Decisions and Orders

Massachusetts Energy Facilities Siting Board

VOLUME 12

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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 ON COMPLIANCE

Sheila R. McIntyre
Hearing Officer
February 16, 2001

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The Energy Facilities Siting Board hereby APPROVES subject to conditions the petition of Mirant Kendall, LLC 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

On December 14, 2000, the Energy Facilities Siting Board ("Siting Board") conditionally approved the petition of Southern Energy Kendall, LLC, now operating as Mirant Kendall, LLC[1] ("Mirant Kendall" or "Company") 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 ("project"). Southern Energy Kendall, LLC, 11 DOMSB 255 (2000) ("Southern Energy Decision").

A. Pre-Construction Conditions

In the Southern Energy Decision, the Siting Board found that, upon compliance with three conditions ("Conditions"), the Company's proposed project could commence construction. To establish compliance with these Conditions, the Siting Board required the Company: (1) to file with the Siting Board for further review a traffic analysis and mitigation plan identifying the location of off-site parking for construction workers, providing information on the schedule and volume of project-related traffic, and setting forth plans for any necessary mitigation ("Condition A"); (2) to enclose its 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 an analysis of the cost and relative safety advantages of the design options considered for ammonia storage ("Condition B"); and (3) in consultation with Cambridge officials, to revise its Spill Prevention, Control and Countermeasure ("SPCC") Plan and

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[1] The Company informed the Siting Board in a letter dated January 24, 2001 that Southern Energy Kendall, LLC had changed its name to Mirant Kendall, LLC.

Emergency Response Plan, and to update the construction section of the Emergency Response Plan ("Condition C"). Southern Energy Decision, 11 DOMSB at 392-393. The Siting Board found that the Company was required to comply with these Conditions prior to commencement of construction of the proposed project (or, in the case of Condition B, prior to commencement of construction of the ammonia tank). Id. at 392.[2]

B. Project Change Notification

In addition to imposing conditions, the Siting Board in the Southern Energy Decision also required the Company to notify the Siting Board of any changes to the proposed project, other than minor variations, so that the Siting Board may decide whether to inquire further into any issue associated with a particular change. Id. at 396.

C. The Company's Filings

On January 11, 2001, the Company submitted a compliance filing relative to Conditions A, B, and C ("Compliance Filing").[3] The Compliance Filing also brought to the Siting Board's attention a change in the Company's traffic mitigation plan.

The Siting Board issued information requests to the Company on January 19, 2001 ("First Set of Information Requests") and on January 25, 2001 ("Second Set of Information Requests"). On January 24, 2001, the Company responded to the First Set of Information Requests. On January 30, 2001, the Company responded to the Second Set Information Requests. The Company supplemented its responses to the Second Set of Information Requests on January 31, 2001.

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[2] In addition to the pre-construction Conditions, the Siting Board imposed nine additional conditions relative to the construction and operation of the proposed project. Southern Energy Decision, 11 DOMSB at 393-396.

[3] The January 11, 2001 filing consisted of the following documents, each of which shall be marked for identification and entered into evidence with the following designations: a seven page letter titled "Compliance with Traffic Condition and Safety Conditions" (Exh. CF-1); a Certificate of Service (Exh. CF-2); Transportation Demand Management Plan (Exh.CF-3); and a letter from the City of Cambridge titled "SPCC Plans" (Exh. CF-4).

II. CONDITION A - TRAFFIC

In order to minimize traffic related impacts, the Siting Board in the underlying proceeding directed the Company to file with the Siting Board a traffic analysis and mitigation plan that identified the location of the off-site parking area and would provide information on the schedule and volume of project-related traffic at affected intersections along the likely routes of arrival and departure and set forth plans for any necessary mitigation. Southern Energy Decision, 11 DOMSB at 392. Condition A directed that the analysis should include a Level of Service analysis with accompanying back-up data, and required that all assumptions should be clearly stated. Condition A also stated that 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 parking site; and (2) comments from Cambridge and, if applicable, the community in which the satellite parking would be located.

In its Compliance Filing, the Company submitted a Transportation Demand Management ("TDM") Plan which indicated that neither Mirant Kendall nor its engineering, procurement and construction ("EPC") contractor would provide on-site or off-site parking for the construction work force (Compliance Filing, Attachment A). The Company therefore argued that Condition A is no longer applicable to the Kendall project (id. at 3). The Company stated that some subcontractors may arrange for off-site employee parking (First Set of Information Requests, Response EFSB-2)[4] and provided preliminary information on the potential location of such subcontractor parking (Second Set of Information Requests, Response EFSB-2-S). This information indicated that no more than 40 construction workers would be provided with off-site parking in any particular location (id.).

The Company further stated that the TDM Plan anticipates that all construction workers

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[4] The Company identified three subcontractors that had arranged for or were considering the provision of employee parking in the project site area (Second Set of Information Requests, Response EFSB-2-S). The Company indicated that, of these subcontractors, one would employ a maximum of 33 workers on the project in April 2001, a level representing most of the project workers at that time. Two other subcontractors would employ maximums of 29 workers and 35 workers in July 2001 and November 2001, respectively, levels representing 25-30 percent of the project workers at those times.

would be encouraged to use public transportation (Compliance Filing at 2). The Company described five ways in which the Company or its EPC contractor would encourage construction workers to use public transportation: (1) by not providing on-site parking; (2) by having site managers use public transportation; (3) by purchasing public transportation passes for all the salaried onsite EPC contractor employees;[5] (4) by providing showers, a changing room, and secure areas for tool boxes and changing bags; and (5) by posting information for workers regarding public transportation (First Set of Information Requests, Response EFSB-2, at 2). The Company also noted that it would encourage bicycle transit by providing a covered area for bicycle parking (id.).

The Company stated that the MBTA station stop at Kendall Square is two blocks from the project site (Compliance Filing, at 2). The Company explained that there is unmetered parking in the vicinity of the project site but noted that the Kendall Station is closer to the nearest MBTA stop than to the parking (First Set of Information Requests, Response EFSB-2). The Company also stated that there is no long-term metered parking in the vicinity of the project site; the Company therefore argued that the construction workers would be subject to ticketing during the work day if they attempted to park near the project site (id.). The Company stated that parking in residential areas near Kendall Station is by permit only and asserted that construction workers would be discouraged from using parking lots in the area due to the expense (id.).

The Company provided data showing that during the peak construction months of July 2001 through January 2002 the construction work force will consist of fewer than 130 on-site workers and that for the remainder of the construction period the construction work force will consist of 60 or fewer on-site construction workers (Second Set of Information Requests, Response EFSB-2-S). The Company stated that the majority of the construction workers work an eight hour shift from 7 a.m. to 3 p.m., although some workers involved in critical path items could work an overtime shift, generally an eleven hour shift from 7 a.m. to 6 p.m. (id. at Response EFSB-3).

Mirant Kendall has provided information indicating that it no longer intends to provide

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[5] No other transportation or parking subsidies are planned (First Set of Information Requests, Response EFSB-2, at 3).

off-site satellite parking area for its construction workers. Consequently, the Siting Board finds that Condition A of the Southern Energy Decision, which required an analysis of traffic impacts in the vicinity of the satellite parking area, is no longer relevant to this project. We therefore rescind this condition.

However, the Siting Board notes that its finding in the Southern Energy Decision that the impacts of construction worker traffic in the Kendall Station area would be minimized was premised in large part on the Company's statements that workers would arrive at the project site either by shuttle from a satellite parking location or by public transit, and our consequent determination that even if all construction workers drove to the satellite parking location, traffic to the Kendall Station site would be limited to no more than twelve shuttle trips. Southern Energy Decision, 11 DOMSB at 360. The change in the Company's plans eliminates the basis for the Siting Board's original finding that traffic impacts in the Kendall Station area would be minimized, and requires the Siting Board to address this issue anew.

In its Compliance Filing, the Company has indicated that its peak period construction work force will total no more than 130 workers, that the standard construction shift will begin and end outside of peak traffic hours, and that there will be no parking at the Kendall Station site for construction workers. Given these circumstances, the Siting Board concludes that construction worker traffic is unlikely to cause traffic impacts of the type typically generated by major construction projects – significant delays in traffic at intersections near the project site caused by a substantial increase in the number of commuters at those intersections. However, the Siting Board notes that the availability of parking for residents, shoppers, and office workers in the Kendall Station area could be significantly affected if a large percentage of the project's peak construction work force chooses to commute by automobile and park in the vicinity of Kendall Station. The Company has indicated that it anticipates that most construction workers will commute to the project site by public transit. It also appears that some of the project subcontractors may provide parking for their workers in the project area, but at locations some distance from the project site. The Siting Board concludes that if a significant rate of public transit use is achieved throughout the construction period, and if sufficient subcontractor parking arrangements are made throughout the construction period to meet worker needs without

concentrating worker parking in a particular community area, the impacts of construction worker traffic at the Kendall Station area would be minimized.

The Siting Board recognizes, however, that plans for the construction of the proposed project, including plans for the accommodation of construction traffic, are still under development. Consequently, in order to ensure that traffic impacts in the vicinity of Kendall Station are minimized, the Siting Board directs the Company to file by April 1, 2001, an analysis of projected construction traffic and parking impacts for the peak construction period. The analysis should include: (1) the number of workers expected on-site from July 1, 2001 until January 31, 2002; (2) a description of any parking arrangements made by the contractor or subcontractors for these workers and a map showing the parking locations; (3) an estimate of the percentage of construction workers using public transit; and (4) if necessary, a description of the steps which the Company or its contractor could take to limit the impact of construction worker parking in the Kendall Station area. The Siting Board will review this information to determine whether traffic impacts continue to be minimized or whether further mitigation (e.g., the subsidization of passes to increase the use of public transit) is necessary.

Finally, we note that this re-analysis of traffic impacts has been made necessary because the Company failed in its obligation to update the record during the proceeding. The Company has indicated that it was aware well before the close of the record in this case that its contractor had abandoned plans to offer satellite parking for its construction workers. The Company was under an obligation to update its information responses to the Siting Board to reflect this fact, and failed to do so. The Siting Board reminds Mirant Kendall that it is under an absolute obligation 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.

III. CONDITION B - AMMONIA STORAGE

In order to minimize safety impacts, the Siting Board in the underlying proceeding directed 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. Southern Energy Decision, 11 DOMSB at 392-393.

In its Compliance Filing, the Company submitted an analysis of the cost and relative safety of two design options for ammonia storage: a double-walled tank and a single-walled tank enclosed in a containment building (Compliance Filing at 5). With reference to cost, the Company submitted price estimates for various ammonia storage options and estimated that the cost of a double-walled tank would be half the cost of the single-walled tank enclosed in a containment building (id.). With reference to safety, the Company claimed that a double-walled tank would provide the same level of overall safety for residents and workers as a single-walled tank enclosed in a containment building (id.). Further, the Company contended that enclosing the tank would increase risks for the workers who service the tank (id.). The Company stated that an enclosed tank would provide better control of vapor emissions in the event of a release, but argued that a double-walled tank in a bermed secondary containment structure with adequate control systems would provide adequate protection to workers and the surrounding community (id.). The Company therefore concluded the double-walled ammonia storage tank would be a better choice than the enclosed ammonia storage tank (id.).

The Siting Board finds that the Company has complied with the second part of Condition B of the Southern Energy Decision, which required filing of a cost and safety analysis of design options for ammonia storage. Further, the Siting Board finds that with the construction of a double-walled ammonia tank in a bermed secondary containment structure with adequate control systems, the Company will comply with the balance of Condition B.

IV. CONDITION C - SPCC AND EMERGENCY RESPONSE PLAN

In order to minimize safety impacts, the Siting Board in the underlying proceeding directed 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 construction begins in order to cover possible emergencies related to construction accidents.

The Company submitted a letter from John Bulduc, the Environmental Planner for Cambridge, indicating that the Company consulted with the appropriate Cambridge officials in the revision of its SPCC Plan and Emergency Response Plan and that the construction section of the Emergency Response Plan is in order (Compliance Filing, Attachment B). Consequently, the Siting Board finds that the Company has complied with Condition C of the Southern Energy Decision.

V. DECISION

In the Final Decision for this matter issued on December 14, 2000, the Siting Board approved subject to conditions the petition of Mirant Kendall, LLC to upgrade 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 MW in Cambridge, Massachusetts. Southern Energy Decision, 11 DOMSB at 392-396. 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, the Siting Board has examined whether changes in the Company's traffic mitigation plan alter the conclusions we reached in Southern Energy Decision.[6] In Section II, above, the Siting Board found that Condition A of Southern Energy Decision is no longer relevant to this project and therefore rescinded Condition A. The Siting Board also found that with the implementation of the listed condition relative to traffic impacts, the traffic impacts of the proposed facility would be minimized.

Accordingly, the Siting Board finds that, upon compliance with the condition set forth in II. A, above, and the conditions B through L from the Southern Energy Decision, 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 Mirant Kendall, LLC to

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

upgrade 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 MW in Cambridge, Massachusetts subject to conditions B through L as set forth in Southern Energy Decision and condition M below:

(M) In order to ensure that traffic impacts in the vicinity of Kendall Station are minimized, the Siting Board directs the Company to file by April 1, 2001, an analysis of projected construction traffic and parking impacts for the peak construction period. The analysis should include: (1) the number of workers expected on-site from July 1, 2001 until January 31, 2002; (2) a description of any parking arrangements made by the contractor or subcontractors for these workers and a map showing the parking locations; (3) an estimate of the percentage of construction workers using public transit; and (4) if necessary, a description of the steps which the Company or its contractor could take to limit the impact of construction worker parking in the Kendall Station area. The Siting Board will review this information to determine whether traffic impacts continue to be minimized or whether further mitigation (e.g., the subsidization of passes to increase the use of public transit) is necessary.

The Siting Board also finds that the Company has complied with the second part of Condition B, which required filing of a cost and safety analysis of design options for ammonia storage. Further, the Siting Board finds that with the construction of a double-walled ammonia tank in a bermed secondary containment structure with adequate control systems, the Company will comply with the balance of Condition B. The Siting Board further finds that the Company has complied with Condition C.

Findings in this Compliance Decision are based upon the record developed during the compliance proceeding examined in light of findings we made in the Southern Energy Decision. 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 R. McIntyre
Hearing Officer

Dated this 16th day of February, 2001

APPROVED by the Energy Facilities Siting Board at its meeting of February 15, 2001, by the members and designees present and voting: James Connelly (Chairman, DTE/EFSB); W. Robert Keating (Commissioner, DTE); Deirdre K. Manning (Commissioner, DTE); Joseph Donovan (for Elizabeth Ames, Director of Economic Development); and Gina McCarthy (for Robert Durand, Secretary of Environmental Affairs).

James Connelly, Chairman
Energy Facilities Siting Board

Dated this 16th day of February, 2001.

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 the Massachusetts Municipal Wholesale Electric Company for Approval to Construct a Natural Gas Transmission Pipeline	)	EFSB 97-4

FINAL DECISION

M. Kathryn Sedor
Jolette A. Westbrook
Hearing Officers
June 15, 2001

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TABLE OF CONTENTS

LIST OF ABBREVIATIONS

Abbreviation	Explanation
Act	Electric Restructuring Act, Chapter 164 of the Acts of 1997
Altresco Lynn Decision	Altresco Lynn, Inc., 2 DOMSB 1 (1993)
ANP Bellingham Decision	ANP Bellingham Energy Company, 7 DOMSB 39 (1998)
ANP Blackstone Decision	ANP Blackstone Energy Company, 8 DOMSB 1 (1999)
Applicant	Applicant for siting approval
Bay State	Bay State Gas Company
Bay State Contract	Contract for firm transportation between MMWEC and Bay State Gas Company
Berkshire Gas Decision	Berkshire Gas Company, 9 DOMSB 1 (1999)
Btu	British thermal unit
BVW	Bordering vegetated wetlands
c.	Chapter
CELT	Capacity, Energy, Loads, & Transmission (yearly reports provided by NEPOOL)
CMR	Code of Massachusetts Regulations
CO	Carbon monoxide
CO_2	Carbon dioxide
Commonwealth	Commonwealth of Massachusetts
Company	Massachusetts Municipal Wholesale Electric Company
DOMSB	Decisions and Orders of Massachusetts Energy Facilities Siting Board
DOMSC	Decisions and Orders of Massachusetts Energy Facilities Siting Council
Eastern corridor	A route alternative for the proposed project
Eastern Energy Remand	Eastern Energy Corporation (Remand), 1 DOMSB 213 (1993)
EDD(s)	Effective degree day(s)
EIA	Energy Information Administration
Enron Decision	Enron Power Enterprise Corporation, 23 DOMSC 1 (1991)

F	Fahrenheit
FEIR	Final Environmental Impact Report
5.6-mile alternative	Proposed pipeline connecting Stony Brook to the Monson-Palmer line at East Street
G.L.	Massachusetts General Laws
Hampden	Town of Hampden
HRSG(s)	Heat recovery steam generator(s)
Hydro-Québec Contract	Hydro-Québec Phase II Firm Energy Contract
intermediate unit	Stony Brook Intermediate Unit
ISO	Independent System Operator
IT	Interruptible transportation
IT Contract	Contract between MMWEC and Bay State Gas Company for interruptible transportation
lbs/mmBtu	Pounds per million British thermal units
Ludlow	Town of Ludlow
MassPower	264 MW electric generating facility in Springfield, Massachusetts
MASSPOWER Decision	MASSPOWER, Inc., 20 DOMSC 301 (1990)
mcf/hr	Thousand cubic feet per hour
MMWEC	Massachusetts Municipal Wholesale Electric Company
MNHESP	Massachusetts Natural Heritage and Endangered Species Program
Monson-Palmer line	Existing gas pipeline extending from Tennessee pipeline at Monson to near the MassPower facility at Indian Orchard
MW	Megawatts
MW-hrs	Megawatt-hours
NAAQS	National ambient air quality standards
NEA Decision	Northeast Energy Associates, 16 DOMSC 335 (1987)
NEPOOL	New England Power Pool
1985 MassElectric Decision	Massachusetts Electric Company, 13 DOMSC 119 (1985)
1989 MassElectric Decision	Massachusetts Electric Company, 18 DOMSC 383 (1989)
1997 BECo Decision	Boston Edison Company, 6 DOMSB 208 (1997)

1998 NEPCo Decision	New England Power Company, 7 DOMSB 333 (1998)
NO_2	Nitrogen dioxide
NO_X	Nitrogen oxides
Northeast region	New England plus New York state
Northern route	Route for the 5.6-mile alternative along the western/northern corridor
NPDES	National Pollutant Discharge Elimination System
Notice	Company's Notice of Public Hearing and Adjudication
NPV	Net present value
PAC	Pipeline Action Committee
Phase I	First phase of a phased version of the proposed project
Phase II	Second phase of a phased version of the proposed project
Phased project	The proposed project built in two separate phases
PM	Particulates
Preferred corridor	For the proposed project, the Western/Northern Variation
Project Participants	Utilities with power sales agreements for the Stony Brook Intermediate Unit
Proposed project	Proposed pipeline connecting Stony Brook to Tennessee gas pipeline
psig	Pounds per square inch, gauge
RMLD	Reading Municipal Light Department
ROW	Right-of-way
SDEIR	Supplemental Draft Environmental Impact Report
Siting Board	Energy Facilities Siting Board (Massachusetts)
SO_2	Sulfur dioxide
Southern route	Route for the 5.6-mile alternative along the western/eastern corridor
SPCC plan	Spill prevention, containment, and control plan
Stony Brook	Stony Brook Energy Center (Ludlow, Massachusetts)
Tennessee	Tennessee Gas Pipeline Company

3-mile alternative	Proposed pipeline connecting Stony Brook to the Monson-Palmer line at West Street
3-mile alternative 1	Easterly route largely following a WMECO right-of-way
3-mile alternative 2	Westerly route largely following West Street
TMOR	Thirty minute operating reserve
tpy	Tons per year
275 psig line	Existing Bay State pipeline that currently serves Stony Brook
VOC(s)	Volatile organic compound(s)
Western/northern corridor	MMWEC's preferred route alternative for the proposed project
Western/eastern corridor	A route alternative for the proposed project
Wilbraham	Town of Wilbraham
WMECO	Western Massachusetts Electric Company
WMECO Agreement	Letter agreement between MMWEC and WMECO regarding general pipeline alignment and payment for right-of-way use

The Energy Facilities Siting Board ("Siting Board") hereby DENIES the petition of the Massachusetts Municipal Wholesale Electric Company ("MMWEC" or "Company") for approval to construct a natural gas pipeline of approximately 15 miles in length to supply additional natural gas to the Company's existing electric generating facility in Ludlow, Massachusetts. The Siting Board hereby APPROVES the Company's proposed 5.6-mile alternative to the proposed project.

I. INTRODUCTION

A. Summary of the Proposed Project

The Massachusetts Municipal Wholesale Electric Company is a public corporation and a political subdivision of the Commonwealth (Exh. MMWEC-1, at 1). MMWEC was created by the Legislature in 1975 as a non-profit entity to provide Massachusetts cities and towns that operate their own electric systems with the power supply, financial and other services needed to enable them to better serve their customers (id.; Exh. EFSB-3, at 15). Any Massachusetts city or town with a municipal light department may become a member of MMWEC; there are currently 22 MMWEC members (Exh. EFSB-3, at 15; Tr. 8, at 991).

MMWEC stated that it operates the Stony Brook Energy Center ("Stony Brook"), a gas and oil-fired generating plant in Ludlow, Massachusetts, consisting of an intermediate unit and a peaking unit (Exhs. EFSB-3, at 15; MMWEC-JOR/ARM at 7-8). The Stony Brook Intermediate Unit ("intermediate unit") consists of three combustion turbines and three heat recovery steam generators ("HRSGs"), together providing power for an amount of time intermediate between a baseload facility and a peaking unit (Exh. EFSB-4, at 4-1; Tr. 18, at 2856-2858). The intermediate unit is jointly owned by MMWEC and other entities (Exh. MMWEC-JOR/ARM at 8); Massachusetts municipal electric systems are the principal participants ("Project Participants") in the intermediate unit (id. at 8, 9).[1]

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[1] MMWEC is the operator of the intermediate unit in accordance with the provisions of the MMWEC Intermediate Units Agreement for Joint Ownership, Construction and Operation (Exh. HO-G-2). MMWEC has a 90.76% ownership interest in the Stony Brook Intermediate Unit; of the remaining capacity, 8.80% is owned by the Green

(continued...)

MMWEC proposes to construct a 14.7-mile long, 16-inch diameter underground pipeline that would run from an interconnection with the existing Tennessee Gas Pipeline Company ("Tennessee") interstate natural gas pipeline in Hampden, Massachusetts, to Stony Brook in Ludlow ("proposed project") (Exh. MMWEC-1, at 3-5). MMWEC stated that the purpose of the proposed project is to enable MMWEC to increase the use of natural gas at the intermediate unit (Exh. EFSB-3, at 1, 18).[2] MMWEC stated that it has no plans for future extension of the proposed pipeline, and that it is not entertaining any proposals to make the Stony Brook site available for additional generation (id. at 21).

MMWEC indicated that the cost of constructing, operating, and maintaining the proposed project would be borne by the Project Participants and Joint Owners, not by MMWEC itself (Exhs. HO-N-18; RMLD-1-72). MMWEC noted that the reduced fuel costs and increased margins earned on the sale of energy would be passed through to the Project Participants in the form of a reduction in purchase power expenses (Exh. RMLD-1-26).[3] MMWEC asserted that construction of the proposed pipeline would lower electricity costs and also would reduce total emissions of carbon dioxide ("CO_2") and criteria pollutants in the northeastern United States (Exh. EFSB-3, at 18, 20; Exh. MMWEC-JJB-S at 3).

MMWEC, in its initial petition, contemplated that the 14.7-mile proposed project would

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[1] (...continued)
Mountain Power Corporation, and 0.44% by the Village of Lyndonville, Vermont (collectively, the "Joint Owners") (id.). Twenty MMWEC members, four non-MMWEC members, and six out-of-state utilities have signed Power Sales Agreements for the output from the intermediate unit (id.). These entities are referred to as Project Participants (id.). The approval process that is required within MMWEC to make major decisions regarding the Stony Brook facility, is an affirmative vote by the MMWEC Board of Directors (Exh. HO-G-4). MMWEC stated that, although it was not contractually required to do so, the MMWEC Board of Directors consulted with Project Participants prior to voting to construct the proposed project (id.).

[2] MMWEC stated that it analyzed the feasibility of converting the Stony Brook peaking unit to dual-fuel capability in August 1997, but concluded that this would not be economic (Exh. RMLD-2-8, Att. 1).

[3] The Project Participants, in turn, may pass the economic benefits, in whole or in part, onto their customers, in the form of lower electric rates (Exh. RMLD-1-26).

be constructed in a single phase (Exh. MMWEC-1, at 1). However, during the course of the proceeding, MMWEC modified its initial proposal by requesting that the Siting Board approve the separation of the project into two phases ("phased project") (Exh. MMWEC-JOR-S at 1-5). Phase I would be a 20-inch pipeline, approximately 5.4 to 5.6 miles long, entirely within Ludlow, extending from an existing gas pipeline operated by the Bay State Gas Company ("Bay State") and known as the Monson-Palmer line, to Stony Brook (id.). Phase II would be a 16-inch pipeline, approximately 9.1 miles long, extending from the Tennessee pipeline in Hampden, and continuing through Hampden, Wilbraham, and Ludlow to interconnect with the Phase I pipeline in Ludlow (id.). MMWEC explained that the phased project would also include two above-ground facilities, a custody transfer station[4] to be located in Ludlow near the Massachusetts Turnpike, and a metering and pressure regulating station to be located at Stony Brook (Exh. EFSB-3, at 16 to 17).[5]

Significant project alternatives described by MMWEC include an approximately 3-mile long pipeline that would interconnect to Bay State's Monson-Palmer line ("3-mile alternative") and a longer pipeline that would interconnect with the Monson-Palmer line near the point it is crossed by the proposed project ("5.6-mile alternative") (id.). Neither the 3-mile alternative nor the 5.6-mile alternative would interconnect directly to the Tennessee pipeline. The proposed project is shown on Figure 1, at the end of this Decision.

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4 The proposed transfer station would be located within a 25-foot by 36-foot fenced area near the interconnection with the Monson-Palmer line, on East Street in Ludlow (Exhs. MMWEC-JOR-S at 12; EFSB-3, at 16-17).

5 MMWEC has stated that the phased project does not represent a change from the original proposed project (Exh. MMWEC-JOR-S at 4). However, Phase I of the phased project would be constructed of 20-inch diameter pipe, rather than 16-inch pipe as under the original project (Exhs. MMWEC-1, at 4; MMWEC-JOR-S at 4). In addition, the Company stated that the size of the above-ground facilities are dependent on whether only one or both of the phases are built (Exh. EFSB-3, at 16-17). If only Phase I is constructed, both the metering and pressure regulating station and the custody transfer station would be significantly smaller in scale than if both phases were built (id. at 17). Finally, the timing of construction would differ between phased and unphased projects.

B. Description of Project-Related Contracts

1. Bay State Contract

MMWEC stated that on June 22, 1999, it executed a contract with Bay State ("Bay State Contract") for firm transportation service on the Monson-Palmer line in connection with Phase I of the proposed project (Exh. MMWEC-GEL at 4). The Company explained that under the terms of the Bay State Contract, MMWEC would be responsible for constructing, operating, and maintaining the 20-inch pipeline, for buying its own gas, and for arranging for transportation of that gas to Bay State's gate station on the Tennessee pipeline in Monson (id.). Bay State would be responsible for transporting MMWEC's gas on the Monson/Palmer line from the Monson gate station to the interconnection with MMWEC's Phase I pipeline (id.).

The charges for the Bay State transportation service include a fixed demand charge of $70,000 per month and an initial throughput rate of $.03 per million Btu, which escalates at a rate of 3% per year after the first three years (Exh. MMWEC-GEL at 5). The Bay State Contract requires Bay State to deliver gas at a maximum hourly flow rate of 3150 thousand cubic feet per hour ("mcf/hr") at a continuous pressure measured at Stony Brook of 350 pounds per square inch, gauge ("psig"), with two exceptions (id.). First, when Tennessee delivers gas to the Monson gate station at a pressure of less than 510 psig, Bay State's obligations are reduced to 2100 mcf/hr; if the Tennessee delivery pressure is less than 465 psig, the obligation is reduced to 1050 mcf/hr; and if the Tennessee pressure is at less than 425 psig, Bay State has no obligation to deliver any gas (id.). Second, during the period from November 1 through April 30, Bay State may declare up to 45 reduced service days;[6] on such days, Bay State is obligated to deliver only 2100 mcf/hr (id. at 6, 7 and Att. GEL-1, at 5-7). If Bay State fails to provide the level of gas transportation service required under the Bay State Contract, forcing MMWEC to operate the intermediate unit on No. 2 fuel oil, or if Bay State fails to provide the required level of gas transportation service and MMWEC is unable to operate the intermediate unit on oil, Bay State is

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[6] Bay State may declare a reduced service day on any day when, no more than 48 hours prior to the start of the day, Weather Services Corporation projects that there will be more than 45 effective degree days ("EDD") level in the greater Springfield, Massachusetts area (Exh. MMWEC-GEL at Att. GEL-1, at 7).

required to compensate MMWEC for certain incremental costs incurred by MMWEC as provided in the Bay State Contract (id. at 7-8 and Att. GEL-1, at 13-15).[7]

The Bay State Contract commences on the first day of the calendar month following the date on which construction of Phase I is completed and a determination is made by MMWEC that the pipeline is capable of transporting gas (Exh. MMWEC-GEL at 10 and Att.1, at 10). The Company noted that at any time during the pendency of the 20-year Bay State Contract, either MMWEC or Bay State may terminate the Bay State Contract, subject to certain notice requirements and early termination penalties set forth in the Contract (id. Att. 1, at 11).[8] The Company stated that the proposed project would not require any upgrades to the Tennessee mainline (Exh. HO-A-9).

2. WMECO Agreement

MMWEC stated that in August 2000 it executed a legally binding letter agreement with Western Massachusetts Electric Company ("WMECO") that would allow MMWEC to construct, operate and maintain Phase I of the phased project within WMECO's right-of-way ("ROW") and to use WMECO's ROW for Phase II of the phased project ("WMECO Agreement") (Exh. RR-HO-MM-28; Tr. 8, at 993). Specifically, the WMECO Agreement provides that, upon MMWEC

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7 If MMWEC must operate the intermediate unit on oil, Bay State would be required to pay MMWEC the difference between the cost of a volume of fuel oil having a Btu content equivalent to the Btu content of the default deficiency gas (the nominated quantity amount less the amount of gas actually delivered) (Exh. MMWEC-GEL at 8-9, and Att. 13). If MMWEC is unable to operate the intermediate unit with oil, Bay State would be required to pay MMWEC an amount for the lost electric production of the intermediate unit, subject to the conditions of the Bay State Contract (Exh. MMWEC-GEL at 9 and Att. GEL-1, at 14-15).

8 MMWEC may terminate the Bay State Contract upon 36 months prior written notice to Bay State (Exh. MMWEC-GEL, Att. 1, 11). To exercise its right of termination, MMWEC would be required to make an early termination payment to Bay State equal to 50% of the present value of monthly demand charges which would have been payable over the term of the Contract remaining after the effective termination date (id.).

and WMECO's final determination of the location of the pipeline for Phase I,[9] WMECO shall grant to MMWEC a permanent easement of 20 feet, more or less, within certain portions of WMECO's ROW (Exh. RR-HO-MM-28). The WMECO Agreement also states that WMECO shall grant MMWEC a temporary easement of sufficient width for construction purposes along certain portions of WMECO's ROW and permanent and temporary easements over lands owned by WMECO which lie outside of the ROW and which have been identified as necessary for the alignment of Phase I of the pipeline (id.). The WMECO Agreement states that, upon approval by the Siting Board of the proposed project or any part thereof, MMWEC shall pay to WMECO $250,000 for consideration of the Agreement (id.). MMWEC further explained that, if Phase II is constructed, the value of the easements, licences or other rights necessary to construct, operate and maintain Phase II within WMECO's ROW would be based on the fair market value of WMECO's ROW at the time Phase II is constructed (id.; Tr. 9, at 1275-1276).

C. Jurisdiction and Scope of Review

The Company filed its petition to construct a natural gas pipeline in accordance with G.L. c. 164, § 69H, which requires the Siting Board to implement the energy policies in its statute to provide a necessary[10] energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost, and pursuant to G.L. c. 164, § 69J, which requires a project applicant to obtain Siting Board approval for the construction of proposed energy facilities before a construction permit may be issued by another state agency.

As a new pipeline over one mile in length intended for the transmission of natural gas, the

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9 MMWEC stated that the final plan of the alignment for Phase I has not been completed but that in its estimation, MMWEC has reached actual agreement with WMECO for more than 95% of the length of Phase I of the pipeline (Tr. 9, at 1277).

10 The Electric Restructuring Act, Chapter 164 of the Acts of 1997 ("Act") included a number of substantive revisions to the Siting Board's enabling statute, G.L. c. 164 §§ 69G-69Q. One such revision is the amendment of G.L. c. 164, § 69H to replace "necessary" with "reliable." MMWEC filed its petition on November 4, 1997, before the effective date of the Act's revisions to the statute. The Siting Board accordingly reviews the Company's petition under the provisions of the statute that were in effect at the time the petition was filed.

Company's proposed project falls within the definition of "facility" set forth in G.L. c. 164, § 69G, which provides that a "facility" includes:

> any new pipeline for the transmission of gas having a normal operating pressure in excess of one hundred pounds per square inch gauge which is greater than one mile in length except restructuring, rebuilding, or relaying of existing transmission lines of the same capacity.

In accordance with G.L. c. 164, § 69J, before approving a petition to construct facilities, the Siting Board requires an applicant to justify its proposal in three phases. First, the Siting Board requires the applicant to show that additional energy resources are needed (see Section II.A, below). Next, the Siting Board requires the applicant to establish that, on balance, its proposed project is superior to alternative approaches in terms of cost, environmental impact, reliability, and ability to address the identified need (see Section III.B, below). Finally, the Siting Board requires the applicant to show that it has considered a reasonable range of practical facility siting alternatives and that the proposed site for the facility is superior to a noticed alternative site in terms of cost, environmental impact, and reliability of supply (see Sections III.B. and III.C, below).

D. Procedural History

1. MMWEC's Petition to Construct

MMWEC filed with the Siting Board its original petition to construct the proposed project on November 4, 1997. On December 22, 1997, the Town of Wilbraham ("Wilbraham") filed a motion to dismiss MMWEC's petition, on the ground that MMWEC lacked the statutory authority to construct or own the proposed pipeline. Wilbraham's motion to dismiss was denied.[11]

The Siting Board conducted three public hearings regarding the proposed project. Public hearings were held in Hampden, Massachusetts, on February 4, 1998; in Wilbraham, Massachusetts, on February 9, 1998; and in Ludlow, Massachusetts, on February 10, 1998. The

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[11] MMWEC, EFSB 97-4, Hearing Officer Ruling on Motion to Dismiss (March 16, 2000).

Company's Notice of Public Hearing and Adjudication ("Notice") provided a description of the proposed project along each of the three alternative route corridors identified in the petition.[12]

Seven petitions to intervene and four petitions to participate as an interested person were filed. Petitions to intervene were filed by the Towns of Wilbraham, Ludlow ("Ludlow"), and Hampden ("Hampden"); Reading Municipal Light Department ("RMLD"); WMECO; Pipeline Action Committee ("PAC"); and Bay State. Petitions to participate as an interested person were filed by Anthony M. Molé, the Chicopee River Watershed Council, Stephen J. Rourke, and U.S. Generating Company. In a Procedural Order issued on May 15, 1998, the Hearing Officer granted intervenor status to Wilbraham, Ludlow, Hampden, WMECO, RMLD, and PAC. Bay State was granted status as an interested person with expanded rights. The Hearing Officer granted interested person status to each of the four petitioners seeking that status.

On February 2, 2000, Bay State filed a petition for full intervenor status based on MMWEC's request that the Siting Board consider a phased project involving interconnection with Bay State's Monson-Palmer line (Bay State Petition at 2-3). On March 2, 2000, the Hearing Officer issued a ruling granting Bay State's petition.

In the period between August 9, 2000, and August 18, 2000, the West Boylston Municipal Lighting Plant, Georgetown Municipal Light Department, Middleborough Gas and Electric Light Department and Littleton Electric Light Department each filed a petition to intervene out of time. On September 26, 2000, the Hearing Officer issued a ruling denying the petitions.

On May 24, 2000, Wilbraham filed a motion for partial summary judgment to dismiss that portion of MMWEC's petition which requests approval of Phase II of the proposed project. On July 14, 2000, RMLD filed a motion to dismiss with respect to Phase II of the proposed project. In a Hearing Officer ruling issued on November 10, 2000, both motions were denied.

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[12] The Notice was sent to property owners along the originally proposed 14.7-mile project, which encompassed all property owners along the 5.6-mile project alternative. See Procedural Conference Tr., March 30, 2000, at 12-20. The Notice did not reference the 3-mile alternative.

2. Development of Project Phasing and the 5.6-Mile Alternative

On July 10, 1998, RMLD filed a motion seeking suspension of the proceeding based on its contention that MMWEC was negotiating with Bay State regarding a new project alternative: the transportation of gas to Stony Brook via an approximately 5.6-mile pipeline that would interconnect Stony Brook with Bay State's Monson-Palmer line in Ludlow.[13] In a Procedural Order issued on July 22, 1998, the Hearing Officer denied RMLD's motion to suspend the proceeding, but found it "undisputed" that MMWEC was in negotiations with Bay State regarding a 5.6-mile pipeline, and that "MMWEC has indicated that this . . . pipeline may be the first phase of a two-phased approach to the construction of its proposed project." [14] The Hearing Officer ordered MMWEC to submit, no later than July 31, 1998, additional information regarding the potential phasing of the proposed project. Id. On July 31, 1998, the Company filed the affidavit of Christopher P. Fleming, General Manager of MMWEC, in which Mr. Fleming acknowledged discussions between MMWEC and Bay State regarding the possible construction of a 5.6-mile pipeline between Stony Brook and the Bay State Monson-Palmer line as an alternative to MMWEC's proposed project (Exh. MMWEC-2).

A procedural conference was held on August 31, 1998 and parties were given the opportunity to brief the question of the Siting Board's authority to allow phased construction of the proposed project.[15] At that time, the procedural schedule was suspended pending the submission of briefs.[16] The Hearing Officer subsequently determined that the Siting Board could approve phased construction of the proposed project, and that the Siting Board could approve the 5.6-mile/Phase I alternative.[17] Thereafter, on, January 7, 2000, the procedural schedule was

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13 MMWEC, EFSB 97-4, Motion of Reading Municipal Light Department for Suspension of the Procedural Schedule (July 10, 1998).

14 MMWEC, EFSB 97-4, Hearing Officer Procedural Order (July 22, 1998).

15 MMWEC, EFSB 97-4, Hearing Officer Memorandum (October 2, 1998).

16 MMWEC, EFSB 97-4,, Procedural Conference Tr., at 60 (August 31, 1998).

17 MMWEC, EFSB 97-4, Hearing Officer Ruling Regarding the Issue of Phased

(continued...)

further suspended pending the submission of certain information by MMWEC.[18]

In a filing on February 11, 1999, MMWEC confirmed to the Siting Board that, in addition to the project as originally proposed, the Company was proposing construction of the project in two phases. In addition, MMWEC confirmed that it was proposing the 5.6-mile pipeline as a new project alternative.[19]

On January 20, 2000, MMWEC informed the Siting Board that it had executed a contract with Bay State for firm gas transportation service for Phase I of the phased project (Exhs. MMWEC-JOR-S at 2; MMWEC-GEL at 4). In August 2000, MMWEC informed the Siting Board that it had executed an agreement the WMECO Agreement, which provided the Company with property rights necessary to construct portions of the proposed project in WMECO's ROW (Exh. RR-HO-MM-28, App. 1).

3. Discovery and Witnesses

Discovery by the Siting Board and the parties commenced in July 1998. Siting Board Staff, RMLD, Wilbraham, WMECO, PAC, and MMWEC each issued several rounds of information requests. Discovery concluded in December 2000.

On August 17, 1998, MMWEC submitted to the Siting Board the prefiled direct testimony of eight witnesses: Joseph O. Roy and Alan Menard, MMWEC's Manager of Operating Projects and Engineering Services Manager, respectively; A. Bruce Murray, an independent Consulting Engineer; John J. Boudreau, MMWEC's Senior Project Manager for Strategic Planning; Linda M. Benson, Project Manager at Environmental Science Services, Inc., an environmental and engineering consulting firm; Roger W. Flood, Manager of Pipeline Services for Stone and Webster Engineering Corporation; John K. Downing, Senior Environmental Analyst for the Stone and Webster Environmental Sciences and Technology

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17 (...continued)
Construction (January 7, 1999).

18 MMWEC, EFSB 97-4, Hearing Officer Procedural Order (January 7, 1999)

19 MMWEC, EFSB 97-4, Filing of the Massachusetts Municipal Wholesale Electric Company in Response to Hearing Officer Ruling (February 11, 1999).

Division;[20] and William H. Dunn, Jr., Vice President and Consultant with the management consulting firm of Barker, Dunn and Rossi, Inc.

On January 20, 2000, the Company filed the direct testimony of George E. Leary, MMWEC General Manager, and Laurel J. Carlson, Senior Project Manager at Environmental Science Services, Inc.,[21] as well as the supplemental direct testimony of Joseph O. Roy and the supplemental direct testimony of John J. Boudreau. On October 20, 2000, MMWEC filed the second supplemental direct testimony of John J. Boudreau.

On June 9, 2000, PAC filed the direct testimony of Jean Porwoll, M.D., Monson Conservation Commissioner and a member of PAC, and Alan J. Fritts, Engineer and Management Consultant, also a member of PAC. On September 11, 2000, PAC filed the supplemental and revised prefiled testimony of Alan J. Fritts.

On June 9, 2000, Wilbraham filed the direct testimony of Paul L. Chernick, Utility Consultant and President of Resource Insight, Inc. WMECO filed the direct testimony of Michael T. Smith, Director of Energy Delivery for WMECO.[22]

On June 19, 2000, RMLD filed the direct testimony of Susan F. Tierney, Ph.D., Senior Vice President at Lexicon, Inc., and Mayhew Seavey, Jr., Principal of Power Line Models, Inc. On September 19, 2000, RMLD filed the supplemental direct testimony of Susan F. Tierney and Mayhew Seavey, Jr.

4. Hearing and Post-Hearing

Adjudicatory hearings commenced on July 17, 2000, and closed on November 21, 2000.

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20 Stone and Webster is the primary environmental and engineering consultant for MMWEC's proposed project.

21 On July 10, 2000, MMWEC requested the substitution of Laurel Carlson for Linda Benson. MMWEC's request was granted. Thus, Linda Benson did not appear at hearings but her direct prefiled testimony was adopted, with minor modifications, by Laurel Carlson, who did appear and testify at hearings (Exh. MMWEC-LJC at 5).

22 On August 10, 2000, WMECO moved to withdraw the prefiled testimony of Michael Smith. The motion was denied. MMWEC, EFSB 97-4, Hearing Officer Ruling on WMECO Notice of Withdrawal (September 7, 2000).

In addition to testimony from witnesses who submitted prefiled direct testimony, MMWEC also offered the testimony of Michael DiMauro, Environmental Engineer for MMWEC, who testified as to air impacts. Bay State presented the testimony of Paul LaShoto, Director of Engineering Construction for Bay State; Francis Chico DaFonte, Director of Gas Control and Gas Supply for Bay State; and Joseph Ferro, Director of Revenue Development for Bay State, each of whom testified as to need issues.

