahrenheit
FEIR	Final Environmental Impact Report
FOG	FOG atmospheric model
450-acre Brox properties	Contiguous lots owned by Brox Industries, Inc.
GEP	Good Engineering Practice
G. L.	Massachusetts General Laws
GLSD	Greater Lawrence Sanitary District
gpd	Gallons per day

HAPs Study	Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units - Final Report to Congress (1998)
HRSG	Heat recovery steam generator
Hz	Hertz (cycles per second)
I-L	Light Industrial zoning, in Dracut; or Limited Industrial District, in Methuen
IDC Bellingham Decision	IDC Bellingham, LLC, 9 DOMSB 260 (1999)
Incinerator Study Critique	Ignoring Motherhood, Milk, and Mercury (1998)
I-495	Interstate Route 495
I-93	Interstate Route 93
ISCST3	Industrial Source Complex Short-Term Model, Version 3
kV	Kilovolt
kV/m	Kilovolts per meter
LAER	Lowest Achievable Emission Rate
L_{dn}	Day-night average sound level incorporating a 10 dBA penalty to sound at night
L_{eq}	Equivalent sound level; level of steady sound with equivalent average sound energy
L_{90}	Sound level exceeded 90 percent of the time during a measurement period
LOS	Levels of service – a measure of the efficiency of traffic operations at a given location
LRWU	Lowell Regional Wastewater Utility
LUW	Land Under Water Bodies and Waterways
M&NE	Maritimes & Northeast Pipeline, L.L.C.
MADEP	Massachusetts Department of Environmental Protection
MADPH	Massachusetts Department of Public Health
MADPH Cancer Incidence Report	Cancer Incidence in Massachusetts 1987-1994: City/Town Supplement (1997)
MEPA	Massachusetts Environmental Protection Act
Merrimack Valley Report	The Health of the Merrimack Valley (1998)

Methuen	City of Methuen
mG	Milligauss
mgd	Million gallons per day
Millennium Power Decision	U.S. Generating Company, 6 DOMSB 1 (1997)
MMBtu	Million British thermal units
MRI	Merrimack River Initiative
MRWC	Merrimack River Watershed Council
MVRE	Merrimack Valley Residents for the Environment, Inc.
MW	Megawatts
MWH	Megawatt-hours
MWRA	Massachusetts Water Resources Authority
n.	Footnote
NAAQS	National ambient air quality standards
NEA Decision	Northeast Energy Associates, 16 DOMSC 335 (1987)
NEP	New England Power Company
NEPOOL	New England Power Pool
NESWC	Northeast Solid Waste Committee
1985 MECo/NEPCo Decision	Massachusetts Electric Company et al., 13 DOMSC 119 (1985)
Nickel Hill	Nickel Hill Energy, LLC
NO_2	Nitrogen dioxide
NO_X	Nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRC	National Research Council
NSPS	New source performance standards
NSR	New source review
OSHA	Occupational Safety and Health Administration
PM	Particulate matter
PM_{10}	Particulates (10 microns or less)

ppm	Parts per million (by volume for gases)
PSD	Prevention of significant deterioration
RFA	Riverfront Area
RMP	Risk Management Plan
ROW	Right-of-way
SACTI	Seasonal/Annual Cooling Tower Plume Impact model
$SCONO_X$	$SCONO_X$ pollution control technology
SCR	Selective Catalytic Reduction
SCREEN3	SCREEN3 atmospheric dispersion model
7Q	Lowest seven-day average flow (recurrence unspecified)
7Q10	Lowest seven-day average flow with a recurrence interval of once every ten years
7Q100	Lowest seven-day average flow with a recurrence interval of once every one hundred years
SFEIR	Supplemental Final Environmental Impact Report
SILs	Significant impact levels
Silver City Decision	Silver City Energy Limited Partnership, 3 DOMSB 1 (1994)
Sithe Edgar Decision	Sithe Edgar Development LLC, 10 DOMSB 1 (2000)
Sithe Mystic Decision	Sithe Mystic Development LLC, 9 DOMSB 101 (1999)
Sithe West Medway Decision	Sithe West Medway Development LLC, 10 DOMSB 274 (2000)
Siting Board	Energy Facilities Siting Board
Siting Council	Energy Facilities Siting Council
Special Permit	Town of Dracut special permit and site plan approval
SO_2	Sulfur dioxide
SWPPP	Stormwater Pollution Prevention Plan
TELs	Threshold effects exposure limits
Tennessee	Tennessee Gas Pipeline Company
TPS	Technology Performance Standards
tpy	Tons per year

25-acre site	Site proposed for lease to Nickel Hill Energy, LLC
μg/dL	Micrograms per deciliter
$\mu g/m^3$	Micrograms per cubic meter
USGS	United States Geological Survey
VOC	Volatile organic compounds
XONON	XONON pollution control technology

The Energy Facilities Siting Board ("Siting Board") hereby APPROVES, subject to conditions, the petition of Nickel Hill Energy, LLC to construct a net nominal 750-megawatt combined-cycle generating facility at the proposed site in Dracut, Massachusetts.

I. INTRODUCTION

A. Description of the Proposed Facility, Site, and Interconnections

Nickel Hill Energy, LLC ("Nickel Hill" or "Company") has proposed to construct a natural gas-fired, combined-cycle bulk electric generating facility with a net nominal electrical output of 750 megawatts ("MW") in Dracut, Massachusetts ("generating facility" or "proposed facility") (Exh. NHE-1, at 1-1). Nickel Hill proposes to locate the proposed facility on a recently subdivided 25 acre lot ("25-acre site") within 450 acres of contiguous properties owned by Brox Industries, Inc. ("Brox" or "Brox Industries") (id.; Exhs. EFSB-LU-6; RR-EFSB-49). Nickel Hill stated that the 25-acre site is bounded by Methuen Street to the south; the Methuen/Dracut town line to the east; and Brox Industries quarrying, crushing, and batch plant operations to the north and west (Exhs. EFSB-G-5, Att; RR-TD-3; RR-EFSB-49).[1]

The switchyard would be located adjacent to the turbine building (Exhs. EFSB-G-4; INT-MVRE-G-7(d), Bulk Att. at 3-8). The proposed facility would interconnect with an existing New England Power Company ("NEP") 345 kilovolt ("kV") line which crosses the Brox properties approximately 4,200 feet to the west of the proposed facility (Exhs. EFSB-G-4; RR-EFSB-49; Tr. 1, at 38). A single interconnect would be made to the Tennessee Gas Pipeline Company ("Tennessee") gas pipeline at the joint facilities portion of the Maritimes and Northeast Pipeline, L.L.C. ("M&NE") gas pipeline located on Brox property, enabling the proposed project to access gas from more than one system (Exhs. NHE-1, at 2-1; NHE-2, at 3-10).[2] Nickel Hill has

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[1] The rock quarry operation and asphalt batch plant on Brox property would, with certain exceptions, continue to operate during the construction and operation of the proposed facility (Exhs. NHE-1, at 1-1; RR-MVRE-7).

[2] "Interconnection with the M&NE gas pipeline would require the construction of a lateral to the point of Nickel Hill's proposed interconnection with the Tennessee gas pipeline located on Brox property, beyond the boundaries of the 25-acre site (Tr. 1, at 21-22, 34).

(continued...)

executed a term sheet with Brox Industries for the potential lease and option to purchase of the 25-acre site and four-acre site, and for a proposed gas pipeline easement and proposed 150-foot wide overhead aerial-rights easement for an electric interconnection (Exhs. RR-MVRE-7; RR-EFSB-49; Tr. 1, at 18-19; Tr. 18, at 2183).[3] Neither the electric interconnect nor the interconnect with the Tennessee gas pipeline would require an easement beyond the 450-acre Brox properties (Tr. 1, at 21).

Nickel Hill indicated that it would construct a 30-foot wide access road ("25-acre site access road") from Methuen Street to the proposed facility using Town of Dracut ("Dracut") specifications for public roads (Exhs. EFSB-G-5; RR-MVRE-7). In addition, Nickel Hill indicated that Brox Industries intends to relocate the existing Brox access road which connects Route 110 to Methuen Street (Exhs. RR-MVRE-8; RR-TD-10, Att.; Tr. 4, at 421-22).

The proposed facility would obtain cooling and process water from the Merrimack River. The proposed subaqueous infiltration bed system for plant cooling-water usage would be located in the Merrimack River along Route 110 (Exhs. EFSB-G-13C; EFSB-WL-2, Att. at 12 (fig. 20); Tr. 1, at 28; Tr. 15, at 1896).

The proposed facility would include the following major components and structures: two Siemens-Westinghouse or Mitsubishi Heavy Industries "G" technology combined-cycle combustion turbines with steam injection capability and two 170-foot stacks, two heat recovery steam generators ("HRSGs"), one steam turbine generator, and a wet mechanical cooling system (Exhs. EFSB-A-2, Att.; INT-MVRE-G-7(a), Att.; Tr. 1, at 113). The proposed facility also would be equipped with a Selective Catalytic Reduction ("SCR") system for nitrogen oxides ("NO_X") control and oxidation catalyst for carbon monoxide ("CO") control (Exh. INT-MVRE-G-7(a), Att. at 2-2). The turbines would be housed in an 80,000 square-foot building (id.).

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2 (...continued)
Connection to both gas pipelines would be accomplished with a common header system at the point of interconnection (Exhs. EFSB-G-13(c); INT-MVRE-G-7(a), Bulk Att. at 3-7; Tr. 1, at 21, 119-121; Tr. 4, at 447-448).

3 Nickel Hill stated that it is negotiating a noise easement with Brox Industries to be executed contemporaneously with its anticipated lease agreement (Exh. RR-EFSB-73).

Ancillary equipment would include wet mechanical cooling towers, water and wastewater treatment systems, water and wastewater storage tanks, main and auxiliary transformers, a 345 kV switchyard, and administrative and maintenance facilities (id.).

Nickel Hill is a wholly-owned subsidiary of Constellation Power, Inc. ("Constellation") which is a non-utility power generation affiliate of Baltimore Gas and Electric Company ("BG&E") (Exhs. NHE-1, at 1-1; NHE-2, at 2-1; INT-MVRE-G-7(d), Bulk Att. at 2-1; RR-EFSB-34). Constellation and its affiliates develop, own, and operate power projects in the United States and Latin America (Exh. RR-EFSB-34).[4]

B. Procedural History

On April 1, 1999, Nickel Hill filed with the Siting Board a petition to construct and operate a net nominal 750 MW natural gas-fired, combined-cycle generating facility in Dracut, Massachusetts. The Siting Board docketed the petition as EFSB 99-3.

On May 12, 1999, the Siting Board conducted a public hearing in Dracut. In accordance with the direction of the Hearing Officer, Nickel Hill provided notice of the public hearing and adjudication.

Sixty-three timely petitions to intervene were filed[5] along with three untimely petitions to intervene and four timely petitions to participate as interested persons. Nickel Hill filed a response opposing all petitions to intervene except those filed by Dracut, the Town of Andover ("Andover"), the City of Methuen ("Methuen"), and the Merrimack River Watershed Council

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[4] A corporate restructuring occurred in May 1999, which changed the relationship between Constellation and BG&E (Exh. RR-EFSB-34, Att; Tr. 8, at 1039). At the time the petition was filed, Constellation was a subsidiary of BG&E (Tr. 8, at 1039). Following the May 1999 corporate restructuring, BG&E and Constellation became subsidiaries of Constellation Energy Group, Inc. and thus affiliates of each other (Exh. RR-EFSB-34; Tr. 8, at 1039).

[5] Of the 63 timely filed petitions, 52 followed the same basic format ("form petitions") and did not adequately state how the individual petitioner might be substantially and specifically affected by the proceeding. In addition, one petition in a similar format was signed by 38 residents of Dracut and the City of Methuen and filed as a joint petition ("group petitioners").

("MRWC"). Nickel Hill filed a supplemental response addressing late-filed petitions and a supplemental response addressing petitioners' replies.

The Hearing Officer granted the timely petitions to intervene filed by Dracut, Methuen, Andover, the Merrimack Valley Residents for the Environment, Inc. ("MVRE"), and MRWC. Nickel Hill Energy, LLC, EFSB 99-3 (Hearing Officer Procedural Order, June 25, 1999, at 16-17). The Hearing Officer also granted the petitions to intervene of Liese M. Elerin, John R. Klein, Dino Realty Trust, and joint petitioners Robert P. Beatty and Reba J. Beatty. Id. at 10; Nickel Hill Energy, LLC, EFSB 99-3 (Hearing Officer Procedural Order, July 16, 1999).

The Hearing Officer denied the petitions to intervene of the fifty-two form petitioners and the thirty-eight group petitioners and instead allowed these petitioners to participate as interested persons. Nickel Hill Energy, LLC, EFSB 99-3 (Hearing Officer Procedural Order, June 25, 1999, at 18-20).[6] The Hearing Officer also denied the petitions to intervene of S. James Boumil, Marvin Laut, joint petitioners Donald McCandless and Joanne McCandless, and joint petitioners Catherine M. Bruton and Christopher T. Vrountas ("Bruton/Vrountas"), and instead allowed these petitioners to participate as interested persons. Id.

The Hearing Officer also granted the four timely petitions seeking leave to participate as interested persons filed by NEP, Sigma Consultants, U.S. Generating Company, and Andover Village Improvement Society. Id. at 20. The untimely petitions of Councilor Stephen Zanni, joint petitioners Gary and Sharon Gillespie, and joint petitioners Francine and David O'Shea were denied by the Hearing Officer as to intervention and for leave to participate as an interested person on the basis of untimely filing without good cause shown. Id. at 21.

The Siting Board initially conducted fifteen days of evidentiary hearings, commencing on October 14, 1999, and ending on December 27, 1999. Nickel Hill presented the testimony of the following witnesses: Thomas G. Favinger, Business Development Manager, Constellation, who testified as to project description and site selection; Theodore A. Barten, P.E., Managing

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[6] The form petitioners were allowed to participate as a single interested person with a designated spokesperson and the group petitioners were allowed to participate as a single interested person with a designated spokesperson. Nickel Hill Energy, LLC, EFSB 99-3 (Hearing Officer Procedural Order, June 25, 1999, at 20).

Principal of Epsilon Associates, Inc. ("Epsilon"), who testified as to project overview, site selection, and land use, solid waste, visual, safety, and traffic impacts; Dale T. Raczynski, P.E., Principal of Epsilon, who testified as to technology performance standards and air quality impacts; Elizabeth M. Hendrick, Senior Air Quality Meteorologist at Epsilon, who testified as to technology performance standards, and air quality impacts; Andrew D. Magee, Senior Project Manager at Epsilon, who testified as to water resources, wetlands, and traffic impacts; David B. Grogan, President, D. B. Grogan Associates, Inc., who testified as to project overview, site selection, and water resources, wetlands, noise, and safety impacts; David N. Keast, P.E., who testified as to noise impacts, and Peter A. Valberg, Ph.D., Senior Scientist at Cambridge Environmental, Inc., who testified as to electric and magnetic fields ("EMF") and public health impacts.

The Town of Dracut presented the following witnesses: Keith H. Kennedy, Vice President of Tech Environmental, Inc., who testified as to air quality, noise, visual, construction, traffic, and public health impacts; Peter H. Guldberg, President of Tech Environmental, Inc., who testified as to air quality, noise, visual, safety, and construction impacts; Edward J. Schmidt, P.E., Ph.D., Senior Consultant, Shevenell-Gallen and Associates, Inc., who testified as to water impacts; and Andrew J. McCusker, Principal and Owner of Mackworth Environmental Management, who testified as to water impacts. MVRE presented the testimony of Everett F. Penney, Jr., Director of Public Health, Town of Andover, who testified as to public health impacts, and Julie Watts, MPH, Boston University School of Public Health Ph.D. candidate, who testified as to public health impacts.[7]

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[7] MVRE also sought to sponsor additional prefiled testimony as part of its direct case. In response to Nickel Hill's Motion to Strike and/or Clarify MVRE's Direct Case, MVRE was not permitted to introduce additional testimony of Messrs. Penney and Hajec and Ms. Watts because MVRE did not timely seek to have such testimony introduced. Nickel Hill Energy, LLC, EFSB 99-3 (Hearing Officer Ruling, November 22, 1999). In addition, the Hearing Officer determined that certain assertions made by MVRE's counsel did not constitute evidence because counsel did not present himself as an expert witness and there was no indication counsel had direct personal knowledge of such information. Id. (Hearing Officer Ruling at 6-7). Further, counsel did not provide information regarding his experience and qualifications that would have allowed him to qualify to testify about

(continued...)

On March 2, 2000, Nickel Hill, Dracut, MVRE, Andover, and Bruton/Vrountas submitted their respective initial briefs. On March 10, 2000, Nickel Hill, Dracut, MVRE, and Andover submitted their respective reply briefs. On June 2, 2000, Nickel Hill filed a Supplemental Final Environmental Impact Report ("SFEIR") which addressed specific issues raised in the Secretary of Environmental Affair's Certificate on the Final Environmental Impact Report ("FEIR"), namely, alternative air and water technologies, the feasibility of zero ammonia technologies, the potential to further reduce volatile organic compounds emissions, and noise impacts.[8] Because the new information in the SFEIR, included, inter alia, air quality data and an analysis of cooling technologies, information which may be relevant to the Siting Board's analysis of the minimization of environmental impacts and costs of the proposed facility, the Siting Board conducted additional evidentiary hearings on August 3, 2000, and August 15, 2000. These hearings were limited in scope to new information presented in the SFEIR which is under the jurisdiction of the Siting Board (Tr. 18, at 2103-2104; Tr. 19, at 2316-2317). Nickel Hill Energy, LLC, EFSB 99-3 (Hearing Officer Ruling, at 4). Parties were permitted to submit supplemental briefs relative to the SFEIR. On August 25, 2000, Bruton/Vrountas filed a supplemental brief. Supplemental briefs were filed by Nickel Hill, Dracut, MVRE, and Andover on August 28, 2000. On September 6, 2000, Nickel Hill, Dracut, and MVRE filed supplemental reply briefs. The record includes 941 exhibits consisting primarily of information request responses and record request responses.

C. Jurisdiction and Scope of Review

As a generating unit with a design capacity of approximately 750 MW, Nickel Hill's

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7 (...continued)
such issues. Id. (Hearing Officer Ruling at 6-7).

8 On June 22, 2000, the Hearing Officer issued a ruling denying MVRE's request to conduct discovery upon the SFEIR and granting its motion for an additional evidentiary hearing on the new information contained in the SFEIR and for supplemental briefing.

proposed project[9] falls squarely within the first definition of "facility" set forth in G. L. c. 164, § 69G, which states, in pertinent part, that a facility is a generating unit defined as:

> any generating unit designed for or capable of operating at a gross capacity of 100 megawatts or more, including associated buildings, ancillary structures, transmission and pipeline interconnections that are not otherwise facilities, and fuel storage facilities.

In accordance with G. L. c. 164, § 69J¼, before approving a petition to construct a generating facility, the Siting Board must determine that the applicant has met five requirements. First, the Siting Board must determine that the applicant's description of the site selection process used is accurate (see Section II., below). Second, the Siting Board must determine that the applicant's description of the proposed generating facility and its environmental impacts are substantially accurate and complete (see Section III., below). Third, the Siting Board must determine that the proposed generating facility will minimize the environmental impacts consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts (see Section III., below). Fourth, the Siting Board must determine that plans for construction of the proposed generating facility are consistent with current health

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[9] Andover asserts that Nickel Hill lacks standing to seek approval from the Siting Board, arguing that Nickel Hill does not have a legally cognizable interest in the "premises" upon which it seeks to construct its proposed facility, and therefore may not seek a land use permit (Andover Brief at 1-2). This argument fails on two grounds. First, Nickel Hill does have a legally cognizable interest in the 25-acre site through its executed term sheet for the purchase or long-term lease of the 25-acre site for the development, construction, and operation of a power plant (Exhs. EFSB-G-10; RR-MVRE-7; Tr. 1, at 15; Tr. 7, at 912). Second, and more important, neither the Siting Board's statute nor its implementing regulations require that an applicant possess a "legally cognizable interest" either prior to requesting the Siting Board's approval to construct an energy facility, or prior to receiving it. In fact, the statute clearly contemplates that an approval could be granted without such interest, since it includes provisions for the taking of property by eminent domain for an energy facility such as a transmission line subsequent to Siting Board approval of the facility. See G. L. c. 164, § 69R. Andover's argument that because developers of generating facilities proposed under G. L. c. 164, § 69J¼ are no longer required to notice two sites, they should therefore be held to a higher standard than developers of other facilities and required to have a legally cognizable interest in the proposed site may have some merit from a policy perspective, but cannot create a standing requirement where one does not presently exist.

and environmental protection policies of the Commonwealth and with such energy policies as are adopted by the Commonwealth for the specific purpose of guiding the decisions of the Board (see Section IV., below). Finally, if the expected emissions from the proposed facility do not meet the applicable technology performance standard, the Siting Board must determine, based on a comparison with other fossil fuel generating technologies, that the proposed generating facility on balance contributes to a reliable, low-cost, diverse regional energy supply with minimal environmental impacts.[10]

MVRE has argued, based on the Siting Board's mandate to "provide a reliable energy supply for the Commonwealth," that the Siting Board must also determine that power from the Nickel Hill facility would be sold within Massachusetts in order to approve the facility (MVRE Brief at 3-6). This argument is contradicted by the express language of the Siting Board's statute, which reads in pertinent part:

> [The Siting Board] shall implement the provisions contained in sections 69H to 69Q inclusive, so as to provide a reliable energy supply for the commonwealth with a minimum impact on the environment at the lowest possible cost. To accomplish this . . . the board shall review only the environmental impacts of generating facilities, consistent with the commonwealth's policy of allowing market forces to determine the need for and cost of such facilities. Such reviews shall be conducted consistent with section 69J ¼ for generating facilities. G. L. c. 164, § 69H.

The question of where power produced by the proposed facility will be sold is unrelated to the environmental issues which the Siting Board is authorized to investigate, and is inextricably linked to the issues of need and cost which the Siting Board has been directed to leave to market forces. Consequently, the Siting Board finds that this issue is not properly within the scope of review for cases brought before the Siting Board pursuant to G. L. c. 164, § 69J¼.

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10 As set forth in Section III.B, below, the Siting Board finds that the expected emissions from the proposed generating facility do not exceed the technology performance standard specified in 980 CMR, § 12.00. Therefore, a generating technology comparison is not required in this case.

II. SITE SELECTION

A. Standard of Review

G. L. c. 164, § 69J¼ requires the Siting Board to determine whether an applicant's description of its site selection process is accurate. An accurate description of an applicant's site selection process shall include a complete description of the environmental, reliability, regulatory, and other considerations that led to the applicant's decision to pursue the project as proposed at the proposed site, as well as a description of other siting and design options that were considered as part of the site selection process. G. L. c. 164, § 69J¼.

The Siting Board also is required to determine whether a proposed facility provides a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. G. L. c. 164, § 69H. To accomplish this, G. L. c. 164, § 69J¼ requires the Siting Board to determine whether "plans for the construction of a proposed facility minimize the environmental impacts consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts of the proposed generating facility." G. L. c. 164, § 69J¼. Site selection, together with project design and mitigation, is an integral part of the process of minimizing the environmental impacts of an energy facility. The Siting Board therefore reviews the applicant's site selection process in order to determine whether that process contributes to the minimization of environmental impacts of the proposed project and the costs of mitigating, controlling, and reducing such impacts. In making this determination, the Siting Board also will consider, consistent with its broad mandate under G. L. c. 164, § 69H, the reliability, regulatory, and other non-environmental advantages of the proposed site. Id.

B. Description

Nickel Hill Energy, LLC, is a wholly-owned subsidiary of Constellation (Exhs. NHE-1, at 1-1; NHE-2, at 2-1; INT-MVRE-G-7(d), Bulk Att. at 2-1; RR-EFSB-34). Constellation is a non-utility power generation affiliate of BG&E with direct ownership positions in 34 energy projects that are under construction or in operation (Exhs. NHE-1, at 1-1; RR-EFSB-34; Tr. 1, at 150).

The Company indicated that Constellation identified New England, and specifically

Massachusetts, as a potentially attractive location for development of power generation projects (Exh. NHE-1, at 2-3). Constellation stated that it considered New England attractive because: (1) many New England states, including Massachusetts, were in the process of deregulating electricity generation; (2) New England offered a favorable regulatory framework; (3) the regional economy was strong; and (4) the competition included many older, inefficient generating facilities (Exh. EFSB-SS-1, at 1).

The Company stated that Constellation identified six candidate sites for development of an electric generating facility (Exh. NHE-1, at 2-6).[11] The sites were located in Norwich, Connecticut; Orrington, Maine; Wallingford, Connecticut; Pawtucket, Rhode Island; Dracut, Massachusetts; and at the Devens Commerce Center ("Devens site"), located in Ayer, Harvard, and Shirley, Massachusetts (id. at 2-6 to 2-7). The Company stated that Constellation identified the three candidate sites in Maine and Massachusetts by mapping the intersections of natural gas and transmission lines, looking for individual sites near these intersections, and then confirming each site's potential with a site visit (Tr. 1, at 154-155, 160). The Company indicated that the Rhode Island and Connecticut sites were brought to the attention of Constellation by owners of the properties or their representatives (Tr. 1, at 157-158; Exh. EFSB-SS-2, at 2). The Company stated that Constellation did not review the various sites with any preconceived idea of plant size or cooling technology (Exh. EFSB-SS-1(d, e); Tr. 3, at 303).

The Company indicated that Constellation considered the following factors in evaluating potential sites for development: (1) close proximity to a natural gas pipeline with sufficient capacity; (2) close proximity to major electric transmission lines; (3) proximity to an adequate water supply for cooling purposes; (4) existence of any required sanitary and industrial sewer connections; (5) location within a community that supported development of an appropriate generation facility; (6) adequate acreage of buildable land; (7) location in an industrial area with zoning that is compatible with industrial and commercial uses; (8) "reasonable" distances from

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[11] The Company stated that Constellation also investigated the possibility of purchasing existing facilities with the potential for expansion, but that for various reasons Constellation either did not pursue or did not submit winning bids on these properties (Exh. EFSB-SS-3; Tr. 2, at 223).

Motion to Compel, November 6, 1999). Finally, MVRE challenged the adequacy of Nickel Hill's description of the site selection process on the grounds that the Company did not provide land acquisition costs for the various alternative sites (Tr. 3, at 347, 349).

Ms. Watts, MPH, witness for MVRE, objected to siting the proposed facility in the Merrimack Valley on the grounds that the region is burdened with health concerns and air polluting industries (Exh. MVRE-DC-4). Bruton/Vrountas argued that the Merrimack Valley has high rates of respiratory disease, heart disease, and incidence of certain cancers (Bruton/Vrountas Brief at 5). Bruton/Vrountas further argued that the Greater Lawrence area has a history of poor enforcement of air regulations, and suggested that the Merrimack Valley was a poor selection for a power plant site due to the various existing health conditions in the area (id. at 9, 13-16).

The Town of Dracut argued that the Company has selected an appropriate site for its facility, citing nine findings drawn from the Dracut Special Permit and Site Plan Approval ("Special Permit") (Dracut Brief at 3, 4).[16] Dracut also argued that Siting Board regulations do not require any particular level of consideration of alternate sites (id. at 4).

Nickel Hill maintained that the selection of an appropriate site contributes to the minimization of environmental impacts (Exh. EFSB-SS-2, at 1). The Company asserted that environmental impacts are minimized by selecting a location close to suitable gas lines, electric lines, and water, since short interconnections would have fewer impacts than long interconnections (id.). The Company argued that impacts are further minimized by selecting a large and/or well-buffered site, which reduces potential noise and visual impacts on neighbors and which gives flexibility in facility layout, allowing a design that can avoid wetlands and take best advantage of buffer areas (id.). The Company asserted that based on these criteria, the location and size of the 450-acre Brox properties is "nearly ideal," and concluded that the process leading to the selection of the Dracut site therefore minimizes environmental impacts (id.).

In response to MVRE's argument that the Merrimack Valley is not a suitable location for a generating facility, the Company provided information on point source emissions within

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[16] The nine findings address zoning, permitting, site buffering, mix of neighboring land use, distance to residences, distance to sensitive receptors, and compatibility with existing use (Exh. EFSB-G-13(d), Att.).

Massachusetts to support its assertion that the Merrimack Valley area does not have a disproportionate number of major emissions sources or a disproportionate share of total emissions (Exh. EFSB-SS-5).[17]

In response to MVRE's contentions regarding the Devens site, Nickel Hill asserted that neither G. L. c. 164, § 69J¼ nor any Siting Board decision interpreting that statute requires an applicant to consider an alternate site, within or outside the Commonwealth, and noted that the Restructuring Act of 1997 specifically removed the requirement to review and notice alternate sites (Nickel Hill Reply Brief at 20-21). The Company also indicated that "it took some time to evaluate whether gas could be brought to this site in an economical, reliable and least environmental impact manner" (Tr. 3, at 385). The Company added that it had originally hoped to share the cost of building an appropriately-sized gas transmission service to Devens, but that this likelihood eventually appeared to be small (Tr. 3, at 389, 390). The Company indicated that the "0" rating of the Devens site for zoning and land use was in fact a neutral rating that reflected, in part, unclear resolution of zoning issues in discussions with the Devens Commerce Commission (Tr. 3, at 322). In response to MVRE's land acquisition cost arguments, the Company argued that the cost of alternative sites falls outside the Siting Board's jurisdiction, and that land acquisition costs did not figure into the Company's site selection evaluation (Tr. 3, at 347).

D. Analysis

Nickel Hill has presented a site selection process which resulted in a decision by Constellation to pursue development of a generation facility on a portion of the Brox properties in Dracut. Nickel Hill provided information on six potential sites for generating facilities in New

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[17] Choosing NO_X as an indicator, the Company determined that eleven of the top 100 Massachusetts NO_X sources are within the Merrimack Valley Air Pollution Control District ("APCD"), and that these eleven account for only 6 percent of stationary source NO_X emissions, statewide; in contrast, the Southeastern Massachusetts APCD accounts for 46 percent of the stationary source NO_X emissions from the Commonwealth's 100 largest emitters (Exh. EFSB-SS-5). The Company also determined that none of the top five NO_X sources in Massachusetts are located in the Merrimack Valley APCD (id.).

England, and described the sites' suitability with respect to a number of criteria concerning existing infrastructure and land uses that could influence environmental and community impacts. The Siting Board notes that the Company provided information on the six sites, developed based on site visits, environmental analyses specific to each site, and consideration of economic factors and reliability.

MVRE implicitly argued that Nickel Hill's description of its site selection process is not accurate, contending that the Devens site was not actually given serious consideration. MVRE also argued that the description is not complete because comparative land acquisition costs were not provided. The Siting Board notes that there is no indication in the record that Nickel Hill's description of its site selection process is inaccurate. The "0" or neutral rating for land use and zoning assigned to the Devens site appears to accurately reflect Constellation's determination that the zoning status of the Devens site was unclear.[18] The Siting Board also notes that neither its statute nor its regulations require proponents of generating facilities to determine and report land acquisition costs for other sites considered.[19] Accordingly, the Siting Board finds that the Company's description of the site selection process used is accurate.

MVRE has argued that Nickel Hill's site selection process was inadequate because Nickel Hill did not consider any suitable alternate location in Massachusetts. The Siting Board notes that there is no statutory or regulatory requirement that the proponent of a generating facility consider alternate sites, either within or outside of Massachusetts; G. L. c. 164 § 69J¼ requires only that the proponent accurately describe the process by which a site was selected. Moreover,

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18 Although not a basis for the Siting Board's conclusion, documents examined in camera by the Hearing Officer contain legal analysis prepared by Nickel Hill's counsel regarding the zoning considerations of the Devens site, which analysis does not contradict the testimony of Nickel Hill's witnesses. Nickel Hill Energy, LLC, 99-3 (Hearing Officer Ruling, January 14, 2000, at 4). See Exhs. NHE-1, at 2-7; EFSB-SS-1, at 6; Tr. 3, at 318-331.

19 A generic requirement of this kind may, in fact, be inconsistent with the Siting Board's governing statute which states that it "shall not require any data related to the . . . cost of the proposed generating facility, except for data related to the costs associated with the mitigation, control or reduction of the environmental impacts of the proposed generating facility." G. L. c. 164, § 69J¼.

as discussed above, the record indicates that Constellation did in fact evaluate a second potentially viable site in Massachusetts and that it found this site to be inferior to the Dracut site in several respects.

MVRE further argued that a site selection process that results in the siting of a generating facility within the Merrimack Valley is inherently faulty, because of the prevalence of respiratory disease in the region and the presence of other pollution sources. Nickel Hill, on the other hand, asserts that its proposal minimizes environmental impacts in part through its location on a large, well-buffered site that is close to major infrastructure elements. The record indicates that Constellation identified the strengths and weaknesses of each of the six sites, and selected the Dracut site as the most advantageous. The record indicates that the chosen site has a number of attributes which would help to minimize the environmental impacts of a generating facility, including proximity to available water and to electric, gas, and sewer infrastructure, the size of the site, the existing visual buffers, existing use for mining, and distance from residential areas. The primary disadvantage of the site, as identified by the intervenors, is its location in an area that has several communities with salient health status statistics and a history of air emissions compliance issues.

The Siting Board recognizes that an analysis of local air quality impacts is critical to the evaluation of a petition to construct a generating facility. However, this analysis must be based on a rigorous evaluation of the emissions of the specific facility proposed at the specific site; the Siting Board cannot conclude a priori that an entire region such as the Merrimack Valley is an unsuitable location for any type of generating facility.[20] The Siting Board therefore rejects the notion that Constellation's site selection process is inherently flawed. On balance, based on the significant advantages of the site across a broad range of criteria, the Siting Board finds that the Company's site selection process resulted in the selection of a site that contributes to the minimization of environmental impacts and the costs of mitigating, controlling, and reducing such impacts.

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[20] Descriptions of baseline air quality and baseline health status are provided below in Section III.B.2 and Section III.L.1, respectively.

III. ENVIRONMENTAL IMPACTS

A. Standard of Review

G. L. c. 164, § 69J¼ requires the Siting Board to determine whether the plans for construction of a proposed generating facility minimize the environmental impacts of the proposed facility consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts of the proposed generating facility. In order to make this determination, the Siting Board assesses the impacts of the proposed facility in eight areas prescribed by its statute, including air quality, water resources, wetlands, solid waste, visual impacts, noise, local and regional land use, and health, and determines whether the applicant's description of these impacts is accurate and complete. G. L. c. 164, § 69J¼.

The Siting Board also assesses the costs and benefits of options for mitigating, controlling, or reducing these impacts, and determines whether mitigation beyond that proposed by the applicant is required to minimize the environmental impacts of the proposed facility consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts of the proposed generating facility. Compliance with other agencies' standards does not establish that a proposed facility's environmental impacts have been minimized.

Finally, the Siting Board assesses any tradeoffs that need to be made among conflicting environmental impacts, particularly where an option for mitigating one type of impact has the effect of increasing another type of impact. An assessment of all impacts of a facility is necessary to determine whether an appropriate balance is achieved both among conflicting environmental concerns and between environmental impacts and cost. A facility proposal which achieves this balance meets the Siting Board's statutory requirement to minimize environmental impacts consistent with minimizing the costs associated with the mitigation, control, and reduction of the environmental impacts of the proposed generating facility.

B. Air Quality

This section describes the emissions and impacts of the proposed facility, compliance with existing regulations, and emission offsets proposed by the Company.

1. Applicable Regulations

The Company stated that the principal air quality regulatory programs that apply to the proposed facility are the Massachusetts Air Plan Approval program, Non-Attainment Review, and U.S. Environmental Protection Agency ("EPA") Prevention of Significant Deterioration requirements; all three programs are administered by the Massachusetts Department of Environmental Protection ("MADEP") (Exhs. EFSB-A-2-S, Att. at 3-1; RR-EFSB-68(a), Att. at 3-1rev). Specific regulations include the National Ambient Air Quality Standards ("NAAQS");[21] New Source Review ("NSR") requirements; Prevention of Significant Deterioration ("PSD") requirements; and New Source Performance Standards ("NSPS") for criteria pollutants (Exhs. NHE-2, at 5.2-1; RR-EFSB-68(a), Att. at 3-1rev). The Company indicated that all areas of the country are classified as "attainment," "non-attainment," or "unclassified" with respect to NAAQS for six criteria pollutants: nitrogen dioxide ("NO_2"), sulfur dioxide ("SO_2"), particulates ("PM_{10}"), CO, ground level ozone, and lead (Exhs. NHE-2, at 5.2-3; EFSB-A-2-S, Att. at 3-4). According to the Company, the proposed facility is subject to NSR for precursors of ozone, which is considered a non-attainment criteria pollutant (Exh. EFSB-A-2-S, Att. at 3-1; see Table 1, below); PSD applies to major new sources of criteria pollutants (id. at 3-2; see Table 1, below); and NSPS apply to pollutants on the basis of process or source category (id. at 3-5).

The Company stated that Massachusetts regulations for air plan approval require Best Available Control Technology ("BACT")[22] for each regulated pollutant (Exhs. NHE-2, at 5.2-5; EFSB-A-2-S, Att. at 3-6). In addition, the Company stated that the facility is required to have

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21 In addition, MADEP has adopted the NAAQS limits as Massachusetts Ambient Air Quality Standards (Exh. EFSB-A-2-S, Att. at 3-3).

22 The Company stated that "BACT" is defined in the PSD regulations as "an emissions limitation . . . based on the maximum degree of reduction for each pollutant subject to regulation . . . which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental and economic impacts and other costs, determines is achievable . . . through application of production processes or available methods, systems and techniques . . . for control of such pollutant." (Exh. EFSB-A-2-S, Att. at 4-16).

Lowest Achievable Emissions Rate ("LAER")[23] technology for VOC and NO_X, which are regulated as precursors to ozone by MADEP (Exh. EFSB-A-2-S, Att. at 3-1). The Company stated that the Technology Performance Standard ("TPS") established by the Siting Board requires new facilities either to demonstrate that emissions comply within the TPS emissions criteria or to provide data enabling the Siting Board to determine whether the proposed facility will contribute to a reliable, low-cost, diverse, regional energy supply with minimal environmental impacts (Exh. NHE-1, at 3-1). The Company stated that, under the Acid Rain Program, the EPA requires owners of new plants to acquire SO_2 emission allowances to offset their potential to emit SO_2 (id. at 4.2-8; Exh. NHE-2, at 5.2-5).

The Company described several other air quality requirements including a MADEP prohibition on dust or odor-causing emissions from construction or operation of a fossil-fuel plant, an additional limitation on particulate matter emissions from new fossil-fuel facilities in Massachusetts, and the MADEP air toxics policy (Exh. EFSB-A-2-S, Att. at 3-7, 3-8).[24]

2. Baseline Air Quality

The Company provided an assessment of regional air quality, based on MADEP measurements of air quality. The Company provided data from MADEP air quality monitoring stations in Lowell, Lawrence, and Lynn, asserting that these stations were most representative of air quality in Dracut (Exh. EFSB-A-2-S, Att. at 5-12). The Company presented SO_2, NO_2, CO, PM_{10}, and ozone data from these air monitoring stations for 1995, 1996, and 1997 (id. at 5-13; Exh. RR-EFSB-42). The Company indicated that these air quality measurements were below NAAQS concentrations each year for these four criteria pollutants, but that some CO levels and

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23 The Company stated that EPA defines "LAER" as "the most stringent emission limitation contained in the implementation plan of any State for such class or category of source, or the most stringent limitation achieved in practice by such class or category of source." (Exh. EFSB-A-2-S, Att. at 4-1).

24 The Company also described the MADEP short-term ambient NO_2 policy applicable to sources emitting over 250 tons per year of NO_2; however, the Company stated that the proposed facility would not be subject to the policy because the NO_2 emissions would be less than this emissions threshold (Exh. EFSB-A-2-S, Att. at 3-3, 3-8).

all highest annual ozone levels were more than 50 percent of NAAQS (Exhs. EFSB-A-2-S, Att. at 5-13, 5-14; EFSB-42).[25, 26] From a regulatory standpoint, the Company indicated that the Dracut area was "in attainment" or "unclassified/attainment" for SO_2, NO_2, CO, total suspended particulates/PM_{10}, and lead, and discussed the attainment status of ozone (Exhs. INT-MVRE-G-7(a), Att. at 5.1-1; RR-EFSB-68(a), Att. at 3-5).[27]

3. Proposed Facility Emissions

The Company stated that the proposed facility would use "G" series combined-cycle combustion turbines and would burn only natural gas; pollution control would include SCR for NO_X control and an oxidation catalyst for CO (Exh. INT-MVRE-G-7(a), Att. at 2-23, 3-10,

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25 The Company indicated that much of the relatively high measured CO concentration in ambient air is likely attributable to automobile traffic (Tr. 10, at 1288).

26 The Company subsequently provided air quality data for 1997, 1998, and 1999 from MADEP monitoring stations in Lowell, Lawrence, and Lynn; the latter data indicated that concentrations of CO, NO_2, SO_2, and PM_{10} were all less than 50 percent of the respective standards in 1997, 1998, and 1999 (Exh. RR-EFSB-68(a), Att. at 5-13).

27 The Company indicated that while the highest 1-hour ozone level measured in Massachusetts in each of the years 1995, 1996, 1997, and 1998 exceeded the ambient air standard of 0.12 ppm, the highest measurements at the MADEP Lawrence monitoring station were below that standard (Exh. RR-EFSB-42). The Company indicated furthermore that there were no exceedances of the 1-hour ozone standard at the Lawrence monitoring station in the ten-year period, 1989 to 1998 (Exh. INT-MVRE-G-7(a), Att. at 5.9-3). However, the Company stated that until mid-1999, the entire Commonwealth had been classified as nonattainment for ozone, on the basis of the 1-hour ozone standard (Exh. RR-EFSB-68(a), Att. at 3-1rev). EPA's new 8-hour ozone standard was remanded to EPA on May 14, 1999, but not vacated (id.). On June 9, 1999, the EPA determined that the 1-hour standard had been attained and also no longer applied to eastern Massachusetts, including Dracut (id.; Exh. RR-EFSB-42). On October 22, 1999, MADEP reinstated requirements for continued NSR for major sources of ozone precursors, equivalent to the requirements for a "serious" non-attainment zone (Exh. RR-EFSB-68(a), Att. at 3-1rev. 3-5). On July 20, 2000, the EPA rescinded its previous finding that the 1-hour standard no longer applied to eastern Massachusetts, effective January 16, 2001; the State may submit a redesignation request for areas that have had no ozone violations since the revocation of the 1-hour standard (id.). The Dracut area is in attainment (or unclassified) for other criteria pollutants (Exh. NHE-2, at 5.2-4).

3-11). The Company indicated that the proposed facility would emit air pollutants including carbon dioxide ("CO_2"), NO_X, CO, VOC, particulate matter, SO_2, sulfuric acid mist, and ammonia (Exhs. EFSB-A-2-S, Att. at 3-2, 4-20; RR-EFSB-46). The Company tabulated maximum potential annual emissions of specific pollutants for the proposed facility, and compared these maximum emissions against non-attainment NSR threshold criteria and PSD significant emission rates (Exh. EFSB-A-2-S, Att. at 3-2). Table 1, below, shows maximum annual emissions in tons per year ("tpy"), as calculated by the Company.

Table 1
Potential Annual Emissions to Air

Pollutant [a]	Maximum Potential Emissions (tpy) [b,c]	NSR Threshold Criteria (tpy) [d]	PSD Significant Emission Rate (tpy) [e]
Carbon dioxide (CO_2)	2,278,663 [f]	N/A	N/A
Nitrogen oxides (NO_X/NO_2)	157	50	40
Carbon monoxide (CO)	309	N/A	100
Volatile organic compounds (VOC)	98 (81) [g,h]	50	40
Total particulates	111	N/A	15
PM_{10}	111	N/A	25
Sulfur dioxide (SO_2)	65 (48) [g]	N/A	40
Sulfuric acid mist (H_2SO_4)	29 (21) [g]	N/A	7
Lead (Pb)	<0.3	N/A	0.6

Values that exceed applicable criteria, thus triggering certain regulatory requirements, are underlined.
N/A Not applicable

a. PSD pollutants and CO_2. No emissions are expected for these additional PSD pollutants: asbestos, beryllium, mercury, vinyl chloride, fluorides, hydrogen sulfide, total reduced sulfur, reduced sulfur compounds, chlorofluorocarbons, halons, and ozone depleting substances (Exh. EFSB-A-2-S, Att. at 3-2).
b. Annual potential to emit from new units at 8,760 hours per year or with an allowance for start-ups, in tons per year (Exh. EFSB-A-2-S, Att. at 3-2).
c. See Exh. EFSB-A-2-S, Att. at 3-2 for additional notes.
d. Non-attainment New Source Review thresholds apply to VOC and NO_X as ozone precursors; the proposed facility is subject to LAER for these pollutants (Exhs. EFSB-A-2-S, Att. at 3-1; RR-EFSB-68(a), Att. at 3-1rev).
e. Prevention of Significant Deterioration review requires BACT for each pollutant that meets PSD significance criteria (Exh. EFSB-A-2-S, Att. at 3-3).
f. Carbon dioxide emissions data are from Exh. RR-EFSB-46.
g. Values in parentheses were provided in the Company's air plan revisions (Exh. RR-EFSB-68(a), Att. at 3-2), which were provided after the close of hearings.
h. The anticipated maximum potential emissions of VOC as given in the FEIR, 98 tpy, was revised in the SFEIR, dated May 31, 2000, to 71 tpy, which number was also quoted in hearings on August 15, 2000 (Exhs. INT-MVRE-G-7(a), Att. at 3-11; INT-MVRE-G-7(d), Bulk Att. at 3-13; Tr. 19, at 2429). The same value of 98 tpy, given in the Air Plan Approval Application, was changed in the air plan revisions, dated August 24, 2000, to a value of 81 tpy (Exhs. EFSB-A-2-S, Att. at 3-2; RR-EFSB-68(a), Att. at 3-1, 3-2). The evidentiary record does not resolve the difference between the values of 71 tpy and 81 tpy. However, the Company has since indicated that it provided the value of 71 tpy in error (Nickel Hill Supplemental Reply Brief at 5, n.4).

4. Emissions Control and Monitoring

The Company stated that non-attainment NSR review for two ozone precursors – VOC and NO_X – is required because the new units would emit VOC and NO_X above NSR thresholds of 50 tpy (Exh. EFSB-A-2-S, Att. at 3-1). The Company stated that LAER would be achieved for NO_X and VOC, and that BACT would be incorporated for CO, SO_2, PM_{10}, and other pollutants (id. at 3-6, 3-7, 4-16). The Company indicated that there are some trade-offs in reducing emissions of various pollutants; as examples, reducing NO_X emissions by reducing the flame temperature tends to increase VOC and CO emissions, and increases in emission of added ammonia ("ammonia slip") occur as NO_X emissions are controlled with an SCR system (id. at 4-16; Exh. EFSB-A-3; Tr. 19, at 2493).

The Company identified 2 parts per million ("ppm") as LAER for NO_X and indicated that 2 ppm would be achieved with a dry low-nitrogen oxides combustion system with SCR (Exhs. INT-MVRE-G-7(a), Att. at 3-10; INT-MVRE-G-7(d), Bulk Att. at 3-11; RR-EFSB-68(a), Att. at 2-1).[28] The Company stated that the SCR system uses aqueous ammonia (19 percent ammonia in water, by weight) to react with NO_X in the turbine exhaust gas over a catalyst to form nitrogen gas and water (Exh. EFSB-A-2-S at 2-1, 4-2).[29] The Company noted that, based on the 2 ppm NO_X emission rate attainable with SCR, it anticipated a facility permit limit for NO_X of 157 tpy (id. at 3-2; Exh. RR-EFSB-68(a), Att. at 3-2).[30]

The Company also evaluated XONON and $SCONO_X$, two NO_X control technologies that do not require the addition of ammonia (Exh. EFSB-A-2-S, Att. at 4-3; Tr. 10, at 1261). The Company stated that XONON technology uses flameless low-temperature catalytic combustion

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[28] The stated emission concentration for NO_X is 2 ppm dry volume basis, corrected to 15 percent oxygen (Exh. RR-EFSB-68(a), Att. at 3-5).

[29] The Company indicated that achieving a NO_X level of 2 ppm while minimizing ammonia slip would be facilitated by using 50 percent more catalyst than would normally be recommended for the facility (Exh. EFSB-A-1; Tr. 10, at 1273).

[30] A slightly different figure, 156 tpy, is given by the Company in the SFEIR (Exh. INT-MVRE-G-7(d), Bulk Att. at 3-13). The Siting Board notes that the difference in the numbers is inconsequential for purposes of Siting Board review.

of natural gas to reduce NO_X emissions, but has not been demonstrated to achieve 2 ppm and is not commercially available (Exhs. EFSB-A-2-S, Att. at 4-3; RR-EFSB-68(a), Att. at 4-3). The Company provided information indicating that $SCONO_X$ uses an oxidation catalyst and a potassium carbonate coating to absorb NO_2, followed by periodic regeneration of the potassium carbonate with hydrogen and CO_2 in the absence of oxygen (Exh. INT-MVRE-G-7(d), Bulk Att., Appendix A of Appendix E). The Company provided a press release indicating that ABB Alstom Power was marketing $SCONO_X$ for natural gas-fired combined-cycle combustion turbines of any size (Exh. INT-MVRE-G-7(b)). The Company indicated that ammonia and PM_{10} emissions might be reduced with a $SCONO_X$ system and added that SO_2 could also be reduced (Exh. INT-MVRE-G-7(d), Bulk Att., Appendix E at 12; Tr. 19, at 2415). However, the Company asserted that $SCONO_X$ has not been demonstrated to reliably meet 2 ppm NO_X on large power plants (Exhs. EFSB-A-2-S, Att. at 4-5, 4-7; INT-MVRE-G-7(d), Bulk Att. at 4-7; RR-EFSB-68(a), Att. at 4-5; Tr. 10, at 1260), requires substantial maintenance which would require periodic shut-downs (Exhs. INT-MVRE-G-7(d), Bulk Att. at 5-7; RR-EFSB-68(a), Att. at 4-6), would have a capital cost of approximately $73,600,000, as compared to $13,900,000 for SCR (Exh. INT-MVRE-G-7(d), Bulk Att. at 5-6), and would cost approximately $11,600,000 more per year than SCR (including annualized capital and operating costs but not costs of excess downtime) (id. at 5-7). The Company noted that in each of three recent air plan approvals for combined-cycle power plants, MADEP has concluded that SCR is the most cost-effective means of achieving BACT/LAER emission rates for NO_X (id. at 5-5, 5-6). The Special Permit includes provisions that may require the Company to revisit the issue of using $SCONO_X$.[31]

The Company identified 1 ppm as LAER for VOC and indicated that the limit of 1 ppm would be achieved by working closely with the turbine vendor that is selected (Exhs. INT-

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[31] The Special Permit requires the Company to install an alternative technology designed to reduce or eliminate the use of ammonia under specified conditions which include consideration of availability, reliability, and total costs (not to exceed $1,000,000 compared to maintaining the SCR system); such conditions are to be evaluated every other year for 15 years (Exh. EFSB-G-13(d), Att. at 18).

MVRE-G-7(d), Bulk Att. at 2-9; RR-EFSB-68(a), Att. at 3-2, 4-15; Tr. 19, at 2380-2382).[32]

With regard to CO, the Company stated that a dry low-NO_X combustion turbine generates CO at a somewhat higher rate than a conventional low-NO_X combustion turbine (Exhs. NHE-2, at 5.2-7; EFSB-A-2-S, Att. at 4-16). The Company stated that it would use a passive oxidation catalyst as an add-on control for CO, thereby limiting CO emissions to 2 ppm when operating at a load of 75 percent or more (Exh. EFSB-A-2-S, Att. at 4-17, 4-18).[33]

With regard to SO_2, the Company stated that the only practical means for controlling SO_2 emissions is to limit the sulfur content of the fuel; the Company proposed to limit sulfur in the gas to 1.07 grains per 100 standard cubic feet, and asserted that use of natural gas as the only fuel is BACT for the project (id. at 4-18).[34] While the Company has proposed to use no backup fuel, a diesel generator is proposed to provide emergency electrical power for the plant in the event of losing grid power (Tr. 15, at 1878-1879). The Company stated that the projected maximum SO_2 emissions would not be exceeded due to emergency use of the generator (Exh. EFSB-A-2-S, Att. at 3-2).

With regard to particulate matter, the Company stated that BACT would be achieved by the use of natural gas and advanced combustion turbine technology, and by limiting ammonia slip to 2 ppm (or 58 tpy) (Exhs. NHE-2, at 5.2-7; INT-MVRE-G-7(d), Bulk Att. at 2-6, 5-4; RR-EFSB-68(a), Att. at 2-1, Appendix D at 11). The Company indicated that add-on stack emissions controls for particulate matter would not be feasible, given the high exhaust flow rates and low exhaust concentrations of particulates (Exh. EFSB-A-2-S, Att. at 4-18). The Company does propose to use high efficiency drift eliminators to limit drift from the wet mechanical cooling tower, and to use mist eliminators to control oil mist from lube oil vents on the turbines and

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32 The stated emission concentration for VOC is 1 ppm, dry volume basis, corrected to 15 percent oxygen (Exh. RR-EFSB-68(a) Att. at 4-15).

33 The Company proposes to limit CO emissions to 2 ppm, dry volume basis, corrected to 15 percent oxygen (Exh. EFSB-A-2-S at 4-17, 4-18).

34 The limit for sulfur in gas was subsequently lowered in the air plan revisions from 1.07 grains per 100 standard cubic feet to 0.8 grains per 100 standard cubic feet (Exhs. EFSB-A-2-S, Att. at 4-18; RR-EFSB-68(a), Att. at 4-18), with a concomitant reduction in SO_2 emissions as shown parenthetically in Table 1, above.

cooling towers (id. at 4-18, 4-19).[35]

Relative to NSPS, the Company stated that emissions of NO_X would be limited to 2 ppm and thus would be well below the nominal 75 ppm[36] NSPS for NO_X from gas turbines (Exhs. NHE-2, at 5.2-3; RR-EFSB-68(a), Att. at 3-5). The Company also stated that fuel sulfur fractions and flue gas SO_2 concentrations would be below NSPS standards (Exhs. NHE-2, at 5.2-3; RR-EFSB-68(a), Att. at 3-5).[37]

As noted above, proponents of new generating facilities must either demonstrate that the TPS thresholds are met or provide an analysis comparing the proposal to other fossil-fuel generating technologies. The Company presented tables comparing the expected facility emission rates with TPS thresholds, expressed in pounds per megawatt hour ("MWH") at 100 percent load (Exh. NHE-1, at 3-2 and 3-3). The Company stated that the facility's emissions would be below TPS thresholds for all criteria pollutants as well as all non-criteria pollutants (id. at 3-2 to 3-4). The Company presented the following data for criteria pollutants set forth in Table 2, below.

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35 Use of drift eliminators is required by Condition IV.G of the Special Permit (Exh. EFSB-G-13(d), Att., at Appendix B)

36 The Company stated that the NSPS is a nominal value of 75 ppm NO_X, corrected to 15 percent oxygen, with allowance for a heat rate correction for efficient turbines and a correction for fuel-bound nitrogen (Exh. RR-EFSB-68(a), Att. at 3-5).

37 The Company stated that NSPS limits fuel sulfur content to 0.8 percent by weight and SO_2 emissions to 150 ppm (dry volume, corrected to 15 percent oxygen) (Exh. RR-EFSB-68(a), Att. at 3-5).

Table 2
Comparison to Technology Performance Standards

Pollutant	Performance Standard (pounds/MWH)	Project Emission Rate (pounds/MWH)[a]
SO_2	0.021	0.020
NO_X	0.120	0.051
PM^b/PM_{10}	0.081	0.027
CO	0.077	0.031
VOC	0.035	0.009

Source: Exh. NHE-1, at 3-2
a. Emission rates from 100 percent base load at 50° F; some of these projected rates may have been reduced since the project was first proposed.
b. "PM" is particulate matter.

The Company stated that it would perform initial emissions stack testing, periodic re-testing, and, for NO_X, CO, and ammonia, continuous emissions monitoring (Exhs. INT-MVRE-G-7(a), Att. at 2-23; INT-MVRE-G-7(d), at 8-4; Tr. 10, at 1242).

5. Ambient Air Impacts

The Company asserted that emissions from the project would have "insignificant" effects on local air quality (Exh. NHE-2, at 5.2-34). In support of this statement, the Company presented results of both screening level and refined atmospheric dispersion modeling, which predicted project-related ground-level ambient concentrations of criteria and other pollutants (Exhs. EFSB-A-2-S, Att. at 6-1 to 6-10; INT-MVRE-G-7(a), Att. at 5.1-5, 5.1-6).[38, 39, 40] The

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38 The Company indicated that the EPA-approved SCREEN3 dispersion model was used to predict maximum downwind ground-level concentrations from the project of NO_2, SO_2, PM_{10}, and CO within a radius of 30 kilometers (18.6 miles) (Exh. EFSB-A-2-S, Att. at 6-2, 6-7).

39 The Company indicated that the EPA-approved Industrial Source Complex Short-Term Version 3 ("ISCST3") model was used to predict maximum time-averaged ambient

(continued...)

Company indicated that the height of the stacks was assumed to be the full good engineering practice ("GEP") height of 170 feet (Exhs. EFSB-A-2-S, Att. at 6-1; INT-MVRE-G-7(a), Att. at 5.1-5).[41] Operating conditions representing maximum impact were modeled for each criteria pollutant (Exh. INT-MVRE-G-7(a), Att. at 5.1-6). The Company then compared modeled concentrations to significant impact levels ("SILs")[42] for criteria pollutants, and MADEP Allowable Ambient Levels ("AALs") and Threshold Effects Exposure Limits ("TELs") for air toxics,[43] as shown below in Tables 3 and 4 (Exhs. EFSB-A-2-S, Att. at 6-9; RR-EFSB-68(a),

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39 (...continued)
ground-level concentrations due to the project of NO_2, sulfuric acid, ammonia, formaldehyde, and six trace metals (arsenic, cadmium, hexavalent chromium, lead, manganese, and mercury) within a radius of 20 kilometers (12.4 miles), based on five years of National Weather Service data and one year of data collected in Haverhill (Exh. EFSB-A-2-S, Att. at 6-2, 6-3, and 6-8 to 6-10).

40 Commenters in the Massachusetts Environmental Policy Act process asserted that data from Portland, Maine, and Logan Airport in Boston, supplemented by one year of data from the Merrimack Valley, were inadequate for modeling (Exh. INT-MVRE-G-7(a), Att. at section 7, comments 15.11 and 19.9). The Company responded that it is common for air analyses to use upper air data from locations distant from a site, due to the paucity of stations where the National Weather Service collects upper air data (id.). The Company stated that air impacts from the project were "insignificant" as modeled based on National Weather Service data from Logan Airport, and likewise "insignificant" as modeled on the data from the Merrimack Valley (id. at Section 7, response 15.11).

41 The Company offered its viewpoint that a GEP stack height of 170 feet achieves a balance between mitigating ground-level air impacts and visual impacts (Exh. INT-MVRE-G-7(a), Att. at 6-4, section 7.0, response 9.5; Tr. 10, at 1315-1316).

42 EPA and MADEP established SILs as an additional set of criteria for NO_2, SO_2, CO, and PM_{10} at a level of emissions from a new source or a modification to an existing source low enough so that emissions below SILs would not significantly affect modeled air quality; a detailed evaluation of compliance with the NAAQS is not required if SILs are not exceeded (Exh. EFSB-A-2-S, Att. at 1-5).

43 Massachusetts regulates non-criteria toxic air pollutants by assessing compliance with short-term exposure guidelines (maximum 24-hour impact) known as TELs and by assessing compliance with long-term exposure guidelines (averaged over one year) known as AALs. IDC Bellingham LLC, 9 DOMSB 260, at 26 (1999) ("IDC Bellingham (continued...)

Att. at 6-7, 6-8, and 6-10; INT-MVRE-G-7(a), Att. at 5.1-7, 5.1-8). Criteria pollutants were modeled for both simple and complex terrain, and were evaluated first using SCREEN3 and then using the more refined ISCST3 model for pollutants that were not screened out with the screening model (Exh EFSB-A-2-S, Att. at 6-2 to 6-9). Non-criteria pollutants were evaluated only with the more refined model (id.). Based on these comparisons, the Company predicted that facility-related ground-level ambient pollutant concentrations would not exceed SILs, AALs, or TELs (id. at 6-9; Exh. RR-EFSB-68(a), Att. at 2-5, 6-7, 6-8, 6-10).[44, 45]

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43 (...continued)
Decision").

44 The average annual concentration of NO_2 as projected by the screening model exceeded the SIL, but the concentration projected by the refined model was less than the SIL (Exhs. EFSB-A-2, Att. at 6-9; RR-EFSB-68(a), Att. at 6-8). Based on refined modeling, maximum concentrations from the facility would range from 0.01 percent to 97 percent of the SILs, TELs, and AALs (as calculated from Exh. EFSB-A-2, Att. at 6-9, 6-10); the latter figure of 97 percent was revised to 42 percent, based on the air plan revisions (Exh. RR-EFSB-68(a), Att. at 6-10).

45 The Company specifically highlighted the comparison of a predicted maximum 24-hour ammonia impact of 4.9 or 5.1 $\mu g/m^3$ as being below the 24-hour TEL of 100 $\mu g/m^3$ (Exhs. INT-MVRE-G-7(a), Att. at 5.1-8; EFSB-A-2-S, Att. at 6-10). The modeled maximum 24-hour ammonia impact listed in the air plan revisions is 1 $\mu g/m^3$, which apparently differs from the previously reported value of 4.9 or 5.1 $\mu g/m^3$ (Exh. RR-EFSB-68(a), Att. at 6-10). The revised value is also below the 24-hour TEL.

Table 3
Incremental Facility Impact of Criteria Air Pollutants

Pollutant	Averaging Period	Modeled Maximum Concentration ($\mu g/m^3$)[a]	Significant Impact Levels ($\mu g/m^3$)	Operating Condition; Dispersion Model
NO_2	Annual	0.13	1	75% Load, Gas, 0°F; ISCST3, Boston 1995 meteorology, Simple terrain
		0.5		75% Load, Gas, 0°F; SCREEN3, Complex terrain
SO_2	3-Hour	3.64 / 1.80	25	75% Load, Gas, 0°F; SCREEN3, Simple / Complex
	24-Hour	1.62 / 0.80	5	75% Load, Gas, 0°F; SCREEN3, Simple / Complex
	Annual	0.32 / 0.16	1	75% Load, Gas, 0°F; SCREEN3, Simple / Complex
PM_{10}	24-Hour	3.5 / 1.8	5	75% Load, Gas, 0°F; SCREEN3, Simple / Complex
	Annual	0.7 / 0.4	1	75% Load, Gas, 0°F; SCREEN3, Simple / Complex
CO	1-Hour	115.0 / 57.7	2000	50% Load, Start-up, 0°F; SCREEN3, Simple / Complex
	8-Hour	80.5 / 40.4	500	50% Load, Start-up, 0°F; SCREEN3, Simple / Complex

Sources: Exhs. INT-MVRE-G-7(a) at 5.1-7; EFSB-A-2, at 6-7 to 6-9; RR-EFSB-68(a), Att. at 6-7, 6-8.

a. Where two values are provided, they are from simple and complex terrain modeling, respectively. Listed concentrations were calculated using the SCREEN3 program, except annual average NO_2 concentrations, which were recalculated using the more refined ISCST3 model.

Table 4
Incremental Facility Impact of Air Toxics

Pollutant	Averaging Period	Modeled Maximum Concentration ($\mu g/m^3$)	MADEP Guideline ($\mu g/m^3$) [a]	Operating Condition; Dispersion Model
Sulfuric acid	24-Hour	0.38	2.72	75% Load, Gas, 0°F; ISCST3
	Annual	0.02	2.72	75% Load, Gas, 0°F; ISCST3
Ammonia	24-Hour	1.0	100	75% Load, Gas, 0°F; ISCST3
	Annual	0.05	100	75% Load, Gas, 0°F; ISCST3
Formaldehyde	24-Hour	0.14	0.33	75% Load, Gas, 0°F; ISCST3
	Annual	0.007	0.08	75% Load, Gas, 0°F; ISCST3
Arsenic	24-Hour	<0.0000181	0.0005	75% Load, Gas, 0°F; ISCST3
	Annual	<0.000000818	0.0002	75% Load, Gas, 0°F; ISCST3
Cadmium	24-Hour	<0.000311	0.003	75% Load, Gas, 0°F; ISCST3
	Annual	<0.0000140	0.001	75% Load, Gas, 0°F; ISCST3
Hexavalent chromium	24-Hour	<0.000481	0.003	75% Load, Gas, 0°F; ISCST3
	Annual	<0.0000217	0.0001	75% Load, Gas, 0°F; ISCST3
Lead	24-Hour	<0.00592	0.14	75% Load, Gas, 0°F; ISCST3
	Annual	<0.000267	0.07	75% Load, Gas, 0°F; ISCST3
Manganese	24-Hour	<0.000592	N/A	75% Load, Gas, 0°F; ISCST3
	Annual	<0.0000267	N/A	75% Load, Gas, 0°F; ISCST3
Mercury	24-Hour	<0.000163	0.14	75% Load, Gas, 0°F; ISCST3
	Annual	<0.00000734	0.07	75% Load, Gas, 0°F; ISCST3

Source: Exh. RR-EFSB-68(a), Att. at 6-10.
a. 24-hour TELs and annual AALs.
< Less than listed value. Emission factor based on one-half the detection limit, as cited from EPA draft emission factors (see Exh. EFSB-A-2, Att. at 4-20).
N/A Not available

The Company also presented a comparison of expected ambient SO_2 concentrations to vegetation sensitivity threshold values (Exh. EFSB-A-2-S, Att. at 6-12). A representative annual average background concentration of SO_2, obtained from a Lawrence monitoring station,

18.3 $\mu g/m^3$, is above the annual average vegetation sensitivity threshold of 18 $\mu g/m^3$; addition of a "very small" contribution of SO_2 (0.4 $\mu g/m^3$) by the proposed project would raise the maximum predicted concentration plus background to 18.7 $\mu g/m^3$, according to the Company (Exh. EFSB-A-2-S, Att. at 6-13; Tr. 10, at 1264).[46] The Company indicated there would not be damage to vegetation from salts present in water drawn from the Merrimack River that would be concentrated by evaporation in the cooling towers, emitted in drift, and deposited on land at an estimated rate of 1 to 10 pounds per acre per year within a half-mile radius of the facility (Tr. 10, at 1213).

The Company reported on results of its interactive source modeling for SO_2, NO_X, PM_{10}, and CO, which provide the sum of ambient concentrations as measured at representative MADEP monitoring locations ("background") added onto concentrations modeled for 29 facilities within a radius of 10 miles, including the subject facility (Exhs. NHE-2, at 5.2-24 to 5.2-28; INT-MVRE-G-7(a), Att. at 5.1-9 to 5.1-13).[47, 48] Modeling results are summarized below in Table 5. The results indicate that the proposed facility would increase cumulative concentrations by no more than one-half of one percent ($\leq$0.5 percent) for these criteria pollutants at the locations of maximum impacts from combined sources (Exh. INT-MVRE-G-7(a),

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46 Subsequent data presented by the Company indicate a background concentration of 21.0 $\mu g/m^3$, which combined with a revised facility contribution of 0.3 $\mu g/m^3$, gives a total of 21.3 $\mu g/m^3$, which exceeds the listed vegetation sensitivity concentration of 18 $\mu g/m^3$ (Exh. RR-EFSB-68(a), Att. at 6-13). The Company also stated that secondary NAAQS are intended to protect public welfare from effects including damage to vegetation, and indicated that the only secondary standard for SO_2 is 1300 $\mu g/m^3$, for a 3-hour average concentration (Exhs. NHE-2, at 5.2-2; EFSB-H-2).

47 The 29 facilities include the proposed Nickel Hill facility (two stacks), MA Refusetech in North Andover (two stacks), Ogden Haverhill (two stacks), the Ogden LTF boiler in Lawrence, Newark Atlantic Paper in Lawrence, Brox Industries in Dracut (two stacks), and additional sources in Billerica, Wilmington, Tewksbury, Lowell, Lawrence, North Andover, and Methuen (Exhs. NHE-2, at 5.2-27; INT-MVRE-G-7(a), Att. at 5.1-12).

48 The Company indicated that it has also prepared preliminary maps from supplemental dispersion modeling of eight selected facilities in the area, and agreed to provide additional air modeling runs for the Merrimack Valley region to the Massachusetts Department of Public Health (Exhs. INT-MVRE-G-7(d), Bulk Att. at 7-1, 7-2; RR-MVRE-30; Tr. 19, at 2371).

Att. at 5.1-13).[49] The Company concluded that maximum combined concentrations from the proposed facility, interactive sources, and background are all below the NAAQS for the modeled criteria pollutants (id. at 5.1-13).[50]

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[49] Percentage is based on Siting Board staff calculation from cited exhibits.

[50] The cumulative impact concentration for 24-hour SO_2 was 92 percent of the standard at the point of maximum cumulative impact, at which the contribution from Nickel Hill was less than 0.001 percent (Exh. INT-MVRE-G-7(a), Att. at 5.1-13). The cumulative impact concentration for annual SO_2 was 76 percent of the standard at the point of maximum cumulative impact, at which the contribution from Nickel Hill was approximately 0.02 percent (id.). The cumulative impact concentration for 8-hour CO was 91 percent of the standard at the point of maximum cumulative impact, at which the contribution from Nickel Hill was approximately 0.5 percent and measured background constituted 99.5 percent (id.). The maximum combined concentrations range from 39 percent to 57 percent of the NAAQS for SO_2, NO_2, PM_{10}, and CO for the other specified averaging periods (id.) (Apportionment calculations by Siting Board staff).

Table 5
Cumulative Impact of Criteria Air Pollutants

Pollutant	Averaging Period	Nickel Hill Contribution ($\mu g/m^3$)[a]	Cumulative Impact ($\mu g/m^3$)[a]	NAAQS ($\mu g/m^3$)	Percent of Standard	Principal Contributor [b]
NO_X	Annual	0.034	49.7	100	50	Background is 61%
SO_2	3-Hour	0.000	700.9	1300	54	Indust/Instit is 79%
	24-Hour	0.000	334.4	365	92	Indust/Instit is 74%
	Annual	0.014	61.0	80	76	Indust/Instit is 70%
PM_{10}	24-Hour	0.000	76.6	150	51	Indust/Instit is 51%
	Annual	0.023	19.7	50	39	Background is 76%
CO	1-Hour	0.132	22,639.4	40,000	57	Background is 99.4%
	8-Hour	41.312	9089.4	10,000	91	Background is 99.5%

Source: Exh. INT-MVRE-G-7(a) at 5.1-13
a. Nickel Hill contribution to concentration at point of maximum cumulative concentration.
b. Principal contributor to maximum concentration ("Background" is monitored background; "Indust/Instit" includes all modeled sources except Nickel Hill and three incinerators, i.e., 25 industrial and institutional sources within 20 kilometers of Nickel Hill), each expressed as a percentage of the total predicted cumulative impact for that pollutant and averaging time, as calculated by Siting Board staff.

The Company stated that in addition to direct emissions offsets, the project will result in net decreases in New England regional emissions by displacement of power generation from older generating facilities (Exhs. INT-MVRE-G-7(a), Att. at 5.1-1; INT-MVRE-G-7(d), Bulk Att. at 3-28; Tr. 1, at 133 to 135; see also Exh. EFSB-A-10-S(a)). The Company provided a displacement analysis indicating that the proposed facility has the potential to reduce regional emissions of CO_2, NO_X, and SO_2 by substituting for power from existing plants (Exh. EFSB-A-10). The Company asserted that the project could reduce regional emissions of NO_X and SO_2 by quantities on the order of 8,000 tpy and 30,000 tpy, respectively, assuming continuous full load operation of the proposed facility (Exhs. INT-MVRE-G-7(d), Bulk Att. at 3-28; EFSB-A-10, at 2). The Company estimated a net reduction in the emission of CO_2 of 2,510,000 tpy under continuous full load (Exh. EFSB-A-10, at 2). As projected by the Company, emissions of these three air pollutants from the proposed facility would be half or less than half of the

emissions displaced from other generators, leading to a substantial regional benefit (id.).[51]

The Company indicated it would control dust during construction by paving or gravelling areas with heavy traffic, wetting exposed surfaces, sweeping up dust, and revegetating disturbed areas (Exh. EFSB-H-3). Conditions V.M and V.W of the Special Permit require these types of dust mitigation measures (Exh. INT-MVRE-G-7(a), Att. at Appendix B-25, 26).

6. Offset Proposals and Marketable Allowances

The Company stated that, pursuant to MADEP's New Source Review regulations, it would be required to obtain offsets for the proposed facility's VOC and NO_X emissions at a ratio of 1.26 to 1 (Exhs. NHE-1 at 4.2-1; EFSB-A-4-S; RR-EFSB-68(a), Att. at 3-1rev; INT-MVRE-G-7(a), Att. at 2-15, 5.1-1, 5.1-3).[52] The Company indicated its intention to obtain some or all of the required VOC and NO_X offsets from sources within the Merrimack Valley (Exhs. EFSB-A-2-S, Att. at 3-2; INT-MVRE-G-7(a), Att. at 2-15; INT-MVRE-G-7(d), Bulk Att. at 3-13; EFSB-A-4-S; Tr. 10, at 1217, 1293). The Company stated more recently that it had obtained 2 tons of VOC offsets and 158 tons of NO_X offsets from a facility located in the Merrimack Valley (Exhs. INT-MVRE-G-7(a), Att. at 2-15, 2-23, 3-11; EFSB-A-4-S2; RR-EFSB-68(a), Att. at 3-1rev). The Company stated that SO_2 emission allowances are available, and would be secured for the project (Exhs. NHE-1 at 4.2-8; NHE-2, at 5.2-5).

With respect to the Siting Board requirement that a generator offset one percent of CO_2 emissions from a project, the Company proposes to obtain offsets or provide mitigation measures for a portion of the project's CO_2 emissions (Exh. NHE-2, at 5.2-8).[53]

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51 The Company most recently projected facility emissions of 157 tpy for NO_X, which compares to an estimated displacement of 8,500 tpy of NO_X; facility emissions of 48 tpy of SO_2, compared to displacement of 30,500 tpy of SO_2; and facility emissions of 2,278,663 tpy of CO_2, compared to displacement of 4,875,000 tpy of CO_2 (Exhs. RR-EFSB-68(a), Att. at 3-2; EFSB-A-10, at 2).

52 Based on this ratio, the corrected value for the emissions offsets required by the project is 102 tpy of VOC and 197 tpy of NO_X (Exh. RR-EFSB-68(a), Att. at 3-1rev).

53 The Company further stated that it is considering mitigation steps accepted by the Siting (continued...)

7. Positions of the Parties

MVRE asserted that the air of the Merrimack Valley is "already extremely polluted" (MVRE Brief at 16). Bruton/Vrountas also raised concerns about baseline air quality, asserting that incinerators in the Greater Lawrence area have been out of compliance with MADEP regulations at various times, and that Merrimack Valley residents are breathing air pollutants emitted by trash incinerators that burn a substantial proportion of all trash currently burned in Massachusetts (Bruton/Vrountas Brief at 9). Nickel Hill contended that air quality in the Merrimack Valley "compares favorably with other areas in Massachusetts" (Nickel Hill Reply Brief at 41).

MVRE questioned how the Company could credibly indicate accurate numbers of annual starts and stops for the proposed facility without substantial documentation of how such numbers were calculated (MVRE Brief at 27; MVRE Reply Brief at 8). The Company indicated that the numbers presented for annual starts and stops reflected the Company's collective judgment of how the proposed plant would be dispatched under the anticipated regional business environment, rather than having been calculated from specified assumptions; the Company also indicated that it estimated high for the number of starts and stops in order to afford itself operating flexibility (Exhs. INT-MVRE-G-7(a), Att. at 2-14; DR-MVRE-62-S2; Tr. 11, at 1485).

MVRE questioned the credibility of the Company's emissions projections, asserting that emission rates presented in various Nickel Hill documents had changed over time without explanation (MVRE Brief at 17, 29). The Company generally did not dispute that there had been changes in stated emission rates over time. Mr. Barten, a witness for the Company, described the air permitting process as one in which there is some inherent tension between manufacturers, project proponents such as Nickel Hill, and regulators (Tr. 19, at 2436).

MVRE and Andover both questioned whether Nickel Hill had contractual performance guarantees from either of the possible turbine manufacturers for VOC and ammonia emission levels (Tr. 19, at 2319, 2328, 2383, 2439, 2507). The Company stated that it has obtained no

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53 (...continued)
Board in past cases, such as funding a level equal to $1.50 per ton for one percent of the facility's CO_2 emissions (Exh. EFSB-A-11; Tr. 10, at 1328; Nickel Hill Brief at 50).

such performance guarantee(s) to date, and added that negotiation for performance guarantees from suppliers is primarily a financial risk management issue related to the Company's ability to finance the project (Tr. 19, at 2319, 2328, 2380-2381). The Company noted that the MADEP air plan approval would govern the actual emissions that are permitted from the proposed facility (Exh. EFSB-A-2, Att. at 3-1, 3-6).

Bruton/Vrountas contended that $SCONO_X$ technology could reduce emissions of VOC, particulates, and other hazardous emissions to half or less of levels for SCR technology set forth in the FEIR (Bruton/Vrountas Brief at 2).[54] In their Massachusetts Environmental Policy Act ("MEPA") comments on the FEIR, MVRE contended that ammonia slip could be eliminated, NO_X emissions would be reduced to 1 ppm, and CO, VOC, and PM_{10} would be reduced if $SCONO_X$ were selected in lieu of SCR for NO_X control (Exh. INT-MVRE-G-7(d), Bulk Att. subsection 9). MVRE also maintained that $SCONO_X$ would avoid the need to transport aqueous ammonia to the site (see Section III.H, below).

8. Analysis

Intervenors have expressed considerable concern about the air quality impacts of the proposed facility, due in large part to a belief that air quality in the Merrimack Valley is unusually poor, and that emissions from the proposed facility, combined with emissions from existing sources in the Merrimack Valley, could pose a health threat to Merrimack Valley residents. The Siting Board addresses the potential cumulative health impacts of the proposed facility in more detail in Section III.L, below. Here we consider the proposed facility's air emissions and possible mitigation options to determine whether air quality impacts would be minimized.

Nickel Hill proposes to construct a 750 MW combined-cycle generating facility, using dry low-NO_X combustion turbines with SCR as additional NO_X control technology. The record shows that the proposed facility would emit CO_2, NO_X, CO, VOC, particulate matter, SO_2, sulfuric acid mist, and ammonia; would be required to achieve LAER for NO_X and VOC; and

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54 The SFEIR does propose reductions in ammonia slip and VOC emissions, relative to commitments proposed in the FEIR (Exh. INT-MVRE-G-7(a), Att. at 2-6, 2-9).

would be required to incorporate BACT for other pollutants including CO, SO_2, and PM_{10}. The Company has proposed additional measures to minimize emissions, specifically use of only natural gas as fuel (i.e., no oil back-up for the turbines) and selection of the full GEP stack height of 170 feet. The Company has provided the Siting Board with documentation showing that the facility will meet the Siting Board's TPS emissions criteria; consequently, the Siting Board finds that no alternative technologies assessment is required for the proposed facility.

The Company provided information on baseline regional air quality, the proposed facility's anticipated emissions, and the cumulative air quality impacts of 29 regional emissions sources including the facility. For background air quality, the Company provided 1995 to 1997 monitoring results from MADEP stations in Lawrence, Lowell, and Lynn, which were within air quality standards for SO_2, NO_2, CO, PM_{10}, and ozone. The record indicates that with a qualified exception for ozone, air quality in the region meets existing health-based standards.

The Company indicated that emissions from the proposed facility would be minimized in accordance with EPA and MADEP regulations, and provided estimates of air emissions in terms of concentration in stack gases and in terms of tonnage per year. Actual emissions from the facility would be limited by its MADEP air plan approval.

The Company used accepted air modeling protocols to assess the impacts of the proposed facility and demonstrated that air emissions from the proposed project would not cause local air quality to significantly worsen, as compared to established air quality standards. The modeling demonstrated that impacts from the proposed facility would be below SILs for all criteria emissions. The results of the cumulative air quality impact analysis show that, for the pollutants evaluated, NO_2, SO_2, PM_{10}, and CO, the maximum combined concentrations at the location of maximum impact would be below the NAAQS, which are the federal health-based standards. The maximum combined concentrations would in fact be no greater than 76 percent of the NAAQS, with the exceptions that 24-hour SO_2 levels would be 92 percent of the standard (largely due to the modeled impact of industrial and/or institutional sources) and 8-hour CO levels would be 91 percent of the standard (primarily due to high measured concentrations). In addition, the record shows that the proposed facility would represent one-half of one percent or

less to the maximum combined concentrations.[55] The modeling also demonstrated that facility-related ambient concentrations of toxic air pollutants would be within the TELs and AALs, the state health-based guidelines. The Siting Board finds that construction of the 170-foot stack, use of only gas as fuel, and compliance with BACT and LAER, as required by MADEP, would minimize local air quality impacts.

The record shows that annual average SO_2 concentrations nearby in Lawrence already exceed published criteria identified for vegetation sensitivity. Because natural gas would be the only fuel and natural gas is a low-sulfur fuel, because the additional contribution from the facility to SO_2 concentrations in Lawrence would be modest, because primary and secondary NAAQS for SO_2 are not exceeded, and because a GEP stack height has been proposed, the Siting Board concludes that concentrations of SO_2 from the proposed facility would be minimized. Therefore, the Siting Board finds that adverse effects of SO_2 on vegetation sensitivity would be minimized.

MVRE has questioned the credibility of the Company's emissions estimates, noting that the estimates have changed several times during the course of this proceeding. The Siting Board notes that changes in emissions estimates are not unexpected during the early stages of the permitting process, as a developer works with its equipment vendors to meet the information and performance requirements of this agency, the MEPA office, and MADEP; consequently, these changes, in and of themselves, do not suggest that the emissions levels currently proposed are inaccurate. Final, binding, emissions limits for the proposed facility will not be established until the MADEP issues its final air plan approval, which by statute it may not do until after the Siting Board issues its final approval. See G.L. c. 164, § 69J¼. The Siting Board therefore is obligated to act on emissions estimates which may be further refined in the MADEP air plan approval process. The Siting Board emphasizes that this decision is based on the emissions commitments made by the Company in this proceeding. If the MADEP air plan approval establishes emissions limits that are substantially different from the range of values set forth in Table 1, above, Nickel Hill would be obligated to notify the Siting Board so that the Siting Board could determine whether to inquire further into the issue.

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55 Calculation by Siting Board staff from values presented in Table 5, above.

MVRE and Andover have argued that Nickel Hill should be required to employ an ammonia-free NO_X control technology such as $SCONO_X$, rather than SCR, which requires use of ammonia to react with NO_X in the exhaust gases. The record shows that Nickel Hill extensively evaluated alternatives to SCR for controlling NO_X, most recently in the SFEIR filed with the MEPA office on May 31, 2000. The record indicates that one such technology, $SCONO_X$, is described by its manufacturer as commercially available and is currently being offered for installation on combined-cycle generators. However, the record also shows that the SCONOx technology has not yet been demonstrated on a large-scale facility such as Nickel Hill's; that the additional capital costs, although a matter of some debate, may be as much as $60 million; and that use of the $SCONO_X$ technology may slightly increase water use, increase plant downtime for maintenance, and reduce plant efficiency. Moreover, the record shows that MADEP recently has considered the use of $SCONO_X$, as opposed to SCR, in the context of supplemental BACT analyses for three different power plants, and each time has concluded that SCR is the more cost-effective means of achieving BACT/LAER for NO_X. Given the evidence in the record of the high cost of the technology and the level of technical and economic uncertainty regarding its use in large-scale generators such as the proposed facility, the record does not support a finding that the use of $SCONO_X$ would minimize the environmental impacts of the proposed facility, consistent with minimizing the costs associated with the mitigation, control and reduction of environmental impacts. As a result, the Siting Board will not require use of such technology as a condition of this approval.

In previous decisions, the Siting Board has held that, due both to its primacy of jurisdiction and to its greater expertise in emissions control technologies, MADEP is the agency best suited to determine whether and when to introduce new emissions control technologies into the Commonwealth. IDC Bellingham Decision, 9 DOMSB at 35; Sithe Edgar Development LLC, 10 DOMSB 1, at 36 (2000) ("Sithe Edgar Decision"); Brockton Power LLC, 10 DOMSB 157, at 190 (2000) ("Brockton Power Decision"). The Siting Board notes that MADEP, as part of its air plan approval process, will determine the level of NO_X control that constitutes LAER for this facility and the method that constitutes BACT, and in doing so will take up, with the information then available, the issue of whether an ammonia-free NO_X control technology

constitutes BACT and LAER for the proposed facility. The Siting Board notes that MADEP's determination of BACT incorporates consideration of feasibility, cost, and environmental protection, and thus is generally consistent with the Siting Board's mandate to minimize both environmental impacts and the cost of mitigating or controlling such impacts. The Siting Board therefore finds that in meeting BACT and LAER for NO_X as set forth by MADEP in a future air plan approval, Nickel Hill would minimize NO_X emissions and ammonia slip from the proposed facility consistent with minimizing the cost of mitigating, controlling, and reducing such emissions.

The Siting Board notes that many of the issues discussed above, including specific emissions limits for criteria and non-criteria pollutants, the determination of which technologies are BACT or LAER for such pollutants, the specific determination of whether to use $SCONO_X$ or another zero ammonia NO_X control technology to address safety and emissions issues related to the use of ammonia for NO_X control, and the approval of VOC and NO_X offset plans, ultimately fall within the jurisdiction of MADEP and will be further addressed in the MADEP air plan approval process for the proposed facility. Because an air plan approval is required by state and federal law for generating facilities such as the proposed facility, the assumption that such an approval must be obtained, and that these issues must be finally resolved, before construction is implicit in every Siting Board approval of a generating facility. Here, because concerns about the proposed facility focus on its air emissions, we find it appropriate to make that point explicit. Consequently, the Siting Board directs the Company, prior to commencement of construction of the proposed facility, to obtain from MADEP an air plan approval addressing:

1. specific emissions limits for regulated pollutants consistent with all relevant public health standards;
2. BACT and LAER determinations for each regulated pollutant;
3. the use of $SCONO_X$ or another zero ammonia technology for NO_X control; and
4. VOC and NO_X offset plans.

The Company shall file a copy of the air plan approval with the Siting Board prior to commencement of construction of the proposed facility, and shall note any differences between

the terms of the air plan approval and the terms of this Final Decision so that the Siting Board may decide whether to inquire further into a particular issue.

With respect to emission offsets, the Company has discussed how it plans to offset proposed emissions of VOC, NO_X, and CO_2 – pollutants which potentially contribute to regional ground-level ozone concerns and global climate change concerns. The record shows that the Company will obtain VOC and NO_X offsets representing greater amounts of permitted emissions than Nickel Hill will be permitted to emit, by a ratio of 1.26 to 1, and that a majority of the NO_X offsets will be obtained from within the Merrimack Valley. The record indicates also that the Company intends to purchase SO_2 emission allowances to meet the SO_2 offset requirements.

The Company provided a displacement analysis showing that the proposed facility has the potential to reduce New England emissions of CO_2, NO_X, and SO_2 by substituting for power from existing plants. As projected by the Company, emissions of these three air pollutants from the proposed facility would be half or less than half of the emissions displaced from other generators, leading to a regional benefit. However, to the extent that the facility produces electric power that meets new demand for power, these emissions would represent an incremental increase in regional air pollution, rather than a decrease.

In Dighton Power Associates, 5 DOMSB 193 (1997) ("Dighton Power Decision"), the Siting Board set forth a new approach to the mitigation of CO_2 emissions that required generating facilities to make a monetary contribution, within the early years of facility operation, to one or more cost-effective CO_2 offset program(s), with such program(s) to be selected in consultation with the Siting Board staff. Dighton Power Decision, 5 DOMSB at 239-240. In the Dighton Power Decision, the Siting Board expressed an expectation that the contribution of future project developers would reflect the approach set forth in the Dighton Power Decision, which was determined as an offset based on one percent of annual facility CO_2 emissions, at $1.50 per ton, to be donated in the early years of facility operation.[56] Id. at 240.

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[56] The Siting Board recognizes that, in future reviews, evidence may be developed that supports use of a different assumed monetary value for the cost of providing CO_2 offsets, or use of a range of monetary values, or a greater or sole use of a non-monetary basis, in determining the appropriate level of CO_2 mitigation. Future applicants are put on notice (continued...)

Here, consistent with its rulings in recent cases, the Siting Board directs the Company to make a monetary contribution to cost-effective CO_2 mitigation programs in an amount that reflects the proposed facility's annual CO_2 emissions of 2,278,663 tpy over 20 years of operation. Based on the projected maximum annual CO_2 emissions and assuming distribution in five annual installments, the contribution requirements would total $725,866, when adjusted for cost increases.[57] Therefore, the Siting Board requires the Company to provide $725,866 to be paid in five annual installments during the first five years of facility operation, to a cost effective CO_2 offset program or programs to be selected in consultation with the staff of the Siting Board. Alternatively, the Company may elect to provide a single contribution of $590,819 by the end of the first year of facility operation.[58]

Based on the analysis above, the Siting Board finds that, with implementation of the proposed mitigation and the condition outlined above, the air quality impacts of the proposed facility would be minimized.

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56 (...continued)
that the Siting Board may seek to develop evidence relating to the appropriateness of the review standards set forth in the Dighton Power Decision or other reviews, and separately that the Siting Board may adjust its existing monetary standard to account for inflation or other similar minor changes based on the passage of time.

57 The contribution is based on offsetting one percent of facility CO_2 emissions, over 20 years, at $1.50 per ton. The 20-year amount of $683,599 is first distributed as a series of payments to be made over the first five years of project operation, then adjusted to include an annual cost increase of three percent. Annual contribution amounts would be distributed as follows: year one $136,720; year two $140,822; year three $145,046; year four $149,398; year five $153,880. See Sithe West Medway Development LLC, 10 DOMSB 274, at 309 (2000) ("Sithe West Medway Decision"); Brockton Power Decision, 10 DOMSB at 193; U.S. Generating Company, 6 DOMSB 1, at 125, 128-129 (1997) ("Millennium Power Decision").

58 This figure is calculated by discounting, at ten percent annually, the five annual payments totaling $725,866. See Sithe West Medway Decision, 10 DOMSB at 309; Brockton Power Decision, 10 DOMSB at 193; Millennium Power Decision, 6 DOMSB at 125, 128-129. The single up-front payment of $590,819 would be due by the end of the first year of operation.

C. Water Resources

The following section describes the water resource impacts of the proposed facility, discusses possible cooling system alternatives to mitigate impacts, and compares the cost and benefits of these alternatives.

1. Description of Water Intake and Discharges

The Company proposes to use water obtained directly from the Merrimack River for cooling and process uses (Exh. NHE-1, at 1-19). The annual average water demand would be 2.8 million gallons per day ("mgd") (id.; Tr. 5, at 572). This water would be used for cooling tower make-up and demineralizer regeneration throughout the year; for power augmentation by steam injection and inlet air evaporative cooling on a seasonal basis; and for periodic filter backwashes and equipment washdowns (Exh. NHE-1, at 1-19). Estimates provided by the Company indicate that the vast majority of water use would consist of evaporation from the wet mechanical cooling towers, which ranges from approximately 1.8 mgd in winter to approximately 3.1 mgd in the summer, with an annual average evaporation of approximately 2.6 mgd (id.; Exh. NHE-2, at 3-14). Lesser amounts of water go to the following (with approximate average annual rates usage in parentheses): power augmentation (107,000 gallons per day ("gpd")), cooling tower blowdown (79,000 gpd), evaporative air cooling (20,000 gpd), HRSG feedwater (20,000 gpd), sand filter backwash (2,000 gpd), and other process water (Exh. NHE-1, at 1-19). Potable water for the facility (1,000 gpd) would be obtained from the Dracut municipal water supply (Exhs. INT-MVRE-G-7(a), Att. at 4-7, 5.3-5; INT-MVRE-G-7(d), Bulk Att. at 4-7). The connection to the existing municipal water supply would be on Methuen Street, to the west of the proposed facility (Tr. 1, at 29).

The Company indicated that the wet mechanical draft cooling towers would be used to cool the steam turbine condenser and other cooling loads by direct heat transfer to air and by evaporation of water (Exh. NHE-1, at 1-20). Since evaporation tends to concentrate dissolved solids, some cooling tower water is continuously drawn off and replaced with fresh water, to limit dissolved solid concentrations in the cooling tower water (id.). Power augmentation by steam injection uses water to enhance power output during peak demand periods, which occur in

the summer; inlet air evaporative cooling also allows for maintenance of power output during periods of warm weather (id. at 1-21). HRSG feedwater replaces blowdown from the HRSG (Exh. NHE-2, at 3-15).

The Company stated that overall water use would be higher in the summer when cooling tower evaporation is greatest and both power augmentation and inlet air cooling would be used (Exh. NHE-1, at 1-19). The Company stated that average plant water requirements would range from approximately 1.9 mgd in the winter to 3.6 mgd in the summer, with a maximum 24-hour rate of 3.9 mgd, and a peak rate of 4.4 mgd (id.; Exh. RR-EFSB-72).

Nickel Hill has proposed to withdraw water from the Merrimack River to meet its cooling and process water demands, using pumps with a maximum capacity of 4 mgd and with onsite storage capacity of 1.5 million gallons making up the balance over any short time period (Tr. 18, at 2148). Because the volume withdrawn exceeds 100,000 gpd for a prolonged period, the facility would need to get approval for the withdrawals from MADEP in accordance with the Water Management Act (Tr. 6, at 730).

The Company indicated it would limit its water consumption through internal reuse of 20,000 gpd of HRSG blowdown in cooling tower make-up; use of drift eliminators in the cooling towers; high cycles of concentration in the cooling towers; and use of water-conserving sanitary fixtures, in accordance with the state building code (Exh. INT-MVRE-G-7(a), Att. at 5.3-5, 5.3-6; Tr. 5, at 584).

The proposed water intake structure would be an infiltration bed design called a "Johnson screen" that would be installed flush to the bottom of the Merrimack River (Exh. NHE-1, at 1-23, 4.3-1). As described by the Company, the water intake would be located within a pool extending upstream from the Essex Dam, which is located 4.7 miles downstream in Lawrence (id. at 4.3-3). The preferred intake location is approximately 33 miles from the mouth of the river at Plum Island (Tr. 5, at 590).[59] A valve pit, wet well, and pump house would be built to the north of

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[59] Two intake locations have been most recently discussed by the Company; the preferred location as shown on site plans is in the Merrimack River approximately 800 feet south of the Route 110/Brox access road intersection (Exhs. EFSB-W-3; INT-MVRE-G-7(a), Att. at fig. 3.1-2; INT-MVRE-G-7(d), Bulk Att. at fig. 3.1-2).

Route 110 to pump water up to the proposed facility (Exhs. NHE-1, at 1-23; INT-MVRE-G-7(a), Att. at 3-17). The water intake would be regulated by dredging and navigable waters programs of the U.S. Army Corps of Engineers, waterways license and water quality certification from MADEP, review by the Massachusetts Division of Fish and Wildlife, and permitting by the Dracut Conservation Commission (Exh. EFSB-W-1).

The Company stated that a new wastewater discharge line would be built from the proposed facility to connect with existing Dracut sewers at the intersection of Route 110 and York Street, following a route along Methuen Street, the Brox access road, and Route 110 (Exh. NHE-2, at 5.7-1). The Company stated that the project would discharge approximately 133,000 gpd of wastewater to the Lowell Regional Wastewater Utility ("LRWU") in summer and 64,000 gpd in winter (id.; Exh. EFSB-W-7). The wastewater would contain concentrated dissolved solids from river water plus water treatment chemicals, some of which would be added specifically to control the pH of the wastewater (Exhs. NHE-2, at 5.7-1; EFSB-W-8; Tr. 6, at 796).[60] The Company stated that the sanitary wastewater from the facility would be discharged to an on-site septic system (Exh. INT-MVRE-G-7(a), Att. at 5.5-1). The Company asserted that wastewater from the proposed project would have no impact on water quality in the Merrimack River (Exh. NHE-1, at 4.3-20).

The Company stated that the facility is being designed to comply with the performance standards of the MADEP Stormwater Management Policy (Exh. EFSB-H-2). The Company stated that just under six acres of impervious surface would be created at the site, some of which is already disturbed (Tr. 6, at 690). The Company plans to construct three stormwater retention basins to handle stormwater runoff (Tr. 6, at 691). The Company described additional plans to manage stormwater during the construction phase of the project and during long-term operations (Exh. NHE-1, at 4.5-1). The Company specified that MADEP and EPA guidelines would be

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60 Dissolved solids in wastewater would include sodium, calcium, magnesium, chloride, silicate, and sulfate ions (Exh. EFSB-W-8). The Company also indicated that it would be adding sodium hypochlorite to cooling tower water, and antiscalants, corrosion inhibitors, and oxygen scavengers to HRSG feedwater (Exh. NHE-2, at 5.12-6). No specific information on the HRSG additives was provided for the record.

the project would not affect downstream uses of the river, including water supply, wastewater discharge, hydropower,[66] and recreation (Exh. NHE-1, at 4.3-20 to 4.3-26; Tr. 5, at 598).[67]

To address whether the proposed withdrawal could result in cumulative impacts when combined with other changes in water use patterns, the Company provided information on water use characteristics and trends for the Merrimack River basin as a whole, and for the reach of the river in which the project intake would be located. Citing a water use analysis included as part of the 1996 Merrimack River Initiative ("MRI") report, the Company indicated that most existing water use in the Merrimack River basin is non-consumptive (Exhs. RR-EFSB-17; RR-EFSB-15; Tr. 5, at 610-611).[68] The Company stated that the largest consumptive use of water within the Merrimack River basin is an out-of-basin transfer to the Massachusetts Water Resources Authority ("MWRA") from the Wachusett Reservoir system, and that other non-domestic consumptive uses include evaporative losses of less than 15 mgd for industrial and irrigation

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65 (...continued)
2148). Calculation by Siting Board staff indicates that this design flow rate of the intake pumps is 0.7 percent of the 7Q10 river flow and 0.8 percent of the 7Q100 river flow.

66 The Company stated that the Essex Company has a charter from the legislature to produce hydropower at Lawrence, downstream of the proposed facility (Tr. 5, at 599-604). The Company acknowledged that production of hydropower at Lawrence would theoretically be affected by the proposed facility and estimated the effect as a reduction of 0.008 MW (Exh. NHE-1, at 4.3-25). The Company stated that it has reached general agreement with the Essex Company on business terms, which would compensate for the reduction in power without necessarily resolving legal issues on water rights (Exh. EFSB-W-2-S2; Tr. 5, at 599-604; Tr. 15, at 1911-1912).

67 The Company indicated that any small changes in water levels in the river caused by facility operation would be dwarfed by fluctuations brought about by operation of the Essex Dam, such as during repair of sacrificial flash boards atop the dam (Tr. 5, at 596).

68 The Company stated that the MRI report identified a total water usage of 658.64 mgd, including as predominant shares 391.90 mgd for public water supply and 220.75 mgd for a once-through cooling system at a thermo-electric facility in the mid-to-upper portion of the basin (Exh. RR-EFSB-17). With respect to the public water supply usage, the Company stated that typically 80 to 85 percent of water withdrawals are returned as sewage, reflecting losses to leakage and to consumptive uses such as washing cars and watering gardens; however, sewage volumes also may be increased by infiltration/inflow of groundwater or stormwater into sewer lines (Tr. 5, at 614-615).

purposes (id.; Exh. INT-MVRE-G-7(a), Att. at 5.3-4). With respect to future trends, the Company asserted that consumptive use in the watershed would not necessarily increase significantly with population growth that is anticipated in the region,[69] that it was not aware of any active consideration of increasing withdrawal from the watershed by the MWRA, and that the one other known power plant proposed for the watershed, AES Londonderry in New Hampshire, is expected to use 2 or 3 mgd of water for cooling tower make-up (Exh. INT-MVRE-G-7(a), Att. at 5.3-5; Tr. 5, at 608, 613, 616).

The Company indicated that, in the reach of the river consisting of a pool above the Essex Dam ("Essex Dam pool"), where the project intake would be located, river flows are subject to effects of the management practices of the operators of the Essex Dam (Exh. EFSB-W-14) as well as effects of other water withdrawals from the Essex Dam pool. The Company explained that during low flow periods, i.e., 7Q10 flow or less, the operators of the Essex Dam are required to maintain a minimum flow past the dam equalling inflow to the Essex Dam pool or 614 mgd, whichever is less (Exh. EFSB-W-14; Tr. 6, at 705). The Company was unable to identify procedures used by the dam operators to ensure the required flow past the dam, but indicated that maintaining the pool at a constant level would be the likely means for ensuring that the inflow-to-the-pool flow requirement was met at the dam (Tr. 6, at 718-724).[70]

The Company indicated that other water supply uses in the area of the Essex Dam pool, downstream from the Lowell gaging station, include withdrawals by the Lawrence and Methuen municipal water systems, taken directly from the pool, and withdrawals by the Andover municipal system taken from a tributary stream that discharges to the pool (Exh. RR-EFSB-18,

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69 The Company noted that trends in overall water use are positively correlated with population growth, and cited population projections that estimate increases over the next ten years of 10.6 percent for New Hampshire, and within Massachusetts, 2.2 percent for Middlesex County and 5.9 percent for Essex County (Exh. RR-EFSB-17S). At the same time, the Company cited its investigation of usage in eight Massachusetts public supply systems, which indicates irregular trends in recent years with declining usage in some communities (id.; Exh. RR-EFSB-66).

70 The Company acknowledged that given the assumed low flow operating procedure for the Essex Dam, the effect of the added withdrawal for the proposed project may be to slightly reduce the flow of the Merrimack River at the Essex Dam (Tr. 6, at 711-712).

Att.; Tr. 5, at 625-627).[71] Return flows from these water systems occur via the Greater Lawrence Sanitary District's ("GLSD") wastewater treatment plant located on the Merrimack River two miles downstream of the Essex Dam (Exh. RR-EFSB-18, Att.; Tr. 5, at 628-629). Thus, for the portion of the Merrimack River between the Essex Dam and the GLSD discharge, flows are reduced by the total amounts of municipal water system withdrawals, not just the consumptive component of those withdrawals (Tr. 5, at 628-629).

To help address possible cumulative impacts of the proposed project withdrawal together with other future water withdrawal amounts from the Essex Dam pool, the Company provided current water use trends, as well as existing and future withdrawal permit limitations, for the Lawrence, Methuen, and Andover water systems (Exhs. RR-EFSB-66; RR-EFSB-20-S, Att.). The Company reported that average annual water use in the three communities declined from a total of 22.5 mgd in 1995 to 19.9 mgd in 1998, noting that each of the communities showed reductions that may be attributable to population declines, water pipe repairs or improvements, or use of low flow fixtures in new or rehabilitated structures (Exh. RR-EFSB-66). The Company further reported that the permitted withdrawals for Lawrence, Methuen, and Andover through 2015 total 22.56 mgd (Exh. RR-EFSB-20-S, Att.).

As possible mitigation for any potential impact of its proposed withdrawal during low flow conditions, the Company identified the option of curtailing its water use on a contingency basis, e.g., if river flow is less than the 7Q10 rate (Tr. 5, at 632-636). The Company explained that it could reduce its peak 24-hour water use by 648,000 gpd, if it ceased its use of steam augmentation, and by 72,000 gpd, if it ceased its use of air inlet cooling (Tr. 5, at 633-634). The Company argued that it was unnecessary for it to develop plans for or agree to use such contingency measures, given that its proposed peak use is less than 1 percent of 7Q10 flow (Tr. 5, at 635-636).

With respect to the proposed intake structure, the Company stated that the intake screen

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[71] The Company indicated that although the City of Haverhill and Town of North Andover are located downstream of the Essex Dam and also rely on surface water supply, withdrawals are from Kenoza Lake, Millvale Reservoir, and Lake Cochichewick located on tributaries of the Merrimack River (Exhs. RR-EFSB-19, Att.; RR-EFSB-66).

was designed to minimize the approach velocity of water entering the screen (Exh. NHE-2, at 5.6-10). The water intake approach velocity was calculated as 0.003 feet per second, which compares to an estimated river flow velocity of 0.4 to 1.2 feet per second and an EPA design guideline for screen intake velocity of 0.5 feet per second (id. at 5.6-11; Exh. INT-MVRE-G-7(d), Bulk Att. at 4-13, 8-7; Tr. 18, at 2145). The velocity through interstices in the rock cladding was estimated to be 0.03 feet per second (Tr. 18, at 2145, 2170).

To construct the infiltration bed, the Company would excavate sediment by dredging from a barge, with offsite disposal of sediments, and then lower into place a largely preconstructed infiltration bed (Exh. EFSB-W-11; Tr. 5, at 661; Tr. 18, at 2173). As required by Section III.C of the Special Permit, construction would not occur between March 15 and June 15 to avoid anadromous fish spawning (Exhs. EFSB-W-19; EFSB-G-13(d)). The Company would use silt curtains in the river to mitigate turbidity impacts during construction (Tr. 5, at 562, 661). The Company stated that the riverbed would be reconstructed by placing 4-inch broken stone in wire-gabion baskets over the infiltration bed, with additional rip-rap set above that at the grade of the existing river bed (Exh. NHE-2, at 6-4). The Company stated that, although there would be construction impacts at the river bank, it would minimize the area cleared of vegetation, and use silt fences, hay bales, and revegetation to mitigate construction impacts (id. at 5.6-11).

The Company indicated that periodic backwashing of the intake would likely be required, for periods of up to 30 minutes, two to four times per year, and noted that because backwashing would most likely be required during seasonal high flows, the procedures would re-suspend sediments into river waters that would already contain a seasonally high amount of suspended sediment (Exh. EFSB-W-18). Based on the low-approach velocity infiltration bed, mitigation of turbidity during construction, and low water consumption relative to total river flow, the Company predicted that, overall, construction and operation of its water intake would not result in impacts to fish (Exh. NHE-1, at 4.3-24).

The Company evaluated installation of radial wells (Ranney collectors) as an alternative to an infiltration bed (Johnson screen) for the water intake, and indicated that a Ranney collector would be somewhat preferable for minimizing environmental impact during construction (Exh. INT-MVRE-G-7(a), Att. at 4-13; Tr. 6, at 695). However, the Company stated that subsurface

conditions precluded use of Ranney collectors, so the Johnson screen approach was selected instead (id. at 4-13).

The Company stated that water quality in the Merrimack River has improved significantly in the last thirty years, with construction of primary, secondary, and tertiary treatment facilities for wastewater (Exh. NHE-1, at 4.3-8). The Commonwealth of Massachusetts classifies the fresh-water reaches of the Merrimack River as Class B, which designates it as habitat for fish, other aquatic life, and wildlife;[72] for primary and secondary recreational contact; as a potential source for a treated public water supply; and for agricultural and industrial uses (id. at 4.3-8). The Company identified low levels of dissolved oxygen, high nutrient loading, and high fecal coliform following heavy rainfalls as water quality issues that were prevalent around 1990 (id. at 4.3-10, 4.3-11). The Company stated that current water quality sampling indicates that the quality of the river water is generally good or very good, with the exception of problems due to release of untreated sanitary wastewater from combined sewer overflows during wet, rainy weather (id. at 4.3-10, 4.3-11).

Wastewater flows from the project, exclusive of sanitary wastewater flows, were estimated by the Company at approximately 91,000 gpd, on average, and 133,000 gpd during the summer, consisting mostly of cooling tower blowdown (Exh. NHE-2, at 5.7-1). The Company reported that the Lowell Regional Water Utility ("LRWU") treats an average dry weather flow of approximately 32 mgd, that Dracut's average daily flow allocation is 2.6 mgd, and that Dracut currently uses 1.35 mgd of that allocation (id.). The Company stated that Dracut's Comprehensive Wastewater Management Plan specifies an allotment of 100,000 gpd for a power plant on an average annual basis (id.; Exh. INT-MVRE-G-7(a) Att. at 5.5-1; Tr. 1, at 126-127). The Company stated that in order to minimize the impact to Dracut's sewer lines and to the LRWU, facility wastewater would be collected in a tank and discharged to the sewer at off-peak hours (Exhs. NHE-1, at 1-21; NHE-2, at 5.7-2).

Overall, the Company calculated that the project's maximum wastewater flow of

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[72] The Company indicated that the Merrimack River harbors fish of many types, including bass, perch, bullhead, shad, herring, and sturgeon (Exh. INT-MVRE-G-7(a), Att. at 5.4-1 to 5.4-5).

133,000 gpd represents 0.4 percent of the LRWU design flow capacity of 32.0 mgd (Exhs. NHE-2, at 5.7-1, 5.7-4; RR-TD-8, Att. at Attachment B). The Company indicated that it would work with Dracut and the LRWU to provide for appropriate infiltration and inflow reductions on the plant's wastewater load originating from Dracut (Exh. NHE-1, at 1-21; Tr. 5, at 742-744, 765-767).

The Company stated that its process wastewater would be pre-treated prior to discharge to the LRWU (Exh. NHE-1, at 4.3-19). The Company stated further that its use of the facility's pretreatment program would aid the LRWU in meeting its surface water discharge permit (id. at 4.3-20). The LRWU releases wastewater into the Merrimack River upstream of the proposed facility intake (Exh. NHE-2, at 5.5-4).[73]

The Company stated that the stormwater detention basins and their outlet control devices would regulate outlet discharge rates at or below pre-development peak rates of discharge, for 2 to 100-year design storm events (id. at 6-5).[74] The consequent settling period would improve the quality of surface water flowing offsite (Exh. NHE-1, at 4.5-3). Mr. Magee, a witness for the Company, indicated that stormwater would readily infiltrate into the sandy glacial soil at the site (Tr. 5, at 555). However, the Company also indicated that water does not readily infiltrate below the ground surface at the site, as evidenced by the presence of surface water features adjacent to the site and by the general lack of seepage out of adjacent quarry walls (Exh. INT-MVRE-G-7(a), Att. at sec. 7, response 9.14; Tr. 6, at 692).

The Company indicated that any groundwater flow through bedrock fractures would generally be eastward towards the Merrimack River (Exh. INT-MVRE-G-7(a), Att. at sec. 7, response 9.14; Tr. 6, at 692). The Company indicated that, based on information provided by officials in Dracut and Methuen, no municipal or private wells are located within 1,000 feet of

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73 The Company stated that the LRWU is 3.1 miles upstream of the project (Exh. NHE-2, at 5.5-12) and that the Essex Dam pool extends 3 miles upstream of the previously proposed intake location (id. at 5.5-15). Thus, the intake and discharge points are both in the same pool of the river, or close to it.

74 A two-year storm event is one exceeded on average once every two years; a 100-year storm event is one exceeded on average once every one hundred years.

the project site (Exh. INT-MVRE-G-7(a), Att. at sec. 7.0, response 9.16). The Company indicated that it would conduct limited surface water sampling of Beaver Pond, adjacent to the proposed facility to monitor impacts from construction and the start of operations (id. at sec. 7, response 9.21).

3. Process Alternatives to Reduce Intake of River Water

The Company provided information on two alternative cooling technologies it considered for the project – a wet mechanical cooling system using treated effluent from the LRWU, and an air cooled condenser system (Exh. INT-MVRE-G-7(d), Bulk Att. at 4-6). The Company indicated that, compared to using river water for wet cooling, use of treated effluent for wet cooling would require the same average consumptive water use out of the Merrimack basin, would engender additional costs for a pretreatment system and higher water pumping costs, would require a higher volume of wastewater treatment at the LRWU,[75] and would require construction of a 3-mile water supply line along Route 110 from the LRWU, but would avoid construction costs for an intake system and any impacts at the river intake (id. at 4-10 to 4-12; Exh. RR-EFSB-70). The Company identified advantages of air cooling as: the elimination of consumptive water use for cooling; elimination of cooling tower blowdown discharges to the LRWU; lack of visible plumes from cooling towers; and a smaller water intake structure in the Merrimack River (Exh. INT-MVRE-G-7(d), Bulk Att. at 4-10). The Company identified disadvantages of air cooling as: (1) the need for a larger and taller cooling structure[76] and

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[75] Effluent from the LRWU would have a higher dissolved solids content, and specifically a higher dissolved silica concentration, which requires more treatment prior to use in the HRSGs, reduces potential recycling of cooling tower water by approximately half and increases cooling tower blowdown (Exh. RR-EFSB-71; Tr. 18, at 2133). Discharge to the LRWU would be increased from 79,000 gpd to 250,000 gpd, thereby exceeding Dracut's planning allotment of 100,000 gpd from a power plant (Tr. 18, at 2181-2182). The practical significance of an increase in the volume of water discharged to the LRWU would depend on whether the discharge were flowed through primary and secondary treatment processes (Tr. 5, at 641).

[76] For a wet-cooled condenser, a 36,000 square-foot structure with a height of 55 feet is (continued...)

possibly a proportionally higher facility stack; (2) loss of an average of 20 MW (2.8 percent) of power and its concomitant earnings loss and lessened air emissions displacement;[77] and (3) substantially higher costs to mitigate noise impacts (id. at 4-10 to 4-12; Exh. RR-EFSB-70).[78] The Company indicated that the extra cost, over 20 years, of using treated effluent, including construction, operation, and lost capacity, would be $6.2 million and the extra cost of using air for cooling would be $48 million, relative to using river water for wet mechanical cooling (Exh. INT-MVRE-G-7(d), Bulk Att. at 4-10).

4. Analysis

The record indicates that the proposed facility would use on average 2.8 mgd of water, almost all of which would be withdrawn from the Merrimack River. The vast majority of this water use would be for wet mechanical cooling. Based on the Company's estimates of an average 2.6 mgd of evaporation, the proposed 750 MW facility would use approximately 3,700 gpd of water per MW of capacity and "consume" approximately 3,500 gpd per MW. This

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76 (...continued)
proposed; a dry-cooled condenser meeting noise requirements would be approximately 60,000 square feet and 90 to 110 feet tall, according to the Company (Exh. INT-MVRE-G-7(d), Att. at 4-10; Tr. 18, at 2115, 2180).

77 The Company stated that the comparative loss in plant output associated with selecting air cooling over wet mechanical cooling ranges from 15 MW (2.0 percent) in winter to 27 MW (3.9 percent) in summer (Exh. RR-EFSB-70). The Company estimated that the reduced displacement of power from other generating facilities would lead to increased regional emissions of 210 tpy NO_X and 731 tpy SO_2, compared to using wet cooling (Exh. INT-MVRE-G-7(d), Bulk Att. at 4-11).

78 The Company indicated that air-cooled condensers are typically louder than wet mechanical systems due to the larger and more numerous fans required (Exh. MRWC-2). The Company compared the costs of noise mitigation for the proposed facility using an air-cooled condenser and two different wet mechanical cooling units, assuming in each case an acoustic performance of 48 decibels at 400 feet (Exh. INT-MVRE-G-7(d), Bulk Att. at 4-9 to 4-12, 6-19). The Company noted that while this level of noise control could be achieved for either an air-cooled or a water-cooled facility, the cost of achieving it (including capital costs plus operation and maintenance costs over 20 years) would be $41.8 to $48 million greater with the air-cooled condenser (id. at 4-8, 4-9, 4-11).

rate of water consumption compares favorably with the per-MW use of water-cooled facilities previously reviewed by the Siting Board.[79] However, it is significantly higher than the water requirements of recently reviewed air-cooled generating facilities.[80]

Nickel Hill has identified design options, including air cooling and use of treated effluent for cooling and process water, that would reduce the demands of the proposed facility on the Merrimack River. However, the Company argues that, given the high volume of the Merrimack River, the proposed water withdrawals would have an insignificant impact on the river, and that the facility as proposed therefore would minimize water resource impacts. To evaluate this argument, the Siting Board must first consider the impacts of the proposed water withdrawal on: (1) flow in the Merrimack River, (2) water quality in the Merrimack River, (3) fish or other aquatic life in the Merrimack River, and (4) wastewater.

With respect to flow in the Merrimack River, the record indicates that less than one percent of river flow would be diverted under low flow river conditions such as the 7Q10 flow volume. Thus, the record demonstrates that the proposed water use, considered separately, would not result in any appreciable change in flow rates on the river downstream of the proposed facility, even during summer drought (i.e., 7Q10 or 7Q100) conditions.

Based on information in the record, the Siting Board also considers the potential for

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79 Comparable usage rates for other facilities using wet mechanical cooling are 5,185 gpd per MW for the 270 MW Brockton Power facility, 6,900 gpd per MW for the 360 MW Millennium facility, 6,986 gpd per MW for the 146 MW Enron facility, and 8,333 gpd per MW for the 240 MW Masspower facility. Brockton Power Decision, 10 DOMSB at 157, 202 (2000); Millennium Power Decision, 6 DOMSB 1, at 12, 129; Enron Power Enterprise Corporation, 23 DOMSC 1, at 140 (1991); Masspower, Inc., 20 DOMSC 301, at 305, 390 (1990).

80 The comparable usage rates for recently reviewed air-cooled facilities include: 169 gpd per MW for the 775 MW Sithe Edgar project; 87 gpd per MW for the 1550 MW Sithe Mystic project; 272 gpd per MW for the 580 MW ANP Blackstone project; 256 gpd per MW for the 580 MW ANP Bellingham project; and 613 gpd per MW for the 170 MW Dighton Power project. Sithe Edgar Decision, 10 DOMSB at 55; Sithe Mystic Development LLC, 9 DOMSB 101, at 145 ("Sithe Mystic Decision"); ANP Blackstone Energy Company, 8 DOMSB 1, at 146 (1999) ("ANP Blackstone Decision"); ANP Bellingham Energy Company, 7 DOMSB 39, at 170 (1998) ("ANP Bellingham Decision"); Dighton Power Decision, 5 DOMSB at 240.

cumulative effects from the proposed project and other expanded water uses in the Merrimack River basin. The Company identified a planned new AES Londonderry Project in New Hampshire as an added consumptive use of 2 to 3 mgd, and intervenors have raised concerns about increased consumptive use from general growth in the basin. Additionally, immediately downstream of the Essex Dam, the effect of flow reductions from the proposed project would be in addition to the effect of any increase in water use by municipal systems that withdraw water from the Essex Dam pool or its tributaries, with return flow at the GLSD wastewater treatment plant. Aside from the AES Londonderry Project, however, it is unclear that increased surface water withdrawals for municipal or industrial use, with associated consumptive losses, will actually occur.[81] The record shows that the water systems in the vicinity of the Essex Dam pool are experiencing declines in water use, a trend that may well be present in other municipal water systems that use the river upstream of the pool. While there also is the potential for increased consumptive water use associated with general growth in the Merrimack River basin, the effects of some such use changes, if they occur, on low flow in the lower portion of the Merrimack River may be diminished based on the specific locations and the type of sources of withdrawals. Overall, the Siting Board finds that the proposed facility's water consumption would not appreciably reduce the flow in the Merrimack River.

The record indicates that the proposed project would have minimal impacts on water quality in the Merrimack River. The record shows that the consumptive water use by the proposed facility is approximately 0.06 percent of the average flow of the Merrimack River; therefore, increases in the concentration of dissolved solids after their return to the river would be minimal. The Siting Board therefore finds that the proposed facility's water consumption would have a minimal effect on water quality.

Water would be withdrawn from the Merrimack River through a water infiltration bed in the bottom of the river, designed so that the velocity of water moving into the bed would be slow

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81 Although the record shows that much of the expected increase in demand for water will be returned as discharges to the watershed, the record provides little or no information on the potential redistribution of discharges to seasons with a higher volume of runoff (during storms and during snowmelt), potentially due to activities such as snowmaking or paving over soils, that might reduce the 7Q10 volumes in the future.

enough to allow fish and other aquatic organisms to avoid entrainment/impingement. While there would be some resuspension of river sediments by periodic backwashing of the filter bed, there is no evidence that adverse effects on fish or other aquatic life would be expected from operation of the water infiltration bed. Therefore, the Siting Board finds adverse impacts on fish and other aquatic life from the proposed facility would be minimal.

The Company indicated that the small amounts of process water discharged from the facility to the municipal sewerage system would be equalized and neutralized, that all discharges would comply with pretreatment limits, and that the volumes of sanitary wastewater from the proposed facility would be minimal. The record indicates that the design flow of the LRWU, 32 mgd, just accommodates its average dry-weather flow, 32 mgd. The record shows that facility wastewater would be collected in a tank and discharged to the sewer at off-peak hours in order to minimize the impact to Dracut's sewer lines and to the LRWU. The record shows that Nickel Hill would work with Dracut to reduce inflow and infiltration elsewhere to compensate for the additional volume of wastewater that would be discharged to the LRWU. The record does not specify some of the components of water treatment chemicals added by the facility, and their anticipated breakdown products within the facility or the LRWU. In order to help ensure proper treatment of wastewater discharged into a source of potable water, the Siting Board directs the Company to provide to the LRWU information on the components of the water treatment products that it uses, with copies to the Siting Board. With the above condition, the Siting Board finds that wastewater impacts would be minimized.

While the record shows that retention basins would be built to attenuate surface stormwater flows, the tight bedrock in the quarry area suggests that infiltration into groundwater would be modest. Either way, detention of stormwater by the basins is expected to minimize peak rates of surface water runoff from the site. Consequently, the Siting Board finds that stormwater impacts would be minimized.

The Company addressed options to reduce possible impacts associated with project water use, including the design alternative of using air cooled condensers, and the option of using contingency operating procedures to curtail water use under low flow conditions. With respect to the cooling design alternative, the record demonstrates that the Company's selection of a wet

mechanical cooling design, which accounts for most of the projected demand for water, is attributable to an overall design goal of maximizing the heat rate, or energy efficiency, of the proposed facility. Nickel Hill's analysis of air-cooled condensers indicates that this alternative would greatly reduce water use. The analysis indicates, however, that the use of air-cooled condensers also would significantly reduce the energy efficiency of the facility and would result in considerable additional costs to the Company, partly attributable to increased difficulty in mitigating noise from an air cooling system. The analysis also indicates that a considerably larger structure would be required for cooling purposes, which might in turn lead to an increase in stack height and overall increased visual impacts. Given the finding, above, that the proposed facility would not appreciably reduce the flow in the Merrimack River, the Siting Board finds that wet mechanical cooling for the Nickel Hill facility, rather than dry cooling, best minimizes water supply impacts consistent with minimizing overall environmental impacts and minimizing the cost of mitigating, controlling, and reducing these impacts.

The Company also analyzed the use of treated effluent as a source of cooling and process water that would eliminate the need to withdraw water directly from the Merrimack River. Use of treated effluent has been proposed and found advantageous in some previous Siting Board decisions (e.g., Brockton Power Decision, 10 DOMSB at 157, 205). Here, however, the record indicates that the use of treated effluent instead of Merrimack River water would not affect the total flow of the river, and that considerable additional water pre-treatment and increased pumping would increase costs to the Company. Also, the discharge to the regional water plant, which is operated close to capacity, would increase under the alternative of using treated effluent for cooling. Consequently, the Siting Board finds that wet mechanical cooling for the Nickel Hill facility using Merrimack River water, rather than using treated effluent, best minimizes water-related impacts consistent with minimizing cost.

The record also shows that the Company could use contingency operating procedures to curtail water use under 7Q10 or other low flow conditions – for example, by ceasing use of steam augmentation or air inlet cooling or, in extreme conditions, overall facility operation. Such measures do not appear necessary based on the added consumptive usage from the project alone, which is less than 1 percent of 7Q10 flow, but represent potential mitigation for water use

impacts should growth in consumptive water use in the Merrimack River basin as a whole be found to pose a future environmental or other problem related to low flow in the Merrimack River. The record contains insufficient evidence to support a finding that consumptive use trends in the Merrimack River basin require imposing measures to curtail project water use under low flow conditions. Further, given that such operating curtailments would result in increased operation of other generating facilities, there may be offsetting environmental and cost disadvantages. Therefore, the Siting Board will not require operational restrictions for purposes of water conservation beyond the specific measures which the Company has identified to limit water use at the proposed facility. The Siting Board notes that MADEP will review the proposed water use for the project under the Water Management Act, and could address any environmental or other concerns, and any necessary mitigation, related to the added consumptive water use for the proposed project.

Overall, the record demonstrates that the facility was sited in part to make use of an existing high volume source of fresh water. As such, the design of the facility has the potential to minimize environmental impacts and costs known to be associated with inefficient use of energy resources, albeit at the disadvantage of not minimizing the transfer of water out of the Merrimack River watershed and into the atmosphere. The Siting Board has found above that water flow and water quality impacts of water withdrawal have been minimized, and that adverse impacts on fish and other aquatic life would be minimal. In addition, the Siting Board has found that wet mechanical cooling for the Nickel Hill facility using Merrimack River water, rather than using dry cooling or using treated effluent for wet mechanical cooling, best minimizes water-related impacts consistent with minimizing cost. The Siting Board also found above that wastewater and stormwater impacts of the proposed facility would be minimized. Accordingly, the Siting Board finds, based on the record in this proceeding, that the water resource impacts of the proposed facility would be minimized, consistent with minimizing other environmental impacts and the cost of mitigating, controlling, and reducing such impacts.

D. Wetlands

This section describes wetland impacts which would result from the construction of the

proposed facility and its interconnections, and the proposed mitigation of potential impacts.

1. Description

Nickel Hill indicated that the Dracut Conservation Commission, the MADEP, and the U.S. Army Corps of Engineers would regulate wetland impacts from construction and operation of the proposed facility (Exhs. NHE-2, at 5.8; NHE-1, at 4.4). Wetland resource areas on or near the project site that are protected by local, state, and federal regulations include Land Under Water Bodies and Waterways ("LUW"), Bank of or Land Under Rivers that Underlie Anadromous/Catadromous Fish Runs, Riverfront Area ("RFA"), Bordering Land Subject to Flooding ("BLSF"), Bordering Vegetated Wetlands ("BVW"), and a Vernal Pool[82] (Exhs. NHE-1, at 4.4-3 to 4.4-10; NHE-2, at 5.8-3 to 5.8-8). The Company indicated that it received an Order of Conditions from the Dracut Conservation Commission on January 19, 2000 (Exh. INT-MVRE-G-7(d), Bulk Att. at 3-2).

Nickel Hill indicated that, while most facility structures would be located outside of wetland resource areas and their buffer zones, some portions of the main turbine building and the cooling tower block would be placed within the 100-foot buffer zone but outside a 50-foot setback (Exhs. EFSB-WL-2-S, Att., Attachment A, at 5, 37; INT-MVRE-G-7(d), Bulk Att. at 8-9; Tr. 4, at 526). The Company stated that moving the cooling tower block farther from the wetlands and closer to the turbine and the HRSG building would effectively reduce cooling efficiency, and result in higher air emissions per unit generation (Tr. 4, at 528-529). In addition, 210 linear feet of new paved roadway (the 25-acre site access road) would be within the 100-foot buffer zone (Exh. EFSB-WL-2-S, Att., Attachment A, at 38; Tr. 4, at 522-524). The Company stated that, where feasible, it would maintain a 10-foot "no-disturbance zone" around wetland

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82 Nickel Hill stated that the Massachusetts Natural Heritage Atlas (1997-98 edition) lists no certified vernal pools on the Brox Industries property (Exh. EFSB-WL-2-S, Att. at Attachment A, at 25-26). However, during initial environmental field work, the Company identified three potential vernal pools; following further field investigation, it concluded that one area, located within a BVW near the transmission line corridor, satisfies the minimum requirements to be recognized as a vernal pool under 310 CMR 10.04 (id.).

resource areas (Exh. EFSB-WL-2-S, Att., Attachment A, at 5-6, 37).[83] However, the Company stated that grading for the cooling tower block would encroach within 10 feet of a wetland area in two locations, and that the new site access road would come within 5 feet of the BVW (Tr. 4, at 519-520, 526). The Company noted that some of the areas where the 10-foot no-disturbance zone would not be maintained were previously disturbed and are devoid of vegetation from quarry operations (Exh. EFSB-WL-2-S, Att., Attachment A, at 6, 37).

Nickel Hill also discussed wetlands impacts associated with the construction of the electric and natural gas interconnections for the proposed facility. The Company stated that construction of the interconnection with the Tennessee natural gas pipeline would result in temporary disturbance within the 100-foot wetland buffer zone, but would not affect any wetland resource areas (Exhs. INT-MVRE-G-7(d), Bulk Att. at 8-10; EFSB-WL-2-S, Att., Attachment A, at 42). Most of the pipeline interconnection route is devoid of vegetation due to on-going quarry operations (Exh. INT-MVRE-G-7(d), Bulk Att. at 8-9). The Company stated that any trees greater than 15 feet in height within 15 feet of either side of the pipeline would be cleared, and that low vegetation would be maintained along a 10-foot corridor centered on the pipeline (id.). The Company also stated that pesticides would not be used along the pipeline right-of-way ("ROW") (id.).

Nickel Hill stated that construction of the overhead electric transmission interconnection would temporarily alter approximately 73,724 square feet of BVW, and that three steel support structures would be installed within the 100-foot buffer zone of BVW, but that no permanent filling of BVW would be required (Exhs. EFSB-WL-2-S, Att., Attachment A, at 7, 50; INT-MVRE-G-7(d), Bulk Att. at 8-10). The Company noted that the transmission layout was designed to avoid impacts to the identified vernal pool (Exhs. EFSB-WL-2-S, Att., Attachment A, at 49; EFSB-WL-4; Tr. 4, at 530-534). The Company stated that selective tree clearing and trimming would be necessary for construction and long term maintenance of the transmission interconnect, but that pesticides would not be used along the transmission corridor (Exhs. EFSB-WL-2-S, Att., Attachment A, at 7, 50; INT-MVRE-G-7(d), Bulk Att. at 8-10).

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[83] Nickel Hill indicated that, in accordance with town bylaws, Dracut seeks to maintain an undisturbed 10-foot buffer around wetland areas (Tr. 4, at 518).

Nickel Hill also analyzed the wetland impacts associated with utility work along the Brox access road and Methuen Street, including the construction of a river water intake main, a sewer force main, a domestic water main, and a sewer pump station, and widening the pavement on Methuen Street. The Company stated that this work would temporarily impact approximately 26,480 square feet of previously altered wetland buffer zone and 950 square feet of previously altered RFA (Exh. EFSB-WL-2-S, Att., Attachment A, at 35). This area is currently composed of impervious surfaces and previously disturbed roadway shoulders (Exhs. EFSB-WL-2-S, Att., Attachment A, at 35; INT-MVRE-G-7(d), Bulk Att. at 8-10). The Company stated it would conduct limited tree cutting in the 100-foot buffer zone along the Brox access road to allow for the installation of erosion and sedimentation control barriers (Exh. EFSB-WL-2-S, Att., Attachment A, at 35).

Finally, the Company evaluated the wetlands impacts of the proposed Merrimack River water intake structure, piping, and pump station. The Company noted that the pump station could be placed in one of two possible locations: at the intersection of Route 110 with the current Brox access road, or at a point 600 feet to the west at a partially paved area on the side of Route 110 known as "the turnaround" (Exh. INT-MVRE-G-7(d), Bulk Att. at 3-23). The Company identified the turnaround as the preferred location of the intake based on subsoil conditions, the expressed preference of Dracut, and discussions with the Massachusetts Highway Department regarding use of the land between the river and the highway (Tr. 18, at 2167-2168).[84] The January 19, 2000, Order of Conditions approved the construction of the pump station at either location, but required mitigation in the form of site cleanup, stabilization of existing exposed bank, and landscaping if the turnaround location is chosen (Exh. INT-MVRE-G-7(d), Bulk Att., at Appendix B at 6-7). Nickel Hill noted that its choice of location would be subject

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[84] Nickel Hill indicated that if the pump station were located at the intersection of Route 110 and the existing Brox access road, the river water intake main would run up the existing Brox access road, along Methuen Street, and up the new 25-acre site access road to the proposed facility. If the pump station were located at the turnaround, the river water intake main would either: (1) follow Route 110 to its intersection with the existing Brox access road and then follow the route described above; or (2) cross Route 110 and follow the new Brox access road until it intersects with the existing Brox access road, and then follow the route described above (Exh. INT-MVRE-G-7(d), Bulk Att. at 3-23).

to further review by MADEP and the Army Corps of Engineers (id. at 3-24).

The Company stated that the construction of the river water intake structure, piping, and pump station would result in temporary impacts on LUW, RFA, and Anadromous/Catadromous Fish Runs (Exh. EFSB-WL-2-S, Att., Attachment A, at 7). Specifically, the Company stated that installation of the river water intake system would require dredging a 40 by 52 foot area of the river bottom to a depth of six feet, for a total displacement of 462 cubic yards of material (id. Attachment A, at 64). The river water intake system itself would be an infiltration bed constructed using "Johnson screens" set in a bed of stone that would be flush with the river bottom (Exh. INT-MVRE-G-7(d), Bulk Att. at 3-20).[85]

The Company stated that construction of the infiltration bed would take place within the riverfront area along the Merrimack River (Exh. EFSB-WL-2-S, Att., Attachment A at 7). However, the Company stated that work in this area would be limited to previously developed areas along Route 110 and the associated ROW (id., Attachment A at 67). The Company stated that sediment from the river-bottom excavation area would be tested to determine appropriate disposal methods (id., Attachment A, at 66). The Company also stated that all materials would be stockpiled on the north side of Route 110 on Brox property beyond the 100-foot buffer zone of jurisdictional wetland resource areas (id., Attachment A, at 68). At the end of each work day, the stockpiles would be surrounded with hay bales and a trenched silt fence (id.). To minimize the effect of sediment disturbance within the river, the Company stated it would install weighted turbidity barriers during dredging operations to contain suspended sediment and limit intrusion into nearby waters and habitats (id.).

The Company indicated that it would implement an erosion and sedimentation control program to minimize impacts to wetlands during construction (Exhs. EFSB-WL-2-S, Att., Attachment A, at 40; INT-MVRE-G-7(d), Bulk Att. at 8-8). The Company stated that the erosion and sedimentation control program incorporates Best Management Practices specified in the guidelines developed by the MADEP and the EPA and complies with the National Pollutant

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[85] The Company also considered using a Ranney collector, which would not require construction within the river, but found that the subsoil conditions did not favor this type of collector (Tr. 15, at 1896).

Discharge Elimination System General Permit for stormwater discharge from construction activities (Exh. EFSB-WL-2-S, Att., Attachment A, at 40). The Company stated that, as part of the sedimentation and erosion control plan, double-staked hay bales and trenched silt fencing would be installed between the boundaries of all wetland resource areas and proposed construction locations (id., Attachment A at 36, 68; Exh. INT-MVRE-G-7(d), Bulk Att. at 8-9).

The Company stated that, prior to construction, it would prepare and submit to the Dracut Conservation Commission for approval a Spill Prevention Plan addressing steps to be taken in the event of an accidental release of a hazardous substance near a wetland area (Exh. EFSB-WL-2-S, Att., Attachment A at 70). As part of this plan, a spill containment kit would be kept on-site in the project manager's trailer throughout construction operations (id. at 70).

2. Analysis

The Siting Board notes that wetlands are considered to be potentially sensitive to direct construction impacts, changes in site hydrology, surface water contamination, and groundwater contamination. Here, the record demonstrates that there would be no permanent alteration of wetlands associated with the construction of the proposed facility, its electric and gas interconnections, or associated utilities and roadways. Portions of the cooling tower block, three steel supports for the transmission interconnection, and approximately 210 feet of roadway would be located within the 100-foot buffer zone. Fill for the cooling tower block and some roadway segments would encroach within a 10-foot "no-disturbance zone" that was requested by the Dracut Conservation Commission under the general wetland protection bylaw. The record demonstrates that the Company designed the facility layout to avoid wetland areas and wetland buffer zones to the extent possible, and that moving the cooling tower block further away from wetland areas would compromise other environmental concerns.

The record also demonstrates that construction of the natural gas pipeline and electric transmission interconnections would result in temporary disturbance within the 100-foot wetland buffer zone, and that utility work would result in the temporary disturbance of approximately 26,480 square feet of wetland buffer zone and 950 square feet of RFA. Much of this area, including all of the RFA, has been previously altered by quarrying or road construction. The

record indicates that project work in wetland buffer zones would be conducted so as to minimize effects on nearby wetlands.

The record shows that the construction of the river water intake structure, piping, and pump station would result in temporary impacts on LUW, RFA, and Anadromous/Catadromous Fish Runs, and that construction of the infiltration bed would affect some previously developed riverfront area. The Company has proposed measures to minimize the effect of sediment disturbance in the river during construction. The Siting Board notes that the record is not clear as to whether the pump station would be located at the intersection of Route 110 and the Brox access road, or approximately 600 feet to the west at the turnaround. However, the Dracut Conservation Commission has approved the construction of the pump station in either location, subject to mitigating conditions. Further, we note that under either scenario, the river water intake main will be placed in roadways, thus limiting wetland and other environmental impacts. Consequently, the Siting Board finds that construction of the pump station in either location, with appropriate mitigation, would minimize wetland impacts.

The record demonstrates no significant anticipated change to site hydrology that would affect wetlands. The record shows that measures would be taken to prevent the spilling of potentially damaging chemicals into the environment at the site. The record also shows that the quality and quantity of water runoff into on-site and off-site wetlands is not expected to change appreciably as a result of the proposed facility. Accordingly, the Siting Board finds that the wetlands impacts of the proposed facility would be minimized.

E. Solid Waste

This section describes the solid waste impacts of the proposed facility and the mitigation proposed by Nickel Hill.

1. Description

Nickel Hill stated that solid and hazardous waste would be generated during construction, operation, and maintenance of the proposed facility (Exh. NHE-1, at 4.6-1, 4.6-2). The Company stated that all solid and hazardous waste at the proposed facility would be properly stored and

removed by appropriately licensed haulers (Exhs. EFSB-SW-2; EFSB-SW-3; NHE-1, at 4.6-1, 4.6-2). The Company also indicated that where feasible, solid waste would be separated into separate streams and recycled (Exhs. EFSB-SW-1; EFSB-SW-3). Furthermore, the Company stated that it would meet all federal, state, and local requirements governing the handling, storage, and disposal of hazardous waste (Exh. EFSB-SW-3).

Nickel Hill stated that approximately 100 tons of solid waste would be generated during construction of the proposed facility (Exh. EFSB-SW-1). This would include approximately 70 tons of excess concrete and 25 tons of scrap metal, as well as excavated soil or rock, packaging material, "empty non-hazardous chemical containers," and scrap material including lumber, insulation, cable, wiring, and siding (id.; Exh. NHE-1, at 4.6-1). Some household-type solid waste would also be produced by the construction work force (Exh. NHE-1, at 4.6-1). In addition, the Company stated that the construction and start-up process would require the use of some cleaning solvents, oils, and solvent based coatings (id.).

The Company indicated that it plans to minimize the volume of soil or rock that must be removed from the site by reusing as much as possible elsewhere on the Brox property, for regrading quarried areas or the construction of berms (id.). The Company anticipated that wood scrap recycling would occur at the Brox Industries waste tree reprocessing area for the manufacture of mulch (Exh. EFSB-SW-1). The Company stated that scrap metal also would be recycled at an appropriate facility (id.). The Company proposed to collect other construction debris in large roll-off containers which would be hauled to an appropriate construction and demolition landfill by a licensed contractor (Exh. NHE-1, at 4.6-1). Hazardous waste and other trash generated during construction would be collected in appropriate containers and removed for disposal by licensed hazardous and solid waste contractors (id.).

The Company indicated that operational solid waste would consist of mixed office waste, water treatment filter media, and various other items including rags, rusted metal, broken machine parts and electrical materials, and empty containers (id.; Exh. EFSB-SW-2). Of the office waste that would be produced, efforts would be made to recycle paper (Exh. NHE-1, at 4.6-1). All other operational solid wastes would be removed by a local waste management firm (Exh. EFSB-SW-2).

The Company stated that maintenance activities would produce some hazardous and non-hazardous wastes, such as spent lubrication oil filters, empty chemical containers, and depleted CO and SCR catalyst units (id.). The CO unit contains platinum as its catalyst, which would be treated as a non-hazardous waste and processed for reuse (Tr. 8, at 1030-31). The Company stated that the SCR catalyst unit "contains some vanadium" and would be treated as a hazardous waste (id. at 1030). The SCR system proposed by the Company would use 72 cubic meters of catalyst per turbine, or a total of 5,090 cubic feet for the facility (Exh. AND-13). The Company stated that it expected to replace the SCR catalyst every five to six years (Tr. 19, at 2397-98). The proper disposal and reprocessing of the CO and SCR catalysts would be the responsibility of the vendor of the replacement catalyst (Tr. 8, at 1030-31). The Company stated that all hazardous waste would be stored for no more than 90 days in a designated area before being removed and disposed of by an licensed hazardous waste contractor (Exh. EFSB-SW-3; Tr. 8, at 1031-33).

2. Analysis

The Company has stated that it would reduce, reuse, and recycle solid waste to the maximum extent possible during construction and operation of the proposed facility, and indicated it would facilitate recycling by the separation of solid waste. The record shows that all remaining waste would be removed by licensed waste contractors and disposed of at appropriate disposal sites for hazardous and non-hazardous waste.

The Siting Board notes that the proposed facility is a gas-fired facility, and that the Company's choice of fuel contributes considerably to the minimization of solid waste impacts, when compared to a coal fired plant. See, e.g., Silver City Energy Limited Partnership, 3 DOMSB 1, at 173-174 ("Silver City Decision"). The Company's commitment to recycle both construction and operational solid waste, where possible, contributes to minimizing the solid waste impacts of the proposed facility. Accordingly, the Siting Board finds that the solid waste impacts of the proposed facility would be minimized.[86]

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[86] The Siting Board notes that it will require future applicants of proposed generating (continued...)

F. Visual Impacts

This section describes the visual impacts of the proposed facility, the mitigation proposed by the Company, and the cost and benefits of any additional mitigation options.

1. Description

The Company stated that the proposed facility would be located on a 25-acre site within the contiguous 450-acre properties owned by Brox (Exh. NHE-1, at 4.9-1 to 4.9-2, 4.9-13). The Company indicated that Brox operates a quarry and related industrial facilities on its properties but that much of the land is still forested (id. at 4.9-1). The Company stated that the quarry operation is currently visually buffered from the surrounding community (id.). The Company anticipated that existing terrain and vegetation also would screen views of the proposed project, including its two stacks and major buildings, from most community locations (id. at 4.9-1 to 4.9-2, 4.9-13).

The Company asserted that construction of the stacks for the proposed project as designed would minimize their visual impacts (Exhs. EFSB-V-4; EFSB-V-6). The Company indicated that it proposed to construct two 22-foot diameter stacks at the GEP height of 170 feet, and added that the below-grade placement of the HRSG reduced the GEP stack height from nearly 200 feet to 170 feet (Exh. EFSB-V-4). The Company stated that it considered constructing one 50-foot diameter stack, but noted that the larger diameter of the single stack design would likely increase intrusion into an adjoining wetland buffer area and necessitate relocation of the aqueous ammonia storage tank to a less safe area (id.).

The Company indicated that, in addition to the Brox facilities located immediately to the west of the proposed 25-acre site, other non-residential uses exist in the immediate area,

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86 (...continued)
facilities, regardless of fuel type or size, to demonstrate that they have minimized solid waste impacts by characterizing the estimated waste stream from the proposed facility, describing the solid waste minimization and recycling strategies proposed for the facility, and as applicable, providing comparisons with statewide policy initiatives and/or governmental or industry guidelines or averages. See Sithe Edgar Decision, 10 DOMSB at 71.

including additional sand and gravel operations to the east and south, and a NEP transmission corridor to the west (Exh. NHE-1, at 4.9-1 to 4.9-2).

At the same time, the Company stated that the area to the north of the Brox properties is primarily agricultural and residential and that other nearby residential uses are located on Wheeler Street to the east and Methuen Street to the southwest; the area to the west beyond the NEP transmission ROW approximately a mile from the proposed facility includes additional agricultural and residential areas (id.). The Company indicated that the residences on Methuen Street are visually and physically separated from the Brox properties by berms at the end of the quarry and by downward sloping terrain (id.).

The Company submitted a study of the likely visibility of the proposed facility from 20 sensitive receptors in the area of the proposed facility (Exhs. NHE-1, at 4.9-1 to 4.9-13; NHE-2, at 5.4-1 to 5.4-11). The Company stated that it first performed a map-based screening analysis, using USGS maps to locate areas within a one-mile radius of the proposed facility from which the facility stacks might be visible, and then conducted a field test of this initial screening (Exh. NHE-2, at 5.4-1 (fig. 5.4-2)).[87] The Company stated that, based on field test results, it selected for detailed study viewsheds of 20 representative residential and public locations with a potential view of the proposed facility stacks (id.).[88]

Based on viewsheds prepared for its selected receptor locations, the Company asserted that the proposed project would be effectively screened from most community locations by existing forested areas and terrain (id. at 5.4-1 to 5.4-11; Exh. EFSB-V-3). The Company indicated that it expected much of the existing woodland around the Brox properties to be

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87 To verify the conclusions of its screening analysis, the Company spot-checked areas within a one-mile radius of the proposed project site where no view of the proposed stacks was expected (Exh. NHE-2, at 5.4-1).