On December 11, 2000, the final exhibit list was issued. The record includes over 2100 exhibits consisting primarily of information request responses and record request responses. On December 15, 2000, MMWEC, Wilbraham, Bay State, and RMLD each filed an Initial Brief. On December 19, 2000, PAC filed an Initial Brief. On January 8, 2001, MMWEC, Bay State, PAC and RMLD each filed a Reply Brief.

II. ANALYSIS OF THE PROPOSED PROJECT

A. Need

1. Standard of Review

In accordance with G.L. c. 164, § 69J, the Siting Board is charged with the responsibility for implementing the energy policies in its statute to provide a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. In carrying out its statutory mandates with respect to the construction of energy facilities such as MMWEC's proposed natural gas pipeline, the Siting Board first evaluates whether there is a need for additional energy resources[23] to meet reliability, economic efficiency, or environmental objectives. The Siting Board must find that additional energy resources are needed as a prerequisite to approving a proposed energy facility. Berkshire Gas Company, 9 DOMSB 1, 12 (1999) ("Berkshire Gas Decision"); New England Power Company, 7 DOMSB 333, 344 (1998) ("1998 NEPCO Decision"); Massachusetts Electric Company, 18 DOMSC 383, 393 (1989)

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[23] In this Decision, the term "additional energy resources" is used generically to encompass both supply and capacity additions including, but not limited to, new or expanded gas pipelines, new or expanded gas storage facilities, new gas supply or transportation contracts, and savings associated with conservation and load management.

("MassElectric Decision").

2. Description of the Existing System

Stony Brook is located in Ludlow, east of the Westover Air Reserve Base (Exh. EFSB-3, at Fig. 1). The Stony Brook facility is comprised of two units located on one site: an intermediate unit which can operate on either natural gas or No. 2 fuel oil, and a peaking unit which operates only on No. 2 fuel oil (id. at 15; Exh. MMWEC-JOR/ARM at 7-8). The two units have a total generating capacity of 522 megawatts ("MW") (Exhs. MMWEC-JOR/ARM at 7-8; EFSB-3, at 15; Tr. 7, at 786). The intermediate unit, which began operating in 1981,[24] consists of three identically rated dual-fuel combined cycle combustion turbines, each with a HRSG, with a total capacity of 352 MW (Exhs. MMWEC-JOR/ARM at 8; MMWEC-ABM at 4; Tr. 7, at 786). MMWEC stated that it is in the process of upgrading the intermediate unit's three turbines; it expects to realize a 3 to 5% increase in net output following these upgrades (Tr. 9, at 1358).

MMWEC provided information on the annual hours of operation of the intermediate unit in recent years, including the time operated on gas and on oil (see Tables 1A-1C). MMWEC indicated that it ran all three of the intermediate unit turbines on gas simultaneously for 74 days in 1997, 115 days in 1998, 128 days in 1999 and 64 days between January through July of 2000 (Exh. RR-TW-MM-2). MMWEC noted that turbine 1B has been converted to use a dry-low nitrogen oxide ("NO_X") control system, and that the Company therefore tends to use turbine 1B more frequently during the ozone season so that it does not exceed the intermediate unit's NO_X cap (Exh. HO-N-64; Tr. 7, at 792).

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[24] The intermediate unit began as an oil-only unit; the three turbines were converted to dual-fuel capability in 1982 and 1986 (Exh. HO-G-5).

TABLE 1A
ANNUAL HOURS OF OPERATION FOR THE INTERMEDIATE UNIT

	Turbine 1A	Turbine 1B	Turbine 1C
1996	1387	1948	1201
1997	2667	3641	2227
1998	3026	3784	2715
1999	2872	3186	2400

TABLE 1B
INTERMEDIATE UNIT HOURS OF OPERATION ON GAS

	Turbine 1A	Turbine 1B	Turbine 1C
1996 [a]	955	1490	706
1997 [a]	2164	3420	1627
1998 [a]	2162	3574	1839
1999 [b]	2145	2983	1416

TABLE 1C
INTERMEDIATE UNIT HOURS OF OPERATION ON OIL

	Turbine 1A	Turbine 1B	Turbine 1C
1996	432	458	495
1997	503	221	600
1998	864	210	876
1999 [b]	727	202	984

Sources: Exhs. HO-N-52; RR-HO-MM-30
a. Calculated by subtraction of hours on oil from total hours of operation (from Tables 1C, 1A).
b. Calculated from total hours of operation and percentage of operating time on gas (Exh. HO-N-52 Att. 1).

MMWEC presently has the ability to supply the three turbines with oil 365 days per year (Tr. 7, at 797; Tr. 9, at 1217; Company Initial Brief at 30). The Company indicated that the Stony Brook intermediate unit is able to operate throughout its design capabilities while burning on oil under all operating conditions (Exh. TW-132).

MMWEC explained that the intermediate unit currently receives gas through a 12-inch, 275 psig distribution line ("275 psig line") owned and operated by Bay State (Exh. MMWEC-

ABM at 4).[25] The 275 psig line is approximately 19 miles long and begins at the East Longmeadow gate station where it connects to the Tennessee pipeline (id.).[26] The series of mains that comprise the 275 psig line were installed from 1963 through 1972 (Exh. PAC-A-9 (November 3, 1984 letter)). MMWEC initially stated that the maximum capacity of this line under steady state conditions is approximately 1800 to 1900 mcf/hr, an amount sufficient to fuel approximately 1.8 to 1.9 of the three intermediate unit turbines (Exhs. MMWEC-JOR/ARM at 18; EFSB-3, at 30, 31). However, the Company later asserted that it currently receives a maximum of 1700 mcf/hr on the 275 psig line (Exhs. MMWEC-JJB-S-2, at 6; Tr. 8, 1073).

MMWEC receives its gas from Bay State as an interruptible transportation ("IT") customer (Exh. MMWEC-JOR/ARM at 17; Tr. 15, at 2272). MMWEC has been an IT customer since 1981, and is the sole interruptible customer served off of the 275 psig line (Exhs. MMWEC-ABM-5, at 18; HO-BSG-4; RR-PAC-BSG-3).[27] Bay State indicated that it is currently unable to provide MMWEC with firm 365-day service off the 275 psig line at the minimum pressure that MMWEC states is necessary to operate one turbine throughout the winter season (Exh. HO-BSG-4). Specifically, Bay State asserted that it cannot supply MMWEC with service off the 275 psig line on days colder than a 40 EDD, which typically occurs from December 1 through March 15, due to the demand of Bay State's existing firm customers (Exhs. HO-BSG-8;

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25 MMWEC receives gas from the 275 psig line at a pressure of approximately 110 psig and uses its compressors to increase the pressure to the level required to fire the intermediate units (Exhs. EFSB-3, at 31; MMWEC-JOR/ARM at 21; Tr. 8, at 1071).

26 MMWEC indicated that Bay State operates a liquified natural gas ("LNG") plant in Ludlow, approximately 12 miles from the gate station, where the gas flowing to Stony Brook passes through the LNG plant yard (Exh. MMWEC-ABM-5). Bay State reported that the only time that liquification of natural gas would occur is in the non-heating months, and that the most recent time period in which it liquified natural gas at the Ludlow facility was June through August of 1996 (Exh. HO-BSG-3).

27 The current IT agreement has been in place since July 1, 1997 and it continues on an annual basis unless terminated by either party providing ninety-days written notice (Exh. HO-BSG-6).

RR-PAC-BSG-6).[28]

MMWEC stated that, to allow the intermediate units to operate properly, gas pressure should be controlled at 310 psig in the gas supply header immediately upstream of the gas turbines (Exh. RMLD-2-41). The Company explained that there is a 25 psig pressure drop between the existing gas compressor house and the pressure control point, and a 25 psig pressure drop across the regulating control valve (Exh. HO-N-4). MMWEC noted that a pressure drop is based on physical piping conditions such as length, internal diameter, valves, fittings, and flow path changes (id.). The Stony Brook system currently has three gas compressors, two of which operate at any one time (Exhs. HO-A-11; MMWEC-JOR/ARM at 21). MMWEC reported that outage time due to compressor problems was limited to a total of 39 minutes in the five-year period of 1991 to 1996 (Exhs. MMWEC-JOR/ARM at 21; EFSB-3, at 34).

The Monson-Palmer line, which is the proposed supply for Phase I, is an 18.7 mile 16-inch distribution lateral owned by Bay State, with a maximum operating pressure of 500 psig, which runs from the Tennessee gate station in Monson to the 264 MW MassPower generating facility ("MassPower") in Springfield (Exhs. EFSB-3, at 32; MMWEC-JOR/ARM at 22). The Company stated that the Monson-Palmer line presently supplies MassPower with 2250 mcf/hr of gas and that 400 mcf/hr is dedicated to the local distribution system in the towns of Monson and Palmer, of which up to 250 mcf is currently taken (Exhs. HO-A-8; RR-PAC-BSG-7; Tr. 9, at 1329-1333).

3. Economic Need

a. Basis for Economic Need

MMWEC asserted that the proposed project would provide a necessary energy supply in that it would provide economic efficiency benefits for Stony Brook, the Commonwealth, and the New England region (Company Reply Brief at 24).[29] Specifically, MMWEC argued that

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[28] Bay State noted that it expects that its annual firm growth will lower the level of degree days at which interruptions must occur (Tr. 21, at 3205-3207).

[29] The Company also asserted that its economic analyses demonstrate that construction of (continued...)

construction of the proposed project would result in significant savings for the Project Participants and the Joint Owners of the intermediate unit over a wide range of reasonable assumptions (Exhs. MMWEC-JJB at 6; MMWEC-JJB-S at 3; MMWEC-JJB-S-2, at 9; Company Reply Brief at 24).

MMWEC and RMLD each performed extensive modeling of the economic benefits of the proposed project under a variety of economic scenarios. MMWEC's modeling is described in Section II.A.3.b, below. RMLD's modeling is described in Section II.A.3.c, below. The parties' positions with respect to specific modeling assumptions are discussed in Section II.A.3.d, below.

b. MMWEC's Modeling

MMWEC asserted that the net economic benefit of the proposed project should be defined as the increase in the energy value[30] of Stony Brook resulting from the construction of a new pipeline, less the cost of constructing, owning and operating the new pipeline (Exh. MMWEC-JJB at 8). The Company stated that it calculated the economic benefits of the proposed project by modeling the increase in the energy value of the Stony Brook intermediate unit resulting from the construction of the proposed pipeline (id.).

The Company developed costs for the proposed project based on estimates prepared by Stone and Webster (Exh. HO-N-53; Tr. 23, at 3474). The capital cost estimates included direct construction costs, legal costs, MMWEC costs, and other costs, as well as an allowance for escalation, interest during construction, and credit for the sale of compressors (Exhs. HO-N-53, Att. 2; MMWEC-JJB at 36). The direct construction costs consisted of costs for land, pipeline materials, pipeline installation, major facilities, permitting, engineering procurement, and contingency (Exh. HO-N-37). MMWEC provided capital cost estimates of $28.458 million for

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29 (...continued)
the proposed project would increase competition in the electric energy market in New England by creating downward pressure on electric energy prices in the region (Exhs. MMWEC-JJB at 6; MMWEC-JJB-S at 3).

30 MMWEC defined the energy value of Stony Brook as the competitive market value of the energy produced, less the short-run marginal cost of operating the unit (Exh. MMWEC-JJB at 8).

the proposed project and $17.269 million for Phase I, assuming an on-line date of January 2002 (Exh. HO-N-53, Att. 2). The Company noted that the cost figures for the proposed project assume the 14.7-mile line is constructed as a single line, rather than in phases (Tr. 10, at 1399; Tr. 13, at 1927).

To analyze economic benefits, the Company stated that it used a deterministic model developed by Edward Bodmer of the Energy Exchange of Chicago to simulate the bid-based dispatch of the New England Power Pool ("NEPOOL") system (Exhs. MMWEC-JJB-15; HO-N-70-R; Tr. 23, at 3422). MMWEC stated that the model is based on a chronological hourly evaluation of the demand for and supply of electricity (Exh. MMWEC-JJB at 16). Key demand and supply assumptions used by the dispatch model included: (1) the projected load and load shape for the NEPOOL region; (2) the existing generation capacity available to the NEPOOL region, including imports from neighboring regions; (3) new capacity additions for the region and the operating characteristics of such additions; and (4) the heat rates and projected fuel and variable operation and maintenance expenses of existing thermal units (Exh. MMWEC-JJB at 18).

Key modeling assumptions related to the Stony Brook intermediate unit included: (1) the limitations on Bay State's ability to deliver gas to Stony Brook via the existing 275 psig line and via the proposed pipeline; (2) the price of natural gas and distillate fuel oil delivered to Stony Brook; and (3) Stony Brook's heat rate, including any effects resulting from increased firing on natural gas and changes in the existing gas supply system (id. at 18-19). Throughout its modeling, the Company assumed that natural gas would not be available to Stony Brook during the months of December and January (Exhs. HO-A-46; MMWEC-JJB-S at 9; HO-N-46). MMWEC asserted that this assumption is conservative, since the Company recently has been able to purchase gas in those two months; consequently, the Company argued that its modeling likely understates the economic value of the proposed project (Exhs. HO-N-46; PAC-00N-21; Tr. 8, at 996-997).

MMWEC provided two primary economic analyses based on demand and supply projections taken from NEPOOL's 2000 Capacity, Energy, Loads & Transmission ("CELT")

Report (Exhs. HO-N-53; HO-N-53R; MMWEC-JJB; MMWEC-JJB-S; MMWEC-JJB-S-2).[31] MMWEC's initial analysis ("Low Generation/HQ Firm case") assumed: (1) peak energy demand as forecasted in the 2000 CELT Report reference case; (2) existing generation resources as reflected in the 2000 CELT Report; (3) the addition of approximately 6250 MW of new generation by the year 2003; (4) dispatch of Hydro-Québec under a must-take contract[32] that is dispatched before the Stony Brook intermediate unit on gas, resulting in the importation of 9 terawatt-hours of energy annually; (5) fossil fuel costs based on projections in the Energy Information Administration's ("EIA") Annual Energy Outlook 2000;[33] and (6) a commercial operation date of January 2002 for the proposed project (Exhs. HO-N-53-R; MMWEC-JJB-S-2, at 11; Tr. 23, at 3376). Generic future capacity additions were assumed to be 80% gas-fired combined cycle units and 20% simple cycle combustion units (Exh. MMWEC-JJB at 22). MMWEC's modeling showed that, under these assumptions, the net present value ("NPV") savings of the proposed project to the Project Participants and Joint Owners in the intermediate unit for the 2002 to 2021 period would be approximately $20.8 million, while the NPV savings of Phase I would be $22.5 million (Exh. HO-N-53-R Att. 1).

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31 MMWEC earlier provided analyses based on the 1996 and 1998 CELT Reports (Exhs. MMWEC-JJB-S-2, at 3; HO-N-9; HO-N-37).

32 The Hydro-Québec Phase II Firm Energy Contract ("Hydro-Québec Contract"), which expires in 2001, provides for Hydro-Québec to supply energy to a group of utilities known as the New England Utilities, most but not all of which are NEPOOL members (Exh. MMWEC-JJB-S-2, at 7; Tr. 24, at 3497-3498). MMWEC explained that the present contract is a firm energy contract where Hydro-Québec agreed to provide 7 terawatt-hours of energy per year, with an extension provision which resulted in a 9 terawatt-hour delivery rate the last year (Tr. 24, at 3498). MMWEC noted that extension Hydro-Québec of the Hydro-Québec Contract is not reflected in the 2000 CELT Report (Exh. PAC-00N-58).

33 MMWEC explained that, for both cases, it calculated the starting gas prices for the existing units in the dispatch analysis by reviewing spot gas price purchases for 1997 as the base year, when they were available, and then applied the escalation rates reflected in the EIA forecast (Tr. 23, at 3358). Specifically, for all fuels, the Company stated that the start prices for identified units were based on what was actually paid and reported to the EIA, and for units where the prices could not be identified, the cost was based on the Brayton 4 unit in Somerset (id. at 3362).

MMWEC's other primary analysis, its preferred analysis ("High Generation/HQ Dispatch case"), relied on the same forecasts of peak energy demand and fuel prices, and the same assessment of existing generation. It differed from the Low Generation/HQ Firm case in the following respects: (1) it assumed the addition of 10,071 MW, rather than 6250 MW, of new generation by the year 2003;[34] (2) it modeled Hydro-Québec as dispatched on a bid basis at approximately $28 per MW-hr, after Stony Brook on gas, resulting in the importation of an average of 3.2 terawatt-hours of energy annually;[35] and (3) it reduced the assumed current deliverability of gas to Stony Brook on the 275 psig line from the equivalent of 1.9 turbines to 1.7 turbines (Exhs. N-53-R; MMWEC-JJB-S-2, at 6). MMWEC's modeling showed that, for this case, the NPV savings of the proposed project to the Project Participants and Joint Owners for the 2002 to 2021 period would be approximately $16.5 million, and the NPV savings of Phase I would be approximately $18.4 million (Exh. MMWEC-JJB-S-2, at 9 and Att. JJB-4-S(2)).

At RMLD's request, MMWEC also modeled a variation on the High Generation/HQ Dispatch case which assumed that the dispatch of Hydro-Québec would remain unchanged

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34 Unit additions consisted of generating units not listed as available in the 2000 CELT Report, but beleived to be either "In Commercial Operation" or "Under Construction"(Exh. MMWEC-JJB-S-2 Att. JJB-1-S(2)). Units in the first category consisted of (based on winter capacity): (1) Duke Bridgeport - 520 MW; (2) Andoscroggin - 109.2 MW; (3) EMI Dighton - 181.81 MW; (4) Maine Independence - 490 MW; (5) Berkshire Power - 264.7 MW; (6) Tiverton - 285.8 MW. Units in the second category included: (1) Millennium - 400 MW; (2) Rumford Power - 257.2 MW; (3) Bucksport Power - 174 MW; (4) ANP Blackstone - 580 MW; (5) Devon (Milford) - 580 MW; (6) Westbrook Power - 520 MW; (7) Lake Road - 810 MW; (8) ANP Bellingham - 580 MW; (9) Mystic - 1550 MW; (10) Edgar - 775 MW; (11) AES Londonderry - 742 MW; (12) Con Ed Newington - 525 MW; (13) Wallingford - 250 MW; and (14) generic contingent resource - 477 MW (id.).

35 MMWEC's witness, Mr. Boudreau, argued that the modeled reduction in energy imports from Hydro-Québec comports with Hydro-Québec's intentions to reduce its exports to the United States by two-thirds, based in part on the growing load in Quebec (Exh. PAC-00N-59, Att. 3; Tr. 23, at 3367, 3379; Tr. 24 at 3506). MMWEC also argued that future imports from Hydro-Québec would decline as a result of the excess capacity resulting from an assumed addition of approximately 10,000 MW of new generating capacity in the region (Exh. MMWEC-JJB-S-2, at 7).

("High Generation/HQ Firm Case"). In this case, the NPV savings of the proposed project to the Project Participants and Joint Owners for the 2002 to 2021 period would be approximately negative $1.6 million, and the NPV savings of Phase I would be approximately $1.2 million (Exh. RMLD-7-14-A; Tr. 23, at 3373).

Finally, MMWEC provided a sensitivity analysis based on the High Generation/HQ Dispatch Case which assumed that additional combined cycle capacity with a winter rating of 1000 MW would be added on July 1, 2004, and that a further 1000 MW of combined cycle capacity would be added on January 1, 2005 ("+ 2000 MW Case") (Exh. MMWEC-JJB-S-2, at 11). MMWEC's modeling showed that, in this case, the NPV savings of the proposed project to the Project Participants and Joint Owners for the 2002 to 2021 period would be approximately $2.5 million, and the NPV savings of Phase I would be $5.1 million (id., at 9 and Att. JJB-4-S(2)).

TABLE 2
CASE SPECIFIC NPV OF THE SAVINGS (in millions $)

CASES	14.7-Mile	PHASE I
CELT 2000 (High Generation/HQ Dispatch Case)	$16.481	$18.419
CELT 2000 (Low Generation/HQ Firm Case)	$20.797	$22.532
CELT 2000 (High Generation/HQ Firm)	($1.6)	$1.2
CELT 2000 (High Generation/HQ Dispatch Case + 2000 MW)	$2.512	$5.123

Sources: Exhs. HO-N-53R; MMWEC-JJB-S-2; HO-A-47-S(2); HO-N-73; HO-N-73R; RMLD-7-14-A.

MMWEC ran 20 additional cases testing the sensitivity of its High Generation/HQ Dispatch case and Low Generation/HQ Firm case to assumptions regarding reserve levels, fuel prices, load forecasts, gas availability, and similar issues (Exh. MMWEC-JJB-S-2, at 11-14).[36]

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[36] In addition to the High Generation/HQ Dispatch Case and the +2000 MW case discussed above, the Company analyzed the following sensitivity cases: (1) low reserves - assumes (continued...)

The modeled NPV savings of the proposed project ranged from negative $17.2 million to positive $27.04 million under the various scenarios; the modeled NPV savings of Phase I of the proposed project ranged from negative $13.67 million to positive $28.58 million (Exh. MMWEC-JJB-S-2, Att. JJB-4-S(2)). The only sensitivity case to yield a negative NPV savings was the low load case; the highest modeled NPV savings resulted from the low reserve case (Exh. MMWEC-JJB-S-2, Att. JJB-4-S(2). MMWEC also modeled the termination by MMWEC of the Bay State Contract at the end of the 60th month of operation, resulting in an early

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36 (...continued)
installed reserve levels fall to 6% by the year 2017; (2) high reserves - assumes new capacity is built to maintain a reserve level of 20%; (3) high gas prices - assumes gas prices are 10% higher than the reference case for all NEPOOL units; (4) low gas prices - assumes gas prices are 10% lower than the reference case for all NEPOOL units; (5) high supply - gas is assumed to be available to the Stony Brook units during the months of December and January; (6) high load - uses high case load forecast from the 2000 CELT Report; (7) low load - uses low case load forecast from the 2000 CELT Report; (8) high oil and gas prices - the price of gas is assumed to be 46% higher, the price of No. 2 oil is assumed to be 42% higher, and the price of No. 6 oil is assumed to be 34% higher than under the reference case, based on the increase in the cost of fuel from the 1996 to 2000 EIA; (9) increased exports - assumes the sale of 500 MW of firm capacity at 100% load factor for the period January 1, 2002 to December 31, 2010; (10) base unit retirements - coal plants totaling approximately 529 MW are retired; (11) reduced IT supply - assumes that by January 1, 2005, the ability of Bay State Gas to deliver gas over 275 psig line will restrict Stony Brook to one turbine for the months of April through October with no gas for the remaining months; and (12) new combined cycle delay - assumes generation additions categorized as "under construction" are delayed by one year (Exh. MMWEC-JJB-S-2 at 11-14).

MMWEC ran the following eight sensitivity analyses for the Low Generation/HQ Firm case: (1) + 4000 - assumes 4000 MW of new combined-cycle capacity to come on-line in 1000 MW increments in January 2002, 2003, 2004 and 2005; (2) + 2000 - assumes 2000 MW of new combined-cycle capacity come on-line in 1000 MW increments in January 2002 and 2003; (3) low reserves - assumes reserve levels fall to 6%; (4) high gas prices - assumes gas prices are 10% higher than the reference case for all NEPOOL units; (5) low gas prices - assumes gas prices are 10% lower than the reference case for all NEPOOL units; (6) high supply - assumes gas is available for the months of December and January to fire two units under Phase I and the 3-mile alternative, and to fire all three units for the proposed project; (7) high load - uses the high case load forecast from the 2000 CELT Report; and (8) low load - uses the low case load forecast from the 2000 CELT Report (Exh. HO-N-53-R).

termination payment of approximately $3.19 million to Bay State (Exhs. HO-N-57; PAC-00N-15). The Company's modeling indicated that these additional costs would reduce the NPV savings of the proposed project by approximately $6 million (Exhs. HO-N-53; HO-N-53R; HO-N-73; HO-N-73R).

c. RMLD's Modeling

RMLD stated that it used PROSYM, a competitive market simulation model developed by Henwood Energy Services, Inc., to project the operation of and market revenues from Stony Brook (Exh. RMLD-MDS at 6). RMLD asserted that the PROSYM model is well suited to this analysis because: (1) it performs a chronological simulation of the operation of the power system; (2) it uses a Monte Carlo simulation to model random forced outages of generators; and (3) it simulates a market where generators are dispatched based on the prices they bid rather than on the cost of generation (id. at 8). Witnesses for RMLD and MMWEC both acknowledged that MMWEC's deterministic model and RMLD's probabilistic model generally yield similar results, given similar assumptions (Tr. 22, at 3281-3282; Tr. 23, at 3422).

RMLD stated that its analysis of the proposed project, like MMWEC's, is based on modeling the net benefits to Stony Brook of adding a pipeline, and that many of its economic assumptions are identical to those used by MMWEC in its modeling (Exhs. RMLD-SFT at 28, 29; RMLD-MDS at 5). However, RMLD modeled different assumptions regarding: (1) the amount of new generating capacity being added to the New England market; and (2) the costs that MMWEC would incur in acquiring the ROW for the pipeline (Exhs. RMLD-SFT at 30; RMLD-MDS at 6).

RMLD developed two forecasts of capacity additions, which it termed the Low and Intermediate Capacity cases (Exhs. RMLD-SFT at 30-3; RMLD-MDS-S at Att. MDS-2-R; MM-RMLD-2-2(b)). The Low Capacity case assumed that all new generation that was either currently operational or under construction at the time RMLD conducted its analysis would come into commercial operation, resulting in the addition of 9340 MW of new generation by the end of

2002.[37] The Intermediate Capacity case assumed that, in addition to the units identified in the Low Capacity case, three additional units deemed to be close to construction also would come into commercial operation, resulting in the addition of 11,115 MW of new generation (Exh. RMLD-MDS-S at Att. MDS-2-R).[38]

RMLD also developed two estimates of ROW acquisition costs (Exh. RMLD-SFT at 35, and Att. SFT-3R). The first estimate, which RMLD labeled "optimistic," was identical to the cost assumptions used by MMWEC in its modeling (Exh. RMLD-SFT at 35). The second estimate, which RMLD labeled "less optimistic," incorporated a higher estimate of the amount of ROW needed for the pipeline, based on a 40-foot width rather than a 20-foot width, and a higher land valuation, with the result that assumed ROW acquisition costs increased from $0.6 million to $1.5 million for Phase I, and from $2.0 million to $4.6 million for the proposed project (Exh. RMLD-SFT at 36-37). Table 3, below, sets forth the NPV savings of the proposed project for the four cases modeled by RMLD.

TABLE 3
RMLD CASES - NPV OF THE SAVINGS (in millions $)

CASES	14.7-Mile	5.6-Mile
1) Low Capacity/Optimistic ROW	$3.937	$6.673
2) Low Capacity/Less Optimistic ROW	$1.390	$5.861
3) Intermediate Capacity/Optimistic ROW	($5.284)	($2.062)
4) Intermediate Capacity/Less Optimistic ROW	($7.821)	($2.857)

Source: Exh. RR-MM-RMLD-2-2(b)

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37 These units included: (1) Bridgeport Harbor (Duke) - 543.7 MW; (2) Andoscroggin - 109 MW; (3) EMI Dighton - 170 MW; (4) Maine Independence - 520 MW; (5) Berkshire Power -300 MW; (6); Millennium - 360 MW; and (7) Bucksport Energy - 175 MW, all currently operational; and (8) Tiverton - 284.4 MW (9) Rumford Power - 265 MW; (10) ANP Blackstone - 580 MW; (11) Devon (Milford) - 544 MW; (12) Westbrook Power - 528 MW; (13) Lake Road -792 MW; (14) ANP Bellingham - 580 MW; (15) Mystic - 1550 MW; (16) Edgar - 775 MW; (17) AES Londonderry - 720 MW; and (18) PDC Meriden - 544 MW, all under construction (Exh. RMLD-MDS-S at Att. MDS-2-R).

38 The three additional units included: (1) Con Ed Newington - 525 MW; (2) ANP Gorham - 900 MW; and (3) Cabot Power - 350 MW (Exh. RMLD-MDS-S at Att. MDS-2-R).

d. Positions of the Parties Regarding Modeling Assumptions

RMLD asserted that the assumptions underlying MMWEC's modeling are not reliable and that MMWEC's analyses therefore are flawed (RMLD Initial Brief at 32). RMLD focused its arguments on assumptions relating to six issues: (1) capacity additions; (2) fuel price forecasts; (3) the on-line date for the proposed project; (4) the current availability of natural gas over the 275 psig line; (5) capacity available from Hydro-Québec; and (6) reserve margins (id. at 33-60).

RMLD noted that the assumption that has the greatest impact on the NPV savings of the proposed project is the amount of new combined cycle capacity added to the existing generation mix in New England (Exh. MMWEC-JJB-S at 12-13; RMLD Initial Brief at 33). RMLD asserted that the most appropriate capacity scenario presented in this proceeding is its own Intermediate Capacity case, since this case is midway between MMWEC's base case and + 2000 MW case (RMLD Initial Brief at 36). In response, MMWEC argued that RMLD's estimates of new combined cycle capacity in New England have been neither consistent nor correct, and asserted that there is no credible record evidence that the Meriden, Cabot, and ANP Gorham plants are either under construction or close to construction (id. at 30-33). PAC noted that the economic value of MMWEC's project is very sensitive to the assumed amount of new combined cycle capacity additions, and argued that MMWEC has not included the full amount of new capacity additions forecasted in the 2000 CELT Report (Tr. 24, at 3496; PAC Initial Brief at 7). PAC calculated that 3646 MW of new capacity additions[39] that have received Siting Board or equivalent approvals were not included in MMWEC's analyses, and noted that MMWEC's own figures show that for every 1000 MW of new capacity that is assumed to be added, the modeled NPV savings of the proposed project is reduced by approximately $6.7 million (Exh. MMWEC-JJB-S-2; PAC Initial Brief at 7). PAC therefore asserted that approved capacity additions could wipe out the entire NPV savings of the proposed project (PAC Initial Brief at 7).

RMLD stated that the set of assumptions with the second largest impact on NPV savings

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[39] PAC listed the following projects: ANP Gorham, Meriden, Cabot, Reliant Hope, Sithe West Medway, Towantic, and Brockton as approved new capacity additions (PAC Initial Petition at 7, citing Exh. RMLD 4-8, Att. 1).

are fuel price forecasts and the price differential between distillate oil, residual fuel oil and natural gas (Exh. MMWEC-JJB-S-2; Tr. 10, at 1428; RMLD Initial Brief at 40). RMLD argued that, in order for MMWEC's proposed facility to produce significant revenue increases, average fuel oil prices must be greater than natural gas prices (Tr. 22, at 3303; RMLD Initial Brief at 40). RMLD stated that the 1999 EIA Annual Energy Outlook fuel price forecast showed a smaller differential between oil and gas prices than the 1997 EIA forecast, and argued that current trends in oil and gas prices more closely resemble those in the 1999 EIA than those in the 2000 EIA forecast (Exh. MMWEC-JJB-S at 8-9; RMLD Initial Brief at 40-42). RMLD asserted that the NPV savings of the project would be further degraded should the spread between oil and natural gas prices decrease (RMLD Initial Brief at 40-42). In response, MMWEC noted that RMLD questioned the validity of MMWEC's fuel price assumptions for the first time in its brief, and argued that its fuel price forecasts were adopted by RMLD's own witnesses, and that the record does not support RMLD's fuel price arguments (Company Reply Brief at 51).

RMLD and PAC asserted that MMWEC's assumed project on-line date of January 1, 2002 is unattainable given the tasks that remain to be completed (RMLD Initial Brief at 43; PAC Initial Brief at 11).[40] RMLD noted that MMWEC's analyses indicate that a one-year delay in the Phase I on-line date would decrease the NPV savings of Phase I by $1.618 million (Exh. RMLD-7-14; RMLD Initial Brief at 45). In response, MMWEC argued that assertions that the Company cannot meet its on-line date of January 1, 2002 are not supported by record evidence (Company Reply Brief at 52).

RMLD noted that MMWEC's High Generation/HQ Dispatch case assumes that the 275 psig line can provide sufficient gas to power only 1.7 of Stony Brook's three units, while earlier analyses assumed that the line could power 1.9 units (RMLD Initial Brief at 51). RMLD and PAC asserted that this change in assumptions, which increases the NPV savings of Phase I by $2.444 million, is unsupported by the record (id. at 54; PAC Initial Brief at 9-10). RMLD

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[40] RMLD listed the following tasks: complete the Final Environmental Impact Report ("FEIR"); obtain property rights for the non-WMECO portions of the ROW; obtain all necessary construction permits; carry out the necessary engineering analyses; obtain approval of the MMWEC Board of Directors; purchase the pipe, and construct the pipeline (RMLD Initial Brief at 43).

noted that while MMWEC assumes a gas requirement of 1050 mcf/hr as the full load operation of all three units, this volume of gas is based on a temperature of 13 degrees Fahrenheit ("F"), and would not be representative of the period of May through October for which the maximum delivery capability of the 275 psig line – whether 1.7 or 1.9 turbines – is assumed (RMLD Initial Brief at 54). In response, MMWEC noted that it consistently testified that the Company currently receives gas sufficient to power about 1.7 turbines over the existing 275 psig line (Company Reply Brief at 43-44). MMWEC further noted that, even if the figure of 1.9 turbines were used, the NPV savings of Phase I would be approximately $15.97 million under the High Generation/HQ Dispatch case (Exh. RMLD-7-14, Att. 2; Company Reply Brief at 46-47).

RMLD also challenged MMWEC's assumption, in the High Generation/HQ Dispatch Case, that the amount of energy exported by Hydro-Québec into New England would decline once the Hydro-Québec Contract expires in 2001 (RMLD Initial Brief at 46-47). RMLD also argued that the High Generation/HQ Dispatch case is flawed because MMWEC used a year 2000 starting fuel price for Hydro-Québec, while continuing to use a 1999 starting fuel price for all other units (Exh. JJB-S-2, Att. 4-S(2); RMLD Initial Brief at 46-47). RMLD asserted that when the starting fuel price for Hydro-Québec is adjusted to be the same as for Stony Brook and the other fossil fuel units, the NPV savings of the 5.6-mile pipeline falls from $18.419 million to $1.174 million (RMLD Initial Brief at 48). RMLD also asserted that MMWEC's assumption that Hydro-Québec will sell 70% less energy to New England for each of the next 20 years is speculative and inconsistent with the evidence in this proceeding (Exh. RMLD-7-5; RMLD Initial Brief at 48). PAC argued that the premise of including a 15% NEPOOL reserve capacity requirement needs to be changed if Hydro-Québec is not considered a must-take contract (PAC Initial Brief at 8).

In response, MMWEC noted that neither RMLD nor PAC disputes that the Hydro-Québec Contract will expire in 2001 (Company Reply Brief at 38). MMWEC noted that when it ran its model using bid prices requested by RMLD, the results showed that Hydro-Québec exported significantly more energy to the United States than indicated in its strategic plan (id. at 39-40). MMWEC asserted that its modeling of imports from Hydro-Québec is consistent with the evidence on the record, including in particular the expiration of the Hydro-Québec Contract

in 2002 and Hydro-Québec's stated intent to reduce exports by two-thirds in order to serve a growing load in the province of Quebec (id. at 42).

RMLD and PAC both argued that MMWEC's modeling understated the amount of new combined cycle capacity likely to be added within New England over time, since it allocates only 80% of new capacity to combined cycle units and allocates 20% to single-cycle combustion turbines (RMLD Initial Brief at 58; PAC Initial Brief at 9). RMLD argued that the 80/20 split is not justified in light of Mr. Seavey's Supplemental Testimony, which indicates that well over 90% of currently projected capacity additions are combined cycle units (id. at 59-60). RMLD asserted that assuming a higher percentage of combined cycle units would lower the modeled NPV savings for the project (id. at 60). In response, MMWEC asserted that the only evidence in this case addressing the likely mix of future capacity additions is MMWEC's economic analysis showing that an 80/20 split would result in an economic balance between future combined cycle units and peaking units (Company Reply Brief at 35). MMWEC argued that the current high penetration rate of new combined cycle units has saturated this sector of the market, and that peaking units will be needed to restore an optimum balance; therefore, MMWEC concluded that its projected 80/20 split for new generation may be conservative (Company Reply Brief at 37).

MMWEC argued that RMLD's less optimistic ROW cost estimates were developed before MMWEC reached an agreement with WMECO concerning the use of WMECO's ROW (Company Reply Brief at 47). MMWEC asserted that the assumptions that underlie the less optimistic ROW costs are now moot, given the agreement (id. at 48). MMWEC also argued that, even if RMLD's less optimistic ROW costs were used, the economics of the project would not change significantly (Company Reply Brief at 50).

MMWEC noted that its estimates of project costs included $5.775 million of project development costs spent between February 1996 and March 31, 2000 (Exh. MMWEC-JJB-S-2, at 8). MMWEC subsequently argued that these are sunk costs with respect to the Company, that they accordingly should be excluded from project costs for purposes of the economic analysis of the proposed project, and that only the project's going forward costs should be considered by the Siting Board (Exh. MMWEC-JJB-S-2, at 8; Tr. 23, at 3476). MMWEC asserted that the NPV savings of the proposed project would be $5.775 million higher if sunk costs were excluded from

the economic analysis (Exh. MMWEC-JJB-S-2, at 8; Tr. 24, at 3646, 3652-3653). In response, RMLD's witness Ms. Tierney asserted that sunk costs must be included in calculating a project's economics, for both economic and public policy reasons (Tr. 20, at 3060). Ms. Tierney asserted that while costs may be sunk from an applicant's perspective, they still should be included when determining whether a particular project has economic benefits for the Commonwealth (id. at 3061). Ms. Tierney noted that the exclusion of sunk costs from the Siting Board's economic analysis of a project would not reflect the project's true cost, and could encourage applicants in future cases to shift the timing of project expenditures in an effort to improve the appearance of project economics (id. at 3059-3061). RMLD concluded that the Siting Board should consider the full costs and benefits of a proposed project (id. at 3061).

e. Analysis

In order to meet its statutory mandate, the Siting Board first evaluates whether there is a need for additional energy resources to meet reliability, economic efficiency or environmental objectives. The Siting Board must find that additional energy resources are needed as a prerequisite to approving a proposed energy facility. Berkshire Gas Decision, 9 DOMSB 1, 12.

MMWEC has asserted that the proposed project would provide both economic efficiency and environmental benefits by increasing the natural gas supply to Stony Brook. In the past, the Siting Board has determined that, in some instances, utilities need to add energy resources primarily for economic efficiency purposes. Specifically, in Massachusetts Electric Company, 13 DOMSC 119, 178-179, 183, 187, 246-247 (1985), and in Boston Gas Company, 11 DOMSC 159, 166-168 (1985), the Siting Board recognized the benefit of adding economic supplies to a specific utility system. The Siting Board also noted in Eastern Energy Corporation (Remand), 1 DOMSB 213 (1993) ("Eastern Energy Remand"), that because G.L. c. 164 requires a necessary energy supply to be provided with a minimum impact on the environment at the lowest possible cost, it is reasonable to conclude that a proposed facility may be necessary even if there is no additional need for supply capacity or transmission reasons. We stated that, in such a case, an applicant would have to establish a record that supported a finding by the Siting Board that the Commonwealth's energy supply would have lower costs and/or reduced environmental impacts

with the addition of the proposed facility than it would have without the addition of the proposed facility. Eastern Energy Remand, 1 DOMSB 213, 411-412.

Here, the Company has provided a 20-year analysis of the economic efficiency benefits associated with the proposed project, together with a detailed description of its methods and assumptions. MMWEC first determined the increase in Stony Brook's energy value resulting from the construction of the new pipeline. MMWEC then calculated the costs of constructing, owning, and operating the proposed pipeline, and finally determined the NPV savings of the proposed project by subtracting this cost from the increased energy value. The intervenors have not questioned MMWEC's basic methods, and in fact have used the same basic methods in their own economic analyses. The Siting Board notes that MMWEC's deterministic model and RMLD's probabilistic model appear to provide similar economic results given similar assumptions. The Siting Board therefore finds that MMWEC's deterministic model and RMLD's probabilistic model both are acceptable as a basis for determining the economic benefits provided by the proposed project.

While the intervenors have not challenged MMWEC's methods, they have challenged a number of the assumptions that MMWEC made in conducting its economic modeling. The Siting Board notes that, while it is important to understand the effect that each assumption has on the analyses, in this case the significant fluctuations in NPV savings are associated almost entirely with the assumed changes in available capacity, including both in-region supply and power imports from Hydro-Québec. Assumptions as to the number of turbines used for the status quo case, the on-line date, reserve levels, and ROW costs, while having an effect on the NPV savings, are not significant factors in determining the economic efficiency of the proposed project.[41] The Siting Board therefore focuses its analysis on these capacity-related issues.

The record shows that MMWEC and RMLD together have put forth a set of economic analyses encompassing a range of capacity assumptions. The varying levels of new generation assumed in different model runs during the proceeding has largely reflected differing

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41 With regard to fuel prices, MMWEC conducted sensitivity analyses under a range of fuel price assumptions. The record shows that the modeled NPV savings remained positive under the varying fuel price inputs.

assumptions as to the number of generating units coming on-line in the immediate planning horizon of 2002. MMWEC has put forth the High Generation/HQ Dispatch case, submitted close to the end of the proceeding, as its preferred case. The High Generation/HQ Dispatch case captures a 10,071 MW increase in generation by 2002 (based on units known to be operational or under construction) and the expiration of the Hydro-Québec Contract, with an attendant reduction in exports to the United States. MMWEC's Low Generation/HQ Firm case assumes approximately 4000 less MW of new generation than MMWEC's preferred case, and the continuation of the Hydro-Québec Contract, with an attendant continuation of current levels of exports to the United States.

RMLD also developed a supply case based on the addition of generating units known to be operational or under construction; this case, which RMLD calls its Low Capacity case, assumes the addition of 9340 MW of new capacity by 2002. RMLD also provided, as its preferred case, an Intermediate Capacity case, which in addition to the new capacity in its Low capacity case, assumes the addition by 2002 of units believed to be close to construction, for a total of 11,115 MW of new capacity by 2002. Finally, MMWEC provided a sensitivity analysis of its High Generation/HQ Dispatch case which assumes the further addition of 2000 MW in 2003 and 2004.

The Siting Board first addresses the issue of new generation and the timing for such generation coming on-line. Based on the evidence provided by MMWEC and RMLD, it is clear that MMWEC's Low Generation case, including 6250 MW of new capacity, significantly underestimates the amount of new generation known to be operating or under construction in New England. Further, based on the record evidence regarding the number of new units in operation and under construction, the Siting Board concludes that RMLD's Low Capacity case at 9340 MW, and MMWEC's High Generation case at 10,071 MW, represent reasonable estimates of known capacity additions. The Siting Board notes, however, that permitting on many additional generating projects was in progress at the close of the record, and that while these projects may not all be built, there is a significant probability of further capacity additions in 2003 and 2004. The Siting Board accepts RMLD's Intermediate Case and MMWEC's +2000 MW case as reasonable approximations of the possible impact of further capacity additions.

The Siting Board next turns to the issue of future imports from Hydro-Québec. The record indicates that the Hydro-Québec Contract is due to expire in 2001, and that a successor contract has not been negotiated. Because significant changes have taken place in the electric industry since the Hydro-Québec Contract was negotiated, including changes in the role played by the signatory electric utilities, the Siting Board concludes that the continuation of the Hydro-Québec Contract in its current form is unlikely. The Siting Board recognizes that Hydro-Québec may seek either to retain some larger portion of its production within Canada, or to export to other regions of the United States. However, the assumption that Hydro-Québec would be dispatched at the $28 bid price, resulting in an approximately 65% decrease in sales to New England, is speculative. The Siting Board concludes that the level of future exports to New England is likely to fall somewhere between those projected by MMWEC and RMLD.

The Siting Board next assesses the various supply scenarios presented by MMWEC and RMLD in light of these conclusions. As can be seen in Tables 2 and 3, above, RMLD and MMWEC have presented four capacity cases[42] reflecting the assumption that the Hydro-Québec contract would continue in its current form. These four cases reflect generating capacity increases of between 6250 MW and 11,115 MW. The expected NPV savings of the proposed project is positive for cases showing capacity increases of up to 9340 MW, while the expected NPV savings of Phase I of the proposed project is positive for cases showing capacity increases of up to 10,071 MW, including both MMWEC's High Generation case and RMLD's Low Capacity case.

MMWEC also has presented two capacity cases that assume a significant reduction in imports from Hydro-Québec. One of these cases assumes capacity additions of 10,071 MW by 2002; the other assumes capacity additions of 12,071 MW by 2004. The NPV savings of both the proposed project and Phase I remain positive for both cases. A comparison of two cases that are identical except for assumptions regarding Hydro-Québec imports – MMWEC's High

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[42] Because MMWEC has reached an agreement with WMECO regarding the use of WMECO's ROW, and because that agreement calls for the use of a 20-foot ROW (as assumed in RMLD's optimistic ROW case), rather than a 40-foot ROW (as assumed in RMLD's less optimistic ROW case), the Siting Board here relies on RMLD's optimistic ROW cases.

Generation/HQ Dispatch case and its High Generation/HQ Firm case – shows a difference in NPV savings of approximately $18.1 million for the proposed project and approximately $17.2 million for Phase I. Thus, projections of economic benefits are highly sensitive to assumptions about future levels of imports from Hydro-Québec.

Overall, the record indicates that the addition of natural gas capacity at Stony Brook is likely to provide economic benefits either if capacity additions remain at current levels, or if additional capacity is added in 2003 and 2004, but Hydro-Québec imports decrease. Economic losses ranging from $1.6 to $5.284 million are projected only if further capacity additions are combined with current levels of imports from Hydro-Québec. The Siting Board has concluded, above, that the continuation of the Hydro-Québec Contract in its current form is unlikely. We note that the losses projected for the cases involving high levels of new capacity and current levels of imports from Hydro-Québec are relatively small; thus, even minor reductions in the current level of imports likely would result in economic benefits. Consequently, the Siting Board concludes that the addition of natural gas capacity at Stony Brook is likely to result in economic benefits under most reasonable capacity scenarios.[43]

The Siting Board concludes that, under most reasonable scenarios, construction of an additional source of natural gas such as the proposed project would provide economic benefits for the Project Participants and Joint Owners, although the level of such benefits is uncertain.

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[43] MMWEC and RMLD differ as to whether an estimated $5.775 million in already incurred project expenses should be included in the economic analysis of the proposed project, or treated as sunk costs. The Siting Board notes, as a matter of policy, that an analysis of the economic need for a project should be prepared prior to making a significant investment in that project, and therefore should include all costs associated with the project, including project development, design, and permitting costs. Expenditures made prior to project approval typically are made at the petitioner's risk. Our analysis of need therefore includes the $5.775 million in the total cost of the proposed project. The Siting Board recognizes, however, that in this instance both the costs and the economic benefits of the proposed project reside with the Project Participants and Joint Owners. Incurred project costs already have been assumed by the Project Participants and Joint Owners; they cannot be disallowed through a future rate case, as in a typical utility proceeding. Therefore, as a practical matter, the actual economic benefits to the Project Participants and Joint Owners of going forward with one or both phases of the proposed project likely would be higher than indicated in Tables 2 and 3, above.

Consequently, the Siting Board finds that MMWEC has demonstrated that there is a need for additional energy resources serving Stony Brook for economic efficiency purposes.

4. Environmental Need

a. MMWEC's Modeling

MMWEC asserted that the proposed project would enable MMWEC to increase the use of natural gas at Stony Brook, and that this would lead to a reduction in regional emissions of criteria pollutants and CO_2, as well as to reductions in the emissions of certain pollutants within Massachusetts (Exh. EFSB-3, at 10). Using results of the dispatch model described in Section II.A.3, above, MMWEC estimated changes in air emissions from Stony Brook, from Massachusetts, and from New England plus New York ("northeast region") (Exh. HO-N-63). MMWEC presented modeling showing increases in overall facility operations and increases in facility air emissions, both reflecting increased gas-fired operation (Exhs. MMWEC-LMB at 8; MMWEC-JJB-S-2; HO-N-75-S-2; RR-HO-MM-31-S-2; Tr. 2, at 223-224). MMWEC's modeling showed that the project would result in decreases in regional air emissions, as described below.

MMWEC modeled the dispatch of the Stony Brook facility and other generation facilities in New England for the period 2002 to 2021, with and without the project, under a variety of economic conditions, as described in Section II.A.3, above.[44] The dispatch model indicated that greater use of Stony Brook, utilizing gas, would lessen the use of other facilities, some of which are fueled with oil (Exhs. HO-N-75-S-2; RR-HO-MM-31-S-2). To estimate changes in air emissions, MMWEC modeled facility, Massachusetts, and regional emissions of CO_2 and five criteria pollutants, for each of three years – 2002, 2005, and 2010 – based on its dispatch model.[45]

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[44] The dispatch model is based on a set of assumptions about hourly power supply bids that would be placed with the New England Independent System Operator ("ISO"). MMWEC suggested that it would be economically rational for firms to place bids at the level of their short-run marginal costs (Tr. 12, at 1702-1704).

[45] MMWEC modeled projected differences in Massachusetts and northeast region annual total emissions in each of three years (2002, 2005, 2010) under: (1) a reference

(continued...)

MMWEC variously used existing facility permit limits, state or federal regulatory limits, and default emission rate factors compiled by the U.S. Environmental Protection Agency to estimate emission rate factors for each plant that could be displaced by increased operation of the intermediate unit (Exh. MMWEC-LMB at 5; Tr. 1, at 62).[46] MMWEC characterized these various rate factors as being very close to the actual emissions of displaced generating facilities (Tr. 1, at 62). MMWEC calculated the change in air emissions for each facility by multiplying the change in the facility's dispatch by its emission rate factor (Exh. MMWEC-LMB at 5).

MMWEC's analysis showed that construction of the proposed project would result in increases in Stony Brook emissions and decreases in emissions at specific generating facilities in New England (id., at 4). Changes in Massachusetts and regional emissions that would result from the project in 2002 are shown in Table 4, below.

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45 (...continued)
economic case based on the High Generation/HQ Dispatch case; and (2) an economic scenario which assumes construction of an additional 2000 MW of combined cycle generation compared to the reference case (Exhs. MMWEC-LMB at 8; MMWEC-JJB-S-2; HO-N-75-S-2; RR-HO-MM-31-S-2). Multiple iterations of air emissions analyses were provided (Exhs. EFSB-3, at 93-99; HO-N-76; HO-N-76-S; HO-76-S-2; HO-N-76-R; RR-HO-MM-31-S-2). Earlier emissions analyses were provided for a wider range of economic scenarios, including high and low gas prices (Exh. HO-N-76-R-3). Differences in ozone season emissions were also modeled (id.; Exhs. HO-N-75-S-2; RR-HO-MM-31-S-2).

46 MMWEC stated that, because the New York facilities that would be displaced were not specifically identified, this procedure could not be followed for New York reductions, and NEPOOL marginal emission rates were used in their stead (Exh. MMWEC-LMB at 13).

TABLE 4
PROJECTED NET CHANGE IN STATE AND REGIONAL EMISSIONS, YEAR 2002 [a]

Pollutant	Change in Massachusetts Emissions, tons per year	Change in Northeast Region Emissions, tons per year
Nitrogen oxides (NO_X)	33 to 43	-173 to -157
Sulfur dioxide (SO_2)	-348 to -307	-872 to -768
Particulates (PM)	-13 to -12	-74 to -67
Carbon monoxide (CO)	-17 to -15	-57 to -51
Carbon dioxide (CO_2)	—[b]	-23,789 to -19,528
Volatile organics (VOC)	4 to 5	-9

Sources: Exhs. HO-N-75-S-2; RR-HO-MM-31-S-2.
a. Ranges shown include emissions changes that would result from the proposed project, if built in its entirety, and emissions changes that would result from construction of Phase I of the project.
b. Carbon dioxide is considered only as a global pollutant, so change in state emissions is not calculated here.

Based on the modeled changes in emissions due to displaced generation, MMWEC claimed that the proposed project would result in a net decrease in emissions of CO_2 and five criteria pollutants in the northeast region, and also would result in a net decrease in emissions of SO_2, particulates, and CO within Massachusetts (Exhs. EFSB-3, at 10, 28; HO-N-75-S-2; HO-N-76-S; RR-HO-MM-31-S-2) (See also Section II.B.5.c, below).

MMWEC's modeling predicted very low oil usage by the intermediate unit under baseline conditions and consequently did not predict that use of No. 2 fuel oil as fuel for Stony Brook would decrease in any significant way as a result of the project (See Section II.B.5, below).[47] MMWEC indicated that the way its dispatch model incorporated the possibility of unexpected outages at other facilities is a factor leading to its prediction of low rates of oil burning at Stony Brook (Tr. 10, at 1471). MMWEC explained that its deterministic model multiplies long-term average outage rates for other facilities by the facilities' power outputs to calculate an average expected power output for each competing facility, rather than the more

47 MMWEC stated that the Stony Brook intermediate unit would continue to burn oil when the gas supply is interrupted for pipeline maintenance, when transportation service is reduced in accordance with the Bay State Contract, and when fuel oil is less expensive than gas (Exhs. HO-N-20-R; HO-N-20-S).

random and abrupt occurrence of outages as they would actually occur; as a result, the deterministic model tends to underestimate oil-fired generation at the Stony Brook facility (Tr. 11, at 1564-1571; Tr. 23, at 3422-3423). Consequently, MMWEC's deterministic model predicts very low dispatch rates in the winter, when reserve levels are typically high, and therefore very low oil usage by the intermediate unit under baseline conditions (Tr. 10, at 1470-1471). MMWEC indicated that in actuality there would continue to be a reasonable likelihood that multiple facilities would have outages in the winter months and that Stony Brook would end up being called on to run on oil (id., at 1471).

MMWEC provided emissions projections for a variety of scenarios including, as part of its final corrected projections, scenarios assuming higher regional electric generation capacities (Exh. HO-N-75-S-2). Scenarios of higher regional generation capacities resulted in reduced dispatch of Stony Brook. For example, a scenario of an additional 2000 MW regional capacity would reduce the projected year 2005 increase in Stony Brook generation, with the proposed project, from 426,600 MW-hrs to 214,100 MW-hrs (Exh. HO-N-75-S-2). MMWEC agreed that with more new power plants coming on line, the proposed project would have progressively less impact in reducing emissions of criteria pollutants (Tr. 2, at 167-168).

b. Positions of the Parties

PAC contended that Stony Brook is located in "what is already one of the poorest air quality areas in Massachusetts"[48] and that emissions from Stony Brook move to very densely

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48 In response to a request from PAC to describe air quality in the Springfield area, MMWEC provided excerpts from the U.S. Environmental Protection Agency's 1996 Annual Report on Air Quality in New England (Exh. PAC-PH-7). The Massachusetts summary from that document indicates that CO was monitored only at Boston, Worcester, Springfield, and Lowell in 1996; that lead monitoring has been discontinued; that nitrogen dioxide ("NO_2") concentrations were highest at monitoring stations located in Worcester, Springfield, and metropolitan Boston and lowest at Quabbin and Newbury; that ozone concentrations were highest in Fairhaven and Truro; that concentrations of particulates were highest at Boston and Springfield and lowest at Quabbin; and that SO_2 concentrations were highest at Chelsea and Swansea and lowest at Quabbin (id.). The document also indicates that biogenic volatile compounds such as isoprene have relatively high concentrations at inland sites including Quabbin (id.).

populated areas no matter which way the wind blows (PAC Initial Brief at 31). PAC contended that, in contrast, the facilities expected to be displaced by increased generation at Stony Brook are largely out-of-state and almost wholly along the coast line, where, it says, emissions are carried out to sea (id.).[49] Finally, regarding the projected increase in Massachusetts NO_x and VOC[50] emissions, PAC questions whether a project that would result in such increases would be allowable under law (id.).

c. Analysis

The Siting Board has held that in determining environmental need, a project proponent must provide full documentation of its assumptions pertaining to environmental benefits associated with the dispatch of generation capacity. ANP Blackstone Energy Company, 8 DOMSB 1, 59 (1999) ("ANP Blackstone Decision"); ANP Bellingham Energy Company, 7 DOMSB 39, 93 (1998) (ANP Bellingham Decision); Altresco Lynn Inc., 2 DOMSB 1, 98 (1993) (Altresco Lynn Decision); see also, Enron Power Enterprise Corporation, 23 DOMSC 1, 71 (1991) ("Enron Decision"); MASSPOWER Inc., 20 DOMSC 301, 388 (1990) ("MASSPOWER Decision").

In the Enron Decision, the Siting Board found for the first time that a proposed generating project would provide Massachusetts with environmental benefits related to net changes in air

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49 In response to a PAC request, MMWEC provided a map showing that generating facilities that were modeled as having the greatest displacement of generation (in one selected year, 2002) are located along the coast from Bridgeport, Connecticut, to Salem, Massachusetts (Exh. RR-PAC-MM-1).

50 PAC's brief refers to MMWEC's air emissions designation "VOC" as "carcinogens" (PAC Initial Brief at 31). The Siting Board understands the Company's use of the term "VOC" to conform to widespread usage of the term in the context of ozone formation, where "VOC" refers to a total amount of volatile organic material, thought to act in bulk as a precursor to the formation of ground-level ozone. The Siting Board recognizes that there are specific carcinogenic chemicals that are also volatile and so can be described as being among the set of VOCs. However, the record does not indicate that power plants, when fueled by natural gas, have any significant emission of volatile carcinogenic compounds, and the term "VOC" does not itself indicate carcinogenicity, as implied by the intervenor comment.

emissions from existing and future generating facilities in Massachusetts. Enron Decision, 23 DOMSC 1, 69-73. In later decisions, the Siting Board found that applicants' projects likely would provide short-term air quality benefits for Massachusetts and/or the region based on the displacement of existing generation and associated emissions. ANP Blackstone Decision, 8 DOMSB 1, 48; Cabot Power Corporation, 2 DOMSB 241, 324, 329 (1994); Eastern Energy Remand, 1 DOMSB 213, 325-335.

Here, the record shows that MMWEC modeled the dispatch of the Stony Brook facility and other generating facilities in New England for the period 2002 to 2021, with and without the proposed project, under a variety of economic conditions. MMWEC's analysis (described in Section II.A.3, above) implicitly assumed that the proposed project would not affect the total amount of electricity consumed in the region, so each additional one megawatt generated at Stony Brook is offset by the displacement of one megawatt generated by a competing facility.[51] The record shows that MMWEC then modeled facility, statewide, and regional emissions of CO_2 and five criteria pollutants, for the years 2002, 2005, and 2010, based on the dispatch model.

The record sets forth the methods MMWEC used to derive emissions changes from modeled displacement of generation in Massachusetts and the northeast region. Although the analysis addresses the addition of a new fuel supply rather than the addition of new generation capability, MMWEC's analytical methods are generally similar to those used in past Siting Board reviews of generating facilities, and raise issues identified in earlier cases. First, the time frame of MMWEC's air pollution displacement analysis is nine years. Despite concerns set forth in past Siting Board reviews of proposed generation facilities, MMWEC did not specifically focus its air pollution displacement analysis on the near future. Second, in addressing the viability over time of aging generators, MMWEC simply assumed that the dispatch of such generators would be best predicted by their short-term operating costs, rather than assuming that some aging plants

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51 The Siting Board has reviewed this type of analysis in past cases. See, e.g., ANP Blackstone Decision, 8 DOMSB 1, 55-56, 61-62; ANP Bellingham Decision, 7 DOMSB 39, 84-87, 94-96; MASSPOWER Decision, 20 DOMSC 301, 387-388.

would be retired or modified.[52] To its credit, MMWEC did assume that future generic combined cycle unit additions would have better fuel efficiencies than Stony Brook.

The record reflects one specific weakness of MMWEC's reliance on a deterministic dispatch model, which incorporates plant outage levels into long-term average generation capacities. As noted by MMWEC, its deterministic modeling likely resulted in the underestimation of oil-fired generation at the Stony Brook facility, as modeled both with and without the proposed project.

Generally, MMWEC's dispatch model supports the expectation that the project would cause wholesale market prices of electricity to decrease marginally in New England. The Siting Board notes that a marginal decrease in prices could marginally postpone the construction of future generating facilities. MMWEC's model does not address this possible economic feed-back mechanism and therefore may overestimate air emissions benefits over the long term.

The Siting Board notes, however, that these are relatively minor methodological issues and that dynamic modeling of the electric industry could introduce additional inaccuracies due to the difficulty of determining the likely market response to lower prices. Consequently, the Siting Board finds that MMWEC's model provides a reliable basis for predicting emissions impacts.

MMWEC's modeling indicates that, in the short run, greater use of Stony Brook on gas would lessen use of other regional generating facilities, some of which are fueled with oil. The model predicts that the proposed project would result in a net decrease in emissions of CO_2 and five criteria pollutants when the entire northeast region is considered, and a net decrease in emissions of SO_2, particulates, and CO within Massachusetts. Modeled in-state and regional decreases in emissions of criteria pollutants are on the order of hundreds of tons per year, and the modeled decreases in regional CO_2 emissions are approximately 20,000 tons per year. These predicted changes are significantly smaller than projected changes resulting from recently approved generating facilities such as the Nickel Hill project, for which the applicant projected

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52 In previous cases involving addition of electrical generating capacity, the Siting Board identified concerns with respect to (1) assumed redispatch of displaced generation over time with continued load growth and (2) failure to address the potential for significant amounts of retirement of existing generating units. See, e.g., ANP Blackstone Decision, 8 DOMSB 1, 47.

regional net reductions of 8000 tons of NO_X per year, 30,000 tons of SO_2 per year, and 2,510,000 tons of CO_2 per year (Nickel Hill Energy, LLC, 11 DOMSB 83, 136 (2000)); ANP Blackstone, for which the applicant projected regional net reductions averaging 4092 tons of NO_X per year, 15,354 tons of SO_2 per year, and 1,400,000 tons of CO_2 per year over five years (ANP Blackstone Decision, 8 DOMSB 1, 58-59); and Millennium, for which the applicant projected regional net reductions averaging 601 tons of NO_X per year, 1366 tons of SO_2 per year, and 550,000 tons of CO_2 per year over six years (U.S. Generating Company, 6 DOMSB 1, 56 (1997)). Thus, the Siting Board concludes that the regional emissions reductions associated with the proposed project, although clear, are on a relatively modest scale. Moreover, while the dispatch model shows that displacement of existing facilities would tend to lessen total regional pollutant emissions, any tendency of the project to delay construction of newer facilities likely would have a countervailing effect. As noted above, MMWEC's model does not account for possible economic feed-back mechanisms. Therefore, the potential countervailing effect of delaying other generators is not reflected in MMWEC's model results.

MMWEC presented changes in both Massachusetts and regional emissions, without reference to the spacial distribution of those emissions. The Siting Board notes that this approach is most suitable for evaluation of emissions of regional and global concern, including emissions of NO_X and VOC, which are precursors to ozone; emissions of SO_2, a contributor to haze and acid rain; and emissions of CO_2, which is considered a factor in climate change. As a result, the Siting Board considers the net impact of the project in reducing regional emissions of SO_2, NO_X, VOC, and CO_2 to be particularly significant. MMWEC's analysis shows benefits on a regional level for each of these pollutants. The Siting Board notes that ground-level concentrations of CO and particulates are not directly related to total statewide or regional emissions. Thus, for other pollutants which may be of local concern, comparison of modeled regional or statewide emissions gives only a rough indication of overall impacts or benefits.

MMWEC's modeling, on its face, predicts increases in Stony Brook emissions of all criteria pollutants as a result of the proposed project. However, as discussed above, MMWEC's use of a deterministic model likely understated the continuing amount of oil-fired generation at Stony Brook; consequently, the projected absence of any improvement in facility emissions is not

wholly credible. Displacement of oil burning at Stony Brook by gas burning at Stony Brook is probably underestimated by the model. A model that projected more baseline use of oil would presumably predict that an enhanced gas supply would lead to a larger reduction in Stony Brook operations on oil, and thereby predict a reduction in local emissions of pollutants, such as SO_2, that have dramatically lower emissions from gas compared to emissions from oil. Therefore, MMWEC's prediction of adverse changes in local emissions of all criteria pollutants could be conservative; i.e. local air emissions would likely increase less than predicted by MMWEC and SO_2 emissions may actually decrease.

PAC has argued in essence that projected increases in local emissions at Stony Brook should be given greater weight than projected emissions reductions at other locations because air quality near Stony Brook is unusually poor and because emissions at other locations might typically drift out to sea. However, the record evidence does not suggest that any one area of the Commonwealth has markedly worse air quality than any other area. Rather, the record suggests that, throughout the state, criteria pollutants tend to have higher concentrations in urban areas than in rural areas. Also, the record does not demonstrate that a given emission of an air pollutant would have a greater adverse impact if released near Ludlow rather than at a point near the ocean, and it does not demonstrate that pollutants emitted along the coast have no local or regional impacts. Therefore, the Siting Board will not give greater weight to Stony Brook emissions than to similar emissions at another location. Notwithstanding modeled increases in Massachusetts NO_X and VOC emissions, the Siting Board notes that emissions of these ozone precursors at Stony Brook will continue to be subject to regulation by the Massachusetts Department of Environmental Protection.

Overall, the Siting Board notes that MMWEC was able to demonstrate, through its displacement analysis, modest net reductions in northeast regional NO_X, SO_2, particulates, CO, and CO_2 emissions in the years 2002 through 2010 if the proposed project is constructed.[53] Thus,

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[53] The record contains little if any information about any additional environmental benefits that might accrue in the future from enhancing gas transportation capacity in the area surrounding Stony Brook, beyond displacement effects from enhanced use of the existing intermediate unit at Stony Brook. Nevertheless, depending on its sizing and design, (continued...)

the Siting Board finds that the proposed project is needed to provide regional air quality benefits.

The Siting Board recognizes the complexity involved in estimating pollutant emissions for Massachusetts due to the transportation of pollutants across state lines and the uncertainty regarding the location of generating facilities to be developed in the future. The Company's approach for estimating Massachusetts emissions benefits by including all generating units physically located in Massachusetts is reasonable. The Company's analysis projects modest net emissions reductions in Massachusetts for SO_2, particulates, and CO over the analysis period. The Siting Board notes that Massachusetts also benefits from reductions in regional emissions of certain criteria pollutants such as NO_X, SO_2, and VOC. Consequently, the Siting Board finds that there is a need in Massachusetts for additional energy resources serving Stony Brook for environmental purposes.

5. Conclusions on Need

The Siting Board has found that there is a need for additional energy resources serving Stony Brook for economic efficiency purposes. Further, based on anticipated improvements in regional air quality and anticipated reductions in the emissions of some air pollutants in Massachusetts, the Siting Board has found that there is a need in Massachusetts for additional energy resources serving Stony Brook for environmental purposes. Consequently, the Siting Board finds that there is a need for additional energy resources serving Stony Brook to provide for a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

The Siting Board notes that MMWEC has not, in this proceeding, argued that the proposed project is needed to ensure the reliability of either the New England or the Massachusetts energy supply. Thus, our finding of a need for additional energy resources is based on economic benefits which would accrue to Project Participants under most reasonable capacity scenarios, and on the clear but relatively modest state and regional environmental

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53 (...continued)
additional pipeline capacity has the potential to support additional use of natural gas at new or modified facilities at Stony Brook or surrounding areas, potentially leading to further regional environmental benefits.

benefits that would result from the increasing operation of the Stony Brook facility on natural gas. Since the finding of need for the proposed project is based solely on economic and environmental benefits, and since the identified benefits may be modest, the Siting Board notes that the benefits of the proposed project could be outweighed by its other environmental impacts. These impacts are considered in Section III.C, below.

B. Comparison of the Proposed Project and Alternatives

1. Standard of Review

G.L. c. 164, § 69H requires the Siting Board to evaluate a proposed project in terms of its consistency with providing a necessary energy supply to the Commonwealth with a minimum impact on the environment at the lowest possible cost. In addition, G.L. c. 164, § 69J requires a petitioner to present "alternatives to planned action" which may include: (1) other methods of generating, manufacturing or storing electric power or gas; (2) other sources of electrical power or natural gas; and (3) no additional electric power or gas.[54]

In implementing its statutory mandate, the Siting Board requires a petitioner to show that, on balance, its proposed project is superior to alternative approaches in terms of cost, environmental impact, and ability to meet the identified need. Berkshire Gas Decision, 9 DOMSB 1, 24; 1998 NEPCo Decision, 7 DOMSB 333, 358; MassElectric Decision, 18 DOMSC 383, 404-405. In addition, the Siting Board requires a petitioner to consider reliability of supply as part of its showing that the proposed project is superior to alternative approaches. Berkshire Gas Decision, 9 DOMSB 1, 24; Commonwealth Electric Company, 5 DOMSB 273, 299-300 (1997); MassElectric Decision, 18 DOMSC 383, 404-405.

2. Identification of Project Approaches

The Company presented three approaches for meeting the identified need: (1) the proposed project; (2) a 5.4-mile pipeline, located entirely in Ludlow, that interconnects with the

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54 G.L. c. 164, § 69J also requires a petitioner to provide a description of "other site locations." The Siting Board reviews MMWEC's preferred and alternative pipeline routes, as well as other potential pipeline routes, in Section III.B., below.

Monson-Palmer line, ("5.6-mile alternative");[55] and (3) an approximately 3.0-mile pipeline that interconnects with the Monson-Palmer line closer to Stony Brook, also located entirely in Ludlow ("3-mile alternative"). During the proceeding, variations to two of these alternatives were identified: the construction of the proposed project in two phases, and the use of the 3-mile alternative combination with the existing 275 psig Bay State line that currently serves Stony Brook.[56]

a. Proposed Project

The Company described the proposed project as a 14.7-mile pipeline originating at the Stony Brook facility and terminating at an interconnection point with the Tennessee interstate pipeline in Hampden (Exh. EFSB-3, at 2). The pipeline would be designed for a maximum allowable operating pressure of 1000 psig, and would be operated to provide a minimum delivery pressure of 360 psig at Stony Brook (id. at 16; Exh. MMWEC-JOR/ARM at 14; Tr. 8, at 1098). The proposed project also would include two above-ground facilities: a custody transfer station, and a meter station located at Stony Brook (Exh. EFSB-3, at 16-17).

MMWEC currently proposes to construct the proposed project in two phases. Phase I would be an approximately 5.4-mile, 20-inch pipeline which would begin at Stony Brook and would terminate at an interconnection point with the Monson-Palmer line close to the Massachusetts Turnpike in Ludlow (Exh. MMWEC-JOR-S at 1, 2, 4). Phase II would be an approximately 9.1-mile, 16-inch pipeline, which would continue along the proposed route from the Monson-Palmer interconnection point to a final interconnection point with Tennessee in Hampden (id. at 1- 2; Exh. EFSB-3, at 32).

MMWEC proposes to construct Phase I first, and to construct Phase II only if the

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55 MMWEC noted that the actual length of the 5.6-mile alternative is approximately 5.4 miles (Exh. EFSB-3, at 39). However, it has generally been identified in the record using the name "5.6-mile alternative."

56 MMWEC stated that it also considered a no-build alternative, i.e., the continued use of the 275 psig line in its present configuration (Exh. EFSB-3, at 30). The Company stated that this approach, because it would not increase the volume of gas available to Stony Brook, would not produce the environmental and economic benefits the Company asserts will result with increased use of gas (id. at 30 to 31).

operation of Phase I proves to be unsatisfactory from either an engineering or economic standpoint (Exh. MMWEC-JOR-S at 2). The Company stated that the Phase I custody transfer station would be located near the Massachusetts Turnpike; if Phase II is constructed, the custody transfer station would be relocated adjacent to the Tennessee ROW in Hampden (Exh. EFSB-3, at 16-17). MMWEC noted that the Phase I custody transfer station and meter station both would be significantly smaller in scale than their Phase II counterparts (id. at 17).

b. 5.6-Mile Alternative

The Company stated that the 5.6-mile alternative would consist of an approximately 5.4-mile, 20-inch pipeline running from Stony Brook to an interconnection point with the Monson-Palmer line at a point in Ludlow near the Massachusetts Turnpike (Exhs. EFSB-3, at 39; MMWEC-JOR-S at 5). MMWEC noted that the location and physical configuration of the 5.6-mile alternative are the same as those of Phase I of the proposed project (Exhs. EFSB-3, at 39; PAC-00N-20). In addition, MMWEC noted that, assuming the same inlet conditions, the capacity of the 5.6-mile alternative is the same as that of Phase I of the proposed project (Exh. PAC-00N-20). MMWEC stated that the primary difference between the 5.6-mile alternative and Phase I of the proposed project is that Phase I is intended as an intermediate step towards construction of the proposed project in its entirety, whereas the 5.6-mile alternative ends at the Ludlow interconnection point (Exh. MMWEC-JOR-S at 6-7).

MMWEC stated that the 5.6-mile alternative would provide natural gas at a delivery pressure of 350 psig at Stony Brook, and therefore would require modifications at the Stony Brook facility (Exhs. MMWEC-GEL at 5- 6; HO-N-4-S). MMWEC calculated that the capacity of the 5.6-mile alternative would be 2730 mcf/hr, at a pipeline roughness of 1800 micro inches (Exh. HO-RR-MM-25).[57] The Company noted that the use of the 275 psig line in conjunction with the 5.6-mile alternative could enable the system to be operated to provide a delivery pressure of 360 psig (Tr. 8, at 1067).

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[57] Bay State calculates a significantly higher flow rate (see Section II.B.3.c, below).

c. 3-Mile Alternative

MMWEC described the 3-mile alternative as an approximately 3-mile, 16-inch pipeline which would extend south from Stony Brook to interconnect with the Monson-Palmer line at a point near West Street and West Road in Ludlow (Exh. EFSB-3, at 8, 9, 32). The Company presented two potential routes for this alternative. The first route ("3-mile alternative 1"), would travel for 2155 feet in West Street, 8100 feet in a WMECO ROW, and 5000 feet in an oil ROW and on MMWEC property, for a total length of 2.89 miles (Exhs. HO-A-6; EFSB-3, at 32; HO-A-47-S; RR-PAC-MM-5). The second route ("3-mile alternative 2"), would run for approximately 2.83 miles, predominantly within the West Street ROW (Exhs. HO-B-A-6; EFSB-3, at 32; HO-A-47-S; RR-PAC-MM-5). The endpoint of the 3-mile alternative lies between Cady's Corner in Ludlow and Indian Orchard in Springfield; there is extensive urbanized land between this point and the Tennessee pipeline, limiting the future potential for expansion of the 3-mile line (Exh. EFSB-3, at Figures 2, 3).

MMWEC calculated that the capacity of the 3-mile line, standing alone, would be 2187 mcf/hr at a delivery pressure of 360 psig, and 2318 mcf/hr at a delivery pressure of 350 psig at a pipeline roughness of 1800 micro inches (Exh. RR-HO-MM-25). However, the Company noted that the use of the existing 275 psig line in conjunction with the 3-mile line could enable the system to operate with a flow rate of between 4000 to 4300 mcf/hr (id.; Exh. EFSB-3, at 30). This calculation assumed that the 3-mile line would provide between 2187 to 2318 mcf/hr under steady state flow conditions, and that the 275 psig line could provide 1800 to 1900 mcf/hr (Exhs. RR-HO-MM-25; EFSB-3, at 30).[58]

MMWEC indicated that the 275 psig line is available to it only on a interruptible basis, as Bay State may use the capacity on the line for other purposes (Exh. MMWEC-JOR/ARM at 17) (See Section II.B.3, below). Bay State indicated that MMWEC is presently the only interruptible customer served off the 275 psig line (Exh. RR-PAC-BSG-3). MMWEC noted that, although the low pressure line has a maximum design pressure of 275 psig, it normally can

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[58] Bay State indicated that when MMWEC is drawing 1000 mcf/hr from the 275 psig line, Bay State can get an additional 1610 mcf/hr through the line without having to run its LNG system (Exh. RR-PAC-BSG-5).

sustain only 95-120 psig pressure at Stony Brook during operation, and therefore under this alternative continued use of gas compression would be required (Exhs. HO-A-27; HO-A-19).

PAC supported a variation of the 3-mile alternative in which two of the three intermediate unit turbines would be supplied by the new 16-inch line and one turbine would be supplied by the existing 275 psig line, with no interconnection between the two lines (Exh. PAC-AJF-S at 6, 7). PAC argued that this is the most logical arrangement, given that neither line has sufficient capacity to service all three turbines (id. at 7).

d. Analysis

Three project approaches have been identified which would allow delivery of additional gas to Stony Brook: the proposed project, the 5.6-mile alternative, and the 3-mile alternative. Each of these alternatives would increase the supply of gas to the intermediate unit by a significant amount, which in turn could lead to economic and environmental benefits and thus meet the identified need.

The Siting Board notes that there is some disagreement among the parties as to the delivery capacity that is needed to operate the three intermediate unit turbines, and the capacity that would be available under each project alternative. To address the evidence and argument presented concerning delivery requirements and delivery capabilities, the Siting Board compares project alternatives with respect to their ability to deliver gas and support gas-fired operation at Stony Brook, as part of its reliability comparison in Section II.B.3, below. However, we note that because MMWEC has made no case that the proposed project is needed for electric reliability purposes, our review of the relative ability of different alternatives to deliver gas and support gas-fired operation at Stony Brook is relevant only as a factor that bears on the review of economic and environmental benefits, in Sections II.B.4 and II.B.5, below.

With respect to the 3-mile alternative, no party has suggested that the new 3-mile line would have adequate capacity to provide significant economic or environmental benefits without continued use of the 275 psig line. Therefore, the Siting Board will review the 3-mile alternative used in conjunction with the 275 psig line.

Accordingly, in the following sections, the Siting Board compares the proposed project,

the 5.6-mile alternative, and the 3-mile alternative with respect to reliability, economic benefits, and environmental impacts.

3. Reliability Comparison

a. MMWEC's Minimum Requirements

As an initial matter, MMWEC presented a set of minimum engineering requirements for the proposed pipeline ("minimum requirements") (Exh. MMWEC-JOR/ARM at 14; Tr. 8, at 1030-1031). The Company asserted that these minimum requirements represent the physical operating characteristics necessary to ensure that the Stony Brook intermediate unit can operate at 100% capacity and can compete in the deregulated electricity market 24 hours a day, seven days a week, 365 days a year (Tr. 9, at 1302, 1307-1308, 1315; Company Initial Brief at 30). The Company stated that these minimum requirements include: (1) a flow rate of 3150 mcf/hr; (2) a delivery pressure of 360 psig; (3) a 25 minute spinning reserve start-up; and (4) availability of 365 day gas service (Exh. MMWEC-JOR/ARM at 14; Tr. 8, at 1030-1031). MMWEC asserted that neither the intervenors nor the Siting Board may dictate to the Company how much capacity and pressure increase MMWEC must accept as the minimum operational improvement that will justify construction of a pipeline to increase the gas supply to Stony Brook (Company Reply Brief at 27).

MMWEC explained the derivation of several of its minimum requirements. The Company stated that a flow rate of 3150 mcf/hr would allow all three intermediate unit turbines to operate at their full capacity throughout the year (Tr. 7, at 792). MMWEC explained that it used 1998 data from the intermediate unit's gas flow meters to establish a relationship between gas flow and ambient temperature (Exh. PAC-2-N-38; Tr. 9, at 1318-1319). MMWEC indicated that each of the three intermediate unit turbines requires approximately 1050 mcf/hr at 13.6 degrees F, a temperature which the Company believes reasonably reflects the conditions under which the ISO experiences peak winter electrical demand (Tr. 9, at 1323-1324). The Company noted that the intermediate unit may require more than 3150 mcf/hr when the ambient temperature is less than 13.6 degrees F, and following turbine upgrades which would increase the volume of gas consumed (Exh. PAC-2N-38; Tr. 9, at 1355-1358).

MMWEC explained that the 360 psig delivery requirement was based on a pressure requirement of 310 psig at the gas turbines and a pressure drop of 50 psig between the regulator and the gas turbines (Exh. MMWEC-JOR/ARM at 15). MMWEC stated that, to allow the intermediate units to operate properly, gas pressure should be controlled at 310 psig in the gas supply header immediately upstream of the gas turbines (Exh. RMLD-2-41). The Company explained that there is a 25 psig pressure drop between the existing gas compressor house and the pressure control point, and a 25 psig pressure drop across the regulating control valve (Exh. HO-N-4).

The Company stated that Stony Brook currently has 25-minute startup capability for all three turbines on oil, which enables it to provide a 30-minute operating reserve ("TMOR") when requested by the ISO (Tr. 8, at 1156; Tr. 9, at 1304). MMWEC stated that, currently, when the intermediate unit is operating on gas delivered via the 275 psig line, it cannot bid into the 30-minute reserve market (Tr. 8, at 1177). MMWEC explained that it wants to have the ability to bid into the 30-minute reserve market using gas, since gas is usually the more economic fuel (id. at 1178; Tr. 9, at 1304, 1307; Exh. RMLD 3-13). MMWEC indicated that it would be subject to financial penalties imposed by the ISO if it is unable to provide a TMOR after having bid to do so (Tr. 8, at 1178-1179).

RMLD, Wilbraham, and PAC all argued that MMWEC's minimum requirements are not, in fact, the minimum operating conditions for a pipeline that would provide the types of economic and environmental benefits on which need for the proposed project is based. RMLD argued that the minimum requirements are not really requirements, but rather are operating goals for Stony Brook (RMLD Reply Brief at 29). RMLD also questioned the derivation of the minimum requirements, arguing that they are not reasonable based on actual Stony Brook operating conditions (id. at 25). First, RMLD noted that the flow rate of 3150 mcf/hr is necessary only when the ambient temperature is at or below 13.6 degrees F, and argued that gas is unlikely to be available to Stony Brook under such weather conditions (id.). Second, RMLD argued that a delivery pressure of 360 psig may not be attainable given restrictions on the Tennessee pipeline (id. at 26). Third, RMLD argued that the intermediate unit is capable of operating on oil to meet the 25-minute spinning reserve, and that MMWEC has not provided any

analyses demonstrating its need for 365 days of availability on gas (id. at 27).

Wilbraham also asserted that the minimum requirements were arbitrary, and suggested that MMWEC established its minimum requirements in a manner intended to foreclose a meaningful examination of project alternatives by focusing attention on engineering standards rather than on the economic benefits of a pipeline (Wilbraham Brief at 11-12). Wilbraham noted that, because Stony Brook is dual-fuel capable, the proposed pipeline is required in order to operate Stony Brook more efficiently, not in order to ensure that it operates at all (id. at 13). Wilbraham asserted that MMWEC has not estimated or evaluated the financial implications of its selected engineering standards (id.).

b. Proposed Project

MMWEC asserted that the proposed project would be able to provide 3150 mcf/hr to the three intermediate unit turbines at a delivery pressure of 360 psig under all operating conditions (Exh. MMWEC-ABM at 12). MMWEC explained that the proposed project would be able to accept gas at the full pressure available from Tennessee, thereby eliminating the upper pressure constraint of 500 psig on the Monson-Palmer line (id.). In light of these physical characteristics, MMWEC argued that the proposed project would have the following three reliability advantages: (1) sufficient gas supply would be available at Stony Brook for response to start-up and sustained running of the gas turbines at full power capability; (2) the full Tennessee gas line pressure would be available up to MMWEC's regulator at the Stony Brook site; and (3) MMWEC would have full control over its gas supply system, and therefore would be able to respond promptly to requests for additional power generation without any adverse effects on MassPower (id. at 25).

c. 5.6-Mile Alternative

MMWEC asserted that the 5.6-mile alternative would not meet its minimum requirements, and enumerated the following concerns regarding gas supply reliability under the 5.6-mile alternative: (1) this alternative would not be able to supply 3150 mcf/hr if the

Tennessee system pressure drops below 510 psig at the Monson gate station;[59] (2) the delivery pressure to the site would be 350 psig rather than 360 psig, which would leave virtually no operating margin and reduce station reliability; (3) Bay State may inform MMWEC of up to 45 reduced service days with no liquidated damages;[60] (4) the turbines might not be able to come on-line to full load within 25 minutes on gas; and (5) the Monson-Palmer line would be fully loaded; consequently, operations at Stony Brook could affect operations at MassPower, and vice versa, especially during transient conditions[61] (Tr. 8, at 999-1001).[62] MMWEC noted that the main problem with the 5.6- mile alternative is pressure drop in the Monson-Palmer line (Tr. 7, at 923). These issues are discussed in more detail below.

i. Capacity and Pressure on the 5.6-Mile Alternative

MMWEC argued that the 5.6-mile alternative would be inferior to the proposed project

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59 MMWEC submitted historical data compiled by Bay State detailing the pressure at the Monson gate station for January 1997 through December 1999, showing that the pressure fell below 510 psig on six days during this period (Exh. PAC-00N-13).

60 With regard to the inclusion of the reduced service day language into the Bay State Contract, Bay State noted that it was understood by all parties that such provisions would not be used, since MMWEC assumed as part of its plan to buy gas on the spot market that it would use oil when gas prices were high, which would likely coincide with the reduced service days (Exh. HO-BSG-1, at 2).

61 In addition, MMWEC asserted that transient conditions could occur when Bay State is liquifying natural gas (Exhs. HO-A-23; EFSB-3, at 30). However, Bay State indicated that it liquifies gas only during the non-heating months, and that it has not liquified gas since the summer of 1996 (Exh. HO-BSG-3).

62 MMWEC also enumerated other "risks" which are related to the Bay State Contract terms: (1) under liquidated damages there is no provision with regard to oil burning that addresses the cost MMWEC would incur for NO_X allowances; (2) if MMWEC cannot burn oil, the liquidated damages would be limited to the cost of only 15% of the annual demand charge; (3) Bay State would be able to default on the Bay State Contract without any further obligation or consequential damages; and (4) a force majeure clause would apply (Tr. 8, at 999-1001). The Siting Board notes that these risks reflect contract terms negotiated between Bay State and MMWEC, and cannot be attributed to the physical differences between the proposed project and the 5.6-mile alternative.

because: (1) it cannot reliably provide the 3150 mcf/hr needed to fuel all three turbines on a peak winter day; and (2) the delivery pressure to the site would be 350 psig, rather than the 360 psig provided by the proposed project (Tr. 8, at 999-1001). MMWEC acknowledged that its contract with Bay State requires Bay State to provide 3150 mcf/hr, but argued that its calculations cast doubt on Bay State's ability to meet its contractual obligations.

MMWEC asserted that the capacity of the 5.6-mile alternative would be approximately 2730 mcf/hr (Exh. RR-HO-MM-25; Tr. 8, at 986, 1008). The Company stated that it calculated this capacity using the Fundamental Flow Equation, which takes into account inlet and outlet pressures, the length of the pipe, its diameter, pipeline roughness, and the effect of gas properties (Exh. MMWEC-ABM at 13). MMWEC explained that its calculations assume a pipeline roughness[63] of 1800 micro inches on the Monson-Palmer line (id. at 9; Tr. 8, at 1012).[64] MMWEC argued that this was an appropriate assumption, as the Monson-Palmer line would be in service for 20 years and there would be some deterioration in the pipe over time (Tr. 8, at 1012; 1051).[65] The Company also noted that the Monson-Palmer line is now nine years old (id. at 1012; 1051).[66] MMWEC also provided calculations indicating that the capacity of the 5.6-mile alternative would be 2991 mcf/hr if roughness were assumed to be 1100 micro inches, and 3317 mcf/hr if roughness were assumed to be 600 micro inches (Exh. HO-RR-MM-25).

Bay State asserted that it is committed to meeting the volume and pressure requirements

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63 The Company explained that as the roughness of the pipe increases, pressure drop increases and flow decreases; therefore capacity could vary significantly depending on the assumption used for pipe roughness (Exhs. MMWEC-ABM-9; HO-A-10; Tr. 8, at 1014).