88 The Company indicated that viewshed photographs were taken during winter defoliate conditions in 1999 (Exh. NHE-2, at 5.4-5). At each studied location, the Company recorded compass headings to the stacks, a description of the terrain, vegetation thickness, and the existence of any open areas with potential views toward the proposed project (id.). The Company stated that receptor locations were chosen to provide examples of views of the proposed project from vantage points in all directions (id. at 5.4-1)

preserved in the long term, in part because the wooded areas on the Brox properties to the north and south of the proposed project are protected under the Massachusetts Wetlands Protection Act (Exh. EFSB-V-1). The Company explained that Brox, in its term sheet with Nickel Hill, has committed to the preservation of woodland to the east of the proposed facility, between the proposed project site and Wheeler Street (id.; Exhs. EFSB-V-10; RR-MVRE-7; EFSB-V-10-S, Att.). Nickel Hill explained that it anticipates addressing the implementation of this commitment by means of a written agreement, conservation restriction, or deed restriction to be negotiated with Brox Industries in connection with the anticipated site lease (id.; Tr. 15, at 1910-1911). The Company further indicated that areas to the southwest, west, northwest, and north of the proposed project site, extensively quarried by Brox and bounded by an approximately 20-foot-high berm, are in turn surrounded by land which is currently largely forested (Exh. EFSB-V-1). Nickel Hill stated that the Company's understanding is that Brox intends to confine its operations within the berm, leaving the forested areas intact (id.).

Based on its visual analysis of 20 locations, the Company identified three locations from which unobstructed views of the tops of the stacks would be expected, including a portion of the nearest residential area north of the 25-acre site, located at Rinzee Road in Dracut (3610 feet from stacks), and two locations near River Road in Andover, one to the southeast at Greybirch Road (4430 feet from stacks), and one to the south at the NEP transmission ROW (6890 feet from stacks) (Exh. NHE-2, at 5.4-7 to 5.4-11, 6-9 (figs. 5.4-7, 5.4-18, 5.4-22)). The Company also identified nine locations from which limited views of the tops of the stacks would be expected, including Wheeler and Lowell Streets to the southeast in Methuen (2,130 feet from stacks), four residential locations to the east and southeast near the Merrimack River in Andover (3770 to 4200 feet from stacks), three locations to the west and northwest in Dracut (5,410 to 6,170 feet from stacks), and River Road and Avery Lane to the south in Andover (6,360 feet from stacks) (id. at 5.4-7 to 5.4-11, 6.9 (figs. 5.4-5 to 5.4-24)). The Company explained that, where limited views of the stacks are indicated, the views are based in whole or in large part on the stack tops being visible through tree branches, and asserted that in some of the identified cases the stacks would not be visible at all during foliate conditions (id. at 5.4-7 to 5.4-11, 6-9).

The Company concluded that, based on the extent to which the stacks and other facility

structures would be visible and the nature of the affected sensitive receptor area, Rinzee Road would be the location likely to be most affected by views of the proposed facility and its stacks (Exh. EFSB-V-6). Specifically, the Company noted that both stack tops likely would be visible from a number of residences along the northern portion of Rinzee Road, and that the alignment of Rinzee Road would prevent the development of a complete vegetated screen (id.). To offset the visual impacts identified at Rinzee Road, the Company proposed meeting with northern Rinzee Road residents to arrange for scattered plantings of trees on private property to block potential views of the proposed facility from yards and residences (id.). The Company proposed to plant trees sufficiently in advance of proposed project completion to provide screening to properties from which the proposed facility would likely be visible (id.).

The Company stated that it is required under the terms of its Special Permit to implement, prior to commercial operation, a selective tree planting and replacement program along the northern half of Rinzee Road, subject to the approval of the Board of Selectmen (Exh. EFSB-G-13(d), Att. at 13-14). The Special Permit also requires that the Company undertake selected tree planting to mitigate any views of the facility from residential locations other than the northern half of Rinzee Road, as requested by affected landowners within two years of commercial operation, and with the approval of the Board of Selectmen; provide a vegetated buffer along portions of the 25-acre site access road; provide a plan for preserving the currently existing visual buffering provided by a wooded area off and to the north of the 25-acre site for the operational life of the proposed facility, with the approval of the Board of Selectmen; and arrange for the preservation of 18 acres between the 25-acre site and Wheeler Street in substantially its current state until the completion of demolition or removal of the proposed facility (id. at 12-14).

The Company indicated that it would be willing to discuss with affected landowners visual impact mitigation other than tree planting (Exh. EFSB-V-6). The Company provided a copy of its on-site landscaping plan for the proposed facility and 25-acre site access road, in further support of its contention that visual impacts of the proposed facility would be minimized (Exh. EFSB-G-13, at Appendix F). In addition, the Company indicated that it would use neutral colors for building exteriors, as approved by the Board of Selectmen (Exh. EFSB-G-13(d), Att. at 13).

The Company stated that outdoor lighting would be required to comply with both Dracut and Federal Aviation Authority regulations (Exhs. EFSB-V-6; EFSB-V-8). The Company indicated, however, that the height of all external lighting fixtures would be set at minimum requirements for ground clearance and intensity (Exh. EFSB-V-6). The Company also stated that lighting fixtures would be focused downward to minimize direct line of sight and reflective impact on off-site locations, and that the number of illuminated areas would be limited to the minimum number required for safety and security (id.).

The Company asserted that the proposed facility would not visually affect any areas included in the Massachusetts Landscape Inventory for their scenic value (Exh. EFSB-V-5). The Company stated that the nearest such area, Lake Cochichewick, is approximately nine miles northeast of the proposed facility site, and would be shielded by distance and topography from any potential visual impact of the proposed project (id.).

The Company indicated that the Deer Jump Reservation, an area of open space extending along the south bank of the Merrimack River in Andover, is located at a distance of 3100 feet at the nearest point from the proposed facility site (Exh. AND-4). The Company's map-based screening analysis indicates that the areas in Andover from which the facility would be potentially visible are generally limited to the residential areas above the top of the river bank area, although the potentially affected area extends to within the sloping riverbank area, and closer to the river, from the vicinity of Nollet Drive to Launching Road (Exh. NHE-2, at fig. 5.4-2).[89]

The Company also submitted the results of its assessment of the potential for visible

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[89] The Company's viewshed analysis includes five residential locations from Nollet Drive to Launching Road, representing the area of Andover that parallels the south bank of the Merrimack River to the southeast and east of the facility site, adjacent to the Deer Jump Reservation (Exh. NHE-2, at figs. 5.4-3, 5.4-20 to 5.4-24). Based on the Company's maps and photographs, high terrain on the opposite, north side of the Merrimack River serves as a determinant of the extent to which the facility stacks are visible in some of the viewsheds, those at Winchester Drive, Greybirch Road and Launching Road; for the remaining viewsheds at Nollet Drive and Inwood Lane, intervening terrain on the north bank of the river between the proposed site and the viewpoints is relatively low, and foreground trees represent an important factor for limitation of facility views (id.).

plumes from the stacks and cooling towers of the proposed project (Exhs. EFSB-V-7-S; RR-TD-18(a)-(f)). The Company used the FOG and SACTI models to model visible plumes from the stacks and cooling towers, respectively (Exh. EFSB-V-7-S at 2). The Company applied the FOG and SACTI models using five years (1991-1995) of National Weather Service meteorological data from Logan Airport in Boston (id.). The Company stated its FOG modeling predicted, in aggregate, that under worst case conditions, a stack plume would be visible approximately 47 percent of daylight hours, and that, when visible, the average length of a stack plume would range from 50 to 100 meters (id. at 3). The Company indicated, however, that visible plume frequency and length for the proposed facility should be less than modeled, based on visual observations of other power plant projects (id. at 4). The Company explained that dry low NO_X combustors reduce the volumes of water injected into the combustion turbines to limit NO_X formation (id. at 3).

With respect to cooling tower plumes, the Company stated that its SACTI modeling predicted that a cooling tower plume of some length would be visible at all times (id.). The Company stated that in winter, the season of longest plume lengths, a 188 to 326 meter plume would likely be visible (id.). The Company stated that its SACTI modeling predicted cooling tower plumes of 23 to 27 meters in summer, when plume lengths are shortest (id.). The Company indicated its belief that the SACTI model is a conservative predictor of visible plume frequency (id.). The Company stated that it based its belief on observations of cooling towers made during summer months at existing generating facilities (id.). The Company reported that these observations indicated periods without the presence of a visible plume (id.).

The Company anticipated that no additional visual impacts would result from construction of such ancillary facilities for the proposed project as the 345 kV switchyard and interconnecting transmission lines (Exh. EFSB-V-2). The Company explained that the switchyard would be lower than adjacent buildings, and that existing wooded areas would screen views of the transmission interconnect, including the lines extending from the NEP transmission ROW back to the plant switchyard, from residences to the south, west, and north of the proposed site (id.).

2. Analysis

Nickel Hill has analyzed the potential visual impacts of the proposed facility on the surrounding area, based on a study of views from 20 receptor locations selected based on elevation, proximity, and the potential for unobstructed views of the proposed facility. For each selected visual receptor site, the Company submitted a viewshed with the current view for that location, over which was superimposed a computerized view of the Company's proposed structures. The record demonstrates that the Company used a consistent and reasonable process for identifying areas within a one-mile radius of the proposed facility from which the proposed facility stacks might be visible.

Nickel Hill also has provided a detailed description of land uses in the vicinity of the Brox properties. The record shows that the proposed facility would be constructed on a 25-acre site which is contiguous to Brox properties that are currently used for industrial purposes, and have comparable visual impacts or are zoned for industrial use. The record further shows that the present industrial uses in the vicinity of the proposed project are buffered from other land uses by existing woodland and topography and that the same screening would benefit the proposed facility. The record shows that no areas included in the Massachusetts Landscape Inventory would be visually affected by the proposed facility.

The Company's visual analysis demonstrates that existing forested areas and terrain would effectively screen views of the proposed project from most community locations in the vicinity of the project. However, the record shows that the tops of the facility stacks are likely to be visible from residences along the northern portion of Rinzee Road approximately three-fifths of a mile north of the site, and through branches or near trees tops from other residential locations within a mile to the north, east, and southeast. The record also shows that although also visible from residential areas to the south, west, and northwest, the proposed facility would be a distant feature of views from such areas, over a mile away, and that these facility views also are likely to include other existing industrial and utility facilities; thus any added visual impacts from the proposed facility would be minimal.

Bruton\Vrountas argue that the facility will affect views from the Deer Jump Reservation, extending along the south bank of the Merrimack River in Andover. The record indicates views

of the upper portions of the stacks would be possible from limited portions of the sloping area that rises from the river edge, principally in the area from Nollet Drive to Launching Road. However, terrain along the north side of the river likely would provide significant screening at intermittent points along the potentially affected area.

Nickel Hill has taken a number of design steps to minimize the visual impacts of the proposed facility. In particular, the Company proposes to construct the HRSG at basement level to allow for a reduced-height GEP stack design.[90] In addition, the Company would further mitigate the visual impacts of the proposed facility with landscaping and by selecting neutral colors for building exteriors. The record demonstrates that to mitigate visual impacts of external lighting, the Company would limit the height and number of external lighting fixtures to the minimum necessary both to comply with regulations and to ensure safety and security at the proposed site.

Nickel Hill also has modeled the potential for visible plumes from the proposed facility's stacks and cooling towers. The FOG model predicts that, under worst case conditions, stack plumes would be visible approximately 47 percent of daylight hours and the average length of the stack plume would range from 50 to 100 meters. However, the record shows this prediction may be conservative, since the use of dry low-NO_X at the proposed facility would reduce the volumes of water injected into the combustion turbines with corresponding reductions in plume frequency and length. The record demonstrates that a cooling tower plume of some length is likely to be visible at all times during the winter months, and that shorter, less frequent cooling tower plumes are likely in spring and autumn. The record is inconclusive with respect to the likely length and frequency of cooling tower plumes in summer months: whereas the SACTI model conservatively predicts that plumes would persist throughout the summer, the Company reports periods without visible cooling tower plumes at existing power generation facilities.

Based on the Company's visual study, including viewsheds and associated analysis, the

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90 The Company also has adopted a two-stack, rather than a single-stack design, primarily to reduce encroachment on a wetland buffer area and to allow optimal siting of an aqueous ammonia tank. The Siting Board concludes that the visual impacts of the two proposed stacks would be substantially similar to those of a larger single stack, particularly given that views of the stacks from most locations would be screened by existing forested areas.

Siting Board concludes that the proposed facility would not significantly change the existing visual character of the 25-acre site and its surroundings. The Siting Board notes the Company's efforts to design its proposed structures in such a way as to mitigate their visual impacts. In particular, the Siting Board notes the Company's location of the proposed project in an area of comparable industrial use with existing vegetative and topographical screening.

The Siting Board also notes, however, that the long-term mitigation of visual impacts from the proposed project depends on maintaining the woodland buffer which surrounds much of the Brox properties. The record shows that the preservation of this buffer depends, in part, on the Company's successful protection of woodland buffer to the east of the proposed facility, between the proposed project site and Wheeler Street, by means of an agreement, conservation restriction, or deed restriction. Accordingly, the Siting Board directs Nickel Hill prior to commencement of construction to submit a copy of the instrument, in recorded form if required, providing for preservation of the 18 acres as a woodland buffer.

Nickel Hill has agreed to meet with residents along the northern part of Rinzee Road to arrange for tree planting on private property in advance of project completion and other visual impact mitigation to screen views of the proposed facility once it is complete. While this approach should address the locations from which the most significant views of the facility are likely, it is possible that additional significant views of the proposed facility may be apparent once construction is complete. In recent decisions, the Siting Board has required proponents of generating facilities to provide selective tree plantings and other reasonable mitigation in residential areas up to one mile from the proposed stack location to mitigate the visibility of the facility and the associated stack. IDC Bellingham Decision, 9 DOMSB at 299-300; ANP Blackstone Decision, 8 DOMSB at 157-158; ANP Bellingham Decision, 7 DOMSB at 180. Consistent with Siting Board precedent concerning the minimization of visual impacts, the Siting Board directs Nickel Hill to provide reasonable off-site mitigation of visual impacts, including shrubs, trees, window awnings, or other mutually agreeable measures, that would screen views of the proposed generating facility and related facilities at affected residential properties and at roadways and other locations within one mile of the proposed facility, as requested by individual property owners or appropriate municipal officials.

In implementing this requirement, the Company: (1) shall provide shrub and tree plantings, window awnings, or other reasonable mitigation on private property, only with the permission of the property owner, and along public ways, only with the permission of the appropriate municipal officials; (2) shall provide written notice of this requirement to appropriate officials and to all potentially affected property owners, prior to the commencement of construction; (3) may limit requests for mitigation measures from local property owners and municipal officials to a specified period ending no less than six months after initial operation of the facility; (4) shall complete all agreed-upon mitigation measures within one year after completion of construction, or if based on a request filed after commencement of construction, within one year after such request; and (5) shall be responsible for the reasonable maintenance and replacement of plantings, as necessary, to ensure that healthy plantings become established.

Accordingly, with the implementation of the above condition, the Siting Board finds that visual impacts of the proposed facility would be minimized.

G. Noise Impacts

1. Description

This section describes the noise impacts of the proposed facility, the mitigation proposed by the Company, and the costs and benefits of any additional mitigation options.

The Company indicated that applicable government regulations include: (1) federal regulations limiting occupational noise exposure; (2) MADEP Policy 90-001 prohibiting tonal sounds and limiting noise increases at property lines and nearest residences to 10 decibels ("dBA")[91] above background levels; and (3) a Dracut noise policy limiting continuously generated sound to 50 dBA at adjacent residences or institutional uses (Exh. NHE-1, at 4.8-4, 4.8-25).

The Company explained that there are various measures of noise, and noted that the

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91 The designation "dBA" indicates sound measured in decibels using the "A-weighting" network, which, within the range of sounds heard by the human ear, emphasizes middle frequency sounds and de-emphasizes lower and higher frequency sounds (Exh. NHE-1, at 4.8-1).

MADEP 10-dBA limit is based on L_{90} noise, the sound level that is exceeded 90 percent of the time during the measurement period (id. at 4.8-3 to 4.8-4). The Company stated that an increase of 3 dBA is the minimum increase in sound level that is generally perceptible to the human ear (Exh. EFSB-N-6).

In conducting its noise analysis, the Company stated that it measured existing background noise in the vicinity of the proposed project (Exh. NHE-1, at 4.8-4 to 4.8-9).[92] The Company indicated that it selected receptor locations to capture measurements at the nearest sound-sensitive locations in various directions from the site (id.). The Company stated that it compiled L_{90} ambient noise data for daytime and nighttime hours at six receptors under foliate conditions and at the same six receptors plus an additional two under defoliate conditions (id.). The Company then projected likely noise impacts of construction and subsequent operation of the proposed facility on sensitive receptors in the surrounding area (id. at 4.8-9 to 4.8-25). The Company indicated that the lowest measured L_{90} level at each receptor location served as a baseline in the sound impact evaluation for the proposed project (id. at 4.8-9). The Company's noise analysis indicated that daytime baseline L_{90} noise levels in the area surrounding the proposed site ranged from 38 dBA (to the west) to 52 dBA (to the east); nighttime baseline sound levels ranged from 31 dBA (to the southwest, west, and north) to 39 dBA (to the south and east) (id.).

The Company stated that the operation of the proposed facility as designed would result in a maximum increase in L_{90} noise at any existing or potential residential location of 6 dBA at night and 2 dBA during daytime hours (Exh. NHE-1, at 4.8-25).[93] The Company indicated that

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92 The Company stated that Brox Industries operations contributed to daytime weekday noise measurements, but did not affect nighttime or weekend measurements (Exh. NHE-1, at 4.8-8). The Company indicated that roadway traffic, industrial activity, and airplane traffic were the dominant contributors to ambient noise measured in the vicinity of the proposed site (id.).

93 The estimated nighttime increases would be: 6 dBA at receptors R-1 (Poppy Lane to north), R-2 (Wheeler Street to northeast), and R-3 (Wheeler Street to southeast); 4 dBA at receptor R-4 (Route 110 to southeast); and 1 dBA at receptor R-5 (Winchester Drive across Merrimack River to southeast) (Exh. NHE-2, at 5.3-21 to 5.3-25).

the proposed facility as designed would operate in compliance with MADEP's policy limiting noise increases at any sensitive receptor (i.e., nearest residences) to 10 dBA above background levels and with the 50 dBA noise limit established by the Dracut Noise Bylaws (Exhs. INT-MVRE-G-7(d) Bulk Att. at 6-12 to 6-16; NHE-1, at 4.8-25; RR-MVRE-25(b), Att.).[94]

The Company stated that its proposed facility, as designed, would result in L_{90} increases of greater than 10 dBA at certain locations outside of the 25-acre site, but within the boundaries of the Brox properties (Exhs. INT-MVRE-G-7(d), Bulk Att. at 6-12 to 6-16; RR-EFSB-73, Att.).[95] The Company stated that to address these increases Nickel Hill and Brox Industries have negotiated a noise easement, to be executed contemporaneously with their lease agreement, which would allow pure tone emissions and noise increases of more than 10 dBA above ambient on Brox properties (Exh. RR-EFSB-73).[96]

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94 The Company explained that the Dracut bylaws limit continuously generated sound at adjacent residences or institutional uses to 50 dBA at night and 60 dBA during the day; continuously generated sound is limited to 65 dBA at adjacent business uses and 70 dBA at adjacent industrial uses at all times (Exh. NHE-1, at 4.8-4).

95 The Company confirmed that no sound level increases greater than 10 dBA would occur beyond the property lines of the Brox properties (Exhs. INT-MVRE-G-7(d), Bulk Att. at 6-12 to 6-16; RR-EFSB-73, Att.; NHE-1, at 4.8-22, 4.8-25; RR-EFSB-73). To illustrate the extent of noise increases above MADEP's 10-dBA limit, the Company provided a map of the proposed site and surrounding Brox properties with the daytime and nighttime 10 dBA isopleths superimposed (Exh. RR-EFSB-73, Att.). The Company's map indicated that the identified 10 dBA isopleths would lie within the 450-acre Brox properties (id.).

96 The Company indicated that its agreement with Brox Industries would allow on Brox properties noise levels of more than 10 dBA, but less than 40 dBA, above ambient levels, and pure tone emissions resulting from sounds originating from the construction, operation, maintenance, and decommissioning of the proposed facility (Exh. RR-EFSB-73). The Company indicated that the noise easement would cover approximately 280 acres of the Brox properties, exclusive of the 25-acre proposed facility site, and that of these 280 acres, approximately 81 acres and 11 acres would lie within the 10-dBA nighttime and 10-dBA daytime isopleths, respectively (id.). The Company described the area to be covered by the noise easement as extending over that portion of the Brox properties east of the NEP transmission corridor, west of Wheeler Street, south of the northern border of the Brox properties, and north of Methuen Street (id.).

The Company also provided estimated day-night sound levels ("L_{dn}")[97] with the proposed facility, at the residential and property line receptors (Exh. RR-EFSB-36). Based on the Company's estimates, noise levels will be above the EPA guideline of 55 dBA at two residential receptors located southeast of the site: receptor R-4 on Route 110 (60 dBA) and receptor R-3 on Wheeler Street (56 dBA) (id.; Exh. NHE-2, at 5.3-21 to 5.3-22).[98] The estimates show that at the remaining residential receptors and the property line receptors, L_{dn} levels will range from 52 to 55 dBA (Exh. RR-EFSB-36).

The Company indicated that the proposed project as designed would include the following noise mitigation measures: enclosure of the combustion turbines, steam turbines, and HRSGs; use of mufflers for both air inlets and exhaust on the combustion turbines; noise controls to limit cooling tower noise to 48 dBA at a distance of 400 feet; acoustic louvers on ventilation air inlets on the north, east, and south sides; mufflers on roof exhaust fans; enclosure or wrapping of pressure reduction valves and exposed pipes associated with gas metering equipment; purchase of low noise transformer equipment, or, in the alternative, use of noise barrier walls to reduce noise impacts of transformers; and enclosure of circulating water pumps and the water pump station (Exh. NHE-1, at 4.8-24).[99]

The Company presented two options for additional noise mitigation, which would reduce the noise impacts of the proposed facility at the closest residential receptor to 3 and 0 dBA above ambient, respectively (Exh. RR-EFSB-35). The Company estimated the net present value of

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97 L_{dn} is defined as the 24-hour equivalent sound level, with a 10 dBA penalty added to sounds occurring between the hours of 10:00 p.m. and 7 a.m. (Exh. EFSB N-5, Att. at 28). EPA has identified an outdoor L_{dn} of less than or equal to 55 dBA in residential areas as the noise level requisite to protect public health and welfare with an adequate margin of safety for both activity interference and hearing loss (id. at 13).

98 The Company did not provide estimates of existing L_{dn} levels without the proposed facility, but did indicate that the equivalent sound level ("L_{eq}") from the proposed facility would be 33 dBA and 37 dBA at receptors R-4 and R-3, respectively (Exh. NHE-2, at 5.3-25).

99 The Company stated that, with proposed mitigation, the noise increment from the water pump station near Route 110 would not exceed 6 dBA at any residential property line (Exhs. NHE-1, at 4.8-24; RR-EFSB-35, Att.).

added costs and lost economic value associated with each level of additional noise control (Exh. RR-EFSB-35, Att.). The Company indicated that such costs include the capital cost of additional control measures,[100] added fuel cost from losses in thermal efficiency, and the value of lost plant capacity (id.). The Company estimated that the net present value cost to reduce noise impacts from 6 to 3 dBA, and from 6 to 0 dBA, at the residential receptor closest to the proposed project would be $14,406,378 and $28,316,407, respectively, over the cost of the proposed noise mitigation (id.).

The Company also provided information regarding the cost of achieving a 10 dBA increase over ambient noise levels at the 24-acre site line with Brox Industries (Exh. RR-EFSB-74). The Company estimated that achieving this reduction would require additional capital costs of $23 to $24 million and create costs associated with lost capacity and increased fuel consumption with a net present value of over $29 million (id.). The Company stated that the total incremental cost of approximately $50 million is 17 percent of the approximate $300 million capital cost of the proposed facility (id.). The Company asserted that these additional costs would render the proposed project non-competitive in the deregulated New England market (Exh. RR-EFSB-74).

With respect to compliance monitoring, the Special Permit requires that the Company conduct sound compliance measurements commencing within 90 days of commercial operation, including continuous measurements to be taken until the termination of commercial operations at a location as close as possible to the residential receptor north of the site, and periodic measurements to be taken twice in the first year of commercial operation, and once annually for the next five years, at locations as close as possible to the remaining residential receptors (Exh. EFSB-G-13(d), Att. at 19-20). The Special Permit provides for reporting of sound compliance measurements to the Dracut Board of Health (id. at 20).

The Company estimated that construction noise at the nearest residential location,

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100 Additional noise mitigation measures could include: turbine and HRSG building walls; roof and ventilation fans; vent silencers; gas turbine stack baffles or silencers; the gas turbine air intake filter and silencers; cooling tower noise barriers on intake and exhaust; and step-up transformer noise barriers (Exh. RR-EFSB-35, Att.).

approximately 1,400 feet to the southeast, would range from L_{eq} 49 dBA to L_{eq} 60 dBA,[101] and that the highest predicted construction noise at this location would be associated with excavation and finishing work (Exh. NHE-1, at 4.8-20). The Company indicated that current weekday daytime ambient L_{eq} values at the nearest residence are in the low-to-mid 50s dBA range (id. at Table 4.8-6). The Company indicated that, consistent with the Special Permit, it would mitigate construction noise impacts by limiting major construction activities to a normal construction workday, typically 7:00 a.m. to 3:30 p.m. (Company Brief at 85, citing Exh. EFSB-G-13(d), Att. at 24).[102] Regarding particular construction activities that may be necessary, the Special Permit also requires Nickel Hill to provide prior notification to Dracut officials and others, as identified by the Board of Selectmen, for construction-related blasting, pile driving, and extended concrete pours (Exh. EFSB-G-13(d), Att. at 24).

The Company stated that in addition to normal construction activities, steam and air blows to expel debris from the steamline piping of the proposed facility would occur sporadically during the daytime in the final phases of construction (Exh. NHE-1, at 4.8-20). The Special Permit provides that the Company will mitigate the noise impacts associated with steam and air blows through prior notification of Dracut officials and others, as identified by the Board of Selectmen, and use of temporary portable sound attenuators (Exh. EFSB-G-13(d), Att. at 24-25).

2. Positions of the Parties

MVRE argued that the Company's noise analysis failed to address the combined noise of the proposed facility and existing Brox Industries processing equipment, and that Nickel Hill's position that additional noise mitigation would be too costly fails to take into account (1) the relationship of such costs to overall project cost and (2) the large size of the proposed project

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101 L_{eq} is the designation of the equivalent sound level, in dBA (Exh. NHE-1, at 4.8-3). The L_{eq} is the level of a hypothetical steady sound which would have the same energy (i.e., the same time-average mean square sound pressure) as the actual fluctuating sound observed (id.). The L_{eq} is strongly influenced by occasional loud, intrusive noises (id.).

102 The Company explained that site activity after 4:00 p.m. or on weekends would be limited to clean-up, repair work, inspections, deliveries, and specialty operations (Exh. EFSB-N-1).

relative to other projects reviewed by the Siting Board (MVRE Brief at 13-16).

Andover argued that the Company failed to propose adequate long term noise monitoring and equipment inspection and maintenance procedures to ensure noise levels are as estimated, and failed to provide evidence as to the expected character of noise from the facility including, for example, qualitative descriptions of such noise or recordings of noise from similar facilities (Andover Brief at 9-10).

Bruton/Vrountas argued that the proposed noise levels from the proposed facility significantly exceed MADEP noise limits at the property line, and therefore additional mitigation must be provided (Bruton/Vrountas Reply Brief at 2, 7-8). Bruton/Vrountas further argued that with respect to the Company's noise measurements taken south of the Merrimack River in Andover, the Company measured noise only during defoliate conditions rather than during both foliate and defoliate conditions, and measured noise at a single location that did not reflect the quietest conditions south of the river given the relative presence of highway noise from I-93 (Bruton/Vrountas Supplemental Brief at 3-4).

In response to Bruton/Vrountas, Nickel Hill argued that the choice of a monitoring location south of the Merrimack River was appropriate because it reflected the point on that side of the river closest to the proposed facility (Supplemental Reply Brief at 9). The Company further argued that, given the distance from the proposed facility to the far side of the Merrimack River, a lower assumed background noise level would not result in a noise increase significantly higher than its 1 dBA estimate (id.).[103] The Company noted that noise increases of less than 3 dBA are not noticeable, and therefore asserted that even a slightly higher noise increase for the receptor south of the Merrimack River would represent essentially no noise impact (id.).

3. Analysis

In past decisions, the Siting Board has reviewed the noise impacts of proposed facilities

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103 For example, the Company calculated that if the background noise for affected areas south of the river were 32 dBA instead of 36 dBA, the combined background and facility noise would be 34 dBA instead of 37 dBA, resulting in an increase of 2 dBA rather than the increase of 1 dBA estimated by the Company (id., citing Exhs. NHE-2, at 5.3-25, table 5.3-10; EFSB-N-6, Att.).

for general consistency with applicable regulations, including the MADEP's 10 dBA standard. Sithe West Medway Decision, 10 DOMSB at 327; Brockton Power Decision, 10 DOMSB at 223; Altresco-Pittsfield, Inc., 17 DOMSC 351, at 401 (1988). In addition, the Siting Board has considered the significance of expected noise increases which, although lower than 10 dBA, may adversely affect existing residences or other sensitive receptors. Sithe West Medway Decision, 10 DOMSB at 327; Brockton Power Decision, 10 DOMSB at 223; Northeast Energy Associates, 16 DOMSC 335, at 402-403 (1987) ("NEA Decision"). The record shows that the proposed facility would meet the most stringent noise restrictions established by the Dracut Noise Bylaws, including a 50 dBA limit for continuously generated sound at adjacent residences or institutional uses. The record also demonstrates that operation of the proposed facility would increase L_{90} noise levels by a maximum of 6 dBA, at the closest residential receptors to the north, northeast and southeast. This maximum residential noise increase of 6 dBA is comparable to or slightly less than the maximum residential noise increases accepted in past Siting Board reviews for locations where the existing noise environment is neither unusually quiet nor unusually noisy. In general, the Siting Board considers noise increases at an already noisy location to be more significant than noise increases in other areas. See Sithe West Medway Decision, 10 DOMSB at 327-328. Most commonly, however, in cases where measured background and calculated facility noise levels at the most affected residential receptors were neither unusually noisy, e.g., as indicated by substantial exceedances of the USEPA's 55-dBA guideline, nor unusually quiet, the Siting Board has accepted or required facility noise mitigation which was sufficient to hold residential L_{90} increases to maximums of 5 to 8 dBA. IDC Bellingham Decision, 9 DOMSB at 311; ANP Bellingham Decision, 7 DOMSB at 190; Berkshire Power Development, Inc., 4 DOMSB 221, at 404 (1996) ("Berkshire Power Decision"); Silver City Energy Limited Partnership, 3 DOMSB 1, at 331, 367-368, 413 (1994) ("Silver City Decision"); NEA Decision, 16 DOMSC at 402-403.

Here, the record shows that the maximum combined facility and background L_{dn} noise level would be 60 dBA at receptor R-4, near Route 110 – a level clearly over the 55 dBA USEPA guideline – and from 52 dBA to 56 dBA at the other residential receptors. However, at receptor R-4, where the modeled combined L_{dn} noise is high, the estimated nighttime L_{90} noise increase

from the proposed facility would be 4 dBA, and the equivalent sound level from the facility would be 33 dBA. The Siting Board concludes that the modeled L_{dn} sound level at receptor R-4 predominantly reflects existing ambient noise, and that the proposed facility would not be a major contributor to noise levels at this receptor.

The record demonstrates that to reduce the maximum residential noise increase to lower levels of 3 dBA and 0 dBA would require additional capital investments of $14.4 million and $28.3 million, respectively. MVRE has argued that additional costs for mitigation must be considered in light of their relationship to total project cost, and the size of the project relative to previous projects reviewed by the Siting Board. While the Siting Board agrees, the identified costs for additional mitigation would represent a significant cost increase in a project with a capital cost of $300 million, and proportionately would be higher than the cost of mitigation options that the Siting Board has determined to be warranted in previous decisions. See IDC Bellingham Decision, 9 DOMSB at 311; Millennium Power Decision, 6 DOMSB at 167; Silver City Decision, 3 DOMSB at 367.[104] Given the significant costs for additional mitigation, and the fact that the estimated maximum residential increase of 6 dBA is clearly within the range accepted in similar cases, the Siting Board finds that no further noise mitigation is warranted to limit noise impacts at residences.

With regard to MVRE's argument that the Company failed to address the combined noise from Brox Industries and the proposed facility, the Siting Board first notes that Brox Industries has conducted quarrying, asphalt batching and other industrial operations at this location for many years, and that these operations are unrelated to the Nickel Hill proposal. Consequently, they are properly considered as part of the existing background noise, rather than as part of the noise attributed to the proposed facility. The Siting Board also notes that Brox operations take place primarily during daytime hours, and therefore generally do not contribute to anticipated

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104 In the cited cases, the Siting Board required additional mitigation to reduce maximum impacts to increases in the range of 5 to 8 dBA, at costs of $500,000 for the 150 MW Silver City Energy Project, $1 million for the 360 MW Millennium Power Project, and $1.4 million for the then-proposed 700 MW IDC Bellingham Project. IDC Bellingham Decision, 9 DOMSB at 311; Millennium Power Decision, 6 DOMSB at 167; Silver City Decision, 3 DOMSB at 367.

nighttime noise levels. Further, the existing and expected L_{dn} noise levels in the Company's analysis, which do reflect noise from Brox Industries, are indicative of community noise levels that do not significantly exceed USEPA guidelines, except at a receptor located southeast of the site near Route 110. The Siting Board therefore finds that noise from the existing Brox Industries operations has been appropriately addressed in the Company's analysis.

With regard to Bruton/Vrountas' argument that the Company's analysis assumes an unrepresentatively high background noise level for the area south of the Merrimack River, the Siting Board agrees with the Company that, even if background noise is assumed to be 32 dBA, rather than 36 dBA at some point south of the Merrimack River, the calculated noise increase at that point likely would not be significantly higher than the Company's 1 dBA estimate. The Company's analysis showed that noise from the facility would be 28 dBA at the receptor chosen to represent the area south of the river that is nearest the site – a level which is lower than the measured nighttime ambient level by a substantial margin. Further, to the extent possible alternative receptor locations south of the river might have reflected lower background noise, such locations likely also would have been more distant from the facility with the result that facility noise also would have been lower. Consequently, the Siting Board finds that the noise impacts of the proposed facility in Andover are accurately represented by the Company's analysis.

The Siting Board notes that operation of the proposed facility would increase noise levels by more than 10 dBA above ambient noise levels at the boundary between the Nickel Hill site and the larger Brox Industries properties. Bruton/Vrountas argue that, given the predicted exceedances of MADEP limits, Nickel Hill must provide additional noise mitigation. However, the record also shows Nickel Hill has negotiated a noise easement with Brox Industries that would allow both noise level increases of more than 10 dBA and pure tone emissions on Brox Industries properties. This noise easement is to be executed contemporaneously with the Nickel Hill/Brox Industries lease agreement. The record shows that no noise level increases greater than 10 dBA would occur beyond the property lines of the Brox Industries properties.

The record demonstrates that an additional capital investment of $23 to $24 million would be required to limit noise increases at the Nickel Hill/Brox property line to no more than

10 dBA, consistent with MADEP Policy 90-001, and that the net present value of the total cost over twenty years (including lost capacity costs and increased fuel consumption) could approach $50 million. The Siting Board notes that this would represent a significant cost increase in a project with an approximate capital cost of $300 million. In light of the industrial zoning of the Brox properties, the agreement which Brox and Nickel Hill have reached as to noise on Brox properties, and the already modest level of noise increases at the nearest residential properties, the Siting Board concludes that limiting noise increases from the proposed facility to a maximum of 10 dBA above ambient at the Nickel Hill property line would not provide sufficient benefit to warrant the significant additional cost. We anticipate that Nickel Hill will seek a waiver of the MADEP property line limit based on the non-residential character of the adjacent off-site areas and the Nickel Hill/Brox Industries noise easement.[105] The Siting Board therefore finds that the noise impacts associated with operation of the proposed facility as designed would be minimized, consistent with minimizing cost of mitigation.

With respect to construction noise impacts, the Siting Board agrees that the Company's proposed mitigation of steam release events and adherence to its proposed construction schedule would help minimize construction-related noise impacts. The Siting Board notes that such practices are consistent with approaches to construction noise mitigation that we have reviewed in recent generating facility cases. The Siting Board therefore finds that the construction noise impacts of the proposed facility would be minimized.

Accordingly, the Siting Board finds that, with the implementation of the proposed mitigation and the noise easement between Nickel Hill and Brox Industries, the noise impacts of the proposed facility would be minimized, consistent with minimizing cost of mitigation.

H. Safety

This section describes safety impacts of the proposed facility, the mitigation proposed by

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[105] The Siting Board notes that several recently-reviewed generating facilities have required a waiver of the MADEP limitation on noise increases at property lines. See Berkshire Power Decision, 4 DOMSB at 205-206; Dighton Power Decision, 5 DOMSB at 246; ANP Bellingham Decision, 7 DOMSB at 186; ANP Blackstone Decision, 8 DOMSB at 167-172; Brockton Power Decision, 10 DOMSB at 223.

the Company, and the costs and benefits of any additional mitigation options.

The Company stated that to help insure safety at the proposed facility it would: (1) adhere to good engineering practices and comply with federal, state and local regulations in its design, construction and operation activities; (2) require its engineering, procurement and construction ("EPC") contractor to have programs in place to ensure compliance with applicable safety and health standards during construction, including an on-site safety engineer for the active phases of the construction process; and (3) employ its affiliate, Constellation Operations Services, to maintain safety and environmental compliance during plant operation (Exh. NHE-1, at 4.12-1). The Company stated that, as part of its commitment to safety at the proposed facility, it would establish comprehensive operating and emergency response procedures, regular safety training and drills, close cooperation with community emergency responders, and an aggressive preventative maintenance program (id.; Tr. 7, at 893 to 896). The Company stated that it would employ highly trained personnel in general and that its plant operators would be licensed (Exh. NHE-1, at 4.12-1).[106]

1. Materials Handling and Storage

The Company indicated that it would store aqueous ammonia on site in a 30,000-gallon welded steel tank (id. at 4.12-2). The Company stated that the tank would be placed within a dike capable of containing 110 percent of the capacity of the tank, and that both the tank and the dike would be leak-tested before use and inspected periodically (id. at 4.12-2 to 4.12-3; Exh. EFSB-S-2). The Company indicated that, to minimize the risk of vehicular damage to the diked tank, the dike would be constructed of concrete reinforced to withstand direct impact from a delivery vehicle at legal speeds (Exh. EFSB-S-2). The Company also stated that the tank would

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[106] MVRE asserted that the Company should be required to provide for comprehensive general liability insurance for the proposed project in the amount of $50 million (Exh. MVRE-DC-1). The Special Permit for the project requires that Nickel Hill obtain the following insurance: environmental impairment liability insurance in aggregate amount of $2 million; public liability insurance in an aggregate amount of $2 million; automobile liability insurance in an aggregate amount of $1 million; and commercial umbrella or excess liability insurance in an aggregate amount of $10 million (Exh. EFSB-G-13(d), Att. at 9-10).

be located to the rear of the proposed facility, away from normal on-site traffic (id.).

The Company provided detailed information with respect to procedures for the delivery of 19 percent aqueous ammonia to the proposed facility (Exh. NHE-1, at 4.12-2 to 4.12-4). The Company stated that its purchase order or contract would specify that ammonia and other chemical delivery occur between 3:00 a.m. and 6:00 a.m., to avoid peak travel hours, and be routed via I-495 and I-93 to Route 110 westbound to the Brox access road (id.; Exh. EFSB-G-13(d), Att. at 22; Tr. 7, at 827-828, 960). The Company anticipated delivery of the ammonia via three 6,500-to-6,750 gallon chemical tanker trucks per week; furthermore, the Special Permit limits ammonia deliveries to a maximum of three per week (Exhs. NHE-1, at 4.12-2 to 4.12-4; EFSB-G-13(d) at 22).

The Company indicated that trucks would be stationed in a bermed unloading area during ammonia transfer, and that the auxiliary plant operator and the delivery driver would stay with the truck throughout the unloading process (id.). The Company also indicated that it would use heavy-duty rubber hoses connected to a permanent pump/pipe system to transfer ammonia, and that trucks delivering ammonia to the proposed facility would be equipped with fast-action shut off valves, and hooked to a line from the top of the ammonia storage tank back to the truck to contain any fumes displaced from the tank (id.). The Company stated that prior to the commencement of operations it would provide written notification of all required delivery procedures to the firm providing the aqueous ammonia (id.). The Company also stated that delivery drivers would receive training in all required procedures, and that procedures would be clearly posted (id.).

The Company anticipated that, in the event of a tank leak or spill, the design of the dike would minimize the exposed surface area of aqueous ammonia solution and, therefore, both the rate of ammonia evaporation and resulting airborne concentrations (id. at 4.12-3; Tr. 7, at 820). The Company explained that the open interior of the dike would be filled with a layer of buoyant plastic spheres which would float on the surface of any ammonia released into the dike (Exh. NHE-1, at 4.12-3; Tr. 7, at 951). The Company indicated that a level gauge on the tank, monitored from the control room, would further reduce the likelihood of an ammonia release (Exh. NHE-1, at 4.12-3). The Company stated that a sudden drop in the level of ammonia in the

tank would activate an alarm and trigger the implementation of emergency response procedures (id.).

The Company assessed the potential for off-site impacts from the possible rupture of the ammonia storage tank wall under worst-case meteorological conditions (Exh. NHE-2, at 5.2-32). The Company indicated that this constituted a worst-case ammonia release scenario (id.). The Company stated that, based on protocols established in Offsite Consequence Analysis Guidance published by the EPA in 1996, it used an ammonia concentration of 200 ppm as the "toxic endpoint" to determine the extent of surrounding area over which impacts of an accidental release represent a worst-case consequence (id. at 5.2-34). The Company calculated that were the storage tank to fail completely, ammonia concentrations of 200 ppm or higher could occur at distances of up to 317 feet from the tank (id. at 5.2-32 to 5.2-34).[107]

The Company indicated that the closest residence would be 1300 feet to the northeast of the ammonia tank, and therefore outside the radius of potential impact should a catastrophic ammonia spill occur (id. at 5.2-34; Exh. EFSB-S-1). The Company indicated that the closest publicly accessible property boundary distance, 689 feet to the east of the tank, would likewise be out of range (id.; Exh. EFSB-S-5). The Company stated that the radius of potential impact would extend beyond the proposed project fenceline to adjoining Brox property, but indicated that wetlands cover large portions of the affected area, including the pond and wetland system to the southeast and a band of wetlands within the wooded land to the east and northeast (Exhs. EFSB-S-1; NHE-2 (fig. 5.8-2)). The Company added that Brox employees do not use the affected location in conjunction with Brox mining operations (Exh. EFSB-S-1). The Company asserted, therefore, that the proposed facility as designed would afford the public adequate protection (Exh. EFSB-S-1; Tr. 7, at 819 to 823).

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[107] The Company explained that an ammonia concentration of 200 ppm is the level up to which nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action (Exh. EFSB-H-6). For levels between 25 ppm and 200 ppm, the Company cited criteria indicating that individuals may experience strong odor and temporary eye and throat irritation and an urge to cough; the criteria further indicate that at levels up to 25 ppm, individuals may experience some odor but no significant irritation (id.) (See Section III.L, below).

The Company presented information regarding the construction cost for its proposed ammonia storage facilities, and the additional costs associated with possible construction of a building over the ammonia tank and containment dike to provide further mitigation of impacts of a catastrophic ammonia spill at its proposed facility (Exh. EFSB-S-1; Tr. 7, at 819 to 823).[108] The Company estimated the cost of constructing the proposed ammonia storage facilities at $670,000 (Exh. RR-EFSB-28). The Company stated that this estimate incorporated costs of a 30,000 gallon tank plus associated equipment, including piping, valves, transfer pump, instrumentation and control, and installation (id.). The Company's estimate of ammonia storage costs also included the cost of constructing a reinforced retention dike sized to hold 110 percent of the tank capacity, with slab and sump pump (id.). With regard to a possible enclosure for the ammonia tank and containment dike, the Company indicated that the additional cost, including a steel frame, siding, locking entry door and roof, would be approximately $26,000, but that ancillary equipment, including an ammonia vapor scrubbing system, monitors and alarms, would involve additional expenditures (id.).

In response to an intervenor request, Nickel Hill modeled a hypothetical accidental spill of aqueous ammonia during transportation along I-93 in Andover (Exhs. INT-MVRE-A-2, INT-MVRE-A-2-S; INT-MVRE-A-2-S2; Tr. 7, at 956-968). The Company stated that, using conservative and reasonable assumptions, it analyzed an ammonia release resulting from the breach of a tanker and spillage of an entire 6,500 gallon load onto the highway within one hour (id.). The Company explained that it simulated the effects of the spill based on requested meteorological assumptions it considered unlikely given the planned early morning delivery time, including an ambient temperature of 90 degrees Fahrenheit ("F"), a relative humidity of 80 percent, and a roadway temperature of 122 degrees F (Exh. INT-MVRE-A-2-S2). Nickel Hill made additional assumptions that it determined were reasonable regarding flowage of ammonia to catch basins along I-93, which would serve to reduce the levels of airborne ammonia resulting

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108 The Company indicated that construction of a building over the ammonia tank and containment dike would likely provide additional mitigation of impacts of a catastrophic ammonia spill, but that the resulting mitigation might be minimally felt beyond the Brox properties fenceline; only the adjoining Brox properties would likely be affected (Tr. 7, at 820 to 821).

from the spill (id.; see Exh. INT-MVRE-A-2-S, at 5; Tr. 7, at 961; Hearing Officer's Ruling of December 15, 1999, at 3). Nickel Hill reported that, based on the requested analysis, the toxic endpoint of a 200 ppm ammonia concentration would extend to a maximum of 581 feet from the source of the spill under average wind and atmospheric stability conditions, and a maximum of 2112 feet under worst-case wind and atmospheric stability conditions (Exh. INT-MVRE-A-2-S, at 5).

As an alternative to the proposed ammonia system, the Company identified the option of installing an ammonia-on-demand ("AOD") system using urea to generate ammonia on-site, but noted that to date the system has not been demonstrated in an SCR system (Exh. INT-MVRE-G-7(d), Att. at 5-8 to 5-10). The Company explained that an AOD system currently is being installed as part of a new SCR system at the Canal Station Unit 1, and also is included in the design for the proposed repowering of Canal Station Unit 2 (id. at 5-9).[109] The Company intends to maintain communication with the supplier of the AOD system at Canal Station, in order to monitor its performance (id. at 5-10).

The Company indicated that, given the newness of the AOD system and the need for extremely high reliability, the AOD system supplier has recommended that a 10,000 gallon backup aqueous ammonia storage tank and vaporizor be included as part of a possible AOD system at the proposed facility (id.). The Company added that with the identified backup aqueous ammonia system, the installation cost of an AOD system would be $2.3 million greater than that for a conventional aqueous ammonia system, and that the total annual costs for the AOD system, including capital and operating costs, would be $1.40 million, or $0.63 million greater than that for a conventional aqueous ammonia system (id.; Exh. RR-TD-21). The Company noted that, while more expensive, the AOD system would essentially eliminate the need for transport of aqueous ammonia, and would reduce but not eliminate the need for on-site storage of aqueous ammonia (Exh. INT-MVRE-G-7(d), Att. at 5-10). The Company stated that later in the design process, it would determine in consultation with its EPC contractor whether to install an AOD system based on the then-available information as to emissions control

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[109] The Siting Board is currently reviewing the proposed Canal Unit 2 repowering project in Southern Energy Canal III, L.L.C., EFSB 98-9.

effectiveness, operating reliability, and cost (Tr. 18, at 2126-2127, 2183-2186).

The Company stated that operation of the proposed facility would require limited amounts of lubricating oils and other industrial chemicals, primarily for water and wastewater treatment, and for operation of the SCR system (Exh. NHE-2, at 5.12-6). The Company indicated that all on-site chemical storage would be in covered containment areas, with secondary containment appropriate to each chemical (id.).

Andover argued that, in choosing SCR rather than a zero ammonia technology such as $SCONO_X$, the Company placed convenience and cost ahead of the benefits to local residents of eliminating the need to transport, store and use large volumes of aqueous ammonia at the proposed facility (Andover Brief at 7). MVRE and Bruton/Vrountas asserted that with use of SCR, aqueous ammonia would be trucked on roads troubled by high accident rates, through and near residential neighborhoods (MVRE Reply Brief at 21; Bruton/Vrountas Brief at 3). Bruton/ Vrountas argued that the Company only considered a "best possible case" ammonia accident scenario, and that a full risk analysis should be performed for the proposed use of SCR with aqueous ammonia (Bruton/Vrountas Brief at 4).

The Company maintained that it had shown ammonia would be transported to the site and unloaded in a manner that minimizes impacts, that it had performed a thorough and credible analysis of a hypothetical accidental release of aqueous ammonia during transport, and that it had demonstrated that even under extreme and implausible conditions a full tanker ammonia spill would not pose an extensive safety threat (Company Reply Brief at 25, citing Exhs. INT-MVRE-A-2; INT-MVRE-A-2-S; INT-MVRE-A-2-S2).

2. Fogging and Icing

The Company submitted predictions of fogging and icing likely to result from proposed facility operation (Exh. EFSB-A-2-S, Att. at 6-22 to 6-26). To generate its predictions, the Company applied the SACTI model to five years of actual and modeled meteorological data for the area of the proposed project (id.).

Based on its analysis, the Company anticipated that episodes of fogging would occur at five roadway locations, but would last no more than a total of three hours per year at all locations

except at Lowell Street, 300 meters to the south-southeast of the cooling tower (id.). The Company predicted eight hours of fogging per year at Lowell Street (id.). The Company stated that the fogging episodes predicted by SACTI would occur during high relative humidity and wind speed conditions greater than 10 meters per second (id.). The Company indicated that such conditions transport the plume to the ground and are generally associated with precipitation events such as rain or snow (id.).

The Company also anticipated, based on its analysis, that icing associated with the proposed cooling tower operation would occur less than three hours per year on average (id.). The Company stated that its SACTI modeling predicted that episodes of icing would occur with greatest frequency when winds blew from the west, northwest or north during winter months (id.).

The Company asserted that actual impacts of fogging and icing would be less than predicted because its model conservatively (1) includes nighttime hours, precipitation, snow and naturally occurring fog conditions, and (2) does not consider reductions in fogging and icing due to plume mixing as the plume drifts over other facility structures (id.).

3. Emergency Response

The Company indicated that it would prepare both a spill prevention plan and an emergency response plan for its proposed project in conjunction with Dracut (Tr. 7, at 893 to 896). The Company expected to have both plans in place before initial delivery of chemicals to the site of the proposed project prior to commercial operation (id. at 895 to 896).

The Company stated that its proposed project, which would use 19 percent aqueous ammonia, would not require preparation of an EPA-mandated Risk Management Plan ("RMP") (Exh. NHE-2, at 5.12-5). The Company explained that EPA requires an RMP of facilities using significant quantities of 20 percent aqueous ammonia (id.). The Company indicated that, though exempt, it would nonetheless voluntarily prepare an RMP for its proposed project in response to a request by the Dracut Utility Environment Committee (id.). The Company indicated that typical components of an RMP include specification of the amount of material stored on-site; accident history; plans for emergency response, including arrangements with responding

agencies; and publication of accidental release modeling results (id.).

With respect to potential safety impacts of the proposed facility and their mitigation, the Company also cited conclusions in the Special Permit (Exh. EFSB-G-13(d), Att.). In the Special Permit, the Board of Selectmen indicated its expectation that storage and handling of chemicals at the proposed facility as conditioned and as planned by the Company would minimize the risk of fires and other hazards and ensure that appropriate measures to manage those risks would be in place (id. at 5 to 6).

4. Blasting

In response to concerns raised by MVRE, the Company addressed safety issues associated with blasting by Brox in the vicinity of the proposed project. The Company stated that blasting within 50 feet of the gas pipeline for the proposed facility would be prohibited (Exhs. EFSB-G-13(d), Att.; RR-EFSB-29; RR-MVRE-7; Tr. 7, at 831-832). In addition, the Company indicated that it would supervise and review the size and design of any blasting in proximity to its gas lines to ensure that the blasting would have no effect on these lines (Exh. RR-MVRE-7; Tr. 7, at 832).

5. Analysis

The record demonstrates that aqueous ammonia and other non-fuel chemicals would be properly managed and stored, in accordance with applicable public and occupational safety and health standards. The record shows that the 19 percent concentration of aqueous ammonia which the Company plans to use in its proposed facility would not be subject to regulation under the EPA's Risk Management Program, but that the Company has made a commitment to develop an RMP in response to a request from Dracut. The record also demonstrates that, in conjunction with Dracut, the Company will develop both a spill prevention plan and an emergency response plan for its proposed facility. The record further demonstrates that no blasting would be allowed within 50 feet of the gas pipeline for the proposed facility. The record also shows that the Company will supervise and review the size and design of any blasting in proximity to its gas lines to ensure that the blasting would not affect these lines.

With respect to use of aqueous ammonia at the site, the Company's modeling results

demonstrate that in the event of a release from a rupture of the ammonia tank under worst-case conditions, aqueous ammonia concentrations at all points along the Brox properties boundary would be less than the 200 ppm guideline set by EPA. Concentrations of 200 ppm or more, the toxicity threshold used in the Company's analysis, would extend under worst-case conditions to 317 feet from the ammonia storage tank, including locations up to approximately 165 feet beyond the eastern boundary of the 25-acre site but within the Brox properties.

The record shows that the affected off-site areas in the Company's analysis, including a pond and wetland system to the southeast and woods with some wetlands to the east and northeast, lie fully within property of Brox Industries and are not used by Brox Industries employees. The Company proposes to install fencing to the east and north of the portion of the Brox properties adjacent to Wheeler Street. However, the overall Brox Industries properties comprise 450 acres and contain significant areas of wooded land along and within other portions of the boundary, including the western, northern and southeastern boundary areas. The Siting Board notes that if Nickel Hill wished to fully secure the off-site area subject to ammonia release effects, it would need to fence more than the area adjacent to Wheeler Street, and additionally would need to closely monitor and maintain the fencing that it does install to ensure its continuing effectiveness.

The Siting Board notes that, in additional areas beyond those potentially affected by the worst-case consequences in the Company's analysis, the identified ammonia release would result in concentrations of between 25 ppm and 200 ppm, from which individuals could experience strong odor and irritation. In a recent generating facility review, the Siting Board considered whether there was likely to be off-site exposure to concentrations of less than 200 ppm, from which individuals might experience odor and irritation. See IDC Bellingham Decision, 9 DOMSB at 317-318, 320. Here, the record does not establish whether ammonia concentrations would be limited to levels below those which potentially cause odor and irritation, at nearby locations outside the Brox properties boundary and on portions of the Brox properties occupied by Brox employees.

With respect to the Company's analysis of a hypothetical ammonia spill from a tanker truck accident on I-93, the record shows that assuming spillage of an entire tanker load within

one hour, ammonia concentrations of 200 ppm or more would extend to a maximum distance of nearly 2112 feet. The Siting Board concludes that the Company's transport spill analysis included conservative assumptions about temperature, wind, and stability conditions, and reasonable assumptions as to the likely size of the pool of spilled ammonia given flowage away from the pool via catchbasins.

In past generating facility reviews, the Siting Board has accepted use of aqueous ammonia systems with plans for ammonia delivery and usage comparable to those proposed by Nickel Hill. Here, the record shows that the Company's ammonia delivery plans include a limited number of tanker deliveries – three per week – confined to a limited early morning period when light traffic conditions are expected. However, the Company's analysis of a transport-related ammonia spill shows the potential for ammonia concentrations of 200 ppm up to 2112 feet, which could affect residential, commercial, and public areas.

While the likelihood of a tanker truck accident similar to the one analyzed is small, the Company's plans to use a conventional aqueous ammonia system warrant inclusion of ammonia transport safety as part of its emergency response planning for the project. The Siting Board therefore directs the Company, as part of its development of emergency response plans for the facility, to identify in cooperation with Dracut and Methuen steps to address possible ammonia tanker truck delivery accidents along the planned tanker delivery route between the I-93/Route 110 interchange and the proposed site.

Nickel Hill has indicated that it may decide during the project design stage to install an AOD system with a 10,000 gallon tank to store a backup supply of aqueous ammonia, rather than a conventional aqueous ammonia system with a 30,000 gallon storage tank. Use of an AOD system would essentially remove potential safety impacts from aqueous ammonia transport, and reduce such potential impacts from on-site ammonia storage. While a worst-case ammonia release was not modeled for the AOD system, use of the smaller 10,000 gallon tank likely would further reduce the extent of any off-site areas subject to effects from such releases.

The Company has committed to further consider the option of using an AOD system as project design progresses, and indicated that it may well proceed with such a system assuming performance comparable to a conventional system can be demonstrated, and the expected costs,

although higher than those for a conventional system, are not unacceptably high at that time. To allow the Siting Board to remain informed as to the Company's choice of an ammonia system, the Siting Board directs the Company, prior to commencement of construction of such ammonia system, to provide an update to the Siting Board on its evaluation of the performance and relative cost for an AOD system, and its plans for installing a conventional or alternative ammonia system as part of the SCR design based on evaluation of performance and cost.

The Company also identified the option of constructing a building over the ammonia tank and containment dike, which likely would provide additional mitigation of the impacts of a worst-case ammonia spill. The record demonstrates that the cost of enclosing ammonia storage facilities for the proposed project would be approximately $26,000 above the $670,000 for the ammonia storage facilities themselves, plus the cost of ancillary equipment, including an ammonia vapor scrubbing system, monitors and alarms.

In recent power plant cases reviewed by the Siting Board, applicants have proposed to install aqueous ammonia storage tanks that were either double-walled or enclosed. Brockton Power Decision, 10 DOMSB at 226; Sithe Edgar Decision, 10 DOMSB at 97; IDC Bellingham Decision, 9 DOMSB at 317-318; Sithe Mystic Development LLC, 9 DOMSB at 166-167 ("Sithe Mystic Decision"); ANP Blackstone Decision, 8 DOMSB at 179; ANP Bellingham Decision, 7 DOMSB at 203.[110, 111] Here, the use by Nickel Hill of either an enclosure for the ammonia

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[110] Four of the applicants provided modeled maximum off-site ammonia concentrations from a worst-case spill, with the proposed mitigation for their projects, which ranged from less than 0.5 ppm to 29.5 ppm. Brockton Power Decision, 10 DOMSB at 226-227; Sithe Edgar Decision, 10 DOMSB at 98; IDC Bellingham Decision, 9 DOMSB at 317-318; Sithe Mystic Decision, 9 DOMSB at 167.

[111] In three of these previous cases, applicants proposing use of containment structures for ammonia storage tanks provided estimates of worst-case ammonia concentrations indicating that, even without containment structures, property line concentrations would have been well under 200 ppm. IDC Bellingham Decision, 9 DOMSB at 318; ANP Blackstone Decision, 8 DOMSB at 179; ANP Bellingham Decision, 7 DOMSB at 203. The maximum modeled concentrations without use of containment structures would have been 200 ppm at a distance of 317 feet from the IDC Bellingham facility's ammonia storage tank, well short of the nearest facility property line located at a distance of

(continued...)

storage tank, or other mitigative design such as a double-walled tank, would provide an additional level of safety for individuals who may access the area of Brox properties subject to ammonia concentrations of 200 ppm or more, the worst-case consequences in the Company's analysis, or who may be in other portions of the Brox properties or in off-site areas along Wheeler Street where they may experience odor and irritation from the worst-case ammonia release scenario. Based on the Company's estimates, the cost of enclosing the ammonia storage tank would be reasonable. We note that, should the Company implement an AOD system as discussed above, use of an enclosure for the ammonia storage tank or double-walled tank likely would not be warranted.

Therefore, to provide an additional level of safety in the event of a spill from the ammonia storage tank, the Siting Board directs that Nickel Hill enclose the ammonia storage tank or incorporate an alternative design such as a double-walled tank to mitigate the impacts of any potential ammonia spill, unless Nickel Hill determines that it will install an AOD system. To allow the Siting Board to remain informed as to the Company's final design for the ammonia storage tank, the Siting Board directs the Company, prior to commencement of construction of the ammonia system, to provide an update to the Siting Board on the Company's plans to enclose the ammonia storage tank or use an alternative design as part of the SCR design.

The record identifies areas potentially affected by cooling tower fogging and icing and characterizes meteorological conditions when fogging and icing might occur. The record also demonstrates that the Company's analysis is conservative and that fogging and icing are likely to pose an infrequent problem in the vicinity of the proposed project. The record shows, however, that the Company has not proposed a plan for mitigation of fogging and icing on roadways in the area surrounding the proposed facility, as needed. The Siting Board therefore directs Nickel Hill to monitor fogging and icing in the vicinity of the proposed facility and, as necessary, establish a plan in cooperation with appropriate local officials to deice or sand iced roadways and alert motorists and residents concerning any project-related fogging or icing episodes affecting public

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111 (...continued)
1500 feet from the storage tank, and would have been 79 ppm and 42 ppm at the property lines of the ANP Blackstone and ANP Bellingham facilities, respectively. Id.

safety.

Accordingly, the Siting Board finds that, with the implementation of the proposed mitigation and the above conditions, the safety impacts of the proposed facility would be minimized.

I. Traffic

This section describes the impacts of construction and operation of the proposed facility on local traffic conditions and outlines proposed mitigation of traffic impacts.

1. Description

The Company asserted that traffic impacts associated with the construction and operation of the proposed facility would be minimized (Company Brief at 98 to 99). In support of its assertion, the Company provided data on existing traffic conditions, and modeled future traffic levels of service ("LOS") with the proposed facility in Year 2001 and Year 2004, and without the proposed facility in Year 2004 (Exhs. NHE-2, at 5.11-1 to 5.11-19; EFSB-T-5; EFSB-T-6; EFSB-T-11(a), Att.; EFSB-T-11(b), Att.; EFSB-T-11(c), Att.; EFSB-T-11(d), Att.).[112]

The Company's analyses focused on the Route 110 intersection with the Brox access road[113] and the Route 110/Route 113 intersection about two miles to the northeast (Exh. NHE-2, at 5.11-1; Tr. 7, at 834). The Company collected automatic traffic recorder counts ("ATR") in March 1999 at two Route 110 locations, (1) west of the Brox access road and (2) west of Route 113 (Exh. NHE-2, at 5.11-5). Based on these counts, the Company determined that peak

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[112] The Company's Year 2001 traffic modeling identified and located increases in traffic from construction of the proposed facility (Exhs. NHE-2, at 5.11-11 to 5.11-13, at Appendix D; EFSB-T-5; EFSB-T-6; EFSB-T-11(c), Att.; EFSB-T-11(d), Att.). The Company's Year 2004 traffic modeling identified and located increases in traffic from operation of the proposed facility (Exh. NHE-2, at 5.11-13 to 5.11-17, at Appendix D).

[113] The Company asserted that the proposed relocation of the entrance to the Brox access road from Route 110 should not affect its traffic analyses, since there are no roads or intersections between the current and proposed entrances (Exh. EFSB-G-13(e); Tr. 7, at 834 to 835).

commuter traffic periods in the vicinity of the project site are from 7:00-8:00 a.m. and 4:00-5:00 p.m. (id.). The Company also collected six-hour peak period manual counts of turning movements and vehicle classifications at the Route 110 intersections with the Brox access road and Route 113 in Methuen (id.).

The Company compared its March 1999 ATR data with Massachusetts Highway Department annual average traffic volumes in the vicinity of the proposed site (id. at 5.11-5).[114] The Company indicated that the annual average traffic volumes were approximately seven percent higher than the observed traffic count data from its March 1999 study (id.). The Company stated that it therefore adjusted its observed traffic count data upwards by seven percent to reflect average traffic conditions (id.). The Company stated that additional adjustments were made to reflect increases in truck traffic during peak operation of an existing asphalt batching plant on the Brox property near the proposed project site (id. at 5.11-5 to 5.11-6). The Company's adjustments to traffic count data also incorporated a projected annual area growth rate of three percent (Exh. NHE-1, at 4.10-6).

In modeling Year 2001 construction traffic impacts, the Company anticipated a maximum construction-related workforce of 300 during a total construction period of 18 to 24 months (id. at 5.11-9). The Company stated that its traffic analysis assumed that seventy percent of the workers would make trips within peak commuter traffic hours,[115] and that each worker would drive alone and make an average of 2.5 trips per day to or from the construction site (id.). The Company anticipated that trucks delivering construction materials and equipment would average 40 trips per weekday to or from the proposed facility site during the project construction period (Exh. EFSB-T-5). The Company assumed that 10 of these truck trips would occur during each of the morning and afternoon peak commuter traffic hours (id.). However, the Company stated that

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114 For annual average traffic volumes in the area of the proposed site, the Company relied on data collected at the two closest appropriately located Massachusetts Highway Department permanent traffic count stations, Station 21 in Tyngsborough on Route 113 and Station 12 in Haverhill on Route 110 (Exh. NHE-2, at 5.11-5).

115 The Company asserted that its assumption was conservative, given its expectation that the majority of construction workers would arrive prior to 7:00 a.m. and depart at approximately 3:30 p.m. (Exhs. NHE-2, at 5.11-9; RR-TD-14; Tr. 7, at 871 to 874).

construction phase deliveries would be scheduled during off-peak hours, to the extent possible (id.).

The Company's traffic analysis indicated that the intersection of Route 110 with Route 113, rated at LOS B,[116] would be largely unaffected by the addition of construction-related traffic (Exh. NHE-1, at 4.10-12, 4.10-17). However, the Company indicated that the intersection of Route 110 with the Brox access road currently is at LOS D during morning and afternoon peak hour traffic, and that vehicles exiting the Brox access road might experience a further decrease in LOS during construction of the proposed facility (id.). The Company proposed stationing a police officer at the intersection of the Brox access road with Route 110 to control traffic flow at that location (id.). The Company indicated that other possible steps to control traffic at the Brox access road/110 intersection include: (1) constructing a right turn deceleration lane onto the Brox access road; (2) warning motorists of construction with high visibility signs along the Route 110 approaches to the Brox access road; and (3) restriping the northbound approach to the Brox access road to create a left turn or bypass lane (id.).

The Company also discussed the effect that construction of the proposed facility's water intake system, water line, and sewer line would have on traffic along Route 110 (Exhs. EFSB-T-9; Tr. 5, at 674 to 678; RR-EFSB-24; RR-EFSB-25). The Company indicated that a segment of the 24-inch diameter water supply line for the proposed facility would run from the wet well/pumphouse westerly to Route 110 at a depth of four feet (grade to top of pipe), then along the edge of Route 110, within the existing MHD ROW, to the proposed relocated Brox access road (Exhs. EFSB-T-9; Tr. 5, at 674 to 678; RR-EFSB-24; RR-EFSB-25). The Company stated that Route 110 at this location is wide enough to allow for reduced speed two-way traffic during pipe installation (Exhs. EFSB-T-9; Tr. 5, at 674 to 678; RR-EFSB-24; RR-EFSB-25). The

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116 The Company explained that LOS, defined over six categories from A (optimum/free flow) to F (high congestion), is a qualitative measure of roadway operating conditions (Exh. NHE-1, at 4.10-12). A variety of factors contribute to an LOS rating which include, but are not limited to, roadway geometry, travel speed and length of delays, and freedom to maneuver (id.). The Company stated that LOS C, a condition of stable flow, or better is considered desirable for peak or design flow in rural areas and LOS D is considered acceptable in urban areas (id.).

Company proposed temporary restriping of the roadway and a police detail to ensure safe passage of traffic during the approximately one to two weeks needed to install the water line (Exhs. EFSB-T-9; Tr. 5, at 674 to 678; RR-EFSB-24; RR-EFSB-25).

In addition, the Company indicated that a 4-inch diameter sewer line for the proposed facility would begin at a lift station at the northeast corner of the Brox access road/Route 110 intersection, then cross beneath the highway to the south shoulder of Route 110 (id.). From this point, the sewer line would run westerly along the south shoulder of Route 110 for approximately 4,300 feet to an existing manhole (id.). The Company stated that, as in the case of the water supply line, temporary restriping of Route 110 would allow for reduced speed two-way traffic (id.). The Company indicated it would arrange for a police detail for the two to three week period needed to install the sewer pipe (id.). The Company indicated that installation of the sewer line segment from the Brox access road/Route 110 intersection beneath Route 110 to its south shoulder would involve trenching (id.). The Company stated, however, that trenching would require no more than two days to complete and would block no more than half of Route 110 at any given time (id.).

The Company provided information from Dracut regarding school bus routes in the vicinity of the proposed facility site (Exh. EFSB-T-8, Att.). This information indicated that school buses pick up students in the area from 6:30 a.m. to 7:15 a.m. and from 8:10 a.m. to 8:35 a.m., and that return trips begin at 1:45 p.m. and at 3:00 p.m. (id.).

The Company also examined traffic impacts associated with the operation of the proposed facility changes by modeling projected Year 2004 LOS with and without the proposed facility (Exh. NHE-2, at 5.11-17). The Company assumed that, once in operation, the proposed facility would require a staff of twenty distributed over three shifts of twelve, six, and two employees, and that each employee would make an average of three daily trips to or from the proposed facility (Exh. NHE-1, at 4.10-13). The Company also stated that operation of the proposed facility would require several truck deliveries per week, and indicated that it would schedule these deliveries for off-peak hours to the extent possible (id.).[117] The Company

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[117] The Company estimated that operation of the proposed facility would require an average (continued...)

estimated that with the proposed project in operation, peak-hour traffic to the north and south of the proposed facility site along Route 110 would increase by a maximum of nine vehicles (Exh. NHE-2, at 5.11-15). Given these assumptions, the Company projected that Year 2004 traffic exiting the Brox access road onto Route 110 would experience LOS E with or without the proposed facility in operation (id. at 5.11-17). The Company anticipated that levels of service for all other traffic study sites would remain unchanged at LOS B or better (Exhs. NHE-1, at 4.10-12, 4.10-17).

The Company examined accident data for the period 1995 to 1997 for intersections in the traffic study area (Exh. NHE-2, at 5.11-6). The Company indicated general regional concern with respect to accidents along the Route 110 corridor, and reported one accident on Route 110 at the Brox access road for the years of its analysis (id.). The Company analyzed the sight lines of vehicles entering or exiting the Brox access road at its intersection with Route 110 and determined that, for an approach speed of 45 miles per hour, the intersection currently exceeds the minimum stopping sight distance requirements of 325 feet in both directions (id. at 5.11-18; Tr. 7, at 836). The Company noted that present corner sight distances, approximately 350 feet to the east and 650 feet to the west, would be improved to 1100 feet in both directions with the proposed relocation of the Brox access road entrance (id.).

Nickel Hill also submitted a copy of its Special Permit, which includes a number of conditions intended to minimize the traffic impacts of the proposed facility (Exh. EFSB-G-13(d), Att. at 23-26). Specifically, the Special Permit requires that the Brox access road be relocated, and that Methuen Street be widened from its intersection with the Brox access road to its intersection with the 25-acre site access road, before a building permit for the proposed project will be issued (Exh. EFSB-G-13(d), Att. at 23). The Special Permit also makes provision for warning signs on Route 110 and Methuen Street and for uniformed officer control, and sets specific work schedules (id. at 23-24). The Special Permit concludes that traffic would increase very little with operation of the proposed facility as conditioned; that the relocation of the Brox

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117 (...continued)
of four truck trips (entrances or exits) over a 24-hour period, all scheduled during off-peak traffic hours (Exh. NHE-1, at 4.10-14).

access road would resolve the largest single traffic hazard associated with proposed project construction and operation; and that the timing of work shifts set forth in the Special Permit would minimize impacts on existing traffic congestion during construction of the proposed facility (id. at 23-24; Dracut Brief at 17).

2. Analysis

Nickel Hill has provided an analysis of the impacts of facility construction and operation on traffic conditions in the vicinity of the proposed facility site. The record demonstrates that operation of the proposed facility would create minimal additional traffic, and that traffic conditions as measured by LOS would be unaffected by this operational traffic. Further, Dracut has found that traffic safety in the vicinity of the Brox access road would likely improve with the road's relocation and that traffic would increase very little with operation of the proposed facility as conditioned in the Special Permit. Consequently, the Siting Board finds that the traffic impacts of operation of the proposed facility would be minimized.

With respect to construction traffic impacts, the record demonstrates a reduction in LOS at one location, the intersection of the Brox access road with Route 110. The Company has proposed stationing a police officer at this intersection to control traffic flow, and also has indicated that it is prepared to consider additional mitigation measures including: (1) constructing a right turn deceleration lane into the Brox access road; and (2) restriping the northbound approach to Brox Industries Drive to create a left turn or bypass lane. The Special Permit requires posting of approved signs warning of construction along Route 110 both east and west of the Brox access road. In addition, the Special Permit sets forth a construction schedule that provides for shift changes which occur outside of peak commuter traffic hours; thus, construction traffic impacts may be somewhat less than those modeled. The arrival and departure of construction workers may overlap with some school bus traffic on area roads; any steps which minimize the impacts of construction traffic generally should also minimize any impacts on school bus schedules. The Siting Board encourages the Company to continue discussions with state and local officials and police to determine which additional measures are required to minimize traffic impacts from construction of the proposed facility.