64 MMWEC's witness, Mr. Murray, also assumed that the roughness of the 275 psig line would be approximately 1900 micro inches (Exh. MMWEC-ABM at 190).

65 The roughness of the Monson-Palmer line was measured at 1100 micro inches when it was installed in 1993 (Exh. HO-A-10, at Att. 3).

66 Mr. Murray noted that in general a pipeline's condition deteriorates quickly at the beginning of its life and then levels out (Tr. 8, at 1047-1048). Mr. Murray stated that it was his experience that the very best roughness factor was 600 micro inches based on a brand new pipe before it is installed (id. at 1023). He cited a number of factors that would cause a pipe to deteriorate after it is installed such as a small amounts of liquid in the line and lubricating oil from compressors (id.).

set forth in the Bay State Contract (Exh. HO-BSG-1; Bay State Initial Brief at 7). Bay State noted that its customers generally accept its gas flow simulations and assume that Bay State will live up to its contractual agreements (Tr. 19, at 2962).

Bay State indicated that it modeled the capacity of the 5.6-mile alternative using the Panhandle B Equation (Tr. 15, at 2230-2231). Bay State asserted that the Panhandle B Equation provides a more accurate prediction of the expected performance of its Monson-Palmer line because it uses actual operating data as input, while the Fundamental Flow Equation does not (Exh. HO-BSG-1). Bay State reported that it validated the use of the Panhandle B Equation by comparing actual pressure and flow data to calculated values; Bay State asserted that this comparison clearly demonstrated that Bay State's computer model accurately simulated field conditions (Exh. HO-BSG-9; Tr. 15, at 2233, 2289). Bay State noted that it has used the Panhandle B Equation to model performance of its Granite State Transmission pipeline and that it adequately predicted performance for system planning purposes (Tr. 19, at 2892-2893). Bay State also asserted that the Fundamental Flow Equation tends to overestimate pressure drop due to pipe wall friction, particularly in larger diameter pipes (Exh. HO-BSG-4).

With regard to the measurement of pipeline roughness, Bay State asserted that a pipeline that it installs today will perform almost identically 20 years from now (Tr. 19, at 2960). Bay State indicated that it had used a 95% efficiency factor in its modeling, and asserted that this factor has held constant over the life of the Monson-Palmer line (id. at 2894). Bay State argued that internal pipeline corrosion is not an issue in the northeast since the pipelines are located a significant distance from the producing wells and the gas producing regions, where the impurities tend to settle (Tr. 21, at 3163-3164; Tr. 19, at 2959-2960). Bay State acknowledged that use of a lower efficiency factor would result in lower calculated capacity (Tr. 19, at 2894). However, Bay State asserted that since the Monson-Palmer line was measured at 1100 micro inches in 1993, MMWEC's assumption that the pipeline roughness has increased 60% since the pipeline is far greater than what actual data shows (id. at 2960; Bay State Reply Brief at 12).

MMWEC argued that the Panhandle B Equation was developed for large diameter pipelines, and therefore is not appropriate for smaller diameter pipelines, such as the 16-inch Monson-Palmer line (Tr. 9, at 1284-1285). The Company also asserted that the Panhandle B

Equation likely would overestimate the performance of the pipeline because it does not recognize roughness, but instead uses an efficiency factor that approximates roughness (Tr. 8, at 1022).[67] The Company suggested that if Bay State used an approximately 79% efficiency factor, it would arrive at the Company's calculated delivery rate of 2730 mcf/hr (Exh. PAC-00N-48; Tr. 8, at 1036-1037).

Finally, Bay State noted that there is no physical impediment that would prevent Bay State from operating the Monson-Palmer line at over 500 psig, as it was tested at a maximum operating pressure of 750 psig (Tr. 19, at 2972-2973). Bay State therefore asserted that it would be possible to increase the pressure on the Monson-Palmer line, which would address MMWEC's pressure and flow concerns associated with deliverability capability (Tr. 21, at 3090; Bay State Reply Brief at 15).

ii. Connection with the Monson-Palmer Line

MMWEC expressed concern about the use of the Monson-Palmer line to serve both Stony Brook and MassPower arguing that the transient conditions[68] created when a turbine starts up or shuts down could result in the tripping of, or damage to, other turbines (Exhs. MMWEC-JOR/ARM at 25; MMWEC-ABM at 8; Tr. 8, at 1064, 1077). MMWEC asserted that because the Monson-Palmer line has insufficient capacity to operate all three turbines in the winter months, the transient condition which would be created when any of the five turbines – two associated with MassPower and three associated with the intermediate unit – start-up or shut-down, could trip units already on-line (Exh. MMWEC-ABM at 24; Tr. 8, at 1157). MMWEC noted that Stony Brook would be particularly susceptible to transient conditions under the 5.6-mile alternative, because MMWEC would have to accept a lower pressure drop (20 psig

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67 Mr. Murray noted that an efficiency factor, which is a variable used in calculating capacity, does not affect the capacity calculation when pipe roughness is the controlling factor, as is the case in the calculations used by MMWEC (Exh. MMWEC-ABM at 18; Tr. 9, at 1281-1282).

68 The Company explained that a transient condition consists of a pressure wave that could develop in the system, triggering an inadequate response of the control systems (Tr. 8, at 1059-1060)

rather than 25 psig) across its control valve in order to use gas at the 350 psig delivery pressure, MMWEC argued that this lower pressure drop reduces the ability of the control valve to ride through transient situations (Tr. 8, at 1066-1067).[69]

MMWEC stated that it would have fewer concerns regarding the use of the Monson-Palmer line to supply both Stony Brook and MassPower if the full 3150 mcf/hr were available, and Stony Brook's internal plant header system were adequately sized (Exh. HO-N-50). The Company asserted that the proposed project, which would connect directly to the Tennessee system and therefore is not constrained, would be better able to withstand transients than the Monson-Palmer line, which is fully subscribed and cannot absorb transient situations (Tr. 8, at 1078).

Bay State concurred that with MassPower and MMWEC connecting to the Monson-Palmer line, the Monson-Palmer line would be essentially fully subscribed (Tr. 19, at 2910). However, Bay State argued that tripping and transient issues occur primarily when multiple units come on-line simultaneously; it asserted that, if a number of units are already on, the addition of another unit would not disrupt the system (id. at 2916).[70] Bay State noted that it would be very unusual for all five turbines to come on-line at the same time (Tr. 19, at 2915-2916). Bay State acknowledged that an unexpected or short-notice simultaneous start-up of all three MMWEC turbines under the 5.6-mile alternative could cause operational problems if Bay State was not maintaining 500 psig on the inlet (Exh. HO-BSG-2). However, Bay State noted that if there was insufficient pressure at the inlet to the Monson Gate Station, or another type of failure, it is likely that any alternative that ties into the Tennessee system would be affected (id.; Tr. 19, at 2922).

d. 3-Mile Alternative

MMWEC acknowledged that the 3-mile alternative, used in conjunction with the 275

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69 To use gas delivered at 350 psig, MMWEC would also have to make modifications to internal piping by replacing the existing 8-inch plant gas piping with 12-inch piping at a cost of approximately $64,000 (Exhs. HO-N-4-S; HO-A-36; EFSB-3, at 39).

70 Bay State indicated that to its knowledge, the two MassPower units come on line simultaneously without incident (Tr. 19, at 2914-2915).

psig line, could provide delivery pressures of 360 psig, and that the combined capacity of the 3-mile pipeline and the 275 psig line would be between 4000 to 4300 mcf/hr (Exhs. RR-HO-MM-25; EFSB-3, at 30; Tr. 8, at 1067). However, MMWEC raised deliverability concerns related to the physical interconnection of the two pipelines, the future availability of gas over the 275 psig line, and the location of a transfer station for the 3-mile alternative.

i. Interaction of 3-Mile and 275 psig Pipelines

MMWEC asserted that it would be both unwise and unnecessary to mix a high pressure system such as the proposed 3-mile alternative with a low pressure distribution system such as the 275 psig line (Exh. HO-A-23).[71] MMWEC stated that its concern with connecting a high pressure source to a low pressure source is primarily one of safety, but there are also reliability issues (Exh. HO-N-79; Tr. 9, at 1189). The Company stated that in order to interconnect the 3-mile alternative and the 275 psig line so that gas from either line could be used to supply any of the three turbines, it would have to design, install, and maintain a redundant supply header scheme consisting of cross connects, suitable pressure regulating and metering facilities, and check valves and safety valves (Exhs. HO-A-35; HO-A-44). MMWEC asserted that in its experience, such complex systems exhibit inherently poor reliability and require high maintenance (Exh. EFSB-A-35). The Company estimated that the cost of the additional equipment, including installation, would be $250,000 above the capital costs of the 5.6-mile alternative (Exh. HO-A-44).

A second possible configuration for the 3-mile alternative would be to dedicate two turbines to the 3-mile alternative and one turbine to the 275 psig line (Exh. PAC-AJF at 7; Tr. 8, at 1119; Tr. 9, at 1214). MMWEC noted that this arrangement would reduce reliability and increase operating costs since, if one of the two turbines connected to the 3-mile alternative were out of service, MMWEC could not use the gas to run the third turbine (Exh. HO-A-44; Tr. 9, at 1215). The Company stated that, in this configuration, elements of the existing piping system could be salvaged and reused; it therefore estimated that the cost of the additional equipment for

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[71] Bay State noted that a 275 psig line is not technically considered a low pressure line under any definition of pipeline pressure designations (Exh. HO-BSG-10).

this configuration, including installation, would be less than $100,000 above the capital costs of the 5.6-mile alternative (Exh. HO-A-44).

ii. Availability of Firm Service on the 275 Psig Line

As described in Section II.A.2. above, Bay State asserted it is not economically or operationally feasible to provide MMWEC with firm 365 day service over the 275 psig line (Exh. HO-BSG-4). Bay State noted that, due to demand from its existing firm customers, it currently cannot serve MMWEC over the 275 psig line on days colder than 40 EDD; these days typically occur between December 1 and March 15 (Exh. HO-BSG-8). Bay State indicated that, recently, it has met MMWEC's request for service at all times outside of this winter peak period; however, it projects growth in firm customer demand along the 275 psig line that would curtail gas availability to MMWEC over the long term (Tr. 19, at 2930; Tr. 21, at 3230; Bay State Reply Brief at 5).

iii. Transfer Station for 3-Mile Alternative

Bay State indicated that if MMWEC were to construct the 3-mile alternative, Bay State would require an interconnection valve capable of remote operation electronically connected to its Ludlow gas dispatch center (Exh. RR-HO-BSG-1). Bay State asserted that it would have difficulty siting the necessary custody transfer point in the area at the intersection of West Avenue and West Street in Ludlow (id.). Bay State explained that this is a difficult location because of the number of subsurface utility structures already in place (id.). PAC argued that there is sufficient land for a transfer station in the vicinity of West Street, which is less than 500 feet from the interconnection point (PAC Reply Brief at 7). Specifically, PAC described an open area east of West Street and north of the westbound lane of the Massachusetts Turnpike as an option for locating the transfer station (id.).

e. Analysis

In Section II.A.5 above, the Siting Board found that there is a need for additional energy resources serving Stony Brook to provide for a necessary energy supply for the Commonwealth

with a minimum impact on the environment at the lowest possible cost. The Siting Board noted that its finding of need was based on potential economic and environmental benefits, and was not premised on reliability concerns, as MMWEC has the ability to operate the Stony Brook intermediate unit on oil whenever it chooses to do so.

Here, MMWEC has set forth four operating and engineering parameters that it asserts are necessary to allow the intermediate unit to operate most efficiently on natural gas. A new pipeline which provides MMWEC's stated "minimum requirements" would allow the intermediate unit to be dispatched on natural gas at 100% capacity at any time during the year. RMLD, Wilbraham, and PAC each has asserted that MMWEC has used the minimum requirements to focus attention on engineering standards rather than economic need, and has argued that the Siting Board should approve only the project alternative that best ensures a necessary energy supply with a minimum impact on the environment at the lowest cost. MMWEC, conversely, contends that neither the Siting Board nor the intervenors may dictate to the Company the minimum operating standards that would justify construction of a new gas pipeline.

The Siting Board notes that MMWEC's minimum requirements reflect the Company's judgment as to the optimal operating conditions for a gas pipeline serving Stony Brook. For example, MMWEC's minimum flow rate of 3150 mcf/hr is sufficient to allow all three intermediate unit turbines to operate on gas at 100% capacity at an ambient temperature of 13.6 degrees F. If the ambient temperature is higher than 13.6 degrees F, or if all three turbines are not operating at full capacity, a lower flow rate would be sufficient to meet Stony Brook's needs. Similarly, while MMWEC's minimum requirements call for a delivery pressure of 360 psig, the Company has entered into a contract with Bay State to receive gas at 350 psig, and intends to make compensating improvements to internal piping at Stony Brook. Thus, the minimum requirements do not appear to be threshold conditions without which no economic or environmental benefits can be achieved; rather, they reflect operating conditions which MMWEC finds desirable. The Siting Board therefore concludes that it should view MMWEC's minimum requirements, not as baseline performance standards, but as indicators of the extent to which each alternative is likely to provide the economic and environmental benefits which have been

identified as forming the basis of the need for this project.

MMWEC's primary concerns with regard to the 5.6-mile alternative center on the volume of gas which can be delivered to Stony Brook, the pressure at which it can be delivered, and the potential for instability during transient situations. The record contains conflicting evidence with respect to the volume of gas which could be delivered to Stony Brook via the 5.6-mile alternative. Bay State asserts that it can reliably supply Stony Brook at 3150 mcf/hr, while MMWEC calculates that the capacity of the 5.6-mile alternative is 2730 mcf/hr. The divergent estimates result from different assumptions regarding the capacity of Bay State's Monson-Palmer line, which provides a critical link between the Tennessee mainline and the 5.6-mile pipeline to Stony Brook.

The Siting Board notes that the Bay State and MMWEC capacity calculations both were developed by credible experts who used industry-standard equations – the Fundamental Flow Equation and the Panhandle B Equation – to model flow in the Monson-Palmer line. Since both models appear to be credible, the Siting Board focuses on the assumptions made regarding the internal roughness of the Monson-Palmer line. MMWEC's modeling assumes a pipeline roughness of 1800 micro inches, while Bay State's modeling uses an efficiency factor of 95%, which appears to be the equivalent of a much lower level of roughness. The record shows that in 1993, the pipeline roughness of the Monson-Palmer line was measured at 1100 micro inches. Given that degradation of pipelines correlates to the distance from the wellhead, and that pipelines located far from the source of gas experience minimal corrosion, the use of a roughness of 1800 micro inches to model the capacity of the Monson-Palmer line appears to be excessive. Further, the roughness of the 275 psig line, which is between 30 to 40 years old, was measured at 1900 micro inches, only 100 micro inches more than the 1800 figure used by MMWEC for the nine year old Monson-Palmer line. Therefore, the Siting Board concludes that the current roughness of the Monson-Palmer line likely is closer to 1100 micro inches than to 1800 micro inches. When a roughness of 1100 micro inches is used, the modeled capacity of the 5.6-mile alternative is closer to 3150 mcf/hr than to 2730 mcf/hr. Accordingly, the Siting Board concludes that the actual economic and environmental benefits of the 5.6-mile alternative are likely to be closer to those modeled based on a 3150 mcf/hr capacity than to those modeled based

on a 2730 mcf/hr capacity.

MMWEC asserted that since its calculations confirm that the delivery rate would be less than 3150 mcf/hr, the Monson-Palmer line's ability to supply both MMWEC and MassPower, when each is operating at full capacity, is compromised. The Siting Board acknowledges that, while the exact delivery rate of the 5.6-mile alternative is unknown, and is dependent on the assumptions discussed above, the delivery rate of the proposed project, which would connect directly to Tennessee, would be at least 3150 mcf/hr, making transient situations less of a concern. Further, the proposed project would operate at a delivery pressure of 360 psig; this higher pressure could allow MMWEC greater operational control during transient situations and therefore could reduce concerns regarding tripping and turbine damage. We note that these concerns are greatest in the winter when MMWEC would be less likely to be operating on gas. In addition, we note that Bay State has recognized the option of uprating the Monson-Palmer line which could resolve the capacity and pressure concerns associated with the 5.6-mile alternative.

With respect to the 3-mile alternative, the record shows that use of the 3-mile pipeline together with the existing 275 psig line would meet MMWEC's capacity and pressure requirements. The record also shows that connecting pipelines of differing pressures poses operational and mechanical difficulties. The operational difficulties associated with cross-connecting the 3-mile pipeline and the 275 psig line could be eliminated by dedicating two turbines to the 3-mile line and one turbine to the existing 275 psig line. However, the 275 psig line is subject to interruption during the December to March 15 time period, and the availability of the 275 psig line to service Stony Brook may decrease in the future due to increased demand from Bay State's firm customers. Therefore, if it were to build the 3-mile alternative, MMWEC would be required to choose between a complex interconnect that would provide it with the ability to operate in a flexible manner, and an operationally simpler system that would subject one of the three turbines to supply interruptions. Under either option, the availability of gas would decline over time as additional firm load is added to the 275 psig line. Consequently, the Siting Board concludes that the 3-mile alterative would provide a less reliable gas supply than the proposed project and the 5.6-mile alternative.

Accordingly, the Siting Board finds that the proposed project would be superior to the

5.6-mile alternative and the 3-mile alternative with respect to reliability. Further, the Siting Board finds that the 5.6-mile alternative would be superior to the 3-mile alternative with respect to reliability. As stated in Section II.B.2.d, above, the relative reliability of different project approaches is relevant to this review primarily to the extent that it is a factor bearing on the level of economic and environmental benefits each approach would provide. In Sections II.B.4 and II.B.5, below, the Siting Board examines the impact that variations in reliability have on the ability of each project approach to meet the identified need by providing economic and environmental benefits.

4. Economic Comparison

As discussed in Section II.A.3, above, both MMWEC and RMLD presented economic analyses for the proposed project in its entirety and for Phase I. The Siting Board notes that, because Phase I and the 5.6-mile alternative are physically identical, the economic analyses of Phase I can serve as analyses of the 5.6-mile alternative. MMWEC and PAC also analyzed the economic benefits of the 3-mile alternative, and MMWEC provided an additional analysis of the economic benefits of the 5.6-mile alternative at a lower assumed flow rate. These analyses are described in Sections II.B.4.a and II.B.4.b, below. The relative economic benefits of the proposed project, the 5.6-mile alternative, and the 3-mile alternative, as calculated by various parties, are summarized in Table 5, below.

a. MMWEC's Modeling of Alternatives

MMWEC conducted economic analyses of the 3-mile alternative using the demand, supply and economic assumptions underlying the High Demand/HQ Dispatch and the Low Generation/HQ Firm cases, but with altered assumptions regarding capital costs, turbine use, and gas transportation costs. Specifically, MMWEC assumed that it could obtain natural gas for two of its turbines for 10 months each year, and that gas for the remaining turbine would be available only for 9 months each year (Exh. RR-HO-MM-2). MMWEC's analysis assumed that it would build and own the 3-mile line, that transportation over the Monson-Palmer line would be under a firm transportation contract with Bay State, structured similarly to the existing Bay State

Contract, and that MMWEC would continue to pay interruptible transportation costs for the 275 psig line (Exh. EFSB-3, at 2 to 4; HO-A-47-S-2, Att. 1-S(2)).[72] At the Siting Board's request, the Company also provided an analysis which assumed that transportation on the 275 psig line would be charged at the volumetric rate set in the Bay State Contract, rather than on an interruptible basis (Exh. HO-A-47-S-2, Att. 2-S(2)). See Table 5, below, for MMWEC's costs.

MMWEC also provided economic analyses of the 5.6-mile alternative assuming that the gas flow rate would be 2730 mcf/hr, rather than 3150 mcf/hr (Exhs. HO-RR-MM-31-S; HO-RR-MM-31-S(2)). Using this assumption, the NPV of the 5.6-mile alternative would be $15.043 million under the High Generation/HQ Dispatch case, $18.614 under the Low Generation/HQ Firm case, and $3.134 million under the +2000 MW case (Exhs. HO-RR-MM-31-S; HO-RR-MM-31-S(2)).[73]

b. PAC's Calculations Regarding the 3-Mile Alternative

PAC estimated the costs of the 3-mile pipeline based on the estimates, assumptions, and factors that Stone and Webster used to calculate costs for the 5.6-mile alternative (Exh. PAC-AJF-S at 10). PAC explained that it used ratios to account for differences in line length and diameter, where applicable, and for special construction considerations such as road, aqueduct, or wetland crossings (id.). PAC estimated the total capital costs for the 3-mile alternative at $12.553 million (id. at 11).[74] PAC argued that MMWEC's estimates for the capital and operating cost of the 3-mile alternative are not accurate (Exh. AJF-S at 6). In addition, PAC assumed that

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72 Both the Company and Bay State acknowledged that MMWEC could own and operate the 3-mile alternative (Tr. 10, at 1049). The Company provided an analysis showing that the NPV of the 3-mile alternative would change by only 1% based on ownership (Exh. RR-HO-MM-33).

73 MMWEC also indicated that under the High Generation/HQ Dispatch case, +2000 sensitivity, the NPV savings would be $3.134 million (Exh. HO-RR-MM-31-S(2)).

74 The capital cost estimate is based on the 3-mile alternative 1, which follows the WMECO ROW for much of the route (Exh. PAC-AJF-4R). PAC noted that it selected alternative 1 because its terrain characteristics are similar to the 5.6-mile alternative; and therefore, the Stone and Webster estimates would be more readily applicable to this route (id.).

transportation on the 275 psig line would be charged at the volumetric rate set in the Bay State Contract, rather than on an interruptible basis (Exh. PAC-AJF-S at 12; PAC Initial Brief at 19).

To determine the increase in energy value associated with the 3-mile alternative, PAC extrapolated from MMWEC's Low Generation/HQ Firm case (Exh. PAC-AJF-S at 10-11). Specifically, PAC assumed that the 3-mile alternative would allow the three intermediate unit turbines to operate on gas for 29 turbine-months, rather than the 30 turbine-months that would be possible if either the proposed project or the 5.6-mile alternative were constructed; consequently, PAC determined that the energy value of the 3-mile alternative should be 29/30 of the 5.6-mile alternative (id. at 7-8). PAC's recalculation resulted in a NPV savings of $25.07 million for the 3-mile alternative (id. at Att. AJF-4R; Exh. HO-RR-MM-36; PAC Initial Brief at 23).

TABLE 5
NPV OF THE SAVINGS (in millions $)

CASES	14.7-Mile	5.6-Mile 3150 mcf/hr	5.6-Mile 2730 mcf/hr	3-Mile
High Generation/HQ Dispatch Case	$16.481	$18.419	$15.043	$8.085[a] $16.163[b]
With Termination Penalty	$10.4[c]			
Low Generation/HQ Firm Case	$20.797	$22.532	$18.614	$15.416[a] $21.247[b]
PAC's Calculation				$25.07
With Termination Penalty	$14.6			
RMLD's Cases				
1) Low Cap./Optimistic ROW	$3.937	$6.673		
2) Low Cap./Less Optimistic ROW	$1.390	$5.861		
3) Intermediate Cap./Optimistic ROW	($5.284)	($2.062)		
4) Intermediate Cap./Less Optimistic ROW	($7.821)	($2.857)		

Sources: Exhs. HO-N-53R; MMWEC-JJB-S-2; PAC-AJF-S; HO-A-47-S(2); RR-MM-RMLD-2-2(b); HO-N-73; HO-N-73R; RR-HO-MM-36; RR-HO-MM-31.

a. Assuming interruptible transportation on the 275 psig line.

b. Assuming a $0.03/mmBtu charge for transportation on the 275 psig line, as part of a single contract covering transportation on the 3-mile line and on the Monson-Palmer line.

c. Since the record does not include an update of the cost of the 14.7-mile line for the High Generation/HQ Dispatch case with the termination penalty, the Siting Board calculated based on the earlier analyses that the addition of the early termination payment at five years decreases the NPV savings by approximately $6 million.

c. Positions of the Parties

Bay State asserted that the best record evidence in this case demonstrates that the 5.6-mile alternative would yield greater net economic benefits than the other project alternatives (Bay State Initial Brief at 13). Bay State challenged PAC's net benefit calculations for the 3-mile alternative on several grounds (Bay State Reply Brief at 5-6). First, it challenged PAC's assumption that IT rates for the 275 psig line could be reduced to be comparable to the throughput charge on the Monson-Palmer line, arguing that Bay State's witness contradicted this assumption (id.). Bay State also argued that PAC's analysis omitted: (1) the costs of reconfiguring piping inside the Stony Brook plant to interconnect the 3-mile pipeline; (2) engineering costs associated with connecting the 3-mile alternative to the Monson-Palmer line; and (3) the societal costs of traffic disruptions associated with construction of the 3-mile alternative (id. at 6).

MMWEC also challenged PAC's analysis on several fronts. First, MMWEC challenged PAC's assumption that the energy value of the 3-mile alternative would be 29/30th of energy value of the 5.6-mile alternative (Company Reply Brief at 64). MMWEC noted that this calculation assumes that the energy production of a third turbine in February would be the same as the average energy production of all three turbines for the ten months between February and November (id. at 65). MMWEC argued that, in reality, generation is higher during the colder months (id.). Second, MMWEC challenged PAC's assumption that transportation pricing for the 3-mile alternative and the 275 psig line would be identical to the pricing in the Bay State Contract, noting that Bay State's witness had testified that its long-run marginal costs would be different under the two arrangements (id.). Finally, MMWEC argued that PAC's capital cost estimate for construction within West Street was inaccurate, both because PAC underestimated the length of the pipeline to be built in West Street, and because it relied on a 1989 Bay State estimate for construction of the MassPower line, which proved to be low (id. at 66).

Wilbraham asserted that the construction of the second phase of the proposed project would produce negative economic benefits, noting that the positive savings MMWEC projects for the proposed project lie entirely with Phase I (Wilbraham Initial Brief at 16). Wilbraham stated that the fundamental problem with MMWEC's economic analysis was its failure to

provide an incremental analysis of the costs and benefits of the Phase II (id. at 17).

d. Analysis

MMWEC, RMLD, and PAC have provided a range of estimates of the NPV savings associated with each of the three project alternatives, under a variety of assumptions. A comparison of the various estimates for the proposed project and the 5.6-mile alternative indicates that the NPV savings of the 5.6-mile alternative, including capital costs and operating and maintenance costs, would be higher than those of the proposed project, with one exception. In the case where the 5.6-mile alternative is assumed to operate at a flow rate of 2730 mcf/hr, rather than 3150 mcf/hr, the NPV savings of the proposed project exceeds that of the 5.6-mile alternative by approximately $1.4 to $2 million.

In Section III.B.3.c, above, the Siting Board examined the probable flow rate of the 5.6-mile alternative, and determined that it likely would be closer to Bay State's projected rate of 3150 mcf/hr than to MMWEC's projected rate of 2730 mcf/hr. Consequently, the Siting Board places greater weight on the cases assuming a flow rate of 3150 mcf/hr, and concludes that the NPV savings of the 5.6-mile alternative likely would exceed that of the proposed project.

The Siting Board's conclusion in this regard is strengthened by the fact that MMWEC modeled the proposed project using single-phase construction costs, even though it currently intends to construct the proposed project using a phased approach. The construction of the pipeline in two phases likely would result in higher construction costs, due to the inherent inefficiencies of staggering construction. The Siting Board notes that, under the terms of the Bay State Contract, MMWEC could be liable for a termination fee if it cancels the contract in order to build Phase II. MMWEC has argued that the fee would not apply if Bay State cannot honor its contract obligations, and therefore has not included the termination fee in the cost of the proposed project. While this may be true, the Siting Board notes that, under certain circumstances, MMWEC would be contractually bound to pay the termination penalty if it chose to construct Phase II. As shown in Table 5, incorporating the termination penalty into the costs of the proposed project significantly reduces the NPV savings of the proposed project, and

significantly increases the margin by which the 5.6-mile alternative is the more cost-effective.[75]

The record indicates that the NPV savings of the 3-mile alternative is sensitive to the assumptions used regarding the pricing of gas transportation service on the existing 275 psig line. MMWEC's modeling shows that assuming a fixed volumetric transportation charge, rather than the current interruptible pricing mechanism, would add between $5.5 and $8.0 million to the NPV of the 3-mile alternative. The Siting Board notes that the hypothetical volumetric pricing arrangement would provide firm and interruptible service over different pipelines under a single undifferentiated rate, with a demand charge that recovers the cost of only one of the two lines. Such an arrangement would not be typical under current ratemaking practice. Moreover, Bay State, which owns the 275 psig line, has expressed doubt that it would enter into a contract under such terms. Consequently, the Siting Board places greater weight on scenarios that assume continued interruptible pricing for the 275 psig line.

MMWEC has provided comparisons of the NPV savings of the proposed project, the 5.6-mile alternative, and the 3-mile alternative under two supply scenarios: the High Generation/HQ Dispatch case, and the Low Generation/HQ Firm case. In both cases, the NPV savings of the both the proposed project and the 5.6-mile alternative are significantly higher than those of the 3-mile alternative.[74] PAC has provided an alternate calculation of the NPV savings of the 3-mile alternative, assuming a volumetric charge for the 275 psig line. PAC's calculations suggest that the 3-mile alternative has NPV savings that are $2.5 million higher than those of the 5.6-mile alternative, and $4.3 million higher than those of the proposed project. However, these differences result in large part from PAC's assumptions regarding pricing of transportation on the

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75 The Siting Board notes that any termination penalty resulting from a decision by MMWEC to extend the 5.6-mile alternative would properly be treated as a cost of that extension. Therefore, should MMWEC in the future seek approval to extend the 5.6-mile alternative, it must include estimated termination penalties in the project cost calculations presented to the Siting Board.

74 From the record, it is unclear why under the High Generation/HQ Dispatch case, the 3-mile alternative has approximately $300,000 lower NPV savings than the proposed project, while under the Low Generation/HQ Firm case, the 3-mile alternative has approximately $500,000 higher NPV savings than the proposed project (See Table 5, above).

275 psig line. In addition, PAC's approach to developing capital costs and to estimating the economic value of the 3-mile line are based on extrapolation from MMWEC's 5.6-mile alternative analysis, and are therefore likely to be somewhat less accurate than MMWEC's direct cost estimates and modeling. Accordingly, the Siting Board finds that the 5.6-mile alternative would provide greater economic benefits than either the proposed project or the 3-mile alternative. Consequently, the Siting Board finds that the 5.6-mile alternative would be superior to both the proposed project and the 3-mile alternative with respect to meeting the identified economic need.

5. Environmental Comparison

In this section, the Siting Board compares the environmental impacts of facilities and potential mitigation for such impacts, among the three project approaches described in Section II.B.2 above: (1) the proposed project (the 14.7-mile direct interconnection with Tennessee's pipeline); (2) the 5.6-mile alternative (interconnection with the Monson-Palmer line at East Street);[75] and (3) the 3-mile alternative (interconnection with the Monson-Palmer line at West Street). Each of these three project approaches has its own route alternatives, so there may be a range of impacts for each alternative for some parameters. For purposes of this section, quantitative information on the first two project approaches is provided specifically for MMWEC's preferred route, unless otherwise noted. Environmental impacts are grouped as: (a) environmental impacts of pipeline installation (i.e., direct environmental impacts); and (b) indirect impacts and benefits of enhancing the gas supply to Stony Brook (e.g., regional air quality benefits).

a. Environmental Impacts of Pipeline Installation

Tables 6 and 7, below, quantitatively compare impacts of pipeline construction on wetlands, streams, wildlife habitat, agricultural land, and residential areas.

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[75] Data presented for Phase I of the proposed project contribute to the characterization of the environmental impacts of the 5.6-mile alternative, since the two are considered functionally equivalent.

TABLE 6
COMPARISON OF WETLANDS, STREAM, AND HABITAT IMPACTS FROM PIPELINE INSTALLATION/CONSTRUCTION

	Proposed Project (by Western/Northern Corridor) [a]	**5.6-Mile Alternative** (by Western/Northern Corridor)	**3-Mile Alternative** (Route alternative 1 or 2)
Bordering Vegetated Wetland Area	32.3 acres	8.4 acres	1.7 acres
Total Number of Stream Crossings	22	11	0 - 2
Perennial Streams	14	5	0 - 1
Trout Streams	9	5	0 - 1
Vernal Pools [b]	4 [c]	1 [d]	1 to 5
Vegetative Cover Altered	35.4 acres	18.8 acres	4.2 - 8.2 acres
Permanent Forest Clearance	7.2 acres	2.3 acres	0.6 - 1.0 acres
Forest Cleared for Construction	26.9 acres	7.9 acres	1.4 - 2.2 acres
Rare Species Occurrences [d]	28	8	0
Number of Rare Plant Species [d]	6	0	0
Number of Rare Animal Species [d]	8	5	0
Total Agricultural Impact	18.2 acres	9.2 acres	1.1 - 3.9 acres
Linear Feet of Prime Farmland	6696 feet	2980 feet	0 - 1750 feet

Source: Exh. RR-HO-MM-10, Att. 1, except where noted.

a. MMWEC proposes to determine alignment of Phase II according to the same concepts used to select an alignment for the 5.6-mile alternative (Tr. 4, at 358).
b. Exh. EFSB-3, at 72, G-4, G-5.
c. MMWEC indicated that construction activities would avoid or go under vernal pools (Exh. EFSB-3, at 111).
d. Exh. EFSB-3, at 68.

TABLE 7
COMPARISON OF LAND USE IMPACTS FROM PIPELINE INSTALLATION/CONSTRUCTION

	Proposed Project (by Western/Northern Corridor)	**5.6-Mile Alternative** (by Western/Northern)	**3-Mile Alternative** (Route alternative 1 or 2)
Number of Road Crossings	22	10	1 - 8
Residential Properties Crossed	46	25	2 - 29
Houses Within 100 feet	16	4	21 - 94
Schools and Hospitals Within 200 feet	2	0	0
Aqueduct Crossings	3	3	1
Length of In-Street Construction [a]	0.2 miles [b]	0.1 miles	0.41-2.5 miles [c]

Source: Exh. RR-HO-MM-17, Att. 1.
a. Exhs. EFSB-3, at 32, 170, App. H; HO-EL-2 Att. 4; HO-A-47-S.
b. Distance estimated from maps for a road cut along East Street at Massachusetts Turnpike.
c. According to PAC, the distance listed as 0.41 miles is actually 0.3 miles (Tr. 5, at 567).

i. Permanent Impacts

Pipeline installation can be expected to have permanent environmental impacts including (1) changes to upland forest vegetation, changes to forested wetland vegetation, and visual impacts from loss of screening by trees; (2) limitation on future land development within the pipeline ROW; (3) possible changes in localized drainage patterns, and (4) changes in safety risks from possible future excavation within ROWs. As in other Siting Board cases, some of the potential impacts would be mitigated in accordance with stated plans of the applicant. Generally, construction of the proposed project or the 5.6-mile alternative along the western/northern corridor would follow existing ROWs (Exh. EFSB-3, at 172). In such locations, MMWEC stated that the permanent ROW would be 20 feet wide and that an additional 45 feet would

generally be taken as temporary ROW (Tr. 4, at 369). Where the northern/western corridor route follows an oil transmission pipeline ROW in the vicinity of the oil tank farm east of West Street, MMWEC indicated that approximately 15 feet of new clearing would be required for a 20-foot wide permanent gas pipeline ROW (id., at 416-417). Construction of the 3-mile alternative would be predominantly either along an existing ROW (3-mile alternative 1) or along an existing street (3-mile alternative 2) (Exh. EFSB-3, at 32, Fig. 1).

MMWEC indicated that approximately 7.2 acres of forest would be permanently cut for the proposed project, approximately 2.28 acres of forest would be permanently cut for the 5.6-mile alternative, and approximately 0.6 to 1.0 acre(s) of forest would be permanently cut for the 3-mile alternative (Exh. RR-HO-MM-10, Att. 1; Tr. 4, at 357). In addition, MMWEC indicated that there may be some individual trees that WMECO has allowed to grow as exceptions to the general rule of keeping the WMECO ROW cleared, that would need to be permanently removed for installation of the gas pipeline (Tr. 3, at 368). The Company stated that there would be some permanent conversion of forested wetland to shrub and wet meadow communities along the permanent ROW, but did not estimate the affected acreage (Exh. EFSB-3, at 11).

Mr. Flood, a witness for MMWEC, stated that the safety of a pipeline is enhanced by placing it in an area that is not prone to future third-party work (Tr. 4, at 488). He added that a cross-country pipeline would normally be expected to have a better safety record than a line that is laid in streets or along the street frontage of residences, where periodic third-party subsurface work may be anticipated (id.).

Regarding cultural resources, MMWEC stated that it has extensively surveyed the 5.6-mile alternative on the western/northern corridor and that no further cultural resource survey would be required for the 5.6-mile alternative or 3-mile alternative 2 (Tr. 6, at 720-722). Phase II of the proposed project and other route alternatives would require additional field work to investigate cultural resources (id.).

ii. Temporary Construction Impacts

As in previous pipeline cases, pipeline construction is expected to have temporary

impacts on forest lands, wetlands, surface water quality, noise levels, and traffic patterns. Many of these temporary impacts can be mitigated. MMWEC estimated that construction of the proposed project would require approximately 17 to 22 weeks, while construction of either the 5.6-mile alternative or the 3-mile alternative would require approximately 8 to 12 weeks (Exh. HO-A-26).

The Company stated that most of the effects of the project on wetland resources would be temporary and related to construction (Exh. EFSB-3, at 103). The Company stated that the duration of construction work would be approximately 30 days at any one wetland location along the route, including vegetation clearing, pipeline installation, and initial wetland restoration; the Company indicated that full wetland recovery would take at least one year (id.).

The Company stated that it conducted wetland resource surveys along the proposed route, using both the approach specified by the U.S. Army Corps of Engineers' *Wetlands Delineation Manual* and the resource categories set forth in the Massachusetts Wetlands Protection Act (id.; Exh. HO-EW-22).[76] The Company indicated that 32.3 acres of Bordering Vegetated Wetlands ("BVW") would be affected by ROW clearing for the proposed project, 8.4 acres would be affected by the 5.6-mile alternative, and a minimum of 1.7 acres would be affected by the 3-mile alternative (Exhs. EFSB-3, at 104; RR-HO-MM-10, Att. 1). The Company indicated that there would be 22 stream crossings along the proposed project, of which 14 would be across perennial streams; 11 stream crossings along the 5.6-mile alternative, of which 5 would cross perennial streams; and depending on the route selected, either two stream crossings including one perennial stream crossing, or no stream crossings along the 3-mile alternative (Exh. RR-HO-MM-10, Att. 1).[77] Several of the streams crossed are identified as trout streams (id.).

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[76] The Company stated that wetlands along the proposed routes were delineated in 1996 and 1997, flagged, and mapped. Approximate wetland boundaries are depicted in aerial mosaic sheets provided in the Supplemental Draft Environmental Impact Report ("SDEIR") (Exh. EFSB-3, at App. H). The wetland delineations in Ludlow had not been presented to the Ludlow Conservation Commission, as of May 12, 2000, pending selection of a precise pipeline alignment (Exh. HO-EW-22).

[77] For the proposed project only, MMWEC indicated that significant stream crossings would include a major crossing of the Chicopee River and multiple crossings of the Mill

(continued...)

MMWEC stated that there are 44 bank areas, 15 bordering and 3 isolated areas of land subject to flooding, and 14 riverfront areas along the proposed project route (Exh. EFSB-3, at 64). The Company also noted there are areas "that could be characterized as vernal pools" along each of the various alternative corridors (id. at 72; HO-EW-24). The Company stated it submitted its survey results to the Massachusetts Natural Heritage and Endangered Species Program ("MNHESP") (Exhs. EFSB-3, at 72; HO-EW-24). The Company stated that there is only one potential vernal pool along the 5.6-mile alternative, and noted that a narrowed construction corridor is proposed for this location due to the presence of a state-listed rare species; the Company stated that all construction vehicles and activity would be routed more than 100 feet from the rare species habitat, and that directional drilling would be performed if the MNHESP certifies the pool (Exhs. HO-EW-25; HO-EW-26). The Company noted three additional areas that could be characterized as vernal pools along the preferred route for Phase II of the proposed project (Exh. EFSB-3, at 67). The Company committed to avoid all known habitat of rare species found along the project corridor (Exh. EFSB-3, at 12).

In addition to permanent changes to forest area, discussed above, MMWEC indicated that construction would require temporary clearing of forest for equipment access, including: approximately 26.9 acres of forest for the proposed project; 7.9 acres for the 5.6-mile alternative; and 1.4 to 2.2 acres for the 3-mile alternative (Exh. RR-HO-MM-10, Att. 1; Tr. 4, at 357). A total of 6696 linear feet of prime farmland would be temporarily affected by the proposed project; 2990 linear feet along the 5.6-mile alternative, and up to 1750 linear feet for the 3-mile alternative (Exh. RR-HO-MM-10).

MMWEC indicated that the proposed project and 3-mile alternative 2 would have the greatest construction noise impact on neighbors (Tr. 4, at 457-459; Tr. 6, at 725-728). The Company stated that 3-mile alternative 2 would have obtrusive construction noise impacts due to the required slow-moving stovepipe construction in the street, directly in front of houses (Tr. 4,

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77 (...continued)
River in Wilbraham, which the project route generally follows for over a mile and a half (Exh. EFSB-3, at 143K, Fig. 1). MMWEC noted that directional drilling would be attempted for the Chicopee River crossing and considered for the Mill River wetlands (id. at 143H; Tr. 4, at 514).

at 457-459; Tr. 6, at 725-728). The Company stated that the proposed project would have extensive construction noise impact on neighbors, due to its longer length and overall construction duration (Tr. 4, at 457-459; Tr. 6, at 725-728). Mr. Downing, a witness for MMWEC, stated that the 5.6-mile alternative likely would have the least construction noise impact of the three approaches (Tr. 6, at 727).

MMWEC indicated that construction traffic impacts would be minor for either the proposed project or the 5.6-mile alternative, because MMWEC plans to avoid open cutting of roads by boring each road crossing from the side (Tr. 4, at 460-463). The Company indicated that traffic impacts would be most significant for 3-mile alternative 2 (id. at 467-468).

iii. Positions of the Parties

MMWEC acknowledged that both the 5.6-mile alternative and the 3-mile alternative would have fewer overall impacts to the natural environment than the proposed project (Company Initial Brief at 125). MMWEC contended, however, that impacts of construction on the built environment would be "much greater" for the 3-mile alternative than for either the 5.6-mile alternative or the proposed project (id.).

PAC contended that MMWEC's own numbers show that the 3-mile alternative would have fewer environmental impacts than the 5.6-mile alternative, and that the 5.6-mile alternative would have a significantly fewer environmental impacts than the proposed project (Tr. 5, at 556; PAC Initial Brief at 6, 16).[78]

RMLD argued that the 5.6-mile alternative would result in fewer impacts to the natural environment than the proposed project, when air impacts are excluded (RMLD Reply Brief

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78 PAC contended that the rank-order of six alternatives from least wetlands impacts to most wetlands impacts is: (1) 3-mile alternative 2, (2) 3-mile alternative 1, (3) the 5.6-mile alternative, (4) the western/eastern route for the proposed project, (5) the western/northern route for the proposed project, and (6) the eastern route for the proposed project (PAC Initial Brief at 27). PAC contended that the rank-order of six alternatives with respect to impacts to upland resources and the built environment is: (1) 3-mile alternative 2, (2) 3-mile alternative 1, (3) the 5.6-mile alternative, (4) the western/northern route for the proposed project, (5) the western/eastern route for the proposed project, and (6) the eastern route for the proposed project (id.).

at 34).