The record further demonstrates that, where installation of water and sewer lines is required along Route 110, the Company would restripe the roadway and arrange for a police detail to allow continued passage of two-way traffic at reduced speeds throughout the construction period. The record also shows that the Company would limit the time required to install water lines along Route 110 and to install sewer lines along and across Route 110. These measures should ensure the maintenance of two-way traffic along Route 110 throughout the construction period, and the passage of safety and emergency vehicles at all times.

Based on the record, the Siting Board concludes that, with the implementation of mitigation measures developed in consultation with Dracut, the traffic impacts of the construction of the proposed facility would be minimized. Accordingly, the Siting Board finds that the traffic impacts of the proposed facility would be minimized.

J. Electric and Magnetic Fields

This section describes the EMF impacts of the proposed facility and potential mitigation.

1. Description

Nickel Hill indicated that the operation of the proposed facility would produce magnetic fields associated with increased power flow on certain existing transmission lines (Exh. NHE-2, at Appendix F, at 1-1).[118] The Company stated that the proposed facility would interconnect with the existing 345 kV #394 line at the NEP transmission corridor to the west of the project site (id.; Exh. NHE-1, at 4.11-1; Tr. 12, at 1593).

The Company stated that the NEP transmission ROW varies in width from 350 to 500 feet (Exhs. NHE-1, at 4.11-1; NHE-2, at Appendix F, at 1-1; Tr. 12, at 1599). The Company indicated that the ROW is occupied by five lines, the #394 line being the second from the east

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[118] The Company also discussed electric and magnetic fields at the residences nearest to the proposed transmission line interconnection and the plant switchyard (Exh. EFSB-E-3). The Company stated that due to the large distances (1,600 to 2,300 feet) to the nearest residences, EMF impacts from the interconnection line would be minimal and levels would be indistinguishable from those that existed prior to construction of the interconnection (id.).

side of the ROW (Exhs. NHE-1, at 4.11-6; NHE-2, at Appendix F, at 4-1; Tr. 12, at 1598). The Company initially stated that there would be no need to reconductor or add new lines along the NEP transmission ROW to accommodate the project; however, the Draft System Impact Study prepared by NEP for the project suggests that reconductoring of some existing 115 kV line segments on other ROWs connecting to the Ward Hill substation may be required to avoid thermal overloads (Exhs. NHE-1, at 4.11-1; EFSB-E-1, Att. at 2).

The Company stated that electric fields caused by the #394 line would not change as a result of the interconnection of the proposed facility, because there is no anticipated change in transmission line voltage (Exhs. NHE-1, at 4.11-1; NHE-2, at Appendix F at 1-2). The Company stated that the maximum measured electric field at the edge of the ROW was 0.7 kilovolts per meter ("kV/m"), and that this is below the 1.8 kV/m value previously accepted by the Siting Board (id.).

The Company stated that it conducted a survey of magnetic field strengths in March 1999 along four roads that traverse the NEP transmission corridor in Dracut and Andover (Exhs. NHE-1, at 4.11-6; NHE-2, Appendix F at 4-1). The Company indicated that magnetic field strengths along the center of the ROW varied from 38.6 to 48.0 milligauss ("mG") at the four road crossings, with a maximum edge of ROW magnetic field strength of 17.6 mG (Exhs. NHE-1, at 4.11-15; EFSB-E-5). The Company calculated that the maximum magnetic field levels at the edge of the ROW would be 29.8 mG or less with the proposed facility on-line, and stated that a magnetic field strength of 85 mG at the edge of a ROW had previously been accepted by the Siting Board (Exhs. EFSB-E-5; NHE-2, Appendix F at 1-1 to 1-2; Tr. 12, at 1594).

The Company stated that the closest residences to the NEP transmission corridor in the survey area were 70 feet west and 120 feet east of the ROW edge (Exh. EFSB-E-3). Magnetic field levels at these residential locations were measured at 1.9 and 9.6 mG, respectively (id.). The Company stated that the maximum expected magnetic field levels at these residences would be 8.2 and 13.9 mG, respectively, with the proposed facility on-line (id.).

2. Analysis

The record indicates that the proposed project would be interconnected to NEP's 345 kV

#394 line at the western edge of the Brox properties. The Company's EMF analysis shows that electric fields at the edge of the NEP transmission ROW would not change and that magnetic fields at the edge of the ROW would be a maximum of 29.8 mG, a level approximately 12.2 mG greater than the highest edge-of-ROW level measured by the Company in March 1999.

In a previous review of proposed transmission line facilities, the Siting Board accepted edge-of-ROW levels of 1.8 kV/m for the electric field and 85 mG for the magnetic field. Massachusetts Electric Company, et al., 13 DOMSC 119, at 228-242 (1985) ("1985 MECo/ NEPCo Decision"). Here, off-site magnetic fields at the edge of the NEP transmission ROW would remain well below the levels found acceptable in the 1985 MECo/NEPCo Decision. The record further indicates that, given that electric and magnetic field levels decrease as the distance from a source increases, the proposed project would result in smaller magnetic field changes at nearest residences and other locations set back from the ROW, than at the ROW edge.

Although the #394 line does not require reconductoring or other upgrades, the Draft System Impact Study suggests that reconductoring of some existing 115 kV line segments may be necessary to avoid thermal overloads. The Siting Board notes that, to the extent reconductoring or other transmission line upgrades may be required, there may be opportunities to reduce magnetic fields through changes in transmission line design.

The Siting Board wishes to remain informed as to the progress and outcome of transmission upgrade designs related to interconnecting the proposed project. Therefore, the Siting Board directs Nickel Hill to provide the Siting Board with an update on the extent and design of required transmission upgrades, if any, and the measures incorporated into any transmission upgrade designs to minimize magnetic field impacts, at such time as Nickel Hill reaches final agreement with all transmission providers regarding transmission upgrades.

Accordingly, the Siting Board finds that with the Company's pursuit of cost-effective designs for decreasing magnetic fields along any affected transmission lines that require upgrades, the electric and magnetic field impacts of the proposed facility would be minimized.

K. Land Use

This section describes the land use impacts of the proposed facility, including the impacts

to wildlife species and habitat, and significant cultural resources.

1. Description

Nickel Hill proposes to construct the proposed facility on a 25-acre site located in the southeast corner of Dracut (Exh. NHE-1, at 4.7-1). The 25-acre site was subdivided from 450 contiguous acres of Brox properties extending from Dracut into Methuen (id.; Exhs. INT-MVRE-G-7(d), Bulk Att. at 2-1; EFSB-LU-6-S, Att.; RR-EFSB-49(a)).[119] Nickel Hill stated that the 25-acre site is bounded by Methuen Street to the south; the Methuen/Dracut town line to the east; and Brox Industries crushing and asphalt batch plant operations to the north and west (Exhs. EFSB-G-5, Att; RR-TD-3). Nickel Hill asserts that its choice of site serves to minimize the land use impacts of the proposed facility because it is appropriately zoned, abuts an existing industrial use, is contiguous to gas pipelines and electric transmission lines, and is contiguous to a major electric load center (Tr. 4, at 508-09).

Nickel Hill described the 450-acre Brox properties as "roughly bounded by State Route 110 (Merrimack Avenue in Dracut) to the south; the NEP transmission corridor to the west; Wheeler Street to the east; and agricultural and forested land, a portion of the Tennessee pipeline, and the Asadorian Heights subdivision to the north" (Exhs. NHE-2, at 3-1; INT-MVRE-G-7(a), Att. at 3-1). The Company indicated that Brox Industries operates a rock quarry, stone crushing plant, and asphalt batch plant within its 450-acre holdings (Exh. INT-MVRE-G-7(d), Bulk Att. at 2-1). The Company stated that Brox Industries intends to continue its current quarrying operations during the construction and operation of the proposed facility (Exh. RR-EFSB-9).

Nickel Hill stated that the area upon which the proposed facility would be constructed is relatively level and largely devoid of trees, as most of the 25-acre site has been disturbed in connection with the operations of Brox Industries (Exh. EFSB-LU-6-S, Att.). The Company indicated that public access to the 25-acre site would be limited by the construction of a fence generally along the eastern border of the Brox properties in Methuen, along Wheeler Street, and

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[119] Nickel Hill and Brox Industries have executed a term sheet that addresses the terms to be included in an anticipated lease agreement and option to purchase (Exh. RR-MVRE-7; Tr. 1, at 15, 39-42; Tr. 7, at 912).

extending at least 100 yards westward, along the northern edge of the Brox properties (Exhs. RR-TD-15, Att.; EFSB-G-13(d), Att. at 10). The Company stated that a tractor-trailer parking lot, storage area, and pond are located on the southern portion of the 25-acre site (Exhs. NHE-1, at 4.7-1; NHE-2, at 5.1-1).

Nickel Hill stated the 25-acre site is zoned light industrial ("I-L"), a designation which permits a proposed private or public utility facility to be constructed by special permit issued by the Dracut Board of Selectmen and upon site plan review (Exhs. EFSB-LU-1(a); EFSB-LU-3; INT-MVRE-G-7(d), Bulk Att. at 2-2; NHE-1, at fig. 4.7-2; Tr. 4, at 485-86).[120] On December 7, 1999, Nickel Hill received its Special Permit, which incorporates over 100 conditions addressing site conditions, visual, water, wetlands, air, and noise impacts, hazardous material and safety issues, and facility construction, and transportation (Exh. INT-MVRE-G-7(d), Bulk Att. at 2-2).[121] The Company indicated that the proposed facility would require a zoning variance because the height of both the building and stacks would exceed the 65-foot maximum height set forth in section 2.12.50 of the Dracut Zoning By-laws (Exhs. NHE-1, at 4.7-1; EFSB-LU-3). The Company stated that it has not yet applied for the height variance (Tr. 4, at 483).

Nickel Hill stated that most of the remaining Brox properties in Dracut are zoned I-L, although minor portions are zoned residential and business/commercial (Exhs. EFSB-LU-1(a); EFSB-LU-3; INT-MVRE-G-7(d), Bulk Att. at 2-2; NHE-1, at fig. 4.7-2; Tr. 4, at 486). The Company asserted that residential development of the I-L zoned portions of the Brox properties would require an amendment to the Dracut Zoning By-laws (Exh. RR-EFSB-63; Tr. 4, at 488). Nickel Hill stated that portions of the Brox properties located in Methuen are similarly zoned limited industrial and that the Brox properties located within one-half mile east of the eastern

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120 Amendment 2.11.43 of the Dracut Zoning By-laws was adopted in June of 1999 which defines "public or private utility facilities" as: "[f]acilities, equipment and structures necessary for generating electricity for commercial purposes, or for conducting a service by a public service corporation" (Exh. RR-TD-2, Att.; Tr. 4, at 483-484).

121 The record indicates that the Special Permit applies to all of the 450 acres owned by Brox Industries within Dracut (Assessor's Map 39, Lots 1A, 16-14, 16-15, 16-16, 16-17, 16-18, 2, 3, 7.26; Assessor's Map 55, Lot 1A, 16-9, 16-10, 16-11, 16-12, 16-13, and 35) (Exh. INT-MVRE-G-7(a), Att. at Appendix B; Tr. 13, at 1710).

boundary of the 25-acre site, i.e., Wheeler Street, are predominately zoned limited industrial, with the exception of an area zoned agricultural/conservation which borders the Brox properties (Exhs. NHE-1, at 4.7-1; RR-MVRE-26; Tr. 15, at 1889-1890).

The Company indicated that the land uses within one-half mile of the 25-acre site consist primarily of forest (58.0 percent) and mining (28.7 percent), with the remaining land divided among residential, cropland, water, urban open, and wetland uses (Exh. RR-TD-4; Tr. 4, at 501). The Company also stated that land uses within a one mile radius of the 25-acre site consist primarily of forest (46.2 percent), residential (17.1 percent), and mining (10.1 percent), with the remaining land divided among cropland, water, pasture, urban open, wetland, woody perennial, and recreational uses (id.). The Company noted that a 30-acre sand and gravel operation, Zambino Sand and Gravel, is located to the east of the site, across Wheeler Street in Methuen, and that another sand and gravel operation, New England Cement Block and Pipe Company, is located to the southwest of the Brox properties (Exh. INT-MVRE-G-7(d), Bulk Att. at 3-2).

The Company stated that 86 residences are located within a one-half mile radius of the 25-acre site in Dracut and Methuen; these residences are located to the north on Rinzee Road, Poppy Lane, and Wheeler Street, and to the southeast along Lowell Street (Exhs. EFSB-LU-4; NHE-1, at 4.7-4; RR-TD-4; Tr. 4, at 429, 501). The Company stated the closest residence to the 25-acre site is located on Poppy Lane, approximately 1,600 feet from the edge of the proposed power block (Tr. 4, at 429).

Nickel Hill stated that neighboring land uses would be separated from the proposed facility by the surrounding Brox properties, including wooded areas to the north, east, and south of the site (Exh. INT-MVRE-G-7(d), Bulk Att. at 3-2). As discussed in Section III.F, the Company indicated that Brox Industries is committed to maintaining 18 acres due east of the 25-acre site in its current wooded/wetland state for the life of the proposed facility (id.). The Special Permit requires the preservation of the 18 acres in substantially its current state until the removal of the facility (Exh. EFSB-G-13(d), Att. at 14). These 18 acres consist of wooded land, scrub vegetation, revegetated area, and land designated as a wetland buffer area (Tr. 4, at 476). In addition, areas to the north and west of the 25-acre site are subject to a 1990 agreement between Brox Industries and Dracut, which provides that Brox will not conduct quarrying

operations and will grade and stabilize areas for which quarrying activities are completed along the northern and western boundaries of the 450-acre Brox properties (Exhs. INT-MVRE-G-7(d), Bulk Att. at 3-2; RR-MVRE-25). This area is north and east of the NEP transmission ROW (Exh. RR-MVRE-25(b), Att.). Moreover, the Special Permit requires the Board of Selectmen to approve a plan for the preservation of the visual buffering provided by wooded areas to the north of the 25-acre site for the life of the proposed facility (Exh. EFSB-G-13(d), Att. at 13). The Special Permit also provides that if the facility is generally out of service for two years, Nickel Hill or the owner of the 25-acre site shall remove the facility and return the area to a graded and vegetated condition (id. at 10).[122]

Nickel Hill indicated that it has agreed to construct a 30-foot wide access road to the 25-acre site from Methuen Street (which crosses Brox property) using Dracut "public road" specifications (Exhs. EFSB-G-5, Att.; RR-MVRE-7). The Special Permit provides that the existing tree line may be cleared only to the degree necessary to construct the 25-acre site access road and stormwater drainage components of the proposed facility, or to provide adequate sight distances for vehicles exiting the 25-acre site access road onto Methuen Street (Exh. EFSB-G-13(d), Att. at 25). Nickel Hill also indicated that Brox Industries intends to relocate the existing Brox access road, which connects Route 110 to Methuen Street (Exhs. RR-MVRE-8; RR-TD-10, Att.; Tr. 4, at 421-422).[123] Nickel Hill stated it would be granted an easement to use the relocated Brox access road, which Brox Industries would maintain (Exh. RR-MVRE-8).

Nickel Hill also discussed the land use impacts of the gas, electric, and water interconnections for the proposed facility. The Company stated that the proposed facility would interconnect with the Tennessee and the M&NE pipelines at a point where an existing Tennessee ROW abuts the northwest corner of the Brox properties (Exhs. EFSB-G-5, Att.; INT-MVRE-G-

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122 The Special Permit further provides that Nickel Hill shall annually deposit, for 29 years, funds in an account for Dracut for removal of the facility and restoration of the area should Nickel Hill or the site owner fail to do so as conditioned in the Special Permit (Exh. EFSB-G-13(d), Att. at 10).

123 The Company anticipates that Brox Industries will remove the unused portion of the existing Brox access road (approximately 0.8 acres) and return it to vegetation (Exh. RR-EFSB-25).

7(d), Bulk Att. at 3-8). An approximately 3,700-foot interconnecting gas pipeline, to be constructed entirely on Brox property, would run westerly from the power block, skirting the active quarrying area, along the northern boundary of the Brox properties (id.). In addition, the Company indicated that M&NE would construct a lateral of less than one-half mile along the existing Tennessee ROW to serve the proposed facility (id.).

The Company stated that the proposed facility would interconnect with an existing NEP 345 kV transmission line, which crosses the western portion of the Brox properties (Exh. EFSB-G-4). An approximately 4,200-foot 345 kV overhead circuit would run westerly from the 345 kV switchyard adjacent to the turbine building, spanning the active quarrying area, and crossing cleared and uncleared Brox property, to the NEP transmission ROW (Exhs. EFSB-G-4; INT-MVRE-G-7(d), Bulk Att. at 3-8 to 3-9). Nickel Hill stated that the nearest residences are within 1,200 feet of the 345kV switchyard, 1,400 feet of the point of interconnection with NEP's transmission line, and 2,100 feet of the interconnection with the Tennessee and M&NE pipelines (Exhs. EFSB-LU-5; RR-TD-3, Att.). The Company stated that construction of the river water intake structure would require the submission to MADEP of a G. L. c. 91 license application and compliance with the waterways regulations at 310 CMR, § 9.00 (Exh. RR-EFSB-11).[124]

The Company did not identify any substantial effects of the facility on wildlife or wildlife habitat. Nickel Hill provided an opinion from the Massachusetts Division of Fisheries and Wildlife - Natural Heritage and Endangered Species Program stating that, although the proposed facility would be built within the natural habitat of the bald eagle along the Merrimack River, the proposed facility will not adversely affect the actual habitat of the bald eagle (Exhs. EFSB-LU-9-S2; EFSB-LU-9(c)). The Company stated that "according to the most recent edition of the Massachusetts Natural Heritage Atlas, no Estimated Habitats of Rare Wetlands Wildlife and Certified Vernal Pools or High Priority Sites of Rare Species Habitats and Exemplary Natural Communities occur" on the Brox properties as a whole or on the 25-acre site (Exh. NHE-1,

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[124] The Company indicated that if the pumphouse remains at the intersection of the existing Brox access road and Route 110, the water line would follow the existing road. If the pumphouse is located at the Route 110 turnaround, the water lines would most likely follow the relocated Brox access road (Exh. RR-EFSB-25).

at 4.4-3).

An Intensive (Locational) Archaeological Survey, conducted by a Nickel Hill contractor, concluded that the 25-acre site was not "archaeologically significant" (Exh. EFSB-LU-10(a)). Further, the Massachusetts Historical Commission, commenting on the DEIR, stated that the survey found that because no significant historic or cultural resources were identified, no further review by the Massachusetts Historical Commission is warranted (Exh. EFSB-LU-10(b)).

Nickel Hill stated that construction of the proposed facility and ancillary facilities (e.g., main facility site and access road, gas line with access road, transmission line and NEP interface, sewer and water lines, and river water intake and pump station area) would result in the permanent loss of 9.5 acres of vegetation and an additional 3.1 acres of temporary vegetation disturbance (Exh. RR-EFSB-8). Construction of the proposed facility would involve some clearing of and placement of structures upon 6.4 acres of the 25-acre site (Exhs. EFSB-MVRE-G-7(a), at 6-11; NHE-2, at 6-8).

2. Analysis

As part of its review of land use impacts, the Siting Board considers the extent to which a proposed facility would be consistent with existing land uses, and with state and local requirements, policies, or plans relating to land use, and considers impacts on terrestrial resources, including vegetative cover and habitat. Here, the record indicates that the proposed facility would be located on previously disturbed industrially zoned property subdivided from an active quarrying and asphalt manufacturing operation. The proposed facility is allowed under the Dracut Zoning By-laws through the Board of Selectmen's approval of a Special Permit and site plan review, which approval has been granted. Because of the height of the power block and stacks, a variance from the Dracut Zoning Board of Appeals would be required. Thus, the Siting Board finds that construction of the proposed facility is consistent with the present industrial use of the site.

The record indicates that the area within a one-half mile radius of the 25-acre site is predominately forest and mining, with 58 percent of the land area given to forest use and 28.7 percent to mining. Thus, the vast majority of the surrounding land uses within a one-half

mile radius of the 25-acre site are non-sensitive. The record indicates that minimal residential zoning exists within a one-half mile radius of the 25-acre site and that the closest residence to the 25-acre site is 1,600 feet from the proposed power block. The record also indicates that the 25-acre site is buffered by existing terrain and forest and that the existing buffer, to a large degree, will be preserved through the provisions and conditions of the Special Permit. Moreover, as described in Section III.F, above, the Siting Board has required Nickel Hill to comply with certain conditions which would minimize visual impacts from neighboring residential areas. Therefore, the Siting Board finds the proposed facility would have minimal impacts on sensitive neighboring land uses.

Nickel Hill has adequately considered the likely impacts of the proposed facility with respect to wildlife species and habitats, and historic and archaeological resources. Based on its review of information submitted by the Company, the Siting Board finds that no resource impacts are likely to occur as a result of the construction or operation of the proposed facility.

Given the presence of mining, industrial, and utility land uses in the immediate project area, the extent of site buffering, and the conditions which would limit the visual impacts of the proposed facility, the Siting Board concludes that the proposed facility will be compatible with existing land uses. Accordingly, the Siting Board finds that the land use impacts of the proposed facility would be minimized.

L. Cumulative Health Impacts

This section describes the cumulative health impacts of the proposed facility. The Siting Board considers the term "cumulative health" to encompass the range of effects that a proposed facility could have on human health through emission of pollutants over various pathways, as well as possible effects on human health unrelated to emissions of substances (e.g., health effects of noise and of EMF). Cumulative health effects are considered in the context of existing background conditions, existing baseline health conditions, and, when appropriate, likely changes in the contributions of other major emissions sources.

The analysis of the health effects of a proposed generating facility is closely related to the analysis, in sections above, of specific environmental impacts which could have an effect on

human health and any necessary mitigation measures. This section sets forth information on the human health effects that may be associated with air emissions, including criteria pollutants and air toxics, discharges to ground and surface waters, the handling and disposal of hazardous materials, EMF, and noise. In addition, this section describes any existing health-based regulatory programs governing these impacts and considers the impacts of the proposed facility in light of such programs.

1. Baseline Health Conditions

The baseline health conditions prevailing in the Merrimack Valley were a subject of considerable debate in this proceeding. Certain intervenors expressed concern that the Merrimack Valley population already suffers from increased health risks relative to any randomly selected group of the same size, citing exposures to other power plants and to mercury, along with high rates of asthma and other diseases (Bruton/Vrountas Brief at 14). In comments on the FEIR, Sharon Pollard, Mayor of Methuen, contended that higher levels of asthma and certain types of cancer in the Merrimack Valley are due to air pollutants from incinerators, commercial and industrial facilities, and cars on highways (Exh. INT-MVRE-G-7(d), Bulk Att. at Section 9, Commenter 8). A limited number of people expressed the belief that the region had higher cancer rates than the rest of the state (e.g., Exh. NHE-2, at Appendix G, Commenter 49). More specifically, several sets of comments on the Environmental Notification Form refer to the elevated breast cancer incidence in Andover as a baseline health condition, mostly of concern relative to air emissions from the proposed facility (id. at Appendix G, Commenters 37, 41, 52, 54, 56, 57).

In response, Nickel Hill argued that none of the 24 Merrimack Valley communities studied had overall cancer incidence rates that were significantly higher than statistically expected and that, of the individual forms of cancer that had statistically significant excesses in one or more of the Merrimack Valley communities, none could be associated with operation of a gas-fired power plant (Nickel Hill Brief at 157). Nickel Hill also argued that factors other than outdoor air quality are responsible for high hospital discharge rates for asthma in Lawrence (id. at 156).

Studies entered into the evidentiary record of the case, providing information on regional baseline health conditions, include a 1997 Massachusetts Department of Public Health ("MADPH") study entitled Cancer Incidence in Massachusetts 1987-1994: City/Town Supplement ("MADPH Cancer Incidence Report") (Exh. RR-EFSB-51, Att.); a 1998 report entitled The Health of the Merrimack Valley ("Merrimack Valley Report") authored by Eugene DeClercq, Ph.D. (Exh. EFSB-H-A-4, Att. 2); and a 1998 MADPH study entitled Evaluation of Breast Cancer Incidence in Andover, MA: 1987-1994 ("Andover Breast Cancer Report") (Exh. NH-MVRE-JW-19, Att. 2). Also entered into the evidentiary record is a 1998 critique of a MADEP document, entitled Ignoring Motherhood, Milk, and Mercury ("Incinerator Study Critique"), which was prepared by three authors, including Ms. Watts, witness for MVRE, and endorsed by several environmental groups (Exh. EFSB-H-A-4, Att. 1).

The Cancer Incidence Report compared the incidence rate of cancer in 24 categories for each of the 351 Massachusetts cities and towns with the state-wide average for males, females, and the total population, and noted statistically significant deviations (Exh. NHE-2, at 5.14-5). The Merrimack Valley Report presented and discussed demographics and health status data from 24 cities and towns in the region, including some data from the MADPH Cancer Incidence Report (Exh. EFSB-H-A-4, Att. 2).[125] The Andover Breast Cancer Report provided townwide breast cancer incidence rates and demographic information, and discussed risk factors for breast cancer (Exh. NH-MVRE-JW-19, Att. 2). The Incinerator Study Critique challenged a permit-related draft MADEP document, and focused on the environmental fate of pollutants from two incinerators in the Merrimack Valley (Exh. EFSB-H-A-4, Att. 1).

The MADPH Cancer Incidence Report compared cancer incidence in Dracut to state-wide averages, and found an elevated incidence rate of bladder cancer in males that was

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[125] The cities and towns discussed in the Merrimack Valley Report were: Newburyport, Salisbury, Amesbury, Merrimac, Haverhill, Groveland, West Newbury, Newbury, Rowley, Georgetown, Boxford, Middleton, North Andover, Methuen, Lawrence, Andover, Dracut, Lowell, Tewksbury, Billerica, Chelmsford, Westford, Tyngsborough, and Dunstable (Exh. EFSB-H-A-4, Att. 2).

statistically significant at $p \leq 0.01$;[126] an elevated rate of uterine cancer that was statistically significant at $p \leq 0.05$; and a decreased incidence rate of non-Hodgkin's lymphoma in females (also statistically significant at $p \leq 0.05$) (Exhs. NHE-2, at 5.14-6; RR-EFSB-51, Att.). The Company noted that overall cancer incidence in Dracut was 2 percent above the statewide average, which was not statistically significant (id.). The Company also noted that, as indicated in the MADPH report, a finding of statistical significance does not necessarily indicate biological or public health significance (Exh. NHE-2, at 5.14-7).

The MADPH Cancer Incidence Report compared cancer incidence in Methuen to state-wide averages, and found an elevated incidence rate of colorectal cancer in males (35 percent above expected; statistically significant at $p \leq 0.001$); also, of melanoma, in total, of bladder cancer, in total, and "other cancers," in males and in total (each statistically significant at $p \leq 0.05$) (id. at 5.14-6; Exh. RR-EFSB-51, Att.). The Company noted that overall cancer incidence in Methuen was 5 percent above the statewide average, which was not statistically significant (id.). However, the incidence of total cancers was statistically elevated among males in Methuen (statistically significant at $p \leq 0.05$) (Exh. RR-EFSB-51, Att.).

The MADPH Cancer Incidence Report compared cancer incidence in Andover to state-wide averages, and found elevated incidence rates for breast cancer in females (31 percent above expected; statistically significant at $p \leq 0.001$); elevated rates of colorectal cancer, in males and in total, leukemia, in total, and prostate cancer (each statistically significant at $p \leq 0.05$); and reduced rates of lung cancer, in males and females, and stomach cancer, in total (Exhs. NHE-2, at 5.14-6; RR-EFSB-51, Att.). The Company noted that overall cancer incidence in Andover was 6 percent above the statewide average, which was not statistically significant (id.).

The MADPH Cancer Incidence Report indicated that Lawrence had a statistically

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126 The p-value is the probability that the observed difference or a greater difference between the observed number of cases and the expected number of cases would be obtained if, actually, the town-wide risk were equal to the state-wide risk. For "$p \leq 0.05$," the probability is at most one in twenty. For "$p \leq 0.01$," the probability is at most one in a hundred. Some findings of statistical significance are expected to occur by chance alone. The smaller the p-value is, the more evidence there is that the observed disparity is not due to chance alone.

elevated incidence of cervical cancer, and statistically reduced incidence of esophageal cancer (in total), melanoma of skin (in both sexes), breast cancer, and non-Hodgkins lymphoma (in total) (Exh. RR-EFSB-51, Att.).

In summarizing cancer data presented in the Merrimack Valley Report, the Company stated that none of 24 Merrimack Valley communities had an overall cancer incidence rate that was significantly higher than statistically expected based on statewide averages (Exh. NHE-2, at 5.14-2).[127] The Merrimack Valley Report also listed cities and towns with statistically significant elevations (but not reductions) at $p \leq 0.01$ among males or females, for the 24 MADPH cancer categories; these consisted of Andover (breast cancer, as noted above), Methuen (colorectal, as noted above), Billerica and Salisbury (bronchus and lung), Tewksbury (kidney and renal pelvis), Boxford (melanoma of skin), Lowell (oral cavity and pharynx), North Andover (prostate), and Dracut (bladder, as noted above) (Exh. EFSB-H-A-4, Att. 2, at 32).

The Company's summary of the Merrimack Valley Report focused on measures of health status related to respiratory health (Exh. NHE-2, at 5.14-6). The Company stated that among the 18 Merrimack Valley communities with 1994 data on hospital discharges for asthma, one-third (6 communities) had discharge rates above state averages and two-thirds had discharge rates below state averages (id.).[128, 129] According to the Company, the hospital discharge rate for asthma for Lawrence was twice the state average, Methuen was also above the state average,

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127 The Merrimack Valley Report indicated that two communities, Boxford and Haverhill, had overall cancer rates that were significantly lower than would be expected based on statewide averages (Exh. EFSB-H-A-4, Att. 2, at 32).

128 The Company argued that a high rate of hospital discharge for asthma may be attributable to high population density and housing stock (Nickel Hill Brief at 156). Bruton/Vrountas argued that it is "patently specious" to use hospital discharge data as a measure for asthma prevalence (Bruton/Vrountas Reply Brief at 6).

129 The Merrimack Valley Report indicated that Lawrence, Haverhill, Merrimac, Methuen, Groveland, and Lowell had hospital discharge rates above the state average; Newburyport, Amesbury, Georgetown, Dracut, North Andover, Billerica, Westford, Chelmsford, Tewksbury, Tyngsborough, Andover, and Dunstable were reported as below the state average; the report did not provide asthma hospital discharge rates for Middleton, Boxford, Newbury, Rowley, Salisbury, or West Newbury (Exh. EFSB-H-A-4, Att. 2, at 32).

Dracut was below the state average, and Andover was one-fourth the state average (Exh. NHE-2, at 5.14-2).[130] As indicated by the Company, hospital discharge rate for pneumonia was broadly similar to asthma: the rate for Lawrence was well above the state average, Methuen was also above the state average, and Dracut and Andover were below the state average for pneumonia (id.; Exh. EFSB-H-A-4, Att. 2, at 30).

The Merrimack Valley Report was also cited in Ms. Watts' prefiled testimony as stating that there is a high prevalence of lead poisoning in Lawrence due in part to old housing stock and "other problems" (Exh. MVRE-DC-4).[131, 132] The Merrimack Valley Report stated that the rate of deaths for heart disease exceeds the state average in 19 of 24 Merrimack Valley communities (Exh. EFSB-H-A-4, Att. 2, at 30).

The Andover Breast Cancer Report stated that there was a 31 percent excess in breast cancer in Andover from 1987 to 1994, relative to average state rates (Exh. NH-MVRE-JW-8, Att. 2, at Table 1). The study determined that the mean age at first full-term pregnancy was higher in Andover than in the state as a whole and increased in Andover between 1975 to 1990 (id. at 17). The study cited an increase in breast cancer screening in the 1980s (id. at 14). The study found data that indicate that Andover as a whole displays higher socioeconomic

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130 The Merrimack Valley Report characterized the rate in Lawrence as *more than double* the state rate (emphasis added); also, the rate in Andover would be more accurately characterized as one-third the state rate rather than as one-fourth (Exh. EFSB-H-A-4, Att. 2, at 29, 30).

131 The Merrimack Valley Report indicates that 1.54 percent of children tested in Lawrence in fiscal years 1996 and 1997 had blood lead levels above 20 micrograms per deciliter ("μg/dL"), a percentage well above the state average (Exh. EFSB-H-A-4, Att. 2, at 21). The rate in Methuen, 0.49 percent, also exceeds the state average of 0.32 percent, while Dracut and Andover were well below the state average (id.).

132 The Merrimack Valley Report characterizes Lawrence (as well as Lowell and Haverhill) as having higher population densities, higher non-white populations, higher poverty rates, higher unemployment, and a lower proportion of single family homes, compared to the smaller communities in the Merrimack Valley (Exh. EFSB-H-A-4, Att. 2, at 5). The study states that, based on demographic features, it is not surprising that these three communities have a disproportionate share of the region's health problems (id. at 8). The report indicates that childhood lead poisoning is most prevalent in the three larger cities, especially Lawrence (id. at 23).

characteristics than the state (id. at 39) The study indicated that known or strongly suspected factors for increased risk or incidence of breast cancer include early detection brought on by mammography utilization, family history, having fewer children and having children later in life, higher socioeconomic status, higher body weight, and exogenous estrogens (id. at 28 to 34).[133] The study indicated that the cases in Andover did not display any pattern that would suggest that ambient environmental factors were contributing causes (id. at 39).

The Incinerator Study Critique was co-authored by Ms. Watts, witness for MVRE. The critique largely responded to a draft MADEP study intended to evaluate the combined impacts of two incinerators on air quality, but the critique did offer several statements related to baseline health status in the Merrimack Valley region (Exh. EFSB-H-A-4, Att. 1). The critique asserted that high mercury levels have been found wherever local fish were tested (id. at 4). The critique asserted that three trash incinerators operating in the Lawrence area have released high levels of mercury, dioxin, lead, and other persistent pollutants (id. at 5). The critique stated that the Northeast Solid Waste Committee ("NESWC") incinerator in North Andover exceeded its CO limits in the past and modeled dioxin concentrations from NESWC have exceeded MADEP AALs, but that levels of dioxin in soil or food have not been measured (id. at 5, 6). The critique cited the existing high lead poisoning rate in Lawrence in relation to the additional lead emitted by the incinerators (id. at 6, 7). The critique asserted that ten percent of Lawrence public school students have asthma and indicated that three young women died of asthma in the year of the critique (id. at 7).[134]

The record demonstrates that some individual communities in the vicinity of the proposed power plant have health profiles that are markedly different from state averages. These

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133 Studies cited in the Andover Breast Cancer Report reported a 30 percent increase in breast cancer risk among women under 45 years associated with oral contraceptive use and a 71 percent increase in breast cancer risk among women 60 to 64 years associated with estrogen replacement therapy (Exh. NH-MVRE-JW-8, Att. 2, at 31).

134 The authors of the critique also cited a high hospital discharge rate for pediatric asthma in Lawrence in 1994-95 (Exh. EFSB-H-A-4, Att. 1, at 7). However, the critique did not identify the source of the asthma statistics that were presented or present comparative data for a wider area such as the state.

differences include statistically elevated and reduced levels of various types of cancer; elevated hospital discharge rates for asthma and pneumonia in Lawrence and Methuen, with reduced rates in Dracut and Andover; and a high prevalence of lead poisoning in Lawrence. Socioeconomic or cultural factors may play a role in differences among individual communities. However, evaluation of baseline health data in the record gives no indication of regional consistency in health status, except for heart disease, which appears to be prevalent at comparatively high levels in many Merrimack Valley communities. The record provides no indication of a connection between heart disease in the Merrimack Valley and environmental exposures.

The record does include some limited data that suggest there could be elevated levels of persistent environmental contaminants such as lead and mercury, in soils, sediments, and fish in the Merrimack Valley. However, total exposures have not been quantified, compared to other parts of the state, or linked to actual health status throughout the Merrimack Valley. While there may be localized health impacts that could be attributed to exposure to these contaminants, given the general lack of consistency in health status among Merrimack Valley communities, there is little basis in the record from which to conclude that environmental exposures in the Merrimack Valley are causing regional health to differ from that of the state as a whole in any consistent fashion.

2. Criteria Pollutants

As discussed in Section III.B.1, above, EPA and MADEP regulate the emissions of six criteria pollutants under NAAQS: SO_2, PM_{10}, NO_2, CO, ozone, and lead. Dr. Valberg, witness for the Company, stated that the primary non-cancer effects of criteria pollutants are: (1) changes in respiratory function (e.g., reduced lung capacity); (2) lung irritation, which may be of concern for people with some existing chronic lung diseases; and (3) correlations with day-to-day mortality statistics (Tr. 12, at 1639-1640). In reference to concerns about air pollution and asthma, Dr. Valberg indicated that ambient air pollution was unlikely to be a factor in recent increases in the prevalence of asthma since air quality has been simultaneously improving (Tr. 12, at 1641). Under cross-examination by the Company, Ms. Watts agreed to statements that the NAAQS are set in a manner that is intended to protect public health, with a margin of safety,

and that, from the perspective of EPA, this margin of safety would protect the health of sensitive populations such as asthmatics, children, and the elderly (Tr. 14, at 1780, 1781).

The Company indicated that EPA established SILs as air quality management tools; SILs are ambient concentration criteria low enough to allow a conclusion that emissions below SILs would not significantly affect modeled air quality, without a detailed evaluation of compliance with the NAAQS (Exh. EFSB-H-2; Tr. 12, at 1648). The Company reported that its dispersion modeling indicated that incremental concentrations due to the proposed gas-fired facility would be below SILs (Exh. INT-MVRE-G-7(a), Att. at 5.1-7). On this basis, the Company concluded that air quality in the area would be essentially the same with or without the plant (Exh. EFSB-H-2).

As discussed in Section III.B.2, above, the Company indicated that regional air quality measurements from Lowell, Lawrence, and Lynn were below NAAQS concentrations in 1995, 1996, and 1997 for SO_2, PM_{10}, NO_2, CO, and ozone (Exhs. EFSB-A-2-S, Att. at 5-13; RR-EFSB-42). To assess air impacts of the proposed facility and other existing sources of emissions, the Company conducted cumulative air modeling of the criteria pollutants (Exh. NHE-2, at 5.2-24 to 5.2-28). The maximum cumulative concentrations presented for the locations of maximum impact for NO_2, SO_2, PM_{10}, and CO are below the NAAQS (id.; Exh. INT-MVRE-G-7(a), Att. at 5.1-13). In addition, the modeling shows that the proposed facility would contribute no more than one-half of one percent ($\leq$0.5 percent) of the cumulative pollutant concentration at any of the points of maximum cumulative impact (id.).[135] The Company asserted that, insofar as the predicted sum of the facility impact and the ambient concentration for any particular chemical is below the applicable NAAQS, no health effects would be expected (Nickel Hill Brief at 152). Specifically regarding lead, the Company indicated that less than 0.2 tpy would be emitted (Exh. EFSB-A-2, Att. at 4-21).[136] Regarding ozone, the EPA stated

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135 This percentage is based on Siting Board staff calculation, based on the cited exhibit.

136 Since excessive lead levels have been documented in Lawrence residents, minimization of lead emissions would be important. The lead emissions predicted by the Company, 0.2 tpy, are calculated based on a detection limit from EPA-reviewed testing of emissions (continued...)

in 1997 that peak ozone concentrations are typically measured at some considerable distance downwind of sources of ozone precursors (Exh. RR-EFSB-54, Att. at 16). As discussed in Section III.B.5, above, VOC and NO_X emissions would be minimized in accordance with LAER emission rates (Exh. INT-MVRE-G-7(d), Bulk Att. at 2-9, 3-11). Also as discussed in Section III.B.5, above, regional NO_X emissions would be significantly reduced by displacement of marginal generators in the region, and the facility's VOC and NO_X emissions would be offset under the New Source Review regulations (Exhs. NHE-1, at 4.2-1; INT-MVRE-G-7(d), Bulk Att. at 3-28).

As discussed in Section III.B.1, EPA has set in place ambient air quality standards, called NAAQS, for six criteria pollutants: SO_2, PM_{10}, NO_2, CO, ozone, and lead. These standards are set based on an extensive review of the medical literature regarding the health effects of each pollutant, and are designed to be protective of human health, including the health of sensitive subgroups, with an adequate margin for safety. Sithe West Medway Decision, 10 DOMSB at 350; Sithe Mystic Decision, 9 DOMSB at 192. The Siting Board gives great weight to these standards as indicators of whether incremental emissions of criteria pollutants will have a discernable impact on public health. Sithe West Medway Decision, 10 DOMSB at 350; Brockton Power Decision, 10 DOMSB at 88; Sithe Mystic Decision, 9 DOMSB at 192.

The record also shows that MADEP has set in place standards for reviewing the compliance of proposed new sources of criteria pollutants, such as the proposed facility, with NAAQS. New sources may not cause or contribute significantly to a violation of NAAQS. Sithe West Medway Decision, 10 DOMSB at 350; Sithe Mystic Decision, 9 DOMSB at 192. In addition, as discussed in Section III.B, above, MADEP requires major new sources to meet BACT (when the area is in attainment or is unclassified for a particular pollutant), or LAER (when the area is in non-compliance for a particular pollutant), and to obtain offsets for 100 percent or more of emissions when the area is in non-compliance for a particular pollutant.

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136 (...continued)
from a natural gas-fired turbine, in which no lead was actually detected (Exh. EFSB-A-2, Att. at 4-21). Modeled ambient levels would be over an order of magnitude below MADEP TELs and AALs (id. at 6-10).

MADEP's New Source Program balances environmental impacts and costs when an area is in compliance with NAAQS, and requires stronger measures, including emissions offsets, when an area is in non-attainment. Id. The Siting Board finds that this approach is consistent with its own mandate to minimize both the environmental impacts and costs of proposed generating facilities. Sithe West Medway Decision, 10 DOMSB at 351; Brockton Power Decision, 10 DOMSB at 88; Sithe Mystic Decision, 9 DOMSB at 192. The Siting Board therefore gives great weight to compliance with MADEP air quality programs as an indicator of whether the Company has minimized the health impacts of the proposed facility. Sithe West Medway Decision, 10 DOMSB at 351; Brockton Power Decision, 10 DOMSB at 89; Sithe Mystic Decision, 9 DOMSB at 192.

In this case, the Company's air analysis showed that the Dracut area is unclassified or in attainment for SO_2, PM_{10}, NO_2, CO, and lead, but is treated as being in non-attainment for ozone. In addition, the record indicates that regional background levels are less than the ambient standards for criteria pollutants. Thus, Dracut area levels of criteria pollutants are generally within standards set for purposes of protecting public health. Also, the proposed facility's emissions of all criteria pollutants would be below the SILs. Fueling the project with only natural gas tends to minimize air pollution emissions. The Siting Board concludes that there is no evidence suggesting that the proposed facility's emissions of SO_2, PM_{10}, NO_X, CO, and lead would have a discernable impact on public health.

With respect to health impacts of multiple sources in the Merrimack Valley, cumulative air modeling of the proposed facility, together with 28 other sources within a radius of 10 miles of the proposed facility, is described in Section III.B.5, above. The record shows that the cumulative concentrations modeled for each criteria pollutant were below NAAQS.[137] The record also shows that the proposed facility's contribution to modeled pollutant concentrations would be well below one percent of the maximum cumulative impacts for SO_2, PM_{10}, NO_2, and

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[137] As shown in Table 5, above, the Company predicted the maximum cumulative 24-hour average and annual average impacts for SO_2 to be 92 percent and 76 percent of the NAAQS, respectively, and the maximum cumulative 8-hour average impact for CO to be 91 percent of the NAAQS; other cumulative impacts ranged from 39 percent to 57 percent of standards.

CO. The Company has committed to meeting BACT or LAER, as applicable, and to obtaining offsets or allowances for its NO_X and SO_2 emissions as required. Further, displacement analysis performed by the Company indicates substantial reduction in regional emissions of SO_2, NO_X, and CO_2. The record indicates that ground-level ozone concentrations are best evaluated as a regional rather than a local issue, and that increases in regional ozone concentrations associated with the proposed facility would be minimized by compliance with LAER and both direct offsets and displacement of ozone precursor emissions. Based on the stated compliance with MADEP air quality standards, the Siting Board finds that the cumulative health impacts of criteria pollutant emissions from the proposed facility would be minimized.

3. Air Toxics

The Company indicated that, for air toxics, MADEP has developed ambient air quality criteria which are intended to protect public health (Exh. EFSB-H-2). These criteria are presented as 24-hour TELs and annual average AALs (id.). The Company stated that these ambient air quality criteria were developed to ensure that contributions from any single emissions source would not have any significant impact on public health (id.). As discussed in more detail in Section III.B, above, the Company reported that its dispersion modeling indicated that the proposed facility would not produce air toxic concentrations that exceed AALs or TELs (id.). In addition, the Company referred to a 1998 EPA report entitled "Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units – Final Report to Congress" ("HAPs Study"), which assessed emissions from 684 utility plants, including coal-fired, oil-fired, and natural gas-fired generators (Exh. EFSB-H-1). The Company quoted from the HAPs Study, indicating that the cancer risks for all gas-fired plants were well below one chance in one million, and that no noncancer hazards were identified (id.).

The Company stated that one does not generally expect to find mercury in emissions from combustion of natural gas (Tr. 11, at 1530-1531). Specifically, the Company indicated that the proposed facility would emit less than 0.005 tpy of mercury (Exh. EFSB-A-2, Att. at 4-21). Any increases in ambient concentrations were modeled to be 0.1 percent of MADEP TELs and AALs, or less (id., Att. at 6-10).

The record indicates that in the general case, air emissions from gas-fired power plants pose minimal health risks and that in this specific case, the proposed facility would not exceed applicable ambient limits for air toxics. Based on findings attributed to EPA's HAPs Study, the Siting Board concludes that, in the absence of project-specific evidence to the contrary, the emissions of non-criteria pollutants from a gas-fired generating facility should be considered to have no discernable public health impacts. Based on the stated compliance with MADEP AALs and TELs, the Siting Board finds that the cumulative health impacts of non-criteria pollutant emissions from the proposed facility would be minimized.

4. Discharges to Ground and Surface Waters

The Company indicated that during normal facility operations, discharges to land would be limited to stormwater discharges (Exh. EFSB-H-2). The Company stated that the proposed facility is being designed to comply with MADEP stormwater management policy (see Section III.C) and that under normal operating conditions, stormwater runoff should not contain any contaminants that would contribute to adverse health effects (Exh. EFSB-H-2). The Company stated that the stormwater runoff would comply with MADEP stormwater management guidelines and National Pollutant Discharge Elimination System ("NPDES") Construction General Permit Requirements (Exh. EFSB-H-3). The record does not indicate the existence of any high yield aquifer or drinking water supply wells in the immediate area of the proposed project.

The Company indicated that Lawrence and Methuen withdraw water from the Merrimack River for potable water supplies (Exh. NHE-1, at 4.3-21, 4.3-22). Also, there are boating and fishing activities downstream (id. at 4.3-25). The Company indicated that the LRWU is subject to an NPDES permit; that NPDES standards are designed to protect human and ecological health; and that project discharges would not adversely affect the LRWU's ability to meet its permit limits (Exh. EFSB-H-2). As discussed in Section III.C, above, the Company stated that wastewater constituents would principally be concentrated solids from Merrimack River water. The record does not identify any potential for humans to be exposed to any harmful contaminants that might be discharged from the proposed facility to ground and surface waters.

In Section III.C, above, the Siting Board found that the environmental impacts of the proposed facility would be minimized with respect to water resources. Consequently, the Siting Board finds that the health risks of the proposed facility related to discharges to ground and surface waters would be minimized.

5. Handling and Disposal of Hazardous Materials

As discussed in Section III.H above, the proposed project would use 19 percent aqueous ammonia for NO_x control, and limited amounts of lubricating oils and certain other industrial chemicals, primarily for water and wastewater treatment.[138] The Company stated that ammonia is a naturally occurring compound; for instance, ammonia is released in small quantities by human bodies (Exh. EFSB-H-6). The Company stated that use of ammonia in fertilizer constitutes its principal anthropogenic source (id.). The Company identified a concentration of 5 ppm as a threshold of odor detection; concentrations up to 25 ppm as causing no significant irritation; concentrations up to 200 ppm as having a strong odor and likely to cause eye, nose, and throat irritation but which most individuals may be exposed to for an hour without serious health effects or impairment; and 1,000 ppm as a one-hour concentration that would cause severe irritation but would not be life-threatening (id.).

In Section III.H, above, the Siting Board reviewed the Company's plans for storage and handling of hazardous materials, including aqueous ammonia, and its plans for minimizing and responding to accidental releases of hazardous materials. The Siting Board determined that aqueous ammonia and other non-fuel chemicals would be properly managed and stored and that the Company would consider using an AOD system requiring one-third of the on-site ammonia storage of using bulk ammonia for NO_X control. The Company estimated that, in the event of an ammonia tank failure, ammonia concentrations above 200 ppm, the threshold of potential toxicity noted above, would be limited to the 25-acre site and a small portion of the Brox

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138 Sulfuric acid and sodium hydroxide would be used for demineralizer regeneration; sodium hypochlorite would be used as a cooling tower biocide; sodium sulfite may be needed to neutralize residual chlorine in wastewater; and various other chemicals would be used to treat water for the HRSG (Exhs. NHE-2, at 5.12-6; EFSB-W-22).

property abutting the 25-acre site. Nonetheless, to minimize the possibility that Brox employees and other individuals accessing the Brox property would be exposed to harmful concentrations of ammonia, the Siting Board has required the Company either to enclose the ammonia tank or to install other mitigation such as a double-walled ammonia tank, unless it chooses to use an AOD system.

The Company also analyzed an ammonia spill from a tanker truck accident, demonstrating that ammonia concentrations above 200 ppm, the threshold of potential toxicity noted above, would not extend more than 2112 feet from the spill. In order to minimize potential public exposure in case of an accident, the Company has agreed to require that ammonia deliveries be made between 3:00 a.m and 6:00 a.m. In addition, the Siting Board has directed the Company, as part of its development of emergency response plans for the facility, to identify in cooperation with Dracut and Methuen steps to address possible tanker truck delivery accidents along the planned tanker delivery route between the I-93/Route 110 interchange and the proposed site. The Siting Board found that, with the implementation these conditions (and a condition related to fogging and icing), the safety impacts of the proposed facility would be minimized.

As discussed in Section III.E, above, solid and hazardous wastes generated at the facility would include spent water treatment media, spent lubrication oil filters, depleted CO and SCR catalyst units, rags, broken and rusted equipment, and empty containers. The Siting Board found that wastes would either be recycled or removed by licensed waste contractors and disposed of at appropriate disposal sites for hazardous and non-hazardous wastes. The Company has demonstrated that it has in place procedures for the proper handling, storage, and disposal of hazardous materials during construction and operation of the proposed facility. In addition, the Company has demonstrated that ammonia concentrations from an accidental spill would be below levels hazardous to public health at the Brox properties boundaries, and that accidental spills of other hazardous materials could be contained at the source and therefore would not affect public health. Consequently, the Siting Board finds that the health risks from the proposed project related to the handling and disposal of hazardous materials would be minimized.

6. EMF

As discussed in Section III.J, above, the Company predicted that magnetic field strengths would increase along the ROW containing an existing 345 kV (#394) line, to the west of the site, to which the project would interconnect (Tr. 12, at 1596). The Company predicted that electric field strengths along the ROW would not change (Exh. NHE-1, at 4.11-1). The Company stated that magnetic field strength increases would be minimized by interconnecting to the highest voltage line in the area, which minimizes current (Tr. 12, at 1672). The Company estimated that, when the proposed facility is in operation, maximum magnetic field strengths along the edge of the ROW would increase to 29.8 mG (Exh. EFSB-E-5).

The possible health effects of exposure to EMF have been a subject of considerable debate. The Company's witness, Dr. Valberg, stated that it is not known whether there is any mechanism by which EMF can affect biology (Tr. 12, at 1587). The Company indicated that regulatory agencies have not identified an adverse health effect from EMF which could be used to define "safe" exposure levels (Exhs. NHE-1, at 4.11-4; EFSB-H-7). The Company summarized some existing guidance regarding exposure to EMF, noting that there are no regulatory standards for such exposure (Exh. NHE-1, at 4.11-4). The Company stated that the International Radiation Protection Association provides guidance recommending limits on magnetic field exposures for members of the general public, and reported the limit variously as 833 and 1000 mG (id. at 4.11-4, 4.11-5).[139] In a 1985 case involving the construction of the 345 kV overhead HydroQuebec line, the Siting Board heard expert testimony, reviewed the existing literature, and concluded that there was no affirmative evidence that the proposed facilities, which had edge-of-ROW levels of 85 mG, would produce harmful health effects. 1985 MECo/NEPCo Decision, 13 DOMSC at 228-242.

The Company quoted a finding from a 1997 National Academy of Sciences/National Research Council report to the effect that available laboratory and human data have not demonstrated what, if any, magnitudes of power line electric and magnetic fields cause human

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[139] The Company also presented several guidelines for occupational exposure and a guideline of 1000 mG for individuals with pacemakers, issued by the American Conference of Governmental Industrial Hygienists ("ACGIH") (Exh. NHE-1, at 4.11-4).

health effects (Exh. NHE-1, at 4.11-4). The Company provided a copy of this report, which provides a comprehensive review of research up to that date on the biological effects of exposure to power-frequency electric and magnetic fields, including cellular and molecular studies, animal studies, and epidemiological studies (Exh. RR-EFSB-55(a)). The report concludes that the current body of evidence does not show that exposure to such fields presents a human health hazard (id. at 2). With respect to epidemiological studies, the report stated that studies have not identified factors explaining an association between outdoor electrical wiring configurations and childhood leukemia, and indicates also that the aggregate evidence does not support an association between magnetic field exposure and adult cancer, pregnancy outcome, neurobehavioral disorders, and childhood cancers other than leukemia (id. at 3). With respect to in vitro studies, the report finds that exposure to 50-60 Hertz ("Hz") fields induces changes in cultured cells only at field strengths 1,000 to 100,000 times the levels typically found in residences (id. at 6). With respect to animal studies, the study finds no convincing evidence that exposure to power-frequency fields causes cancer or has any adverse effects on reproduction or development in animals (id. at 7). The report finds evidence of behavioral response when animals are exposed to fields that are considerably stronger than fields encountered in a residential environment; however, there was no demonstration of adverse neurological impacts (id.).

The Company also provided journal articles reporting on three recent case-control studies[140] that were conducted to assess the relationship between the risk of childhood leukemia and/or all cancers and residential exposure to magnetic and/or electric fields (Exhs. RR-EFSB-55(a), Att.; RR-EFSB-55(b), Att.; RR-EFSB-55(c), Att.). Two separate articles describing Ontario study findings appear to suggest a relationship between leukemia risk

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[140] The articles provided were: (1) Green, L.M., A.B. Miller, et al., 1999, "A case-control study of childhood leukemia in Southern Ontario, Canada, and exposure to magnetic fields in residences;" (2) Green, L.M., A.B. Miller, et al., 1999, "Childhood leukemia and personal monitoring of residential exposures to electric and magnetic fields in Ontario, Canada;" (3) Linet, M.S., E.E. Hatch, et al., 1997, "Residential exposure to magnetic fields and acute lymphoblastic leukemia in children;" and (4) UK Childhood Cancer Study Investigators, 1999, "Exposure to power-frequency magnetic fields and the risk of childhood cancer."

and measured EMF but not between leukemia risk and proximity to power lines with a high current configuration (Exh. RR-EFSB-55(a), Att.). The 1997 study conducted in several American states found "little evidence" of a relationship between acute lymphoblastic leukemia and either magnetic field levels or electrical wire configurations (Exh. RR-EFSB-55(b), Att.). The British study of a large number of cases and controls found no evidence of a relationship between either childhood leukemia or other childhood cancer and power-frequency magnetic fields (Exh. RR-EFSB-55(c), Att.).

Overall, although there are some epidemiological studies which suggest a correlation between exposure to magnetic fields and childhood leukemia, and some evidence of biological response to exposure to magnetic fields in animal studies, there is no clear evidence of a cause-and-effect association between magnetic field exposure and human health. Thus, the record in this case does not support a conclusion that any changes in EMF levels anticipated as a result of the proposed facility would pose a public health concern. In Section III.I, above, the Siting Board found that the EMF impacts of the proposed facility would be minimized. Accordingly, the Siting Board finds that the health effects, if any, of magnetic fields associated with the proposed facility would be minimized.

7. Noise

As discussed in Section III.G, above, the proposed facility would produce noticeable noise in some surrounding community areas, both during the facility construction period and during operation of the facility. The Company has assessed the noise impacts of the proposed facility in relation to applicable federal and local criteria for acceptable ambient noise, as well as the MADEP standard which limits allowable noise increases from new sources.

The Company provided information indicating that the Occupational Safety and Health Administration ("OSHA") has established guidelines to prevent hearing loss due to long-term exposure to noise; the Company stated that the OSHA limit is 70 dBA, on a 24-hour L_{eq} basis (Exh. EFSB-H-7).[141] The Company stated that there have been studies of sleep disturbance

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[141] The EPA also has identified a sound level of 70 dBA, on a 24-hour L_{eq} basis, as (continued...)

above thresholds in the 40 to 70 dBA range (id.). Dr. Valberg stated that, although noise can disturb sleep, there are no real health guidelines for such disturbances (Tr. 12, at 1582, 1583).

The Company forecasted plant noise as up to 37 dBA, L_{eq}, at residences, with night-time totals for plant noise plus ambient predicted as up to 38 dBA (Exh. NHE-2, at 5.3-25). Construction noises up to 60 dBA, L_{eq}, were forecasted at the nearest residence, and the Company indicated that short duration steam blows could be louder (id. at 5.3-20).

The record shows that operational noise levels in residential areas would be well below thresholds where hearing loss from long-term noise exposure could occur. The record indicates that night-time operational noise levels outdoors at residences would be below the range considered likely to cause sleep disturbance. The record suggests that sleep disturbance would be a possibility if construction were scheduled at night. However, the Company stated that construction hours would be limited to minimize noise disturbances to the community (id. at 6-11). Condition VI.E of the Special Permit requires, with limited exceptions, that construction work would occur only from 7:00 a.m. to 5:30 p.m., Monday through Friday (Exh. INT-MVRE-G-7(a), Att., Appendix B at 24). Also, as noted in Section III.G, above, Dracut noise bylaws limit nighttime noise to 50 dBA at residences. Therefore, no adverse effects on health due to facility noise are expected. As noted in Section III.G, the proposed project has been designed to minimize noise, consistent with minimizing cost of mitigating, controlling, and reducing such impacts. Consequently, the Siting Board finds that the health effects, if any, of noise from the proposed facility would be minimized.

8. Conclusions

In the subsections above, the Siting Board has reviewed baseline health conditions in cities and towns proximate to the proposed facility, and has analyzed the potential health impacts

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[141] (...continued)
protecting against damage to hearing; in addition, the EPA identified 55 dBA as a day-night sound level at which normal outdoor conversation at approximately 3 meters would not be impaired (Exh. EFSB-N-5, Att. at 29). The EPA indicated that the complaint level at an L_{dn} of 55 dBA would be approximately one percent, "dependent on attitude and other non-[noise-]level related factors" (id. at 22).

of the proposed facility on the surrounding area over various pathways. With respect to baseline health conditions, the Siting Board has noted that the incidence of some specific types of cancer was statistically elevated, compared to statewide averages, within a recent eight-year period. The Siting Board has also noted that hospitalization rates for pediatric asthma were above statewide averages in Lawrence in 1994-95, and that excessive lead levels have been documented in Lawrence residents.

With respect to potential health impacts, the Siting Board has found that:

(1) the cumulative health impacts of criteria pollutant emissions from the proposed facility would be minimized;

(2) the cumulative health impacts of non-criteria pollutant emissions from the proposed facility would be minimized;

(3) the health risks of the proposed facility related to discharges to ground and surface waters would be minimized;

(4) the health risks of the proposed facility related to the handling and disposal of hazardous materials would be minimized;

(5) the health effects, if any, of magnetic fields associated with the proposed facility would be minimized; and

(6) the health effects, if any, of noise from the proposed facility would be minimized.

The Siting Board recognizes that potential health impacts have been a primary concern for many of the intervenors throughout this proceeding. On brief, for example, MVRE argued that there is no substantial evidence to prove that the cumulative impacts from Nickel Hill and other sources in the Merrimack Valley do not have the potential to contribute to the statistically significant cancer excesses in nine Merrimack Valley communities (MVRE Reply Brief at 18). In addition, certain parties argued that a decision should be delayed until further studies have been completed; for example, Bruton/Vrountas argued that the MADPH study of asthma in the Merrimack Valley should be completed and "other health and cumulative impact studies should be performed" before the Nickel Hill project can be considered (Bruton/Vrountas Brief at 14, n.3).

In response, Nickel Hill argued that there is no credible evidence to support a claim that communities in the Merrimack Valley are any more susceptible to adverse health effects from operation of a generating facility than any other area of the Commonwealth (Nickel Hill Supplemental Brief at 18). Similarly, Dracut argued that the record is void of any evidence drawing credible links between any health ailments and the emissions of a facility such as that proposed (Dracut Reply Brief at 6).

The Siting Board notes that, at this point in the proceeding, the parties differ not so much about the interpretation of the data presented, as about the standard which the Siting Board should adopt in reviewing the potential health impacts of power plants. For example, in their Brief, Bruton/Vrountas quoted with approval the following statement made by MVRE witness Everett Penney:

> "We need to take the attitude that this plant should not be permitted and should not be allowed to operate until we can prove that there's going to be absolutely no adverse public health and environmental impacts." (Bruton/Vrountas Brief at 16).[142]

This is not a standard which the Siting Board can adopt, for several reasons. First, it is inconsistent with the Siting Board's mandate to minimize environmental impacts consistent with minimizing costs (see Section III.A). The Siting Board is required to determine that impacts would be minimized and balanced with costs, not to determine that a facility would have no impacts whatsoever. See G.L. c. 164, § 69J¼. Second, it is an impracticable standard, both because it is generally impossible to prove a negative proposition, and because it is a general rule of environmental science that every action, however minor, will have some impact.
For similar reasons, the Siting Board cannot adopt the position that approval of this facility should be delayed indefinitely pending the completion of further studies regarding background health conditions in the Merrimack Valley. The Siting Board's statute calls for it to issue a decision within a set period of time; the Siting Board therefore need not, and may not, wait for the completion of all conceivably relevant studies before rendering a decision. See G.L. c. 164,

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142 Because Mr. Penney's statements were not made under oath, they do not constitute evidence in this proceeding.

§ 69J¼. Instead, the Siting Board must use the record data available to it at the time of the proceeding to document the potential health impacts of a proposed generating facility, and must determine in a timely fashion whether these potential health impacts have been minimized. In order to accomplish this, the Siting Board has systematically reviewed the potential impacts of the anticipated emissions from the proposed facility in light of existing information about the health status of the population of Dracut and other communities in the Merrimack Valley. Because this has been an issue of significant concern in this proceeding, we summarize the review here. The Nickel Hill facility is proposed as a combined-cycle, natural gas-fired power plant. It is expected to emit certain criteria pollutants, including SO_2, PM_{10}, NO_2, and CO, as well as VOC, a precursor to the criteria pollutant ozone. It is also expected to emit ammonia, as a byproduct of its NO_X control technology. Because it would be fueled exclusively by natural gas, it is not expected to emit detectable quantities of lead or mercury; these emissions are associated with the combustion of oil or coal, not of natural gas.

As discussed in more detail in Sections III.B and III.L.2, above, the Siting Board has reviewed both the proposed facility's incremental emissions of SO_2, PM_{10}, NO_2, and CO, and the emissions of the proposed facility combined with those of 27 other existing major emissions sources within a 10-mile radius. The proposed facility's incremental emissions all would be below SILs. Further, the cumulative analysis demonstrates that even the combined emissions of the proposed facility and the 27 other major sources would not cause maximum concentrations of criteria pollutants to increase above levels that EPA has determined to be protective of human health. Cumulative concentrations would be approximately 90 percent of these standards for 24-hour SO_2 and for 8-hour CO; however, the proposed facility's emissions would increase concentrations of these pollutants by less than one-half of one percent. Thus, although the proposed facility would emit criteria pollutants, these emissions would not lead to a violation of health-based air quality standards, even in combination with the emissions of other sources in the Merrimack Valley.[143]

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[143] The Siting Board notes that the Secretary of the Executive Office of Environmental Affairs, Robert Durand, in his Certificate on the FEIR for the Nickel Hill project, found (continued...)

The Siting Board also has reviewed the proposed facility's expected emissions of VOC, which along with NO_X is a precursor to ozone. Several intervenors in this case have raised concerns about ozone levels as they relate to the incidence of asthma in certain parts of the Merrimack Valley. The Siting Board notes that ozone is generally formed at a distance downwind of VOC and NO_X sources, and therefore that any effect on ozone levels directly associated with the proposed facility's emissions of VOC and NO_X would primarily be found at locations downwind of the Dracut/Methuen/Andover area. Ozone concentrations in the Dracut/Methuen/Andover area would depend on ozone precursor emissions throughout a wider area, extending well beyond the Merrimack Valley, including emissions sources that are not reflected in the Company's interactive source modeling.

In addition, the record establishes that Nickel Hill would be required to provide VOC and NO_X offsets at ratios of 1.26:1, and includes the Company's analysis indicating that operation of the proposed facility would result in relatively large reductions in NO_X emissions from other generating facilities in the New England region that would be displaced. Given the status of ozone as a regional pollutant, the evidence as to direct offsets and potential additional displacement through economic dispatch has bearing on the evaluation of overall facility impacts. The comparative importance of local emissions, direct offsets, and economic displacement was not established in the record. However, the Siting Board notes that given the very low facility emissions allowed under LAER for VOC and NO_X, the significant (50-fold) modeled displacement of regional NO_X emissions, and the direct offsets of VOC and NO_X emissions, operation of the proposed facility likely would result in decreases in emissions of precursors that affect ozone in the Merrimack Valley; such decreases would offset any contribution of the facility's emission of ozone precursors that affect ozone in the Merrimack Valley. Thus, although it is critical that the proposed facility minimize its VOC and NO_X emissions, those emissions are unlikely to significantly affect public health in the vicinity of the

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143 (...continued)
that Nickel Hill's air modeling "demonstrates that the facility's modeled emissions will be below levels at which health impacts would be expected" (Exh. INT-MVRE-G-7(d), sec. 9, Certificate at 3).

proposed facility.

As discussed in more detail in Section III.L.3 above, the Siting Board also has reviewed evidence regarding the proposed facility's anticipated emissions of air toxics, non-criteria pollutants frequently associated with an increased risk of cancer. The Company's modeling demonstrates that its emissions of all air toxics, including ammonia, would be below health-based standards set by the MADEP. This modeling is corroborated by the 1998 EPA HAPs Study, which assessed air toxic emissions from generators and concluded that cancer risks for gas-fired plants were well below one-in-a-million, and that no non-cancer risks were identified. The Siting Board recognizes that emissions of lead (which is classified as both a criteria pollutant and an air toxic) or mercury would be of particular concern in the Merrimack Valley region, as excessive lead levels have been documented in Lawrence residents, and there is some indication that elevated levels of persistent environmental contaminants including lead and mercury exist in local soils, sediments, and fish. However, the record indicates that emissions of lead and mercury from the proposed facility, if any, would be at undetectable levels and would be over an order of magnitude below MADEP standards. In short, health impacts from the emission of air toxics have been essentially eliminated through the choice of natural gas as the primary fuel for the proposed facility and the decision to forego the use of oil as a backup fuel.

In summary, then, the record shows that: (1) the criteria pollutant emissions of the proposed facility, in combination with the emissions from other regional facilities, would not cause local air quality to violate health-based standards; (2) because ozone concentrations depend on emissions of precursors over a wide region, emissions of the ozone precursors VOC and NO_X are unlikely to significantly affect public health in the vicinity of the proposed facility; and (3) due to the use of natural gas as the sole fuel for the proposed facility, emissions of air toxics would be extremely low to non-existent, and therefore would not raise health concerns. Ms. Watts, a witness for MVRE, has asserted there likely would be synergistic[144] adverse health effects among pollutants, but did not provide more detailed information as to what such effects might be (Tr. 14, at 1730, 1862). The Siting Board notes that nothing in the record suggests

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144 A "synergistic" effect is any combined effect greater than a simple additive effect.

multiple toxicities with either additive, synergistic, or antagonistic[145] action. Accordingly, the Siting Board finds that the cumulative health impacts of the proposed facility associated with air emissions, considering background health conditions and existing air quality, would be minimized.

In subsections above, the Siting Board also has reviewed potential health-related impacts related to discharges to ground and surface waters, the handling and disposal of hazardous materials, magnetic fields associated with the proposed facility, and noise, and has found that each would be minimized. The record provides no indication that health effects from the different types of potential exposures, however minimal, would combine to create an overall effect greater than the sum of the minimized effects; and the record provides no indication of an interaction of potential facility-related health effects with documented pre-existing health conditions in Dracut and other communities. Consequently, the Siting Board finds that there is no evidence in the record to support a conclusion that the proposed facility would exacerbate any existing public health problems in the Merrimack Valley. Accordingly, based on its review of the record, the Siting Board finds that the cumulative health impacts of the proposed facility would be minimized.

M. Conclusions

Based on the information in Sections II and III, above, the Siting Board finds that Nickel Hill's description of the proposed generating facility and its environmental impacts is substantially accurate and complete.

In Section III.B, the Siting Board has found that, with the implementation of a condition directing Nickel Hill to pay $725,866 in five annual installment during the first five years of facility operation to a cost-effective CO_2 offset program(s) to be selected in consultation with the Staff of the Siting Board, the air quality impacts of the proposed facility would be minimized.

In Section III.C, the Siting Board has found that, with the implementation of a condition directing Nickel Hill to provide to the Lowell Regional Wastewater Utility information on the

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145 An "antagonistic" effect is any combined effect less than an additive effect.

components of the water treatment products that it uses, with copies to the Siting Board, the water resource impacts of the proposed facility would be minimized consistent with minimizing other environmental impacts and the cost of mitigating, controlling, and reducing such impacts.

In Section III.D, the Siting Board has found that the wetlands impacts of the proposed facility would be minimized.

In Section III.E, the Siting Board has found that the solid waste impacts of the proposed facility would be minimized.

In Section III.F, the Siting Board has found that, with the implementation of conditions directing Nickel Hill: (1) to submit, prior to commencement of construction, a copy of the instrument, in recorded form if required, that provides for the preservation of 18 acres east of the 25-acre site as a woodland buffer; and (2) to provide reasonable off-site mitigation of visual impacts, including shrubs, trees, window awnings, or other mutually agreeable measures, that would screen views of the proposed generating facility and related facilities at affected residential properties and at roadways and other locations within one mile of the proposed facility, as requested by individual property owners or appropriate municipal officials, the visual impacts of the proposed facility would be minimized.

In Section III.G, the Siting Board has found that, with the implementation of the proposed mitigation and the noise easement between Nickel Hill and Brox Industries, the noise impacts of the proposed facility would be minimized, consistent with minimizing cost of mitigation.

In Section III.H, the Siting Board has found that, with the implementation of the conditions directing Nickel Hill: (1) as part of its development of emergency response plans for the facility, to identify in cooperation with Dracut and Methuen steps to address possible tanker truck delivery accidents along the planned tanker delivery route between the I-93/Route 110 interchange and the proposed site; (2) in order to allow the Siting Board to remain informed as to Nickel Hill's choice of an ammonia system, to provide an update to the Siting Board on its evaluation of the performance and relative cost for an AOD system, and its plans for installing a conventional or alternative ammonia system as part of the SCR design based on evaluation of performance and cost; (3) to enclose the ammonia storage tank or incorporate an alternative design such as a double-walled tank to mitigate the impacts of any potential ammonia spill,

unless Nickel Hill determines that it will install an AOD system; (4) to provide an update to the Siting Board, prior to commencement of construction of the ammonia system, on Nickel Hill's plans for installing an ammonia system as part of the SCR design; (5) to monitor fogging and icing in the vicinity of the proposed facility and, as necessary, establish a plan in cooperation with appropriate local officials to deice or sand iced roadways and alert motorists and residents concerning any project-related fogging or icing episodes affecting public safety, the safety impacts of the proposed facility would be minimized.

In Section III.I, the Siting Board has found that the traffic impacts of the proposed facility would be minimized.

In Section III.J., the Siting Board has found that, with the implementation of the condition directing Nickel Hill to provide the Siting Board with an update on the extent and design of required transmission upgrades, if any, and the measures incorporated into any design of required transmission upgrade designs to minimize magnetic field impacts, at such time as Nickel Hill reaches final agreement with all transmission providers regarding transmission upgrades, the EMF impacts of the proposed facility would be minimized.

In Section III.K, the Siting Board has found that the land use impacts of the proposed facility would be minimized.

In Section III.L, the Siting has found that the cumulative health impacts of the proposed facility would be minimized.

Accordingly, the Siting Board finds that, with the implementation of the above-listed conditions, Nickel Hill's plans for the construction of the proposed generating facility would minimize the environmental impacts of the proposed facility consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts of the proposed generating facility. In addition, the Siting Board finds that an appropriate balance would be achieved among conflicting environmental concerns as well as between environmental impacts and costs.

IV. CONSISTENCY WITH THE POLICIES OF THE COMMONWEALTH

A. Standard of Review

G. L. c. 164, § 69J¼ requires the Siting Board to determine whether the plans for construction of a proposed generating facility are consistent with current health and environmental protection policies of the Commonwealth and with such energy policies of the Commonwealth as are adopted by the Commonwealth for the specific purpose of guiding the decisions of the Siting Board. The health and environmental protection policies applicable to the review of a generating facility vary considerably depending on the unique features of the site and technology proposed; however, they may include existing regulatory programs of the Commonwealth relating to issues such as air quality, water-related discharges, noise, water supply, wetlands or river front protection, rare and endangered species, and historical or agricultural land preservation. Therefore, in this Section, the Siting Board summarizes the health and environmental protection policies of the Commonwealth that are applicable to the proposed project and discusses the extent to which the proposed project complies with these policies.[146]

B. Analysis

In Sections II and III, above, the Siting Board has reviewed the process by which Nickel Hill sited and designed the proposed facility, and the environmental and health impacts of the proposed project as sited and designed. As part of this review, the Siting Board has identified a number of Commonwealth policies applicable to the design, construction, and operation of the proposed facility. These are briefly summarized below.

As discussed in Section III.B, above, the MADEP extensively regulates emissions of criteria and non-criteria pollutants from new sources such as the proposed facility. Nickel Hill has demonstrated that it expects to comply with all MADEP standards.

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[146] The Siting Board notes that its Technology Performance Standard at 980 CMR, § 12.00 could be construed as an energy policy of the Commonwealth adopted for the purpose of guiding the decisions of the Siting Board. The proposed project's compliance with 980 CMR, § 12.00 is discussed in Section III.B, above. The Commonwealth has not adopted any other energy policies pertaining to the Siting Board's review of generating facilities since G.L. c. 164, § 69J¼ was enacted.

As discussed in Section III.C, above, Nickel Hill has demonstrated that it will comply with state and local requirements related to wastewater treatment and stormwater management.

As discussed in Section III.D, above, Nickel Hill has demonstrated that the wetlands impacts of the proposed facility would be minimized. In addition, Nickel Hill has received an Order of Conditions for the proposed project from the Dracut Conservation Commission, as required by the Massachusetts Wetlands Protection Act.

As discussed in Section III.G, above, Nickel Hill has demonstrated that it will limit L_{90} noise increases at the nearest residence to 6 dBA, which is consistent with MADEP Policy 90-001, which limits such increases to 10 dBA. Because operation of the facility would increase noise levels more than 10 dBA above ambient noise levels at the boundary of the 25-acre site, but would not exceed a 10 dBA increase at the boundaries of the 450-acre Brox properties, Nickel Hill and Brox Industries are negotiating a noise easement that would allow both noise level increases of more than 10 dBA and pure tone emissions on Brox Industries properties. The Siting Board anticipates Nickel Hill will seek a waiver of the MADEP property line limit based on the non-residential character of the adjacent off-site areas and the anticipated Nickel Hill/Brox Industries noise easement.

As discussed in Section III.K, above, Nickel Hill has demonstrated that it has complied with state programs protecting historical and archeological resource areas, and rare or endangered species.

Consequently, based on its review above, the Siting Board finds that plans for construction of the proposed facility are consistent with current health and environmental protection policies of the Commonwealth and with such energy policies of the Commonwealth as have been adopted by the Commonwealth for the specific purpose of guiding the decisions of the Siting Board.

V. DECISION

The Siting Board's enabling statute directs the Siting Board to implement the energy policies contained in G. L. c. 164, §§ 69H-69Q to provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. G. L.

c. 164, § 69H. Section 69J¼ requires that, in its consideration of a proposed generating facility, the Siting Board review inter alia the site selection process, the environmental impacts of the proposed facility, and the consistency of the plans for construction and operation of the proposed facility with the environmental policies of the Commonwealth.

In Section II, above, the Siting Board has found that Nickel Hill's description of the site selection process used is accurate and that the site selection process resulted in the selection of a site that contributes to the minimization of the environmental impacts of the proposed facility and the costs of mitigating, controlling, and reducing such impacts.

In Section III, above, the Siting Board has found that with the implementation of listed conditions relative to air quality, water resources, visual, safety, and EMF impacts, Nickel Hill's plans for the construction of the proposed generating facility would minimize the environmental impacts of the proposed facility consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts of the proposed facility. The Siting Board also has found that Nickel Hill's description of the proposed generating facility and its environmental impacts are substantially accurate and complete.

In Section IV, above, the Siting Board has found that the construction of the proposed facility on balance contributes to a reliable, low-cost, diverse, regional energy supply with minimal environmental impacts.

In Section V, above, the Siting Board has found that the plans for the construction of the proposed facility are consistent with current health and environmental protection policies of the Commonwealth and with such energy policies of the Commonwealth as have been adopted by the Commonwealth for the specific purpose of guiding the decisions of the Siting Board.

Accordingly, the Siting Board finds that, upon compliance with the conditions set forth in Sections III.B, III.C, III.F, III.H, and III.J, above, and listed below, the construction and operation of the proposed facility will provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

Accordingly, the Siting Board APPROVES the petition of Nickel Hill Energy, LLC to construct a 750 MW generating facility in Dracut, Massachusetts, subject to the following conditions:

Prior to the commencement of construction of the proposed facility:

(A) In order to minimize air quality impacts, the Siting Board directs Nickel Hill to obtain from the MADEP an air plan approval addressing emissions limits for regulated pollutants, BACT and LAER determinations, the use of SCONO$_X$ or another zero-ammonia technology for NO$_X$ control, VOC and NO$_X$ offset plans, and to file a copy with the Siting Board.

(B) In order to minimize visual impacts, the Siting Board directs Nickel Hill to submit a copy of the instrument, in recorded form if required, providing for preservation of the 18 acres as a woodland buffer.

Prior to the commencement of construction of the ammonia system:

(A) In order to minimize safety impacts, the Siting Board directs Nickel Hill to (1) provide an update to the Siting Board on its evaluation of the performance and relative cost for an AOD system, and (2) on its plans to enclose the ammonia storage tank or use an alternative design as part of the SCR design.

During construction and operation of the proposed facility:

(B) In order to minimize air quality impacts, the Siting Board directs Nickel Hill to provide $725,866 to be paid in five annual installments during the first five years of facility operation, to a cost-effective CO_2 offset program or programs to be selected in consultation with the Staff of the Siting Board. Alternatively, Nickel Hill may elect to provide a single contribution of $590,819 by the end of the first year of facility operation.

(C) In order to minimize water resource impacts, the Siting Board directs Nickel Hill to provide to the Lowell Regional Wastewater Utility information on the components of the water treatment products that it uses, with copies to the Siting Board.

(D) In order to minimize visual impacts, the Siting Board directs the Company to provide reasonable off-site mitigation of visual impacts, including shrubs, trees, window awnings, or other mutually-agreeable measures, that would screen views of the proposed facility at affected residential properties and at roadways and

other locations within one mile of the proposed facility, as requested by residents or appropriate municipal officials. In implementing the off-site mitigation, Nickel Hill: (1) shall provide shrub and tree plantings, window awnings, or other reasonable mitigation on private property, only with the permission of the property owner, and along public ways, only with the permission of appropriate municipal officials; (2) shall provide written notice of this requirement to appropriate municipal officials and to all potentially affected property owners, prior to the commencement of construction; (3) may limit requests for mitigation measures from local property owners and municipal officials to a specified period ending no less than six months after initial operation of the plant; (4) shall complete all agreed-upon mitigation measures within one year after completion of construction, or if based on a request filed after commencement of construction, within one year after such request; and (5) shall be responsible for the reasonable maintenance and replacement of plantings, as necessary, to ensure that healthy plantings become established.

(E) In order to minimize safety impacts, the Siting Board directs Nickel Hill, as part of its development of emergency response plans for the facility, to identify in cooperation with Dracut and Methuen steps to address possible ammonia tanker truck delivery accidents along the planned tanker delivery route between the I-93/Route 110 interchange and proposed site.

(F) In order to minimize safety impacts, the Siting Board directs Nickel Hill to enclose the ammonia storage tank or incorporate an alternative design such as a double-walled tank to mitigate the impacts of any ammonia spill, unless it determines that it will install an AOD system.

(G) In order to minimize safety impacts, the Siting Board directs Nickel Hill to monitor fogging and icing in the vicinity of the proposed facility and, as necessary, establish a plan in cooperation with appropriate local officials to deice or sand iced roadways and alert motorists and residents concerning any project-related fogging or icing episodes affecting public safety.

(H) In order to minimize EMF impacts, the Siting Board directs Nickel Hill to provide the Siting Board with an update on the extent and design of required transmission upgrades, if any, and the measures incorporated into any design of required transmission upgrade designs to minimize magnetic field impacts, at such time as Nickel Hill reaches final agreement with all transmission providers regarding transmission upgrades.

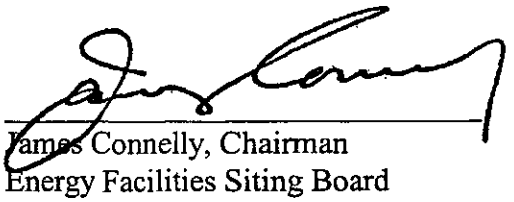
Because issues addressed in this Decision relative to this facility are subject to change over time, construction of the proposed generating facility must be commenced within three years of the date of this decision.

In addition, the Siting Board notes that the findings in this Decision are based upon the record in this case. A project proponent has an absolute obligation to construct and operate its facility in conformance with all aspects of its proposal as presented to the Siting Board. Therefore, the Siting Board requires Nickel Hill to notify the Siting Board of any changes other than minor variations to the proposal, so that the Siting Board may decide whether to inquire further into a particular issue. Nickel Hill is obligated to provide the Siting Board with sufficient information on changes to the proposed project to enable the Siting Board to make these determinations.

Denise L. Desautels
Hearing Officer

Dated this 13th day of November, 2000.

APPROVED by the Energy Facilities Siting Board at its meeting of November 9, 2000, by the members and designees present and voting: James Connelly (Chairman, DTE/EFSB); Deirdre K. Manning (Commissioner, DTE); David L. O'Connor (Commissioner, Division of Energy Resources); Joseph Donovan (for Elizabeth Ames, Director of Economic Development); and Sonia Hamel (for Robert Durand, Secretary of Environmental Affairs).



James Connelly, Chairman
Energy Facilities Siting Board

Dated this 13th day of November, 2000.

Appeal as to matters of law from any final decision, order, or ruling of the Siting Board may be taken to the Supreme Judicial Court by an aggrieved party in interest by the filing of a written petition praying that the order of the Siting Board be modified or set aside in whole or in part.

Such petition for appeal shall be filed with the Siting Board within twenty days after the date of service of the decision, order, or ruling of the Siting Board, or within such further time as the Siting Board may allow upon request filed prior to the expiration of the twenty days after the date of service of said decision, order, or ruling. Within ten days after such petition has been filed, the appealing party shall enter the appeal in the Supreme Judicial Court sitting in Suffolk County by filing a copy thereof with the clerk of said court. (Massachusetts General Laws, Chapter 25, Sec. 5; Chapter 164, Sec. 69P).

EPSILON ASSOCIATES INC.
Engineers ■ Environmental Consultants

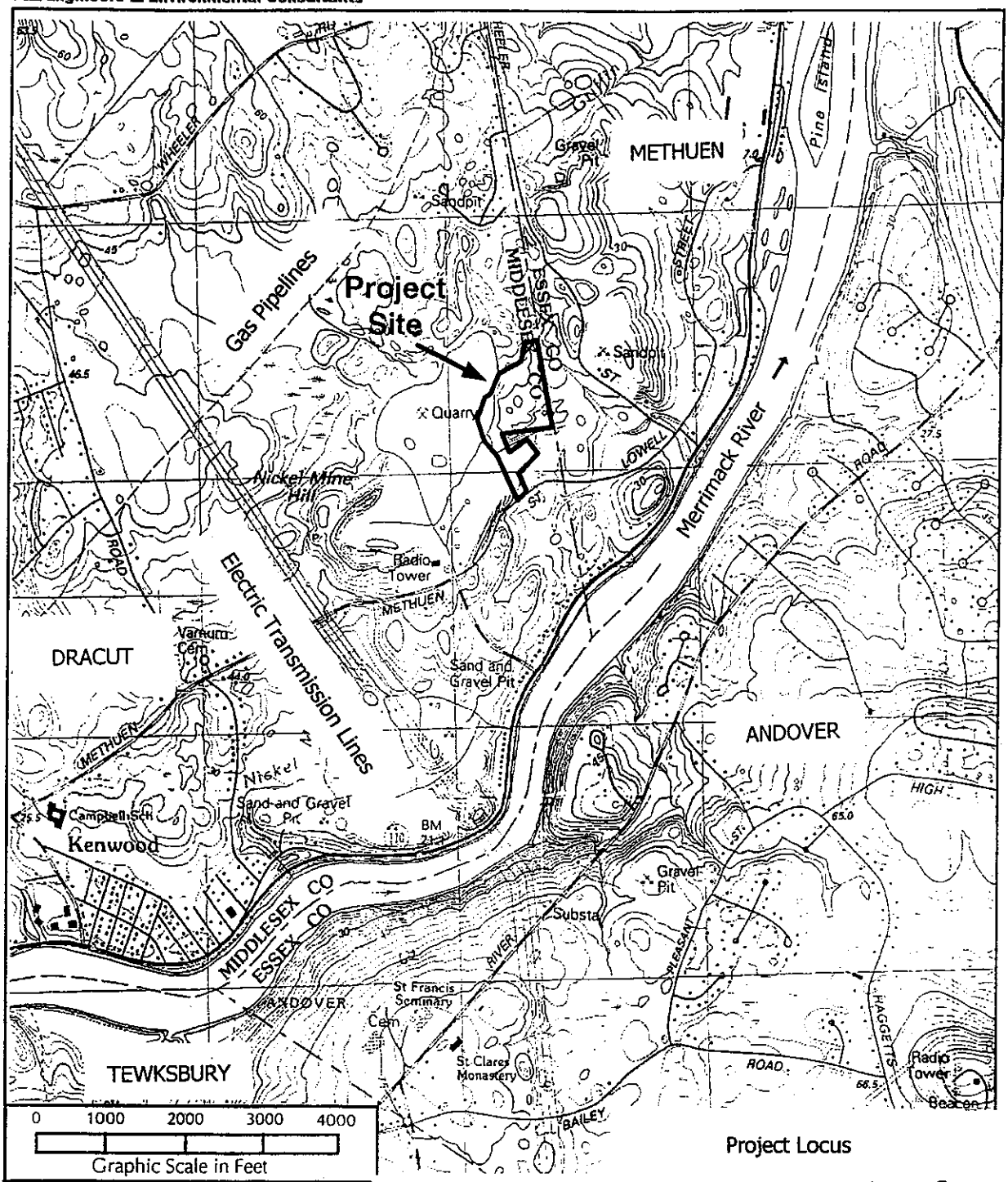
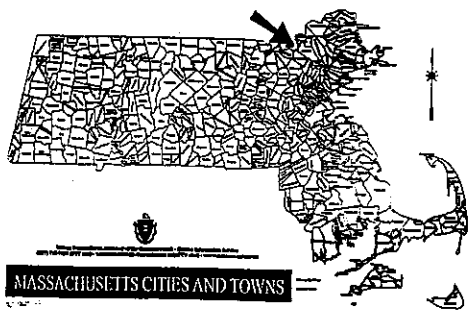
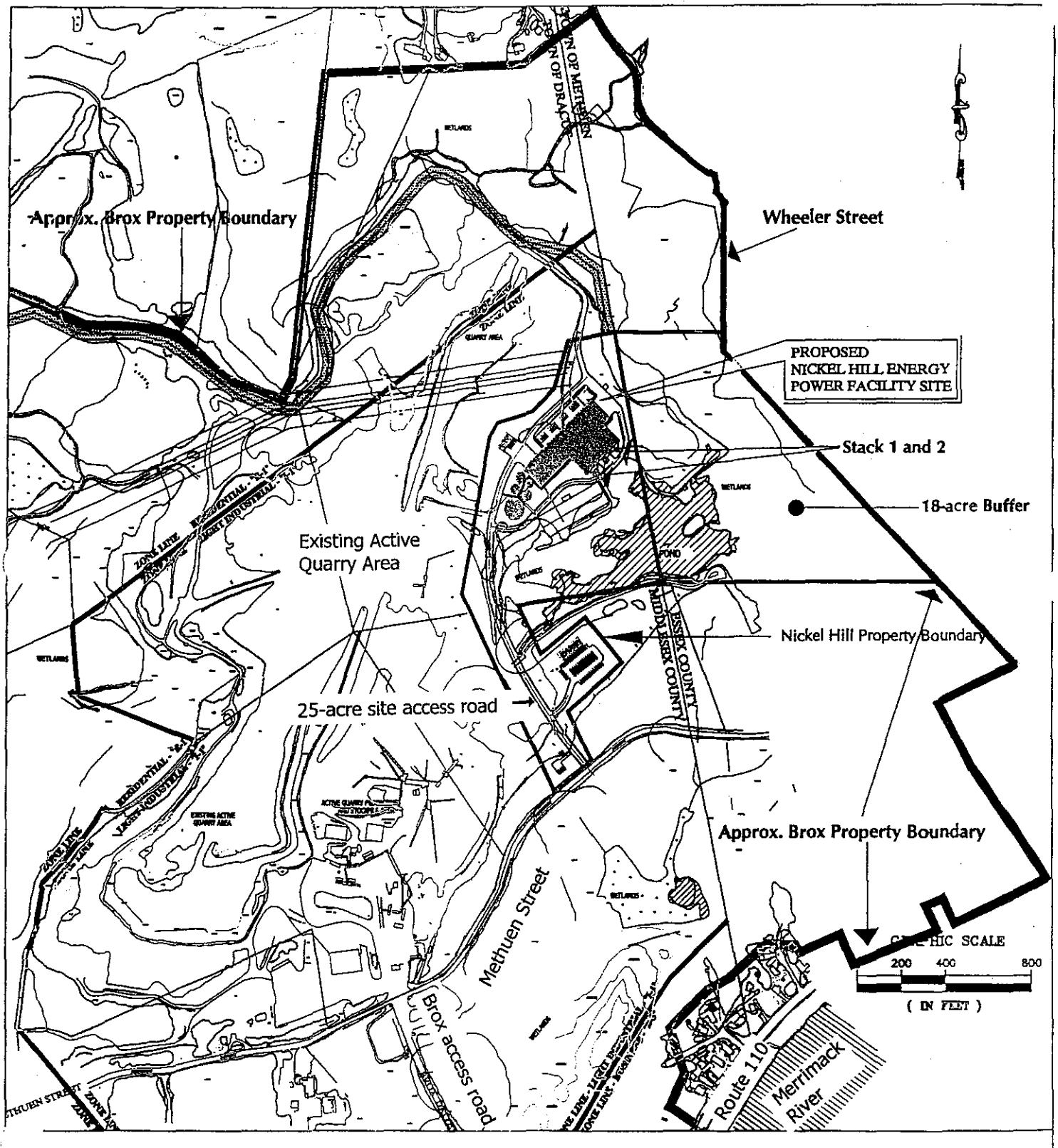


FIGURE 1
Site Locus
Nickel Hill Energy Facility, Dracut

Project Locus





Adapted from SFEIR Figure 3.2-1, dated 31 May 2000. Original by:

EPSILON ASSOCIATES INC. Engineers & Environmental Consultants

FIGURE 2
Preliminary Layout of Generating and Ancillary Equipment

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Board

Petition of Southern Energy Kendall, LLC for Approval to Upgrade and Replace Generating Facilities at the Existing Kendall Square Station in Cambridge, Massachusetts	)	EFSB 99-4

FINAL DECISION

Sheila R. McIntyre
Hearing Officer
December 15, 2000

On the Decision:
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Barbara Shapiro
William Febiger

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FIGURE 1: SITE LOCATION MAP

LIST OF ABBREVIATIONS

Abbreviation	Explanation
AALs	Annual allowable ambient limits
ACCs	Air cooled condensers
ANP Bellingham Decision	ANP Bellingham Energy Company, 7 DOMSB 39 (1998)
ANP Bellingham Compliance Decision	ANP Bellingham Energy Company - Compliance, 9 DOMSB 211 (1999)
ANP Blackstone Decision	ANP Blackstone Energy Company, 8 DOMSB 1 (1999)
AUL	Activity and Use Limitations
BACT	Best available control technology
Board	Energy Facilities Siting Board
Berkshire Power Decision	Berkshire Power Development, Inc., 4 DOMSB 221 (1996)
Brockton Power Decision	Brockton Power LLC, 10 DOMSB 157 (2000)
BTA	Best technology available
Btu/kWh	British thermal units per kilowatt hour
Canal Station site	Southern Energy Canal Units 1 and 2 in Sandwich, Massachusetts
canal walk	Proposed public access path along the Broad Canal
Cancer Incidence Reports	Massachusetts Department of Public Health cancer statistic reports
CELCo	Cambridge Electric Light Company
CELCo/ComGas	Cambridge Electric Light Company and Commonwealth Gas Company collectively
cfs	Cubic feet per second
CHA Report	1999 Public Health Assessment: A Report from the Cambridge Health Alliance
Charles Basin	Charles River from Watertown Dam to the Science Park Dam
CHC	Cambridge Historical Commission
City	Cambridge, Massachusetts as an intervenor
CLEPC	Cambridge Local Emergency Planning Commission
CO	Carbon monoxide
CO_2	Carbon dioxide

Com/Energy	Commonwealth Energy
COM/Gas	Commonwealth Gas Company
Company	Southern Energy Kendall, L.L.C.
COM/Steam	Commonwealth Energy Steam Company
CSO	Combined sewer overflows
CTG	Combustion turbine generator
CRWA	Charles River Watershed Association
dBA	A-weighted decibel
Diffuser	Pipe that diffuses once-through cooling water
Dighton Power Decision	Dighton Power Associates, 5 DOMSB 193 (1997)
DO	Dissolved oxygen
EMF	Electric and magnetic fields
ENF	Environmental Notification Form
EPA	The United States Environmental Protection Agency
EPC	Engineering, procurement, and construction
ERCs	Emission reduction credits
ERP	Emergency Response Plan
F	Fahrenheit
FAA	Federal Aviation Administration
FEIR	Final Environmental Impact Report
fps	Feet per second
GEP	Good Engineering Practice
GIS	Geographic Information Systems
gpd	Gallons per day
HAPs	Hazardous air pollutants
HAPs Study	EPA's 1998 "Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units – Final Report to Congress"
HRSG	Heat recovery steam generator
Hz	Hertz (cycles per second)

IDC Bellingham Decision	IDC Bellingham, LLC, 9 DOMSB 260 (1999)
Kendall Station	The Existing Kendall Square Station
Kendall Station project	The proposal to upgrade Kendall Station
kV	Kilovolt
kV/m	Kilovolts per meter
L_{10}	The sound level that is exceeded 10 percent of a measuring period
L_{90}	The level of noise that is exceeded 90 percent of a measuring period
LAER	Lowest Achievable Emission Rate
Land Boulevard	Edwin Land Boulevard
lbs/MMBtu	Pounds per million British thermal units
L_{dn}	Day-night average sound level with nighttime penalty
L_{eq}	24-hour equivalent noise level
LNAPL	Light non-aqueous phase liquid
LOS	Level of service -- a measure of the efficiency of traffic operations at a given location
LUW	Land under a water body
MassGIS	Massachusetts Geographic Information System
MBTA	Massachusetts Bay Transportation Authority
MCP	Massachusetts Contingency Plan
MDC	Metropolitan District Commission
MDEM	Massachusetts Department of Environmental Management
MDEP	Massachusetts Department of Environmental Protection
mG	Milligauss
$\mu g/m^3$	Micrograms per cubic meter
mgd	Million gallons per day
mg/l	Milligrams per liter
MGP	Manufactured gas plant
mgy	Million gallons per year
MHC	Massachusetts Historical Commission

Millennium Power Decision	U.S. Generating Company, 6 DOMSB 1 (1997)
MIT	Massachusetts Institute of Technology
MMBtu	Million British thermal units
MW	Megawatt
MWRA	Massachusetts Water Resources Authority
NAAQS	National ambient air quality standards
NEA Decision	Northeast Energy Associates, 16 DOMSC 335 (1987)
1985 MECoNEPCo Decision	Massachusetts Electric Company et al., 13 DOMSC 119 (1985)
NML	Noise Monitoring Location
NO_2	Nitrogen dioxide
NO_X	Nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRC	National Research Council
NRHP	National Register of Historic Places
NSPS	New source performance standards
NSR	New source review
OTC	Once-through cooling
Ozone	Ground level ozone
Peakers	Peaking generators
PL	Property line
PM-2.5	Particulate matter less than 2.5 microns
PM-10	Particulate matter less than 10 microns
PPAs	Power purchase agreements
Ppm	Parts per million
Proposed project	The proposal to upgrade Kendall Station
PSD	Prevention of significant deterioration
PUD	Planned unit development
RAO	Response Action Outcomes

Restructuring Act	M.G.L. c. 164 of the Acts of 1997
ROW	Right-of-way
SCR	Selective Catalytic Reduction System
SE Kendall	Southern Energy Kendall, L.L.C.
7Q10	Seven-day, ten-year low water flow
Sigma	Sigma Consultants, Inc.
SILs	Significant Impact Levels
Silver City Decision	Silver City Energy Limited Partnership, 3 DOMSB 1 (1994)
Sithe Edgar Decision	Sithe Edgar Development LLC, 10 DOMSB 1 (2000)
Sithe Mystic Decision	Sithe Mystic Development LLC, 9 DOMSB 101 (1999)
Sithe West Medway Decision	Sithe West Medway Development LLC, 10 DOMSB 274 (2000)
Siting Board	Energy Facilities Siting Board
SO_2	Sulfur dioxide
Southern Energy	Southern Energy, Inc.
SO_X	Sulfur oxides
SPCC Plan	Spill Prevention, Control and Countermeasure Plan
TDM	Transportation and Demand Management
TDS	Total dissolved solids
TELs	Threshold effects exposure limits
TLV	Threshold Limit Value
tpy	Tons per year
TRC	TRC Environmental Corporation
TSS	Total suspended solids
TURA	Toxic Use Reduction Act
VOCs	Volatile organic compounds
WPA	Wetlands Protection Act

The Energy Facilities Siting Board hereby APPROVES subject to conditions the petition of Southern Energy Kendall, L.L.C. for approval to upgrade generating facilities at the existing Kendall Square Station in Cambridge, Massachusetts. This upgrade will increase the electrical generating capacity at Kendall Square Station from approximately 64 megawatts to approximately 234 megawatts.

I. INTRODUCTION

A. Description of Proposed Project, Site, and Interconnections

Southern Energy Kendall, L.L.C. ("SE Kendall" or "Company")[1] proposes to upgrade Kendall Square Station ("Kendall Station"), an existing cogeneration plant, into a natural gas-fired, combined-cycle, electric generating facility with a total net nominal electric output of 234 megawatts ("MW") in Cambridge, Massachusetts ("proposed project") (Exh. EFSB-G-2-S Bulk Att. at 2-1 to 2-2). The proposed project would integrate a new combined-cycle turbine with a net nominal capacity of 170 MW with existing steam turbines on the site with a net nominal electrical output of 64 MW (id. at 2-1). In December of 1998, Southern Energy purchased the Kendall Station generating assets from Commonwealth Energy ("COM/Energy") under the divestiture of generating assets pursuant to the Massachusetts Restructuring Act of 1997 (Exhs. SEK-1, at 3-4; EFSB-SS-5; G.L. c. 164, §1A).

The proposed project would be located on the 5.8-acre site of Kendall Station in an area of east Cambridge zoned for office and planned unit development (Exh. SEK-1, at 4.2-1 to 4.2-10). The proposed site is bordered to the south by the Broad Canal, an extension of the Charles River; to the east by First Street; to the north by Athenaeum Street and office buildings; and to the west by land currently used as parking lots, where Cambridge Research Park L.L.C. has proposed a ten acre multi-use office, commercial, and residential development (id. at 4.2-10 and 4.2-14, Figure 4.2-5).

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[1] The Southern Company is an international energy company based in Atlanta, Georgia (Exh. EFSB-G-4). Southern Energy, Inc. ("Southern Energy") is a wholly owned subsidiary of the Southern Company; SE Kendall is an indirect wholly owned subsidiary of Southern Energy (id.).

The Company stated that the proposed site contains existing electrical and steam generating equipment and ancillary facilities, including a power block building, administrative offices, a storage shed, a switchyard, two fuel oil tanks, two jet engine peaking generators ("peakers"), cooling water intakes along the Broad Canal, and other minor structures (id. at 2-2). The existing facility produces steam using three main steam boilers (boilers 1, 2 and 3)[2] and two back-up steam package boilers (boilers 4 and 5)[3] (Exhs. EFSB-G-8; EFSB-G-8-S). The steam produced from both the main and package boilers is fed through up to three existing steam turbine generators ("steam turbines")[4] and sent to Commonwealth Energy Steam Company ("COM/Steam") for sale to major customers in the Kendall Station area (Exh. EFSB-G-2-S Bulk Att. at 2-2).[5]

As part of the proposed project, the Company proposed to construct a new building to the west of the existing turbine building that will house a 170 MW GE 7241 FA combustion turbine generator ("CTG"), a heat recovery steam generator ("HRSG"), and a 250-foot exhaust stack (Exh. EFSB-G-2-S Bulk Att. at 2-12 to 2-13, Figure 2-4). The CTG would run primarily on natural gas, with a 30-day back-up supply of 0.05 percent sulfur, distillate oil (id. at 2-13). SE Kendall proposed to use the CTG to generate electricity, and the HRSG to condense the steam

---

2 The Company stated that boiler 1 is rated at 18 MW, boiler 2 at 21 MW, and boiler 3 at 25 MW and that all boilers can run on residual oil or natural gas (Exhs. EFSB-G-8; EFSB-RR-67-S).

3 The Company noted that boilers 4 and 5 are owned by COM/Steam but operated by SE Kendall under an agreement between SE Kendall and Com/Steam (Exh. EFSB-S-3; Tr. 2, at 242-243).

4 The three existing steam turbines currently operate at 13.8 kilovolts ("kV") and inject power into the local grid at that level (Tr. 5, at 671-672). In the future, the Company expects to add a new transformer ("future transformer") that would step-up the output from these steam turbines to 115 kV and interconnect them with the same transmission line that would leave the site (id.).

5 COM/Steam, which is a subsidiary of NSTAR, distributes steam to 17 major customers in the Cambridge and Boston area, including Massachusetts General Hospital, the Museum of Science, Polaroid, and Biogen (Exh. EFSB-G-2-S Bulk Att. at 2-2). SE Kendall proposes to expand steam sales following construction of the proposed project (id. at 2-1 to 2-2; Tr. 8, at 1022).

for use in the steam turbines of the existing plant or for sale to COM/Steam (Exh. EFSB-G-2-S Bulk Att. at 2-1, 2-12 to 2-13, Figure 2-3). Boiler 3 would be used for additional steam capacity during peak steam sale days when the CTG is operating on oil and for back-up in the event that the CTG breaks down or is shut down for maintenance (id. at 2-1; Exh. EFSB-RR-69). Boilers 1 and 2 would serve as additional back-up for steam in the event that either boiler 3 is down or the CTG is down and boiler 3 cannot meet the steam demand (Exhs. EFSB-G-8(c)-S; EFSB-RR-69).

The Company proposes to use the existing once-through-cooling ("OTC") intakes to withdraw cooling water for the proposed project from the Broad Canal. However, the Company proposes to modify the OTC discharge configuration by constructing a new pipe with the capability of diffusing the OTC water out of vents as it discharges into the Charles River ("diffuser") (Exhs. EFSB-G-2-S Bulk Att. at 2-19, Figures 2-3, 2-5; EFSB-G-1-S (Appendix 2)). The Company also proposes to use fin-fan coolers mounted on top of the new building to cool the CTG and the other new equipment (Exh. EFSB-G-2-S Bulk Att. at 2-1; Tr. 8, at 1028). SE Kendall proposes to refurbish the 1.25 million gallon oil tank for storage of the low sulfur oil and reuse buildings on-site for water treatment and other ancillary services (Exhs. EFSB-G-2-S Bulk Att. at Figure 2-4; EFSB-RR-9). Further, the Company proposes to construct a 10,000-gallon ammonia storage tank, a 100,000-gallon demineralized water tank, a switchyard, a substation, and a public access path along the Broad Canal ("canal walk") (Exh. EFSB-G-2-S Bulk Att. at 2-14 to 2-15).

The proposed project would interconnect with the regional transmission system via a new 2.6 mile 115 kV underground transmission line running from Cambridge Electric Light Company's ("CELCo") Putnam Station in Cambridge to Kendall Station (id. at 2-14). The existing natural gas supply to Kendall Station would be upgraded by installing a new high pressure distribution line from Commonwealth Gas Company's ("COM/Gas") existing Third Street gate station and by replacing an existing 14-inch pipeline from the gate station to the connection point with the Algonquin Gas Transmission Company pipeline in Somerville (Exhs. EFSB-G-2-S Bulk Att. at 2-14, Appendix 2; EFSB-G-3).

B. Procedural History

On July 27, 1999, SE Kendall filed with the Energy Facilities Siting Board ("Siting Board") a petition for approval to upgrade the equipment at the existing Kendall Station in Cambridge, Massachusetts. The Siting Board docketed the petition as EFSB 99-4.

On September 23, 1999, the Siting Board conducted a public hearing in Cambridge. In accordance with the direction of the Hearing Officer, the Company provided notice of the public hearing and adjudication.

Timely petitions to intervene were filed by the City of Cambridge ("City"), Joseph J. Avin, Carole K. Bellew, Stephen Bikofsky, Barbara Broussard, Mary Ann Donofrio, Philip Higonnet, Jennie Iantosca, Frances Menezes, Charles C. Poirier, Mary Travers, and Robert Travers; a joint petition to intervene was filed by CELCo and COM/Gas (collectively "CELCo/ComGas"). The Hearing Officer granted the petitions to intervene filed by the City and by CELCo/ComGas (Southern Energy Kendall LLC, EFSB 99-4, Hearing Officer Ruling, October 26, 1999). The Hearing Officer denied the intervention petitions of Mr. Avin, Ms. Bellew, Mr. Bikofsky, Ms. Broussard, Ms. Donofrio, Mr. Higonnet, Ms. Iantosca, Ms. Menezes, Mr. Poirier, Ms. Travers, and Mr. Travers, but permitted these petitioners to participate as a single interested person with a designated spokesperson (id.). The Hearing Officer received timely petitions to participate as interested persons from Sigma Consultants, Inc. ("Sigma") and Massachusetts Institute of Technology ("MIT") (id.). The Hearing Officer granted these petitions (id.).

The Siting Board conducted thirteen days of evidentiary hearings, commencing on February 14, 2000, and ending on May 24, 2000. SE Kendall presented the testimony of the following witnesses: Glenn Harkness, P.E., Senior Vice President of TRC Environmental Corporation ("TRC"), who testified as to site selection, and visual and traffic impacts; Shawn Konary, Environmental Affairs Manager for Southern Energy New England, who testified as to safety, general and solid waste impacts; Laurence Labrie, Senior Air Quality Scientist with TRC, who testified as to safety, general, and air impacts; Gary Ritter, Certified Safety Professional and Certified Industrial Hygienist with TRC, who testified as to safety and general impacts; Charles Cooper, Director of Environmental Permitting and Planning at TRC, who testified as to land use,

health, water, and wetlands impacts; James Barnes, P.E., Senior Engineering Consultant at Acentech Incorporated, who testified as to noise impacts; Peter Valberg, Ph.D., Senior Scientist at Cambridge Environmental, Inc. and Adjunct Associate Professor of Environmental Health at the Harvard School of Public Health, who testified as to electric and magnetic fields ("EMF") and health impacts; Andrew Smyth, Senior Water Resources Specialist at TRC, who testified as to water and wetland impacts; and Norman Cowden, P.E., Project Director for the Kendall Station Project at Southern Energy New England, L.L.C., who testified as to general, site selection, safety, water, EMF, wetland, air and visual impacts.

On June 23, 2000, SE Kendall and the City submitted initial briefs. On July 7, 2000, SE Kendall and the City submitted reply briefs. The record includes 692 exhibits consisting primarily of information request responses and record request responses.

C. Jurisdiction and Scope of Review

As a unit designed to increase existing generating capacity at Kendall Station by 170 MW, from approximately 64 MW to approximately 234 MW, SE Kendall's proposed project falls within the first definition of facility set forth in G.L. c. 164, § 69G, which states, in pertinent part, that a facility is a generating unit defined as:

> any generating unit designed for or capable of operating at a gross capacity of 100 megawatts or more, including associated buildings, ancillary structures, transmission and pipeline interconnections that are not otherwise facilities, and fuel storage facilities.

In accordance with G. L. c. 164, § 69J¼, before approving a petition to construct a generating facility, the Siting Board must determine that the applicant has met five requirements. First, the Siting Board must determine that the applicant's description of the site selection process used is accurate (see Section II., below). Second, the Siting Board must determine that the applicant's description of the proposed generating facility and its environmental impacts are substantially accurate and complete (see Section III., below). Third, the Siting Board must determine that the proposed generating facility will minimize the environmental impacts consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts (see Section III., below). Fourth, the Siting Board must determine

that plans for construction of the proposed generating facility are consistent with current health and environmental protection policies of the Commonwealth and with such energy policies as are adopted by the Commonwealth for the specific purpose of guiding the decisions of the Board (see Section IV., below). Finally, if the expected emissions from the proposed facility do not meet the applicable technology performance standard, the Siting Board must determine, based on a comparison with other fossil fuel generating technologies, that the proposed generating facility on balance contributes to a reliable, low-cost, diverse regional energy supply with minimal environmental impacts.[6]

II. SITE SELECTION

A. Standard of Review

G.L. c. 164, § 69J¼ requires the Siting Board to determine whether an applicant's description of the site selection process used is accurate. An accurate description of an applicant's site selection process shall include a complete description of the environmental, reliability, regulatory, and other considerations that led to the applicant's decision to pursue the project as proposed at the proposed site, as well as a description of other siting and design options that were considered as part of the site selection process.

The Siting Board also is required to determine whether a proposed project provides a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. G.L. c. 164, § 69H. To accomplish this, G.L. c. 164, § 69J¼ requires the Siting Board to determine whether "plans for the construction of a proposed project minimize the environmental impacts consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts of the proposed generating facility." G.L. c. 164, § 69J¼. Site selection, together with project design and mitigation, is an integral part of the process of minimizing the environmental impacts of an energy facility. The Siting

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[6] As set forth in Section III.B, below, the Siting Board finds that the expected emissions from the proposed generating facility do not exceed the technology performance standard specified in 980 CMR, § 12.00. Therefore, a generating technology comparison is not required in this case.

Board therefore will review the applicant's site selection process in order to determine whether that process contributes to the minimization of environmental impacts of the proposed project and the costs of mitigating, controlling, and reducing such impacts. In making this determination, the Siting Board also will consider, consistent with its broad mandate under G.L. c. 164, § 69H, the reliability, regulatory, and other non-environmental advantages of the proposed site.

B. Description

SE Kendall is a wholly owned subsidiary of Southern Energy, an international company headquartered in Atlanta, Georgia, whose operations include electric generation and distribution, integrated utility operations, and energy marketing (Exh. EFSB-G-4). In early 1997, Southern Energy decided to pursue a position in the New England generation market in response to the restructuring of the electricity industry in New England (Exhs. EFSB-SS-1; EFSB-2). SE Kendall stated that Southern Energy's goals in New England were to develop a portfolio of existing generation assets and to develop new generating facilities with better efficiency and lower emissions rates than existing regional generating units (Exh. SEK-1, at 3-3).[7]

SE Kendall stated that Southern Energy sought to identify sites in New England which were already committed to power generation and transmission and which offered the potential for further development (id. at 3-2). Southern Energy specifically sought sites where additional generation: (1) would have minimal impact on the environment; (2) would have access to existing water, natural gas, and electric transmission infrastructure; (3) would receive a level of community support; and (4) would be consistent with the policies and objectives of the Restructuring Act (id. at 3-2). The Company asserted that sites already used for electrical generation (i.e., sites considered as brownfield sites) offered advantages from a development perspective (id. at 3-2 to 3-3; Exh. EFSB-SS-2). SE Kendall stated that Southern Energy found

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[7] Southern Energy currently owns generating assets in New York state, including the Bowtie (1215 MW) and Lovett (443 MW) generating stations and two smaller peaking units (Exh. EFSB-SS-2). In addition, Southern Energy began development of a new 525 MW facility on an industrial site in New Hampshire, but subsequently sold the rights to develop and construct the facility (Exh. EFSB-SS-14).

that the Kendall Station measured favorably when considering these factors (Exh. EFSB-SS-2).

Southern Energy successfully bid for the non-nuclear generating assets of COM/Energy, and acquired the assets in December, 1998 (Exh. SEK-1, at 3-4).[8] In addition to Kendall Station, Southern Energy also acquired Canal Units 1 and 2 in Sandwich, Massachusetts ("Canal Station site"), five diesel generating plants located in Martha's Vineyard, and a 1.4325 percent ownership interest in the William F. Wyman Unit 4 located in Maine (id. at 3-4).

SE Kendall stated that Southern Energy evaluated the sites that it purchased from COM/Energy for their potential to be further developed while minimizing environmental impacts including: local and regional land use, water resources, wetlands, air quality, solid waste and hazardous waste, local and regional health impacts, EMF, visual impacts, noise, traffic impacts, and cultural resources (Exhs. EFSB-SS-5; SEK-1, at 3-5). Although Southern Energy did not formally rank or write field observation on the sites it purchased, it visited and evaluated each of the sites on numerous occasions (Exh. EFSB-SS-15). SE Kendall noted that the sites on Martha's Vineyard do not have adequate land and associated infrastructure necessary to develop a large generating facility without significant land-use impacts (Exh. EFSB-SS-5).

SE Kendall indicated that Southern Energy generally requires a 25-acre site consistent with existing land uses and community development objectives for construction of an upgrade or expansion of 500 MW or greater (id.). SE Kendall noted that the only portion of the Kendall Station site available for development is approximately 0.8 acres; consequently, Southern Energy designed a smaller 170 MW combined-cycle facility which incorporated some of the existing equipment on-site (Exh. EFSB-SS-10). SE Kendall asserted that the capacity of the GE 7FA combustion turbine proposed for the upgrade is perfectly matched with the existing steam turbines, while the next smaller available combustion turbine, at 86 MW, would be able to supply only 60 percent of the steam needed for the existing turbines (Exh. EFSB-SS-17). SE Kendall stated that the configuration of the proposed project on the Kendall Station site was constrained by both existing equipment and historical features on the site (Exh. EFSB-SS-12; Tr. 3, at 356-357). In addition, SE Kendall testified that the size and shape of the proposed buildings

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[8] The Company indicated that it has bid for other generating assets in the region but that those bids had not been accepted (Exh. EFSB-SS-2; Tr. 3, at 403).

were determined primarily by the size of the turbines and HRSG units; however, SE Kendall indicated that it reduced its typical design height for the HRSG enclosure to reduce visual impacts (Tr. 3, at 360-361).

SE Kendall argued that, as a brownfield site, the Kendall Station site offers SE Kendall the potential for expanding the existing facilities while minimizing environmental impacts and creating certain environmental improvements (Exh. SEK-1, at 3-5). In particular, SE Kendall asserted that generating capacity at the site could be increased while reducing NO_X and SO_X emissions (Tr. 3, at 365-368). The Company also asserted that the redevelopment project would allow the Company to reduce the current impacts of discharges from Kendall Station on the Charles River and to create an environmental benefit by dissipating the salt wedge in that part of the Charles River (id. at 431-433). In addition, the Company testified that the Kendall Station site could be redeveloped without any increase in impervious surface, and argued that its proposal would actually reduce demand for city water and sewer and stormwater discharges (id. at 388, 392-393).

SE Kendall argued that the higher ambient noise levels associated with the urban location of the proposed project make increases in noise levels less noticeable than at a greenfield site, and that the high buildings surrounding the Kendall Station site would limit the distance at which facility noise could be heard (id. at 369-370, 424). The Company asserted that the visual impacts of the proposed project expansion would be less than those of a facility constructed on a greenfield site because existing and proposed buildings would block views of the facility from most directions, and because the site is already in industrial use (id. at 373-374). SE Kendall testified that the Kendall Station site also has advantages with respect to traffic because of its ready access to public transportation (id. at 376-377). With respect to safety, the Company noted that Kendall Station is located in close proximity to fire stations and hospitals, and argued that Cambridge fire, emergency and health professionals are better trained than their rural counterparts to deal with the type of industrial events (e.g., release of hazardous substances) which could occur at a generating facility (id. at 429-430).

The Company also discussed the advantages and disadvantages of the site with respect to natural gas and electrical interconnections and other infrastructure (Exhs. EFSB-SS-8; EFSB-SS-

9; Tr. 3, at 419-420). The Company stated that, while the electric and natural gas interconnections likely would require Siting Board approval, they would run underground, reducing environmental impacts (Exhs. EFSB-SS-8; EFSB-SS-9; Tr. 3, at 419-420). The Company also noted that because Kendall Station is located close to electrical power demand, there would be no need for upgrades to the regional transmission grid to support the project (Tr. 3, at 416-417, 419-420). The Company noted that it would reuse the existing steam system, water intake and outfall system, and storage tanks (id. at 415).

C. Analysis

The Company has described a development strategy for the Northeast which focuses on the purchase and redevelopment of existing generating assets, and which resulted in the purchase of existing generation assets from Com/Energy. SE Kendall has provided information on the sites Southern Energy has pursued in the Northeast and the assets it bought from Com/Energy. SE Kendall provided information on why Southern Energy chose to develop the Canal Station and Kendall Station sites, as well as how it decided upon site layout, generating capacity, and associated cooling and other technologies for the proposed project. The Siting Board finds that the Company's description of the site selection process used is accurate.

The Company asserted that its proposal minimizes environmental impacts in part through the use of a "brownfield approach" to development. In previous cases, the Siting Board has reviewed the development of new generation on sites currently or previously used for power generation. In these decisions, the Siting Board has noted that the redevelopment and reuse of previously disturbed sites and the use of existing infrastructure can limit many of the environmental impacts that may be associated with industrial development. Additionally, where an industrial character and the presence of industrial support infrastructure are already evident, there often is the potential to develop additional facilities such as a generating plant, consistent with consideration of land use compatibility for such development. The Siting Board encourages such "brownfield" development where appropriate. However, the Siting Board notes that the benefits of such an approach are necessarily site and facility-specific. A review of any such site must take into account the scale, the nature and physical attributes of any existing or recent use

on the site, the existing character of the surrounding area, and the impacts which the specific proposed use would have on the surrounding area. See Sithe Mystic Development, 9 DOMSB 101, at 123 (1999) ("Sithe Mystic Decision"); Sithe Edgar Development, 10 DOMSB 1, at 24 (2000) ("Sithe Edgar Decision"); Sithe West Medway Development, 10 DOMSB 274, at 296 (2000) ("Sithe West Medway Decision").

Here, SE Kendall is proposing the installation of new equipment to be operated integrally with the existing facilities, rather than the development of a separate new generating facility on a brownfield site. Much of the existing equipment and infrastructure – steam turbines, oil tanks, once-through cooling structures -- will be reused in the upgraded facility. The record indicates that the redevelopment of the Kendall Station site could increase generating capacity near the Boston load center while reducing air emissions from the site and improving water quality in the neighboring Charles River. Further, because Kendall Station is located on the Broad Canal, the site has ready access to an adequate supply of water for once-through cooling. In addition, the site has certain advantages directly related to its location in a highly-developed urban area -- the presence of tall structures on and around the site which could block views of the facility from most directions, access to an extensive public transportation network and trained emergency services, and a relatively high level of ambient noise which could, to a certain extent, camouflage facility noise.

However, because the site is located in a dense urban area with constant activity, the noise, visual and safety impacts of the proposed project could affect a significant number of people. The small size of the site and the constraints created by the location of existing equipment may limit the Company's ability to address these issues through site layout. In addition, because ambient noise levels are already high, any increase in noise resulting from the proposed project upgrade is of concern. Finally, although electricity currently is generated at the Kendall Station, the existing natural gas supply and electric transmission infrastructure is not adequate to serve the upgraded facility, and the site is located at a considerable distance from interconnection points. Thus, construction of the proposed project also will require the construction of new natural gas and electric interconnections, each lengthy enough to be the subject of separate Siting Board proceedings. The Siting Board anticipates that these

interconnections will be constructed primarily underground and in city streets, and that future Siting Board proceedings will adjudicate the interconnection routes that could minimize environmental impacts.

The record reflects the advantages and disadvantages of redevelopment at the Kendall Station site. On balance, the advantages contribute to the minimization of environmental impacts and the creation of certain environmental benefits; however, the disadvantages create the potential for environmental impacts which will need to be minimized by the Company through design or mitigation. Accordingly, the Siting Board finds that the Company's site selection process resulted in the selection of a site that contributes to the minimization of environmental impacts and the costs of mitigating, controlling, and reducing such impacts.

III. ENVIRONMENTAL IMPACTS

A. Standard of Review

G.L. c. 164, § 69J¼ requires the Siting Board to determine whether the plans for construction of a proposed generating facility minimize the environmental impacts of the proposed project consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts of the proposed generating facility. In order to make this determination, the Siting Board assesses the impacts of the proposed project in eight areas prescribed by its statute, including air quality, water resources, wetlands, solid waste, visual impacts, noise, local and regional land use, and health, and determines whether the applicant's description of these impacts is accurate and complete. G.L. c. 164, § 69J¼.

The Siting Board also assesses the costs and benefits of options for mitigating, controlling, or reducing these impacts, and determines whether mitigation beyond that proposed by the applicant is required to minimize the environmental impacts of the proposed project consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts of the proposed generating facility. Compliance with other agencies' standards does not establish that a proposed project's environmental impacts have been minimized.

Finally, the Siting Board assesses any tradeoffs that need to be made among conflicting

environmental impacts, particularly where an option for mitigating one type of impact has the effect of increasing another type of impact. An assessment of all impacts of a facility is necessary to determine whether an appropriate balance is achieved both among conflicting environmental concerns and between environmental impacts and cost. A facility proposal which achieves this balance meets the Siting Board's statutory requirement to minimize environmental impacts consistent with minimizing the costs associated with the mitigation, control, and reduction of the environmental impacts of the proposed generating facility.

B. Air Quality

This Section describes the proposed project's emissions and impacts, compliance with existing regulations, offset proposals, and mitigation proposed by the Company.

1. Applicable Regulations

The Company indicated that regulations governing air impacts of point sources include National Ambient Air Quality Standards ("NAAQS");[9] New Source Review ("NSR") requirements; Prevention of Significant Deterioration ("PSD"),[10] and New Source Performance Standards ("NSPS") for criteria pollutants; the MDEP Major Comprehensive Plan Approval; MDEP's Air Toxics Policy Operating Permit; and Title IV Acid Rain Sulfur Dioxide Allowances (Exh. EFSB-A-1-S at 3-2 to 3-9).

The Company indicated that, under NAAQS, all geographic areas are classified and designated as attainment, non-attainment or unclassified for the six criteria pollutants: sulfur dioxide ("SO_2"), nitrogen oxides ("NO_X"), carbon monoxide ("CO"), particulate matter ("PM-

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9 The Company stated that the MDEP enforces the NAAQS as state air quality standards (Exh. EFSB-A-1-S at 3-2).

10 The Company asserted since it is not changing the existing units in any way -- such as adding new controls, increasing capacity, or making physical alterations – it is not required to assess the net change in emissions of SO_2, PM-10, and CO to determine whether PSD applies to this facility (Tr. 13, at 1887).

10"), ground level ozone, and lead (id. at 3-2 to 3-3).[11] The Company indicated that Massachusetts is classified as "unclassified" or "attainment" for SO_2, NO_2, CO, lead, and PM-10, but is classified as in serious non-attainment for ozone (id. at 3-3). The Company stated that, under the PSD review, the proposed project would be required to incorporate Best Available Control Technologies ("BACT") for SO_2, PM-10, NO_X, CO, and volatile organic compounds ("VOCs") (id. at 6-2).[12]

The Company stated that since Massachusetts is classified as non-attainment for ozone, special rules apply to NO_X and VOCs, which are precursors to ozone (id. at 3-4). The Company indicated that Kendall Station is an existing major source for both NO_X and VOCs and that a net annual emissions increase of greater than 25 tons would trigger non-attainment NSR requirements for these two pollutants (id.). The Company therefore determined that it would confine its annual NO_X and VOCs emissions to an amount equal to or less than past actual emissions plus 25 tons (id.).[13] Consequently, the Company asserted that it would not be subject to the Lowest Achievable Emission Rate ("LAER") and emission offset requirements of NSR (id. at 3-4).

SE Kendall indicated that two different components of the project – the new combustion

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11 The Company stated that implementation of a new compliance standard for particulates, which would be based on a standard for PM-2.5, as well as a new 8-hour ozone standard, has been delayed (Exh. EFSB-A-1-S at 3-3).

12 The Company stated that under federal standards the proposed project would be required to meet BACT only for PM-10, CO, and SO_2 (Exh. EFSB-A-1-S at 6-2). However, Massachusetts BACT requirements apply to all new sources emitting more than one ton per year ("tpy") of a pollutant; consequently the new unit is subject to BACT for SO_2, PM-10, NO_X, CO, and VOCs (id.).

13 The Company stated that the calculation of the net annual emission rate is the difference between past actual emissions and future actual emissions (Exh. EFSB-A-1-S at 5-2). The Company used the average of past annual emissions for the years 1998 and 1999 to calculate allowable emissions for both NO_X and VOCs (id. at 5-1 and Appendix E at Table E-1). The Company stated that the past actual rate for NO_X was 365 tpy; therefore the facility NO_X limit would be 390 tpy (id. at 5-3). The Company stated that the past actual rate for VOCs was 8 tpy; therefore, the facility VOCs limit would be 33 tpy (id. at 5-2).

turbine and the use of the duct burners for supplementary firing of the HRSG, could be subject to NSPS (id. at 3-5 to 3-6). However, the Company indicated that emissions of all regulated pollutants would fall below NSPS threshold levels (id. at 3-5 to 3-6).

SE Kendall noted that the proposed project would be subject to Title IV of the 1990 Clean Air Act -- the Acid Rain Program -- which would require the Company to monitor SO_2 and NO_X emissions, and if necessary, to purchase annual SO_2 allowances (Exhs. EFSB-A-1-S at 3-6). The Company explained that the United States Environmental Protection Agency ("EPA") allocates SO_2 allowances to existing units, which can either use the allowances to cover their emissions or trade them to other facilities (id.). In addition, the proposed project must comport with a NO_X Budget Program, which requires subject facilities to comply with a limit on emissions during the "ozone season" of May 1 through September 30 (id. at 3-7; Exh. EFSB-A-24). The Company stated that MDEP regulates the three Kendall Station main boilers as existing sources under the program and has allocated ozone season NO_X emission allowances equal to 106 tons to Kendall Station (Exhs. EFSB-A-24-S; EFSB-A-33-S; Tr. 9 at 1315). The Company asserted that the relegation of boilers 1, 2, and 3 to back-up status would provide sufficient NO_X allowances for the new power generation equipment to operate at full capacity without the need to purchase additional allowances (Exhs. EFSB-A-24-S; EFSB-A-1-S at 3-7; Tr. 9, at 1315-1320).[14]

The Company stated that MDEP also has an Air Toxics Policy, which establishes Threshold Effects Exposure Limits ("TELs") and annual Average Allowable Limits ("AALs") (Exh. EFSB-A-1-S at 3-8).

The Company stated that its proposed project would meet the technology performance standard for Air Emissions from New Electric Generating Facilities promulgated by the Siting Board in 980 CMR §12.00 (Exh. SEK-1, at 4.5-4). SE Kendall provided documentation indicating that its proposed project would meet the technology performance standard for both

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[14] The Company calculated that the total NO_X emissions to be generated by Kendall Station during the ozone season would be 65.6 tons, of which 48 would be emitted by the new equipment and 17.6 by boiler 3 (Exh. EFSB-A-33-S). The Company based these calculations on boiler 3 operating at a maximum of 3.5 percent of the time during ozone season, since steam demand and outages are at a minimum during ozone season (id.).

criteria pollutants and heavy metals (id.; Exh. EFSB-RR-92).

2. Equipment and Operations

The proposed project would be comprised of a mix of existing and new equipment, including a new combustion turbine and HRSG and three existing boilers which, together with two existing package boilers would be used both to generate electricity and to generate steam for sale to COM/Steam for resale to major customers (Exh. EFSB-A-1-S at 2-1, 2-8).[15] The Company indicated that this mix of equipment could be operated in nine different configurations (Exh. EFSB-RR-69).[16]

SE Kendall stated that it anticipates operating the new CTG at a 90 percent capacity factor, and that it intends to seek a permit allowing it to operate the CTG on No. 2 fuel oil for up to 720 hours annually (Exhs. EFSB-A-1-S at 2-8; EFSB-RR-92; SEK-1, at 4.5-1; Tr. 13 at 1911 and 1942-1943).[17] The Company indicated that it would operate on oil either when the supply of natural gas is disrupted, or when it is more economic to do so (Exhs. EFSB-A-34; RR-CC-9). The Company stated that (1) it expects to use oil for close to the 30 days allowed under its

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15 The Company stated that the proposed project is designed to accommodate an increase in steam customer load over present levels, and estimated that it could produce up to 720,000 lbs/hr of steam for sale (Tr. 13, at 2005 to 2006). The Company has an obligation to meet its steam sale requirements on an uninterruptible basis (Tr. 8, at 1044; Tr. 13, at 1969).

16 The following are the possible configurations that can occur through the operation of Kendall Station: (1) the CTG operating on natural gas; (2) the CTG operating on natural gas with power augmentation; (3) the CTG operating on natural gas with steam augmentation; (4) the CTG operating on oil; (5) the CTG operating on oil with boiler 3 on oil; (6) only boiler 3 operating (it would operate 50 percent on natural gas and 50 percent on oil); (7) only boilers 1 and 2 operating (they would operate on natural gas if available, if not available, would use oil); (8) the CTG operating on oil with boilers 1 and 2 operating on oil; and (9) boilers 1, 2 , and 3 operating (boiler 3 would operate 50 percent on natural gas and 50 percent on oil; boilers 1 and 2 would operate on natural gas if available, if not would use oil) (Exh. EFSB-RR-69).

17 SE Kendall noted that although it is requesting a permit allowing operation on oil for 30 days annually, its fuel procurement specialist recommended that back-up fuel be available for 720 to 1070 hours based on a "maximum" statistical year (Exh. EFSB-A-34).

anticipated permit, and (2) the annual average use of oil over the life of the project would probably be less than 30 days but could not be specifically estimated (Exh. EFSB-A-25; Tr. 9, at 1322). The Company estimated that, of the 30 days of oil use, approximately five days would be due solely to the physical unavailability of natural gas (Exh. CC-RR-9). The Company indicated that, although it did not expect to burn oil frequently during the summer, it would oppose seasonal restrictions on its ability to burn oil, arguing that the number of new natural gas generators proposed for the region makes it conceivable natural gas would be difficult to procure on summer peak days (Exh. EFSB-RR-93; Tr. 13, at 1910-1911).

SE Kendall stated that, under certain conditions, it would operate the CTG with power augmentation (Exh. EFSB-A-1-S at 2-5 and Appendix C). The Company explained that power augmentation minimizes the reduction in power output associated with increases in temperature by firing natural gas into the HRSG to produce additional steam; the steam is injected into the turbine, increasing the air density and thus the power output (Exhs. EFSB-G-8-S; EFSB-A-2-S). The Company noted that power augmentation can only be used when firing natural gas and when the ambient temperature is over 60 degrees Fahrenheit ("F") (Exhs. EFSB-A-2-S; EFSB-A-26). The Company explained that it would limit the use of power augmentation to 1,000 hours per year (Exhs. EFSB-A-2-S; EFSB-A-26). The Company noted that the proposed project's duct burners would be sized to supply steam for power augmentation in the summer and to meet maximum steam sales in the winter using steam augmentation (Exh. NEC-2, at 3). However, the Company noted that peak steam usage only occurs for a few days during the winter; consequently, winter duct firing would be limited (id.; Exh. EFSB-A-1-S at Appendix C, Table C-8).

SE Kendall stated that the new generating equipment would incorporate BACT for CO, PM-10, SO_2, NO_X and VOCs (Exh. EFSB-A-1-S at 6-6 to 6-11). To meet BACT for NO_X, SE Kendall would use Selective Catalytic Reduction ("SCR")[18] together with an efficient natural

[18] The Company explained that SCR is an add-on emissions control technology that uses ammonia to convert nitrous oxides into nitrogen and water (Exh. EFSB-A-1-S at 6-9).

gas-fired combined-cycle turbine (id. at 6-11).[19] The Company asserted that combustion turbines have inherently low VOCs emissions and that uncontrolled VOCs emissions would be minimized through good combustion practices (id.). The Company explained that BACT for VOCs emissions would be achieved through the use of advanced dry low-NO_X turbine combustion and low-NO_X duct burners (id.). The Company also proposed to use an oxidation catalyst to reduce CO emissions, which also would reduce VOCs emissions. The Company stated that it would achieve BACT for SO_2 and PM-10 through the use of natural gas as the primary fuel and very low sulfur oil as the back-up fuel (id. at 6-6 to 6-7).

SE Kendall stated that existing boilers 1, 2, and 3 would be used primarily to meet steam customer demand during planned and unplanned outages of the CTG (Exhs. EFSB-A-4-S; NEC-1-S at 2; EFSB-G-2-S Bulk Att. at 1-8). However, the Company stated that boiler 3 would operate in conjunction with the CTG to meet steam demand at times when the CTG is running on oil (Exhs. EFSB-A-16-S; EFSB-A-4-S). The Company indicated that boilers 1, 2, and 3 have dual-fuel capability; it anticipated that boiler 3 would operate half the time on natural gas and half the time on No. 6 fuel oil, while boilers 1 and 2 would burn oil only if natural gas were unavailable (Exhs. EFSB-G-8-S; EFSB-A-16-S).

SE Kendall indicated that existing package boilers 4 and 5, which can operate only on oil, would serve as back-up to boilers 1, 2 and 3 (Exhs. EFSB-A-4-S; NEC-1-S at 2; EFSB-G-2-S Bulk Att. at 1-8).[20] The Company noted that the two existing jet turbine peaking units, which are not connected to the proposed project, would continue to operate at their current capacity factor of one percent, with operation typically occurring during summer daytime hours (Exhs. EFSB-G-

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19 The Company stated that the new equipment would meet a NO_X emission limit of 2 parts per million ("ppm") when firing natural gas, which is the lowest guaranteed NO_X emission limit available under SCR (Exh. EFSB-A-1-S at 6-9). The Company included an evaluation of $SCONO_X$ in its BACT analysis, but asserted that $SCONO_X$ is an emerging, unproven technology, that also would result in a NO_X emission limit of 2 ppm (id.). The Company estimated that the levelized cost per ton of NO_X removal using $SCONO_X$ would be eight times that of using SCR, and asserted that the cost of $SCONO_X$ is well above the MDEP's economic threshold per ton (id. at 6-10 to 6-11).

20 SE Kendall stated package boilers 4 and 5 would operate infrequently since they are the third level of back-up behind the use of boiler 3, and boilers 1 and 2 (Exh. NEC-2, at 4).

8-S; EFSB-A-16-S).

3. Emissions and Impacts

SE Kendall asserted that the proposed project would significantly reduce NO_X and SO_2 emissions from the Kendall Station site, specifically projecting a station-wide decrease in NO_X emissions from 365 tpy to 204 tpy and in SO_2 emissions from 247 tpy to 166 tpy (Exhs. EFSB-G-2-S Bulk Att. at 2-25 and Figure 2-9; EFSB-A-1-S at Figure 2-5). The Company asserted that the air quality impacts of the proposed project would be minimized by the use of efficient combustion technology, the use of advanced pollution control equipment, the use of natural gas as the primary fuel for the new CTG/HRSG system, the use of 0.05 percent low-sulfur oil as the back-up fuel for the new equipment, and the use of 0.3 percent, rather than 0.5 percent, sulfur oil in the existing units (Exhs. EFSB-A-1-S at 2-1, 2-5; EFSB-RR-82). The Company projected that the proposed project would result in increased emissions of other criteria pollutants from the existing Kendall Station, including increases from 25 tpy to 158 tpy of CO; from 43 tpy to 67 tpy of PM-10; and from 8 tpy to 24 tpy of VOCs (See Table 1) (Exhs. EFSB-G-2-S Bulk Att. at Figure 2-9; EFSB-A-1-S at Figure 2-5; EFSB-RR-92).

Table 1
Potential Annual Emissions to Air

Pollutant	Upgrade Project Expected Annual Emissions (tpy) [a]	Past Annual Emissions (tpy) [b,c]
Nitrogen oxides (NO_X)	204	365
Sulfur dioxide (SO_2)	166	247
Particulates (PM-10)	67	43
Carbon monoxide (CO)	158	25
Volatile Organic Compounds (VOCs)	24	8

a. Source: Exhs. EFSB-RR-92; EFSB-A-1-S Figure 2-5
b. Source: Exhs. EFSB-A-1-S Figure 2-5 and Appendix E, Table E-1
c. Average of 1998 and 1999

SE Kendall based its emissions projections on an "expected" operating scenario, which assumed that the new CTG would operate at a 90 percent capacity factor with 720 hours of operation on oil; that boilers 1, 2, and 3 would operate at a combined capacity factor of 10 percent during scheduled and unscheduled outages of the CTG; and that boiler 3 would operate at an 8.2 percent capacity factor in conjunction with the CTG to meet steam demand (Exhs. EFSB-A-1-S at 2-8 to 2-10; EFSB-RR-92; Tr. 13, at 1942-1943).[21] The Company explained that this scenario is an expectation of how the facility would operate in terms of the stated emissions, and that it expects that the emission levels would not be exceeded (Tr. 9, at 1277). The Company asserted that its emissions estimates provide a conservative picture of how much oil would be burned in the existing units; however it acknowledged that when the CTG is not running, there are a number of potential configurations that could occur based on steam demand (Tr. 9, at 1279). SE Kendall indicated that it applied a 10 percent degradation factor in its calculations of facility emissions (Exh. EFSB-A-1-S at 6-5; Tr. 9, at 1288-1289; Tr. 13, at 1894). The Company noted that it always applies a degradation factor to take into account the normal wear and tear of machinery over time, to be conservative and to stay within compliance through the life of its project (Tr. 9, 1289-1292; Tr. 13, at 1894).[22]

The Company indicated that it used the EPA- and MDEP-approved Industrial Source Complex Short-Term ("ISCST3") atmospheric dispersion model to demonstrate compliance with ambient air quality standards (Exh. EFSB-A-1-S at 4-11). The Company asserted that the

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21 Specifically, the expected case assumes that: (1) the CTG operates on natural gas for 5,240 hours annually; (2) the CTG operates on natural gas with power augmentation for 1,000 hours annually; (3) the CTG operates on natural gas with steam augmentation for 1,800 hours annually; (4) boilers 1 and 2 operate on natural gas for 620 hours annually; (5) boilers 1 and 2 or boilers 4 and 5 operate on oil for 600 hours annually; (6) boiler 3 operates on natural gas for 797 hours annually; (7) boiler 3 or boilers 4 and 5 operate on oil for 797 hours annually; and (8) jets 1 and 2 operate for 88 hours annually (Exh. EFSB-A-1-S at Appendix C, Tables C-7 and C-10).

22 SE Kendall expressed its belief that applying a degradation factor is commonplace throughout the industry and that other proponents probably have incorporated such a factor but have not detailed its use to the same extent as the Company (Tr. 13, at 1894).

ISCST3 model is preferred by the EPA and other agencies for refined modeling since it can simulate atmospheric dispersion associated with multiple stacks, simple, intermediate and complex terrain, and building wake effects (id.; SEK-1, at 4.5-20). The Company's modeling indicated that emissions from the new CTG, when firing oil, would result in maximum ground level concentrations that exceed EPA Significant Impact Levels ("SILs") for SO_2 for the 3-hour and 24-hour averaging periods and for PM-10 for the 24-hour averaging period, with impacts ranging from 4.4 percent to 7.4 percent of NAAQS (See Table 2; Exhs. EFSB-A-1-S at 4-12 to 4-14; EFSB-RR-92; Tr. 13, at 1899). SE Kendall asserted that the modeled exceedences of SILs are not unusual, and are due to the location of the project in a complex area surrounded by taller structures which would cause building downwash, coupled with a proposed stack height that is lower than the Good Engineering Practice ("GEP") height (Tr. 13, at 1900, 1907).

Table 2
Incremental Impact of Proposed Combustion Turbine

Pollutant	Averaging Period	Modeled Maximum Concentration ($\mu g/m^3$) [a]	Significant Impact Levels ($\mu g/m^3$)	Operating Condition; Dispersion Model
NO_2	Annual	0.68	1	1 month on oil, 11 months on gas, load not specified; ISCST3
SO_2	3-Hour	62.7 / 8.13	25	Oil / Gas; ISCST3
	24-Hour	26.9 / 3.31	5	Oil / Gas; ISCST3
	Annual	0.66	1	1 month on oil, 11 months on gas, load not specified; ISCST3
PM-10	24-Hour	6.6 / 3.6	5	Oil / Gas; ISCST3
	Annual	0.50	1	1 month on oil, 11 months on gas, load not specified; ISCST3
CO	1-Hour	37.8 / 24.8	2000	Oil / Gas; ISCST3
	8-Hour	14.9 / 7.9	500	Oil / Gas; ISCST3

Sources: Exhs. EFSB-A-1-S at 4-11 to 4-14; EFSB-RR-92B Att.

a. Where two values are provided, they are from oil and natural gas firing, respectively.

The Company stated that because modeled emissions from the new CTG exceeded SILs for SO_2 and PM-10, it was required to conduct a combined source impact analysis to demonstrate the proposed project's compliance with NAAQS for these two pollutants (Exh. EFSB-A-1-S at 4-12 to 4-15; Tr. 13, at 1904). The Company modeled the combined impacts of SO_2 emissions from the new CTG and existing Kendall Station sources; its modeling for PM-10 included the new CTG, existing Kendall Station sources and 12 other major sources, including Sithe's Mystic and New Boston Stations, Logan Airport, Braintree Electric and the Trigen facility in Boston (Exhs. EFSB-RR-92 (Att. 92-C); EFSB-A-1-S at Appendix D).[23] These modeled impacts were added to existing ambient air quality data to determine total combined air quality impacts (Exhs. EFSB-RR-92; EFSB-A-29-S). SE Kendall provided combined source impact analyses for two operating configurations: the overall worst-case configuration, in which the new CTG is off-line and the back-up equipment is operating on oil, and a worst-case CTG configuration, which assumes that the new CTG is on-line and operating on oil (Exh. EFSB-RR-92 (Att. 92-C)).[24] The overall worst-case operating configuration resulted in modeled impacts ranging from 87 to 97 percent of NAAQS; the worst-case CTG configuration resulted in modeled impacts that ranged from 73 to 93 percent of NAAQS (See Table 3) (id.).

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23 SE Kendall asserted that it is not required to incorporate other major sources for the combined impact analysis for SO_2 because the proposed project is expected to result in a net decrease in SO_2 emissions from Kendall Station (Exh. EFSB-A-1-S at 4-12; Tr. 13, at 1921).

24 The Company explained that twelve different operating scenarios were modeled, which resulted in the highest second high concentration being a scenario where the new unit was not operating (Exh. EFSB-A-1-S at 4-12; Tr. 13, at 1901).