Bay State contended that the 5.6-mile alternative is "reasonable in terms of environmental impacts compared to other alternatives and any potential advantages to other alternatives over the [5.6-mile alternative] are not definitive," (Bay State Initial Brief at 14). Bay State also noted that the proposed project has greater environmental impacts than the 5.6-mile alternative (Bay State Reply Brief at 17).

iv. Analysis

The record shows that the terrestrial, aquatic, and wetland impacts of the proposed project, the 5.6-mile alternative, and the 3-mile alternative are generally proportionate to their length, with the proposed project having the greatest impacts, and the 3-mile alternative having the least. Land use impacts of the project approaches are significantly affected by the type, as well as the length, of route, with the in-street construction of much of 3-mile alternative 2 presenting some distinct disadvantages relative to disruptions to residents during pipeline construction. The two versions of the 3-mile alternative include a broad range of potential impacts and there are clearly some trade-offs of dissimilar impacts in such a comparison. We focus on 3-mile alternative 1, principally due to its lower level of temporary impacts.

The record demonstrates that in virtually every respect, there are greater impacts directly related to pipeline installation for the full 14.7-mile proposed project, compared to the 5.6-mile alternative. The principal disadvantages of 3-mile alternative 1, compared to the 5.6-mile alternative, are the greater number of residences within 100 feet of a pipeline route, unspecified but likely greater land use impacts around a take station,[79] and greater impacts on traffic due to a

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[79] MMWEC and Bay State indicated that there is no ideally situated parcel for a custody transfer station in the vicinity of the intersection of West Street and West Avenue in Ludlow. The transfer station likely would be placed in proximity to non-industrial land uses. Therefore, the Siting Board notes that both versions of the 3-mile alternative would likely have some land use impacts associated with installation of a transfer station, although the extent of such impacts cannot be specified. In contrast, the designated location for a transfer station for the 5.6-mile alternative, next to the Massachusetts Turnpike near East Street in Ludlow, has been shown to be relatively distant from residential or recreational areas, and therefore would contribute to lesser land use impact.

length of in-street construction. Although the number of residences is higher, the record does not show that significant visual impacts are likely since an existing cleared corridor would be used; land use impacts around a take station would presumably affect a small area; and the length of in-street construction is only several hundred yards. On balance, the greater impacts on natural resources of the 5.6-mile alternative slightly outweigh the limited number of community impacts for which 3-mile alternative 1 is inferior.

Consequently, the Siting Board finds that the 3-mile alternative would be slightly superior to the 5.6-mile alternative, and that the 3-mile alternative and the 5.6-mile alternative would be superior to the proposed project, with respect to the direct environmental impacts of pipeline installation.

b. Impacts and Benefits of Enhanced Gas Supply

i. Air Quality Impacts and Benefits

As described in Section II.B.5, above, MMWEC modeled the changes in Stony Brook, state, and regional air emissions that would result from construction of the proposed project and Phase I of the proposed project (i.e., the 5.6-mile alternative) and the resulting displacement of the dispatch of regional generation facilities by increased dispatch of the intermediate unit. MMWEC also modeled changes in emissions that would result from construction of the 3-mile alternative (Exhs. HO-N-75-S-2; RR-HO-MM-31-S-2; Tr. 2, at 164).

Differences in regional air quality benefits, and other impacts of enhancing the natural gas supply to Stony Brook are related to the increase in the number of hours that Stony Brook would operate on gas, which in turn is dependent on the economic factors discussed above in Section II.B.4. Table 8, below, shows MMWEC's projections for three selected years (2002, 2005, 2010) of (1) increases in the amount of power generated at Stony Brook; and (2) changes in emissions, under each of the three project approaches.

TABLE 8
AIR EMISSIONS DIFFERENCES FROM NO-BUILD, FOR THREE SELECTED YEARS [a]

PROJECTED DIFFERENCE IN STONY BROOK OPERATIONS, MW-hrs									
	Reference Case: 14.7 mile [b]			Reference Case: 5.6-mile [c]			Reference Case: 3-mile [d]		
	2002	2005	2010	2002	2005	2010	2002	2005	2010
MW-hrs: gas	633,600	426,600	559,100	630,600/ 543,400	420,700/ 378,100	553,200/ 484,500	522,100	353,300	472,100
MW-hrs: oil	0	0	-200	0	0	-200	0	0	-200
PROJECTED DIFFERENCE IN ANNUAL EMISSIONS AT STONY BROOK, tons per year									
	Reference Case: 14.7 mile			Reference Case: 5.6-mile			Reference Case: 3-mile		
	2002	2005	2010	2002	2005	2010	2002	2005	2010
NO_X	281	189	248	280 / 241	187 / 168	246 / 215	232	157	210
SO_2	2	1	1	2 / 1	1 / 1	1 / 1	1	1	1
PM	53	36	47	53 / 46	35 / 32	47 / 41	44	30	40
CO	24	16	21	24 / 20	16 / 14	21 / 18	19	13	18
VOC	9	6	8	9 / 8	6 / 5	8 / 7	7	5	7

Source: Exh. HO-N-75-S-2 at Tables 4-2, 4-4 and Exh. RR-HO-MM-31-S-2 at Tables 4-2, 4-4.

a. A positive number indicates an increase in emissions; a negative number indicates a decrease.
b. "Case 23 - Reference Case - 14.7 mile" (Exh. HO-N-75-S-2).
c. In the middle three columns, the first value represents the availability of gas from Bay State as specified in the Bay State Contract, from Case 24 of Exh. HO-N-75-S-2 (December 1, 2000); the second value represents the availability of gas from Bay State as modeled by MMWEC, from Case 18 in Exh. RR-HO-MM-31-S-2 (February 13, 2001).
d. "Case 25 - Reference Case - Bay State Alternative w/ Low Pressure Line priced according to existing interruptible transportation (IT) contract" (Exh. HO-N-75-S-2, Case 25, Tables 4-2, 4-4).

Table 9, below, shows MMWEC's projections for three selected years (2002, 2005, 2010) of changes in emissions resulting from the three project approaches, for displaced facilities in Massachusetts. Table 10, below, shows MMWEC's projection of net statewide changes in Massachusetts emissions resulting from the proposed project; the net change combines projected changes at Stony Brook with changes at displaced facilities elsewhere in Massachusetts. Table 11, below, shows MMWEC's projections, for three selected years (2002, 2005, 2010), of net future changes in emissions resulting from the three project approaches, including all northeast region generators.

TABLE 9
PROJECTED DIFFERENCE IN ANNUAL EMISSIONS AT OTHER MASSACHUSETTS PLANTS, tpy

	Reference Case: 14.7 mile [a]			Reference Case: 5.6-mile [b]			Reference Case: 3-mile [c]		
	2002	2005	2010	2002	2005	2010	2002	2005	2010
NO_X	-238	-75	-152	-237 / -208	-71 / -65	-148 / -128	-193	-58	-127
SO_2	-349	-220	-432	-348 / -308	-207 / -189	-421 / -360	-287	-169	-355
PM	-66	-38	-73	-65 / -58	-36 / -33	-71 / -61	-53	-29	-60
CO	-41	-17	-35	-40 / -36	-16 / -15	-34 / -29	-35	-13	-29
VOC	-4	-2	-5	-4 / -4	-2 / -2	-5 / -4	-3	-2	-4

Source: Exh. HO-N–75-S-2, at Tables 4-2a, 4-4, and Exh. RR-HO-MM-31-S-2, at Table 4-2a.

a. "Case 23 - Reference Case - 14.7 mile" (Exh. HO-N-75-S-2).

c. In the middle three columns, the first value represents the availability of gas from Bay State as specified in the Bay State Contract, from Case 24 of Exh. HO-N-75-S-2 (December 1, 2000); the second value represents the availability of gas from Bay State as modeled by MMWEC, from Case 18 in Exh. RR-HO-MM-31-S-2 (February 13, 2001).

c. "Case 25 - Reference Case - Bay State Alternative w/ Low Pressure Line priced according to existing interruptible transportation (IT) contract" (Exh. HO-N-75-S-2, Case 25, Tables 4-2a, 4-4).

TABLE 10
PROJECTED NET DIFFERENCE IN MASSACHUSETTS ANNUAL EMISSIONS, tpy

	Reference Case: 14.7 mile [a]			Reference Case: 5.6-mile [b]			Reference Case: 3-mile [c]		
	2002	2005	2010	2002	2005	2010	2002	2005	2010
NO_X	43	114	96	43 / 33	116 / 103	98 / 87	39	99	83
SO_2	-348	-219	-431	-346 / -307	-206 / -188	-419 / -359	-286	-168	-354
PM	-12	-2	-26	-12 / -13	0 / -1	-24 / -20	-9	1	-20
CO	-17	-1	-14	-17 / -15	0 / -1	-13 / -11	-15	0	-12
VOC	5	4	3	5 / 4	4 / 3	3 / 3	4	3	3

a. "Case 23 - Reference Case - 14.7 mile" (Exh. HO-N-75-S-2, Case 23, Tables 4-2a, 4-4).

b. In the middle three columns, the first value represents the availability of gas from Bay State as specified in the Bay State Contract, from Case 24 of Exh. HO-N-75-S-2 (December 1, 2000); the second value represents the availability of gas from Bay State as modeled by MMWEC, from Case 18 in Exh. RR-HO-MM-31-S-2 (February 13, 2001).

c. "Case 25 - Reference Case - Bay State Alternative w/ Low Pressure Line priced according to existing interruptible transportation (IT) contract" (Exh. HO-N-75-S-2, Case 25, Tables 4-2a, 4-4).

TABLE 11
PROJECTED NET DIFFERENCE IN NORTHEAST REGION ANNUAL EMISSIONS, tpy

	Reference Case: 14.7 mile [a]			Reference Case: 5.6-mile [b]			Reference Case: 3-mile [c]		
	2002	2005	2010	2002	2005	2010	2002	2005	2010
NO_X	-173	-66	-71	-173 / -157	-65 / -53	-69 / -60	-135	-35	-47
SO_2	-872	-775	-904	-870 / -768	-762 / -672	-890 / -773	-694	-572	-715
PM	-74	-55	-74	-74 /-67	-53 / -48	-72 /-61	-59	-38	-58
CO	-57	-33	-48	-57 /-51	-33 / -29	-47 /-41	-49	-25	-39
CO_2 [d]	-19,528	-22,776	-40,894	-20,540 / -23,789	-21,070/ -16,467	-38,988/ -32,161	-17,003	-4,552	-25,158
VOC	-9	-10	-8	-9 / -9	-10 / -8	-8 / -7	-8	-7	-6

Source: From Tables 4-2, 4-4 (Exh. HO-N-75-S-2); Table 4-2, 4-4 (Exh. RR-HO-MM-31-S-2).

c. "Case 23 - Reference Case - 14.7 mile" (Exh. HO-N-75-S-2).

b. The first value in the middle three columns represents the availability of gas from Bay State as specified in the Bay State Contract, from Case 24 of Exh. HO-N-75-S-2 (December 1, 2000); the second value represents the availability of gas from Bay State as modeled by MMWEC, from Case 18 in Exh. RR-HO-MM-31-S-2 (February 13, 2001).

c. "Case 25 - Reference Case - Bay State Alternative w/ Low Pressure Line priced according to existing interruptible transportation (IT) contract" (Exh. HO-N-75-S-2, Case 25, Tables 4-2, 4-4).

d. There would also be an annual increase of 280 to 370 tons of CO_2 released due to the loss of forest and disturbance of soils from pipeline installation (Exh. MMWEC-LMB at 15).

Projections and calculations provided by MMWEC indicate that the project would not cause either Massachusetts or northeast region total emissions of NO_X, SO_2, CO_2, or VOC to increase or decrease by more than 1% (Exh. RR-HO-MM-1). On the basis of the modeled regional decrease in CO_2 emissions, MMWEC argued that the increase in CO_2 emissions at Stony Brook would be fully mitigated (Exh. PAC ED-11-S).

ii. Noise and Water Consumption Impacts

MMWEC indicated that installation of a new pipeline would allow for more hours of facility operation, which could lengthen the time the facility would create noise; but asserted that the increase in hours would be offset by eliminating noise from the gas compressor station (Tr. 4, at 444-451). MMWEC indicated that noise from the existing compressors would not be

eliminated if the existing 275 psig line were maintained as a supplemental gas supply as part of the 3-mile alternative (Exh. HO-A-27). MMWEC provided historical data suggesting that the Stony Brook turbines do not increase ambient noise levels at the property boundaries by more than 5 decibels (A-weighted), but did not provide noise measurement data comparing noise from the existing gas compressors to overall plant noise (Exh. RR-HO-MM-21, Att. 1; Tr. 5, at 603, 668-672). MMWEC estimated distances from the existing gas compressors to other land uses as 1800 feet to a commercial structure (Bassett Boat), 2000 feet to vacant land, and 2300 feet to the closest residences (Tr. 4, at 446-551).

The Company estimated that additional water consumption at Stony Brook would be 142,136,874 to 226,383,404 gallons per year with the proposed project and 136,685,018 to 205,473,955 gallons per year with the 5.6-mile alternative, based on the additional intermediate unit generation predicted for the years 2000, 2005, and 2010 (Exh. HO-N-32(S)). MMWEC stated that the greatest water uses are for cooling and for NO_X emissions control (Tr. 3, at 343). MMWEC indicated that the source of water for Stony Brook is the Springfield Water and Sewer Commission (id., at 318).[80] MMWEC stated that it has a contract with the City of Springfield to supply water to Stony Brook at the rate of 1.8 million gallons per day (i.e., 657 million gallons per year); MMWEC stated that this rate is greater than the amount needed for the expected additional generation with the proposed project (Exhs. HO-N-68; RR-HO-MM-14; Tr. 3, at 318, 319).

iii. Positions of the Parties

MMWEC contended that the proposed project would result in a greater reduction in total air emissions than the alternatives (Company Initial Brief at 100). Further, MMWEC contended that, while the proposed project would consume the most water and the 3-mile alternative would

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[80] MMWEC provided information indicating the Springfield Water and Sewer Commission obtains water from Cobble Mountain Reservoir in Blandford, and that the system's water use did not increase during the 1990s (Exh. RR-HO-MM-15, Att. 1; Tr. 3, at 319). Water pumped from the West Parish Filters Treatment Plant, which treats water from Cobble Mountain Reservoir, was more than 14.6 billion gallons in 1990 and 1991, and between 12.5 billion and 13.5 billion gallons each year from 1992 to 1999, according to data from the Springfield Water and Sewer Commission (Exh. RR-HO-MM-15, Att. 1).

consume the least water among the approaches, the impact of such increases would be "minimal to non-existent" (id.).

With respect to air emissions, PAC claimed that, if MMWEC could alter its internal accounting practices, it could bid as low, and run Stony Brook as frequently, with the 5.6-mile alternative as with the proposed project (PAC Initial Brief at 16).[81] PAC also contended, based on an expectation that Stony Brook would use oil rather than gas in two winter months each year, that Stony Brook would run on gas 83% of the time, or only slightly more than its historical rate of 77% on gas (id. at 31).

RMLD contended that, under the dispatch assumptions it considers most likely,[82] the proposed project would have little or no air emission advantage over the 5.6-mile alternative (RMLD Reply Brief at 33).

iv. Analysis

MMWEC has modeled both anticipated changes in emissions from the intermediate unit, and anticipated changes in statewide and regional power plant emissions, that would result from each of the three project approaches. The modeling results are set forth in Tables 8, 9, 10, and 11, above.

MMWEC's modeling shows that the proposed project would have both the greatest adverse impact on facility air emissions from Stony Brook and the greatest positive impact on regional air emissions. As shown in Table 8, the proposed project would result in more additional hours of gas-fired operation than the other two project approaches. The 5.6-mile

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81 PAC contended that MMWEC's goal "is to get as many generating hours as possible" (PAC Initial Brief at 16). PAC asserted further that MMWEC could, in its accounting, put all of the transportation costs charged by Bay State for the 5.6-mile alternative into MMWEC's "pipeline fixed cost account" (id.). PAC argued that the marginal cost of operating Stony Brook thus would be the same for the proposed project and the 5.6-mile alternative, and that MMWEC could then bid the same rate into the ISO (id.). PAC concluded that the air emissions should be considered identical between the 5.6-mile alternative and the proposed project (id.).

82 Specifically, RMLD stated its evaluation assumed Hydro-Québec is dispatched before Stony Brook (RMLD Reply Brief at 33).

alternative would result in 0.5% to 1.4% fewer additional hours of gas-fired operation, compared to the proposed project, assuming gas pressure and volume are provided per the Bay State contract, or 11% to 14% fewer additional hours of gas-fired operation, assuming gas pressure and volume as modeled by MMWEC. Construction of the 3-mile alternative would result in 16% to 18% fewer additional hours of gas-fired operation, as compared to the proposed project.

Projected changes in emissions correlate closely with the projected increases in gas-fired operation of the intermediate unit. Table 8 shows that annual emissions of five criteria pollutants plus CO_2 are projected to increase at the Stony Brook facility under each approach, with the greatest increases occurring with the proposed project.[83] Table 10 shows that Massachusetts total annual emissions of NO_X, SO_2, and VOCs would increase under each alternative, while Massachusetts total emissions of SO_2, particulates, and CO would decrease under each approach; the greatest increases and reductions in emissions would occur with the proposed project while the smallest changes generally would occur with the 3-mile alternative. Table 11 shows that each approach would result in a reduction in the total regional emissions of each of five criteria pollutants and CO_2, with the greatest reductions occurring under the proposed project and the smallest reductions occurring under the 3-mile alternative.

MMWEC's modeling thus demonstrates that the 3-mile alternative would result in both lower additional facility emissions, and smaller reductions in net regional emissions, than either the proposed project or the 5.6-mile alternative. The modeling also shows that the 5.6-mile alternative would result in air emissions changes intermediate between those of the 3-mile alternative and the proposed project.[84] If pipeline performance is as projected by Bay State, the 5.6-mile alternative would have air emissions changes very similar to the proposed project; if

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83 As discussed in Section II.B.5.b, above, MMWEC's model appears to underestimate both current and future oil use at Stony Brook. Changes in emissions from Stony Brook, including emissions of SO_2, may be more advantageous than modeled, especially for the proposed project and the 5.6-mile alternative.

84 Ms. Carlson, a witness for MMWEC, stated that "[a] general understanding from reviewing all the results is that in the broad picture, the 15-mile alternative and the 5.6 tend to be fairly close to each other in results until you get to the outyears and tend to show significantly greater reductions than the [3-mile alternative]" (Tr. 1, at 72).

pipeline performance is as projected by MMWEC, the 5.6-mile alternative would have smaller emissions changes.

MMWEC's claims about the regional air emissions impact of the project could be overstated, because the most effective pipeline to Stony Brook would have the greatest potential to produce price offsets that could inhibit other developers from building new generating facilities – facilities that could have emissions efficiencies equal to or better than Stony Brook operating on natural gas. The record also does not well support PAC's conclusion that the air quality benefits of the 5.6-mile alternative would be nearly identical to those of the proposed project.[85]

The Siting Board notes that ozone, which is considered a regional pollutant, is the one criteria pollutant that has recently exceeded National Ambient Air Quality Standards ("NAAQS") in Massachusetts. Therefore, the advantage of approaches that reduce emissions of regional ozone precursors such as NO_X and VOC warrants some additional weight, relative to any disadvantage in increasing local emissions. Again, however, the differences among project approaches in local and regional emissions are small. On balance, the proposed pipeline is slightly superior to the 5.6-mile alternative, and the 5.6-mile alternative slightly superior to the 3-mile alternative, with respect to air emissions.

The Siting Board considers the net air pollution impacts of the three approaches to be generally similar, with each having benefits with respect to regional emissions but each having

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[85] The Siting Board affords little credibility to PAC's assertion that changing MMWEC's internal accounting would cause MMWEC's bids to be indifferent as to gas transportation costs. PAC's assertion is inconsistent with the reality that MMWEC incurs gas transportation costs when it operates. The Siting Board notes that MMWEC would be expected to place bids at a higher price for the 5.6-mile alternative than it would for the full project, due to the additional cost for transportation on the Monson-Palmer line. Therefore, the 5.6-mile alternative would not have air quality benefits that match the proposed project. Also, the record indicates that there may be a physical limit where maximum gas flow through the 5.6-mile alternative could be substantially lower than flow through the proposed project, especially when temperatures are very low. Furthermore, the Siting Board notes PAC's assumption that Stony Brook would operate at a uniform frequency throughout the year is not supported by the record. As a result, there is no substantial support for PAC's contention that the fuel mix at Stony Brook would change only slightly with the project.

adverse impacts with respect to facility emissions, as modeled by MMWEC.[86] The proposed project would have the largest regional benefits but also the largest increase in facility emissions, compared to the 5.6-mile alternative, and the 3-mile alternative would have the smallest changes. Therefore, advantages and disadvantages of the three approaches are partially offsetting, with respect to air quality. The record shows that the magnitude of emissions changes from the 5.6-mile alternative depends on the physical ability of that pipeline to deliver gas to Stony Brook; the difference between the proposed project and the 5.6-mile alternative has not been definitively established but is likely to be modest, while the disadvantage of the 3-mile alternative would be more substantial.

For particulates and CO, criteria pollutants that may be of concern in close proximity to emitters, MMWEC's analysis shows offsetting changes consisting of increases at Stony Brook and decreases at various displaced facilities. For Massachusetts and the northeast region as a whole, MMWEC's analysis shows the reduction in particulates and CO, as well as SO_2, exceed in aggregate the added emissions of these pollutants at Stony Brook. Regional emissions of the criteria pollutants that are of regional concern would be reduced most with the approach modeled to provide the greatest increase in Stony Brook operations. These regional pollutants include SO_2, which is a factor in regional haze, smog, and acid rain; NO_X and VOCs, which are ozone precursors. Regional emissions of CO_2, considered a factor in global climate change, would also be most reduced by the approach modeled to provide the greatest increase in Stony Brook operations. As a result, the proposed project would provide the largest reductions in regional emissions of these pollutants; the 3-mile alternative would provide lower reductions; and the 5.6-mile alternative would provide an intermediate level. The Siting Board finds that both the proposed project and the 5.6-mile alternative would be superior to the 3-mile alternative and that the proposed project would slightly superior to the 5.6-mile alternative, with respect to air quality impacts. Consequently, the Siting Board finds that the proposed project would be slightly superior to the 5.6-mile alternative, and superior to the 3-mile alternative with respect to meeting

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[86] The Siting Board notes that the differences among project approaches in modeled emissions impacts are small compared to the sensitivity of the projections to other factors such as changes in regional generating capacity.

the identified need.

The projected increase in operating hours resulting from the construction of a new gas pipeline also affects noise and water use. As noted by PAC, MMWEC did not provide quantitative data comparing compressor noise levels to noise levels from the rest of Stony Brook. Therefore, the overall change in facility noise from increasing gas supplies is not established. However, since Stony Brook is relatively isolated from residential areas, facility noise levels are only of minor concern.[87]

Water use impacts are expected to be highest for the proposed project and lowest for the 3-mile alternative. However, the record indicates that water usage would remain less than the 1.8 million gallons per day contracted from the Springfield Water and Sewer Commission.

Air quality, noise, and water use impacts have been identified as indirect environmental impacts of the proposed project and its alternatives. The Siting Board finds that noise and water use impacts of the proposed project, the 5.6-mile alternative, and the 3-mile alternative would be comparable. Therefore, the Siting Board finds that the proposed project and the 5.6-mile alternative would each be superior to the 3-mile alternative, and that the proposed project would be slightly superior to the 5.6-mile alternative, with respect to indirect environmental impacts.

c. Net Environmental Impacts

The Siting Board has found that the 3-mile alternative would be slightly superior to the 5.6-mile alternative, and the 3-mile alternative and the 5.6-mile alternative would be superior to the proposed project, with respect to the direct environmental impacts of pipeline installation. The Siting Board has also found that the proposed project and the 5.6-mile alternative would each be superior to the 3-mile alternative, and that the proposed project would be slightly superior to the 5.6-mile alternative, with respect to indirect environmental impacts.

Installation of a pipeline of over 5 miles in length would result in a range of clear environmental impacts. Many of the environmental impacts would be only temporary, or

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87 The record does not reveal differences in noise generation at Stony Brook among project approaches, except that use of the 3-mile alternative in combination with the existing 275 psig line would fail to eliminate noise generated by the existing compressors.

mitigated by use of existing ROWs. The projected air pollution benefits are more speculative, as well as being relatively modest. Also, to the extent there are modeled differences among the three approaches with respect to air emissions impacts, the record suggests that Bay State may be able to uprate the Monson-Palmer line, which likely would significantly lessen the differences. These factors make the construction impact disadvantages of the proposed project more compelling than the indirect air emissions impact disadvantages of the 3-mile alternative. The 5.6-mile alternative appears to deliver most of the air emissions benefits of the proposed project, while avoiding much of the construction impacts because it is less than half the length of the proposed project. The 3-mile alternative is, on balance, slightly superior to the 5.6-mile alternative with respect to construction impacts, but because this difference is slight it is offset by the smaller air emissions benefits of the 3-mile alternative, as modeled by MMWEC. On balance, the Siting Board finds that the 3-mile alternative and the 5.6-mile alternative would each be superior to the proposed project, and the 5.6-mile alternative and the 3-mile alternative would be comparable, with respect to overall environmental impact.

6. Balancing Cost and Environmental Impacts and Benefits

In Section II.B.3.d, above, the Siting Board found that the proposed project would be superior to the 5.6-mile alternative and the 3-mile alternative with respect to reliability. This finding was based on record evidence regarding projected gas availability, flow rates, and delivery pressures for each of the three project approaches. However, as discussed above, because the need for additional energy resources is based entirely on projected economic benefits to the Project Participants, and on projected reductions in regional air emissions, these measures of project reliability are relevant to this review primarily insofar as they affect the level of such economic and environmental benefits, or the certainty with which they would be provided.

In Section II.B.4.d, the Siting Board found that the 5.6-mile alternative would provide greater economic benefits than either the proposed project or the 3-mile alternative. Further, in Section II.B.5, above, the Siting Board found that the 3-mile alternative would be slightly superior to the 5.6-mile alternative, and that the 3-mile alternative and the 5.6-mile alternative would be superior to the proposed project, with respect to the direct environmental impacts of

pipeline installation. The Siting Board also found that the proposed project and the 5.6-mile alternative would each be superior to the 3-mile alternative, and that the proposed project would be slightly superior to the 5.6-mile alternative, with respect to indirect environmental impacts. Overall, the Siting Board found that the 3-mile alternative and the 5.6-mile alternative would each be superior to the proposed project, and the 5.6-mile alternative and the 3-mile alternative would be comparable, with respect to overall environmental impacts.

The evidence and argument in this proceeding has focused almost exclusively on the ability of each alternative to meet the currently identified need for economic and environmental benefits related to the more efficient use of the intermediate unit. However, the Siting Board cannot completely ignore the possibility of further expansion in the use of natural gas at Stony Brook, either in the existing peaking units or in a future generating project.[88] It is likely that hypothetical future needs for additional gas supplies could be met most readily, and with the lowest incremental environmental impact, if an option with extra capacity, such as the proposed project, were selected. The 5.6-mile alternative also provides some flexibility to meet future energy needs, since it could be continued along a direct route to the Tennessee pipeline at some later date, subject to economic and environmental review. The 3-mile alternative appears to be most restricted by its interconnection at the far end of the Monson-Palmer line and, by inspection of maps provided, the least readily extended to the Tennessee pipeline.

The proposed project allows the intermediate unit to be dispatched more frequently than either of the other project approaches, and therefore provides the highest level of regional emissions reductions. However, because of its higher construction costs, it provides lower economic benefits than the 5.6-mile alternative. The Siting Board notes that, because the difference in emissions reductions between the proposed project and the 5.6-mile alternative is small, particularly when compared to total regional emissions, the economic advantages of the 5.6-mile alternative outweigh the air quality advantages of the proposed project. The Siting

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88 The record indicates that MMWEC previously has considered the possibility of using an enhanced gas supply to power additional units at Stony Brook. The record indicates that additional uses which were considered were deemed uneconomic at the time by MMWEC. The record indicates that the 5.6-mile alternative by itself would not have sufficient capacity to supply the existing peakers as well as the intermediate unit.

Board therefore concludes that, overall, the 5.6-mile alternative would better meet the identified need for economic and environmental benefits than the proposed project. Moreover, because of its substantially greater length, the environmental impacts associated with the construction of the proposed project would be significantly higher than those of the 5.6-mile alternative. The proposed project does provide somewhat greater flexibility to meet future energy needs at Stony Brook; however, because such future needs are entirely hypothetical, the potential future advantages of the proposed project do not outweigh its current economic and environmental disadvantages. The Siting Board therefore finds that the 5.6-mile alternative would be superior to the proposed project with respect to providing a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

In comparing the 5.6-mile alternative with the 3-mile alternative, the Siting Board notes that the 5.6-mile alternative would provide greater economic and air quality benefits than the 3-mile alternative, while the 3-mile alternative would result in slightly lower direct environmental impacts. The Siting Board notes that, although the 5.6-mile alternative has greater impacts on natural resources as a result of its greater route length, it has a somewhat lower level of community impact, including less in-street construction and less construction near residences. In addition, the 5.6-mile alternative offers significantly greater economic benefits – an NPV advantage of between $1.3 million and $10.3 million based on MMWEC's cases. Further, if demand for gas at Stony Brook increases in the future, the 5.6-mile alternative could be extended along the WMECO ROW to the Tennessee pipeline; extension of the 3-mile alternative would be considerably more difficult, as the area between East Street and the Tennessee pipeline is more densely developed. On balance, the Siting Board finds that the 5.6-mile alternative would be superior to the 3-mile alternative with respect to providing a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

Accordingly, having compared the three project approaches, the Siting Board finds that, on balance, the 5.6-mile alternative would be superior to both the proposed project and the 3-mile alternative with respect to providing a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

In making this finding, the Siting Board notes that, although the weight of the evidence

suggests that the 5.6-mile alternative would operate substantially as projected by Bay State, the actual flow rate cannot be known with certainty until the pipeline is in place and operational. Should the capacity of the 5.6-mile alternative prove to be substantially lower than anticipated, MMWEC and Bay State have at least three possible options to improve delivery of gas to Stony Brook. First, the Company can pursue with Bay State the possibility of uprating the Monson-Palmer line to a higher pressure, which should allow for increased flow rates on the 5.6-mile alternative. Second, the Company could reconsider the use of the 275 psig line as a supplemental delivery route. Third, the Company can seek approval to continue the 5.6-mile line on out to the Tennessee main line. If the need arises, the Siting Board encourages MMWEC to pursue whichever option best provides for a reliable energy supply with a minimum impact on the environment at the lowest possible cost.

III. ANALYSIS OF THE PREFERRED AND ALTERNATE ROUTES

The Siting Board has a statutory mandate to implement the policies of G.L. c. 164, §§ 69J-69Q to provide a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. G.L. c. 164, §§ 69H and J. Further, G.L. c. 164, § 69J requires the Siting Board to review alternatives to planned projects, including "other site locations." In implementing this statutory mandate, the Siting Board requires a petitioner to demonstrate that it examined a reasonable range of practical facility siting alternatives, and that its proposed facilities are sited at locations that minimize costs and environmental impacts while ensuring supply reliability. ANP Blackstone Decision, 8 DOMSB 1, 103; ANP Bellingham Decision, 7 DOMSB 39, 133; New England Power Company, 21 DOMSC 325, 376 (1991).

In Section II.B, above, the Siting Board found that the 5.6-mile alternative would be superior to both the proposed project and the 3-mile alternative with respect to providing a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. Consequently, Section III.A, below, describes the two noticed routes for the 5.6-mile alternative.[89] In Section III.B, below, the Siting Board reviews MMWEC's site

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[89] These two routes, known as the northern and southern routes, are shortened versions of (continued...)

selection process to determine whether MMWEC examined a reasonable range of practical facility siting options. Finally, in Section III.C, below, the Siting Board evaluates the environmental impacts, cost and reliability of the 5.6-mile alternative along the northern and southern routes in order to determine whether environmental impacts would be minimized and whether an appropriate balance would be achieved among environmental impacts, cost, and reliability.

A. Description

The 5.6-mile alternative would be a 20-inch pipeline[90] connecting at one end to Stony Brook and connecting at the other to Bay State's Monson-Palmer line at a point where the Massachusetts Turnpike crosses over East Street (Exh. EFSB-3, at 9). MMWEC has identified its preferred route for the 5.6-mile alternative, which follows the western-northern corridor ("northern route") and an alternate route which departs from the preferred route along a more southerly course in the vicinity of Ludlow Center ("southern route"). Both routes would be located entirely within the town of Ludlow (id. at Fig. 1).

MMWEC stated that the permanent easement for the pipeline typically would be 20 feet wide along the existing WMECO ROW, with the pipeline alignment generally located 10 feet inside the WMECO ROW (id. at App. F 12; Exhs. HO-EL-19-S; Tr. 3, at 249; Tr. 4, at 367, 382-383).[91] During construction, the project would require a 45-foot temporary easement (Exh. EFSB-3, at App. F 12; Tr. 4, at 369). A custody transfer station, consisting of an isolation valve,

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89 (...continued)
two of the three noticed routes for the proposed project.

90 The original design of the 14.7-mile pipeline was for welded steel pipe with a fusion bonded epoxy coating and cathodic protection, designed for a maximum allowable operating pressure of 1000 psig (Exh. MMWEC-1, at 3-4). It is expected that the 5.6-mile alternative would also be constructed of welded steel pipe with a fusion bonded epoxy coating and cathodic protection, designed for a maximum allowable operating pressure of 1000 psig.

91 Where the route does not follow an existing ROW, 40 feet of permanent easement would be required (Tr. 4, at 434).

a blow-down valve, and an enclosure for communications and control equipment, all within a 25-foot by 36-foot fence, would be located next to East Street near the interconnection with the Monson-Palmer line (Exhs. EFSB-3, at 16, 17; HO-EL-2-S; PAC 00A-1). A metering and pressure regulating station would be located at Stony Brook (Exh. EFSB-3, at 16, 17).

The northern route for the 5.6-mile alternative primarily follows existing electric transmission ROWs held by WMECO (Tr. 4, at 364-365).[92] From the Stony Brook facility, the northern route proceeds south and then east, following along an existing oil pipeline across West Street to the WMECO Ludlow-Orchard line ROW near Tank Farm Road (Exh. EFSB-3, at 39, 41, 43, Fig. 1). The northern route then parallels this WMECO ROW, passing north of Ludlow Center, to a point next to the Ludlow substation, an electric substation just north of Route 21 (id.). Veering slightly south of the actual substation, the northern route then turns almost directly south, and parallels the WMECO Ludlow-Scitico line ROW to a point near the Massachusetts Turnpike (id). The northern route would deviate from the WMECO ROWs to avoid a row of large trees west of the Ludlow substation and the substation itself (Exh. HO-EL-28, Att. 1, at 2). The Route would exit the ROW at the Massachusetts Turnpike to interconnect with the Monson-Palmer line at the point where the Turnpike crosses over East Street in Ludlow (id.).

The southern route, unlike the northern route, passes south of Ludlow Center (Exh. EFSB-3, at Fig. 1).[93] The southern route follows the same route as the northern route from Stony Brook to a point 1400 feet west of Fuller Street, then diverts away from the existing WMECO ROW, angling to the southeast across agricultural lands (id., at 41-43, Fig. 1). It crosses Fuller and Rood Streets, and then Center Street (Route 21) approximately 2000 feet southwest of Ludlow Center (id.). It then angles briefly to the north and then back to the east, crossing Miller

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92 MMWEC stated that WMECO owns 45% of the 14.7-mile corridor in fee simple and has easements to operate electric transmission lines over most of the remainder (Exh. MMWEC-RWF at 10).

93 The southern route is a part of the so-called "Western/Eastern Corridor" that lies between the Stony Brook facility and the connection to the Monson-Palmer line at the Massachusetts Turnpike. (See Fig. 1 of the SDEIR) (Exh. EFSB-3 at Fig. 1). MMWEC stated that the full western/eastern corridor is 14.4 miles long, which compares to a length of 14.7 miles for the proposed project (id., at 43). The southern route would thus be approximately 0.3 miles shorter than the northern route.

Street approximately 1600 feet south of Route 21 (id.). Approximately 1000 feet east of Miller Street in Ludlow, the southern route rejoins the northern route on the WMECO ROW and turns south to interconnect with the Monson-Palmer line (id.). Maps provided by MMWEC show that the southern route deviates from the northern route for about half its length (id., at Fig. 1). The two routes are shown on Figure 2, at the end of this Decision.

B. Site Selection

1. Standard of Review

G.L. c. 164, § 69J provides that a petition to construct a proposed facility must include "a description of alternatives to [the applicant's] planned action" including "other site locations." In past reviews of alternative site locations identified by an applicant, the Siting Board has required the applicant to demonstrate that it examined a reasonable range of practical siting alternatives. ANP Blackstone Decision, 8 DOMSB 1, 199; Berkshire Gas Decision, 9 DOMSB 1, 38; 1998 NEPCo Decision, 7 DOMSB 333, 374. In order to determine whether an applicant has considered a reasonable range of practical alternatives, the Siting Board has required the applicant to meet a two-pronged test. First, the applicant must establish that it developed and applied a reasonable set of criteria for identifying and evaluating alternative sites in a manner which ensures that it has not overlooked or eliminated any sites which, on balance, are clearly superior to the proposed site. Second, the applicant must establish that it identified at least two noticed sites or routes with some measure of geographic diversity. ANP Blackstone Decision, 8 DOMSB 1, 199; Berkshire Gas Decision, 9 DOMSB 1, 38; 1998 NEPCo Decision, 7 DOMSB 333, 374.[94]

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[94] In this decision, the Siting Board has made minor modifications to the site selection standard of review as set forth in previous Siting Board decisions. These modifications reflect an effort to clarify application of the standard of review, and do not alter the standard of review substantively. In the future, the Siting Board intends to re-examine the substantive analysis required by the site selection standard of review.

2. Site Selection Process

a. Description

According to MMWEC, the first step in selecting a pipeline corridor was the establishment of a regional search area (Exhs. MMWEC-JOR/ARM at 32; EFSB-3, at 44). MMWEC stated that it considered several regional interstate gas pipelines as potential sources of gas for Stony Brook, including the Iroquois Gas Transmission System in Connecticut, the Algonquin Gas Transmission Company pipelines in Connecticut, and the Tennessee system in Massachusetts (Exh. EFSB-3, at 43-44). Among these, the Tennessee system was selected as most practicable based on proximity to Stony Brook (id. at 44). MMWEC stated that existing laterals from the Tennessee pipeline, terminating in Westfield, Holyoke, Ludlow, and Springfield, were evaluated and determined to have inadequate capacities (id.). MMWEC stated that it therefore identified a search area extending from Stony Brook on the north to the existing Tennessee pipeline on the south (id. at 45; Exhs. MMWEC-1, at 40; MMWEC-JOR/ARM at 33). MMWEC identified the Connecticut River as the western boundary of the search area, noting that routes crossing the river would have been undesirable due to the presence of endangered species of fish (Exhs. MMWEC-1, at 40; HO-A-2; MMWEC-JOR/ARM at 33). MMWEC identified Route 32 in Monson as the eastern limit of its search area, because routes further east would have been unnecessarily long, with concomitant increases in environmental impacts and cost (Exhs. MMWEC-1, at 40; MMWEC-JOR/ARM at 33-34; EFSB-3, at 45-46).

MMWEC indicated that it consulted with officials and residents of various municipalities in its search area to identify community priorities (Exh. MMWEC-1, at 41). Based on written comments and meetings with community representatives, MMWEC indicated that community preferences were: (1) to avoid population centers and town-owned open space and conservation lands; (2) to avoid disturbance to wetlands, wildlife habitat, and water and forest resources; (3) to avoid sites contaminated with hazardous wastes; and (4) to minimize bridge crossings, road and infrastructure disturbance, the diversion of town public safety personnel, and traffic impacts during construction (id. at 42; Exh. MMWEC-JOR/ARM at 35).

MMWEC stated that it identified 12 preliminary study corridors within the regional search area extending from the Tennessee pipeline to Stony Brook (Exhs. EFSB-3, at Fig. 2;

MMWEC-JOR/ARM at 35; MMWEC-JKD at 6). To evaluate these corridors, MMWEC developed siting criteria which reflected environmental impacts, cost, pipeline engineering, reliability, and safety concerns (Exhs. MMWEC-JOR/ARM at 37; MMWEC-JKD at 6). MMWEC stated that it developed the selection criteria with the idea that a cross-country pipeline would be constructed, in contrast to an in-road pipeline (Tr. 6, at 714-715). MMWEC indicated it developed site selection criteria to reflect the following: rare and endangered species, wetlands/vernal pools, population density, river crossings, parks and public lands, cultural resources, sensitive receptors, wildlife habitat, aesthetics, water supply resources, interruption to commerce, wooded versus cleared ROW, contaminated areas, noise, agriculture, recreation fishing, road/rail crossings, pipeline length, Chicopee River crossing, geology, parcels traversed, topography, wetlands/floodplain, cathodic protection, tie-in location, bridges, construction period, infrastructure, access, and vibration (Exh. MMWEC-JKD at Att. JKD-3). To evaluate alternatives with respect to the above concerns, MMWEC developed ratings based on specific indicators of potential impact, such as (1) the length of proposed pipeline that would be within specific types of resource areas (e.g., cropland), (2) the number of specific types of land uses (e.g., roads) or resources (e.g., streams) that would be crossed by the proposed pipeline; and (3) the number of specific types of land uses (e.g., schools), or the area of specific types of resource areas (e.g., wetlands), that would be within a set distance of the proposed pipeline (Exhs. MMWEC-JKD, Att. JKD-2; MMWEC-RWF at 12, 15).

MMWEC indicated that it developed weights ranging from 1.64 to 4.79 for each criterion, and then rated each corridor for each criterion on a scale of one to five (Exh. MMWEC-JKD at 7-9, Att. JKD-3). MMWEC explained that it calculated, aggregated, and ranked cumulative weighted scores for each study corridor by multiplying the indicator ratings by the weights (id. at 9).

MMWEC's original 12 corridors crossed the Chicopee River at one of three locations and terminated at the Tennessee pipeline at one of three locations, located several miles apart in Hampden and Monson (Exh. EFSB-3, at Fig. 2). The 12 corridors all crossed the Massachusetts Turnpike at one location (id. at Figs. 2, 3). After evaluating the 12 preliminary study corridors, as described below, MMWEC identified another means of crossing the Massachusetts Turnpike,

and identified and evaluated an additional four corridors (Exhs. MMWEC-JKD at 10; EFSB-3, at 49; Tr. 6, at 705). MMWEC indicated that it developed alternative routing for all portions of its project, except for the one-and-one-half miles of the project nearest Stony Brook (Exh. EFSB-3, at Figs. 1, 2, 3).

MMWEC indicated that it considered using the median of the Massachusetts Turnpike for a portion of the route as part of its original 12 alternatives, and also considered using the Massachusetts Turnpike corridor in supplemental evaluations (Exhs MMWEC-1, at 54; EFSB-3, at 49, 54-59).[95] MMWEC stated that disadvantages of using the Turnpike corridor included: (1) permitting constraints; (2) close proximity to densely populated residential and commercial areas; (3) preserving the integrity of existing gas pipelines and fiber optic cables in the corridor; (4) safety of construction personnel along the highway; and (5) safety of the traveling public during construction (Exhs. EFSB-3, at 48; MMWEC-RWF at 13-15).

Six of these 12 corridors, including the two with the highest cumulative weighting scores, were subsequently eliminated from consideration because of land use conflicts with the Massachusetts Turnpike and liquified natural gas storage facilities (Exh. MMWEC-JKD at 11). The remaining ten corridors were subjected to an additional round of evaluation, using a process requested by federal agencies including the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the U.S. Environmental Protection Agency (Exh. MMWEC-JKD at 11-13). Three routes emerged from this evaluation, including the western/eastern corridor and two routes that did not follow existing ROWs (id.). Subsequently, at the request of the federal agencies, the Company revised its selections, adding a route along existing ROWs that it had previously eliminated – the western/northern corridor – and eliminating one of the two routes not following existing ROWs (id. at 13; Tr. 5, at 687-691). The Company designated its three selected corridors as: Corridor A, the eastern corridor; Corridor B, the western/northern corridor; and Corridor C, the western/eastern corridor (Exhs. MMWEC-JKD at 12, 14; MMWEC-JOR/ARM at 31).