Table 3
Cumulative Impact of Selected Criteria Air Pollutants[a]

Pollutant	Averaging Period	Contribution of Proposed Turbine ($\mu g/m^3$) [b]	Cum. Impact With/Without Proposed Turbine ($\mu g/m^3$) [c]	NAAQS ($\mu g/m^3$)	Percent of Standard, With/Without Proposed Turbine [d,e]	Principal Contributor to Cumulative Impact [f]
SO_2	3-Hour	0.2	945.4 / 1125.3	1300	73 / 87	Other
	24-Hour	14.4	284.4 / 355.4	365	78 / 97	Other
PM-10	24-Hour	0.005	139.9 / 143.3	150	93 / 96	Background

Sources: Exh. EFSB-RR-92C Att; EFSB-A-1-S at 3-3

a. Where the maximum predicted impact was below SILs, cumulative impacts were not analyzed by the Company.
b. Contribution by new combustion turbine to concentration at the point of maximum cumulative concentration.
c.. Where two values are presented, the first is the highest cumulative impact, when the proposed combustion turbine is operating, and the second is the highest cumulative impact of a configuration without operation of the proposed combustion turbine.
d. Where two values are presented, the first is the percentage of NAAQS at the point of maximum cumulative impact, when the proposed combustion turbine is operating and the second is the percentage of NAAQS at the point of maximum cumulative impact of a configuration without operation of the proposed combustion turbine.
e. Percent of standard as calculated by Siting Board staff.
f. Principal contributor to maximum concentration: "Background" is monitored background; "Other" is other major sources including existing Kendall Station sources in the case of PM, but includes only existing Kendall Station sources in the case of SO_2 (Exh. EFSB-RR-92C (Att.)).

SE Kendall indicated that its dispersion models likely would predict progressively lower impacts for progressively higher stacks up to the calculated GEP height of 555 feet; however, the Company noted that a 555-foot stack would be visually intrusive (Exhs. EFSB-A-23; SEK-1, at 2-8). The Company asserted that compared to the existing Kendall Station facilities, the proposed project would result in a negligible or positive effect on air quality, and therefore any additional benefits arising from an increase in stack height above the proposed 250 feet would be insignificant (Exh. EFSB-A-23).

With respect to non-criteria pollutants regulated by the MDEP, the Company proposed an ammonia slip of two ppm (id. at 6-9, 6-11). The Company provided modeling of estimated emissions of toxic chemicals that indicated that the proposed project's emissions would be well

below MDEP's established TELs and AALs (Exh. EFSB-A-28b).

The Company asserted that operation of the proposed project would cause displacement of other more polluting, less efficient generating units and therefore would reduce regional NO_X, SO_2, and CO_2 emissions (Exh. EFSB-A-5). In support, SE Kendall provided an analysis projecting reductions in regional emissions based on the "1996 NEPOOL Marginal Emission Rate Analysis of NO_X, SO_2, and CO_2" (Exh. SEK-1, at 2-24). The Company's analysis indicated that by displacing the generation of an existing average 234 MW NEPOOL facility, operation of the proposed project would reduce New England emissions of NO_X, SO_2 and CO_2 by approximately 2052 tpy, 7846 tpy and 565,758 tpy, respectively (id.).

4. CO_2 Offset Proposal

SE Kendall indicated that the proposed project would emit a maximum of 1,105,460 tpy of CO_2 (Exh. EFSB-RR-82-B-S). The Company stated that, to meet the Siting Board's CO_2 offset requirement, it would select the most cost-effective option from one of three options set forth in the Sithe Mystic Decision (id.). SE Kendall provided a calculation of its offset contribution based on the option of funding CO_2 mitigation through a fee based on the net change in CO_2 emissions from the Kendall Station Project (id.). SE Kendall stated that the past actual annual emission rate -- based on the 1998-1999 average -- was 258,953 tpy, and therefore the net additional annual emission rate would be 846,507 tpy (id.). The Company stated that due to the interest by the local community in open space enhancements, it would consider targeting its CO_2 contribution for suitably planted open space in Cambridge (Exh. SEK-1, at 4.5-34; Tr. 13, at 1926). SE Kendall asserted it would finalize its proposal through the submission of a compliance filing to the Siting Board (Company Initial Brief at 27).

5. Position of the Parties

In its brief, the City expressed strong support for the proposed project based on projected reductions in emissions and displacement benefits associated with the operation of the proposed project on natural gas (City Initial Brief at 23-24). However, the City sought a condition explicitly limiting the use of oil as fuel for the proposed project (id. at 33-34).

In support of its suggested condition, the City noted that the proposed project would result in increased emissions of PM-10, VOCs and CO from the Kendall Station site, and could result in increases, rather than reductions, in facility-wide NO_X and SO_2 emissions (id. at 24). The City noted that while the Company anticipates significant reductions in NO_X and SO_2 emissions, as a matter of permitting strategy it is seeking a cap on NO_X emissions that is 25 tpy higher than existing emissions, and is seeking no cap on SO_2 emissions (id. at 25-27). The City argued that, while the emissions projections which the Company has presented for air permitting are "conservative" in the sense that they likely overstate future emissions, this conservatism may lead to unnecessary regulatory flexibility and overall higher emissions from the proposed project (id. at 28-30).[25]

The City noted that the Company anticipates operating the new CTG for 720 hours of full load operation on oil and that, in addition, it anticipates operating boilers 1, 2, and 3 on oil for a significant number of hours when the new CTG is off-line (id. at 30, 31). Thus, the City argued that the proposed project as a whole is likely to operate on oil for more than 30 days full power equivalent (id. at 31). The City questioned whether this extensive use of oil would actually be necessary, except in circumstances where the CTG is unavailable for an extended period of time and the Company needs to burn oil in the existing units to serve its steam customers (id. at 32). The City acknowledged that SE Kendall needs flexibility to meet its obligations to its steam customers and to respond to possible future disruptions in the natural gas market (id.). However, the City asserted that the Company's air calculations already appear to incorporate ample flexibility, and argued that oil use for the entire plant should be limited to 30 days annually, unless the CTG is unavailable and it is necessary to burn oil to serve uninterruptible steam customers (id.). The City therefore proposed the following conditions:

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[25] The City argued that the Company's air permitting calculations are conservative in that: (1) the air plans application assumes that the existing units operate more frequently than expected; (2) emissions calculations assume that boilers would operate at 100 percent capacity; and (3) emissions calculations incorporate a 10 percent degradation factor to account for a deterioration in equipment operation over time (City Initial Brief at 28-30).

> To minimize emissions of pollutants to the air, the Company shall make a compliance filing demonstrating its final operating restrictions designed to reduce air pollution. The Siting Board will expeditiously issue a compliance decision affirming this decision if the Company commits to limit its use of oil to no more than the sum of: (a) 30 days full power annual equivalent for the CTG, plus (b) during CTG outages: (i) non-summer use consistent with the operation of existing equipment shown in Ex. EFSB-RR-69, plus (ii) summer time oil use associated only with physical unavailability of natural gas and meeting non-interruptible steam and electric demand. If the Company's plan involves additional use of oil, the Siting Board will determine, based on the compliance filing, whether additional discovery and hearings are necessary. If additional proceedings are needed, they will be an extension of this case. Therefore, the parties to this case would be parties to any additional proceedings and the issues in any such additional proceedings would be limited to the issues raised by the changes to the Company's proposal.
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> To minimize sulphur emissions, the Company shall implement its proposal to use 0.05 % (or less) percent sulfur distillate oil as backup fuel for the Combustion Turbine Generator and 0.3% sulphur (or less) No. 6 fuel oil where burning oil is allowed for the existing boilers (City Initial Brief at 33-34).

In response to the City's proposed conditions, SE Kendall noted that, even using the conservative emissions levels in its Air Plan Application, estimated emissions of NO_X, SO_2, PM-10, and VOCs from the existing units would be significantly below average emissions levels for 1998 and 1999 (Company Reply Brief at 5). The Company therefore asserted that there is no basis for limiting oil use at Kendall Station, except for the 30-day limit on the use of oil in the new CTG/HRSG system (id. at 6).

With respect to CO_2 mitigation, the City requested that the Company's CO_2 offset contributions by directed toward projects related to the City's Climate Protection Action Plan, and its ClimateWise Project (City Initial Brief at 35).[26] Specifically, the City proposed the following condition:

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[26] The City indicated that the Climate Protection Action Plan is being prepared as part of Cambridge's participation in the "Cities for Climate Protection" campaign, a project of the International Council for Local Environmental Initiatives, and that the ClimateWise project, which seeks to help local businesses and institution reduce their greenhouse gas emissions, is funded by a grant from EPA (City Initial Brief at 35).

To minimize CO_2 emissions, the Siting Board requires the Company to provide CO_2 offsets through a total contribution of $269,650 to be paid in five annual installments, annually in advance, covering the first five years of facility operation into a fund for climate protection projects to be administered by the City of Cambridge. Alternatively, the Company may pay its contribution in one lump sum, with a present value equal to $203,300 within 45 days of the issuance of this Decision (id. at 35, 36).

6. Analysis

The record shows that the proposed project would consist of a highly efficient combustion turbine primarily fueled with natural gas, but permitted to use 0.05 percent distillate fuel oil as a back-up fuel for up to 720 hours per year.[27] The record also indicates that the project would include an HRSG with duct firing, incorporating advanced pollution control equipment. The record shows that the proposed project would achieve BACT for NO_X, VOCs, PM-10, SO_2, and CO.[28] The Company also has shown that its proposed facility would not emit toxics or other non–criteria pollutants at levels that exceed state or federal standards. The Company provided

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27 The record also indicates that the Company intends to use oil with a 0.3 percent sulfur content in the existing boilers, rather than the 0.5 percent sulfur oil that is currently used. The Siting Board notes that the air analyses relied upon in this decision assume the use of 0.05 percent sulfur oil in the CTG and 0.3 percent sulfur oil in the existing boilers. Consequently, a decision to routinely use oil with a sulfur content other than that set forth in this decision, either in the CTG or the existing boilers, would require written notification to the Siting Board so that the Siting Board could determine whether to inquire further into the air impacts of the proposed project.

28 With regard to the use of SCR or a zero ammonia technology to achieve BACT, the Siting Board is of the opinion that, due to its primacy of jurisdiction and to its greater expertise in emissions control technologies, MDEP is the agency best suited to determine whether and when to introduce new emissions control technologies into the Commonwealth. See IDC Bellingham LLC, 9 DOMSB 225, at 270 (1999). As a result, the Siting Board will not require use of such technology (id.). The Siting Board also notes that MDEP in a recent natural gas facility permit effectively has allowed the use of SCR rather than a zero ammonia technology at this time, with a review of the cost-effectiveness of retrofitting a zero ammonia technology to be conducted within five years. ANP Bellingham Compliance Decision, 9 DOMSB 211, at 221 (1999). The Siting Board therefore concludes that by incorporating the control technology that MDEP determines to be LAER for NO_X, the Company will have minimized its NO_X emissions and ammonia slip consistent with minimizing the cost of mitigating and controlling such technologies.

information regarding total facility emissions which demonstrates that the proposed project would meet technology performance standards for both criteria and non-criteria pollutants. Consequently, the Siting Board finds that no alternative technologies assessment is required for the proposed project.

SE Kendall has used MDEP-approved air modeling techniques to model, for certain pollutants, both the air quality impacts of the proposed project and the cumulative air quality impacts of the proposed project and other existing sources of emissions. The record indicates that the proposed project should benefit regional air quality through net decreases in emissions of NO_X and SO_2 from Kendall Station and through the potential displacement of older generating facilities in the New England region. Station-wide emissions of other criteria pollutants, including PM-10, CO, and VOCs, would increase.[29]

SE Kendall proposes to seek a permit to fuel the new CTG with oil for up to 30 days annually. The Company has indicated that it would use oil both during periods of natural gas curtailment and for economic reasons, and that it anticipates using oil for most of the permitted 30 days in a typical year. The Company also has the ability to operate its existing boilers on oil, and has stated that it anticipates: (1) operating boiler 3 on oil at times when the CTG is operating on oil and demand for steam cannot be met by the CTG alone; (2) operating boiler 3 on either natural gas or oil when the CTG is off-line; and (3) operating boilers 1 and 2 on oil only when natural gas is unavailable. The Siting Board notes that Kendall Station is a must run producer of steam, and that the Company is responsible to serve its steam customers before electricity production.

The record indicates that, under a reasonably conservative operating scenario, station-wide emissions of NO_X and SO_2 would be reduced significantly – from 365 tpy to 204 tpy for NO_X, and from 247 tpy to 166 tpy for SO_2 – while additional generating capacity would be created within the currently constrained Boston load center. However, SE Kendall has not

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29 The modeling indicates that concentrations of pollutants from the proposed project with the new CTG when firing oil would be above SILs for SO_2 for the 3-hour and 24-hour averaging periods and for PM-10 for the 24-hour averaging period.

proposed to guarantee these reductions through a regulatory mechanism such as an enforceable emissions cap for Kendall Station. Instead, it seeks to retain operational flexibility, particularly for its existing units, in order to serve its steam customers and to respond to fluctuations in the prices of natural gas and oil. Thus, the possibility exists that the projected NO_X and SO_2 benefits could be significantly less than projected, and that emissions of PM-10, CO, and VOCs could be significantly higher than projected, if the new CTG operates at less than the projected 90 percent capacity factor and the existing equipment operates frequently on oil to meet the needs of Kendall Station's steam customers. Further, because of the many possible operating configurations that could be used to generate some combination of electricity and steam, it is difficult to establish a single reasonable worst-case estimate of overall emissions.

The City has proposed to address these uncertainties by restricting the use of oil in both the new and existing equipment to levels consistent with representations made in this proceeding, and by restricting the use of oil during the ozone season to those occasions when it is required to meet the needs of uninterruptible steam customers because natural gas is physically unavailable. The City acknowledges that the Company needs flexibility to meet the needs of its steam customers and to respond to disruptions in the natural gas market, but argues that the conservative emissions projections presented in this proceeding incorporate substantial flexibility.

The Siting Board agrees with the City regarding the need to strictly limit oil firing during the ozone season, when regional emissions of NO_X and VOCs result in the highest concentrations of ozone. The record indicates that both new and old equipment would emit substantially higher levels of these ozone precursors when operating on oil than when operating on natural gas. The record also indicates that, while Massachusetts meets federal air quality standards for all other criteria pollutants, it is classified as in serious non-attainment for ozone. It is therefore particularly important to minimize the proposed project's emissions of ozone precursors during the ozone season. The Siting Board notes that such limitations would be consistent with restrictions on oil firing at other recently approved facilities, which have agreed to refrain from the use of oil during the ozone season either entirely, or except in the case of a natural gas supply emergency. Brockton Power, LLC, 10 DOMSB 157, at 192 (2000) ("Brockton Power

Decision"); Sithe Edgar Decision, 10 DOMSB at 39. Therefore, the Siting Board directs the Company to limit oil firing for the new equipment and boilers 1, 2, and 3 to the months outside of the ozone season of May 1 through September 30, except in the case of a natural gas supply interruption beyond the Company's control, and to seek an air quality plan approval from the MDEP incorporating this condition. The Company shall provide the Siting Board with a copy of its pre-construction air quality plan approval prior to the commencement of construction.

The Siting Board also agrees with the City that, given the regulatory framework anticipated by the Company, the proposed project's emissions of criteria pollutants could theoretically be higher than currently projected. However, given the conservative nature of the assumptions underlying the Company's emissions projections, it is unlikely that emissions would be substantially higher than projected for any sustained period of time. The City's proposal for limiting the use of oil at Kendall Station is complex, and would be best analyzed in the context of the Company's MDEP air plan review. Based on this record, the Siting Board cannot conclude that this or a similar condition would minimize environmental impacts consistent with minimizing the cost of mitigation, control and reduction of impacts, or that it would not have unanticipated consequences on the reliability or cost of electricity in the Boston load center. Further, the Company has agreed to fire the new CTG with oil for no more than 30 days each year, and the Siting Board already has placed limits on the use of oil during the five months that make up the ozone season. Consequently, the Siting Board will not place further limitations on the use of oil as a condition of this approval.[30]

SE Kendall has proposed a single 250-foot stack in order to minimize the visual impacts of the proposed project. Although the Company did not conduct modeling analyses to determine the extent to which moderate increases in stack height would reduce air quality impacts, it seems clear that the significantly sub-GEP stack height contributes to SO_2 and PM-10 impacts in excess of SILs. The Siting Board acknowledges that locating a stack with a height approaching GEP in

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30 The Siting Board notes that, upon further analysis of the Company's Air Plan Proposal, MDEP may set further limits on emissions from Kendall Station, potentially including an enforceable cap on NO_X and SO_2 emissions below current levels. Nothing in this decision is intended to preclude such action by MDEP.

the Kendall Square area would be unacceptable. The Siting Board also notes that there are likely to be overall air quality benefits associated with the displacement of the existing boilers with the CTG and HRSG, even given the substantially sub-GEP stack height. In Section III.F., below, the Siting Board reviews the visual impacts of the proposed project and concludes that, although the proposed stack is taller than the existing stacks, the overall visual impacts of the proposed project would be minimized. Consequently, the Siting Board finds that the proposed 250-foot stack height, in conjunction with limiting oil firing for the new equipment and boilers 1, 2, and 3 to the months outside of the ozone season, except in the case of a natural gas supply interruption beyond the Company's control, would minimize air quality impacts consistent with the minimization of the visual impacts of the proposed project.

The Siting Board has set forth a general approach to the mitigation of CO_2 emissions that requires generating facility applicants to make a monetary contribution, based on offsetting one percent of annual facility CO_2 emissions at $1.50 per ton,[31] to cost-effective CO_2 offset programs selected in consultation with the Siting Board staff. Nickel Hill Energy, EFSB 99-3, at 42-43; Brockton Power Decision, 10 DOMSB at 192-193; Dighton Power Associates, 5 DOMSB at 239-240 (1997) ("Dighton Power Decision"). The Siting Board also recently has approved a non-monetary approach to CO_2 mitigation based on the shutdown or curtailment of an existing source of CO_2 emissions. Sithe Edgar Decision, 10 DOMSB at 136-140; Sithe Mystic Decision, 9 DOMSB at 136-140.

In the Sithe Mystic Decision, the Siting Board accepted for the first time a non-monetary CO_2 mitigation program based on voluntary curtailment of operations at an existing source, subject to conditions precluding collateral use of the curtailed operations for offsetting other pollutant emissions. Sithe Mystic Decision, 9 DOMSB at 136-140. In that decision, the Siting

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31 The Siting Board notes that, in future reviews, evidence may be developed that supports use of a different assumed cost of providing CO_2 offsets, or use of a range of monetary values, or a greater or sole use of a non-monetary basis, in determining the appropriate level of CO_2 mitigation. Future applicants are put on notice that the Siting Board may seek to develop evidence relating to the appropriateness of the review standards set forth in Dighton Power Decision, 5 DOMSB 193 (1997), or other reviews, and that the Siting Board may adjust its existing monetary standard to account for inflation or other similar changes based on the passage of time.

Board also outlined two alternative approaches: (1) Sithe could make the standard monetary contribution, based on offsetting one percent of CO_2 emissions from its proposed facility at $1.50 per ton; or (2) Sithe could base its monetary contribution on the net increase in CO_2 emissions at the Mystic Station site, provided that it did not use CO_2 reductions from its existing units as offsets for CO_2 emission from any other source. Id. at 140.

SE Kendall proposes to meet the Siting Board's CO_2 offset requirement by selecting the most-cost effective option of the three set forth in the Sithe Mystic Decision. The Company has estimated that the net increase in CO_2 emissions from the Kendall Station Project would be 846,507 tpy. The Company therefore concludes that providing CO_2 mitigation based on an offset level of 8465 tpy, representing 1 percent of the added emissions from the proposed facility, would be consistent with Siting Board precedent regarding CO_2 mitigation.

The Siting Board finds that SE Kendall's suggested approach of providing offsets for 1 percent of the net increase in CO_2 emissions from Kendall Station, currently estimated at 8465 tpy, properly complies with Siting Board requirements for CO_2 mitigation, provided that SE Kendall establishes that it would make no additional use of the CO_2 emissions reductions to provide offsets for CO_2 emissions from other sources. Alternatively, SE Kendall may elect to provide offsets for 1 percent of the maximum CO_2 emissions from the proposed project.

Alternatively, consistent with the CO_2 mitigation approach accepted in the Sithe Mystic Decision, the Company may use any reductions in overall CO_2 emissions from existing equipment at Kendall Station to offset 1 percent of the proposed project's maximum CO_2 emissions. Use of offsets from the existing equipment at Kendall Station would be subject to the condition that SE Kendall establish that: (1) the existing equipment would be subject to enforceable operating limits, with supporting verification mechanisms, to ensure that projected reductions in CO_2 emissions are realized; and (2) it will make no collateral use of the modified operations of existing equipment on which the CO_2 offsets for the proposed project are based, in order to provide emissions offsets relating to other pollutants and/or other sources.

The City has requested that any required emissions offset contribution be targeted to programs specific to Cambridge. However, this request is premature given the Siting Board's general approach to CO_2 mitigation, set forth above, which requires applicants to select CO_2

mitigation programs outside of the adjudicatory process in consultation with Siting Board staff. This consultation generally takes place at a time close to commencement of commercial operation, in order to allow consideration of a broad range of cost-effective CO_2 mitigation options, including options that might not be available at the time of the underlying proceeding. The Company has committed to further consider CO_2 mitigation options with the City. If the Company proposes to support Cambridge-based programs as part of a monetary CO_2 mitigation approach, the Siting Board staff will evaluate the proposal as it would any other CO_2 mitigation proposal. Specifically, the Siting Board staff evaluates a CO_2 mitigation program based on its ability to provide proven, incremental offsets, its cost-effectiveness, its ability to provide ancillary environmental or economic benefits that flow to the community or region, and other similar criteria.[32]

Accordingly, consistent with its rulings in recent cases, the Siting Board directs the Company either to: (1) make a monetary contribution to a cost-effective program or programs to be selected upon consultation with the staff of the Siting Board, based on the maximum CO_2 emissions from the operation over 20 years of the proposed project; or (2) make a monetary contribution based on the maximum net increase in CO_2 emissions from Kendall Station over 20 years, if it can establish that it will make no additional use of the CO_2 emissions reductions from existing equipment to provide offsets for CO_2 emissions from other sources; or (3) provide offsets for 1 percent of the proposed project's maximum CO_2 emissions based on voluntary curtailment of operations of existing equipment at Kendall Station, or of equipment at another existing source, subject to conditions, as described above, that the curtailment of operations be based on enforceable and verifiable limits and that there be no collateral use of the curtailment of operations to provide emissions offsets relating to other pollutants and/or sources. If the Company elects to pursue monetary CO_2 offsets, the Siting Board directs the Company to

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32 We note that the selection by applicants of a CO_2 mitigation program or programs in consultation with the staff of the Siting Board -- a conditional requirement in recent generating facility reviews consistent with the CO_2 mitigation standard set forth in the Dighton Power Decision -- must include consideration of the relative cost-effectiveness of various reasonably available programs. Dighton Power Decision, 5 DOMSB at 239-240. See, e.g., ANP Blackstone Energy Company, 8 DOMSB at 127-128 (1999).

provide CO_2 offsets through a total contribution of $352,142 (or $269,650, if based on the maximum net increase in CO_2 emissions from Kendall Station), to be paid in five annual installments during the first five years of facility operation.[33, 34]

Accordingly, the Siting Board finds that, with the implementation of the above conditions concerning use of oil for back-up and CO_2, the air quality impacts of the proposed project would be minimized.

C. Water Resources

In this Section, the Siting Board addresses the water-related impacts of the proposed project, including: (1) the water supply requirements of the facility and related impacts on affected water supply systems and on other water resources; and (2) the water-related discharges from the facility, including heated effluent and wastewater.

1. Description

The Company stated that the existing facility uses water withdrawn from the Broad Canal for OTC of the steam turbines, and uses water obtained from the City of Cambridge for process and sanitary purposes, and for production of steam for distribution to steam customers (Exhs. EFSB-G-2-S Bulk Att. at 3-15, 3-21; EFSB-RR-70-C). The Company stated that after use at the facility, the OTC water is discharged to the Charles River via an outfall pipe in the riverbank

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33 The contribution is based on offsetting 1 percent of facility CO_2 emissions over 20 years, at $1.50 per ton. The 20-year amount is first distributed as a series of payments to be made over the first five years of project operation, then adjusted to include an annual cost increase of 3 percent. See IDC Bellingham LLC, 9 DOMSB at 273; Sithe Mystic Decision, 9 DOMSB at 140; U.S. Generating Company, 6 DOMSB 1, at 128-129 (1997) ("Millennium Power Decision").

34 If the Company chooses, the CO_2 offset requirement also would be satisfied by a single first-year contribution based on the net present value of the five annual payments totaling $352,142, (or $269,650 if based on the maximum net increase in CO_2 emissions), discounted at 10 percent per year. See IDC Bellingham LLC, 9 DOMSB at 273; Sithe Mystic Decision, 9 DOMSB at 140; Millennium Power Decision, 6 DOMSB at 128-129. The single up-front payment of $$286,626, (or $219,484 if based on the maximum net increase in CO_2 emissions) would be due by the end of the first year of operation.

retaining wall, and process wastewater is discharged to a Massachusetts Water Resources Authority ("MWRA") sewer (Exh. EFSB-G-2-S Bulk Att. at 3-15 to 3-17, 3-21).

The Company stated that the proposed project would continue to use river water for OTC; in addition, process water would be diverted from the OTC flow once it has gone through the condensers (id. at 3-21; 3-67 to 3-71).[35] SE Kendall stated that OTC water, wastewater generated from the water treatment process ("water treatment reject"), and boiler blowdown all would be discharged to the Charles River via a new diffuser system (id. at 3-72). The proposed project would rely on city water only for sanitary water requirements and as an emergency back-up source for process water; sanitary wastewater and other process wastewater would be discharged to the MWRA sewer system (id. at 3-67 to 3-72).

SE Kendall estimated that its current process water requirements average 188,640 gallons per day ("gpd"); of this, 151,200 gpd is used for steam distribution and the remaining 37,440 gpd is used for sanitary, boiler makeup, and equipment wash down uses (id. at 3-66 to 3-67; Exh. EFSB-RR-70-C-S2; Tr. 12, at 1744-1745). The Company estimated that the process water requirements for the proposed project would average of 632,160 gpd,[36] including an annual average 87,120 gpd for HRSG/boiler make-up and other process water needs,[37] and additional

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35 The Company considered obtaining process water for the proposed project from Cambridge, but determined that doing so would increase process water requirements from 632,160 gpd to 724,320 gpd due to the need to demineralize the city water (Exhs. EFSB-G-2-S Bulk Att. at 3-67; EFSB-WU-1). The Company also noted that the use of city water for process requirements would increase the project's production of demineralized wastewater and its use of water treatment chemicals (Exh. EFSB-WU-2).

36 The Company estimated this based upon the following hours of operation per year as described in Section III.A: 4,414 hours CTG with natural gas firing, 950 hours of natural gas-fired CTG with power augmentation, 1,800 hours of natural gas-fired CTG with steam augmentation, 220 hours of CTG burning oil, 500 hours of oil-fired CTG with boiler, 3,569 hours of natural gas-fired boiler 3, and 307 hours of natural gas-fired boilers 1, 2, and 3 (Exhs. EFSB-RR-70-C-S2 (Att.); EFSB-G-2-S Bulk Att. at Table 3-17). The Company noted that this operating scenario is different from the worst-case scenario used to model air quality impacts (Exh. EFSB-RR-70-C; Tr. 11, at 1605-1607).

37 The Company stated that the proposed project would use 55,872 gpd of process water when firing the CTG with natural gas, 197,136 gpd when firing the CTG with oil, and (continued...)

water for steam distribution (id. at 3-21, 3-67, Table 3-17; Exh. EFSB-RR-70-C-S2).

The Company stated that the existing facility discharges an average of 43,488 gpd of wastewater including stormwater to the MWRA sewer system and added that the proposed project would generate an average of approximately 49,824 gpd of wastewater (Exhs. EFSB-G-2-S Bulk Att. at 3-21, 3-75; EFSB-RR-70-C-S2 (Att. 3)). SE Kendall indicated that, with the diversion and treatment of river water to meet process requirements at the proposed project, an additional 361,440 gpd of water treatment reject would be combined with the OTC return flow and discharged to the Charles River (Exh. EFSB-G-2-S Bulk Att. at 3-21).[38]

The Company indicated that it evaluated alternatives to OTC, including the use of wet cooling towers, helper towers, and air-cooled condensers, but concluded that these alternatives would require more land than was available at the proposed site, would be more costly, and would have greater noise, visual, and land use impacts than OTC (id. at 4-28-4-41; Exh. EFSB-G-2-S Bulk Att. at 4-28, Figures 4-2, 4-3, 4-4).

2. Impacts on Municipal Water Supply and Sewage Systems

The Company stated that Kendall Station's use of city water would decrease from an annual average of 188,640 gpd to 5,040 gpd under the proposed project (Exhs. EFSB-G-2-S Bulk Att. at 3-21, Table 3-17; EFSB-RR-70-C-S2). The Company stated that although it does not foresee the need for an emergency back-up supply of water, in the event of an emergency it would obtain process water from Cambridge (Exh. EFSB-G-2-S Bulk Att. at 3-67).[39]

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37 (...continued)
223,776 gpd when using power augmentation (Exhs. EFSB-G-2-S Bulk Att. at Table 3-17; EFSB-RR-70-C-S2).

38 SE Kendall noted that a portion of the process wastewater generated by the proposed project, specifically 20,160 gpd of boiler blowdown wastewater, also would be combined and mixed with the OTC return flow (Exhs. EFSB-G-2-S Bulk Att. at 3-21; EFSB-RR-70-C-S2 (Att. 3)).

39 The Company at various times estimated its maximum emergency back-up water requirement at levels between 188,640 gpd and 518,400 gpd (Exhs. EFSB-G-2-S Bulk Att. at 3-67; EFSB-RR-96-C).

The Company stated that Cambridge obtains its water supply from system reservoirs at upstream locations in the Charles River watershed, and noted that Cambridge is permitted to withdraw 16 mgd and currently uses 15 mgd (id. at 3-66; Exh. EFSB-WU-13). The Company stated that its proposed use of river water for process purposes would reduce the demand on Cambridge's water supply; further, because process water would be withdrawn at Kendall Station, downstream of Cambridge's reservoirs, upstream flow reductions during low-flow periods would be reduced (Exhs. EFSB-WU-2; EFSB-G-2-S Bulk Att. at 3-71).[40] The Company indicated that the City of Cambridge, the CRWA, and regulatory agencies generally approve of the use of river water as opposed to city water for process water needs (Exh. EFSB-G-2-S2-A (Att.); EFSB-G-1-S (Att. b)).

With respect to wastewater, the Company stated that the existing facility discharges an average of approximately 38,304 gpd of wastewater into the MWRA's combined stormwater and sanitary sewer system (Exhs. EFSB-G-2-S Bulk Att. at 3-21; EFSB-RR-70-C-S2 (Att. 3)). SE Kendall explained that while the proposed project would significantly increase the amount of wastewater generated, both water treatment reject and boiler blowdown would be discharged to the river rather than to the MWRA (id.). Thus, wastewater discharges to the MWRA would decrease by 13,824 gpd (id.). The Company noted that the MWRA's combined sewers currently experience frequent periods of excess flow with discharges of untreated wastewater via combined sewer overflow ("CSO") outfalls, thus increases in discharges to the MWRA might increase CSO discharges (Exhs. EFSB-WU-4; EFSB-WU-7).

3. Impacts on the Charles River

SE Kendall stated that the character of the Charles River near its mouth in the vicinity of Kendall Station has been affected by urbanization in Boston and Cambridge and by the Science Park Dam located just downstream of the Kendall Station (Exhs. EFSB-G-2-S Bulk Att. at 3-5 to

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40 The Company noted that the streams that feed the Cambridge water supply have seven-day, ten-year low water flows ("7Q10s") of between 0.19 and 10.2 cubic feet per second ("cfs"), while the 7Q10 of the Charles River near Kendall Station is estimated at 22 cfs (Exh. EFSB-G-2-S Bulk Att. at 3-6, 3-66 to 3-67).

3-6; EFSB-WG-1 (Att.)). The Company stated that the Metropolitan District Commission ("MDC") regulates the dam to keep the Charles River at 108 feet above sea level at all times, creating a nine-mile stretch of river from the Watertown Dam to the Science Park Dam ("Charles Basin") that functions in some ways as a lake (Exhs. EFSB-WG-2 (Att. A); EFSB-G-2-S Bulk Att. at 3-6; Tr. 11, at 1528-1529). The Company stated that the Charles Basin is classified by the MDEP as a Class B CSO[41] river, but noted that these standards are currently not met (Exhs. EFSB-WQ-4; EFSB-WQ-5; EFSB-WQ-5-S; EFSB-WG-1 (Att.) at 8, 85-86).

The Company noted low dissolved oxygen ("DO") levels in the lower portion of the Charles Basin resulting from the stratification of water behind the dam (Exhs. EFSB-WQ-20 (Att. at 4); EFSB-G-2-S Bulk Att. at 3-6, 3-7 and 3-10). The Company explained that salt water, which is denser and colder than the freshwater in the Charles River, intrudes through locks and leaks in the dam, creating a migrating salt water wedge along the bottom of a portion of the Charles River up to the Longfellow Bridge ("lower Charles Basin") (Exh. EFSB-G-2-S Bulk Att. at 3-10, 3-12 to 3-13). The Company explained that the salt water wedge exacerbates the thermal stratification and prevents the mixing of higher DO surface water with the bottom waters (id. at 3-12 to 3-13). The salt water wedge has resulted in DO levels in the bottom zone of the river of less than 5 milligrams per liter ("mg/l"), which is the Class B water quality standard, and in fact, the Company submitted figures documenting DO levels at 0 mg/l ("anoxia") (id. at 3-12, Figures 3-25, 3-29; Exh. EFSB-G-2-S2 (Att. B) at 10). The Company indicated that the low DO levels make the lower Charles Basin unsuitable habitat for benthic, or river bottom dwelling, species, and reported that the lower Charles Basin behind the dam has only four benthic organisms per four square feet, as compared to 81 in the Charles River near the Watertown Dam and 335 in the Connecticut River (Exhs. EFSB-WQ-10; EFSB-G-2-S Bulk Att. at 3-7). The Company indicated that a variety of agencies and organizations have raised concerns about anoxia in the lower Charles Basin and that these groups have identified that problem as a priority in basin plans developed under the Massachusetts Executive Office of Environmental Affairs ("EOEA") (Exhs.

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41 SE Kendall explained that a Class B CSO river should meet water quality standards that support primary and secondary contact recreational uses, with an exception made to allow CSO discharges (Exh. EFSB-WG-1 (Att.), at 87; EFSB-WQ-6).

EFSB-WQ-3: EFSB-G-1-S; EFSB-G-2-S (Att. A); EFSB-WG-2 (Att. A)).

SE Kendall stated that it currently withdraws water for OTC from the Broad Canal and discharges it into the Charles River just downstream of Kendall Station (Exh. EFSB-G-2-S (Att.) at 3-15 to 3-16). The Company's discharges are governed by a National Pollution Discharge Elimination System ("NPDES") permit from EPA, which allows it to discharge a monthly average of 70 mgd and a daily maximum of 80 mgd, with a maximum rise in temperature of 20 degrees F over the temperature of the intake water (id. at 3-23; Exhs. EFSB-WQ-1 (Att.); EFSB-G-2-S Bulk Att. at 3-23). However, the Company stated that its actual water use is much lower than its permit limitations, estimating that it currently uses an average 47.5 mgd and a maximum of 66.8 mgd (Exhs. EFSB-WU-9; EFSB-RR-72; EFSB-RR-70-C-S).[42] The Company also noted that while the NPDES permit allows for the transfer of heat load to the cooling water of up to an average of 486.5 million British thermal units ("MMBtu") per hour or a maximum of 556 MMBtu/hr, the project's actual average heat load transfer is 217 MMBtu/hr and its average daily maximum heat load transfer is 250 MMBtu/hr (Exh. CC-2 (Figure 1); Tr. 10, at 1455-1457, 1497-1498).

SE Kendall has proposed to change its NPDES permit slightly to allow a maximum average use of 70 mgd on an annual basis, rather than a monthly basis, while maintaining the maximum daily use of 80 mgd and the maximum temperature change of 20 degrees F over the intake temperature (Exhs. EFSB-G-2-S Bulk Att. at 3-23; EFSB-WQ-9-S).[43] SE Kendall stated that this change would allow it to increase its average discharge to the river, and projected that its maximum monthly average discharge would be approximately 77 mgd when the proposed

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42 The Company estimated the maximum based upon the past ten years of operation, excluding 1999, during which the plant was running at higher capacity (Tr. 8, at 1160-1161).

43 In its original petition, the Company had proposed to use a maximum of 86.4 mgd on a daily and an annual average basis (a heat load of 600 MMBtu/hr), but as a result of comments on the DEIR, the Company reduced its need to those currently proposed through the use of a fin-fan cooler mounted on the roof to cool the new CTG and through refinements to the heat and material balances (Exhs. CC-2, at 2; EFSB-G-2-S Bulk Att. at 1-8 to 1-9; EFSB-WQ-9-S).

project is in operation (Exh. EFSB-G-2-S Bulk Att. at 3-22 to 3-23; Tr. 8, at 1158-1159). SE Kendall noted that its withdrawals, discharges and heat load would vary based on operational factors including the extent of steam augmentation, the type of fuel used, and the amount of steam sent to customers (Exh. EFSB-RR-70-C-S2; Tr. 8, at 1168-1169). The Company indicated that it also intends to discharge water treatment reject and boiler blowdown to the Charles River (Exh. EFSB-G-2-S Bulk Att. at 3-72).

SE Kendall described the impacts of its water withdrawals and discharges on water levels in the Charles River, on water quality, and on fisheries. With respect to water levels, the Company indicated that withdrawals for the proposed project would represent up to 72 percent of the average summer flow of the Charles River at Waltham, and nearly five and a half times the 7Q10 of 22 cfs at Kendall Station (id. at 3-67; Exh. EFSB-RR-70-C-S2). However, the Company asserted that since the MDC regulates the Science Park Dam to maintain the river at 108 feet above sea level at all times, this large withdrawal in comparison to river flow would not have an impact on water levels (Exh. EFSB-G-2-S Bulk Att. at 3-67; Tr. 11, at 1526-1532). SE Kendall indicated that Kendall Station does not currently use river water for any consumptive purpose, i.e., all water withdrawn from the river is discharged back to the river (Exhs. EFSB-G-2-S Bulk Att. at 3-67; EFSB-RR-70-C-S2). However, the proposed project would consume on average 0.98 cfs of river water, or on average 0.6 percent of the average summer flow and 4.5 percent of 7Q10 flow at Kendall Station (id.; EFSB-RR-70-C-S1).[44]

The Company asserted that the inclusion of boiler blowdown and water treatment reject in its discharges to the Charles River would not have a significant impact on water quality (Exh. EFSB-G-2-S Bulk Att. at 3-72-3-75). The Company noted that the boiler blowdown is very similar in composition to the river water (id. at 3-72). The Company stated that water treatment reject would have high concentrations of total suspended solids ("TSS"), total dissolved solids ("TDS"), and de minimis levels of other pollutants; however, it argued that because the water

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[44] The Company indicated that the proposed project would consume the most water during power augmentation and oil-fired operations, estimating that consumptive use would be 1.19 cfs or 5.4 percent of 7Q10 flow during power augmentation and 1.15 to 1.16 cfs or 5.2 percent of 7Q10 flow during oil-fired operations (Exhs. EFSB-G-2-S Bulk Att. at 3-67; EFSB-RR-70-C-S2).

treatment reject would make up only 0.5 percent of the discharge volume, concentrations of TSS and TDS in the discharge water would increase by only 1 percent (id. at 3-72; Exh. EFSB-WQ-14). The Company stated that wastewater discharges to the river would be regulated under its NPDES permit, as well as by the MWRA, the Army Corps of Engineers and MDEP, and added that discharges to the MWRA must meet certain pollutant standards set by MWRA and EPA (Exh. EFSB-G-2-S Bulk Att. at 3-4 to 3-5).

SE Kendall modeled the impact of the proposed project on the temperature of the Charles River under a variety of river flow and seasonal conditions, and used a number of different assumptions regarding the allocation of discharges between the existing surface pipe and the proposed deep diffuser (id. at 3-6; Exh. EFSB-RR-84). The Company asserted that its model incorporated conservative assumptions regarding facility operations, oxygen demand levels, and the duration of the modeled 7Q10 or extreme low flow rate (Exhs. EFSB-G-2-S Bulk Att. at 3-48; AS-2, at 3).[45] The Company submitted graphical representations of the change in temperature from the intake temperature under these different scenarios, including surface, transverse, and longitudinal simulations of the change in temperature and final temperature (Exh. EFSB-RR-86 (Att.)). SE Kendall stated that the model results show that average temperature changes and resulting final temperatures would be within normal variation for this type of ecosystem (Exh. EFSB-G-2-S Bulk Att. at 3-42 to 3-45). Table 4 below summarizes the results of some of the model runs.

The Company also conducted a model run for 7Q10 flow with the current facility running at average discharge and heat load (Exh. EFSB-RR-87). The graphical representations

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[45] SE Kendall also used existing input data from 1998 and 1999 to model temperature and DO changes and compared those with actual water temperature readings ("calibration models"). The Company stated that these calibrations show that on average modeled temperature changes were 2.52 times higher than actual temperature changes (Exh. EFSB-G-2-S Bulk Att. at 3-33). The Company also stated that its DO model generally predicted higher values for DO than the actual data, but that the modeled and actual values were close (id. at 3-33). SE Kendall submitted comments from agencies that indicate their concern with the accuracy of the models and the projection that temperature impacts would exceed the 5 degree F water quality standard under some scenarios (Exh. EFSB-G-2-S2-A (Att.); EFSB-G-1-S).

of this model run indicate that current facility operation results in modeled average temperature rises of approximately between 1 to 3 degrees F, with a small area around the surface discharge having an 8 degree F temperature rise (id.).

Table 4
Effects of the Proposed Project's OTC Discharge on Water Temperature and DO in the Charles River

Flow/Month Scenario	Average Surface Temp-erature Increase (degrees F)	Maximum Surface Temp-erature Increase (degrees F)	Average Bottom Temp-erature Increase (degrees F)	Maximum Bottom Temp-erature Increase (degrees F)	Average Bottom DO (mg/l)
Average Flow May	3.5	7.6	2.5	3.6	7.3
Average Flow September	5.1	9.2	3.7	5.1	6.2
Extreme Low Flow March/April	6.0	10.1	5.0	6.3	9.0
Extreme Low Flow June	5.9	10.0	4.6	6.0	6.3
7Q10	6.0	10.1	6.5	6.0	6.1

Sources: Exhs. EFSB-G-2-S Bulk Att. at Table 3-13; EFSB-RR-86 (Att.); EFSB-RR-89 (Att.)

SE Kendall asserted that the anticipated temperature changes associated with operation of the proposed project would be within the tolerance ranges of fish species and would have no ecological impact (Exh. EFSB-G-2-S Bulk Att. at 3-60 to 3-61; Tr. 12, at 1794). In support, the Company provided information on the optimal, avoidance and lethal water temperatures of different fish species that are found in the Charles River and compared it to the maximum temperature that would be present over 90 percent of the model area (Exh. EFSB-G-2-S Bulk Att. at Table 3-16). The Company submitted a letter from the Massachusetts Division of Fisheries and Wildlife stating that likely average temperature impacts outside the 5 degree F mixing zone appear to be within likely normal temperature ranges for inland fish and that the increase in DO would more than offset any intake or temperature impacts (Exh.

EFSB-RR-97-S).[46]

SE Kendall also evaluated the impacts of the proposed project on Charles River basin fisheries resulting from impingement and entrainment losses at the OTC intake (Exh. EFSB-G-2-S Bulk Att. at 3-53 to 3-59). The Company indicated that the existing facility withdraws water from the Broad Canal through screened intakes at a rate of between 0.6 and 1.1 feet per second ("fps"), and does not employ a fish return system (id. at 4-7; Exh. EFSB-WF-6). The Company conducted studies of current impingement and entrainment rates beginning in the spring of 1999; it reported that 304 fish were impinged during a 162-day period, consisting primarily of river herring, white perch, and sunfish (Exh. EFSB-G-2-S Bulk Att. at 3-51 to 3-52, Table 3-15). The Company noted that most fish were impinged during the anadromous fish runs in the spring (id. at 3-51 to 3-52, Table 3-15). The Company estimated current entrainment losses based on icthyoplankton studies (id. at 3-52). The Company concluded that total impingement and adult equivalent[47] entrainment losses represent less than 1 percent of the fish's population for all species of fish except white perch (Exh. EFSB-G-2-S Bulk Att. at 3-54, Table 3-15).

In order to mitigate impingement and entrainment impacts associated with increased water withdrawals for the proposed project, SE Kendall proposed to deploy a barrier net around the water intakes; it anticipated that the barrier net would effectively reduce the velocity of the intake water to less than 0.05 fps (Exh. EFSB-WF-6-S).[48] The Company indicated that the barrier net would be deployed during certain times of the year when the data shows that most of the impingement and entrainment occurs, namely late April through early July (Exh. EFSB-G-2-

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46 The Company indicated that not all fish temperature tolerances have been established (Exh. EFSB-G-2-S Bulk Att. at Table 3-16; Tr. 12, at 1810-1811).

47 The Company explained that it estimated the impact of the intake on eggs and larvae, but since a vast number of fish eggs and larvae do not make it to adulthood, the Company translated egg and larval losses into adult equivalents (Exh. EFSB-G-2-S Bulk Att. Appendix 3.6; Tr. 12, at 1760).

48 The Company evaluated other options for reducing fish impacts, including a Gunderboom system, traveling screens with fish returns, and fine-mesh screens, and concluded the barrier net would be the most effective and least costly option (Exhs. EFSB-WF-7-S; EFSB-G-2-S Bulk Att. at 4-52 to 4-61). SE Kendall also stated that EPA would require the Best Technology Available ("BTA") for fish return systems and barriers (id.).

S Bulk Att. at 3-54). The Company asserted that the barrier net would virtually eliminate impingement and significantly reduce entrainment losses (id.; Exh. EFSB-WF-11-S). The Company estimated that, at 50 percent effectiveness, the barrier net would reduce impingement and entrainment losses to less than current levels; at 25 percent effectiveness, losses would be greater than at present, but impacts for all species except white perch would be less than 1 percent of the total population (Exh. EFSB-G-2-S Bulk Att. Table 3-15). The Company stated that it tested the barrier net in late spring of 2000 and noted that federal and state agencies had raised concerns about SE Kendall's estimates of fish losses until results of the barrier net tests were available (id. at 3-12, Appendix 3.6; Exh. EFSB-G-2-S2 (Att. B)).

As further mitigation for the proposed project's impacts on fisheries, the Company has proposed to extend one of its discharge pipes down to the bottom and middle of the Charles Basin (approximately 600 feet) and diffuse the discharge through ports located near the end of the pipe (Exh. EFSB-G-2-S Bulk Att. at 3-17 to 3-20).[49] The Company asserted that the diffuser pipe would increase DO levels[50] in the lower basin because the warmer effluent would rise to the surface, breaking the stratification layer and creating convection that circulates higher surface water into the depths (id. at 3-43).[51] The Company modeled projected DO levels in the Charles Basin with the diffuser in place; Table 4 above shows the average predicted DO level for a variety of model runs. The Company estimated that the oxygenation of the benthic environment resulting from the use of the diffuser would result in a 10 percent increase in the population of resident species, since the lower Charles Basin represented about 10 percent of the habitat of the

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49 SE Kendall stated that it chose the discharge design and location with the maximum benefit and the minimum cost and that the diffuser would cost approximately $2 million (Exhs. EFSB-WQ-24; EFSB-WQ-18).

50 SE Kendall testified that the temperature increases resulting from the proposed discharge would decrease DO levels, but that this would be insignificant compared to the proposed diffuser's projected increase (Tr. 10, at 1422, 1425-1426).

51 The Company reported that the MDC temporarily employed aerators in the lower Charles River that increased DO and decreased biological oxygen demand, phosphorus and ammonia, and that other electrical generating facilities have successfully employed deep diffusers to dissipate thermal discharges (Exhs. EFSB-G-2-S Bulk Att. at 3-12; EFSB-WQ-20 (Att.); EFSB-WQ-25).

lower Charles River (Tr. 12, at 1832-1824).

Overall, SE Kendall asserted that the diffuser would increase DO levels in the lower Charles Basin, with a consequent extension of fish habitat that would more than offset the proposed project's entrainment and impingement impacts (Exh. EFSB-G-2-S Bulk Att. at 3-50). Based on its impingement and entrainment studies, the Company projected that the proposed project would have the greatest negative impacts on river herring and white perch, and that those same species, as well as northern pike and channel catfish, would benefit most from the improved bottom conditions (Exh. EFSB-WF-11-S). The Company submitted comments from agencies and other organizations indicating a serious concern about the population data used and the overall impact on fisheries, and recommending further study, but supporting the use of the barrier net and the deep diffuser to offset impacts (Exhs. EFSB-G-2-S2-A (Att.); EFSB-G-1-S (Att. b)). The Company also asserted that the proposed project would decrease levels of ammonia and hydrogen sulfides (products made during anaerobic breakdown), decrease phosphorus levels, improve clarity, reduce algae blooms, and decrease levels of more mobile heavy metals (Exh. EFSB-G-2-S Bulk Att. at 3-11, 3-17, 3-49 to 3-50; Tr. 11, at 1825). Consequently, the Company argued that there would be a net increase in fish populations as a result of the proposed project (Exh. EFSB-G-2-S Bulk Att. at 3-50, 3-60, Table 3-16).

4. Positions of the Parties

In its briefs, the City addressed a number of water-related issues, including the likely impacts of the Company's proposed increased use of once-through cooling water, uncertainties with regard to the Company's thermal modeling and fisheries analyses, uncertainties regarding the operation and benefits of the proposed barrier nets and diffuser, and the Company's plans to rely on city water for process uses in an emergency (City Initial Brief at 2-21; City Reply Brief at 2-3). Overall, the City agreed with the Company that the proposed changes to the discharge structure should improve water quality in the Charles River by breaking up the existing salt wedge, and that the barrier net should reduce the entrainment of larvae and impingement of fish (City Initial Brief at 2-3). However, the City sought certain conditions to ensure the minimization of the proposed project's impacts on the Charles River and on Cambridge's water

supply (id. at 18-22; City Reply Brief at 3).

First, the City requested that the Siting Board specifically condition its approval of the proposed facility on the construction of the deep diffuser, arguing that without the fisheries benefits provided by the diffuser technology, it would be impossible to conclude that impacts on the Charles River would be minimized (City Initial Brief at 18). The City therefore proposed the following condition:

> In order to minimize water and fisheries, the Siting Board directs the Company to make a compliance filing with the Siting Board regarding the Company's final design, construction and operational protocols of the facility's cooling water system discharge. The Siting Board will expeditiously issue a compliance decision affirming this decision if the Company builds a discharge 600 to 800 feet into the Charles River, with diffuser ports a minimum depth of 25 feet, substantially at the location shown on Figures 3-47 and 3-48 of the FEIR, designed to improve the water quality and aquatic habitat of the Charles River. The construction must include a diffuser designed to mix and re-oxygenate this portion of the Charles River Lower Basin. The Project must also include a bypass option that would terminate discharge of cooling water through the deep diffuser, temporarily or permanently, in the event that the discharge produces net adverse impacts to the River and its environment. If the Company's choice of cooling water system discharge changes, the Siting Board will determine, based on the compliance filing, whether additional discovery and hearings are necessary. If additional proceedings are needed, they will be an extension of this case. Therefore, the parties to this case would be parties to any additional proceedings and the issues in any such additional proceedings would be limited to the issues raised by the changes to the Company's proposal (id. at 18-19).

Second, the City argued that, because the Company's modeling of thermal impacts, its fisheries analysis, and its net testing all are subject to a certain degree of uncertainty, the Company should be required to monitor the impacts of the proposed project on water temperature, dissolved oxygen content, fish spawning patterns, and entrainment and impingement (id. at 19). The City therefore proposed the following condition:

> In order to minimize impacts upon fisheries, the Company shall make a compliance filing with the Siting Board, regarding the Company's choice of fisheries monitoring, including in-stream biological monitoring, to ensure that the increased intake of River water and increased discharge of cooling water are not having a net adverse impact upon the environment of the Charles River. The Company's compliance filing shall include a plan

> to adjust its operations to avoid such impacts (including but not limited to adjustments in the location of the discharge, the amount of water taken in, and other measures) and to implement that plan in the event that monitoring demonstrates that such adverse impacts are occurring (id. at 20).

Third, the City argued that because the proposed barrier net was still in the testing stage at the time briefs were filed, the Company should be under an obligation to revisit the issue of the net unless it is installed as currently proposed (id.). The City therefore proposed the following condition:

> In order to minimize impacts on fisheries, the Company shall make a compliance filing with the Siting Board regarding the Company's choice of, and timing of use of barrier net and other facilities designed to minimize entrainment and impingement of fish, larvae and eggs by the plant's intake of water. The Siting Board will expeditiously issue a compliance decision affirming this decision if (a) the Company justifies not installing a Gunderboom, with reduced intrusion into the Broad Canal and (b) there has been no change in the Company's decision to construct and use a fine-mesh exclusion barrier with a low approach velocity, on the order of 0.043 ft/s or less, spanning at least 250 feet in length and 15 feet in depth, constructed of 30 % monofilament geotextile fabric with openings sized at 1/32 inch. If the Company's choice of barrier net changes, the Siting Board will determine, based on the compliance filing, whether additional discovery and hearings are necessary. If additional proceedings are needed, they will be an extension of this case. Therefore, the parties to this case would be parties to any additional proceedings and the issues in any such additional proceedings would be limited to the issues raised by the changes to the Company's proposal (id. at 21).

In response to these three proposed conditions, the Company contended that matters relating to the design of the intake and discharge will be addressed appropriately and effectively during the NPDES permitting process, which can be expected "to address the location and placement of discharge structures, intake mitigation measures, construction and operation protocols, monitoring requirements and any and all other issues relating to water and habitat" (Company Reply Brief at 1). The Company asserted that EPA, through the NPDES process, would ultimately determine project design, and urged the Siting Board to approve the proposed project subject to approval by appropriate state and federal agencies and the submission of a compliance filing which addresses the design, construction, operation and other requirements imposed by those permits (id. at 2).

The City also raised concerns regarding the Company's plans for the emergency use of city water for process purposes (City Initial Brief at 16-18; City Reply Brief at 2-3). The City noted that current demand for city water is close to the limits on its withdrawals from reservoirs, and that further water demands might require investment in new water sources or infrastructure improvements (City Initial Brief at 16). The City expressed particular concern regarding the Company's varying record estimates of the amount of water it might need in an emergency, and the lack of clarity as to whether a permit from the City would be required for such use (id.). In addition, the City expressed concern that a prolonged use of emergency water could interfere with the optimal functioning of Cambridge's water supply system (City Reply Brief at 3). The City therefore proposed the following condition:

> The Company shall make a compliance filing with the Siting Board with copies to the City of Cambridge regarding its plan for the emergency use of City of Cambridge water. The Siting Board will expeditiously issue a compliance decision affirming this decision if the Company commits to limit its emergency use of City water to its current average daily use (200,000 gallons per day), for no more than 30 days unless extended by the City Water Department for good cause. If the Company's plan involves additional use of City water, the Siting Board will determine, based on the compliance filing, whether additional discovery and hearings are necessary. If additional proceedings are needed, they will be an extension of this case. Therefore, the parties to this case would be parties to any additional proceedings and the issues in any such additional proceedings and the issues in any such additional proceedings would be limited to the issues raised by the changes to the Company's proposal (id. at 3).

Concerning the emergency supply of water, the Company proposed to limit its emergency use of water to the greater of (a) its current average daily use (250,000 gpd), or (b) the minimum amount necessary to serve its non-interruptible steam customers, not to exceed 518,000 gpd (Company Reply Brief at 7).

Finally, the City requested that the Siting Board impose a condition similar to those imposed in the ANP Blackstone Energy Company, 8 DOMSB 1 (1999) ("ANP Blackstone Decision"), and ANP Bellingham Energy Company, 7 DOMSB 39 (1998) ("ANP Bellingham Decision"), directing the Company to cooperate with the Charles River Watershed Association and local officials (City Initial Brief at 21-22). Specifically, the City requested the following

condition:

> In order to minimize impacts to water resources, the Siting Board directs the Company to work with the Charles River Watershed Association ("CRWA") and the City of Cambridge to ensure periodic coordination of program activities and to share periodic reports with City of Cambridge officials, the CRWA, and the Siting Board (id. at 22).

5. Analysis

SE Kendall has proposed an upgrade to its existing facilities at Kendall Station, which produce both electricity for sale into the regional energy market, and steam for sale to major customers through Com/Steam. The proposed project, like the existing facilities, would be cooled by water withdrawn from the Broad Canal and returned to the Charles River. Thus, the proposed project would require water for three primary purposes: for electric production, for steam production, and for once-though cooling. The record demonstrates that, although the Company analyzed cooling technologies other than once-though cooling, none of these alternate technologies would be feasible given the size constraints of the Kendall Station site. The Company intends to withdraw most of its process water from the Broad Canal, and to discharge most of its wastewater to the Charles River in combination with its OTC discharge. However, it would still rely on city water for sanitary uses and for process water in emergencies, and would continue some discharges to the MWRA sewer system. Consequently, in order to determine whether the water impacts of the proposed project would be minimized, the Siting Board considers below the proposed project's impacts on municipal water and sewer systems, and on water quality, water flow, and fisheries in the Charles River.

The record indicates that proposed project would increase water use at Kendall Station for electric and steam production from the current average of 188,640 gpd to an average of approximately 632,160 gpd. An average of approximately 87,120 gpd would be used for HRSG/boiler make-up and other process water needs; process water requirements would range from approximately 55,872 gpd during baseload operations, up to 197,126 gpd when the CTG operates on oil and 223,776 gpd during power augmentation. The per MW process water requirements for the proposed facility would be 372 gpd. Although this represents a significant

reduction from the current 957 gpd per MW requirement for the existing facility, it is considerably higher than the per MW water use of recently approved generating facilities.[52]

The record indicates that the Company has taken steps to reduce the proposed project's water use. In particular, the Company's proposal to obtain process water from the Charles River, rather than from municipal water supplies, has the effect of reducing overall process water demand from 724,320 gpd to 632,160 gpd. Further, because the process water would be taken from the OTC flow after it has been used for cooling, the magnitude of process water use would not affect the magnitude of withdrawals from the Broad Canal. The use of OTC water for process purposes also would reduce Kendall Station's use of city water from the current average of 188,640 gpd to 5,040 gpd. The Company analyzed the alternative of obtaining its process water from municipal supplies rather than the river; however, because the overall demand for city water of 15 mgd is close to Cambridge's permitted amount of 16 mgd and the capacity of city water lines to supply water to Kendall Station is unclear, the record suggests that Cambridge might not be able to supply process water for the proposed project without either expanding its permitted water supply or investing in new infrastructure. Finally, given that Cambridge's water sources include upstream reservoirs, reduced use of city water for Kendall Station could result in higher flows upstream in the Charles River and thereby provide water resource benefits in Cambridge and other areas.

The Company has stated that, in event of an emergency, it may seek to use city water for process water and steam production; the Company's estimate of its emergency water use needs has ranged from 188,640 gpd to 518,000 gpd at various points in the proceeding. The City supports the proposed use of city water as a back-up supply, but has expressed concern about its ability to provide water at the higher levels proposed by the Company, or over an extended

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52 The comparable usage rates for recently reviewed facilities include: 169 gpd per MW for the 775 MW Sithe Edgar project (with back-up oil); 87 gpd per MW for the 1550 MW Sithe Mystic project; 272 gpd per MW for the 580 MW ANP Blackstone project; 256 gpd per MW for the 580 MW ANP Bellingham project; and 613 gpd per MW for the 170 MW Dighton Power project. Sithe Edgar Decision, 10 DOMSB at 55; Sithe Mystic Decision, 9 DOMSB at 145; ANP Blackstone Decision, 8 DOMSB 1, at 146; ANP Bellingham Decision, 7 DOMSB 39, at 170; Dighton Power Decision, 5 DOMSB at 240.

period of time. Consequently, the City has requested a condition setting limits on the Company's use of city water in emergencies without prior approval. Given the limitations on Cambridge's water supply and water distribution infrastructure, it is necessary to resolve the conditions under which city water would be used for process water in order to ensure that the impacts of the proposed project on the city water supply are minimized. The Siting Board notes, however, that issues regarding the precise terms and conditions for the use of city water as a back-up supply are matters that should properly be resolved through negotiations between the City and the Company. Consequently, the Siting Board directs the Company to negotiate a mutually acceptable emergency water use agreement with the City and to provide a copy to the Siting Board prior to the commencement of commercial operation. With the implementation of this condition, the Siting Board concludes that the proposed project's impacts on municipal water supplies would be minimized.

The record indicates that the proposed project would significantly increase wastewater flows from Kendall Station. However, most of the proposed project's wastewater would be water treatment reject and boiler blowdown, which would be discharged to the Charles River with the OTC water, resulting in a net reduction of 13,824 gpd in wastewater discharges to the MWRA sewer system. The record indicates that the boiler blowdown would be similar in chemical composition to river water, while the water treatment reject would be high in TSS and TDS, but would constitute less than one percent of the total discharge volumes. These discharges would be regulated by several agencies including EPA, MDEP, MWRA, and the Cambridge Conservation Commission. The record also indicates that the MWRA sewer system periodically overflows via CSOs in the Kendall Station area; the reduction in discharges to the MWRA sewer system therefore may result in water quality benefits by reducing the frequency and amounts of CSO discharges into the Charles River. Accordingly, the Siting Board finds that the wastewater impacts of the proposed project on both the MWRA system and the Charles River would be minimized.

SE Kendall proposes to withdraw water for OTC and for process uses from the Broad Canal and to return the OTC water, together with most of the proposed project's process wastewater, to the Charles River. While the record suggests that these withdrawals and

discharges would require only minor changes to the Company's NPDES permit, the water volumes withdrawn and discharged would increase by nearly one half, from an existing average of 47.5 mgd to a projected annual average of 70 mgd. These changes in volume may have impacts on flow levels, water temperature, DO levels, and fisheries in the Charles River.

With respect to flow levels, the record shows that the proposed project typically would not withdraw or consume a significant percentage of the flow of the Charles River. However, during periods of low flow, the proposed project's withdrawals would exceed river flow[53] and include consumptive losses that are a significant percentage of river flow, 4.5 percent of 7Q10 flow on average and as much as 5.2 to 5.4 percent of 7Q10 flow with use of power augmentation or oil firing. Although the MDC would operate the Science Park Dam to maintain a constant water level in the Charles Basin, the relatively high consumptive water use resulting from oil firing and other operations, if occurring during low-flow conditions, could lead to decreases in river flow rates past the project's intake/discharge point and downstream of the Science Park Dam. In Section III.B, above, the Siting Board directed the Company to limit its use of oil during the ozone season, which is also a period when low flows might be expected. The Siting Board notes that this condition should reduce the amounts of potential downstream flow reduction associated with operation of the proposed project during low flow conditions.

The record indicates that the proposed project's withdrawals and discharges would result in the entrainment and impingement of fish larvae and fish, and would alter water temperature and dissolved oxygen levels in the Charles Basin. Each of the impacts could ultimately affect fish populations in the Charles River. The Company has recently begun monitoring the impingement rates at the existing facility and has conducted icthyoplankton studies to estimate entrainment impacts. The Company used data from these studies to estimate the additional impingement and entrainment losses that could result from the proposed project's increased water withdrawal. The Company has proposed to use a barrier net, subject to regulatory

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53 The record shows that the Charles River functions in some ways as a lake in the project area, and thus to the extent that project withdrawals could theoretically exceed river flow, the same water would pass through the OTC equipment several times. The Company's thermal models address this possibility.

approval, to reduce impingement and entrainment losses. The record shows that at 50 percent effectiveness, the barrier net would reduce impacts to below current levels; at 25 percent effectiveness, the proposed project's impacts would be higher than current impacts, but would still represent the loss of less than 1 percent of the population for all but one species of fish.

SE Kendall modeled projected water temperature changes in the vicinity of the proposed discharges under a number of conditions. The Company's model predicts that the proposed project would raise the average temperature of water in the study area between the Longfellow Bridge and the Museum of Science by 2.5 to 6.5 degrees F, with a maximum temperature increase of 10.1 degrees F in extreme low flow conditions.[54] A comparison of modeled and actual water temperature increases resulting from the operation of the existing facility suggests that these values likely are high, and that actual temperature increases may be only half those modeled. The record indicates that the modeled temperature changes are generally within known normal ranges for freshwater species of fish, and may be within the temperature ranges of anadromous fish; however, optimum and lethal temperatures have not been established for all species at all life stages.

As mitigation for potential entrainment, impingement, and thermal impacts on fish populations, the Company has proposed to direct a portion of its discharge to the bottom of the Charles River through a newly constructed deep diffuser. The diffuser is intended to re-oxygenate the lower Charles Basin by causing stratified layers of water to mix. The record demonstrates that a salt water wedge in the lower Charles Basin has caused severe anoxia problems, which in turn have caused an extremely poor benthic community and the production of toxic hydrogen sulfide. Without a healthy benthic community, the lower Charles Basin cannot support significant bottom fisheries or effectively process accumulated sediments. The record demonstrates that the diffuser is likely to provide some increase in DO, with modeled levels increasing significantly. This increase in DO should reduce hydrogen sulfide levels, decrease algae blooms, increase the breakdown of organic pollutants, and stabilize metals, as evidenced by past attempts by MDC and modeling by the Company. In addition, the Company estimates that

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[54] Discharges from the existing facility under 7Q10 conditions would raise water temperature in the study area by an average of 1 to 3 degrees F.

the reoxygenation would increase fish habitat in the Charles River by approximately 10 percent, and consequently projects a 10 percent increase in fish populations. The Siting Board notes that fish populations are dependent on factors other than availability of habitat, and that populations are therefore unlikely to increase in exact proportion with the extension of habitat. However, the creation of significant new habitat through the re-oxygenation of the lower Charles Basin is an important benefit which has the potential to offset potential entrainment, impingement, and thermal impacts on fish populations. The Siting Board notes that, while numerous agencies and the City have expressed concern about the potential impacts of the proposed withdrawals and discharges on fish populations, overall they support the construction of the deep diffuser, and feel it has significant potential to improve water quality and habitat in the lower Charles Basin.

In summary, the proposed project's increased water withdrawals from the Broad Canal may result in increased impingement and entrainment of fish larvae and fish; however, these increases should be partially or completely offset by the Company's proposed installation of a barrier net at the intake structures. Similarly, the proposed project's increased discharges to the Charles River may result in an increase in thermal impacts on fish populations; however, these impacts should be partially or completely offset by the Company's proposed construction of the deep diffuser. Thus, the proposed project could have a net overall positive impact on water resources. The Siting Board concludes that, if the barrier net and deep diffuser are installed and operate substantially as anticipated, the impacts of the proposed project's increased water withdrawals and discharges would be minimized.

The Siting Board notes that it is important to ensure that the proposed project's overall impacts on water resources, including the benefits of the diffuser and barrier net, are close to those presented here, because the minimization of impacts is dependent on these benefits. Because the design of the Company's discharge, including the diffuser, is not yet complete, and because the actual effectiveness of both the diffuser and the barrier net are still unknown, the City has proposed three conditions addressing the Company's proposed mitigation. Two of the conditions would require pre-construction compliance filings to allow the Siting Board to review the design of the barrier net and discharges once designs are complete and have been approved by other agencies. The Siting Board recognizes that the exact design, installation and operation of

the intake/discharge system is subject to approval by other agencies, including EPA, MDEP, the Massachusetts Department of Fisheries and Wildlife and the Cambridge Conservation Commission, and thus is subject to change. We agree with the Company that these agencies have both the authority and the expertise to deal with detailed design and engineering issues. Consequently, the Siting Board will not require a compliance filing to review detailed design issues. However, the Siting Board notes that its approval is contingent upon the installation of the deep diffuser and barrier net substantially as proposed in this proceeding. If there are substantial changes in the final design of the proposed project's intake or discharge, and in particular to the deep diffuser or barrier net, the Company must notify the Siting Board so that it can determine whether to inquire further into the changes.

The City's third proposed condition would require the Company to conduct monitoring to ensure that the proposed project's increased withdrawals and discharges do not have a net adverse impact on the Charles River. The Siting Board agrees that SE Kendall should monitor the effects of its intake/discharge system on water quality and fisheries, particularly since the benefits of the proposed barrier net and diffuser, although potentially significant, have not been tested. The Siting Board anticipates that such monitoring will take place primarily under the auspices of EPA, as a condition of the Company's revised NPDES permit. The Siting Board directs the Company, in consultation with MDEP and EPA, to develop and implement a plan to monitor the impacts and the beneficial effects of the proposed intake/discharge system, including temperature impacts, fishery impacts as indicated by changes in impingement and entrainment rates, DO changes and other parameters the Company considers important, for a minimum of two years following the commencement of commercial operation. The Company shall provide the Siting Board with a copy of its monitoring plan prior to commencement of commercial operation. Within three years of the commencement of commercial operation, the Company shall provide the Siting Board with an analysis of the results to date of its monitoring of temperature impacts, fishery impacts and DO changes, with supporting data. If the Siting Board determines based on the Company's analysis that the temperature or fishery impacts are significantly greater than approved by the Siting Board, or that, overall, the DO benefits of the intake/discharge system are not being realized, then the Siting Board may require operating changes or additional mitigation

that contributes to the minimization of water resources impacts, consistent with the cost of mitigating, controlling and reducing such impacts.

Accordingly, the Siting Board finds that, with the conditions set forth above regarding an emergency water supply agreement and monitoring of the impacts and benefits of the proposed intake/discharge system, the water resource impacts of the proposed project would be minimized.

D. Wetlands

This Section describes the wetland impacts of the proposed project and its interconnections and the mitigation proposed by the Company.

1. Description

SE Kendall stated that Kendall Station is located on a highly developed and disturbed site bounded to the south by the Broad Canal; the Charles River is located approximately 200 feet east of the site. The Company delineated wetlands on and adjacent to the proposed site, as defined by the Massachusetts Wetlands Protection Act ("WPA")[55] (Exh. SEK-1, at 4.7-1 to 4.7-2, 4.7-10). Specifically, the Company identified an area of bank and land under a waterbody ("LUW") associated with the Broad Canal on the southern portion of the site and a 100-foot buffer zone extending northward from the bank (id., at 4.7-2, 4.7-12, Figure 4.7-1). The Company stated that the site is not located in a flood zone, and that current facility staff are unaware of any past flooding from sewers, storm drains, or the river (Exhs. EFSB-WW-5; SEK-1, at 4.7-10 to 4.7-11; EFSB-RR-60; Tr. 7, at 925). The Company also identified areas of bank, LUW, buffer zone, and land located within the 25-foot riverfront zone associated with the Charles River, where the cooling water discharge pipe for the proposed project would be located (Exh. SEK-1, at 4.7-2, 4.7-12).

SE Kendall indicated that the proposed generating facility would not affect any wetland resource area or buffer zone; however, the removal of existing structures and construction of a switchyard and substation control building would permanently alter 12,740 square feet of

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55 Reference to the WPA includes any amendments to the act, including the Rivers Protection Act.

wetland buffer zone, while utility lines would be installed within a 21,000 square-foot area of buffer zone, creating some temporary impacts (Exhs. SEK-1, at 4.7-2; EFSB-WW-1). The Company stated that it could not move the electrical facilities out of the buffer zone because of site constraints and traffic circulation requirements (Tr. 7, at 880-881). The Company indicated that it currently stores water treatment chemicals and fuel oil in the buffer zone and in the future would use mineral oil for the switchyard, to be located in the buffer zone (Exh. EFSB-RR-57; Tr. 7, at 877-878). The Company testified that it would have three hazardous waste containment areas on-site -- one near the northern oil tank for unloading, one around the chemical storage area to the north of the existing turbine building, and one to the southwest of the southern oil tank; however site plans do not show the containment area near the southern oil tank (Exhs. EFSB-G-2-S Bulk Att. at Figure 2-4; Tr. 7, at 929-932, 953).

The Company estimated that the proposed pedestrian canal walk along the Broad Canal would occupy 4530 square feet of buffer zone, and that construction of the canal walk would temporarily affect 94 linear feet of bank along the Broad Canal, consisting of a granite wall in poor condition (Exhs. EFSB-WW-2; EFSB-WW-12). The Company indicated that it would restore the wall to the extent practical, and that the bank's ability to provide storm protection, flood control or wildlife habitat therefore would be unaffected (Exhs. EFSB-WW-2; EFSB-WW-12). In addition, the Company stated that a portion of the canal walk may be constructed on piles in the Broad Canal and such piles would permanently alter approximately 6250 square feet of the LUW (Exhs. EFSB-RR-59; EFSB-G-2-S Bulk Att. at 1-9, 4-52). The Company indicated that it is consulting with the Cambridge Conservation Commission concerning the best means to reduce the impact of the canal walk on the bank and other wetland resources (Tr. 7, at 887-892).