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[95] Requests that MMWEC consider routes running along the Massachusetts Turnpike were included among public comments on the DEIR for the project (Exh. EFSB-3, at App. B). Maps of the corridor area show that the Massachusetts Turnpike is roughly parallel to the Tennessee pipeline (id. at Fig. 3).

MMWEC stated that after further evaluating the three corridors, it selected the western/northern corridor as its preferred route for its proposed project (Exh. MMWEC-JOR/ARM at 32). MMWEC stated that the principal advantage of the western/northern corridor was the potential to use an alignment largely within existing ROWs (Exhs. EFSB-3, at 177; MMWEC-JKD at 27-28). MMWEC noted that using existing ROWs would reduce the amount of both temporary and permanent tree clearing, which would reduce visual impact and construction noise and would tend to reduce overall ecological change (Tr. 3, at 265-268; Tr. 4, at 431-434,459). However, the Company noted that the western/northern corridor would affect more scrub/shrub habitat than some of the other alternatives (Exh. EFSB-3, at 112). Table 6, in Section II.B.5, above summarizes quantitative environmental impacts of the western/northern corridor.

MMWEC stated that the primary advantages of the eastern corridor include the relatively low levels of expected wetland impacts and mapped threatened and endangered species,[96] and the relatively low number of adjacent residences (Exh. EFSB-3, at 53). However, MMWEC noted that use of the eastern corridor would require the creation of new ROW along most of its length, resulting in relatively large amounts of forest clearing and forest fragmentation, and affecting views at road crossings and in some cases along visible ridgelines (id.; Exh. HO-EL-26). The Company stated that, on the eastern corridor route to Tennessee, 17.3 acres of wetlands would be affected, 44.2 acres of forest would be permanently cleared, 40 streams would be crossed, and endangered species habitat would be encountered at 14 sites; also the Chicopee River would be crossed (Exh. PAC-ED-14(S)). MMWEC subsequently argued that the eastern corridor was inferior to the western/northern corridor, based partly or in whole on these environmental factors (Company Initial Brief at 148-149).

The western/eastern corridor overlaps the route of the western/northern corridor for much of its length between Stony Brook and the Tennessee mainline, but deviates from it for an approximately 2-mile segment between Stony Brook and the Massachusetts Turnpike (Exh.

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96 MMWEC stated that, while available information initially indicated that species designated as rare were not present along the eastern corridor, MMWEC's field crews later determined that several of these species were present on the eastern corridor as well as other corridors (Tr. 3, at 271-272).

EFSB-3, at Fig. 1). MMWEC noted that, although slightly shorter in overall length, the western/eastern corridor does not follow existing ROWs where it deviates from the western/northern corridor, and therefore would be less advantageous with respect to use of existing ROWs (Tr. 3, at 265). The advantages and disadvantages of the western/eastern corridor are discussed in more detail in Section III.C.2, below, where part of the corridor is treated as an alternative route for the 5.6-mile alternative.

MMWEC later identified routing options for an interconnection with the Monson-Palmer line, which traverses the regional search area and is intersected by MMWEC's identified study corridors at intermediate points between Stony Brook and the Tennessee main line (Exh. EFSB-3, at 8, 9, 32, 39, Fig.1). Specifically, MMWEC identified two routing alternatives that would interconnect with the Monson-Palmer line at East Street (the northern and southern routes for the 5.6-mile alternative), and two alternatives that would interconnect with the Monson-Palmer line at West Street, designated as the 3-mile alternatives 1 and 2 (id.; Exhs. MMWEC-JOR/ARM at 22-23; MMWEC-JOR-S at 5).[97]

MMWEC stated that, due to variations in pressure drop at different points along the Monson-Palmer line, the potential supply from an interconnection would vary among alternatives, and would be greatest for those corridors that intersected that line furthest to the east, towards the existing Tennessee gate station (Exh. HO-A-39). MMWEC stated that for this reason, the potential supply from the interconnection to the Monson-Palmer line would be greatest for the eastern corridor, next greatest for the 5.6-mile alternative, and smallest for the 3-mile alternative (id.).

b. Positions of the Parties

MMWEC contended that it examined a reasonable range of siting alternatives, developed

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[97] Similarly, based on the identified corridors, there are two possible routes for interconnection to the Monson-Palmer line where it is intersected by the eastern corridor. While MMWEC considered the alternative of interconnection along the eastern corridor, MMWEC did not provide information on the availability of land for a custody transfer station at the intersection of the eastern corridor with the Monson-Palmer line (Exh. HO-A-39).

a reasonable set of criteria for evaluating these alternatives, and applied the criteria in an appropriate manner so that it did not overlook or eliminate any routes that, on balance, were clearly superior to its proposed project along the western/northern corridor (Company Initial Brief at 126, 131). PAC argued that MMWEC's site selection process failed to capture superior alternatives because of its false reliance on its "minimum requirements" as a basis for site selection (PAC Reply Brief at 3-6). For example, PAC pointed out that neither the 3-mile alternative nor the 5.6-mile alternative, which it asserted are the best alternatives, was considered in MMWEC's evaluation of siting alternatives (PAC Reply Brief at 4).

c. Analysis

MMWEC has developed a set of criteria for identifying and evaluating siting options that address environmental impacts, land use concerns, community issues, cost, and reliability – types of criteria that the Siting Board has found to be appropriate for the siting of public utility facilities. Berkshire Gas Decision, 9 DOMSB 1, 43-44; Boston Edison Company, 6 DOMSB 208, 283 (1997); New England Power Company, 4 DOMSB 109, 167 (1995).

The Company identified a search area for identification of pipeline corridors between Stony Brook and the Tennessee mainline to the south, encompassing a sufficient breadth extending from the Connecticut River on the west to western parts of Monson on the east. This search area is sufficiently broad to include all reasonable routes for an interconnection with Tennessee, as well as all reasonable routes to Bay State's Monson-Palmer line.[98]

The Siting Board notes that the Company performed several iterations of identifying, ranking, and eliminating facility alternatives. The Siting Board recognizes that these iterations reflected an on-going site selection process with input from other parties. Selection criteria thus changed as the process continued. The Siting Board recognizes that it can be, and in this instance was, reasonable and beneficial for an applicant to adapt its site selection process as it receives

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[98] Although MMWEC's formal site-selection process focused on identifying routes that would connect to Tennessee, the Siting Board notes that a number of alternatives were evaluated in detail during this proceeding, including the alternative of connecting to the Monson-Palmer line at an intermediate point along identified corridors and the alternative of a more direct corridor extending to the Monson-Palmer line near West Street.

comments.

With respect to concerns that use of the Massachusetts Turnpike was overlooked as an alternative to a cross-country route between Stony Brook and the Tennessee line, inspection of maps of the corridor area show that the Massachusetts Turnpike is roughly parallel to the Tennessee pipeline, and thus would not provide such an alternative. In addition, the Company identified conflicts with roadway safety and existing utilities along the Turnpike corridor. The Siting Board considers that the Company was not unreasonable in eliminating routes that include following part of the Massachusetts Turnpike.

Based on the foregoing, the Siting Board finds that MMWEC has developed a reasonable set of criteria for identifying and evaluating facility alternatives. The Siting Board also finds that the Company has applied its proposed facility site selection criteria consistently and appropriately, and in a manner which ensures that it has not overlooked or eliminated any siting options that are clearly superior to the noticed alternatives.

Accordingly, the Siting Board finds that the Company has developed and applied a reasonable set of criteria for identifying and evaluating alternatives to the proposed project in a manner which ensures that it has not overlooked or eliminated any siting options which, on balance, are clearly superior to the noticed alternatives.

3. Geographic Diversity

MMWEC described a site selection process that included alternatives crossing major obstacles of the route at multiple locations and terminating at multiple locations along the Tennessee gas pipeline. Of the entire 14.7-mile proposed project, alternatives were evaluated for all but a distance of one mile. Although each identified route overlaps a segment of at least one other route, each identified route is distinct, offering a different set of environmental and cost advantages and disadvantages. Consequently, the Siting Board finds that the Company has identified a range of practical pipeline route alternatives with some measure of geographic diversity.

4. Conclusions on the Site Selection Process

The Siting Board has found that the Company has developed and applied a reasonable set of criteria for identifying and evaluating alternatives to the proposed project in a manner which ensures that it has not overlooked or eliminated any siting options which, on balance, are clearly superior to the noticed alternatives. In addition, the Siting Board has found that the Company has identified a range of practical pipeline route alternatives with some measure of geographic diversity. Consequently, the Siting Board finds that MMWEC has demonstrated that it examined a reasonable range of practical siting alternatives.

C. Environmental Impacts, Cost, and Reliability of the Proposed and Alternative Facilities

In this section, the Siting Board evaluates the environmental impacts of the 5.6-mile alternative along the northern route, discusses mitigation of impacts, and compares the southern route to the northern route. The Siting Board then compares the cost and reliability of the northern and southern routes. Finally, the Siting Board determines whether environmental impacts of the 5.6-mile alternative would be minimized, and evaluates whether an appropriate balance would be achieved among environmental impacts, cost, and reliability.

1. Standard of Review

In implementing its statutory mandate to ensure a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost, the Siting Board requires a petitioner to show that its proposed facility is sited at a location that minimizes costs and environmental impacts while ensuring a reliable energy supply. To determine whether such a showing is made, the Siting Board requires a petitioner to demonstrate that the proposed site for the facility is superior to the noticed alternatives on the basis of balancing cost, environmental impact, and reliability of supply. Berkshire Gas Decision, 9 DOMSB 1, 40; 1998 NEPCo Decision, 7 DOMSB 333, 383; Boston Edison Company, 6 DOMSB 208, 287 (1997) ("1997 BECo Decision").

An assessment of all impacts of a proposed facility is necessary to determine whether an appropriate balance is achieved both among conflicting environmental concerns as well as among

environmental impacts, cost, and reliability. A facility which achieves that appropriate balance thereby meets the Siting Board's statutory requirement to minimize environmental impacts at the lowest possible cost. Berkshire Gas Decision, 9 DOMSB 1, at 46; 1998 NEPCo Decision, 7 DOMSB 333, 383-384; 1997 BECo Decision, 6 DOMSB 208, 287.

The Siting Board recognizes that an evaluation of the environmental, cost and reliability trade-offs associated with a particular proposal must be clearly described and consistently applied from one case to the next. Therefore, in order to determine if a petitioner has achieved the proper balance among environmental impacts and among environmental impacts, cost and reliability, the Siting Board must first determine if the petitioner has provided sufficient information regarding environmental impacts and potential mitigation measures in order to make such a determination. The Siting Board then can determine whether environmental impacts would be minimized. Similarly, the Siting Board must find that the petitioner has provided sufficient cost information in order to determine if the appropriate balance among environmental impacts, cost, and reliability would be achieved. 1998 NEPCo Decision, 7 DOMSB 333, 384; 1997 BECo Decision, 6 DOMSB 208, 287-288; Commonwealth Electric Company, 5 DOMSB 273, 337 (1977).

Accordingly, in the sections below, the Siting Board examines the environmental impacts, cost and reliability of the 5.6-mile alternative along the northern and southern routes to determine: (1) whether environmental impacts would be minimized; and (2) whether an appropriate balance would be achieved among conflicting environmental impacts as well as among environmental impacts, cost and reliability. In this examination, the Siting Board compares the northern and southern routes to determine which is superior with respect to providing a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

2. Environmental Impacts

In this subsection, the Siting Board evaluates the environmental impacts of the northern route for the 5.6-mile alternative, discusses mitigation of impacts, and compares the northern and

southern routes for the 5.6-mile alternative.[99] Water and land resources impacts are evaluated first, then land use and visual impacts, and lastly noise and traffic impacts.

a. Water Resources and Habitat

i. Wetlands

The Company stated that wetlands along the proposed routes were delineated in 1996 and 1997, flagged, and mapped (Exh. EFSB-3, at App. F 24). MMWEC presented aerial mosaic sheets depicting approximate wetland boundaries (id. at App. H). MMWEC indicated that a Notice of Intent including wetland boundaries would be filed with the Ludlow Conservation Commission once the precise pipeline alignment is determined (id. at 7, 63; Exh. HO-EW-22).

MMWEC indicated that the northern route would cross or be proximate to 20 banks, 10 lands under water bodies and waterways, 19 BVWs totaling 8.6 acres, 4 bordering lands subject to flooding, 2 isolated lands subject to flooding, 5 riverfront areas, and 22 buffer zones (Exh. EFSB-3, at 63-64, 104). MMWEC stated that, a vernal pool had been certified by the MNHESP at one location along the 5.6-mile alternative (Exh. HO-EW-24; Tr. 3, at 310).

The Company stated that project impacts on wetland resources would be mostly temporary and related to construction (Exh. EFSB-3, at 103). MMWEC indicated it expects increased erosion during the construction period (id. at 11). Also, the Company stated that there would be some permanent conversion of forested wetland to shrub and wet meadow communities along the permanent ROW, but did not quantify this conversion (id. at 11).

MMWEC indicated that construction of the 5.6-mile alternative would take 8 to 12 weeks (Exhs. EFSB-3, at 21; HO-A-26). The Company stated that the duration of construction work would be approximately 30 days at any one location along the route, starting with vegetation

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[99] In general, impacts of the southern route of the 5.6-mile alternative are not expressly described in the record. However, we note these can be calculated from impacts of three alternatives that are presented by MMWEC. Since the 5.6-mile routes are each versions of full proposed project corridors, cut off at the same point, impacts of the southern route can be readily calculated by adjusting impacts listed for the northern route by the difference between listed impacts of the western/northern corridor and the western/eastern corridor. Impacts listed herein are based on matching computations from record data.

clearing and ending with initial wetland restoration (Exh. EFSB-3, at 103). MMWEC indicated that full wetland recovery would take at least one year (id. at 103). With respect to construction and environmental impacts, MMWEC stated that the optimal season for pipeline construction would be summer or early fall (Exh. HO-EW-34).

The Company stated that construction in wet areas would be accomplished by placing timber riprap or construction mats in these areas, to limit the effect of construction equipment on wetland soils and vegetation (Exh. EFSB-3, at App. F 11). To mitigate erosion, silt fence or haybales would be used to trap sediments that might otherwise enter surface water bodies (id. at App. F 15). Temporary installation of flume pipes, slope breakers, ditch plugs, and catchment basins are proposed to limit erosion and sedimentation (id. at App. F 14-16). The Company also stated that it would use temporary ditch plugs, filter sediment-laden waters, contain spoils, and use catchbasins for dewatering flows (id. at 157). MMWEC indicated that a "push/pull" method of construction would be used in certain wetlands along the 5.6-mile alternative, so that a backhoe would be the only piece of major equipment routed through the wetland (id. at 145, App. F 29-30, App. H 8-11).

MMWEC stated that, as a general policy, pipeline construction would go around or under all vernal pools that the MNHESP certifies (Exhs. HO-EW-24; EFSB-3, at 111). Mr. Downing noted that MMWEC already plans to directionally drill under the one certified vernal pool on the northern route, because a rare species is located there (Tr. 3, at 310-311). MMWEC committed to directionally drill or otherwise avoid any additional vernal pools that gained certification (id. at 310, 315; Tr. 5, at 618).

MMWEC explained that, following installation of the pipeline, the pipeline trench would be backfilled and contours of the wetland areas would be restored, except that rock riprap placed to prevent stream bank erosion would be left in place (Exh. EFSB-3, at 105, 146-148, App. F 11). MMWEC stated that dormant seed stock in wetland soils would begin growing on its own following regrading but that wetland areas would be seeded with annual grass to stabilize the area until indigenous wetland species revegetate disturbed areas (id. at 106, 147; Exh. HO-EL-23).

With respect to a comparison between the northern and southern routes, Mr. Downing

indicated that functional values of wetlands along existing ROWs typically are similar to those of undisturbed wetlands, but that aesthetic values might differ (Tr. 3, at 265). The southern route would affect slightly less bordering vegetated wetland than would the northern route (Exh. RR-HO-MM-10). MMWEC indicated that the number of potential vernal pools is the same along both routes (Exh. EFSB-3, at 73).

ii. Streams

MMWEC indicated that along the northern route there are a total of ten stream crossings, five of which are perennial streams, and five of which are characterized by the Company as containing brook trout (Exhs. EFSB-3, at 73, 116, 143Q; HO-EW-28). Increased erosion is to be expected during the construction period (Exh. EFSB-3, at 11). MMWEC predicted temporary increases in turbidity due to land clearing activity and work at stream crossings, but no permanent effects on water quality (id. at 119-120). The Company indicated that "rock type" riprap would be placed along the banks of all stream crossings to be disturbed during construction, up as high as the "typical" water level for the stream (Exh. HO-EW-31). MMWEC stated it expected to use the flume method for crossings of trout streams (Exh. EFSB-3, at 113). The southern route requires four fewer stream crossings and one fewer brook trout stream crossing than the northern route (id. at 73).

The Company indicated that the 5.6-mile alternative would cross under the Chicopee Valley Aqueduct (id. at 5) and that the project would require an "(8m)" permit from the Massachusetts Water Resources Authority (id. at 5). The Company indicated there would be no adverse technical or structural impacts on the aqueduct (Tr. 3, at 293).

The Company indicated that it would use approximately 450,000 gallons of water from the Springfield Water and Sewer Commission in order to perform hydrostatic testing of the pipeline (Exh. HO-EW-39; Tr. 3, at 318; Tr. 4, at 505). MMWEC stated that it would minimize the short-term water supply impact of hydrostatic testing by using its existing 10 million gallon city water storage makeup tank (Tr. 4, at 506). MMWEC stated that particulate matter entrained in hydrostatic test water, from weld slag and other debris, would be captured in a catch basin and/or filtered through a barrier such as hay bales; no follow-up removal of this material from the

environment was described (Exh. HO-EW-39). The Company indicated that it may need to obtain a National Pollutant Discharge Elimination System ("NPDES") permit from the U.S. Environmental Protection Agency, for storm water discharges during construction (Exh. EFSB-3, at 5, 136).

iii. Habitat

MMWEC stated that the permanent easement for the pipeline typically would be 20 feet wide along the existing WMECO ROW, with the pipeline alignment generally located 10 feet inside the WMECO ROW (id. at App. F 12; Exh. HO-EL-19-S; Tr. 3, at 249; Tr. 4, at 367, 382-383). MMWEC indicated that almost all of the pipeline ROW would be aligned on the side of the WMECO ROW that already has been cleared for existing transmission lines (Exh. HO-EL-41). For purposes of calculating habitat impacts, and based on a walking survey and discussions between MMWEC and WMECO, MMWEC assumed that forest currently extends an average of 5 feet into the WMECO ROW (Exh. HO-EL-41; Tr. 4, at 356). Along existing ROWs, MMWEC has illustrated a preliminary design wherein an additional 30 feet of temporary working space would be needed within the existing WMECO ROW, and an additional 20 feet of temporary construction easement outside WMECO's ROW (Exhs. EFSB-3, at App. F 52; HO-EL-19, at 1, Att. 1 Figs. 1 and 2; HO-EL-19-S; Tr. 4, at 383). Forest outside WMECO's ROW would be allowed to revegetate after construction (Tr. 4, at 356). MMWEC stated that it would limit vegetation growth in the permanent pipeline ROW, allowing only scrub/shrub vegetation (Exh. EFSB-3, at 148).

MMWEC stated that it will support the backhoe used for excavation with riprap or construction mats in order to mitigate against soil compaction (id. at 145). MMWEC stated that it would leave stumps in place except along the trenchline, and that hardwoods in the temporary ROW would sprout from stumps, resulting in revegetation of these areas (id. at 109, 144).

The southern route would permanently affect approximately six more acres of forest, and three fewer acres of scrub/shrub habitat, than the northern route; temporary forest impacts would be similar between the two routes (Exh. RR-HO-MM-10).

MMWEC noted that oaks, red maple, and white pine are the predominant trees in forested

areas along the northern route (Exh. EFSB-3, at 69). Other wildlife habitats include hay fields, shrub lands, and edge habitat between the forest and the ROWs (id. at 70-71). MMWEC anticipated the following wildlife and fisheries impacts for the northern route: (1) short-term construction impacts on shrubs, agriculture and fisheries; (2) minor long-term impacts of forest clearing and ROW maintenance; and (3) negligible or no impacts on forest fragmentation and on vernal pools (id. at 114).

MMWEC stated that it consulted with MNHESP to determine the rare species for which surveys should be conducted on the northern route for the 5.6-mile alternative (Exh. HO-EL-14). Rare species surveys were conducted during 1997 and 1998 to determine the distribution of listed species from several taxonomic categories (Exh. EFSB-3, at 67). Rare species located along the northern route were spatterdock darner (a dragonfly), four-toed salamander, wood turtle, American bittern, and parula warbler (id. at 68). According to MMWEC, the MNHESP identified some additional species that might be found in the area crossed by the pipeline route alternatives (id. at 66).

MMWEC stated it would minimize impacts on fisheries and wildlife by constructing the pipeline during the late fall or winter, which are generally outside of high water flow periods and nesting seasons (Exh. EFSB-3, at 152).[100] MMWEC asserted that all rare species habitat would be avoided (Exh. HO-EL-17). The Company stated that in order to avoid disturbing rare species habitat, it would directionally drill at two locations along the 5.6-mile alternative (Exh. HO-EW-41).[101] At these locations, construction vehicles would be required to use road access points to exit and reenter the ROW, so as to avoid traversing rare species habitat (Exh. HO-EW-41). MMWEC asserted that "the project would avoid all direct impacts to threatened and endangered species" (Exh. EFSB-3, at 107).

The Company stated it would have an environmental inspector on-site during pipeline

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100 MMWEC also identified summer or early fall as the optimal season for construction (Exh. HO-EW-34).

101 MMWEC indicated one of the two directional drills at rare species habitats is adjacent to a vernal pool and the other is adjacent to an aqueduct crossing, so each directional drill would be multipurpose (Tr. 3, at 311).

construction, and in the event that an unanticipated species of concern is encountered, the Company would immediately alert the Ludlow Conservation Commission and the MNHESP and prepare a plan to mitigate any impacts (Tr. 3, at 325-326, 328-330).

Comparative data indicated that the presence of rare species is generally similar between the northern and southern routes (Exhs. EFSB-3, at 68; PAC-ED-14(S)). Mr. Downing, a witness for MMWEC, indicated the northern route would have lesser effects on upland habitats than the southern route (Tr. 3, at 268).

iv. Groundwater

MMWEC estimated that groundwater would be encountered along at least 20% of the length of the excavation for the northern route (Exh. HO-EW-35). MMWEC noted that the backfilled pipeline trench could create a conduit for groundwater flow along the pipeline (Exh. EFSB-3, at 120-121). MMWEC indicated that the dominant upland soils along the northern route are highly permeable, limiting surface runoff (id. at 80). MMWEC indicated further that any changes in runoff volumes would be relatively small, since the pipeline would occupy a small fraction of drainage areas it passes through (id. at 118-119).[102] MMWEC indicated that the southern route crosses bedrock aquifers to a slightly lesser extent than the northern route, but did not identify any differential effect on groundwater resources between the two routes (id. at 120-124).

MMWEC stated there is municipal water available on many streets in Ludlow, but provided no information on the locations of private wells on properties abutting the northern route (Exhs. HO-EW-37; HO-EW-38; EFSB-3, at 83-84; Tr. 3, at 297, 305). However, the Company stated that it would conduct a center line survey along the final alignment, to seek out indications of wells and septic systems (Tr. 3, at 299-302). The Company also committed to maintain water and septic service in the event of any disruption to private systems (Exh. EFSB-3, at 131). MMWEC asserted that it would prevent the pipeline from acting as a groundwater conduit by using the originally excavated material, stripped of large stones, as backfill (id. at

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[102] MMWEC stated that the project would not meaningfully alter volumes of surface runoff (Exh. EFSB-3, at 176).

157-158). MMWEC stated that it would install sack breakers to perform as impermeable barriers if the blasting of surficial rock creates a channel for groundwater to follow the pipeline excavation (Exhs. MMWEC-JKD at 38; HO-EW-33; Tr. 4, at 526). MMWEC stated that it would evaluate and use techniques such as limiting the strength of the blast or putting in sack breakers to prevent a hydrologic effect on wells (Tr. 4, at 518).

MMWEC prepared an SPCC plan to mitigate the potential for accidental release of contaminants to the environment during the construction period (Exh. EFSB-3, at App. F 80). The Company stated that brush would be left in long windrows, chipped, or disposed of offsite (id. at App. F 14); that other wastes including existing debris, construction materials packaging, and trash would be disposed of in accordance with applicable regulations (Exh. HO-EL-25); and that fuels, oils, and greases would be handled in accordance with applicable regulations (id.). Although MMWEC expects to share ROW maintenance responsibilities with WMECO, and did not determine whether WMECO uses herbicides on the ROW, MMWEC stated that it would not use herbicides, pesticides, fertilizer, or other chemicals to maintain the gas pipeline ROW (Exhs. EFSB-3, at 13; MMWEC-JKD at 37; HO-EL-24).

v. Positions of the Parties

MMWEC argued that permanent impacts to land resources and land use generally would be less along existing ROWs than along virgin ROWs (Company Initial Brief at 148). Mr. Downing, a witness for MMWEC, stated that in his opinion, the northern route is superior to the southern route with respect to wetland impacts, because a higher proportion of the route is already disturbed as existing ROW and undisturbed wetlands tend to be more valued by people than disturbed wetlands (Tr. 3, at 265-266).[103]

PAC contended that the western/eastern corridor (southern route) would be superior to the western/northern corridor (northern route) with respect to impacts to wetland resource areas but inferior with respect to impacts to upland resources and community impacts (PAC Initial

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[103] Mr. Downing expressed the idea that undisturbed wetlands are more highly valued aesthetically within a forested or semi-agricultural landscape than disturbed wetlands of the same size and quantity (Tr. 3, at 265).

Brief at 27, 30).

PAC also provided a number of suggestions regarding mitigation of wetland impacts. Jean Porwoll of PAC asserted that instead of using temporary bridges at a small fraction of stream crossings and, at the remainder, laying fill in the streams that subsequently would have to be removed from the streams, MMWEC should build temporary bridges at each stream crossing (Tr. 14, at 2153, 2154, 2172). Ms. Porwoll also recommended the use of cellulose fiber netting (i.e., jute) and willow cuttings instead of stone or rock riprap to stabilize banks (id. at 2168). PAC contended that the method described in MMWEC's Environmental Construction Plan for spreading topsoil across the ROW cannot be used in wetland areas (PAC Initial Brief at 28). Ms. Porwoll asserted that the root stocks of existing shrub vegetation along streams can be better preserved by cutting the brush four or five inches above the ground, combined with the use of temporary bridges over streams (Tr. 14, at 2153, 2154). Ms. Porwoll also asserted that it would be superior to spread wetland seed mix, rather than annual ryegrass, in a wetland (id. at 2168).

vi. Analysis

Construction of a pipeline along the northern route for the 5.6-mile alternative route would affect wetlands, streams, trees, and wildlife habitat. Most of the permanent ROW would be within the existing WMECO ROW, limiting permanent tree clearing. The record shows that creation of the 20-foot corridor for the project generally would require approximately five feet of additional clearing on a permanent basis, with a greater width of tree clearing on the less frequent occasions when the pipeline must occupy the uncleared northern and eastern sides of WMECO's ROW. The Company has identified means by which some of the effects of construction can be mitigated. The record shows, based on the Company's plans for mitigation, that impacts to wetlands and upland habitats would be either temporary or relatively minor. The northern route has the advantage of following existing transmission corridors to the greatest extent, so habitat effects would be minimized. This factor outweighs the slight difference in lengths between the northern and southern routes.[104] Accordingly, the Siting Board finds that the northern route

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[104] Based on reported lengths of 14.7 miles for the proposed project, 14.4 mile for the full (continued...)

would be superior to the southern route with respect to water resources and habitat impacts.

The record indicates that one of two materials – "rock type" riprap or cellulose fiber mats/netting – would be used at individual stream-crossing to stabilize stream banks, following construction. However, the record does not include enough information to allow the Siting Board to determine whether one material is superior to the other. The record also does not include enough information to resolve whether installation of temporary bridges to support equipment trenching across streams would be necessary to minimize environmental impacts, or whether planting fast-growing annual grass or allowing revegetation by existing plants would be superior for particular disturbed wetland areas along the 5.6-mile alternative, following construction. Therefore, the Siting Board directs the Company to develop information regarding the advantages and disadvantages of: (1) using fiber netting rather than rock riprap to stabilize stream crossings; (2) installing temporary bridges at stream crossings; and (3) seeding annual grass for wetland revegetation, and to provide the information to the Ludlow Conservation Commission as part of its Notice of Intent for wetlands work. The Siting Board finds that, upon compliance with the above condition, the environmental impacts of the 5.6-mile alternative along the northern route would be minimized with respect to water resources and habitat impacts.

b. Land Use and Visual Impacts

i. Land Use

The WMECO ROW, which the northern route principally follows, is surrounded by lands of mixed use including forested land and low-density residential areas, with smaller amounts of agricultural land and commercial/industrial uses (Exh. EFSB-3, at App. H 8 to H 12; Tr. 4, at 387, 416). MMWEC stated that future development would be prohibited within the 20-foot permanent ROW; this would include a negotiable prohibition on the installation of wells and septic systems (Exh. HO-EL-43). MMWEC stated that land used as temporary workspace would be returned to landowners upon the completion of construction, and that all stone fences crossed

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104 (...continued)
western/eastern corridor, and 5.4 miles for the northern route of the 5.6-mile alternative (see Section III.A), the approximate length of the southern route is calculated as 5.1 miles.

by the project would be reconstructed (Exh. EFSB-3, at App. F 42; HO-EL-43). Table 7 in Section II.B.5, above, provides quantitative information on land use impacts of the 5.6-mile alternative along the northern route.

MMWEC asserted that installation of the pipeline along the northern route would have little impact on the siting of a future electrical transmission power line along the WMECO ROW, because the majority of the proposed alignment is on the side opposite WMECO's planned expansions along the western edge of the Ludlow–Orchard line and the Ludlow–Scitico line (Exh. HO-EL-29). MMWEC asserted that the placement of the pipeline along the northern route should not change the accessibility of the ROW for maintenance purposes (Exh. HO-EL-30).

Mr. Flood, a witness for MMWEC, described three issues regarding the pipeline's compatibility with existing electrical transmission facilities: (1) preserving the structural integrity of towers and guy wires during construction; (2) protecting construction workers from shock hazards during construction; and (3) managing electrical interference with pipeline cathodic protection (Tr. 4, at 482-483). Mr. Flood indicated that each of these issues could be readily resolved by selecting and following appropriate construction procedures (id. at 484). MMWEC stated that MMWEC or WMECO would train the pipeline installation contractor in electrical safety requirements, and that compliance would be monitored by an MMWEC field safety representative (Exh. HO-ES-6). MMWEC also asserted that all potential conflicts with WMECO electrical facilities would be resolved (Exh. HO-EL-27).

To mitigate risk to future third-party excavators, Mr. Flood stated that on the road crossings, MMWEC would have a sleeve crossing on the road and the pipe itself would also be concrete-coated (Tr. 4, at 462, 490). In parts of the WMECO ROW, if MMWEC were crossing WMECO's working access road, MMWEC would either bury the pipeline at a slightly lower depth and with more cover, or would put concrete coating on the pipeline to provide added protection (id. at 489). MMWEC also stated it would inform contractors and the public about the location of the pipeline, in part through the use of markers and the Dig-Safe program (id. at 489).

Electrical interactions discussed by MMWEC include the potential for conductance hazards, for inductance hazards, and interruptions of cathodic protection (Exh. HO-ES-8). These issues are identified in a guideline written for the parent company of WMECO (Exh. HO-

EL-28).[105] MMWEC stated it would address conductance and inductance hazards during construction by grounding the pipeline (Exh. HO-ES-8). MMWEC stated it did not anticipate that its cathodic protection system would be interrupted (id.). MMWEC did not specify differences between routes with respect to issues of electrical interactions.

MMWEC indicated that both the northern and southern routes pass along a potentially unstable slope along the edge of a gravel mining operation that is located just north of the Massachusetts Turnpike (Exh. EFSB-3, at Fig. 1; Tr. 4, at 439-442). Mr. Flood discussed engineering alternatives for this area that would create a stable slope, such as backfilling part of an excavated area (Tr. 4, at 439-442).

MMWEC indicated that 10 parcels along the northern route were identified as in agricultural use, including 6 hayfields, 1 pasture, and 3 parcels of cultivated land (Exh. EFSB-3, at 88). The Company indicated that the construction corridor generally would widen to 80 feet in agricultural parcels within existing power line ROWs (id. at 130). MMWEC stated that construction activities could cause hay crops to lose one cutting within the construction corridor, while crops such as corn could lose a full growing season (id. at 136). The Company indicated that, on agricultural lands, it would: (1) construct only in the summer or fall, to minimize rutting and compaction of soil; (2) install ditch plugs for livestock and farm equipment crossings, as needed; (3) bury the cathodic protection system to specified depths; (4) strip 12 inches of topsoil during site preparation and use it for subsequent restoration; (5) flume or bridge drainage ditches, as warranted; and (6) leave specified depths (e.g., 36 inches) of soil cover over the pipeline, depending on circumstances (id. at 167-168; Exh. MMWEC-JKD at 38). The Company indicated that general agricultural use could continue after pipeline construction, although certain uses might be precluded by the pipeline, including construction of farm buildings, growing large orchard trees, or tree farming (Tr. 3, at 284-286, 291; Tr. 5, at 662-665). MMWEC provided

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105 Northeast Utilities' guideline of January 10, 1991, entitled *General Guideline for Fossil Fuel Transmission Pipelines Within and Adjacent to Northeast Utilities Transmission Line Rights-of-Way* identifies the potential for "conductive and inductive pipeline voltages due to transmission line operation" and "[m]utual interference problems between cathodically protected [Northeast Utilities] systems and cathodically protected piping" (Exh. HO-EL-28, Att. 1, at 4-6).

information showing that the southern route would affect more linear feet of farmland (4006 feet versus 2736 feet), but fewer Chapter 61A farmland preservation parcels than the northern route (Exh. RR-HO-MM-10).

MMWEC indicated that any archaeological sites that might be located within the construction area could be disturbed by grading, excavating, trenching, and similar activities (Exh. EFSB-3, at 114). However, MMWEC stated that a Phase 1B cultural resource survey has been completed for the northern route and indicated that there are no known prehistoric archaeological sites recorded on the northern route (id. at 78; Exh. HO-EL-22). The Company stated that only a Phase 1 survey had been completed along the southern route, and that no intelligible comparison could be made between the northern and southern routes on this point (Exh. HO-EL-22; Tr. 3, at 274-282; Tr. 6, at 723-724).

ii. Visual

MMWEC stated that trees, brush, or existing barriers would be removed at some locations along the northern route for pipeline construction and operation (Exh. HO-EL-26). MMWEC stated that long-term visual impacts along the northern route would result from removal of five feet of forest along the ROW on a permanent basis (Tr. 4, at 382-383). Specifically, the Company indicated that views of the existing WMECO transmission lines from road crossings would increase, due to the widening of the ROW (Exh. HO-EL-34). MMWEC stated that it would clear areas within 20 to 25 feet outside of the existing ROW for use as temporary workspace, but it would attempt to leave in place specimen and large trees that provide a visual buffer between residential properties and the transmission lines (Exh. HO-EL-19-S).

MMWEC stated that the overall route was selected to be away from residential developments in order to limit the visual impacts of removing trees for the pipeline (Exh. HO-EL-34). Within the western/northern corridor, MMWEC largely attempted to select an alignment within the existing WMECO easement in order to limit impacts to residential properties (Exh. MMWEC-RWF at 10). MMWEC indicated that it took visual impacts on abutting residences into account when it selected a specific alignment along the existing

WMECO ROW (Tr. 4, at 384-416).

The Company specifically noted that, subject to negotiations with the landowners, it would seek to avoid removing trees in yards on Miller Street and that it would avoid removing hemlocks that screen views of the Ludlow substation (Tr. 4, at 425). Mr. Downing also stated that MMWEC "would make plans in advance to discuss various trees and features . . . [that homeowners] would like to maintain" and that MMWEC "would try to return that property to the state that the landowner would like to see it in at the end of construction" (id.). Nevertheless, MMWEC stated that the extent of change to residents' views is undetermined because it does not have rights to access adjacent properties (Exhs. HO-EL-37; HO-EL-38).

MMWEC asserted that construction along the northern route would result in fewer visual impacts than construction along the southern route, because the majority of the northern route already has been cleared of trees (Tr. 6, at 724-725). The Company noted that construction along the southern route would open a new corridor, and that the southern route would pass in close proximity to houses in several areas, including residential areas adjacent to Booth Street and Rood Street (Tr. 4, at 434). The Company stated that a wider (40 foot) swath of tree-clearing would be needed along those portions of the southern route which departs from the WMECO ROW (id.). MMWEC indicated that, along this portion of the southern route, visual appearances would be affected at road crossings and in some cases along visible ridgelines (Exh. HO-EL-26).

iii. Positions of the Parties

MMWEC argued that a route which follows existing ROWs for nearly its full length would best avoid potential conflicts with existing developed land uses (Company Initial Brief at 148). PAC and MMWEC both concluded that the northern route is superior to the southern route from the point of view of visual impacts (Tr. 4, at 434; Tr. 5, at 572; Company Initial Brief at 148).

iv. Analysis

The record shows that construction of the 5.6-mile alternative would alter some views and could affect agricultural lands and historical resources. The record shows that MMWEC's

proposed use of a route along existing ROWs would serve to minimize land use and visual impacts. Most of the changes that would cause increased views of the existing transmission lines likely would be temporary as trees grow back in the temporary ROW, while the new linear clearing along a pipeline off the WMECO ROW would be permanent. The northern route generally avoids clearing along new corridors. Accordingly, the Siting Board finds that the northern route would be superior to the southern route with respect to land use and visual impacts.

The record shows that land use and visual impacts would be minimized, primarily through use of an existing ROW and through appropriate construction techniques. The Siting Board notes that use of the existing ROW raises several issues related to construction and operation of a pipeline along an electric transmission line. Among these issues are electrical interactions, which theoretically could affect pipeline reliability. The record shows that safety impacts would be minimized by monitoring for third-party activities, and by coordination with WMECO on pipeline/transmission line compatibility issues.

The record also indicates that removal of trees or wooded areas for temporary or permanent ROW's would increase views of the existing WMECO transmission lines. However, MMWEC has indicated its willingness to consult with owners of property over which the Company intends to seek easements, regarding the preservation of existing trees or wooded areas to maintain a visual buffer from the transmission lines. The Company also has indicated its willingness to consult with property owners regarding post-construction restoration of their properties.

In order to ensure that the visual impacts of tree clearing will be avoided, minimized, and mitigated to the maximum extent practicable, the Siting Board directs MMWEC to implement measures to preserve trees, wooded areas and other features, and, as necessary, to provide replacement plantings or other restoration, consistent with those commitments the Company has made in this proceeding. For each piece of property over which MMWEC intends to acquire either a permanent or temporary easement, MMWEC shall provide written notice to the property owner of an opportunity to meet with the Company, in advance of any construction activities, to identify trees, wooded areas or other features on the property which the owner wishes to

preserve, and to discuss post-construction restoration measures that the owner may wish to have implemented. Consistent with the Company's stated commitment to maintain and restore existing trees on these properties, except in the permanent ROW, the Company shall make every reasonable effort to implement the wishes of the property owners relative to the preservation of trees and wooded areas. Prior to commencement of pipeline construction, MMWEC shall file with the Siting Board a copy of the notice prepared by the Company regarding preservation and restoration of trees and wooded areas, and shall provide the names and addresses of those property owners to whom the notice has been provided.

The record shows that the Company will implement measures to minimize, and in some cases, mitigate, land use and visual impacts. Accordingly, the Siting Board finds that, with implementation of the above condition, the environmental impacts of the 5.6-mile alternative along the northern route would be minimized with respect to land use and visual impacts.

c. Noise and Traffic

i. Noise

MMWEC projected that nearby residents could be affected by noise and also possibly by dust during construction activities (Exh. EFSB-3, at 131). MMWEC indicated that most construction noise, including any blasting,[106] would occur only during daylight hours and would last only a few days in the vicinity of any residence, with the exception of some movement of vehicles along longer stretches of the ROW (Exh. HO-EL-39; Tr. 4, at 452-453). MMWEC stated that noise impacts would be mitigated by restricting construction activities to the period from 7 a.m. to 8 p.m. and by avoiding high-decibel operations during the first two morning hours of that period (Exh. EFSB-3, at 169). MMWEC indicated that construction access would generally be at public road crossings, but that additional temporary access points would be needed east of West Street and east of Munsing Street (Exh. HO-EL-44). MMWEC indicated that the primary staging area for the 5.6-mile alternative would be at Stony Brook (Exh. HO-EL-31). Mr. Flood argued that construction noise impacts would be greater along the southern

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106 MMWEC did not anticipate a need for blasting along the northern route (Exh. EFSB-3, at 124).

route than along the northern route, because the southern route would require substantially more tree removal and grading (Tr. 4, at 459).

Operational noise would originate only from the metering and pressure regulating station at Stony Brook and periodic pipeline monitoring activities (Tr. 4, at 443). MMWEC indicated that it would install or improve barriers against unauthorized entry onto ROWs where appropriate, in consultation with town officials and abutters, in order to minimize noise from off-road vehicles (Exhs. HO-EL-26; HO-EL-42).

Also, MMWEC indicated that unauthorized recreational use could affect additional landowners along corridors which represent new ROW, such as part of the southern route (Exh. HO-EL-26).

ii. Traffic

MMWEC stated that it would bore underneath all roads, with the exception of construction on East Street at the interconnection to the existing Monson-Palmer line (Exhs. MMWEC-1, at 67; EFSB-3, at 132; HO-EW-38; HO-EL-33). Mr. Flood indicated that there would be no difference between the northern and southern routes with respect to traffic impacts (Tr. 4, at 467). MMWEC stated that, prior to construction, it would prepare a plan to minimize construction traffic impacts; this plan would include the use of police traffic details and restricting use of construction vehicles during high traffic periods (Exh. HO-EL-33).

iii. Analysis

The record shows that construction of the 5.6-mile alternative would create temporary noise and traffic impacts along either the northern or southern route. The record shows that construction noise impacts would be lower along the northern route, since the use of an existing ROW would minimize noisy site preparation work such as tree-cutting. The record also shows that construction traffic impacts would not differ between the two routes. Accordingly, the Siting Board finds that the northern route would be superior to the southern route with respect to noise and traffic impacts.

The record shows that MMWEC would minimize traffic impacts by boring under the

pavement at all public road crossings. The record also shows that construction noise would generally be limited to daylight hours. Accordingly, the Siting Board finds that the environmental impacts of the 5.6-mile alternative along the northern route would be minimized with respect to noise and traffic impacts.

d. Conclusion on Environmental Impacts

In the sections above, the Siting Board has reviewed the evidence presented regarding the environmental impacts of the 5.6-mile alternative along the northern and southern routes. The Siting Board finds that MMWEC has provided sufficient information on the environmental impacts of the 5.6-mile alternative, including information on the potential for mitigation, for the Siting Board to determine whether the environmental impacts of the 5.6-mile alternative would be minimized.

The Siting Board has found that the northern route would be superior to the southern route with respect to water resources and habitat impacts, land use and visual impacts, and noise and traffic impacts. The Siting Board also has found that, following provision of information to the Ludlow Conservation Commission and implementation of tree preservation and restorative measures, the environmental impacts of the 5.6-mile alternative along the northern route would be minimized with respect to water resources and habitat impacts, land use and visual impacts, and noise and traffic impacts. Accordingly, the Siting Board finds that the northern route would be superior to the southern route with respect to environmental impacts and that the environmental impacts of the 5.6-mile alternative would be minimized.

3. Facility Cost

MMWEC indicated that the capital cost of constructing the 5.6-mile alternative along the northern route would be $17,269,000 (Exh. HO-N-53, Att. 2). MMWEC defined direct construction costs as consisting of land costs, pipeline materials, pipeline installation, major facilities, permitting, engineering procurement, and contingency (Exh. HO-N-37). MMWEC did not provide a construction cost estimate for the southern route; however, it did provide cost estimates of $28,458,000 for the proposed project on the western/northern corridor, $28,435,000

for the proposed project on the western/eastern corridor, and $17,269,000 for the northern route of the 5.6-mile alternative (Exh. HO-N-53, Att. 2). Based on this information, the Siting Board calculates that the capital cost of the southern route would be approximately $17,246,000. The Siting Board finds that the northern and southern routes would be comparable with respect to cost.

4. Reliability

The Company identified issues related to the ability of the 5.6-mile alternative to deliver a given volume and pressure of gas at Stony Brook, as discussed in Section II.B.3, above. As noted in Section III.C.2.b.i, above, the Company asserted that routes following the WMECO ROW were least likely to suffer third-party damage (Exh. MMWEC-RWF at 17), but otherwise did not distinguish between the northern and southern routes with respect to reliability issues.

MMWEC argued that its preferred and alternative routes generally avoid other pipelines and buried utilities, except at road crossings, and that siting pipelines away from such congestion is desirable (Company Initial Brief at 145). The Siting Board notes that both routes would be within a cleared ROW, rather than along streets, diminishing the risks of suffering third-party damage. The two routes appear to be comparable with respect to reliability. Accordingly, the Siting Board finds that the northern and southern routes would be comparable with respect to reliability.

5. Conclusions

The Siting Board has found that the northern route would be superior to the southern route with respect to environmental impacts and that the two routes would be comparable with respect to cost and reliability. Accordingly, the Siting Board finds that the 5.6-mile alternative along the northern route would be superior to the 5.6-mile alternative along the southern route with respect to providing a necessary energy supply to the Commonwealth with a minimum impact on the environment at the lowest possible cost.

IV. DECISION

The Siting Board's enabling statute directs the Siting Board to implement the energy policies contained in G.L. c. 164, §§ 69H to 69Q, to provide a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. G.L. c. 164, § 69H. In addition, the statute requires that the Siting Board determine whether plans for the construction of energy facilities are consistent with current health, environmental protection, and resource use and development policies as adopted by the Commonwealth. G. L. c. 164, § 69J.

In Section II.A, above, the Siting Board found that there is a need for additional energy resources serving Stony Brook for economic efficiency purposes. In Section II.A, above, the Siting Board also found that there is a need in Massachusetts for additional energy resources serving Stony Brook for environmental purposes. Therefore, the Siting Board found that there is a need for additional energy resources serving Stony Brook to provide for a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

In Section II.B, the Siting Board found that, on balance, the 5.6-mile alternative is superior to both the proposed project and the 3-mile alternative with respect to providing a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

In Section III.B, above, the Siting Board found that the Company developed and applied a reasonable set of criteria for identifying and evaluating alternatives to the proposed project in a manner which ensures that it has not overlooked or eliminated any siting options which, on balance, are clearly superior to the noticed alternatives. The Siting Board also found that the Company identified a range of practical pipeline route alternatives with some measure of geographic diversity. Consequently, the Siting Board found that MMWEC has considered a reasonable range of practical siting alternatives.

In Section III.C, above, the Siting Board found that the 5.6-mile alternative along the northern route would be superior to the 5.6-mile alternative along the southern route with respect to providing a necessary energy supply to the Commonwealth with a minimum impact on the

environment at the lowest possible cost. The Siting Board also found that following provision of information to the Ludlow Conservation Commission and implementation of tree preservation and restorative measures, the environmental impacts of the 5.6-mile alternative along the northern route would be minimized with respect to water resources and habitat impacts, land use and visual impacts, and noise and traffic impacts.

In Section III above, the Siting Board reviewed environmental impacts of the 5.6-mile alternative in light of related regulatory or other programs of the Commonwealth, including programs related to air quality, wetlands protection, and rare and endangered species. As evidenced by the above discussions and analyses, the proposed 5.6-mile alternative along the northern route would be generally consistent with the identified requirements of all such programs.

In Section II.A, above, we stated that since the finding of need for additional energy sources serving the Stony Brook power plant is based solely on economic and environmental benefits, and since the identified benefits in both cases appear to be modest, the benefits of additional energy resources in this case could be outweighed by other environmental impacts. Therefore, we now consider whether the economic and environmental benefits of the 5.6-mile alternative could be outweighed by environmental impacts.

In Section III.C, above, we reviewed the environmental impacts of the 5.6-mile alternative and proposed mitigation measures. In making our finding that the northern route is superior to the southern route with respect to environmental impacts we placed considerable weight on the fact that the northern route runs along existing ROWs. Specifically, we cited the proximity of the pipeline to existing ROWs in making findings that water resources and habitat impacts, land use, and noise and traffic impacts would be minimized. The mitigation measures proposed by MMWEC include the use of directional drilling under state certified vernal pools to minimize habitat impacts; coordination with WMECO on pipeline/transmission line compatibility impacts to minimize noise impacts; implementation of tree preservation and restoration measures to minimize visual impacts; and boring under pavement at all public road crossings to minimize traffic impacts.

Overall, the record demonstrates that, based on the proposed use of existing ROWs and

the proposed mitigation measures, MMWEC has effectively addressed the Siting Board's preliminary concern that the identified project benefits could be outweighed by impacts of project installation. We also note that environmental impact was a principal factor in our determination that the 5.6-mile alternative was the superior project approach, and that use of this project approach helps avoid the possibility that project benefits could be outweighed by project impacts.

Accordingly, the Siting Board finds that the economic and environmental benefits of the 5.6-mile alternative along the northern route are not outweighed by environmental impacts. The Siting Board also finds that construction of the 5.6-mile alternative along the northern route would be consistent with our mandate to minimize environmental impacts. The Siting Board therefore finds that the construction of the 5.6-mile alternative along the northern route would contribute to a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

Accordingly, the Siting Board APPROVES the proposal of the Massachusetts Municipal Wholesale Electric Company to construct a 5.6-mile gas pipeline along the northern route. MMWEC shall comply with the following conditions:

Prior to the commencement of construction:

(A) To minimize habitat impacts, the Siting Board directs MMWEC to develop information regarding the advantages and disadvantages of: (1) using fiber netting rather than rock riprap to stabilize stream crossings; (2) installing temporary bridges at stream crossings; and (3) seeding annual grass for wetland revegetation, and to provide the information to the Ludlow Conservation Commission as part of its Notice of Intent for wetlands work.

(B) To minimize visual impacts, the Siting Board directs MMWEC to implement measures to preserve trees, wooded areas and other features, and, as necessary, to provide replacement plantings or other restoration, consistent with those commitments the Company has made in this proceeding. For each piece of property over which MMWEC intends to acquire either a permanent or temporary easement, MMWEC shall provide written notice to the property owner of an opportunity to meet with the Company, in advance of any construction activities, to identify trees, wooded areas or other features on the property which the owner wishes to

preserve, and to discuss post-construction restoration measures that the owner may wish to have implemented. Consistent with the Company's stated commitment to maintain and restore existing trees on these properties, except in the permanent ROW, the Company shall make every reasonable effort to implement the wishes of the property owners relative to the preservation of trees and wooded areas. Prior to commencement of pipeline construction, MMWEC shall file with the Siting Board a copy of the notice prepared by the Company regarding preservation and restoration of trees and wooded areas, and shall provide the names and addresses of those property owners to whom the notice has been provided.

Because the issues addressed in this Decision relative to this facility are subject to change over time, construction of the proposed facility must commence 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 MMWEC 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. MMWEC 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.

M. Kathryn Sedor
Hearing Officer

Jolette A. Westbrook
Hearing Officer

Dated this 15th day of June, 2001

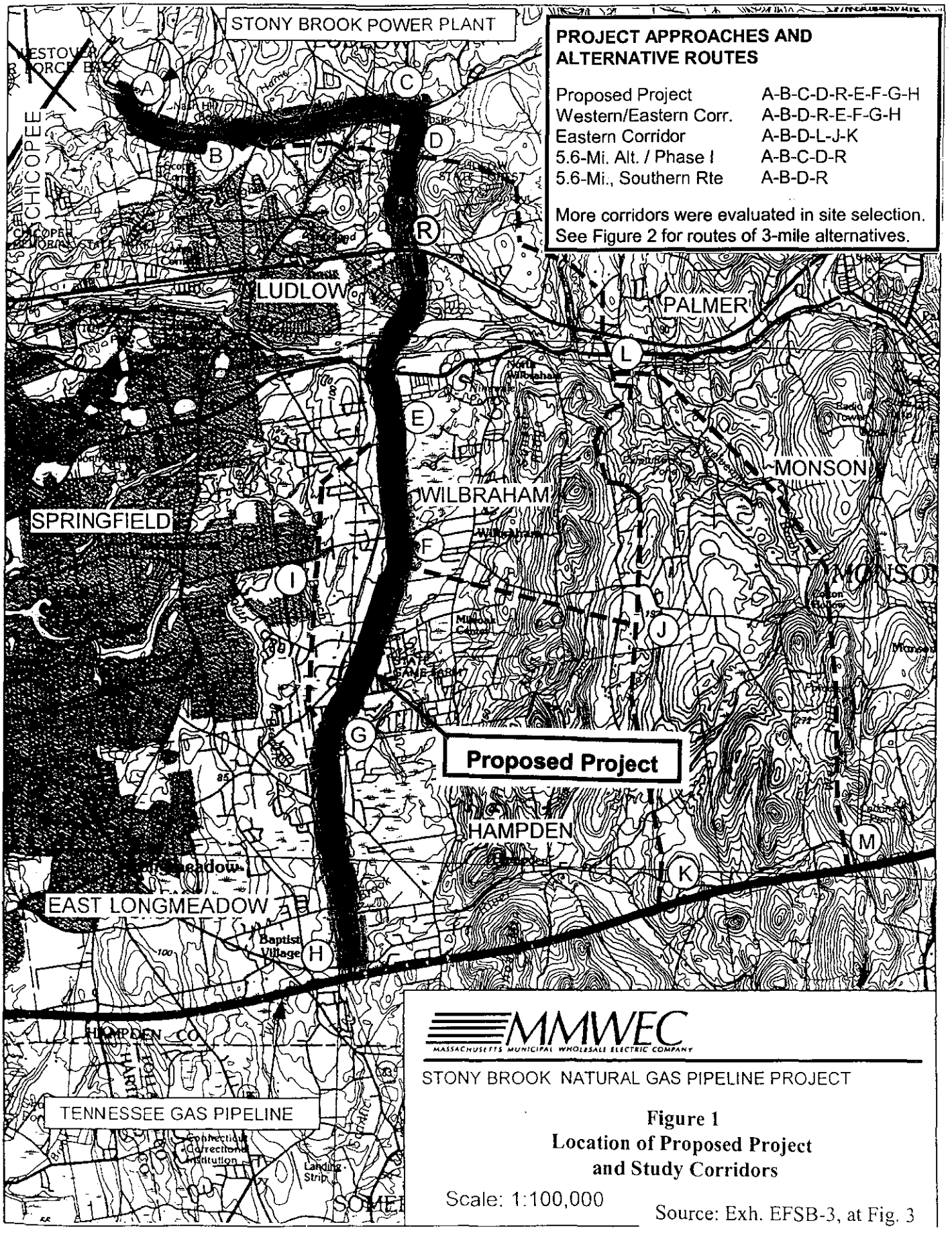
APPROVED by the Energy Facilities Siting Board at its meeting of June 14, 2001, by the members and designees present and voting: James Connelly (Chairman, DTE/EFSB); Deirdre K. Manning (Commissioner, DTE); W. Robert Keating (Commissioner, DTE); David L. O'Connor (Commissioner, Division of Energy Resources); 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 June, 2001.

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).



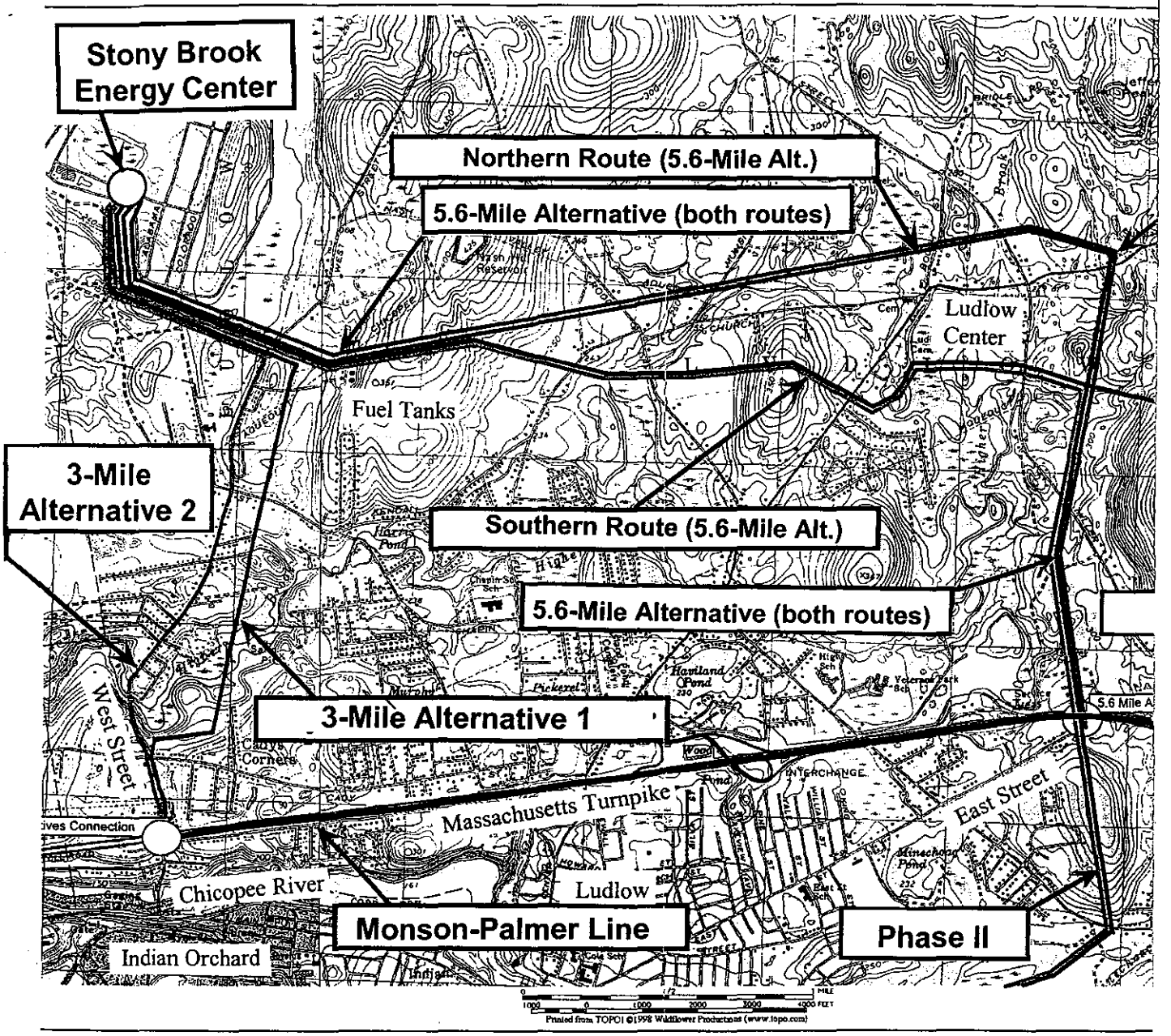
MMWEC
MASSACHUSETTS MUNICIPAL WHOLESALE ELECTRIC COMPANY

STONY BROOK NATURAL GAS PIPELINE PROJECT

Figure 1
Location of Proposed Project and Study Corridors

Scale: 1:100,000

Source: Exh. EFSB-3, at Fig. 3



Source: USGS Topographic Maps
(Springfield-North, Ludlow & Hampden Mass.)

MMWEC
MASSACHUSETTS MUNICIPAL WHOLESALE ELECTRIC COMPANY

STONY BROOK NATURAL GAS PIPELINE PROJECT

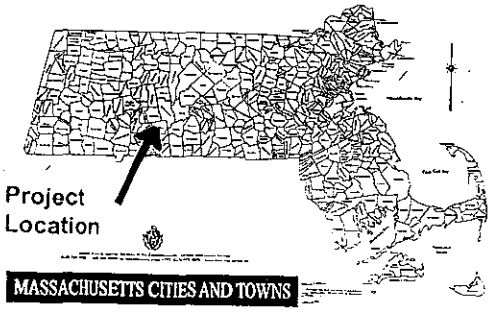


Figure 2
Proposed Routes for 5.6-Mile and 3-Mile Alternatives

Source: Exh. EFSB-3, at Fig. 1

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Board

In the Matter of the Petition of Southern Energy Canal II, L.L.C. for Approval to Construct a Bulk Generating Facility in in the Town of Sandwich, Massachusetts	)))))	EFSB 98-9

FINAL DECISION

William H. Stevens, Jr.
Hearing Officer
June 15, 2001

On the Decision:
William S. Febiger
Miles Keogh

APPEARANCES:

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TABLE OF CONTENTS

LIST OF ABBREVIATIONS

Abbreviation	Explanation
AALs	Allowable Ambient Limits
Local 51	The United Association of Plumbers and Pipefitters Local 51/AFL-CIO
Altresco Decision	Altresco-Pittsfield, Inc., 17 DOMSC 351 (1988)
ANP Bellingham Decision	ANP Bellingham Energy Company, 7 DOMSB 39 (1998)
ANP Bellingham Decision on Compliance	ANP Bellingham Energy Company - Compliance 9 DOMSB 211 (1999)
ANP Blackstone Decision	ANP Blackstone Energy Company, 8 DOMSB 1 (1999)
AOD	Ammonia on Demand
Army Corps	U.S. Army Corps of Engineers Cape Cod Canal Field Office
ASTs	Above-ground storage tanks
BACT	Best available control technology
1993 BECo Decision	Boston Edison Company, 1 DOMSB 1 (1993)
Berkshire Power Decision	Berkshire Power Development, Inc., 4 DOMSB 221 (1996)
Bourne DPW	Cornelius W. Andres, Superintendent of Public Works, Town of Bourne
Bourne Fire Chief	Steven Philbrick, Fire Chief, Town of Bourne Fire/Rescue and Emergency Services
Brockton Power Decision	Brockton Power L.L.C., 10 DOMSB 157 (2000)
Campaign	Campaign to Clean up Polluting Power Plants
Canal-Bourne ROW	Two transmission lines that extend along a right-of-way beginning southwest of Canal Station and running to the Bourne-switching station
Canal redevelopment project	The repowering of existing Canal Unit 2 and other non-Jurisdictional changes at Canal Station
Canal Walk	A recreational walkway maintained by the U.S. Army Corps of Engineers, located adjacent to the Cape Cod Canal and north of Canal Station
Cape Cancer Incidence Report	Massachusetts Department of Public Health study of cancer incidence in the upper Cape Cod area

Cape Cancer Incidence Study	1997 Aschengrau and Ozonoff: Upper Cape Cancer Incidence Study
CCA	Cape Clean Air
CISR	Cape and Islands Self Reliance Corporation
Citizen Groups	Massachusetts Public Interest Research Group, Clean Water Action, and the Campaign to Clean Up Polluting Power Plants
CO	Carbon monoxide
CO_2	Carbon dioxide
Commonwealth Electric	Commonwealth Electric Company
Company	Mirant Canal II, L.L.C.
CTGs	Combustion Turbine Generators
CWA	Clean Water Action
CZM	Office of Coastal Zone Management
dBA	Decibel (A-weighted)
Dighton Power Decision	Dighton Power Associates, 5 DOMSB 193 (1997)
DOMSB	Decisions and Orders of Massachusetts Energy Facilities Siting Board
Duke Energy	Duke Energy Company
DRI	Development of Regional Impact
eastern Tupper Road/6A intersection	Intersection of Tupper Road and Route 6A in Sandwich, Mass.
EMF	Electric and magnetic fields
EPA	United States Environmental Protection Agency
EPC	Engineering, procurement, and construction
FEMA	Federal Emergency Management Agency
GE Study	1998 Mostardi-Platt and General Electric study: Inhalation Risk Assessment of Air Toxic Emissions from Large Combustion Turbine Power Projects
gpd	Gallons per day
gpy	Gallons per year

greenfields ambient level	Hypothetical sound levels assuming Canal Units 1 and 2 were not present
HAPs	Hazardous Air Pollutants
HAPs Study	1998 EPA Report: Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units-Final Report to Congress
HRSGs	Heat recovery steam generators
Hz	Hertz
ICF Kaiser Study	ICF Kaiser Consulting study that examined the health-related impacts of Canal Station.
IDC Bellingham Decision	IDC Bellingham, L.L.C., 9 DOMSB 225 (1999)
IND	Industrial Limited Use Zone
ISCST3	Industrial Source Complex Short-term air dispersion model version 3
ISO-NE	Independent System Operator, New England
kV	Kilovolt
kV/m	Kilovolts per meter
kW	Kilowatt
L_{90}	The level of noise that is exceeded 90 percent of the time
L_{dn}	EPA's recommendation of a maximum day-night noise levels incorporating a 10 dBA penalty for noise at night
LAER	Lowest Achievable Emission Rate
Levels Document	1994 EPA Report: Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety
LOS	Levels of service, a measure of the efficiency of traffic operations at a given location
MAAQS	Massachusetts Ambient Air Quality Standards
MDEM	Massachusetts Department of Environmental Management
MDPH	Massachusetts Department of Public Health
MASSPIRG	Massachusetts Public Interest Research Group

MCP	Massachusetts Contingency Plan
MDEP	Massachusetts Department of Environmental Protection
MDMF	Massachusetts Division of Marine Fisheries
1985 MECo/NEPCo Decision	Massachusetts Electric Company et al., 13 DOMSC 119 (1985)
MEPA	Massachusetts Environmental Policy Act Unit
mG	Milligauss
mgd	Million gallons per day
Millennium Power Decision	U.S. Generating Company, 6 DOMSB 1 (1997)
Mirant Canal II	Mirant Canal II, L.L.C., formerly known as Southern Energy Canal II, L.L.C.
Mirant Canal	Mirant Canal, L.L.C., formerly known as Southern Energy Canal, L.L.C.
MOU	Memorandum of Understanding between the Cape Cod Commission and the Massachusetts Environmental Policy Act Unit
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NCI	National Cancer Institute
NEA Decision	Northeast Energy Associates, 16 DOMSC 335 (1987)
NEP	New England Power Company
Nickel Hill Decision	Nickel Hill Energy L.L.C., 11 DOMSB 83 (2000)
NML	Noise monitoring locations
NO_X	Nitrogen oxide
NPDES	National Pollution Discharge Elimination System
NRC	National Research Council
NSPS	New source performance standards
NSR	New source review
NTEL	Non-threshold effects exposure limit
O_2	Oxygen

OSHA	U.S. Occupational Safety and Health Administration
PM-10	Fine particulates
ppm	Parts per million
proposed project	The Canal Redevelopment Project that requires the repowering of existing Canal Unit 2 at Canal Station
project site	A 9.4 acre site within the northeast quadrant of the 87-acre Canal Station where the repowered Unit 2 structures would be located
PSD	Prevention of significant deterioration
RAO	Response Action Outcome
repowered Unit 2	The upgraded Canal Unit 2 with a generating capacity of 1225 megawatts
Request for Comments	Requests for Comments issued by Energy Facilities Siting Board on March 19, 1999, on proposed standards of review
Restructuring Act	Chapter 164 of the Acts of 1997
ROW	Right-of-way
Sandwich	Town of Sandwich
Sandwich Marina	Sandwich Town Marina
SCR	Selective Catalytic Reduction System
SE Canal II	Southern Energy Canal II, L.L.C.
SE Canal III	Southern Energy Canal III, L.L.C.
Sigma	Sigma Consultants Inc.
Silent Spring Study	1997 Silent Spring Institute: Cape Cod Breast Cancer and Environment Study
SILs	Significant impact levels
Silver City Decision	Silver City Energy Limited Partnership, 3 DOMSB 1 (1994)
Sithe Edgar Decision	Sithe Edgar Development, L.L.C., 10 DOMSB 1 (2000)
Sithe Mystic Decision	Sithe Mystic Development, L.L.C., 9 DOMSB 101 (1999)
Sithe West Medway Decision	Sithe West Medway Development, L.L.C., 10 DOMSB 274 (2000)

Siting Board	Energy Facilities Siting Board
SO_2	Sulfur dioxide
Southern Kendall Decision	Southern Energy Kendall, L.L.C., 11 DOMSB 255 (2000)
SWPPP	Stormwater Pollution Prevention Plan
SPCC	Spill Prevention, Control, and Countermeasure
TELs	Threshold Effects Exposure Limits
Town	Town of Sandwich
TPS	Technology Performance Standards
tpy	Tons per year
Tupper Road well	An off-site well owned by Sandwich
USGen	U.S. Generating Company
USGenNE	U.S. Generating Company New England, Inc.
Verbon Trust	Soozen Tribuna and Steven Striar, Trustees of Verbon Trust
VOCs	Volatile organic compounds
Wells No. 2 and 3	Two existing wells on-site at Canal Station
Well No. 4	A new well to be developed on-site at Canal Station
western Tupper Road/6A intersection	Intersection of Route 6A/Route 130 with Tupper Road in Sandwich, Massachusetts

The Energy Facilities Siting Board ("Siting Board") hereby APPROVES, subject to conditions, the petition of Mirant Canal II, L.L.C. for approval to upgrade generating facilities at the existing Canal Station in Sandwich, Massachusetts. This upgrade would increase the electrical generating capacity of Unit 2 at Canal Station from 560 megawatts to 1225 megawatts.

I. INTRODUCTION

A. Description of Proposed Project, Site and Interconnections

Mirant Canal II, L.L.C. ("Mirant Canal II" or "Company"),[1] proposes to repower Canal Unit 2, one of two existing generating units at the 87-acre Canal Station in the Town of Sandwich Massachusetts ("proposed project") (Exh. SEC-1, at 1-1).[2] Canal Station is owned by Mirant Canal L.L.C. ("Mirant Canal"), which acquired the property from Commonwealth Energy in 1998 (id. at 2-4).[3] It is bounded on the north by the Cape Cod Canal and an adjacent recreational walkway maintained by the U.S. Army Corps of Engineers ("Canal Walk") (id. at 1-5, 1-19, 1-22 (Figs. 1-7, 1-8)). The Sandwich Town Marina ("Sandwich Marina") lies to the east of Canal Station (id.). Residential and commercial properties are located to the south and west of Canal Station (id.).

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1 The Company informed the Siting Board by letter dated February 9, 2001 that Southern Energy Canal II, L.L.C. had changed its name to Mirant Canal II, L.L.C. The February 9, 2001 letter also stated that the name change would be reflected in the names of other Mirant Corporation subsidiaries.

2 The other generating unit at Canal Station, called Unit 1, is fired with oil and has a winter peak capacity of 560 megawatts ("MW") (Exh. SEC-1, at 1-19).

3 Southern Energy Inc., a subsidiary of the Southern Company based in Atlanta, Georgia, successfully bid for the assets at Canal Station under the divestiture of generating assets pursuant to the 1997 Massachusetts Electric Utility Restructuring Act (St. 1997 c. 164) (Exh. SEC-1, at 1-5 (Fig. 1-4)). Southern Energy Canal, L.L.C., now operating as Mirant Canal, was formed to own and operate the two existing units at Canal Station (id.). Mirant Canal II, an affiliate of Mirant Canal, will own and operate the proposed project (id.). Southern Energy Inc. is now known as Mirant Corporation. The Company informed the Siting Board by letter dated April 13, 2001 that Mirant Corporation is now a fully independent, publicly traded company, after the completion of a spin-off from its parent, Southern Company.

As part of the proposed project, the Company would deactivate the existing Unit 2 steam boiler, which currently is fueled primarily by oil, and repower this unit with four natural gas-fired combustion turbines with a total capacity output of 1,225 MW ("repowered Unit 2") (id.). To maintain output during periods of high ambient temperature, repowered Unit 2 would incorporate evaporative inlet coolers and would be able to augment power by firing additional fuel in the heat recovery steam generators ("HRSGs") (id. at 1-8). The proposed project would make use of much of the existing Unit 2 equipment, including its steam turbine/generator, water intake and discharge systems, steam condenser, control room, electrical switchgear, transmission interface equipment, and maintenance shop (id. at 1-1, 1-8). Major new equipment would include: four GE Frame 7241 FA combustion turbine generators ("CTGs"); four HRSGs; and one 230 foot stack with four flues (id. at 1-1, 1-9 (Fig. 1-3)). This equipment, together with minor facilities including two urea pellet silos,[4] a 1,000,000 gallon demineralized water tank, and step-up transformers, would be located on a 9.4 acre site ("project site") within the northeast quadrant of Canal Station, adjacent to the existing Unit 2 (id. , at 1-5, 1-9, 1-10, 1-19, 1-22 (Figs. 1-7, 1-8)).

The Company proposes to use natural gas as the primary fuel for the project and to use No. 2 low sulfur distillate oil as a back-up fuel for up to 30 days a year (id. at 1-10, 1-12). Gas would be delivered to the repowered Unit 2 via Duke Energy Company's ("Duke Energy") gas pipeline originating in Mendon, Massachusetts (Exh. EFSB-L-3). Two existing oil storage tanks, currently used for No. 6 fuel oil, would be refurbished to contain No. 2 fuel oil for the proposed project (id. at 1-9). The Company stated that a new transmission line would be constructed to interconnect the project with the existing Commonwealth Electric Company ("Commonwealth Electric") 345-kilovolt ("kV") transmission substation located at Canal Station just south of Unit 1 (Exh. SEC-1, at 1-10, 2-6).

The Company proposes to use an open loop cooling system with cooling water to be taken from the Cape Cod Canal through a new intake structure that would be installed in the canal bank (id. at 1-16 (Fig. 1-5)). Additional non-potable water requirements of the project

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[4] The Company stated that urea pellets would be used to provide ammonia for the selective catalytic reduction ("SCR") system (id. at 1-9). See Section III.B below.

would be met by use of existing and new ground water wells (id. at 1-19). Wastewater from the project would be discharged into the existing wastewater system at Canal Station (id.).

B. Procedural History

On December 3, 1998, Southern Energy Canal III, L.L.C. ("SE Canal III") filed with the Siting Board a petition for approval to construct a new 525 MW combined cycle power plant in the Town of Sandwich. The Siting Board docketed the matter as EFSB 98-9.

On February 2, 1999, the Siting Board conducted a public hearing in Sandwich. In accordance with the direction of the Hearing Officer, SE Canal III provided notice of the public hearing and adjudication.

Timely petitions to intervene were filed by the Town of Sandwich ("Sandwich" or "Town"); Soozen Tribuna and Steven Striar, Trustees of Verbon Trust ("Verbon Trust"); and Steven Philbrick, Fire Chief, Town of Bourne Fire/Rescue & Emergency Services ("Bourne Fire Chief"). A timely joint petition to intervene was filed by Massachusetts Public Interest Research Group, Inc. ("MASSPIRG"), Clean Water Action, Inc. ("CWA"), and The Campaign to Clean Up Polluting Power Plants ("Campaign") (collectively "Citizen Groups"). Timely petitions to participate as interested persons were filed by Cornelius W. Andres, Superintendent of Public Works, Town of Bourne ("Bourne DPW"); The United Association of Plumbers and Pipefitters Local 51/AFL-CIO ("Local 51"); U.S. Generating Company ("USGen"); U.S. Army Corps of Engineers Cape Cod Canal Field Office ("Army Corps"); Sigma Consultants, Inc. ("Sigma"); and jointly by New England Power Company ("NEP") and USGen New England, Inc. ("USGenNE"). SE Canal III filed opposition to the petition of the Citizen Groups and the joint petition of NEP and USGenNE.

The Hearing Officer granted the petitions to intervene filed by Sandwich, the Verbon Trust and the Bourne Fire Chief. Southern Energy Canal III, L.L.C., EFSB 98-9, Hearing Officer Procedural Ruling, March 5, 1999, at 10. With respect to the Citizen Groups, the Hearing Officer allowed MASSPIRG and CWA to intervene as joint petitioners but denied intervention status to the Campaign (March 11, 1999 Tr. at 9-11). The Hearing Officer granted the petitions to participate as interested persons of the Bourne DPW; Local 51; USGen; the Army Corps;

Sigma; and NEP/USGenNE.[5] Southern Energy Canal III, L.L.C., EFSB 98-9, Hearing Officer Procedural Ruling, March 5, 1999, at 10. Thereafter, the Hearing Officer granted three successive motions by SE Canal III that resulted in the procedural schedule being suspended until September 23, 1999. Southern Energy Canal III, L.L.C., Hearing Officer Procedural Rulings, April 26, June 16, and August 9, 1999.

On October 29, 1999, Southern Energy Canal II, L.L.C. ("SE Canal II") filed with the Siting Board an amended petition stating that it was no longer seeking approval to construct a 525 MW generating unit, but instead would seek approval to repower Unit 2. Due to the changes in the project, the Siting Board conducted a second public hearing in Sandwich on December 14, 1999. In accordance with the direction of the Hearing Officer, SE Canal II provided notice of the public hearing and adjudication.

A joint late-filed petition ("Joint Petition") to intervene was submitted by Cape Clean Air ("CCA"); the Cape and Islands Self-Reliance Corporation ("CISR"); and six individuals: Jane E. Estey, P.E.; Anna Manatis-Lornell, M.D.; Paul Gannett; Charles Kleekamp; Kathryn Kleekamp; and Matthew Patrick ("Individual Petitioners").[6] CCA, CISR and the Individual Petitioners requested leave to intervene as one group or individually. SE Canal II opposed the late-filed petitions for leave to intervene of CCA, CISR and the Individual Petitioners. On February 3, 2000, the Hearing Officer denied the joint petition filed by CCA, CISR and the Individual Petitioners for leave to intervene as a group or as individuals. Southern Energy Canal II, EFSB 98-9, Hearing Officer Procedural Ruling, February 3, 2000.

The Siting Board conducted eight days of evidentiary hearings, commencing on April 12, 2000 and ending on May 1, 2000. The Company presented the testimony of the following witnesses: Norman E. Cowden, P.E., Project Director at Southern Energy New England, L.L.C., who testified as to land use, solid waste, site selection, visual, air, water and wetland issues; Donald B. Hooks, Environmental Manager at Southern Energy Inc., who testified as to

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5 On March 23, 2000, the Hearing Officer granted the joint motion of NEP and USGenNE to withdraw from this proceeding.

6 CCA provided documentation showing that the Individual Petitioners were also CCA members (Joint Petition at 1-5).

water and wetland issues; Glenn Harkness, P.E., Principal-in-Charge at TRC Environmental Corporation, who testified as to land use, traffic, site selection and visual issues; Charles Cooper, Director of Environmental Permitting and Planning at TRC Environmental Corporation, who testified as to water and wetland issues; Laurence A. Labrie, Senior Air Quality Scientist with TRC Environmental Corporation, who testified as to air issues; Gary L. Ritter, C.I.H., C.S.P., C.H.M.M., Senior Industrial Hygienist at TRC Environmental Corporation, who testified as to solid waste and health issues; David E. Schafer, P.E., Water Resources Engineer at TRC Environmental Corporation, who testified as to water and wetland issues; William H. Bailey, Ph.D., Principal Scientist in the Exponent Health Group, who testified as to electric and magnetic fields ("EMF"); James D. Barnes, Senior Engineering Consultant at Acentech, Inc., who testified as to noise issues; Warren F. Diesl, Registered Professional Geologist with Metcalf & Eddy, Inc., who testified as to water and wetland issues; Michael D. Scherer, Ph.D., President of Marine Research, Inc., who testified as to water issues; and Dr. Peter A. Valberg, Senior Scientist at Cambridge Environmental, Inc., who testified as to health issues.

On May 31, 2000, SE Canal II submitted its initial brief.[7] The record includes approximately 257 exhibits, consisting primarily of Company responses to Siting Board information requests and Siting Board record requests.

C. Jurisdiction

As a unit designed to increase existing generating capacity at Canal Station by 665 MW, from 560 MW to 1,225 MW, the Company'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 defined as:

> any generating unit designed for or capable of operating at a gross capacity of 100

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[7] On April 9, 2001, the Hearing Officer granted the Company's motion to reopen the record for the limited purpose of incorporating into the record of this proceeding the Company's seventh and eighth supplemental responses to Exhibit EFSB-W-12. Subsequently, on May 17, 2001, the Hearing Officer granted the Company's motion to reopen the record for the limited purpose of incorporating into the record of this proceeding the Company's updated Air Plan Application with the Massachusetts Department of Environmental Protection, and also admitted into the record updates to two corresponding exhibits.

megawatts or more, including associated buildings, ancillary structures, transmission and pipeline interconnections that are not otherwise facilities, and fuel storage facilities.

D. Scope of Review

1. Background

On November 25, 1997, the Governor signed into law Chapter 164 of the Acts of 1997, entitled "An Act Relative to Restructuring the Electric Utility Industry in the Commonwealth, Regulating the Provision of Electricity and Other Services, and Promoting Enhanced Consumer Protection Therein" ("Restructuring Act"). Sections 204 and 210 of the Restructuring Act altered the scope of the Siting Board's review of generating facility proposals by amending G.L. c. 164, § 69H and by adding a new section, G.L. c. 164, § 69J¼, which sets forth new criteria for the review of generating facility cases.

On March 19, 1999, the Siting Board issued a request for comments on Siting Board staff's four draft standards of review for generating facility cases ("Request for Comments"). The draft standards of review addressed the four major elements of the generating facility review set forth in G.L. c. 164, §§ 69H and 69J¼: the site selection process, the environmental impacts of the proposed facility, consistency with the policies of the Commonwealth, and the generating technology comparison (required only in cases where the expected emissions from a proposed generating facility exceed the levels specified in 980 CMR § 12.03).

In its Request for Comments, the Siting Board stated that parties in pending generating facility cases would have an opportunity to brief the standards of review to be applied in their specific case (Request for Comments at 2). On June 14, 1999, staff issued revised standards of review. On May 12, 2000, parties and interested persons in EFSB 98-9 were invited to submit comments on both versions of the standards of review. Southern Energy Canal II, L.L.C., EFSB 98-9, Hearing Officer Memorandum, May 12, 2000.

2. Position of the Company

The Company supports the Siting Board staff's June 14, 1999 revised standards of review for site selection, environmental impacts and consistency with the policies of the Commonwealth

(Company Brief at 5-6, 17-19, 112-116). However, the Company recommended that, just as the Siting Board in past decisions has deferred to the expertise of other agencies in reviewing environmental impacts, the Siting Board should recognize that a project's compliance with other agency standards demonstrates that health impacts have been minimized (id. at 18-19).

3. Analysis

As discussed in Section III.L below, the Siting Board recognizes that its analysis of the health impacts of a proposed generating facility is necessarily closely related to its review of specific environmental impacts that may also be subject to review by other agencies. The Siting Board has given significant weight to compliance with health standards established by another agency with a greater level of expertise in this area. However, in order to properly fulfill its legislative mandate, it is the Siting Board's practice to make a comprehensive review of all aspects of a proposed project that might affect public health, and not rely entirely on a proponent's compliance with standards that may have been established in a particular area by another agency. The Siting Board sees no reason to change this practice here.

The Company has proposed no further amendments to the June 14, 1999 revised standards of review for generating facilities. The Siting Board therefore finds that the revised standards of review with respect to the site selection process, environmental impacts, and consistency with the policies of the Commonwealth issued on June 14, 1999, comply with the requirements of G.L. c. 164, §§ 69H and J¼ and will govern the scope of review in this proceeding.

In Section II., below, the Siting Board considers the Company's site selection process. In Section III., below, the Siting Board considers the environmental impacts of the proposed facility. In Section IV., below, the Siting Board addresses whether the plans for construction of the proposed 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 Siting Board.[8]

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[8] As set forth in Section III.B, below, the Siting Board finds that the expected emissions (continued...)

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 a petitioner'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 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". 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 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.

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[8] (...continued)
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.

B. Description

The Company stated that Mirant Corporation[9] decided to pursue a position in the New England generation market in early 1997, because of conditions created by electric deregulation and restructuring in New England (Exh. EFSB-S-1). The Company stated that Mirant Corporation's goals were to develop a portfolio of generating assets using existing generation in the region, and to develop new generation using the newer combined cycle technology, which has higher energy efficiency and lower emissions than existing generating units in the region (Exh. SEC-1, at 2-3). The Company asserted that, as a result of restructuring, some existing generating facilities became attractive for potential redevelopment (Exh. EFSB-S-1).

The Company stated that the objective of Mirant Corporation's site selection process was to choose sites: (1) where development would have minimal impact on the environment; (2) which had access to existing infrastructure services, particularly water supply, gas supply, and electric transmission services; (3) where a level of community support for development existed; and (4) where development would be consistent with the policies and objectives of the Restructuring Act (id.; Exh. SEC-1, at 2-1, 2-2). The Company stated that Mirant Corporation assessed the Canal Station site and determined that it measured favorably when considering these factors (Exh. EFSB-S-2). Mirant Corporation therefore bid for the non-nuclear generating assets of Commonwealth Energy and acquired the assets in December, 1998 (Exh. SEC-1, at 2-3 to 2-4).[10]

The Company indicated that the Mirant Corporation owns a number of plants of over 500 MW in the United States, and that it tries to develop new projects of at least that size, consistent

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9 Throughout this decision, the Siting Board will use "Mirant Corporation" to refer to both Southern Energy Inc. and to Mirant Corporation, and will use "Mirant Canal II" to refer to both SE Canal II and to Mirant Canal II.

10 The Company stated that it has pursued other development projects in the Northeast region, including the ownership of several existing generating facilities in New York State, and had proposed to develop a new 525 MW facility on an industrial site in New Hampshire, which it subsequently sold (Exh. EFSB-S-2). The Company indicated that it bid for other generating assets in the region but that these bids were not accepted (Tr. 3, at 226 to 227).

with existing development and community development objectives (Exh. EFSB-S-14). The Company asserted that of all the sites it acquired from Commonwealth Energy, only Canal Station possessed adequate land and associated infrastructure for the development of a generating facility over 500 MW without significant land use impacts (id.; Exh. SEC-1, at 2-3). Once Canal Station was identified as being suitable in terms of size, the site was then evaluated based on environmental impacts, transmission access, natural gas supply, ability to incorporate existing structures, and cost-competitiveness (Exhs. SEC-1, at 2-5 to 2-9; EFSB-S-7; EFSB-S-8; EFSB-S-9).

The Company stated that Mirant Corporation evaluated the sites that it purchased from Commonwealth 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 (Exh. EFSB-S-5; Tr. 3, at 226 to 227). The Company noted that although it did not formally rank or compile field observations on the sites that it purchased, it visited and evaluated each of the sites on numerous occasions (Exh. EFSB-S-3).

The Company stated that the configuration of the proposed project was dictated by the existing equipment and the size of the property (Exhs. EFSB-S-10; EFSB-S-11; Tr. 3, at 255). The Company also indicated that a primary consideration was to minimize visual impacts on the local community (Exh. SEC-1, at 2-2, 2-5, 2-6). The Company stated that input from the community on matters including building bulk, orientation, façade, color, and stack height influenced the design of the proposed project (id. at 2-9 to 2-11; Exh. EFSB-S-10).