SE Kendall described the wetlands impacts of two possible designs for the cooling water outfall pipe and diffuser, which would extend approximately 640 feet into the middle of the Charles River (Exh. EFSB-RR-58). Under the Company's preferred design, the new discharge pipe would connect with one of the two existing discharge pipes as it exits an existing wall along the bank of the Charles River, then enter the river beneath the surface and slope toward the bottom of the river (id.; Tr. 7, at 893-895). SE Kendall estimated that this design would result in

up to 7700 square feet of temporary disturbance and 5300 square feet of permanent disturbance[56] to LUW in the Charles River (Exh. EFSB-RR-58).[57] In an alternative design, the diffuser pipe would connect with the existing discharge pipes prior to their point of entry into the Charles River, then enter the river beneath the surface and slope toward the bottom of the river (Exhs. EFSB-WW-3; EFSB-G-1-S at 2-19 to 2-20, Appendix 2; Tr. 7, at 893-895). The Company estimated that this design would result in up to 12,800 square feet of temporary disturbance and 8,800 square feet of permanent disturbance to LUW (Exhs. EFSB-WW-3; EFSB-RR-58; Tr. 7, at 900). In addition, this alternative would require the dismantling and reconstruction of a portion of the granite wall containing the existing outfall pipes, resulting in the temporary disturbance of approximately 30 linear feet of bank (the wall) (Exh. EFSB-WW-2).

The Company asserted that the dredging required to construct the discharge pipe would be regulated by the Cambridge Conservation Commission through an Order of Conditions, by the Army Corps of Engineers under Section 10 and 404 permits, and by MDEP under a Section 401 permit (Exh. SEK-1, at 8-1 to 8-7). The Company stated that it would reuse the dredged sediment to bury the pipe and confine the area of increased turbidity through silt screens and staged dredging sections (Exhs. EFSB-RR-58; EFSB-G-2-S Figure 3-48).

SE Kendall stated that the proposed project would not significantly benefit or adversely affect the wildlife associated with wetlands on the proposed site, because these wetlands are highly disturbed and support only urban species (Exh. EFSB-WW-16).[58] The Company noted that the Charles River itself provides significant wildlife habitat, which would be improved by the proposed project's discharge, which is expected to reduce anoxic conditions in the deep portions of the lower Charles River (Exhs. EFSB-G-1-S at 8-17; EFSB-WW-4). In addition, the

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56 The Company estimated permanent impacts based upon the area of LUW where the pipe would not be fully buried under the bottom of the Charles River (Exh. EFSB-RR-58).

57 SE Kendall also testified that a small area around the actual discharge would be permanently affected because the discharge area would be cleared of softer and finer sediments (Tr. 7, at 905).

58 The Massachusetts Natural Heritage and Endangered Species Program office indicated that it is not aware of any rare plants or animals or exemplary natural communities that would be adversely affected by the proposed project (Exh. SEK-1, Appendix 4.7).

Company asserted that the proposed discharge would create open water habitat on the Charles River in the winter (Exhs. EFSB-G-1-S at 8-17; EFSB-WW-4). SE Kendall argued that construction of the discharge pipe would not affect the river's carrying capacity or negatively impact fisheries or wildlife, since the discharge pipe would be located in an area that, due to anoxia and contamination, does not support extensive benthic species (Exh. EFSB-WG-2 (Att. A); Tr. 7, at 907-909).

SE Kendall noted that the proposed site is almost entirely impervious, and indicated that construction of the proposed project would create no new impervious surface (Exhs. EFSB-WW-6; EFSB-WW-15 (Att.)). The Company stated that it would upgrade the stormwater management system on the proposed site, which currently discharges a significant portion of rooftop and surface drainage into combined sewers operated by the MWRA (Exhs. EFSB-WW-7; EFSB-G-2-S Bulk Att. at 3-75 to 3-77). The Company proposed to reroute all stormwater away from the combined sewers to stormwater discharge outfalls along the Broad Canal (Exh. EFSB-G-2-S Bulk Att. at 3-75 to 3-77; Tr. 7, at 927). The stormwater would pass through deep sump catch basins and would be treated to remove approximately 80 percent of total suspended solids (Exhs. EFSB-G-2-S Bulk Att. at 3-75 to 3-77; EFSB-RR-64). The Company stated that the proposed project would meet applicable GEP stormwater guidelines (Exhs. SEK-1, Appendix 4.7). The Company also indicated that it would update its existing Stormwater Pollution Prevention Plan under its NPDES permit, and would provide the City of Cambridge with an opportunity to comment on the revised plan (Exhs. EFSB-RR-19; EFSB-RR-62).

The Company stated that it would need to employ temporary erosion control measures during the initial construction period, as the existing stormwater management system would be demolished during construction of the foundations of the proposed project (Exh. EFSB-WW-10; Tr. 7, at 938-939, 943-944). The Company stated that, during construction, it would maintain silt fences around the catch basins and the Broad Canal, handle chemicals in accordance with state and federal regulations, and place oil booms at drainage outfalls during appropriate times of construction (Exhs. EFSB-WW-10; EFSB-WW-15; EFSB-RR-19; Tr. 7, at 941-945). SE Kendall also indicated that it would need to file with the EPA for a General Permit for

Construction to support the construction phase of redevelopment (Exh. EFSB-RR-62).[59]

2. Positions of Parties

The City expressed concerns about the impact of the canal walk, construction of the outfall pipe, storage of chemicals in the buffer zone, repair of the canal wall, and the proper stormwater standards to apply under the WPA, but stated that these issues could be addressed through local permits (City Initial Brief at 22-23).

3. Analysis

The record shows that construction of the proposed project would result in the permanent alteration of: (1) 17,270 square feet of on-site wetlands buffer zone, and (2) up to 8,800 square feet of LUW in the Charles River. In addition, construction of the proposed project would result in temporary impacts to: (1) a 21,000 square-foot area of on-site buffer zone, in which utilities would be installed; (2) up to 12,800 square feet of LUW in the Charles River and up to 6250 square feet of LUW in the Broad Canal; and (3) up to 124 linear feet of bank, consisting of two stone walls along the Broad Canal and the Charles River. The precise routes of the electric and natural gas interconnections for the proposed project have yet to be determined; however, the record indicates that they would be placed along roadways and would not directly affect wetlands.[60]

While the square footage of anticipated wetlands disturbance associated with the proposed project is not insignificant, the record indicates that the affected on-site wetland and wetland buffer areas are already in a disturbed and impervious state. No new impervious surface would be created as a result of the construction of the proposed project, and stormwater

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59 The Company noted that possible routes for the transmission line could extend to riverfront area and the 100-foot buffer zone under the WPA, along the Broad Canal and the Charles River (Exh. EFSB-G-7-S4).

60 The Siting Board will review the wetland impacts, if any, of the project interconnects in Commonwealth Gas Company, EFSB 00-2, and Cambridge Electric Light Company, EFSB 00-3.

discharges would be significantly improved by separating stormwater from combined sewers and installing stormwater pollution removal systems. Further, the record indicates that recreational access to the wetland buffer area would be improved by the construction of the pedestrian canal walk, and that, as further discussed in the water section at III.C, above, wetland habitats of the Charles River could be improved as a result of the proposed project's discharge.

The record indicates that the Company currently is working with the Cambridge Conservation Commission and other regulatory authorities to evaluate design options that would reduce the wetlands impacts of the proposed cooling water discharge and pedestrian canal walk. Plans for both the discharge and the canal walk require further review from other regulatory agencies to determine both the effectiveness of the different design options and their impacts on fishery, historical, and recreational resources. The Siting Board concludes that the adoption of the discharge and canal walk designs agreed upon by the Company and affected federal, state and local regulatory authorities would minimize the wetlands impacts associated with these elements of the proposed project.

Overall, the record demonstrates that the Company would take all measures to reduce the wetland impacts associated with the construction and operation of the proposed project, and that the proposed impacts are necessitated by the location of electrical facilities, the proposed use of OTC, the development of the canal walk as a public access requirement of Chapter 91 regulations, and the constraints of the site. The record also shows that, as part of the development of the proposed project, the Company will improve both stormwater treatment at the site and wetland habitats in the Charles River. Accordingly, the Siting Board finds that the wetland impacts of the proposed project would be minimized.

E. Solid and Hazardous Waste

This Section describes the solid and hazardous waste impacts of the proposed project, the mitigation proposed by the Company, and the costs and benefits of any additional mitigation options.

1. Description

SE Kendall stated that Kendall Station currently generates approximately 1,200 to 1,500 pounds per week of solid waste, consisting primarily of office and plant worker trash, which is transported off-site weekly to an energy waste facility (Exhs. SEK-1, at 4.12-4; EFSB-SW-11). The Company added that the existing facility produces approximately four cubic yards of bottom ash every two years; this bottom ash is recycled or land-filled off-site (Exh. SEK-1, at 4.12-4; Tr. 3, at 328). SE Kendall indicated that the operation of the proposed project would not result in a marked increase in the production of office and plant solid waste, and that the production of bottom ash is expected to decrease, as the new equipment will burn natural gas or No. 2 fuel oil rather than No. 6 fuel oil (Exhs. SEK-1, at 4.12-4; EFSB-SW-1). The Company stated that it was evaluating the option of increasing the size of its solid waste container to reduce the number of trash pick-ups (Exh. EFSB-RR-23).

The Company noted that its parent company, Southern Energy, is an EPA WasteWi$e partner, with programs in place to recycle coal ash, prevent pollution, recycle office waste, and purchase recycled materials (Exh. EFSB-SW-8).[61] The Company stated that, while there is no recycling program for general waste currently in place at the Kendall Station, it is committed to conducting a solid waste audit and developing an integrated solid waste management program for the station prior to the start-up of the proposed project (Exh. EFSB-SW-2; Tr. 3, at 335-336). The Company stated that it would implement recycling and waste reduction strategies used at other Southern Energy facilities at the proposed project as appropriate, and would continue existing waste reduction and recycling efforts, including the recycling of bottles, collection of scrap metal, and reuse of cleaning rags (Exhs. EFSB-SW-8; EFSB-SW-13; Tr. 3, at 348-350). The Company stated that it would comply with Cambridge's solid waste regulations for commercial facilities, which require the completion of a recycling plan, and would incorporate the policies of the City of Cambridge's Division of Recycling into its solid waste audit (Exhs. EFSB-SW-10; EFSB-RR-23; EFSB-RR-24). The Company indicated that the recycling plan,

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61 WasteWi$e is a voluntary EPA-sponsored program aimed at reducing municipal solid waste by working with partners to set recycling goals and report on waste reduction strategies (Exhs. EFSB-SW-7 (Att.) at i; EFSB-RR-27).

which it expected to submit to the City in mid-2000, would later be updated to cover the upgraded facility (Exh. EFSB-RR-26).

The Company testified that Cambridge has reached a 31 percent rate of recycling (Exh. EFSB-RR-26). According to the Massachusetts Solid Waster Master Plan 1997 Update, Massachusetts has set a state-wide goal of 46 percent for recycling of municipal solid waste (consisting of residential and commercial waste); further, the average rate of recycling of non-municipal solid waste (consisting primarily of construction and demolition debris) was 68 percent in 1996 (Exhs. EFSB-SW-14 (Att.) at 1-2, 3-3; EFSB-RR-26). The Company stated that it is committed to achieving Cambridge's recycling goals for commercial facilities and that it would work to achieve or exceed the current overall recycling rate for Cambridge (Exh. EFSB-RR-26).

The Company estimated that construction of the proposed project would generate solid waste including: 4500 cubic yards of soil and concrete, 14 tons of wood and steel, and 7,000 linear feet of wire and cable (Exh. EFSB-SW-5). The Company stated that it would work to reduce and recycle construction waste, specifically metal and paper scrap, during the construction of the proposed project (id.).

The Company indicated that Kendall Station currently is a Small Quantity Generator of federally-regulated hazardous wastes, including sodium hydroxide and sulfuric acid, and a Large Quantity Generator of state-regulated hazardous wastes, including oily debris, used oil and contaminated soil (Exh. SEK-1, at 4.12-3 and 4.12-4; Tr. 3, at 329-330). The Company indicated that the operation and maintenance of the proposed project would slightly increase the amount of hazardous waste produced at Kendall Station, but would not affect the frequency of offsite hazardous waste disposal (Exh. SEK-1, at 4.12-3, 4.12-6). Specifically, the Company noted that the treatment system for make-up water from the Charles River would produce 200 to 400 pounds per week of sediment which might be classified as hazardous, depending on the presence of contaminants such as lead (id. at 4.12-6). The Company also indicated that the proposed project would produce 2,600 gallons of wash water (water used to clear the interior of the combustion turbine) once per month during natural gas firing and once per week during oil firing (id. at 4.12-7 to 4.12-8). The wash water would be collected in a storage tank within the building

and transported off-site by a licenced vendor for treatment (id.).

2. Analysis

The record demonstrates that the operation of the proposed project would have minimal impact on the production of solid waste at Kendall Station. While the volume of plant and office waste would increase slightly from current levels, this increase would be offset by the likely reduction in the production of bottom ash. In addition, the proposed project would result in a slight increase in the quantity of hazardous waste produced at Kendall Station.

The record indicates that SE Kendall's parent company has worked with EPA to reduce waste at other facilities. Here, the Company has committed to submitting plans for recycling in compliance with the City's regulations and to conducting an audit of its existing and proposed facilities to determine how further recycling or waste reduction could be attained.

SE Kendall has indicated that it would attempt to meet or exceed Cambridge's 31 percent average rate of recycling, and would work to reduce construction and demolition debris during construction. The Siting Board encourages SE Kendall to work with the City to develop a program with the goal of attaining a recycling rate for operational wastes, including bottom ash, of 46 percent, the target recycling rate for municipal solid waste set forth in the Massachusetts Solid Waste Master Plan, and to work with its contractor to attain the maximum feasible recycling of construction and demolition debris. The Siting Board notes that SE Kendall intends to submit an updated recycling plan for the upgraded facility to the City. The Siting Board directs the Company, prior to the commencement of operation, to file a copy of the updated recycling plan with the Siting Board, and to report on its recycling rate for construction and demolition debris and its anticipated recycling rate for operational wastes.

The Siting Board finds that, with the implementation of the above condition, the solid waste impacts of the proposed project would be minimized.

F. Visual Impacts

This Section describes the visual impacts of the proposed project and the proposed mitigation.

1. Description

The Company stated that the Kendall Station Project was designed to allow the new structure to appear as a logical extension of existing buildings and to blend into its urban setting (Exh. SEK-1, at 4.9-1). The existing Kendall Station consists of a power block building, administrative offices, a storage shed, field switchyard, fuel oil storage tanks, a guard shack, open parking areas and other minor structures, with building heights ranging from 18 feet to 105 feet, and three 175-foot stacks (Exh. EFSB-G-1-S at 4-6). The new HRSG building would be 85 feet by 225 feet, with a maximum height of 100 feet; the building height would step down as it extends away from the existing power block building, with one 250-foot stack (id.; Exh. SEK-1, at 4.9-1). The Company explained that the proposed HRSG building would be located approximately in the center of the site; it would be aligned with the largest portions of the existing power plant and placed as far away as possible from the Broad Canal side of the site (Exh. EFSB-G-1-S at 1-13; Tr. 1, at 14). The Company asserted that this orientation would create a logical extension of the existing building mass, thereby lessening visual impacts by blending the new building into the existing facility layout (Exh. EFSB-G-1-S at 1-14). The Company explained that the design of the new building and stack would include horizontal and vertical elements similar to elements present in the existing facility, consisting of windows and fenestration (id. at 1-15; Exh. SEK-1, at 4.9-5). SE Kendall stated that the color of the proposed building would blend with the existing plant to reinforce the connection between the existing and new structures (id. at 4.9-5).

The Company asserted that the design of the new building would be consistent with the historic industrial character of the Charles River frontage and the Broad Canal (Exh. SEK-1, at 4-34). SE Kendall stated that Cambridge has expressed a preference for preserving the visual and historical value of the existing building (Exh. EFSB-V-8). The Company noted that the Cambridge Historical Commission ("CHC") would comment on the design of the proposed new building as well as improvements to be made to the existing building, and any canal-side buildings, to enhance the canal walk (Exh. EFSB-L-19).

The Company submitted an evaluation of the potential visual impacts of the proposed project (Exhs. SEK-1, at 4.9-6 to 4.9-15; EFSB-G-1-S at 4-34 to 4-53). The Company selected

eight visual receptor points and the Siting Board requested an additional two viewsheds (Exhs. SEK-1, at 4.9-6; EFSB-V-12; EFSB-V-13). For each viewpoint, the Company presented both a photograph of existing views looking toward the Kendall Station site, and the same photograph with a superimposed computer-generated rendering of the proposed facilities (Exh. SEK-1, at Figures 4.9-5 to 4.9-12).

The Company stated that the existing residences closest to the proposed project are condominiums located off of Edwin Land Boulevard ("Land Boulevard") to the north of the site (Tr. 1, at 28, 45). Based on its viewshed analysis, the Company stated that the view of the new HRSG building from the condominiums would be blocked by the Riverview Office complex, but that the stack would be visible (id. at 28-29). SE Kendall stated that the proposed project and its stack would not be visible from the established East Cambridge neighborhood located to the north of the site (Exh. EFSB-V-12). The Company stated that existing office buildings located on Broadway, and the Riverview Office complex on Athenaeum Street, which abut the proposed project to the south and north, would continue to have direct views of the Kendall Station equipment (Exh. EFSB-V-3). Further, the Company stated that with the exception of the new stack, the proposed project would not be visible from First Street or Land Boulevard; consequently, views of older significant buildings along First Street would be unchanged (Exhs. EFSB-RR-19; EFSB-L-14).

The Company noted that a mixed-use development known as the Cambridge Research Park[62] has been proposed for the 10-acre parcel immediately adjacent to the west of Kendall Station, and that when completed, its residences would be the closest residential use to the proposed project (Exh. EFSB-L-21; Tr. 1, at 28, 45). SE Kendall asserted that the proposed

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62 When completed, the Cambridge Research Park development will consist of 726,000 square feet of life sciences research and office space; 125,000 square feet of retail space; a 400-room hotel; approximately 150 units of housing (with the potential for an additional 100 units of housing); and approximately 95,000 square feet of open space which would include a recreational plaza and a skating rink located between Athenaeum Street and Linsky Way (Exh. EFSB-L-21 (Att.)). The landscaping plan for the development shows vegetation bordering the areas designated for residential development (id.). The Cambridge Research Park would consist of buildings ranging in height from 20 feet to 230 feet (Exh. EFSB-L-3 (Att.)).

project would not cast shadows onto the proposed Cambridge Research Park or associated open space (Exh. EFSB-L-3). The Company also asserted that, when constructed, the Cambridge Research Park would alter or eliminate views of the proposed project from areas to the west and northwest of Kendall Station (Exh. EFSB-V-2).

The Company explained that due to the size constraints of the site, its visual mitigation plans focus on building treatment and architectural details, color and landscaping, including the development of a public canal walk located adjacent to the Broad Canal along the south side of the project site (Exhs. EFSB-V-7; EFSB-V-15; Tr. 1, at 16).[63] The canal walk would be an eight-foot path along the canal's edge with an adjacent four to five-foot landscaped buffer zone and screen fence on the building side of the canal walk, and would include features such as guardrails, light posts and light fixtures, and seating (Exh. EFSB-G-1-S at 4-56 and Figure 2-7). The Company provided plans that detailed the landscaping of the buffer zone along the fence line and the canal walk, with trees to be planted at an initial height of between 12 to 18 feet (id.; Tr. 1, at 16). The Company noted that the only existing on-site trees are located along the front entrance of the power-block building extending along the existing canal walk area to the southeast of the building, and that this vegetation would either remain or be improved as part of the design of the canal walk (Tr. 1, at 19, 53). SE Kendall indicated that in accordance with the preferences of the City and the MDC, the canal walk would be designed so that it could be incorporated into an overall public access plan for the area (Exh. EFSB-G-1-S at 1-14).[64]

The Company indicated that the landscape plans it has submitted to the City do not include plantings within the site boundary beyond those proposed for the canal walk, but that it is reviewing its landscaping plans for the northern property line where Second Street and Athenaeum Street intersect in the vicinity of the site entrance, in light of the City zoning

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63 The MDEP Waterways Program -- Chapter 91 -- requires that SE Kendall provide public access to the Broad Canal because the project will be constructed on filled tidelands (Exh. EFSB-G-1-S at 4-1).

64 A Charles River Basin Master Plan has been developed by the MDC (Exh. EFSB-L-14).

requirements (Exh. EFSB-V-15; Tr. 1, at 39).[65] The Company indicated that it does not plan on-site landscaping along its western boundary; however, SE Kendall stated that it would continue to work with the developers of the Cambridge Research Park to design mutually acceptable plantings or screening along the property line with Cambridge Research Park (Exhs. EFSB-V-15; EFSB-RR-4; Tr. 1, at 50-51). SE Kendall explained that the Cambridge Research Park site has a larger area available for landscaping than the proposed site in the vicinity of this site boundary (Tr. 1, at 39).

The Company suggested that the fenestration on the HRSG building may be backlit so that the "shadowbox type" windows would provide some illumination to the facade of the building (Exh. EFSB-V-1; Tr. 1, at 22). SE Kendall stated that the proposed on-site lighting would be subdued and that the canal walk would use the historic period lighting currently in place on the adjacent MDC property (Tr. 1, at 22). With respect to the new stack and navigational lighting, the Company provided a determination by the Federal Aviation Administration ("FAA") requiring obstruction lighting consisting of red flashing beacons equally spaced around the stack within 20 feet of the top of the stack (Exh. EFSB-RR-1-S). The Company asserted that, with the exception of adhering to the FAA requirements, the final lighting design for the proposed project would be determined through an open interactive process with the City (Tr. 1, at 68).

The Company analyzed the meteorological and operating conditions under which visible exhaust plumes likely would emanate from the new stack based on a model developed by TRC (Exh. EFSB-V-9 (Att.)). The Company stated that the model indicated that a plume might be visible up to 10 percent of the time when a plume could actually exist, which would be during daylight and fair weather, with normal operation using natural gas (id.). SE Kendall noted that any such visible plume would be less than 200 meters long 99 percent of the time, and would be "light and wispy" (id.).

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[65] The Cambridge zoning by-law requires screening from abutting streets and lots for outdoor parking facilities with five or more parking spaces (Exh. EFSB-V-15). The Company stated that if the City requires screening at Athenaeum Street, it would provide a five-foot wide strip densely planted with shrubs or trees (id.).

2. Analysis

The proposed project would be located at a site -- Kendall Station -- that is presently used for electric and steam generation. The record demonstrates that land uses in the area around the proposed project site consist primarily of commercial uses, recreational uses associated with the Charles River and the Broad Canal, and to a lesser extent, multi-family residential uses. The Kendall Station site is the last remaining industrial use in the area, and is visually distinct from its neighboring uses. However, the City has encouraged SE Kendall to maintain the integrity of the existing buildings as much as possible, thereby retaining the current industrial viewshed associated with this site. While the proposed stack would be taller than the existing stacks, the record shows that building heights would not increase and that the new building, through architectural enhancements and placement, would blend with the existing structure.
The record demonstrates that the Company analyzed the potential visual impacts of the proposed project at ten receptor locations in the surrounding area. For each receptor, the Company submitted a viewshed showing the current view from that location, and a second viewshed showing future views with the proposed project.

The record indicates that the views from existing residential areas are limited to views of the stack from the condominiums located to the north of the facility. The record further indicates that the existing residential areas from which the stack could be visible are urban in nature, generally consisting of multi-story dwellings without ground level open space or private yards, and that off-site vegetative screening therefore would not be an effective means of reducing visual impacts. In addition, residential development is planned for the Cambridge Research Park development project; however, the project is in the early stages of development, and additional on-site landscaping could be included into the landscape plan for that development.

The Company plans a landscaped canal walk located along the south of the site. The Company has been working with the City and the MDC to design the canal walk, which could incorporate a recreational path for walking and biking, extensive landscaping, lighting, and seating. The landscaping for the canal walk would extend to the area that fronts on Land Boulevard. The record shows that the Company is committed to working collaboratively with the City and the MDC on the canal walk project.

SE Kendall also has indicated that, if required by the City under its zoning by-law relating to landscaping of parking areas -- which prescribes a five-foot wide landscaped buffer -- it would landscape the area along its northern border which fronts on Athenaeum Street. The Siting Board notes that the Riverfront Offices directly abut the facility to the north, with the attendant pedestrian traffic traveling along Athenaeum Street. In addition, the area surrounding the site is undergoing redevelopment, and there will be an emphasis on pedestrian walkways and recreational activities in the area along Athenaeum Street. Without landscaping in the vicinity of the Kendall Station entranceway which fronts Athenaeum Street, components of the proposed project would be in full view of pedestrians, especially those with destinations in the surrounding mixed-use area. Further, although the Company has proposed building treatments and architectural details that would serve to minimize the visual impacts, the project would result in an already constrained site being more intensively developed. Therefore, to minimize visual impacts of the proposed project from the north of the site, the Siting Board directs the Company to provide a five-foot wide on-site buffer strip densely planted with shrubs or trees along Athenaeum Street.

Accordingly, the Siting Board finds that with the implementation of the above condition, the visual impacts of the proposed project would be minimized.

G. Noise

This Section describes the proposed project's noise impacts and mitigation proposed by the Company.

1. Description

The Company asserted that it had conducted an accurate and reliable analysis of noise impacts, consistent with Siting Board precedent, and that the proposed facility would meet regulatory noise guidelines (Company Initial Brief at 106). The Company stated that increases in off-site noises caused by operation of the proposed facility would be well below MDEP's limit of 10 decibels ("dBA") at the nearest residences, and at or below MDEP's 10 dBA limit at the project property lines (Exhs. EFSB-G-2-S Bulk Att. at 6-9; EFSB-RR-41-A-C2).

The Cambridge Noise Control Ordinance limits both overall A-weighted and octave band noise levels to 50 dBA at nighttime for residential areas, and to 65 dBA for commercial areas and 70 dBA for industrial areas at all times (Exhs. EFSB-A-1-S at 6-2; EFSB-N-21 at (8.16) 5); SEK-1, at 4.6-2). The Company asserted that Cambridge officials recommend that a facility's noise contribution be designed to be less than or equal to the late night ambient levels when the existing ambient levels approach or exceed the city standards (Exh. EFSB-N-8). The Company asserted that it would comply with the ordinance based on the A-weighted indicators at all noise measurement locations ("NML"), and would comply with the octave band restrictions at office and residential locations; however, the Company's witness noted that the project "may or may not" comply for each individual octave band at all property line locations (Exh. EFSB-N-8; Company Initial Brief at 94; Tr. 9, at 1241).

To determine the noise impacts of the proposed facility, the Company analyzed existing noise levels in the vicinity of the proposed site and the expected changes in noise levels resulting from construction and operation of the proposed facility (Exhs. EFSB-RR-41-A-C2; EFSB-A-1-S at 7-9, 7-10; SEK-1, at 4.6-9). The Company measured background noise levels at 13 NMLs, including seven NMLs selected to represent the nearest residential and commercial sites in various directions from Kendall Station, and six NMLs selected to represent property line ("PL") locations (Exh. SEK-1, at 4.6-4).[66] The Company stated that it selected the noise monitoring locations by first identifying nearby noise sensitive areas, then choosing locations at the nearest bordering commercial areas (Exh. EFSB-N-4).

The Company's measurements indicated that existing L_{90}[67] levels in the vicinity of the

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66 The Company initially provided a set of noise measurements based on two methods of noise monitoring -- three hour monitoring (continuous monitoring) at four off-site locations and 10-minute (short-term) monitoring at three off-site locations and the six PL locations (Exh. SEK-1, at 4.6-4). For each NML, the measurements were taken once in order to represent a nighttime weekday period (Exh. SEK-1, at Table 4.6-2). At the request of the Siting Board, the Company conducted additional monitoring to take into account weekend nighttime measurements and daytime measurements for all PLs and the four off-site locations (Exh. EFSB-N-23-S).

67 The Company indicated that L_{90} noise is the sound level that is exceeded 90 percent of the (continued...)

proposed facility ranged from 48 dBA to 56 dBA[68] during the day and from 47 to 56 dBA at night (Exh. EFSB-N-25-S).[69] At the closest existing residence, the Esplanade Condominiums, located 880 feet to the north of the site, the quietest L_{90} noise level was 51 dBA during the day and 53 dBA at night (id.; Exh. EFSB-N-10-C). At the Cambridge Research Park, where residential development has been proposed, located 650 feet to the west of the site, the quietest L_{90} noise level was 49 dBA at night and 50 dBA during the day (Exhs. EFSB-N-10-C; EFSB-N-25-S). The Company indicated that the principal sources of noise that control the L_{90} are distant traffic, and mechanical equipment and ventilation systems from buildings other than the existing Kendall Station (Tr. 9, at 1188).

The Company next used NOISECALC, a model developed by the New York State Department of Public Service specifically for the purpose of calculating noise levels from electric generating facilities, to estimate daytime and nighttime facility noise and combined background and facility noise for three operating scenarios: (1) the Base Case, which assumes operation of the CTG with increased duct firing, steam turbines 1, 2, and 3, a fin-fan cooler with reduced low-noise fan with barrier, and the future transformer; (2) Case 2, which assumes operation of the CTG on oil, steam turbines 1, 2 and 3, boiler 3, a fin-fan cooler with reduced low-noise fan with barrier, and the future transformer; and (3) Case 3, which assumes operation of boilers 1, 2, and 3, steam turbines 1, 2, and 3 and the future transformers (Exhs. EFSB-RR-41-A; EFSB-RR-41-

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67 (...continued)
time during the measurement period (Exh. SEK-1, at 4.6-1).

68 One NML located across the Charles River on Beacon Hill was measured at 59 dBA during the day and 47 dBA at night; this NML was not included in the range noted above (Exh. EFSB-N-25-S).

69 SE Kendall also calculated a "greenfields" ambient noise level of 52 dBA for all receptors by averaging the L_{90} sound level over the whole test period and over all locations (Exhs. SEK-1, at 4.6-7; EFSB-N-24). The Company asserted that this is a fair and conservative method for identifying a greenfields ambient when the background sound sources are typically distant sources, such as traffic and building heating, ventilation and air conditioning systems, rather than local sources (Exh. EFSB-N-24). For the purposes of analyzing the noise impacts associated with the proposed project, the Siting Board relies on the actual measured ambients at each NML.

A-C2; EFSB-N-2; EFSB-A-1-S at 7-6; Tr. 9, at 1177-1181, 1191-1192).

Based on its noise impact analysis, the Company indicated that under the Base Case:[70] (1) L_{90} noise increases at all residential NMLs would range from 0 to 2 dBA for both the day and night; and (2) L_{90} noise increases at commercial NMLs would range from 1 to 5 dBA for both the day and night[71] (Exh. EFSB-RR-41-A-C2). The Company further indicated that under the Base Case: (1) L_{90} noise on the northern site boundary, which directly abuts the Riverview Office building, would increase by 5 dBA for both day and night to a level of 60 dBA during the day and 61 dBA at night; (2) L_{90} noise on the southern site boundary, which directly abuts the Canal Walk, would increase by 7 dBA to a level of 59 dBA during the day and by 8 dBA to a level of 59 dBA at night; (3) L_{90} noise on the western site boundary, which directly abuts the proposed Cambridge Research Park, and is represented by a southwest and a northwest NML, would increase by a maximum of 6 dBA for both day and night to a level of 54 dBA; and (4) L_{90} noise on the eastern site boundary, which fronts on Land Boulevard and is represented by a southeast and a northeast NML, would increase by 1 dBA to a maximum level of 60 dBA during the day, and would increase by 5 dBA to a maximum level of 52 dBA at night (Exh. EFSB-RR-41-A-C2).[72] The Company indicated that its noise impact analysis predicted attenuation of facility noise with distance from the source, due to hemispherical spreading and atmospheric absorption (Exhs. EFSB-N-2; EFSB-A-1-S at 7-7). The Company added that its analysis did not reflect other factors that may be present and serve to attenuate noise impacts at receptor locations, such as shielding by on-site or local buildings and wind effects, and therefore argued that the noise

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70 The Company asserted that the Base Case would be representative of the noise impacts that would occur 90 percent of the time, and reflects the worst-case scenario (Tr. 9, at 1178-1179).

71 The commercial NMLs include the office building south of the Broad Canal and the area along Linsky Way, between Second and Third Street (Exhs. SEK-1, at 4.6-3; EFSB-RR-41-A-C2). As described above, some property line locations also represent commercial locations.

72 The Siting Board notes that the Company's use of 52 dBA to represent all the NMLs based on its calculation of an existing greenfields background yields increases ranging from 0 to 8 dBA (Exhs. EFSB-A-1-S at 7-10; EFSB-RR-41-A-C2).

analysis results are conservative (id.; Tr. 5, at 606).

The Company also provided estimated day-night sound levels ("L_{dn}"),[73] with and without the proposed facility, for each NML (Exh. EFSB-N-11-S). The Company indicated that the existing L_{dn} levels at all NMLs exceed the EPA guideline of 55 dBA, since noise levels at the closest residence and at two PLs measure 71 dBA and noise levels at the remaining NMLs are all 65 dBA (id.; Exh. EFSB-N-15). The Company indicated that with operation of the proposed facility, L_{dn} noise at all but one of the residential and commercial NMLs would remain unchanged; at that location, L_{dn} noise would increase from 65 dBA to 66 dBA (Exh. EFSB-N-11-S). At two of the PL locations, those directly to the north and the south of the new building, the L_{dn} noise would increase from 65 dBA to 68 dBA (id.). The Company noted that the 55 dBA figure set out in the levels document was intended to be used as a guideline, not as a regulation, and that the existing L_{dn} of 65 dBA found in the Kendall Station area is consistent with measurements for urban areas (Tr. 9, at 1209, 1217).

To achieve its noise control targets, SE Kendall indicated that it would implement a combination of the following noise mitigation measures: (1) enclosure of the combustion turbines and HRSGs; (2) enclosure of the gas metering station; (3) enclosure of the boiler feed pumps, air compressors, and other ancillary equipment; (4) an HRSG stack silencer; (5) high-efficiency, low-noise transformers with barrier walls; and (6) reduced-speed low-noise fan and a barrier system for the fin-fan cooler (Exhs. EFSB-N-2-S; EFSB-N-30-S; EFSB-A-1-S at 7-14; EFSB-RR-75-S2; EFSB-RR-94-S). The Company also stated that it would install mufflers on the project's non-emergency steam vents (Exh. EFSB-RR-77).[74] The Company

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[73] L_{dn} is defined as the day-night average sound level -- a 24-hour equivalent sound level, with a 10 dBA penalty added to sounds occurring between the hours of 10:00 p.m. and 7:00 a.m. (Exh. EFSB-N-15 at 13). EPA has identified an outdoor L_{dn} of less than or equal to 55 dBA in community areas as the noise level requisite to protect public health and welfare (id. at 3; Tr. 9, at 1208).

[74] The Company explained that at the existing facility, normal steam venting occurs in the mid-afternoon and late nighttime periods for about 15 to 20 minutes every 12 hours (Exh. EFSB-RR-77). The Company stated that noise from its existing venting can reach 61 dBA at the Esplanade Condominiums, which is similar to the noise from local traffic

(continued...)

asserted that noise from the existing equipment would not significantly contribute to the overall noise levels of Kendall Station with the new equipment at receptor locations as long as the existing building is well maintained (Exhs. EFSB-N-30; EFSB-N-13-S). The Company stated that it would keep the windows and doors closed, provide mufflers for vent openings, and maintain or improve glazing on the east wall windows near the boiler feed pump area (Exhs. EFSB-N-2S; EFSB-N-13-S; EFSB-N-30-S).[75]

SE Kendall estimated construction noise impacts at both the existing and future nearest residences for different construction activity stages, including: (1) 24-hour equivalent sound ("L_{eq}") levels from 59 dBA to 63 dBA during the site clearing, foundation and excavation stages; (2) an L_{eq} level of 66 dBA associated with the use of trucks on-site; and (3) a peak sound level of 85 dBA during pile driving (Exh. EFSB-N-17; Tr. 5, at 648). The Company indicated that, with the exception of pile driving, which is explicitly exempted under the Cambridge Noise Control Ordinance, the project would comply with the provisions of the Cambridge Noise Control Ordinance applicable to construction noise (Exhs. EFSB-N-1; EFSB-N-21 at (8.16) 6; Tr. 5, at 648).[76] The Company stated that steam blows would occur during the final stages of construction for a period of approximately one to two weeks (Exh. EFSB-N-18). SE Kendall stated that it would employ a high performance muffler to reduce the noise from steam blows by 40 to 50 dBA, to approximately 80 to 100 dBA (id.; Tr. 5, at 650). The Company indicated that it expects the noise from the steam blows to exceed limits in the Cambridge Noise Control Ordinance but that a variance could be granted for this situation (Tr. 5, at 650).

The Company argued that, given the urban nature of the area and elevated ambient sound

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74 (...continued)
(id.).

75 The Company indicated that the estimated reduction in future noise due to maintaining or improving the glazing for the east wall windows near the boiler feed pump area would be up to 3 dBA at PL 1 (southeast corner) (Exh. EFSB-RR-44).

76 The Cambridge Noise Control Ordinance places the following limits on construction noise: an L_{10} of 75 dBA for residential abutters, an L_{10} of 80 dBA for business/office abutters, and an L_{10} of 85 dBA for industrial abutters; and a maximum sound level of 86 dBA for residential abutters (Exhs. EFSB-N-1; EFSB-N-21 at (8.16) 6).

levels, the expected construction noise would not be as intrusive as it would be in a rural area (Exh. EFSB-A-1-S at 7-13). To mitigate construction noise impacts, the Company stated that to the extent possible, noise intensive construction activities would be limited to the hours of 7:00 a.m. to 6:00 p.m. Monday through Friday,[77] with pile driving limited without exception to 8:00 a.m. to 5:00 p.m., Monday through Friday (Exhs. EFSB-N-1; EFSB-N-17). In addition, the Company stated that it would maintain functional mufflers on construction equipment (Exh. EFSB-A-1-S at 7-13). Finally, the Company stated that it would notify community groups, the Cambridge Police and Fire departments, and the Cambridge Noise Office of impending steam blows (Tr. 5, at 650).

2. Position of the Parties

The City acknowledged that the noise impact analysis conducted by the Company demonstrates compliance with the MDEP requirements and the Cambridge Noise Control Ordinance on an A-weighted basis, contingent on the sound control scenario proposed by the Company (City Initial Brief at 36). However, the City noted that compliance with the Cambridge Noise Control Ordinance with regard to octave band levels at the property lines is not certain (id. at 36-37). In addition, the City noted that ambient noise levels at the Cambridge Research Park and the Esplanade Condominiums already equal or exceed levels permitted in the ordinance, and that at these locations nighttime levels would increase by 2 dBA and 1 dBA, respectively (id. at 37). The City stated that SE Kendall should pay particular attention to noise reduction at these locations, and that further design work and analyses may be needed (id.). The City noted that further refinement in the design of the proposed project may be necessary for it to fully comply with the Cambridge Noise Control Ordinance (id. at 38). However, the City indicated that as long as the design of the plant, on its face, minimizes excess noise, and the Company maintains the commitment and the ability to remedy any noise violations, the Cambridge Noise Control

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[77] The Siting Board notes that the Cambridge Noise Control Ordinance prohibits construction during the hours of 6:00 p.m. to 7:00 a.m. when the following day is a weekday and during the hours of 6:00 p.m. to 9:00 a.m. when the following day is a Saturday, Sunday or a holiday (Exh. EFSB-21 (Att.) at (8.16) 7).

Ordinance provides adequate assurance that the proposed project's noise would be adequately minimized. The City therefore did not request a condition addressing this issue (id.). The City did express concern about the level of noise associated with non-emergency steam venting and therefore requested that the Siting Board impose the following condition relating to noise: "In order to minimize the noise impacts from steam venting at the plant, the Company shall install mufflers on the non-emergency steam vents (id. at 38-39)."

3. Analysis

In prior decisions, the Siting Board has reviewed the noise impacts of proposed generating facilities for general consistency with applicable governmental regulations, including the MDEP's 10 dBA standard. Sithe West Medway Decision, 10 DOMSB 1, at 322; Brockton Power Decision, 10 DOMSB at 217; Altresco Pittsfield, Inc., 17 DOMSC 351, at 401 (1988). In addition, the Siting Board has considered the significance of expected noise increases which, although lower than 10 dBA, may adversely affect existing residences or other sensitive receptors. IDC Bellingham LLC, 9 DOMSB at 311 (1999) ("IDC Bellingham Decision"); Sithe Mystic Decision, 9 DOMSB at 164; Northeast Energy Associates, 16 DOMSC 335, at 402-403 (1987).

The record demonstrates that the existing nighttime L_{90} noise levels at the residential NMLs in the vicinity of the proposed facility range from to 49 dBA to 53 dBA[78] and that existing L_{dn} levels in this area are well above the 55 dBA guideline identified by EPA as the level requisite to protect public health and welfare with an adequate margin of safety. Thus, there is a compelling reason for the Company to use all cost-effective noise mitigation to limit noise increases at residential receptors closest to the Kendall Station site. Here, SE Kendall voluntarily has committed to installing noise mitigation that would limit the noise impacts of the proposed facility to no more than 2 dBA at residential NMLs in the vicinity of the proposed facility. This commitment represents a level of noise mitigation that is more stringent than required by the Siting Board in most cases, but is consistent with noise levels accepted in recent

[78] The levels at the Beacon Hill NML are not included in this range.

Siting Board reviews of facilities proposed for urban locations with high ambient levels. Sithe Mystic Decision, 9 DOMSB at 161-162 (nighttime L_{90} ranges from 47 to 55 dBA, highest impact at a residential receptor is 2 dBA); Cabot Power Corporation, 7 DOMSB 233, at 301 (1998) (highest residential nighttime L_{90} was 50 dBA, with a 4 dBA increase).

The Siting Board notes that the proposed facility as designed may not satisfy the requirements of the Cambridge Noise Control Ordinance, with respect to the octave band limits at the property lines. The Siting Board notes that the calculated property line noise impacts in this case are significant due to the close proximity of abutting uses and pedestrian access activities at property line locations. SE Kendall has asserted that the noise impacts of the proposed facility will meet regulatory guidelines, and that its facility design properly addresses the intent of the Cambridge Noise Control Ordinance. The record shows that the Cambridge Noise Control Ordinance comprehensively addresses many facets of noise impacts, including both operational and construction noise. The City has indicated its intention to work with SE Kendall to ensure that the proposed project will meet the noise ordinance limits as determined by the City, and to diligently monitor compliance with these limits. The Siting Board anticipates that compliance with the noise ordinance limits would not increase the modeled A-weighted decibel levels.

With respect to construction noise impacts, the Siting Board agrees that adherence to the construction site practices proposed by the Company, and the comprehensive requirements set forth in the Cambridge Noise Control Ordinance, would help minimize construction-related noise impacts. In addition, the Siting Board notes that such practices are consistent with approaches to construction noise mitigation reviewed in recent generating facility cases.

The City has requested a condition requiring mufflers on non-emergency steam vents. The record shows that the Company has incorporated such mufflers into its noise mitigation plans; consequently the condition is not necessary.[79]

Accordingly, the Siting Board finds that, with the implementation of the Company's proposed level of mitigation, the noise impacts of the proposed facility would be minimized.

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[79] The Siting Board notes that the proponent has an obligation to construct and operate its facility in conformance with all aspects of the proposal as presented to the Siting Board.

H. Safety

This Section describes the safety impacts of the proposed project with regard to overall safety, materials handling and storage, fogging and icing, emergency response, and existing hazardous conditions.

SE Kendall stated that it would design and operate the proposed project in accordance with all applicable health and safety regulations and engineering standards, and would review the current facility for potential upgrades of existing safety features (Exh. SEK-1, at 4.13-1). The Company stated that, at a minimum, the proposed project design would include the following safety features: (1) equipment and building layouts that incorporate provisions for safe access to and egress from the facility, as well as adequate access for firefighting and other emergency vehicles; (2) automatic shutdown systems with back-up power supply for turbines and fuel supply systems; (3) emergency lighting with back-up power supply; and (4) automatic fire protection systems, and, where appropriate, the use of fire retardant building material (id.).

SE Kendall stated that it would continue its existing site security program, which monitors and controls entry to the site through the use of a gatehouse and cameras (Exh. EFSB-S-16; Tr. 2, at 172-173).

1. Materials Handling and Storage

The Company indicated that it would store oil for the proposed project in two existing above-ground storage tanks located on the western portion of the site (Exh. SEK-1, at 2-2). The Company stated that No. 2 distillate oil would be stored in a 1.25 million gallon tank and that No. 6 oil would be stored in a one million gallon tank (Exhs. SEK-1, at 2-2; EFSB-S-3; Tr. 2, at 155-156). SE Kendall explained that the larger tank, which currently holds No. 6 oil, would be opened, cleaned, inspected, and repaired if necessary; the smaller tank underwent such procedures three years ago when it was converted to store No. 6 oil (Exhs. EFSB-S-3; EFSB-RR-9).

SE Kendall indicated that the unloading area for the 1.25 million gallon tank would need to be relocated and reconstructed due to the layout of the new HRSG building (Exhs. SEK-1, at 4.12-6; EFSB-S-3). The Company indicated that the existing truck delivery area is equipped

with a containment area to control spills, and stated that oil delivery trucks would follow the established truck route from Land Boulevard (See Traffic Section III.I, below) (Exh. EFSB-RR-14; Tr. 1, at 82).

SE Kendall stated that 19.5 percent aqueous ammonia would be stored in a 10,000 gallon single-walled steel tank located north of the turbine building (Exhs. SEK-1, at 2-9 and Figure 2-4; EFSB-RR-15). The Company stated that the tank would be located on a skid surrounded by a bermed secondary containment structure sized to hold 110 percent of tank volume (Exhs. EFSB-S-10; EFSB-RR-15; CC-RR-6). The Company stated that the tank would be equipped with spill prevention valves, level gauges, an alarm system, tank labels and with baffles that reduce the exposed liquid surface area (Exhs. SEK-1, at 4.5-35 and 4.12-8; CC-RR-6). SE Kendall asserted that its proposed secondary containment system would adequately control spills, and that a double-walled or enclosed tank would not increase the degree of protection to the community (Exh. EFSB-S-22; Tr. 2, at 165-167).[80] The Company estimated the cost of a double-walled tank with containment at approximately $221,715, as opposed to $117,750 for the proposed single-walled tank with containment (Exh. EFSB-RR-15).[81] SE Kendall noted that the final design plans for the tank would be subject to approval by the Cambridge Local Emergency Planning Commission, the Cambridge Fire Department, the Cambridge Department of Public Health, and the Cambridge Licensing Commission (Exhs. EFSB-RR-19; CC-RR-6).

SE Kendall stated that 19.5 percent aqueous ammonia would be delivered to the site in 5,500 to 6,700 gallon tanker trucks, at an average of one truckload per week (Exh. EFSB-S-12;

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80 The Company stated that while double-walled tanks are very commonly used for certain types of petroleum products, they are not necessary for storing aqueous ammonia (Tr. 2, at 165). SE Kendall explained that a double-walled tank would need additional monitoring in the event of leakage between the two walls (Tr. 13, at 1981). Further, the Company asserted that enclosing aqueous ammonia tanks is not a typical practice for electric generating facilities (Exh. EFSB-S-22; Tr. 2, at 163).

81 The Company stated that it was unable to obtain a price quote for a double-walled tank (Exh. EFSB-RR-15). Consequently, it assumed that the cost of a double-walled tank would be 2.5 times that of a single-walled tank, while the cost of the containment structure would remain the same (id.). The Company estimated that the cost of placing a single-walled tank in an enclosed structure would be $579,310 (id.).

Tr. 2, at 227). The Company noted that the delivery and unloading procedure would be performed jointly by the plant equipment operator and the delivery truck driver, and stated that it would prepare an aqueous ammonia operations management method to address the delivery and unloading of aqueous ammonia (Exh. EFSB-S-20-R).[82] The Company indicated that the unloading/delivery area would be bermed and paved (Exh. EFSB-RR-19).

SE Kendall modeled a worst-case release of ammonia from the storage tank using EPA guidance techniques (Exhs. EFSB-S-8; EFSB-RR-13; Tr. 2, at 159).[83] The Company explained that since a release would occur at ground level, maximum concentrations would occur at the surface and would decrease with height and distance downwind as the plumes disperse (Exh. EFSB-RR-13). Consequently, the Company modeled ammonia concentrations at four heights – zero, two, five and ten meters above ground level (id.).[84] The Company's modeling indicated that at ground level, the maximum impact would drop below 200 ppm, a level known as the "toxic endpoint",[85] at a distance of 60 feet from the ammonia tank (Exh. EFSB-S-8(S)). The Company provided a project plan that graphically depicts the distance from the ammonia storage tank to the closest property line, located approximable 30 feet north (Exh. EFSB-G-2-S at Figure

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82 The operations method would address the following: preparing the receiving system for delivery; preparing the aqueous ammonia unloading area for delivery; inspecting the delivery truck; setting up the delivery truck; unloading aqueous ammonia for the delivery truck; completing the delivery and truck exit; and the posting of delivery inspection and delivery documentation (Exh. EFSB-S-20-R).

83 The Company stated that a worst-case release is an instantaneous release of all of the aqueous ammonia into the dike area surrounding the tank, at which point the ammonia would then evaporate from the surface. The release rate would be a function of the exposed surface area of the liquid, weather conditions, and the temperature of the liquid (Exh. EFSB-S-8(S)).

84 The Company stated that it used the USAF Toxic Chemical Dispersion Model to predict maximum concentrations downwind of the release (Exh. EFSB-S-8(S)).

85 The toxic endpoint value, as established by the American Industrial Hygiene Association based on EPA's Emergency Response Planning Guidance 2, is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without sustaining serious or irreversible health effects that could impair the individual's ability to take protective action (Exhs. EFSB-S-18; EFSB-S-21).

2-4). The Company's model predicted worst-case ground level ammonia concentrations of 100 ppm at the Riverview Office Building, located 88 feet from the ammonia tank, and 26 ppm at the canal walk, located 200 feet from the ammonia tank (Exh. EFSB- S-8(S)). The Company stated that at distances above ground level, the impacts at the Riverview Office Building would be less than the most stringent short-term health based standard of 25 ppm (Exh. EFSB-RR-13).[86] The Company asserted that concentrations modeled at heights of two meters should be used to assess impacts, as that is considered to be breathing height (Tr. 13, at 1948). The Company acknowledged, however, that the EPA standards were based on the maximum concentrations at a given distance, without regard to height (id.).[87]

The Company stated that in addition to fuel oil and aqueous ammonia, Kendall Station also currently uses and stores lubricating oils, turbine oil, sodium hydroxide, sulfuric acid, sodium hypochlorite, sodium sulfite, di-sodium phosphate, morpholine, kerosene, and recovered virgin oils (Exh. SEK-1, Table 4.12-1). SE Kendall noted that the use and storage of these chemicals are governed by numerous federal, state, and local laws (Exh. SEK-1, at 4.12-1). The Company noted that it has worked with the state's Toxic Use Reduction Act ("TURA") program

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86 The Company reported that according to the American Industrial Hygiene Emergency Response Planning Guide ("Response Planning Guide"), nearly all individuals could be exposed to ammonia concentrations of 25 ppm for up to one hour without experiencing adverse health effects or an objectionable odor (Exh. EFSB-S-21). However, the Company's witness, Dr. Valberg, also noted that the threshold for odor detection is 5 ppm and that ammonia concentrations in the range of 20 to50 ppm can be disagreeable and irritating (Exh. EFSB-RR-99). The Company explained that mild short-term effects could occur at 25 ppm, which is the first level that would be considered an emergency condition under the Response Planning Guide (Tr. 2, at 162, 168-169).

87 The Company asserted that the use of urea pellets instead of aqueous ammonia to address traffic and safety issues would not be warranted, since the delivery of aqueous ammonia to the proposed facility would require only one truck per week (Exh. EFSB-S-12). In addition, the Company stated that a urea pellet system would not improve the operation of the SCR system, would be more costly, and would be difficult to locate on the constrained Kendall Station site (Exhs. EFSB-S-12; EFSB-RR-20: Tr. 9, at 1329). The Company noted that there are currently other users of ammonia in the Kendall Square area, and that Cambridge safety personnel therefore are familiar with ammonia use and transport (Exh. EFSB-S-12; Tr. 9 at 1324, 1328).

to reduce the use of sulfuric acid and sodium hydroxide at the existing facility and stated that it would work with TURA in the future to use those chemicals more efficiently (Exh. EFSB-SW-4; Tr. 3, at 337-340). The Company indicated that, after construction of the proposed project, all chemicals which are not currently stored within a building or within secondary containment would be stored within a building, and that certain outdoor chemical storage facilities, including the aqueous ammonia delivery area and the No. 6 fuel oil tank, would be upgraded as part of the proposed project (Exh. SEK-1, at 4.12-5 to 4.12-6, Table 4.12-1).

2. Fogging and Icing

The Company testified that the proposed project is designed to use once through cooling, rather than cooling towers (Exh. EFSB-S-13). Therefore, the Company asserted that fogging or icing problems would not result from the operation of the proposed project (id.).

3. Emergency Response

SE Kendall stated that the existing Emergency Response Plan ("ERP") and Spill Prevention, Control and Countermeasure Plan ("SPCC Plan") for Kendall Station would be revised six months before the testing of the proposed project (Exh. EFSB-S-6). The Company stated that revisions would address such issues as: facility information; hazard evaluation; the fire protection system; spill scenarios; exit routes; the stormwater management system; and site plans (Exh. EFSB-S-20-R). SE Kendall indicated that although aqueous ammonia is not regulated under the ERP or SPCC Plan, the Company would prepare a site specific operations method to address the delivery, unloading and storage of aqueous ammonia (id.).

SE Kendall stated that plant staff would receive training for chemical hazards, and that a spill response team would be trained for hazardous material spills (Exh. EFSB-S-10). The Company indicated that, in the unlikely event of an ammonia tank release or spill, the Cambridge Fire Department, Regional HAZ MAT personnel, and the management of the Riverview Office Building would be notified (Exh. CC-RR-6). In addition, the Company indicated that it would provide the City Fire and Police Departments with on-site tours and training, and all plans and appropriate safety manuals to familiarize them with the layout of the site and location of

hazardous materials (Exh. EFSB-RR-19).

4. Existing Hazardous Conditions

SE Kendall indicated that accidental releases of petroleum liquids have occurred in the past at Kendall Station, and that historic uses of the site and nearby areas have resulted in releases of hazardous materials (Exh. SEK-1, at 4.3-6). The Company identified two contaminated areas on the Kendall Station property which have been remediated under the Massachusetts Contingency Plan ("MCP"),[88] and a third contaminated area which is still undergoing remediation (id. at 4-3.6). The two remediated sites are now subject to Activity and Use Limitations ("AUL"), which are designed to restrict soil exposure (id. at 4-3.1; Exh. EFSB-S-17 (Att.)).

SE Kendall provided a history of the contamination and cleanup of the two remediated sites (Exh. SEK-1, at 4-3.9). The Company explained that one of the two sites had been used for ancillary components of a former manufactured natural gas plant ("MGP") and tar processing plant which were once located west of Kendall Station (id.). Studies conducted in 1997 and 1998 identified oil, hazardous materials and low levels of MGP-related residual contaminants in the soil and groundwater at this site ("MGP site"); however no offsite migration of these contaminates was identified (id.). The MGP site was remediated in part through the implementation of an AUL, which requires that a Soil Management plan and a Health and Safety plan be developed and implemented prior to any long-term subsurface work within the AUL area, and that pavement or a crushed stone covering be maintained within the area (id.; Tr. 2, at 179).

The second remediated site was contaminated by a June, 1997 release of No. 6 fuel oil within the secondary containment area of an oil tank (Exh. SEK-1, at 4.3-11; Tr. 2, at 177). Affected soil was excavated and the site was placed under the AUL discussed above for the MGP site (Exh. SEK-1, at 4.3-11). The Company explained that all construction that would take place

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88 Reportable concentrations of oil and hazardous materials are regulated under the MCP, which establishes a standard for determining when response actions are complete in terms of the risks remaining at the site (Exh. SEK-1, at 4-3.1). A condition of No Significant Risk must exist or be achieved through the documentation of a Response Action Outcome ("RAO") (id.).

in the AUL area, which covers approximately half of Kendall Station, would have to take place in accordance with approved Soil Management and Health and Safety plans to address fugitive emissions (Exh. SEK-1, at 4.3-11; Tr. 2, at 179-180). The Company stated that it anticipates that the Soil Management and Health and Safety plans would be prepared approximately six months prior to the start of construction (Exh. EFSB-S-17).

The Company indicated that the site still undergoing remediation, known as the jet fuel release area, was contaminated by the accidental release of jet fuel from underground storage tanks (Exh. SEK-1, at 4.3-11). The Company asserted that the substance associated with the release, termed light non-aqueous phase liquid ("LNAPL"), is localized and is not migrating off-site (id.). The Company explained that the cleanup is being completed with a multi-phase extraction system; results of the cleanup are reported to MDEP every six months (id. at 4.3-11 to 4.3-12). SE Kendall anticipates that the remediation for the jet fuel release area would be completed under a Class A RAO, which would indicate that the site has been cleaned up and does not pose a risk (id. at 12). The Company stated that both the jet fuel storage tanks and the No. 6 fuel oil storage tanks have been upgraded with spill and overflow protection devices to prevent future releases (Exh. EFSB-S-19).

5. Analysis

SE Kendall has demonstrated that it would properly store and handle oil and other non-fuel chemicals in accordance with applicable public safety standards and that it would have in place secondary or tertiary systems to contain chemical spills. The record also demonstrates that SE Kendall has arranged for the proper storage, use, and secondary containment of hazardous materials associated with the construction and operation of the proposed project and that emergency supplies and training in the safe handling of those chemicals would be provided. The record demonstrates that the Company would take steps to ensure the safe transport and delivery of oil. The Company intends to take measures to prevent spills and accidents, or in the event of a spill or accident, to respond and remediate quickly.

SE Kendall has proposed to store aqueous ammonia in a single walled storage tank, arguing that this arrangement adequately protects neighboring properties and that enclosing the

tank or using double-walled construction is not a typical practice within the generating industry. However, it appears from the record that in the event of a worst-case ammonia release, ammonia concentrations above the 200 ppm "toxic endpoint" could extend as much as 30 feet onto the Riverview Office property. Further, the Kendall Station site is located in a dense mixed-use area, and the nearest off-site use -- the Riverview Office Building -- is located only 88 feet from the ammonia tank. The record shows that in the event of a catastrophic failure of the ammonia tank, the ammonia concentrations at the office building would be 100 ppm. While this level is below the 200 ppm "toxic endpoint," the record shows that at concentrations of between 20 and 50 ppm, the general population could experience disagreeable and irritating effects. While the Siting Board recognizes that the possibility of a catastrophic spill is remote, it is nonetheless desirable to protect the general public from this level of impact.

The Company has argued that the use of a double-walled or enclosed ammonia storage tank is not an industry standard. However, in a number of recent cases, developers have proposed aqueous ammonia tanks that were either double-walled or enclosed. Brockton Power Decision, 10 DOMSB at 226; Sithe Edgar Decision, 10 DOMSB at 97; IDC Bellingham Decision, 9 DOMSB at 317-318; Sithe Mystic Decision, 9 DOMSB at 166-167; ANP Blackstone Decision, 8 DOMSB 1, at 179; ANP Bellingham Decision, 7 DOMSB at 203.[89] Given the project's urban mixed-use surroundings, there is significant potential for large numbers of office-

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[89] Four of the applicants provided modeled maximum off-site ammonia concentrations from a worst-case spill, that with the proposed mitigation for their projects, ranged from less than 0.5 ppm to 29.5 ppm. Brockton Power Decision, 10 DOMSB at 226-227; Sithe Edgar Decision, 10 DOMSB at 98; IDC Bellingham Decision, 9 DOMSB at 317-318; Sithe Mystic Decision, 9 DOMSB at 167. In three of these previous cases, applicants proposing use of containment structures for ammonia storage tanks provided estimates of worst-case ammonia concentrations indicating that, even without containment structures, property line concentrations would have been well under 200 ppm. IDC Bellingham Decision, 9 DOMSB at 318; ANP Blackstone Decision, 8 DOMSB at 179; ANP Bellingham Decision, 7 DOMSB at 203. The maximum modeled concentrations without use of containment structures would have been 200 ppm at a distance of 317 feet from the IDC Bellingham facility's ammonia storage tank, well short of the nearest facility property line located at a distance of 1500 feet from the storage tank, and would have been 79 ppm and 42 ppm at the property lines of the ANP Blackstone and ANP Bellingham facilities, respectively. Id.

workers and pedestrians to be in the vicinity of the northern site boundary (See Traffic Section III.I, below). Further, recreational use of the canal walk will take place directly abutting the proposed project. The Siting Board notes that the cost of the two alternatives, a double-walled tank and an enclosed tank, are not prohibitive in comparison to the total cost of the project and appear to be justified in order to provide an additional level of safety in a dense urban area.

Therefore, to provide an additional level of safety in the event of a spill from the ammonia storage tank, the Siting Board directs SE Kendall to enclose the ammonia storage tank or incorporate an alternative design such as a double-walled tank to mitigate the impacts of any potential ammonia spill, and to file with the Siting Board prior to commencement of construction of the ammonia system, an analysis of the cost and relative safety advantages of the design options considered for ammonia storage.

The Company has indicated that it intends to develop emergency procedures and response plans similar to those found acceptable in previous Siting Board decisions; however, the Company has not yet developed such plans. Consequently, the Siting Board directs the Company to (1) consult with the appropriate Cambridge officials in the revision of its SPCC Plan and the Emergency Response Plan; and (2) update the construction section of its Emergency Response Plan, in consultation with appropriate Cambridge officials, and file it with Cambridge before facility construction begins in order to cover possible emergencies related to construction accidents.

The record indicates that the proposed project is subject to several federal, state, and local regulations concerning the use, storage, and disposal of hazardous chemicals and waste. The record indicates that the Company is working with the state's TURA program to reduce the use of certain chemicals and that the Company would work with the TURA program in the future. In addition, the record indicates that construction of the proposed project would result in an improvement in the storage of chemicals, as, at the proposed project, all chemicals would be stored inside or with secondary containment. Finally, the record indicates that several outdoor chemical storage facilities would be upgraded as a result of the proposed project.

With respect to fogging and icing, there is no record evidence that ground level fogging or icing would result from the operation of the proposed project.

With respect to the presence of contamination at the Kendall Station site, the record shows that the existing site has been thoroughly assessed for the presence of hazardous materials and that three areas of contamination have been identified. The Company also has demonstrated that in the view of the MDEP permanent solutions for two of the three sites have been achieved. The Company further expects that a permanent solution for the remaining site would be achieved in the near future. The record shows that, due to the location of the AUL's placed on approximately half of the Kendall Station site, SE Kendall must prepare Soil Management and Health and Safety plans, pursuant to the MCP, prior to beginning any significant construction work. Based on a review of the evidence presented, and assuming (1) the mitigation of any remaining oil and hazardous waste releases at the proposed site as required under the MCP, including a permanent solution for the jet fuel release area; and (2) the implementation of MDEP approved Soil and Management and Health and Safety plans to meet the risk-based standard established by MCP regulations, the Siting Board finds that the safety risks associated with existing hazardous conditions on the site would be minimized.

Accordingly, the Siting Board finds that with the implementation of the above conditions requiring a double-walled or enclosed ammonia storage tank and emergency response plans, the safety impacts of the proposed project would be minimized.

I. Traffic

This Section describes the impact of the construction and operation of the proposed project on local traffic conditions and outlines proposed mitigation of traffic impacts.

1. Description

The Company asserted that the proposed project would be sited, designed and mitigated so that traffic impacts would be minimized (Company Initial Brief at 127). In support of its assertion, the Company provided traffic volume data for existing traffic conditions, and modeled future traffic conditions, with and without the proposed project (Exh. EFSB-T-1).

The Company indicated that the existing peak commuter traffic periods in the vicinity of Kendall Station are from 8:00 a.m. to 9:00 a.m. and 5:00 p.m. to 6:00 p.m. (Exh. SEK-1, at 4.4-

4). The Company stated that construction workers would work a 12-hour shift, from 6:00 a.m. to 6:00 p.m. (Tr. 1, at 88). The Company indicated that the majority of the construction work would occur during this daytime shift, although a minimal number of workers would work in the evening to set up material for the next workday (Exh. SEK-1, at 4.4-10; Tr. 1, at 88). The Company stated that construction of the proposed project would take approximately 22 months, with a maximum of 130 workers expected during the peak construction period, which would occur midway through the schedule and last for four to six months (Exh. SEK-1, at 4.4-10; Tr. 1, at 86).

The Company stated that it would not provide on-site parking for construction workers, and that instead construction workers would commute to the site via public transit or be bused in from a satellite parking area (Exhs. SEK-1, at 4.4-10; EFSB-T-1; EFSB-T-3; Tr. 1, at 89).[90] Therefore, the Company explained that the traffic analyses of impacts associated with the proposed Kendall Station Project would reflect the same traffic volumes for both the no-build and build scenarios (Exh. EFSB-T-1).

The Company indicated that its engineering, procurement and construction ("EPC") contractor would work with Cambridge to develop a Transportation and Demand Management ("TDM") Plan, which would incorporate TDM techniques to encourage construction workers to use public transportation and would reduce single-occupancy vehicle trips (Exhs. SEK-1, at 4.4-10; EFSB-G-2-S Bulk Att. at 8-109). The TDM Plan would be incorporated into a final construction management plan (Exh. EFSB-G-2-S Bulk Att. at 8-109).[91]

The Kendall Station site is in close proximity to two Massachusetts Bay Transportation

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90 SE Kendall noted that five to ten parking spaces would be available on-site to be used by supervisors and for deliveries (Tr. 1, at 89).

91 SE Kendall listed the following nine TDM techniques that could be incorporated into the construction management plan: (1) encouragement of employees to use public transportation; (2) encouragement of car pooling; (3) use of shuttle buses from off-site parking; (4) scheduling construction worker arrivals and departures for off-peak hours; (5) use of an off-site construction staging area; (6) provision of a secure bicycle area; (7) sale of transit passes on-site; (8) provision of lockers, showers and/or changing rooms; and (9) discussions with the Charles River Transportation Management Association (Exhs. EFSB-G-2-S Bulk Att. at 8-110; EFSB-T-3; EFSB-T-4).

Authority ("MBTA") subway stops: the Kendall Square stop, which is located a few blocks from the site, and the Lechmere stop, which is located within a ten minute walk of Kendall Station (Exhs. SEK-1, at Figure 4.4-1; EFSB-G-2-S Bulk Att. at 8-109). The Company stated that it expects as many as 50 percent of the construction workers to eventually use public transportation, depending on the location of their homes (Tr. 1, at 94). SE Kendall noted that it is the responsibility of the EPC contractor to determine the plans for construction parking and whether to offer incentives for public transit use, such as subsidized passes (id. at 96).

The Company indicated that construction of the proposed project would overlap with the ongoing development of the Cambridge Research Park on abutting property between Kendall Station and Third Street (id. at 82-83). Construction of the Cambridge Research Park was scheduled to begin in late 1999 and continue to June of 2003 (Exhs. EFSB-T-1; EFSB-T-6). SE Kendall stated that it would work with Cambridge and with the developer of the Cambridge Research Park to explore possible opportunities to further minimize construction worker traffic to and from the Kendall Station and Cambridge Research Park sites without adversely affecting the Kendall Station Project (Exh. EFSB-RR-11). The Company noted that the developers of the Cambridge Research Park intend to optimize signal phasing at nearby intersections that are served by traffic signal controls, including the Land Boulevard and Binney Street intersection (Tr. 1, at 105).[92]

The Company stated that during the four to six month peak construction period, it expected 25 truck trips a day, over the 10-hour period from 7:00 a.m. to 5:00 p.m. (id. at 84 and 86). The Company indicated that it would attempt to have the truck traffic arrive and depart outside of the peak traffic hours (id. at 86). SE Kendall stated that trucks would follow Land Boulevard to either Binney Street or Rogers Street and then travel south on Second Street to the entrance to the site; SE Kendall added that Cambridge prefers to keep traffic concentrated along

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92 Land Boulevard runs in a northeasterly direction from the vicinity of the intersection of First Street and Athenaeum Street to McGrath Highway and access to Route 93; Binney Street runs in a east-west direction from Land Boulevard, two streets north of Athenaeum Street.

that route to avoid residential areas (Exhs. SEK-1, at Figure 4.4-5; EFSB-T-7; Tr. 1, at 114).[93]

Based on its traffic analysis, the Company indicated that the Land and Binney Street intersection currently operates at an overall Level of Service ("LOS") F for the a.m. peak and LOS C for the p.m. peak (Exh. EFSB-T-1, Tables T-1-A and T-1-B).[94] The traffic analyses for the year 2003, with both the Kendall Station and Cambridge Research Park projects complete, indicate that the Land and Binney Street intersection would continue to operate at the current overall levels of LOS F for the a.m. peak and LOS C for the p.m. peak, even with the signal improvements proposed by Cambridge Research Park (id.; Tr. 1, at 105-106).

The Company indicated that, although there is essentially no pedestrian or vehicle access to Kendall Station for casual use, it would install appropriate barricades and fencing on-site to ensure safe pedestrian travel (Exh. EFSB-T-5). The Company noted that most of the pedestrians walking immediately adjacent to the site are employees traveling to and from the Riverview Office complex at approximately 8:00 to 9:00 a.m. and 4:30 to 6:00 p.m (Tr. 1, at 109). However, SE Kendall noted that when the Cambridge Research Park is complete, the area would experience an increase in pedestrian traffic (id. at 38). The Company stated that, if necessary, it would provide flagmen at areas where pedestrian traffic may conflict with delivery and/or shuttle bus traffic (Exh. EFSB-T-11; Tr. 1, at 110).

The Company maintained that the access to the site, which is a driveway at the end of Second Street and Athenaeum Street, would remain the same after the facility upgrade (Exh. SEK-1, at 4.4-3). The Company stated that once the proposed project is operational, employment at the Kendall Station site would return to current staffing levels of approximately 50 employees

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93 In the event that the primary truck route becomes temporarily unavailable, the Company has developed an alternate truck route that would have the trucks arriving into Kendall Square via the Longfellow Bridge, turning right from Broadway onto Third Street, then right onto Binney Street, and then right onto Second Street into the Kendall Station site (Exh. EFSB-RR-14).

94 Traffic conditions on a roadway and at intersections are represented by the letters A to F on the LOS scale, ranging from LOS A, which represents operations with a very low delay to LOS F, where demand exceeds capacity and is unacceptable to most drivers (Exh. EFSB-RR-8).

on three shifts (Exh. SEK-1, at 4.4-1; Tr. 1, at 97).[95] The Company stated that the shift changes are scheduled to avoid the a.m. and p.m. peak traffic periods (Exh. SEK-1, at 4.4-6).

The Company stated that oil would be delivered at a rate of approximately 1.4 trucks per hour when the CTG is operating on oil, or approximately 17 trucks per 12 hour delivery period (Exhs. EFSB-G-1-S at Appendix 5, Table 2; EFSB-RR-7; Tr. 1, at 102). When both boiler 3 and the CTG are running on oil, there would be an extra three oil truck deliveries over a 12-hour period (Exh. EFSB-RR-7S). The Company also stated that ammonia would be delivered at the rate of one truck per week (Tr. 1, at 111). The Company noted that oil and ammonia delivery trucks would use the same truck route as the construction truck traffic (id. at 103). SE Kendall asserted that use of the preferred route would be included as a contractual obligation with suppliers, and that suppliers of such materials would then be required to follow the preferred route (Tr. 1, at 126).

2. Position of the Parties

The City of Cambridge stated that it anticipated continued coordination with the Company to develop the TDM Plan, finalize primary and back-up transit routes, and ensure that traffic impacts in the area are mitigated (City Initial Brief at 40). The City proposed the following condition to address the construction and operation of the proposed facility in a constrained urban environment:

> "In order to minimize traffic impacts during peak hours, the Company shall (1) use satellite parking and schedule the construction work shift to avoid adverse traffic impacts during the peak commuting hours of 7:15 A.M. to 8:45 A.M. and 5:00 P.M. to 6:00 P.M. (2) schedule deliveries to be spread over the construction work shift, with deliveries of very large equipment and, to the fullest extent possible, deliveries of oil, aqueous ammonia and other materials and substances, scheduled during off-peak times in cooperation with City of Cambridge officials, (3) in consultation with the City of Cambridge, implement measures that would encourage the use of public transportation and alternative routes to the site by

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95 Of the 50 current employees, 30 work the main shift, which is from 6:30 a.m. to 2:30 p.m., and the remaining employees work the evening and night shift (Exh. SEK-1, at 4.4-4).

construction workers, and (4) in consultation with the City, develop and implement a traffic mitigation plan" (City Reply Brief at 4).

3. Analysis

The impacts of construction traffic at or near a proposed facility site typically have two components: the impact of construction worker traffic, and the impact of materials and equipment delivery. Here, the construction worker impact is strictly limited; due to the small size of the Kendall Station site and its location in a densely developed area, there will not be on-site or local parking for construction workers. Workers are anticipated to arrive at the site either by shuttle from a satellite parking location, or by public transportation. Therefore, the only construction worker traffic associated with the proposed facility would be generated by the shuttle bus trips. The Company anticipates a maximum of 130 construction workers on the site at any one time during the four to six month peak construction period; the Siting Board notes that even assuming that all workers drive to the satellite parking location, the transportation of this number of workers could be accomplished by the use of no more than 12 shuttle trips to the site, which would not significantly affect peak commuter traffic in the Kendall Station area. In addition, the EPC contractor, in conjunction with Cambridge, would implement the TDM techniques itemized above into a final construction management plan. In order to minimize off-site parking and shuttle service, one of the goals of applying the TDM techniques is to attain 50 percent public transit use by the workers.

The Siting Board notes that the Kendall Station site is in close proximity to public transportation, thereby increasing the likelihood that a significant percentage of the construction workforce would commute to the site by public transportation thus reducing the number of shuttle bus trips needed to bring workers to the site. For the most part, the TDM techniques proposed by the Company incorporate measures that serve to promote public transit use. The Siting Board therefore concludes that impacts of construction worker traffic at the Kendall Station area would be minimized.

The Siting Board notes, however, that the use of satellite parking does not eliminate construction worker traffic impacts; it merely displaces them to another location. The Company has indicated that the responsibility for identifying and securing an off-site parking area rests

with the EPC contractor; however, ultimately it is SE Kendall which must ensure that traffic impacts are minimized. The Siting Board notes that until the EPC contractor determines the location and size of the satellite parking area, the Siting Board does not have a sufficient record to determine whether traffic impacts near the satellite parking area would be minimized. The Siting Board notes that the off-site parking area could be located either in Cambridge or a surrounding community. Consequently, the traffic impacts from the workers arriving and departing the off-site parking areas may fall in another community. In addition, since the number of parking spots to be available at the off-site lot cannot be determined, the impacts to surrounding roadways and intersections are undocumented.

Therefore, the Siting Board directs the Company, prior to commencement of construction, to file with the Siting Board a traffic analysis and mitigation plan that identifies the location of the off-site parking area and provides information on the schedule and volume of project-related traffic at affected intersections along the likely routes of arrival and departure and sets forth plans for any necessary mitigation. The analysis should include a LOS analysis with back-up data, and all assumptions should be clearly stated. The plan should specifically address: (1) the costs and benefits of subsidizing the MBTA fares of the Company's workers in order to decrease traffic impacts at the satellite site; and (2) comments from Cambridge, and if applicable, the community in which the satellite parking would be located. The Siting Board will expeditiously review the Company's filing to determine whether traffic impacts at the satellite parking site would be minimized.

With respect to equipment deliveries, the Company plans to schedule deliveries for off-peak hours, and to require that trucking companies adhere to a specific route approved by Cambridge in order to avoid residential areas. The Company's traffic analyses show that the intersection of Land Boulevard and Binney Street, which lies along the approved delivery route, currently operates at LOS F during the a.m. peak and would continue to operate as such even with traffic improvements proposed by the developers of the Cambridge Research Park. There is the potential for the traffic to deteriorate even further in this area of poor traffic flow if significant delivery traffic arrives or departs Kendall Station during the peak traffic periods. Consequently, the Siting Board directs the Company to schedule deliveries to be spread over the

construction work shift, with deliveries of very large equipment and, to the fullest extent possible, post-construction deliveries of oil, aqueous ammonia and other materials and substances, scheduled during off-peak times in cooperation with Cambridge officials. In the unlikely event that deliveries can only be scheduled near or during the a.m. peak, the Company should work in conjunction with Cambridge to provide traffic control officers at the intersection of Land Boulevard and Binney Street.

With respect to workforce traffic impacts during facility operation, the Company has demonstrated that no adverse traffic conditions would result from operation of the proposed project at the proposed site.

Finally, because of the number and complexity of traffic issues associated with the proposed project, the City has requested that information regarding traffic impacts and mitigation be detailed in one document. Therefore, in order to allow the interrelated traffic issues to be comprehensively addressed by all affected communities, the Siting Board directs the Company, in consultation with the City and any other affected municipalities, to develop and implement an overall traffic mitigation plan.

Accordingly, the Siting Board finds that with the (1) development of a satellite-parking traffic analysis and mitigation plan, and acceptance of such plan by the Siting Board, (2) the development and implementation of an overall traffic mitigation plan, and (3) the condition relating to deliveries during off-peak hours, the Company will have established that the traffic impacts of the proposed project would be minimized.

J. Electric and Magnetic Fields[96]

This Section describes the electric and magnetic field impacts of the proposed project, the mitigation proposed by the Company, and the costs and benefits of any additional mitigation options.

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[96] Electric fields produced by the presence of voltage, and magnetic fields produced by the flow of electric current, are collectively known as electromagnetic fields ("EMF").

1. Description

The Company indicated that operation of the proposed project would: (1) produce magnetic fields associated with the new 115 kV line to be constructed by CELCo to interconnect the Kendall Station with existing transmission lines owned by CELCo and other utilities; and (2) produce magnetic fields associated with increased power flows at the Kendall Station switchyard and other existing transmission lines (Exhs. SEK-1, at 2-8, 4.11-14; EFSB-G-7-S3). The Company stated that the proposed new 115 kV transmission line would extend approximately 2.6 miles via an underground route from the switchyard at Kendall Station to CELCo's existing Putnam Station (Exh. EFSB-G-7-S4).

The Company explained that the Kendall Station switchyard currently serves as both a generation and a distribution substation; its load can vary from 180 MW to 300 MW, with the electric power generated at Kendall Station being only a fraction of this throughput (Exh. SEK-1, at 4.11-14). Currently there are a number of 13.8 kV underground lines that connect Kendall Station to nearby substations (Exh. SEK-1, at 4.11-14). The Company indicated that, once the proposed project is completed, the output of Kendall Station would be transmitted on the new underground 115 kV circuit to Putnam Station (Exh. SEK-1, at 4.11-14).

To assess EMF impacts, the Company first measured levels of existing electric and magnetic field strength for four locations chosen to represent the area traversed by possible transmission line routes (Exhs. SEK-1, at 4.11-18; EFSB-G-7-S3).[97] The Company indicated that its magnetic field measurements, taken at 3⅓ feet above street level, ranged from a peak strength of 6.5 milligauss ("mG") to a low of 0.1 mG (Exh. SEK-1, at 4.11-8 and 4.11-9). The Company indicated that although it also measured electric fields in the area, underground lines produce no street level electric field strength because underground placement of conductors completely shields such fields (Exh. SEK-1, at 4.11-18).

The Company stated that, to model the maximum possible magnetic field with the new

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97 EMF levels were measured on Second Street near the corner of Second and Athenaeum Streets; on Main Street between 101 and 139 Main Street; on Broadway near the intersection of Broadway and Ames Street; and around a typical residential block with overhead distribution lines about one-half mile from Kendall Station (Exh. SEK-1, at 4.11-4 to 5).

line, the maximum magnetic field that could be produced by the new line is added to the maximum present day magnetic field values at the baseline locations (Exh. EFSB-E-6). The Company explained that, when two sources of magnetic fields are present simultaneously, the possible result can range from a maximum that is the sum of the new and old lines to a minimum that is the difference between the two lines (Exh. EFSB-E-6). The Company asserted that the magnetic field levels projected for the project would be below: (1) any level of concern identified by scientific review groups; (2) precautionary levels suggested by occupational, state, federal, world health, or professional organization summary documents; and (3) existing fields found near home appliances (Exh. SEK-1, at 4.11-19). The Company therefore argued that no EMF mitigation measures would be needed (Exh. SEK-1, at 4.11-19).

In its EMF analysis, the Company projected that if the new line were placed underground in a steel pipe, the combined magnetic field strength from the new line and existing sources at the locations that were monitored for present day fields could range from 0.7 mG to 11.3 mG (Exh. EFSB-E-6).[98] The Company explained that the estimated magnetic field levels in its analysis were low as a result of a number of factors it had assumed about the design of the line, including that: (1) the line would be underground; (2) the phase conductors would be in close proximity in an underground pipe, which helps to minimize magnetic field strength; and (3) the conductors would be in a steel pipe which attenuates the magnetic field (Exh. SEK-1, 4.11-18).

The Company indicated that all modifications to connect the new transmission line at the Putnam Station would be located within the existing building (Exh. EFSB-G-7-S3). The Company presented measured and modeled magnetic field levels near Putnam Station; the highest measured level was 40 mG, found above an underground transmission line running beneath Putnam Street (Exh. EFSB-E-4). With the addition of the new 115 kV line, the Company modeled the maximum potential magnetic field level near Putnam Station to be in a range of 35 to 45 mG (Exh. EFSB-E-7-C).

After the close of hearings, the Company cited updated design information developed by CELCo, and indicated that CELCo currently expects that street level magnetic field strength

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98 The range at Second Street would be 0.7 to 10.3 mG; at Main Street 2.0 to 7.6 mG; at Broadway 2.3 to 7.3 mG, and at the residential block 1.7 to 11.3 mG (Exh. EFSB-E-6).

directly above the new line would be 124 mG, a level substantially greater than that estimated in the Company's EMF analysis (Exh. EFSB-G-7-S4). The Company provided no information concerning design or siting factors which account for the differences between the magnetic field levels in its analysis and the level currently estimated by CELCo. The Company noted that CELCo is developing its estimates of EMF levels, based on its current routing plans and preliminary engineering design for the new transmission cable, for inclusion in CELCo's Siting Board filing for the new transmission line (Exh. EFSB-E-7-C; EFSB–G-12).

The Company stated that the Kendall Station switchyard, which is located close to the proposed canal walk, also is a possible source of electric and magnetic fields (Exh. SEK-1, at 4.11-4). The Company estimated that the EMF levels in the canal walk with a 115 kV switchyard on the site would be 0.3 kilovolts per meter ("kV/m") for the electric field and 62 mG for the magnetic field (Exh. SEK-1, at 4.11-14). The Company indicated that, with installation of chain link fencing as part of the proposed screen fence to separate the site from the canal walk, electric field strength along the canal walk would be further attenuated (Exh. SEK-1, at 4.11-17). The Company also explained that the magnetic field levels would drop to 4 mG on the other side of the Broad Canal from the site (Exh. SEK-1, at 4.11-19; Figure 4.11-6).

The Company indicated that CELCo is also conducting a system impact study which will determine the impact of the proposed project on the local transmission system and the New England Bulk Power system (Exh. EFSB-G-12).

2. Analysis

The record shows that a new transmission line is required to interconnect the proposed project, and that based on current plans CELCo would install a 2.6-mile 115 kV line along an underground route predominantly within public ways in Cambridge.

In a previous review of proposed transmission line facilities, the Siting Board accepted edge-of-ROW levels for a 345 kV line of 1.8 kV for the electric field and 85mG for the magnetic field. Massachusetts Electric Company et al., 13 DOMSC 119, at 228-242 (1985) ("1985 MECo/NEPCo Decision"). Here, the Company provided EMF analyses indicating that EMF impacts from the transmission line would be minimized and well below levels previously

accepted by the Siting Board, based on the Company's assumptions related to the planned underground siting of the line. The transmission line would produce no additional electric fields and would produce magnetic fields which, when combined with existing magnetic field levels, would result in maximum potential magnetic field levels of 45 mG adjacent to Putnam Station and 11.3 mG along the route of the new line. The Company's analysis also indicated that, with operation of the proposed project, the Kendall Station switchyard would produce EMF along the proposed canal walk, including a maximum electric field of 0.3 kV/m and a maximum magnetic field of 62 mG.

With respect to the new transmission line, the record shows that the Company's estimates of magnetic field impacts reflect design assumptions that served to minimize such impacts, including use of a steel pipe conduit with close spacing of conductors. The record also shows that updated design information has been developed by CELCo which indicates that CELCo currently expects that magnetic field strength directly above the new line would be 124 mG. The Siting Board notes that the magnetic field levels estimated by CELCo are substantially greater than those estimated in the Company's EMF analysis, and would be among the highest levels ever reviewed by the Siting Board. In addition, the estimated magnetic field directly over the proposed line, while predominantly within public ways, would represent a substantial increase above existing levels and also be significantly higher than the edge-of-ROW levels previously accepted by the Siting Board.

The Siting Board notes that, in past transmission line reviews, applicants have recognized that some members of the public are concerned about magnetic fields and for that reason, the applicants have incorporated design features into proposed transmission lines that would reduce magnetic fields at a low additional cost or no additional cost. See e.g., NEPCo Uxbridge Decision, 4 DOMSB 109, at 148 (1995). The Siting Board has held that, as part of pursuing interconnection plans that require upgrades to the regional transmission system, generating facility applicants also should work with transmission providers to seek inclusion of practical and cost-effective transmission designs to minimize magnetic field levels along affected ROWs. Sithe Mystic Decision, 9 DOMSB at 181; ANP Blackstone Decision, 8 DOMSB at 188; Silver City Decision, 3 DOMSB at 353-354 (1994).

As has been the case in a number of previous reviews of proposed generating facilities, the project interconnection study has not been completed as of the close of the record, and therefore the extent and final design of required transmission upgrades is subject to change. In addition, the EMF impacts will be addressed as part of the required review by the Siting Board of CELCo's proposal to construct a new 115 kV transmission line to allow interconnection of the proposed project. In that review, it is possible that siting, design or mitigation options will be identified to reduce EMF impacts below the level estimated by CELCo, and that based on its review of such options the Siting Board may determine that a different magnetic field level than estimated by CELCo is required to allow a finding that the EMF impacts of the new transmission line would be minimized, consistent with minimizing cost.

Here, the Siting Board notes that its review of the EMF impacts of the transmission line is supported primarily by the EMF analysis developed by SE Kendall. If the expected EMF impacts of the proposed project change, based on the final design of the transmission line reflecting regulatory and other applicable approvals, SE Kendall must inform the Siting Board of such change in order that the Siting Board may determine whether to inquire further into the matter.

Accordingly, the Siting Board finds that, based on the record in this proceeding, the EMF impacts of the proposed project would be minimized, consistent with minimizing the cost of mitigating, controlling or reducing such impacts.

K. Land Use

This Section describes the land use impacts of the proposed project, including the impacts to wildlife species and habitats, and significant cultural resources.

1. Description

The Company asserted that the proposed project would benefit local land use (Exh. SEK-1, at 4.2-1). The existing station is an older (1947-50) steam and electric generating facility located on a 5.8 acre site at 265 First Street in East Cambridge (id. at 4.2-2). The Company stated that the proposed site contains a power block building with three stacks, administrative

office space, a storage shed, field switchyard, two oil storage tanks, two jet engine peaking generators, and other minor structures (id. at 2-2, Figure 2-2). The Company indicated that the proposed site is nearly completely developed, with a small landscaped area located where the project fronts on First Street (id. at 4.2-10). The proposed new equipment would be contained primarily in an open, paved portion of the site (id. at 4.2-10, Figure 4.2-3). The new equipment would consist of a new building housing the CTG and HRSG, storage tanks for demineralized water and ammonia, an electrical switchyard, and other supporting facilities including a substation control building, gas metering station, and guard house (id. at 2-10 to 2-11).

The Company stated that the existing site is located in an Office 3A District as defined by the City of Cambridge Zoning Ordinance and is also located in a planned unit development ("PUD") overlay district (id. at 4.2-1, Figure 4.2-1). The Company stated that an Office 3A District allows business and professional offices and multi-family dwellings and also allows limited other uses classified as utility under a special permit from the Cambridge Zoning Board of Appeals (id. at 4.2-1). The Company explained that the PUD district allows for larger scale mixed development projects that encourage linkage between developments in East Cambridge and Kendall Square. It stated that although office uses are preferred, all uses allowed in the underlying zoning district are allowed in a PUD district under a special permit from the planning board (id. at 4.2-3; Appendix 4-2). According to the Company, this preference for office use reflects a fundamental shift for this area, which was historically an industrial area (id.). The Company stated that it must also apply to the Cambridge City Council for a "planning overlay special permit" before receiving a building permit (Exh. EFSB-RR-41). This permit application must include a site plan, traffic study, and a certification that all other special permits and variances have been granted (id.). The project also may require a variance in order to modify the cooling discharge system, an existing nonconforming structure (Exh. SEK-1, at 4.2-3; Appendix 4-2). The Company asserted that the project is explicitly exempt from a moratorium on development in East Cambridge (Exh. EFSB-RR-35; Tr. 4, at 557-558).

The Company stated that the land use contiguous to the project is mixed and typical of the existing development in the surrounding area (Exh. SEK-1, at 4.2-10). According to the Company: (1) the Riverview Office Building abuts the site to the north; (2) First Street abuts the

eastern edge of the site, with the Charles River Reservation Bike Path running parallel to it along the Charles River; (3) the Broad Canal runs along the southern site boundary; (4) parking lots that are the future site of the proposed Cambridge Research Park abut the site to the west; and (5) office buildings, a hotel, parking lots, MIT dormitories, and a child care center lie to the southwest of the site (id. at 4.2-10 to 4.2-14). The closest existing residential use is the Esplanade Condominiums, located approximately 450 feet from the site's northeast property line and approximately 880 feet from the proposed new stack (id. at 4.2-14; Exh. EFSB-N-10-C). The proposed residential units would be about 650 feet west of the stack (Exh. EFSB-N-10-C). The MIT dormitories are about 800 to 1,000 feet from the site (Tr. 4, at 562).

The Company submitted land use maps of the area surrounding the site, and based upon those maps calculated that the land uses within one-half mile of the proposed site are 35 percent water, 35 percent commercial, 11 percent open space and recreational uses, 9 percent transportation, 9 percent multi-family residential, and 1 percent industrial (Exhs. EFSB-L-1 (Att.); EFSB-L-2).[99] The Company calculated that land uses within one mile of the proposed site are 25 percent commercial, 20 percent multi-family residential, 18 percent water, 17 percent open space and recreational uses, 15 percent transportation, and 5 percent industrial (Exhs. EFSB-L-1 (Att.); EFSB-L-2). The Company testified that these values are based upon Massachusetts Geographic Information Systems ("GIS") data, and do not fully reflect the extent of mixed use in the area, in which commercial use is predominant with a mix of residential, industrial, and institutional uses (Tr. 4, at 522-528). The Company asserted that 6 sensitive receptors, including playgrounds, schools, hospitals, and parks, are located within approximately one-half mile of the proposed site (Exh. EFSB-L-6; Tr. 4, at 527).

The Company stated the project site is located entirely within filled tidelands, subject to MDEP Chapter 91 review (Exh. SEK-1, at 4.2-3, 4.2-5). According to the Company, the project would comply with all Chapter 91 requirements, including preserving public access rights by providing public access to the Broad Canal (id. at 4.2-5). Specifically, the Company would build

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[99] Open space and recreational uses include: forest, spectator recreation, participation recreation, water-based recreation, marinas, open land, wetlands, and urban open/public spaces (Exh. EFSB-L-2).

a public canal walk along the canal's north wall, with improvements such as period lighting and interpretive elements along the canal walk which discuss the history and use of the site (id. at 4.10-11). The Company stated that the canal walk would require approval from the MDC under G.L. c. 92, §74, which grants the MDC authority to license structures and recreational facilities that encroach on or over the embankment of the Charles River Basin (id. at 4.2-6). The Company stated that the canal walk plan is consistent with the Draft Charles River Basin Master Plan, prepared under MDC guidance, and that plans for the canal walk would be reviewed by the MDC, the Massachusetts Historic Commission ("MHC"), and the CHC prior to implementation (id. at 4.10-11). The Company stated that the site is not located in an area covered by a municipal harbor plan (id. at 4-2.5).

With regard to the potential impacts of the proposed project on historic resources, the Company consulted with the MHC and the CHC, as well as the MDC, which has jurisdiction over the Charles River Historic District (id. at 4.10-2).[100] The Company stated that there are 57 structures, parks, and historic districts within a 1.5 mile radius of the project that are on or eligible for listing on the National Register of Historic Places ("NRHP") (Exh. EFSB-L-13). The most predominant historic resources in the area are the Athenaenum Press Building adjacent to the site and the Charles River Basin Historic District (id.). The Company stated that the Broad Canal is part of the Charles River Historic District and that the existing Kendall Station building may be eligible for listing on the NRHP, because of its intact state, architecture, and association with industry and the development of Cambridge (Exh. SEK-1, at 4.10-2 and 4.10-10). The Company stated that the new building's design will be consistent with the existing plant's appearance (id. at 4.10-10). The Company submitted a determination from the MHC that the proposed project would have no adverse effect on the Charles River Basin Historic District, provided that the MHC and CHC have the opportunity to review and comment on more detailed drawings of the facility once they are available (Exh. EFSB-G-2-S Bulk Att. at 8.7.1). According to the Company, the canal walk would enhance the existing site conditions, reinforce the

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100 SE Kendall noted that, although the CHC has no formal jurisdiction over the project, the Company is consulting with the CHC as well as the MHC on historical matters (Company Initial Brief at 121, 122).

historical character of the MDC's river plan, and preserve the historic seawalls along the canal (Exh. SEK-1, at 4.2-7).

The Company stated that very little natural vegetation or wildlife is present on the site and cited correspondence with the Massachusetts Natural Heritage and Endangered Species Program indicating that no state or federal listed rare plants or animals have been found on the site or within the vicinity (id. at 4.2-10, Appendix 4.2).

The Company stated that CELCo would construct an approximately 2.6 mile 115 kV underground transmission line from Kendall Station to its Putnam Station in Cambridge in order to interconnect the proposed project (Exh. EFSB-G-7-S4). In addition, COM/Gas would construct a new high pressure distribution line from Kendall Station to its existing Third Street gate station, and replace the existing 14-inch pipeline from the gate station to the connection point with the Algonquin Gas Transmission pipeline in Somerville, in order to upgrade the natural gas supply at Kendall Station (Exhs. EFSB-G-2-S; SEK-1, at 2-14, Appendix 2; EFSB-G-3). The Company anticipated that the new and upgraded electric transmission and natural gas pipeline facilities would follow existing streets and would not cause any long-term land use impact (Exh. SEK-1, at 4.2-18). Both the electric transmission and natural gas pipeline facilities and their specific routes are subject to Siting Board approval under separate filings, which will include consideration of the land use impacts of these lines.

2. Analysis

As part of its review of land use impacts, the Siting Board considers the extent to which a proposed project would be consistent with existing land uses, state and local requirements, and policies or plans relating to land use. The Siting Board also considers the potential impacts of the project on terrestrial resources including vegetative cover and habitat.

The record shows that the construction of the proposed project is consistent with the present use of the Kendall Station and that operation of the proposed project would not result in an additional incursion of industrial use beyond the existing Kendall Station boundary. The record shows that the land use in the vicinity of the proposed project is changing from industrial to large scale mixed development. The closest residential property is a condominium complex

450 feet from the Kendall Station property line.

Based on the record in this case, the proposed project is an allowed use under the Cambridge zoning ordinances. The record demonstrates that the facility is located in an Office 3A District that allows utility use under a special permit from the Zoning Board of Appeal. However, the project may require a variance to modify the existing cooling discharge system, an existing nonconforming structure. The record shows the Company must also obtain a planning overlay special permit from the Cambridge City Council. The Company has stated that it intends to apply for the cooling discharge variance, if needed, for the new facility and the planning overlay special permit.

The record shows that the proposed electric transmission and natural gas pipeline facilities will follow along roadways and that their specific routes and land use impacts are subject to Siting Board approval under separate filings.

The record also demonstrates that SE Kendall proposes to provide public access to the Broad Canal through creation of a public canal walk consistent with the goals of the Company's MDEP Chapter 91 permit and the MDC's Charles River Basin Master Plan. The Company has provided information concerning impacts to historic and cultural resources and will continue to consult with the MDC, MHC and CHC throughout the project's development.

The record demonstrates that the Company has adequately considered the impacts of the proposed project with respect to wildlife species and habitats and archeological resources. Based on its review of the information submitted by the Company, and on the separate review that will occur for the proposed electric transmission and natural gas pipelines, the Siting Board concludes that no such resource impacts are likely to occur as a result of the construction or operation of the proposed project.

Accordingly, the Siting Board finds that the land use impacts of the proposed project would be minimized.

L. Cumulative Health Impacts

This section describes the cumulative health impacts of the proposed project. The Siting Board considers the term "cumulative health" to encompass the range of effects that a proposed

project could have on human health through emission of pollutants over various pathways, as well as possible effects on human health unrelated to emissions of pollutants (e.g., EMF or noise effects). The Siting Board considers these effects in the context of existing background conditions, existing baseline health conditions, and, when appropriate, likely changes in the contributions of other major emissions sources.

The analysis of the health impacts of a proposed generating facility is necessarily closely related to the analysis, in sections above, of specific environmental impacts which could have an effect on human health and any necessary mitigation measures. This Section sets forth information on the human health effects that may be associated with air emissions, including criteria pollutants and air toxics, emissions to ground and surface waters, the handling and disposal of hazardous wastes, EMF and noise; describes any existing health-based regulatory programs governing these impacts; and considers the impacts of the proposed project in light of such programs.

1. Baseline Health Conditions

The Company provided summaries of four reports produced within the last ten years documenting health conditions in the Cambridge/Boston/Somerville area (Exhs. SEK-1, at 4.14-1 to 4.14-4; EFSB-H-1; EFSB-H-1-S). Two related reports, published by the Massachusetts Department of Public Health, examine cancer incidence statistics for Massachusetts for the years 1987-1994 ("First Cancer Incidence Report") and for the years 1990-1995 ("Second Cancer Incidence Report") (Exhs. SEK-1, at 4.14-1 to 4.14-3; EFSB-H-1). The Cancer Incidence Reports compare the incidence rate of 22 types of cancer for each of the 351 Massachusetts cities and towns with the state-wide average for males, females, and the total population, and notes statistically significant deviations (Exh. SEK-1, at 4.14-1). The Company noted that the authors of the First Cancer Incidence Report cautioned that statistical significance does not necessarily imply biological or public health significance (id. at 4.14-3).

In Cambridge, the First Cancer Incidence Report finds statistically elevated levels of oral

cancer (significant at p <= 0.01) and prostate cancer (significant at p <= 0.05),[101] and statistically reduced rates of lung cancer, melanoma, cervical cancer, bladder cancer, leukemia, "all other" and total cancer (Exh. SEK-1, at 4.14-2). The Second Cancer Incidence Report found significantly elevated levels of prostate cancer, and significantly reduced levels of uterine, kidney, melanoma, non-Hodgkin's lymphoma, lung, thyroid, and total cancers (Exh. EFSB-H-1).

In the neighboring city of Somerville, the First Cancer Incidence Report found statistically elevated levels of stomach, liver and larynx cancers (all significant at p <= 0.05), and statistically reduced levels of melanoma, breast cancer and leukemia (Exh. SEK-1, at 4.14-2). The Second Cancer Incidence Report found statistically elevated levels of larynx cancer, and statistically reduced rates of melanoma, breast cancer, and prostate cancer (Exh. EFSB-H-1).

Finally, for the City of Boston, the First Cancer Incidence Report found statistically elevated levels of esophagus, larynx, liver, lung, non-Hodgkin's lymphoma, oral, and stomach cancers (all significant at p <= 0.001) and of prostate cancer (p <= 0.01) and cervical cancer, "all other", and total cancers (p <= 0.05) (Exh. SEK-1, at 4.14-2). The First Cancer Incidence Report also found statistically reduced levels of brain, breast, Hodgkin's, kidney, leukemia, melanoma, testis, thyroid and uterine cancers (id.). The Second Cancer Incidence Report found statistically elevated levels of cervical, esophagus, larynx, liver, lung, multiple myeloma, non-Hodgkin's lymphoma, oral, prostate, stomach, thyroid, and total cancers, and statistically reduced rates of bladder, brain, breast, Hodgkin's, leukemia, melanoma, ovary, testis and uterine cancers (Exh. EFSB-H-1). The Company attributed the large number of statistically significant deviations from state averages to Boston's very large population base (Exh. SEK-1, at 4.14-2).

A third report, entitled 1999 Public Health Assessment: A Report from the Cambridge Health Alliance, ("CHA Report") provided an extensive analysis of public health in Cambridge (Exh. EFSB-H-1-S). According to the Company, the CHA Report indicates that mortality rates and causes of death in Cambridge are generally comparable to those of the state as a whole,

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[101] The term statistically significant at $p \leq 0.01$ means that there is at most one chance in 100 that the excess of observed cancer cases is due to chance alone (Exh. EFSB-H-2, at 5). Similarly, the term statistically significant at $p \leq 0.05$ means that there is at most one chance in 20 that the excess of observed cancer cases is due to chance alone (id.).

although the annual death rate from HIV/AIDS is significantly higher in Cambridge than in the rest of the state (id.). With respect to air quality, the CHA Report noted that days with unhealthful air quality in the Boston area have dropped from 15 in 1988 to one or none each year since 1993, and that the Boston area has met EPA ozone standards each year since 1992 (id.). With respect to water quality, the CHA Report indicated that Cambridge tap water has met EPA water quality standards since August 1994 (id.). The Company concluded that the CHA Report did not identify significant differences in health status between Cambridge and the state as a whole (id.).

Finally, the Company provided the abstract and certain data from a study entitled Poverty, Race, and Medication Use are Correlates of Asthma Hosptalization Rates, which was published in July 1995 (Exh. SEK-1, at 4.14-3). The focus of the report is on characteristics of Boston neighborhoods with high hospitalization rates (id.). According to the Company, the report found the city-wide hospitalization rate for asthma to be 4.2 per 1000, while hospitalization rates in the "Downtown" and "Back Bay" areas, which are most directly downwind of the proposed project, were less than 2.5 per 1000 (id.). The Company also indicated that asthma hospitalization rates in Cambridge are below the statewide average (Tr. 6, at 807).

2. Criteria Pollutants

As discussed in Section III.B.1, above, the MDEP regulates the emissions of six criteria pollutants under NAAQS: SO_2, PM-10, NO_2, CO, ozone, and lead.[102] The Company's witness, Dr. Valberg, stated that NO_2, SO_2, and ozone are respiratory irritants which, if inhaled at high levels, could cause coughing, narrowing of airways in the lungs, and lung tissue damage (Tr. 6, at 775-776, 778). Dr. Valberg indicated that CO disrupts the ability of the blood to carry oxygen,

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102 The Company indicated that EPA has promulgated regulations that also would set standards for emissions of PM-2.5 and that would revise the current standard for emissions of PM-10; however, these regulations are not currently in effect (Tr. 6, at 772-774). The Company also indicated that EPA has promulgated a revised ozone standard based on eight-hour, rather than one-hour, concentrations; this standard also is not currently in effect (Tr. 6, at 766, 769-770). The Company indicated that the proposed project would comply with the new ozone standard (Tr. 6, at 769).

with results ranging from a headache to death, and that lead is a neurotoxin that could impair the functioning of the nervous system (Tr. 6, at 777-778). Dr. Valberg indicated that particulate matter generally is a respiratory irritant, which could stimulate coughing and, at very high levels, could accumulate in the lungs (Tr. 6, at 777-778). He noted that asthmatics are particularly sensitive to particulates (for example, ragweed or pollen) which have immune effects (id. at 777).

SE Kendall indicated that EPA has developed NAAQS for six criteria pollutants based on a review of current medical, scientific and public health literature (Tr. 6, at 762-764). The Company stated that primary NAAQS standards are designed to protect human health, including the health of sensitive subgroups, with a margin for safety, while secondary standards are designed to avoid damage to property or vegetation (Exh. EFSB-A-1-S at 3-3; Tr. 6, at 764). The Company indicated that SILs, which represent a small fraction of NAAQS, also have been established for each criteria pollutant; new sources with emissions above SILs are required to conduct interactive source modeling of their emissions to demonstrate compliance with NAAQS (Exh. EFSB-A-1-S at 4-4). The Company provided data on background air quality from MDEP monitoring stations in Boston, Chelsea, Charlestown, and Brookline indicating that background concentrations of SO_2, NO_2, CO, and PM-10 ranged from 20 percent to approximately 61 percent of NAAQS over all measuring periods (Exhs. EFSB-A-1-S at 4-7 to 4-9; EFSB-RR-92-B).

As discussed in Section III.B, above, the Company estimated that the proposed project would reduce Kendall Station NO_x emissions from 365 tpy to 204 tpy, and SO_2 emissions from 247 tpy to 166 tpy, although it does not intend to seek permit restrictions limiting its emissions to these levels (id. at Figure 2-5). The Company estimated that CO emissions would increase from 25 tpy to 158 tpy, PM-10 emissions from 43 tpy to 67 tpy, and VOCs emissions from 8 tpy to 24 tpy (id.).

The Company determined that concentrations of NO_x and CO resulting from the new combustion turbine on oil would be well below SILs; however, concentrations of SO_2 and PM-10 would exceed SILs if the turbine were operating on oil (id. at 4-12 to 4-14). The Company therefore calculated cumulative impacts for these two pollutants under two worst-case operating configurations: the overall worst-case configuration, which occurs when the new combustion turbine is off-line, and a configuration where the new combustion turbine is on-line but operating

on oil (id. at 4-12 to 4-15; Exh. EFSB-RR-92C). The results show that, without the combustion turbine in operation, the maximum cumulative concentrations of SO_2 would be between 86 and 97 percent of the NAAQS, with Kendall Station's emissions making up 50 to 64 percent of the cumulative pollutant concentrations (Exh. EFSB-RR-92C). With the CTG in operation, maximum cumulative concentrations of SO_2 would be between 73 and 78 percent of the NAAQS, with Kendall Station's emissions making up 41 to 50 percent of the concentrations; emissions from the CTG would contribute less than 4 percent to the total (id.). Maximum cumulative concentrations of PM-10 would be 93 percent of NAAQS with the CTG in operation, and 96 percent without the CTG; approximately 44 percent of the concentrations represent the emissions of Kendall Station and 12 other major sources of PM-10, including Sithe's Mystic and New Boston Stations, Logan Airport, Braintree Electric and the Trigen facility in Boston (id.; Exhs. EFSB-RR-92 (Att. 92-C); EFSB-A-1-S at Appendix D).

The record indicates that the EPA has set in place ambient air quality standards, called NAAQS, for six criteria pollutants – SO_2, PM-10, NO_2, CO, ozone, and lead. These standards are set based on an extensive review of the medical literature regarding the health effects of each pollutant, and are designed to be protective of human health, including the health of sensitive subgroups such as the elderly, children, and asthmatics, with an adequate margin for safety. The Siting Board gives great weight to these standards as indicators of whether incremental emissions of criteria pollutants would have a discernable impact on public health.

The record also shows that MDEP has set in place standards for reviewing the compliance of proposed new sources of criteria pollutants, such as the proposed project, with NAAQS. Specifically, new sources may not cause or contribute significantly to a violation of NAAQS. In addition, as discussed in Section III. B, above, MDEP requires major new sources to meet BACT (when the area is in attainment or is unclassifiable for a particular pollutant) or LAER (when the area is in non-compliance for a particular pollutant), and to obtain offsets greater than 100 percent of emissions when the area is in non-compliance for a particular pollutant. The Siting Board notes that MDEP's new source program balances environmental impacts and costs when an area is in compliance with NAAQS, but requires stronger measures, including emissions offsets, when an area is in non-attainment. The Siting Board finds that this

approach is consistent with its own mandate to minimize both the environmental impacts and costs of proposed generating facilities. The Siting Board therefore gives great weight to compliance with MDEP air quality programs as an indicator of whether the Company has minimized the health impacts of a proposed project.

In this case, the record shows that Massachusetts is unclassified or in attainment for SO_2, PM-10, NO_2, CO, and lead, but is treated as non-attainment for ozone. In addition, the record indicates that Cambridge-area background levels of SO_2, PM-10, NO_2, and CO are well below ambient standards for criteria pollutants. Thus, with the possible exception of ozone, Cambridge area levels of criteria pollutants are generally within standards set for purposes of protecting public health. The record also shows that concentrations of NO_X and CO resulting from the new combustion turbine alone would be well below SILs. However, maximum cumulative concentrations of SO_2 with the Kendall Station in operation are up to 97 percent of NAAQS, and maximum cumulative concentrations of PM-10 with Kendall Station and 12 other major sources in operation are up to 96 percent of NAAQS. Thus, the information in the record indicates that operation of the Kendall Station in a worst-case configuration would not cause health-based air quality standards to be violated, although air quality impacts would closely approach those standards.

Because the Company did not provide the air quality modeling for the existing Kendall Station, the Siting Board cannot assess precisely the air quality and related health impacts of the proposed project. However, the following conclusions can be drawn from the record. First, the worst-case impacts of the proposed project likely are very similar to the worst-case impacts of the existing Kendall Station, since the worst-case scenario for the proposed project does not involve the operation of the new CTG. Thus, the maximum cumulative concentrations which closely approach NAAQS are attributable not to the proposed changes at Kendall Station, but to the continued operation of existing equipment.

Second, the air quality impacts of operating the new equipment are significantly less than the impacts of operating the old equipment – in some cases, by an order of magnitude or more. For example, in the worst-case with-CTG scenario, emissions from the new combustion turbine contributed less than 0.01 percent of the total combined impact for 3-hour SO_2, and

approximately 5 percent of the total combined impact for 24-hour SO_2, while operation of existing equipment contributed 41 percent and 50 percent, respectively. Similarly, emissions from the new CTG contribute less than 0.001 percent of the total combined impact for 24-hour PM-10 in the worst-case with-CTG scenario. Some of this significant differential may be attributable to the lower stack height of the existing equipment, as well as to the higher sulfur levels of oil burned in the existing equipment. Thus, any displacement of the existing equipment by the new equipment likely results in a significant improvement in air quality.

Third, the new equipment is expected to displace the existing equipment entirely for at least 80 percent of the year, and in part for approximately 90 percent of the year. In addition, operation of the proposed project is expected to result in significant reductions in annual NO_X and SO_2 emissions from the Kendall Station, although total annual emissions of CO, PM-10, and VOCs are expected to increase. Overall, the record suggests that the proposed project would result in significant air quality improvements for at least some pollutants for the majority of the year, and would not result in increased worst-case pollutant concentrations.

The Siting Board notes that while the proposed project is anticipated to result in lower overall emissions of the ozone precursor NO_X, it is also expected to result in increased emissions of VOCs, another ozone precursor. In Section III.B, above, the Siting Board directed the Company to limit oil firing for both the new and existing equipment to the months outside of the summer ozone season, except when natural gas is unavailable. The Siting Board concludes that, with this condition, the health impacts of the proposed project related to the emission of ozone precursors would be minimized.

Overall, the record indicates that, with the possible exception of ozone, Cambridge area levels of criteria pollutants are generally within standards set for purposes of protecting public health. Further, the record shows that operation of the Kendall Station in a worst-case configuration would not cause health-based air quality standards to be violated, although air quality impacts would closely approach those standards. Moreover, the record suggests that the proposed project would result in significant air quality improvements for at least some pollutants for the majority of the year, and would not result in increased worst-case pollutant concentrations. Finally, the Siting Board has imposed a condition that minimizes potential health

impacts related to the emissions of ozone precursors. Consequently, the Siting Board finds that the cumulative health impacts of criteria pollutant emissions from the proposed project would be minimized.

3. Air Toxics

Air toxics, or hazardous air pollutants, are pollutants known or suspected to cause cancer or other serious health effects such as birth defects or reproductive effects. Toxics include chemicals such as arsenic, benzene, chlorine, beryllium, lead, mercury, nickel, and formaldehyde (Exhs. EFSB-H-3(Att.); EFSB-H-8).

SE Kendall provided a MDEP memorandum setting forth 24-hour average TELs and annual average AALs for air toxics (Exh. EFSB-H-3(Att.)). The memorandum indicates that the TELs and AALs were established in 1995 following a review of the scientific literature and toxicity data, and reflected peer review (id.). The Company indicated that TELs and AALs are permitting tools developed to ensure that toxics emissions from a single source would have an insignificant impact on public health (Exh. EFSB-H-3; Tr. 6 at 790-791).

SE Kendall provided an abstract of a 1998 study by the EPA entitled "Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units – Final Report to Congress" ("HAPs Study") (Exh. SEK-1, at 4.14-4 to 4.14-5). The HAPs Study assessed the hazards and risks due to inhalation exposure to 67 hazardous air pollutants ("HAPs") from 684 fossil fuel plants nation-wide (id.). The HAPs Study also included multipathway assessments for the four highest-priority HAPs – arsenic, mercury, dioxins, and radio nuclides (id.). The HAPs Study eliminated natural gas-fired power plants from its analysis at the screening stage, noting that "[t]he cancer risks for all gas-fired plants were well below one chance in one million ... and no noncancer hazards were identified" (id.). Based on the EPA's findings, the Siting Board concludes that, in the absence of project-specific evidence to the contrary, the air toxics emissions from a natural gas-fired generating facility should be considered to have no discernable public health impacts.

Although SE Kendall proposes to use natural gas as the primary fuel for its proposed project, it does intend to seek permits to use oil as a back-up fuel for its new equipment for up to

720 hours per year, and to continue to use oil in its existing boilers 1, 2 and 3. However, as noted in Section III.B, above, even with the assumption that the facility operates for 720 hours with oil burning, the proposed project's emissions of all regulated air toxics would be below TELs and AALs, which are designed to be protective of public health. In addition, there is no evidence in the record suggesting that the proposed project would emit any specific air toxic at levels which would affect public health. Consequently, the Siting Board finds that the health impacts, if any, of the air toxics emissions from the proposed project would be minimized.

4. Discharges to Ground and Surface Waters

The Company identified two water-linked pathways by which substances hazardous to human health could theoretically reach the local population: through stormwater discharges, and through discharges of project cooling water or other wastewater (Exh. EFSB-H-3). The Company stated that the proposed project would be in compliance with Massachusetts Stormwater Management Standards, which are designed to protect public health and welfare (id.). In addition, as discussed in Section III.D, above, the Company intends to improve on-site stormwater treatment and eliminate site contributions to combined sewer overflows as part of the proposed project.

As discussed in Section III.C, above, cooling water from the proposed project would be discharged to the Charles River pursuant to an existing NPDES permit for the Kendall Station site. In addition, minor discharges would be made to the Cambridge municipal sewer system, which in turn discharges to the MWRA wastewater treatment plant and thence to Massachusetts Bay, pursuant to MWRA's NPDES permit (id.). The Company stated that the NPDES permit discharge limits are set to ensure that discharges will not adversely affect water quality (id.). Further, based on the experience of MDC, which installed an aerator in a similar part of the Charles River in 1978, the Company also anticipated that the startup of the proposed diffuser likely would release substances including hydrogen sulfide from sediments on the bottom of the Charles River (id.). The Company noted that hydrogen sulfide emissions from the start-up of the MDC aerator dropped below detection levels one day after start-up (id.).

In Section III.D, above, the Siting Board reviewed the Company's planned changes to

stormwater systems at Kendall Station, and concluded that handling of stormwater would be significantly improved as a result of the separation of stormwater from combined sewers and the installation of stormwater pollution removal systems. Further, in Section III.C, above, the Siting Board found that the wastewater impacts of the project on both the MWRA sewer system and the Charles River would be minimized. Consequently, the Siting Board finds that the project, as proposed, poses no health risks related to the disposal of cooling water and other wastewater, and that construction of the proposed project would reduce current health risks associated with the flow of stormwater into combined sewers.

5. Handling and Disposal of Hazardous Materials

As discussed in Section III.H, above, the proposed project would use 19.5 percent aqueous ammonia for NO_x control, and limited amounts of certain industrial chemicals for project operation (Exh. SEK-1, at 4.12-5). In addition, the Company would store fuel oil in two on-site oil storage tanks (id. at 2-2).

In Section III.H, above, the Siting Board reviewed the Company's plans for storage and handling of hazardous materials, including aqueous ammonia, and its plans for minimizing and responding to accidental releases of oil or other hazardous materials. The Siting Board determined that oil and other non-fuel chemicals would be properly handled and stored, that emergency supplies and training would be provided concerning the safe handling of hazardous chemicals, and that the Company would be prepared to respond effectively to an accidental release of hazardous materials. The Siting Board also determined that the Company would employ appropriate measures to ensure the safe transport and delivery of oil, to prevent oil spills and accidents, and to respond quickly and effectively to any spills that occur.

With respect to ammonia, the Siting Board has determined that, given the Company's proposed storage design, ammonia concentrations above the toxic endpoint could extend beyond the Kendall Station property boundaries in the event of an ammonia tank failure. Consequently, the Siting Board has directed the Company to enclose the ammonia storage tank or incorporate an alternative design such as a double-walled tank to mitigate the impacts of any potential ammonia spill in order to minimize the risk to public health posed by on-site ammonia storage.

The Company has demonstrated that it has in place procedures for the proper handling, storage, and disposal of hazardous materials during construction and operation of the proposed project. The Company must prepare Soil Management and Health and Safety plans prior to beginning any significant construction work on site. In addition, the Siting Board has required the Company either to enclose its ammonia tank, or to use a double-walled tank, in order to minimize the risk to public health posed by on-site ammonia storage. Consequently, the Siting Board finds that the health risks of the proposed project related to the handling and disposal of hazardous materials would be minimized.

6. EMF

As discussed in Section III. J, above, interconnection of the proposed project would require the construction of a new underground transmission line from Kendall Station to CELCo's Putnam Station in Cambridge. The Company initially estimated worst-case magnetic field strength along the new transmission line at 11.3 mG, but later indicated that CELCo expects that street-level magnetic field strength directly above the new line would be 124 mG.[103] In addition, members of the public using the proposed canal walk near the switchyard could be exposed to magnetic field levels of up to 62 mG while on the canal walk.

The possible health effects of exposure to EMF have been a subject of considerable debate. In a 1985 case involving the construction of the 345 kV overhead HydroQuebec line, the Siting Board heard expert testimony, reviewed the existing literature, and concluded that there was no affirmative evidence that the proposed facilities, which had edge-of-ROW levels of 85 mG, would produce harmful health effects. 1985 MECo/NEPCo Decision, 13 DOMSC 119, at 240. In this case, the Company has provided a summary of existing state and non-regulatory guidance regarding exposure to EMF (Exh. SEK-1, at 4.11-2 to 4.11-3). The Company indicated that eight states have adopted EMF guidelines which are generally based on levels in existing transmission corridors; the maximum permissible levels for magnetic fields under those

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[103] The EMF impacts of the transmission interconnect also will be addressed as part of the Siting Board's review of CELCo's proposal to construct a new 115 kV transmission line. The transmission line filing has been docketed as EFSB 00-03.

guidelines range from 150 mG (for a 230 kV line in Florida) to 250 mG (for a 500 kV, double circuit line in Florida) (id. at 4.11-3). The Company stated that the International Radiation Protection Association recommends that occupational exposure to 60-Hertz ("Hz") magnetic fields be limited to 4167 mG; that routine exposure for the general public be limited to 833 mG; and that general public exposure to fields between 1000 and 10,000 mG be limited to a few hours per day (id. at 4.11-2). The Company also stated that the American Conference of Governmental Industrial Hygienists had established a Threshold Limit Value ("TLV") level of 10,000 mG, to which nearly all workers may be exposed repeatedly without adverse health effects (id. at 4.11-3).

The Company provided a 1997 report by the National Research Council ("NRC"), which provides a comprehensive review of research up to that date on the biologic effects of exposure to power-frequency electric and magnetic fields, including cellular and molecular studies, animal studies, and epidemiological studies (Exh. EFSB-RR-51). The report concludes that the current body of evidence does not show that exposure to such fields presents a human health hazard. (id. at 2). With respect to epidemiological studies, the report indicates that the aggregate evidence does not support an association between magnetic field exposure and adult cancer, pregnancy outcome, neurobehavioral disorders, or childhood cancers other than leukemia (id. at 3). With respect to in vitro studies, the report finds that exposure to 50-60 Hz fields induces changes in cultured cells only at field strengths 1000 to 100,000 times the levels typically found in residences (id. at 6). With respect to animal studies, the study finds no convincing evidence that exposure to power-frequency fields causes cancer or has any adverse effects on reproduction or development in animals (id. at 7). The report finds evidence of behavioral response to fields "considerably larger than those encountered in a residential environment"; however, there was no demonstration of adverse neurobehavioral impacts (id.). The Company provided a summary of a follow-up NRC report,[104] dated June 1999, which concluded that "... it now appears even less likely that [EMF] in the normal domestic or occupational environment produce[s] important

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[104] Research on Power-Frequency Fields Completed Under the Energy Policy Act of 1992. Final Report. National Academy of Sciences Evaluation of the EMF RAPID Program, National Research Council, National Academy Press.

health effects, including cancer" (Exh. EFSB-RR-52, at 2-3). The Company also summarized recent research surveys sponsored by the World Health Organization[105] and the National Institute of Environmental Health Sciences[106] (id.). The Company cited findings from the World Health Organization Report that, while health hazards exist from exposures at high levels (above 50,000 mG), the literature does not establish health hazards associated with lower-level fields (id. at 2). The National Institute of Environmental Health Sciences Report concluded that there is "weak" scientific evidence suggesting that exposure to power line EMF may pose a leukemia hazard, but that there is not sufficient evidence of a risk of other cancer or non-cancer health outcomes to warrant concern (id. at 3).

With respect to recent individual studies, the Company noted that a large number of laboratory studies have been published which found no promoting effect of power-line EMF exposure on tumor development in animals (id. at 4). The Company also provided summaries of six recently-published (1999 or 2000) studies of the association between EMF exposure and leukemia or other childhood cancers (id. at 4-8). While some studies found no correlation between magnetic field exposure and cancer risk, others found a relationship between leukemia risk and modeled residential EMF levels, or measured residential EMF levels for children diagnosed at a young age (id.). Maternal occupational exposure to EMF during pregnancy was not found to be a risk factor for childhood cancers (id. at 7). Finally, the Company summarized recent epidemiological studies finding no correlation between residential or occupational exposure to EMF and breast cancer in adult women, and a non-significant correlation between spot measurements of EMF above 3 mG and brain tumors in adults (id. at 8).

Overall, although there are some epidemiological studies which suggest a correlation between exposure to magnetic fields and childhood leukemia, and some evidence of biological response to exposure to magnetic fields in animal studies, there is no evidence of a cause-and-

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105 Repacholi, Michael H. and Ben Greenbaum, "Interaction of Static and Extremely Low Frequency Electric and Magnetic Fields with Living Systems: Health Effects and Research Needs (World Health Organization)". Bioelectromagnetics 20:133-160, 1999.

106 "Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields", NIH Publication No. 99-4493, June 1999.

effect association between magnetic field exposure and human health. Thus, the record in this case does not support a conclusion that the EMF levels anticipated as a result of the proposed project would pose a public health concern. Accordingly, the Siting Board finds that the health effects, if any, of magnetic fields associated with the proposed project would be minimized.

7. Noise

As discussed in Section III. G, above, the proposed project would produce noise that would be noticeable in some surrounding community areas, both during the facility construction period and during operation of the facility. The Company has assessed the noise impacts of the proposed project in relation to applicable federal and local criteria for acceptable ambient noise, as well as the MDEP standard which limits allowable noise increases from new sources.

With respect to health effects of noise, the Company asserted that the only direct physiological effect of excessive noise is damage to hearing; however, it noted that exposure to unpleasant or unusual noise could increase stress levels, resulting in increased heart rates or blood pressure (Tr. 6, at 848, 854). The Company stated that Occupational Safety and Health Agency guidelines require the use of protective devices to prevent hearing loss at prolonged exposure levels of 85 dBA or higher (Exh. EFSB-H-3). The Company provided an EPA document[107] which recommends that noise exposure not exceed an average of 75 dBA over 8 hours, or 70 dBA over 24 hours in order to prevent hearing loss, and which suggests that an outdoor L_{dn} of 55 dBA likely would result in indoor nighttime noise levels of approximately 32 dBA, which should, in most cases, protect against sleep interference (Exh. EFSB-N-15 at 3, 4, D-34). Dr. Valberg asserted that studies of the impact of noise on the ability to sleep or to concentrate suggest that the effect depends to a great extent on the content of the noise -- for example, steady noise was found to be more tolerable than infrequent staccato noise (Tr. 6, at 847).

The record shows that, with the proposed project in operation, L_{dn} noise levels at two

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107 "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin for Safety", EPA Publication 550/9-74-004, March 1974.

commercial locations (the Riverfront Office Park (NML A) and the property line adjacent to the Riverview Office Building) (PL-5) would increase from 65 dBA to 66 dBA, and from 65 dBA to 68 dBA, respectively, with L_{dn} noise at all other residential and commercial receptors remaining unchanged. The resulting noise levels are below thresholds where hearing loss from long-term noise exposure could occur, although both existing and anticipated noise levels may be high enough to interfere with sleep. Because of the existing high levels of noise in the vicinity of the proposed project, the Company has agreed to limit L_{90} noise increases at residential receptors to no more than 2 dBA. The Siting Board has found that this level of mitigation would minimize the noise impacts of the proposed project. Consequently, the Siting Board finds that the health effects, if any, of noise from the proposed project would be minimized.

8. Conclusions

In the sections above, the Siting Board has reviewed the proposed project's potential for effects on human health resulting from emissions of criteria pollutants, emissions of air toxics, emissions to ground and surface waters, handling and disposal of hazardous materials, electric and magnetic frequencies, and noise. The Siting Board has found that: (1) the cumulative health impacts of criteria pollutant emissions from the proposed project would be minimized; (2) the health impacts, if any, of the air toxics emissions from the proposed project would be minimized; (3) the project, as proposed, poses no health risks related to the disposal of cooling water and other wastewater, and that construction of the proposed project would reduce current health risks associated with the flow of stormwater into combined sewers; (4) the health risks of the proposed project related to the handling and disposal of hazardous materials would be minimized; (5) the health effects, if any, of magnetic fields associated with the proposed project would be minimized; and (6) the health effects, if any, of noise from the proposed project would be minimized.

The Siting Board notes that the only indication of potential pre-existing public health problems in the communities surrounding the proposed project is the existence of statistically elevated levels of a variety of cancers. However, there is no evidence in the record suggesting that the pollutants which the proposed project would emit are in any way linked to the these types

of cancer. Moreover, the record shows that the proposed project emits air toxics, including carcinogens, at levels below TELs and AALs, and that, where adequate information is available, AALs for carcinogens are set to correspond to an incremental lifetime risk of developing cancer of one in one million. Consequently, the Siting Board finds that there is no evidence that the proposed project would exacerbate existing public health problems in the communities surrounding the proposed project.

Accordingly, based on its review of the record, the Siting Board finds that the cumulative health impacts of the proposed project would be minimized.

M. Conclusions

Based on the information in Sections II through III, above, the Siting Board finds that the Company's description of the proposed project and its environmental impacts is substantially accurate and complete.

In Section III.B, the Siting Board has found that, with limitations on oil firing and the implementation of CO_2 mitigation, the air quality impacts of the proposed facility would be minimized.

In Section III.C, the Siting Board has found that with the conditions relating to the development and implementation of a plan for monitoring and with the impacts and benefits of the proposed intake/discharge system; and with the condition requiring an emergency water use agreement, the water resource impacts of the proposed project would be minimized.

In Section III.D, the Siting Board has found that the wetlands impacts of the proposed project would be minimized.

In Section III.E, the Siting Board has found that, with the implementation of the condition directing SE Kendall to file a copy of its updated recycling plan and report on its recycling rate, the solid waste impacts of the proposed project would be minimized.

In Section III.F, the Siting Board has found that, with the implementation of the condition directing the Company to provide a five-foot wide on-site buffer strip along Athenaeum Street to the north of the site, the visual impacts of the proposed project would be minimized.

In Section III.G, the Siting Board has found that with implementation of the Company's

proposed mitigation, the noise impacts of the proposed project would be minimized.

In Section III.H, the Siting Board has found that, with the implementation of the conditions directing SE Kendall to enclose the ammonia storage tank or incorporate an alternative design, and to revise and update its Emergency Response Plan and Spill Prevention, Control, Countermeasure Plan, the safety impacts of the proposed project would be minimized.

In Section III.I, the Siting Board has found that with the (1) development of a satellite-parking traffic analysis and mitigation plan, and acceptance of such plan by the Siting Board, (2) the development and implementation of an overall traffic mitigation plan, and (3) the condition relating to deliveries during off-peak hours, the Company will have established that the traffic impacts of the proposed project would be minimized.

In Section III.J, the Siting Board has found that the EMF impacts of the proposed project would be minimized.

In Section III.K, the Siting Board has found that the land use impacts of the proposed project would be minimized.

In Section III.L, the Siting Board has found that the cumulative health impacts of the proposed project would be minimized.

Accordingly, the Siting Board finds that, with the implementation of the above-listed conditions, SE Kendall's plans for the construction of the proposed generating project would minimize the environmental impacts of the proposed project consistent with the minimization of costs associated with the mitigation, control and reduction of the environmental impacts of the proposed generating facility.

IV. CONSISTENCY WITH THE POLICIES OF THE COMMONWEALTH

A. Standard of Review

G.L. c. 164, § 69J¼ requires the Siting Board to determine whether the plans for construction of a proposed generating facility are consistent with current health and environmental protection policies of the Commonwealth and with such energy policies of the Commonwealth as are adopted by the Commonwealth for the specific purpose of guiding the decisions of the Siting Board. The health and environmental protection policies applicable to the

review of a generating facility vary considerably depending on the unique features of the site and technology proposed; however, they may include existing regulatory programs of the Commonwealth relating to issues such as air quality, water-related discharges, noise, water supply, wetlands or riverfront protection, rare and endangered species, and historical or agricultural land preservation. Therefore, in this section, the Siting Board summarizes the health and environmental protection policies of the Commonwealth that are applicable to the proposed project and discusses the extent to which the proposed project complies with these policies.[108]

B. Analysis

In Sections II and III, above, the Siting Board has reviewed the process by which SE Kendall sited and designed the proposed project, and the environmental and health impacts of the proposed project as sited and designed. As part of this review, the Siting Board has identified a number of Commonwealth policies applicable to the design, construction, and operation of the proposed project. These are briefly summarized below.

As discussed in Section III.B, above, the MDEP extensively regulates emissions of criteria and non-criteria pollutants from new sources such as the proposed project. SE Kendall has demonstrated that it expects to comply with all applicable MDEP standards.

As discussed in Section III.C, above, MDEP, EPA, MWRA and the Army Corps of Engineers regulate various wastewater discharges. SE Kendall has demonstrated that it expects to comply with all applicable MDEP, EPA, MWRA and Army Corps of Engineers standards.

As discussed in Section III.D, above, SE Kendall has demonstrated that it is working with affected federal, state and local regulatory authorities to evaluate design options that would reduce the wetlands impacts of the proposed water intake/discharge and pedestrian canal walk.

As discussed in Section III.G, above, SE Kendall has demonstrated that it will limit

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108 The Siting Board notes that its Technology Performance Standard at 980 CMR, § 12.00 could be construed as an energy policy of the Commonwealth adopted for the purpose of guiding the decisions of the Siting Board. The proposed project's compliance with 980 CMR, § 12.00 is discussed in Sections I.C and III.B, above. The Commonwealth has not adopted any other energy policies pertaining to the Siting Board's review of generating facilities since G.L. c. 164, § 69J¼ was enacted.

increases in off-site noises caused by operation of the proposed facility to 2 dBA at the nearest residences, and to no more than 8 dBA at the project property lines, consistent with MDEP policy 90-001, which limits such increases to 10 dBA.

As discussed in Section III.K, above, SE Kendall has demonstrated that it has complied with state programs protecting historical and archeological resource areas and rare or endangered species.

Consequently, based on its review above, the Siting Board finds that plans for construction of the proposed project are consistent with current health and environmental protection policies of the Commonwealth and with such energy policies of the Commonwealth as have been adopted by the Commonwealth for the specific purpose of guiding the decisions of the Siting Board.

V. DECISION

The Siting Board's enabling statute directs the Siting Board to implement the energy policies contained in G.L. c. 164, §§ 69H-69Q to provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. G.L. c. 164, § 69H. Section 69J¼ requires that, in its consideration of a proposed generating facility, the Siting Board review inter alia the site selection process, the environmental impacts of the proposed project, and the consistency of the plans for construction and operation of the proposed project with the environmental policies of the Commonwealth.

In Section II, above, the Siting Board has found that the Company's description of the site selection process it used is accurate, and that the site selection process resulted in the selection of site that contributes to the minimization of the environmental impacts of the proposed project and the costs of mitigating, controlling, and reducing such impacts.

In Section III, above, the Siting Board has found that with the implementation of listed conditions relative to air quality, water resources, solid and hazardous waste, visual, safety and traffic impacts, the Company's plans for the construction of the proposed generating facility would minimize the environmental impacts of the proposed project consistent with the minimization of costs associated with the mitigation, control and reduction of the environmental

impacts of the proposed project.

In Section IV, above, the Siting Board has found that the plans for the construction of the proposed project are consistent with current health and environmental protection policies of the Commonwealth and with such energy policies of the Commonwealth as have been adopted by the Commonwealth for the specific purpose of guiding the decisions of the Siting Board.

Accordingly, the Siting Board finds that, upon compliance with the conditions set forth in Sections III.B, III.C, III.E, III.F, III.H, and III.I, above, and listed below, the construction and operation of the proposed project will provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

Accordingly, the Siting Board APPROVES the petition of Southern Energy Kendall, L.L.C. to upgrade the generating facilities from its existing generating capacity of approximately 64 MW to approximately 234 MW in Cambridge, Massachusetts, subject to the following conditions:

Prior to the commencement of construction:

A. In order to minimize traffic related impacts, the Siting Board directs the Company to file with the Siting Board a traffic analysis and mitigation plan that identifies the location of the off-site parking area and provides information on the schedule and volume of project-related traffic at affected intersections along the likely routes of arrival and departure and sets forth plans for any necessary mitigation. The analysis should include a LOS analysis with back-up data, and all assumptions should be clearly stated. The plan should specifically address: (1) the costs and benefits of subsidizing the MBTA fares of the Company's workers in order to decrease traffic impacts at the satellite site; and (2) comments from Cambridge, and if applicable, the community in which the satellite parking would be located. The Siting Board will expeditiously review the Company's filing to determine whether traffic impacts at the satellite parking site would be minimized.

B. In order to minimize safety impacts the Siting Board directs the Company (1) to

enclose the ammonia storage tank or incorporate an alternative design such as a double-walled tank to mitigate the impacts of any potential ammonia spill, and (2) to file with the Siting Board prior to commencement of construction of the ammonia system, an analysis of the cost and relative safety advantages of the design options considered for ammonia storage.

C. In order to minimize safety impacts, the Siting Board directs the Company to (1) consult with the appropriate Cambridge officials in the revision of its SPCC Plan and the Emergency Response Plan; and (2) update the construction section of its Emergency Response Plan, in consultation with appropriate Cambridge officials, and file it with Cambridge before project construction begins in order to cover possible emergencies related to construction accidents.

Prior to commencement of operation:

D. In order to minimize solid and hazardous waste impacts, the Siting Board directs the Company to file a copy of the updated recycling plan with the Siting Board, and to report on its recycling rate for construction and demolition debris and its anticipated recycling rate for operational wastes.

E. In order to minimize water impacts, the Siting Board directs the Company to negotiate a mutually acceptable emergency water use agreement with Cambridge and to provide a copy to the Siting Board prior to the commencement of operation.

F. In order to minimize water impacts, the Siting Board directs the Company, in consultation with MDEP and EPA, to develop and implement a plan to monitor the impacts and the beneficial effects of the proposed intake/discharge system, including temperature impacts, fishery impacts as indicated by changes in

impingement and entrainment rates, DO changes and other parameters the Company considers important, for a minimum of two years following the commencement of commercial operation. The Company shall provide the Siting Board with a copy of its monitoring plan prior to commencement of commercial operation.

During construction and operation of the proposed project:

G. In order to minimize air impacts, the Siting Board directs the Company to limit oil firing for the new equipment and boilers 1, 2, and 3 to the months outside the ozone season of May 1 through September 30, except in the case of a natural gas supply interruption beyond the Company's control, and to seek an air quality plan approval from MDEP incorporating this condition. The Company shall provide the Siting Board with a copy of its pre-construction air quality plan approval prior to the commencement of construction.

H. In order to minimize CO_2 emissions, the Siting Board requires the Company either to: (1) make a monetary contribution to a cost-effective program or programs to be selected upon consultation with the staff of the Siting Board, based on the maximum CO_2 emissions from the operation over 20 years of the proposed project; or (2) make a monetary contribution based on the maximum net increase in CO_2 emissions from Kendall Station over 20 years, if it can establish that it will make no additional use of the CO_2 emissions reductions from existing equipment to provide offsets for CO_2 emissions from other sources; or (3) provide offsets for 1 percent of the proposed project's maximum CO_2 emissions based on voluntary curtailment of operations of existing equipment at Kendall Station, or of equipment at another existing source, subject to conditions, as described above, that the curtailment of operations be based on enforceable and verifiable limits and that there be no collateral use of the curtailment of operations to provide

emissions offsets relating to other pollutants and/or sources. If the Company elects to pursue monetary CO_2 offsets, the Siting Board directs the Company to provide CO_2 offsets through a total contribution of $352,142 (or $269,650, if based on the maximum net increase in CO_2 emissions from Kendall Station), to be paid in five annual installments during the first five years of facility operation.

I. In order to minimize water resource impacts, the Siting Board directs the Company to within three years of the commencement of commercial operation, provide the Siting Board with an analysis of the results to date of its monitoring of temperature impacts, fishery impacts and DO changes with supporting data. If the Siting Board determines based on the Company's analysis that the temperature or fishery impacts are significantly greater than approved by the Siting Board, or that, overall, the DO benefits of the intake/discharge system are not being realized, then the Siting Board may require operating changes or additional mitigation that contributes to the minimization of water resources impacts, consistent with the cost of mitigating, controlling and reducing such impacts.

J. In order to minimize visual impacts, the Siting Board directs the Company to provide a five-foot wide on-site buffer strip densely planted with shrubs or trees along Athenaeum Street.

K. In order to minimize traffic impacts, the Siting Board directs the Company to schedule deliveries to be spread over the construction work shift, with deliveries of very large equipment and, to the fullest extent possible, post-construction deliveries of oil, aqueous ammonia and other materials and substances, scheduled during off-peak times in cooperation with Cambridge officials. In the unlikely event that deliveries can only be scheduled near or during the a.m. peak, the Company should work in conjunction with Cambridge to provide traffic control officers at the intersection of Land Boulevard and Binney Street.

L. In order to minimize traffic impacts, the Siting Board directs the Company to consult with the City and any other affected municipalities to develop and implement an overall traffic mitigation plan.

Because issues addressed in this Decision relative to this facility are subject to change over time, construction of the proposed generating facility must be commenced within three years of the date of the decision.

In addition, the Siting Board notes that the findings in this decision are based upon the record in this case. A project proponent has an absolute obligation to construct and operate its facility in conformance with all aspects of its proposal as presented to the Siting Board. Therefore, the Siting Board requires the Company to notify the Siting Board of any changes other than minor variations to the proposal so that the Siting Board may decide whether to inquire further into a particular issue. The Company is obligated to provide the Siting Board with sufficient information on changes to the proposed project to enable the Siting Board to make these determinations.

Sheila Renner McIntyre
Hearing Officer

Dated this 15th day of December, 2000

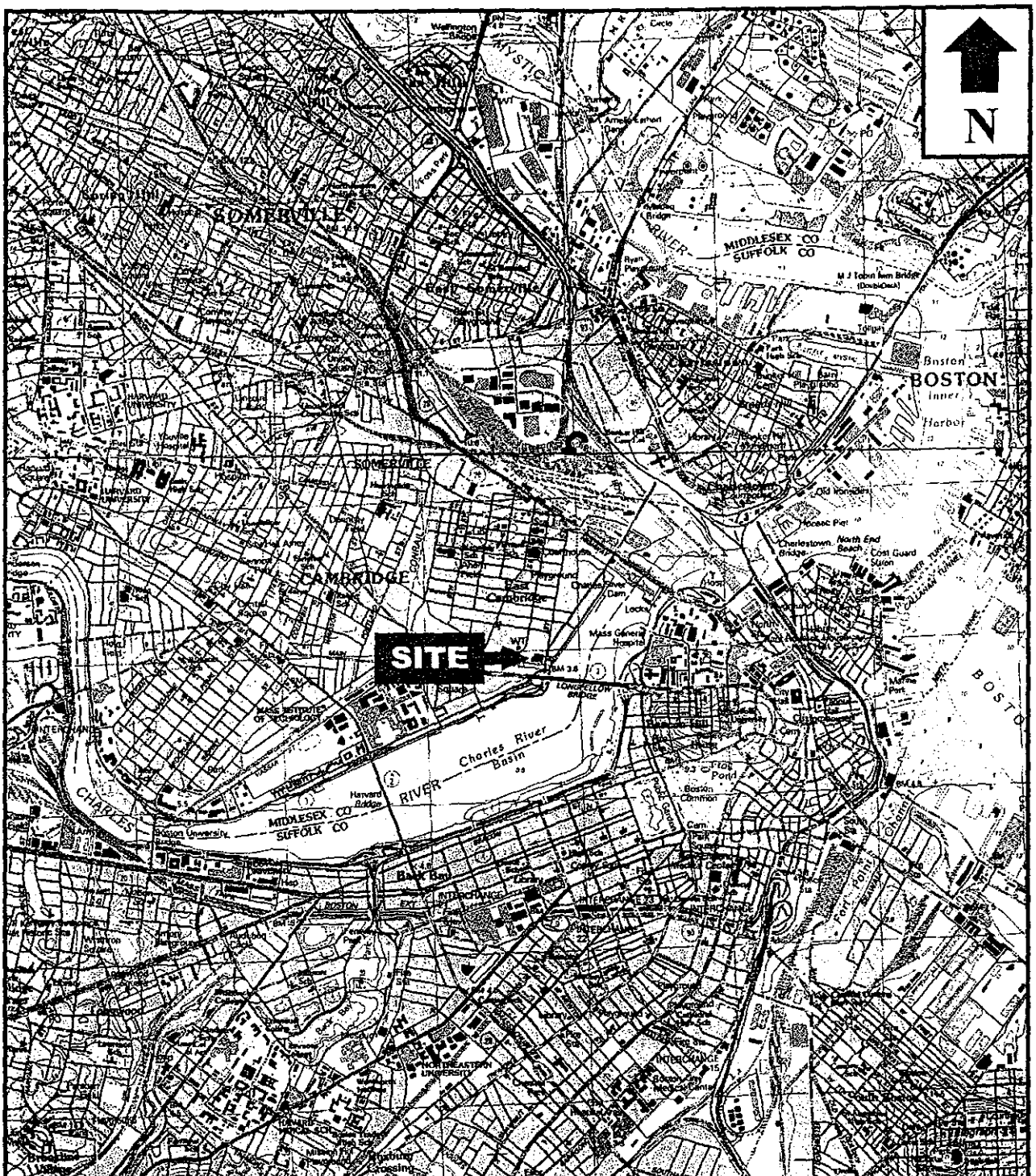
APPROVED by the Energy Facilities Siting Board at its meeting of December 14, 2000, by the members and designees present and voting: James Connelly (Chairman, DTE/EFSB); W. Robert Keating (Commissioner, DTE); Deirdre K. Manning (Commissioner, DTE); David L. O'Connor (Commissioner, Division of Energy Resources); Joseph Donovan (for Elizabeth Ames, Director of Economic Development); and Sonia Hamel (for Robert Durand, Secretary of Environmental Affairs).

James Connelly, Chairman
Energy Facilities Siting Board

Dated this 14th day of December, 2000.

Appeal as to matters of law from any final decision, order or ruling of the Siting Board may be taken to the Supreme Judicial Court by an aggrieved party in interest by the filing of a written petition praying that the order of the Siting Board be modified or set aside in whole or in part.

Such petition for appeal shall be filed with the Siting Board within twenty days after the date of service of the decision, order or ruling of the Siting Board, or within such further time as the Siting Board may allow upon request filed prior to the expiration of the twenty days after the date of service of said decision, order or ruling. Within ten days after such petition has been filed, the appealing party shall enter the appeal in the Supreme Judicial Court sitting in Suffolk County by filing a copy thereof with the clerk of said court. (Massachusetts General Laws, Chapter 25, Sec. 5; Chapter 164, Sec. 69P).



BASE MAP IS A PORTION OF THE FOLLOWING 7.5' x 15' USGS TOPOGRAPHIC QUADRANGLES: BOSTON NORTH, MA 1987, BOSTON SOUTH, MA, 1985

0 .5 1

scale in kilometers

MASS

QUADRANGLE LOCATION

L99-365/1/T

KENDALL SQUARE STATION EQUIPMENT UPGRADE PROJECT

SITE LOCATION MAP

KENDALL SQUARE STATION CAMBRIDGE, MASSACHUSETTS

FIGURE 1