The Company argued that, as a brownfield site, the Canal Station offered the Company the potential to expand existing generating facilities while minimizing environmental impacts (Exhs. SEC-1, at 2-5 to 2-6; EFSB-S-2; Tr. 3, at 228). In particular, the Company asserted that generating capacity at the site could be increased while reducing emissions of all criteria pollutants (Exhs. EFSB-A-2, Bulk Att. at 3-2; SEC-1, at 1-25 (Table 1.4-1)). The Company explained that it also expected less acute visual impacts and impacts to wetlands due to the brownfields nature of the site (Exh. SEC-1, at 2-2, 2-5. 2-6). The Company stated that the Canal

Station site could be redeveloped with less tree-clearing impacts or increases in impervious surface areas than would be the case at a greenfield site (id. at 2-3). Further, in addition to the continued use of the existing Unit 2 turbine, some infrastructure such as the once-through cooling system, oil handling and unloading areas, administrative areas, and water treatment equipment would be reused, reducing the project's footprint (id. at ES-5 to ES-6).

The Company asserted that, following repowering, noise levels in the area would remain the same or decrease slightly from current levels (id. at 1-25 (Table 1.4-1)). The Company also testified that traffic impacts would be less than expected at a greenfield site, because the new facility would not result in an increase in workers during operation and that during construction, workers would be brought to the site by bus from satellite parking areas (Tr. 3, at 225 to 226).

The Company stated that interconnections were an important part of its site selection process and discussed the advantages and disadvantages of the site with respect to gas and electrical interconnections (Exhs. EFSB-S-7; EFSB-S-8; EFSB-S-9). The Company noted that the Canal Station is adjacent to a Commonwealth Electric substation, and that an existing interconnection to an interstate gas pipeline lateral runs beneath the Cape Cod Canal (Exhs. EFSB-L-3; EFSB-L-11; Tr. 1, at 75). However, the Company stated that the site's location, more than 50 miles away from the nearest interstate mainline gas facility in Mendon, Massachusetts, could make delivery of natural gas more expensive and less reliable (Exhs. EFSB-L-3; EFSB-L-11; Tr. 1, at 75; Tr. 4, at 458, 465, 467).

The Company also noted that Canal Station is in a highly visible location (Tr. 3, at 290). For example, the site is visible from the Scusset Beach Reservation, which had over 557,000 visitors between July 1998 and June 1999 (Exh. EFSB-RR-10). Other locations from which the proposed facility would be visible include the Cape Cod Canal, the Canal Walk, the Sandwich Marina, Merchant Square shopping area, and the Sagamore Bridge (Tr. 3, at 290).

C. Analysis

The Company has described Mirant Corporation's 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 Commonwealth Energy. The

Company has provided information on the sites Mirant Corporation pursued in the Northeast and the assets it bought from Commonwealth Energy. The Company also has provided information on how it determined the site layout, generating capacity, and cooling and other technologies for its repowering 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, 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 Southern Energy Kendall, L.L.C., 11 DOMSB 255, at 275-276 (2000) ("Southern Kendall Decision"); Sithe Mystic Development, 9 DOMSB 101, at 123 (1999) ("Sithe Mystic Decision"); Sithe West Medway Development, L.L.C, 10 DOMSB 274, at 296 (2000) ("Sithe West Medway Decision").

Here, the Company is proposing the installation of new equipment to be integrated into a repowered Unit 2. The record demonstrates that the proposed project has the potential to improve local air quality by significantly reducing Canal Station's emissions of all criteria pollutants, and to reduce noise levels in some locations. The record also demonstrates that there are cost and environmental advantages to the reuse of the existing Unit 2 turbine, once-through cooling structures, oil handling and unloading areas, and other existing structures. In addition, the site has certain advantages directly related to the use of existing onsite facilities, the

availability of existing trained emergency services, and the site's proximity to the Cape Cod Canal and the Commonwealth Electric substation.

However, the proposed use of the groundwater sources underlying the site for process water raises issues related to wetland impacts, saltwater intrusion, and possible impacts on municipal water supplies. Furthermore, the distance from the Canal Station to the nearest interstate gas mainline is over 50 miles, which could affect the reliability of gas supply at the proposed facility. Additionally, the proposed project is located in a developed area, with seasonal tourist activity and commercial and residential use in the surrounding community. Therefore, incremental visual and safety impacts could affect a significant number of people.

The record reflects the advantages and disadvantages of redevelopment at the Canal Station site. On balance, the advantages contribute to the creation of certain environmental benefits and to the minimization of environmental impacts; however, the disadvantages create the potential for environmental impacts which would need to be minimized by the Company through design or mitigation. Any disadvantages which could create environmental impacts are reviewed in Section III, below, to ensure that any such impacts would 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 of the proposed project 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.[11]

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 air quality impacts of the proposed project, the mitigation proposed by the Company, and the costs and benefits of any additional mitigation options.

1. Applicable Regulations

The Company indicated that regulations governing air impacts of the project include National Ambient Air Quality Standards ("NAAQS") and Massachusetts Ambient Air Quality Standards ("MAAQS");[12] Massachusetts Best Available Control Technology ("BACT")

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[11] The Siting Board also reviews in this decision the safety, traffic and EMF impacts of the proposed project in Sections III.H, I, and J, below.

[12] The Massachusetts Department of Environmental Protection ("MDEP") has adopted the (continued...)

regulations, and Siting Board Technology Performance Standards ("TPS") (Exhs. EFSB-A-2, Bulk Att. at 3-7; EFSB-RR-28). The Company asserted that, because the Canal Redevelopment Project would be a modification to an existing source and would result in net reductions in estimated emissions, the proposed project would not be subject to the United States Environmental Protection Agency's ("EPA") New Source Performance Standards ("NSPS")[13] for criteria pollutants, Prevention of Significant Deterioration ("PSD")[14] and non-attainment New Source Review ("NSR")[15] requirements, Massachusetts 1-hour nitrogen oxide ("NO_X") Ambient

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(...continued)
NAAQS limits as MAAQS (Exh. EFSB-G-5-C at 4.2-3).

[13] The Company stated that Massachusetts has adopted the EPA's NSPS for pollutants, including NO_X and sulfur dioxide ("SO_2"), which may be emitted from combustion turbines (Exh. SEC-1, at 4.2-6). The Company stated that anticipated emissions of NO_X and SO_2 from Unit 2 following the repowering would fall significantly below the levels set by NSPS (Exh. EFSB-A-2, Bulk Att., at 6-6 to 6-11).

[14] Federal PSD requirements stipulate that modifications to existing sources are subject to PSD review if: 1) the source is within 100 km of Class I (wilderness) areas; and/or 2) such modifications result in a net increase in criteria pollutants (Exhs. SEC-1, at 3.5-5; EFSB-G-5-C at 4.2-6). The proposed project is more than 100 km from the nearest Class I (wilderness) area, and would result in net reductions, rather than net increases, of all criteria pollutants (Exhs. SEC-1, at 3.5-6; EFSB-G-5-C at 4.2-6; EFSB-A-2, Bulk Att. at 3-4, 3-5, 3-7).

[15] Because Massachusetts is classified as "non-attainment" for ozone, new major sources or major modifications to existing sources of NO_X and Volatile Organic Compounds ("VOCs") are subject to Non-Attainment NSR requirements (Exhs. EFSB-G-5-C at 4.2-5; SEC-1, at 3.5-5). However, the addition of new power generation equipment and the shutdown of the Unit 2 power boiler would result in a net decrease in the emissions of all pollutants which are precursors to ozone formation and therefore potentially subject to Non-Attainment NSR requirements (Exh. SEC-1, at 3.5-6).

Standards[16], or the Massachusetts Air Toxics Program[17] (Exh. EFSB-A-2, Bulk Att. at 3-4, 3-5, 3-7).

The Company indicated that, under NAAQS, all geographic areas are classified and designated as attainment, non-attainment or unclassified for six criteria pollutants: SO_2, fine particulates ("PM-10")[18], NO_X, carbon monoxide ("CO"), ground level ozone, and lead (id.). The Company indicated that, although the Sandwich area is classified as "attainment" or "unclassified" for SO_2, PM-10, NO_2, CO, and lead, the entire Commonwealth of Massachusetts is in serious non-attainment for ozone (Exh. SEC-1, at 3.5-4).

The Company asserted that because of the emissions reductions proposed, the proposed project would be exempt from Federal BACT and Lowest Achievable Emissions Rate ("LAER") review of criteria pollutants (Exh. EFSB-A-2, Bulk Att. at 3-7). However, the Company indicated that the proposed project would be subject to Massachusetts BACT regulations, which govern all new sources producing more than one ton per year of NO_X, VOCs, CO, SO_2, and PM-10, regardless of any net emissions reductions (id.).

The Company indicated that the proposed facility would meet the TPS for air emissions from new electric generating facilities set forth in 980 CMR 12.00 (Exh. SEC-1, at 3.5-4). The Company provided documentation indicating that its project would meet the TPS for both criteria

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16 Massachusetts has established a 1-hour ambient standard for major new sources of NO_X emissions, and for modifications to existing sources that result in net emissions increases in excess of 250 tons per year ("tpy") (Exh. SEC-1, at 3.5-4). The Company noted that the proposed project would result in a reduction, rather than an increase, in NO_X emissions (id.).

17 MDEP's Air Toxics Policy establishes Threshold Effects Exposure Limits ("TELs") and annual Allowable Ambient Limits ("AALs"), regulating allowable emissions of over 100 toxic air pollutants (Exhs. EFSB-G-5-C at 4.2-8; SEC-1, at 3.5-3). The Company stated that the proposed project was not subject to this program because the proposed changes to the facility represent a minor modification under the governing regulations (Exh. EFSB-A-2, Bulk Att. at 3-7).

18 The EPA promulgated a Fine Particle (PM-2.5) NAAQS on July 18, 1997. EPA is in the process of establishing a monitoring network for PM-2.5 (Exh. EFSB-A-28 Att.). In the interim, EPA has indicated that PM-10 should continue to be used as a surrogate (id.).

and non-criteria pollutants (id. at 3.5-4).[19]

2. Emissions and Impacts

The Company asserted that the proposed project would result in major reductions of all pollutants of concern at Canal Station (Exhs. SEC-1, at 3.5-1 to 3.5-9; EFSB-G-5-C at 4.2-2). The Company asserted that the air quality impacts of the repowered Unit 2 would be minimized through the shutdown of the Unit 2 boiler, and through the use of efficient combustion technology, advanced pollution control equipment, natural gas as the primary fuel for the new CTG/HRSG system, and 0.05% low-sulfur oil as the back-up fuel (Exh. SEC-1, at 3.5-2 to 3.5-9). The Company also asserted that dispatch of the proposed project in preference to older generating resources in the region would result in further displacement of NO_X, SO_2 and CO_2 emissions (id. at 3.5-12).

The Company stated that while Unit 2 has been technically capable of operating at up to 60% load using natural gas since the mid-nineties, it has done so on only a very limited basis because of the price of natural gas and the unit's inability to operate at full load on gas (Exh. EFSB-A-23; Tr. 4, at 457). Following the repowering, Unit 2 would operate primarily on natural gas, with a maximum of 30 days operation using No. 2 low sulfur distillate oil as backup fuel. The Company stated that as a result of this fuel change and the installation of more efficient equipment, emissions of criteria pollutants from Canal Unit 2 would significantly decrease following the repowering, as set forth in Table 1, below:

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[19] Because the Company provided documentation indicating that its project would meet TPS for both criteria and non-criteria pollutants, the Company is exempt from the requirements of 980 CMR 12.00 to provide data comparing its project to alternative fossil-fuel generating technologies (Exh. SEC-1, at 3.5-4 (Table 3.5-4)). Provision of such information is intended to enable the Siting Board to determine whether the project would contribute on balance to "a reliable, low-cost, and diverse regional energy supply with minimal environmental impacts." M.G.L. c. 164, § 69J¼. Exempting projects which meet the TPS streamlines Siting Board review of proposed facilities which incorporate "state-of-the art" environmental performance characteristics.

TABLE 1

Unit 2 Annual Emissions

Pollutant	Existing Unit 2[1]	Repowered Unit 2[2]	Reduction %, Unit 2	Reduction %, Canal Station[3]
NO_X	3817 tpy	342 tpy	91%	60%
SO_2	14291 tpy	340 tpy	98%	46%
CO	5623 tpy	360 tpy	94%	62%
PM-10	322 tpy	216 tpy	33%	16%
VOCs	81 tpy	46 tpy	43%	20%

1 Based on 1998-1999 actual average emissions.

2 Assuming 100% load firing for 8760 hours, 335 days gas, 30 days oil.

3 Includes Unit 2 repowering and Unit 1 SCR retrofit, compared to 1998-1999 Canal Station emissions.

(Exh. EFSB-A-2-S at 2 to 4).

The Company estimated the quantity of pollutants that would be emitted from repowered Unit 2 on the basis of information from manufacturers and vendors of plant equipment and from government data centers (Exh. SEC-1, at 3.5-1). The Company provided calculations of air emissions from Canal Units 1 and 2 that could be expected following the repowering[20] (id. at 3.5-10). The Company stated that its air modeling results were based on conservative assumptions and overstated the expected impacts; consequently, the Company argued that these results represent a worst-case scenario rather than expected annual impacts (Tr. 4, at 495-499).

The Company stated that the project would incorporate BACT for NO_X, SO_2, VOCs, CO, and PM-10, as well as for other non-criteria pollutants and air toxics that are regulated as part of the MDEP air plans approval process (Exh. EFSB-A-2, Bulk Att. at 6-5 to 6-11). The Company asserted that proposed BACT for the facility includes the use of natural gas as the primary fuel source (id.). The Company indicated that the proposed project would include General Electric GE 7241 FA combustion turbines using a dry low- NO_X combustion system and SCR to limit

20 This calculation was based on the maximum pollutant emissions rate at full load assuming natural gas firing for 335 days per year and low sulfur distillate oil firing for 30 days, including startups, with BACT emissions controls (Exh. SEC-1, at 3.5-10).

NO_X emissions to 2 parts per million ("ppm")[21] when firing natural gas (Exh. EFSB-A-2, Bulk Att. at 2-1, 6-9, 6-11). The Company stated that the ammonia required for the SCR process would be manufactured on-site using an ammonia-on-demand ("AOD") system, which uses solid urea pellets as an ammonia source, and that ammonia slip would be limited to 2 ppm (Exhs. EFSB-A-2, Bulk Att. at 6-11; EFSB-G-5-C at 4.2-21).

The Company stated that: (1) VOCs would be controlled using good combustion practices and an oxidation catalyst (Exhs. EFSB-A-2, Bulk Att. at 6-11; EFSB-G-5-C at 4.2-21); (2) CO would be controlled using an oxidation catalyst (Exhs. EFSB-A-2, Bulk Att. at 6-11; EFSB-G-5-C at 4.2-21); (3) SO_2 would be controlled by the use of low-sulfur fuels (Exhs. EFSB-A-2, Bulk Att. at 6-6; EFSB-G-5-C at 4.2-21); and (4) PM-10 emissions would be controlled by the use of clean fuels and use of combustion turbine technology which reduces incomplete combustion (Exhs. EFSB-A-2, Bulk Att. at 6-7; EFSB-G-5-C at 4.2-21).

The Company indicated that although the primary combustion fuel for the facility would be natural gas, the repowered facility would operate for up to 30 days on low sulfur distillate No. 2 fuel oil (Exhs. SEC-1, at 3.5-1 to 3.5-9; EFSB-G-5-C at 4.2-2; EFSB-A-2, Bulk Att. at App. B). The Company's witness, Mr. Cowden, stated that use of a backup fuel is proposed to maintain the facility's ability to provide reliable electric generation at a low cost with the minimum environmental impacts (Tr. 4, at 455 to 458). Mr. Cowden stated that the Company plans to secure a contract for 335-day firm delivery of natural gas, but that a 365-day firm delivery contract would be cost-prohibitive (id.). The Company asserted that the ability to burn low sulfur distillate No. 2 fuel oil increases the reliability of the project, especially during the

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[21] Alternative NO_X control technologies which do not require ammonia as a catalyst are under development at this time. The Company identified two such technologies, Xonon and $SCONO_X$. Xonon was eliminated from consideration because it provides a lower level of NO_X control than SCR (Exh. EFSB-A-2-S-A at 6-2). The Company included $SCONO_X$ in its BACT analysis, but asserted that $SCONO_X$ is an emerging, unproven technology that would not reduce NO_X emissions below 2 ppm (Exhs. SEC-1, at 3.5-23 to 3.5-27; EFSB-A-2-S-A at 6-2). 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 (Tr. 4, at 508 to 509).

winter, by allowing continued operation of the facility in case of a natural gas supply disruption (Exh. EFSB-A-19; Tr. 4, at 464 to 469). The Company stated that oil firing would occur when the supply of natural gas is interrupted, during times when the price of natural gas exceeds the price of low sulfur distillate, and for purposes of maintenance and training (Exh. EFSB-A-7; Tr. 4, at 464 to 469). The Company stated that the use of low sulfur distillate No. 2 fuel oil in the generating equipment proposed for the facility would meet NAAQS/MAAQS, and Massachusetts BACT requirements (Exh. EFSB-A-2, Bulk Att. at 6-2 to 6-11).

The Company stated that it conducted dispersion modeling of Unit 2 for the ambient air quality which would result from anticipated emissions of SO_2, NO_X, CO, and PM-10 from the project, considered separately and together with emissions from the existing Canal Station Unit 1 and background air quality (Exh. SEC-1, at 3.5-14 to 3.5-15). The Company's modeling generated data using a radial receptor grid extending out to a 15 kilometer radius from the proposed facility. Meteorological data was obtained from T.F. Green Airport in Providence, Rhode Island; upper air recording data was obtained from Chatham, Massachusetts (Exhs. SEC-1, at 3.5-11 to 3.5-14; EFSB-A-2, Bulk Att. at 4-9; EFSB-G-5-C at 4.2-11).

The Company stated that the results of its screening level modeling indicated that the maximum concentrations of criteria pollutants would be below significant impact levels ("SILs"), which represent a small percentage of NAAQS, in all cases except for short-term concentrations of SO_2 and PM-10 when firing distillate oil (Exh. SEC-1, at 3.5-3, 3.5-14 to 3.5-15). The maximum modeled concentrations of criteria pollutants resulting from emissions of the proposed facility are set forth in Table 2, below.

TABLE 2
Modeled maximum ground-level concentrations (in $\mu g/m^3$) from Unit 2, compared with SILs

Pollutant / Time	Modeled concentrations	SIL
NO_X Annual	0.24	1
SO_2 3-hour	122	25
SO_2 24-hour	41	5
SO_2 Annual	0.22	1
PM-10 24-hour	8	5
PM-10 Annual	0.18	1
CO 1-hour	48	2000
CO 8-hour	15	500

(Exh. EFSB-A-2-S-A, at 4-10, 4-11)

The Company stated that, because modeled short-term concentrations of SO_2 and PM-10 from the repowered Unit 2 exceeded SILs, it was required to conduct a combined source impact analysis to demonstrate the proposed project's compliance with NAAQS for these two pollutants (Exh. SEC-1, at 3.5-14 to 3.5-15). The Company indicated that it used the EPA-approved Industrial Source Complex Short-Term version 3 ("ISCST3")[22] atmospheric dispersion model to calculate short-term ground-level concentrations of SO_2 and PM-10 with the proposed facility in operation (Exh. EFSB-G-5-C at 4.2-15 to 4.2-21). The Company stated that evaluation of predicted ambient air quality impacts from the project followed prescribed EPA and MDEP procedures (Exh. SEC-1, at 3.5-10 to 3.5-14).

The Company stated that when modeled emissions levels of SO_2 and PM-10 were combined with emissions from Unit 1 and background air quality levels, the resulting concentrations were well below the limits established by NAAQS/MAAQS, as shown in Table 3, below (id. at 3.5-14 to 3.5-15).

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22 The Company stated that the ISCST3 model is the latest version of the EPA's dispersion model and is appropriate for modeling point sources such as the proposed project and the existing Canal Station Units (Exh. SEC-1, at 3.5-12).

TABLE 3
Cumulative Maximum Impacts of Unit 1, Repowered Unit 2, and background, compared with NAAQS.

Pollutant / Time	Unit 2 predicted maximum Contribution ($\mu g/m^3$)	Canal Station predicted air permit contribution		Background ($\mu g/m^3$)	Cumulative Impact ($\mu g/m^3$) / percentage of NAAQS	NAAQS ($\mu g/m^3$)
		Unit 1 ($\mu g/m^3$)	Unit 2 ($\mu g/m^3$)			
SO_2 3-hour	122	0	91.3[1]	183	274 / 21%	1300
SO_2 24-hour	41	0	26.9[1]	68	95 / 26%	365
PM-10 24-hour	18	0	4.5[2]	44	48.5 / 32%	150

1 Measures the highest second-high data over five years. Highest second-high measurements are the MDEP-approved method for air quality modeling of SO_2 cumulative impacts. Meteorological conditions from the previous 5 years are used to model the air quality impacts of the facility's projected emissions. The second-worst day's resulting air quality from each year are compared, and the worst year's data is used to assess cumulative impact.

2 Measures highest sixth-high data over five years. Highest sixth-high measurements are the MDEP-approved method for air quality modeling of PM-10 cumulative impacts. Meteorological conditions from the previous 5 years are used to model the air quality impacts of the facility's projected emissions. The sixth-worst day's resulting air quality from each year are compared, and the worst year's data is used to assess cumulative impact.

(Exhs. EFSB-A-2-S-A at 4-10 to 4-11; EFSB-RR-27-S)

The Company also indicated that maximum predicted contributions of the project to ambient air quality would fall within the applicable MDEP limits for all non-criteria pollutants and air toxics (Exh. EFSB-G-5-C at 4.3-3, 4.2-8, 4.2-15 to 4.2-21).

The Company indicated that it examined a range of stack heights and associated air quality impacts in selecting the stack height for the project (Exh. SEC-1, at 3.5-12). The Company testified that its selected stack height for the project, 230 feet, would be just above the height of the existing roofline of Canal Station (id. at 1-1). The Company argued that a stack height of 230 feet would best balance existing regulatory requirements with the minimization of the visual impact of the stack in the community (Tr. 3, at 314 to 315).

The Company asserted that operation of the project would cause economic displacement of older generating units with higher emissions rates, and therefore would result in significant regional air quality benefits (Exh. EFSB-SEC-1, at 1-23 to 1-25; Tr. 4, at 435-436). In support of its assertion, the Company used data from the "1997 Marginal Emission Rate Analysis" (September 1998) to compare operations and emissions characteristics of the proposed project with those of other electric generators in the region (Exh. SEC-1, at 1-25, Table 1.4-1-S). The Company's analysis indicated that, by displacing the generation of an existing average 1,225 MW NEPOOL facility, operation of the new equipment would reduce New England emissions of NO_X, SO_2 and CO_2 by approximately 10,867 tpy, 39,639 tpy and 2,509,526 tpy, respectively (id.).[23]

3. Offset Proposals

As described above, the Company asserted that the proposed project would be exempt from most emissions offset requirements, including SO_2, NO_X, and VOCs offset programs (Exh. EFSB-A-2-S-A, at 5-1 to 5-3). The Company explained that these offset requirements would not apply to the proposed project because the new equipment would reduce emissions from Unit 2 by 98% for SO_2, by 91% for NO_X, and by 43% for VOCs (id.).

The Company indicated that the proposed new equipment would emit a maximum of 4,723,970 tpy of CO_2 (Exh. SEC-1, at 3.5-27). The Company stated, based on 1997 and 1998 operations, that existing Unit 2 emits 2,750,050 tpy of CO_2, which would be avoided through the shutdown of the Unit 2 power boiler as part of the proposed project (id.). Therefore, with operation of the proposed project, the maximum net added emissions of CO_2 would be 1,973,910 tpy (id.). The Company stated that, to meet the Siting Board's CO_2 offset requirement, it would choose from among the three options set forth in the Sithe Mystic Decision (id.).[24] The Company

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[23] The Company assumed that the new equipment would operate for 80% of its annual capacity, or 8,545,800 MW-hours, and would produce emissions based on a mix of firing on oil (30 days) and natural gas (335 days) (Exh. SEC-1, at 1-25, Table 1.4-1-S).

[24] In the Sithe Mystic Decision, the Siting Board outlined three approaches to offsetting CO_2 (continued...)

stated that, although it has not as yet selected the option that it would pursue, it would submit a proposal as part of a compliance filing to the Siting Board (id. at 3.5-27, Tr. 4, at 429-439).

The Company discussed the potential for the proposed project to require on-site or off-site tree clearing, which could affect CO_2 assimilation.[25] The Company asserted that because the area proposed for the project is developed, no on-site tree clearing would be required (Exh. SEC-1, at 3.5-28). However, the Company indicated that some improvements to Duke Energy's existing Algonquin Gas Transmission "G" lateral, extending from the project area to Mendon, Massachusetts, would be required to allow delivery natural gas for the project (id. at 2-7; Exh. EFSB-L-3). The Company indicated that these improvements are expected to include installing additional pipeline capacity and additional compression equipment. The Company noted that Duke Energy was developing plans for such improvements, and had not provided the Company with information regarding the extent of tree-clearing impacts that could be expected (Exhs. EFSB-L-3; EFSB-L-11; Tr. 1, at 76). With respect to electrical interconnection, the Company stated that ISO New England and Commonwealth Electric were conducting an interconnect study to determine the extent of any transmission system upgrades needed to support the proposed project (Exh. SEC-1, at 2-6). The Company did not provide information regarding the potential for tree-clearing impacts resulting from possible transmission system upgrades for the line connecting Canal Station to the bulk transmission system.

(...continued)
emissions from a new generating facility when emissions from one or more existing generating facilities were to be reduced contemporaneously (Exh. SEC-1, at 3.5-27).

25 In response to a Siting Board request, the Company provided a 1996 study titled Exchange of Carbon Dioxide by a Deciduous Forest: Response to Interannual Climate Variability conducted by Michael Goulden, William Munger, Song-Miao Fan et al. (Exh. EFSB-SRR-63 Att.). The study shows that the average sequestration rate of deciduous trees on a site in Central Massachusetts over five years was equivalent to 3.6 tons of CO_2 per acre per year (id.).

4. Analysis

The record indicates that the proposed facility would consist of four combustion turbines and four HRSGs using natural gas as their primary fuel and low sulfur distillate No. 2 fuel oil as backup fuel, and incorporating advanced pollution control equipment including SCR. The Company proposes to achieve BACT for CO, PM-10, SO_2, lead, NO_X and VOCs.[26] The Company provided information regarding facility emissions which demonstrates that the proposed facility would meet TPS for both criteria and non-criteria pollutants. Consequently, the Siting Board finds that no alternative technologies assessment is required for the proposed project.

The Company's emissions analysis demonstrates that repowering Unit 2, which would include the shutdown of the existing Unit 2 power boiler and the addition of the new CTGs and HRSGs, would produce significant reductions in emissions of all criteria pollutants. Specifically, Unit 2 annual NO_X emissions would decrease by 91%, Unit 2 annual SO_2 emissions would decrease by 98%, Unit 2 annual CO emissions would decrease by 94%, Unit 2 annual PM-10 emissions would decrease by 33%, and Unit 2 annual VOC emissions would decrease by 43%. At the same time, Unit 2's generating capacity would increase from approximately 560 MW to 1,225 MW.

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26 With regard to the use of SCR versus 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 Decision, 9 DOMSB 225, at 270 (1999) ("IDC Bellingham Decision"). As a result, the Siting Board will not require use of such technology (id.). The Siting Board also notes that MDEP in a recent 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 Energy Company - Compliance Decision, 9 DOMSB 211, at 221 (1999) ("ANP Bellingham Decision on Compliance"). The Siting Board therefore concludes that by incorporating the control technology that MDEP determines to be BACT 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.

The Company has used MDEP-approved air modeling techniques to model both the air quality impacts of emissions from repowered Unit 2, and the cumulative air quality impacts of the combined emissions from Unit 1 and repowered Unit 2, for certain pollutants. This modeling demonstrates that, assuming maximum firing of all turbines using natural gas for 335 days and low sulfur distillate oil for an additional 30 days, pollutant concentrations would be below SILs for all criteria pollutants except for short-term SO_2 and PM-10, and within applicable limits for other hazardous or toxic air pollutants. The Company's cumulative impact analysis indicated that modeled emissions from the proposed facility, combined with modeled emissions from Unit 1 and background ambient conditions, would result in short-term concentrations of SO_2 and PM-10 that are no more than 32% of the NAAQS/MAAQS limits.

The Company has applied for an air quality permit from MDEP that would allow it to fuel Unit 2 with low sulfur distillate oil for up to 30 days each year, without any seasonal restriction on oil-firing. The Company argues that it needs to retain the ability to burn oil in Unit 2 due to the difficulty and cost of acquiring a 365-day supply of natural gas for Canal Station, and states that it intends to use oil when natural gas is unavailable due to supply emergencies, when the use of natural gas is undesirable due to its higher relative cost, and as needed for maintenance and training.

The Siting Board recognizes that economic and reliability arguments may favor allowing reasonable flexibility in the use of oil in situations where air quality conditions would be improved or held well within applicable standards. Here, the record shows that the Company's proposed air emissions are higher than they would be if Unit 2 used only natural gas, and that SILs would be exceeded for some pollutants over short-term periods. However, the Company's cumulative impact modeling demonstrates that air quality would remain well within applicable regulatory standards. Perhaps more important, because the repowered Unit 2 would run primarily on natural gas, rather than occasionally as at present, and because No. 2 low sulfur distillate, rather than No. 6 fuel oil, would be used for backup fuel, the proposed project would significantly improve regional air quality for much of the year. The record also shows that the proposed facility, when burning oil, would have emissions below those of existing marginal units, and that it therefore has the potential to contribute to regional air quality improvements

through displacement, even when burning oil. Further, because Canal Station has existing infrastructure for oil deliveries by barge, the traffic impacts normally associated with the delivery of oil would be minimized through barge deliveries.

Given the significant reductions in emissions across all pollutants associated with the repowering of Unit 2, the wide margin by which air quality standards would be met even during oil-firing, the improvements in local air quality during the significant percentage of the year when the repowered Unit 2 would run on natural gas, and the potential for regional air quality improvements, the Siting Board finds that the Company's proposal to burn oil as a backup fuel for a maximum of 30 days annually minimizes environmental impacts consistent with minimizing the cost of mitigation, control and reduction of such impacts.

The record indicates that the Company has modeled air pollutant emissions with a variety of stack heights and that the proposed stack height was arrived at by balancing the visual impacts of a greater height with the corresponding air quality improvements. When viewed against the reduced emissions and against local pollutant concentrations discussed above, the additional air quality improvements that would result from a taller stack would likely be outweighed by the increased visual impacts of the taller stack.

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 1% of annual facility CO_2 emissions at $1.50 per ton,[27] to cost-effective CO_2 offset programs selected in consultation with the Siting Board staff. Nickel Hill Energy, L.L.C., 11 DOMSB 83, at 143-144 (2000) ("Nickel Hill Decision"); Brockton Power L.L.C., 10 DOMSB 157, at 192-193 (2000) ("Brockton Power Decision"); Dighton Power Decision, 5 DOMSB 193, at 239-240. The Siting Board also recently has approved a non-monetary approach to CO_2 mitigation based on the

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[27] 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 the Dighton Power Associates, 5 DOMSB 193 (1997) ("Dighton Power Decision") 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.

shutdown or curtailment of an existing source of CO_2 emissions. Sithe Edgar Development, LLC, 10 DOMSB 1, at 136-140 (2000) ("Sithe Edgar Decision"); 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 Board also outlined two alternative approaches: (1) Sithe could make the standard monetary contribution, based on offsetting 1% 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 emissions from any other source. Id. at 140. The Company has indicated its intention to meet the Siting Board's CO_2 offset requirement by one of the three approaches set forth in the Sithe Mystic Decision, but has deferred the choice of approach to a compliance filing. However, the Company has provided estimates of the maximum annual CO_2 emissions from its proposed new equipment, and the maximum net increase in annual CO_2 emissions from the proposed project and the shutdown of existing Unit 2; these data are sufficient to allow the Siting Board to determine the level of CO_2 offsets required under each approach.

The Siting Board has required in recent cases that CO_2 mitigation plans be adjusted to include offsets for significant net tree-clearing impacts resulting from the construction of bulk generating facilities, including both on-site and off-site project-related impacts. IDC Bellingham Decision, 9 DOMSB at 268, 274-275, 335; ANP Blackstone Energy Company, 8 DOMSB 1, at 126-127, 129-130, 181 (1999) ("ANP Blackstone Decision"); ANP Bellingham Energy Company, 7 DOMSB 39, at 154, 156-157, 212 (1998) ("ANP Bellingham Decision"). Here, the record indicates that no on-site tree clearing would be required for the construction of the proposed project. However, the planned gas supply and electrical transmission upgrades required to support the proposed project may require tree-clearing; if so, the Company's CO_2 mitigation filing also should include information indicating the extent of tree-clearing associated with

interconnections for the project and should adjust the level of CO_2 mitigation provided to account for tree-clearing impacts.[28]

Accordingly, the Siting Board directs Mirant Canal II to develop, in consultation with the Siting Board staff, a plan to provide CO_2 mitigation beginning no later than the end of the first year following commencement of commercial operation of the proposed project. Consistent with the Siting Board's rulings in recent cases, Mirant Canal II shall either: (1) by the end of the first year of operation, make a monetary contribution of $1,134,498[29] (plus an adjustment for tree-clearing) to a cost-effective program or programs for CO_2 mitigation to be selected upon consultation with the staff of the Siting Board; or (2) by the end of the first year of operation, make a monetary contribution of $474,050[30] (plus an adjustment for tree-clearing), if it can

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28 The Siting Board notes that here, as in past cases, it will use a single time period of 30 years to account for loss of carbon sequestration associated with project-related tree-clearing impacts. See IDC Bellingham Decision, 9 DOMSB at 274-275. In future cases, the Siting Board may consider whether it is more appropriate to include two time periods in calculating sequestration loss; a period of time to account for sequestration lost as a result of the removal of trees, and a period of time to account for loss of annual carbon uptake associated with the loss of a growing forest over the life of the proposed facility. Id.

29 The contribution is based on offsetting 1% of facility CO_2 emissions over 20 years, at $1.50 per ton, yielding a contribution of $1,417,191. The 20-year amount is first distributed as a series of payments over the first five years of project operation, then adjusted to include an annual cost increase of 3%, and finally discounted at 10% per year. See IDC Bellingham Decision, 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"). If the Company chooses, the CO_2 offset requirement also would be satisfied by a monetary contribution of $1,504,823, to be paid in five annual installments during the first five years of facility operation. See IDC Bellingham Decision, 9 DOMSB at 273; Sithe Mystic Decision, 9 DOMSB at 140; Millennium Power Decision, 6 DOMSB at 128-129.

30 The contribution is based on offsetting 1% of the net increase in maximum CO_2 emissions from Canal Station facility CO_2 emissions over 20 years, at $1.50 per ton, yielding a contribution of $592,173. The 20-year amount is first distributed as a series of payments over the first five years of project operation, then adjusted to include an annual cost increase of 3%, and finally discounted at 10% per year. See IDC Bellingham Decision, 9 DOMSB at 273; Sithe Mystic Decision, 9 DOMSB at 140; Millennium

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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% of the proposed project's maximum net CO_2 emissions (plus an adjustment for tree-clearing) based on voluntary curtailment of operations of other existing equipment at Canal Station, or of equipment at another existing source, subject to conditions 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 satisfy or avoid emissions offset requirements relating to other air pollutants emitted from Canal Station and/or to provide emissions offsets for any air pollutants emitted by other sources. If the Company elects one of the monetary contribution options, it should provide the Siting Board with detailed information regarding the program or programs to which the contribution will be made.

Accordingly, the Siting Board finds that, with implementation of the foregoing mitigation for CO_2 impacts, 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 facility, 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, wastewater discharges and storm water discharges.

1. Description

Mirant Canal II stated that Canal Station currently is permitted to withdraw 164 million gallons per year ("gpy") of groundwater, and requires a maximum of 198 million gpy for process water, 11 million gpy of potable water, and 518 million gallons per day ("mgd") of canal water

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(...continued)

Power Decision, 6 DOMSB 1, at 128-129. If the Company chooses, the CO_2 offset requirement also would be satisfied by a monetary contribution of $628,790, to be paid in five annual installments during the first five years of facility operation. See IDC Bellingham Decision, 9 DOMSB at 273; Sithe Mystic Decision, 9 DOMSB at 140; Millennium Power Decision, 6 DOMSB at 128-129

for once-through cooling. The Company estimated that, after repowering, Canal Station would require 305 million gpy for process water, 8.4 million gpy of potable water, and 620 mgd of canal water for once-through cooling (Exhs. SEC-1, at 3.3-13 to 3.3-14, 3.3-40; EFSB-W-29; Tr. 8, at 952, 754).

The Company provided a breakdown of its process water needs, indicating that after repowering, Canal Station would require approximately 452,000 gallons per day ("gpd"), or 314 gallons per minute ("gpm"), of water to meet normal base load water needs while burning natural gas (Exh. EFSB-W-29-A). The Company stated that additional process water would be needed for: (1) steam augmentation (553,000 gpd, 384 gpm) for a maximum of 1,000 hours per year; (2) evaporative cooling (104,000 gpd, 72 gpm) for approximately 2800 hours per year; and (3) NO_X control (644,000 gpd, 447 gpm) during oil firing for a maximum of 30 days per year (Exhs. EFSB-W-25; EFSB-W-29 A to E; SEC-1, at 3.3-15). The Company noted that these other water uses could elevate Canal Station water use to a maximum of 1.1 mgd (763 gpm) on a short term basis (Exh. EFSB-SRR-64; Tr. 8, at 953).[31]

The Company stated that it currently uses 11 million gpy of potable water from Sandwich to refill the potable water tanks of ships delivering oil to its Esco Terminal, to meet the sanitary needs of its employees, to supply high-quality process water for the facility's water treatment plant, and to refill the facility's raw water tank (Exh. SEC-1, at 3.3-14; Tr. 8, at 965-966). Following repowering, the Company would use well water rather than potable water for its raw water tank, reducing potable water use to 8.4 million gpy (Exh. SEC-1, at 3.3-14).

The Company indicated that it evaluated alternatives to once-through cooling for Unit 2, including cooling ponds and spray canals, freshwater and saltwater cooling towers, and air cooled condensers, but concluded that these alternatives were generally inferior to once-through cooling in light of the unique hydraulic advantages of the site (Exh. EFSB-G-5-C at 3-2 to 3-25). Specifically, the Company determined that: (1) cooling ponds and spray canals would require at least 1250 acres of land, would create a significant consumptive fresh water use, and would be

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[31] The Company noted that, while these figures indicate consumption under normal loads and conditions, it does not expect its water use to vary by more than 10% under other operating scenarios (Exh. EFSB-W-32).

unreliable in winter; (2) freshwater cooling towers would require up to 10.5 mgd of freshwater, would have higher capital and operating costs, would reduce plant efficiency, and would result in unacceptable noise and visual impacts; (3) saltwater cooling towers would have many of the same disadvantages as freshwater cooling towers and additionally would result in salt deposition that could create corrosion and severe damage to vegetation; and (4) air cooled condensers would reduce plant efficiency,[32] require significant additional space, and result in increased visual, wetlands, noise and safety impacts (id.).

The Company stated that wastewater would include intake screen sluice and discharge flume flushing water, equipment blowdown, chemical wash water, and neutralized demineralizer regenerant water (id. at 4.6-54, 4.6-59). The Company stated that its existing waste water treatment system would be largely unchanged and that it would continue to discharge waste water to the Cape Cod Canal with water used for once-through cooling (Exhs. EFSB-W-2; EFSB-WL-11; Tr. 6, at 801). The Company stated that its discharge system would be subject to oversight by the EPA as part of its National Pollution Discharge Elimination System ("NPDES") permit (Exhs. EFSB-G-5-C at 4.6-54, 4.6-59; EFSB-WL-11).

2. Impacts of Groundwater Withdrawals

The Company stated that following the repowering, Canal Station's groundwater withdrawal requirements would increase by over 100 mgy, and that its peak daily withdrawal rate would rise to approximately 770 gpm (Exhs. EFSB-W-12-S7; EFSB-W-12-S8). The Company proposed to withdraw this water from two existing on-site wells ("Wells No. 2 and 3") which currently deliver a combined total of 0.54 mgd, or approximately 375 gpm[33], and from a new well to be developed on-site ("Well No. 4") (Exhs. EFSB-W-12-S7; EFSB-W-12-S8). The Company stated that Well No. 4 would be located on the north side of the Canal Station access road,

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32 The Company noted that the drop in efficiency resulting from this alternative would result in the facility producing added NO_X, SO_2 and CO_2 emissions of 151 tpy, 542 tpy and 86,211 tpy, respectively. (Exh. EFSB-G-5-C at 33-21).

33 The Company noted that a 1979 pump test revealed that Wells No. 2 and 3 could deliver a combined volume of approximately 530 gpm (Tr. 8, at 945).

approximately 500 feet west of the Freezer Road entrance, 1200 feet southwest of an existing well used by a fish processing plant, and 450 feet east of a wetlands area (Exh. EFSB-W-12-S3). The Company stated that, at this location, the groundwater exhibits tidal fluctuations despite being approximately 1000 feet from the Cape Cod Canal (id.).

Mirant indicated that, if necessary, it could also withdraw groundwater at an inactive well site owned by the Sandwich Water District ("Tupper Road well site").[34] Existing wells at this site operated at approximately 0.37 mgd (260 gpm) from 1948 to 1978; however, in 1978 a flood damaged the pumping equipment and the wells were never returned to service (Exh. EFSB-W-12-S7; Tr. 8, at 963 to 964). The Company stated that the existing wells required rehabilitation from a buildup of iron deposits and from breached or collapsed screens, and that a new supply well would need to be developed at this site if it were to be used for process water by the Canal Station (Exh. EFSB-W-12-S7; Tr. 8, at 963 to 964). The Company stated that the Tupper Road well site is located approximately 2000 feet to the southeast of Wells 2 and 3 and 2000 feet to the south of the fish processing plant's well (Exh. EFSB-W-90). The Company identified a wetland area immediately adjacent to the Tupper Road well site (Exh. EFSB-W-12-S3). The Company stated that it plans to list both Well No. 4 and the Tupper Road well site on its Water Management Permit as authorized withdrawal points, although it would develop the Tupper Road well site only in the event of the failure of another of its supply wells (id.; Exh. EFSB-W-90; Tr. 8, at 944).

The Company conducted pump tests at the Tupper Road well site and at the proposed site of Well No. 4 in order to assess their ability to provide process water for Canal Station (Exh. EFSB-W-90). The Company stated that its pump tests were performed using protocols developed in consultation with the MDEP, the Cape Cod Commission, and the Sandwich Conservation Commission (id.; Tr. 6, at 682 to 683; Tr. 9, at 1024 to 1025). The Company's pump tests involved the installation and monitoring of observation wells and piezometers in the

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[34] The Company stated that Sandwich can no longer use the Tupper Road well site as a municipal water supply because the Water District does not own the land within a 400 foot radius of the well as required by MDEP Zone 1 wellhead protection regulations (Tr. 6, at 688).

vicinity of the proposed wells (Exhs. EFSB-W-12-S7; EFSB-W-12-S8). These wells and piezometers recorded the drawdown and recovery of nearby surface water and wetlands during pumping at each well (Exhs. EFSB-W-12-S7; EFSB-W-12-S8). The Company provided analyses of the pump test results ("pump test reports") which focused on the impact that additional withdrawals would have on the aquifer, and the likelihood that saline or contaminated water in the area could migrate to local water supplies (Exhs. EFSB-W-12-S7; EFSB-W-12-S8).

The Company proposed that, following the repowering, it would operate Well No. 2 at up to 370 gpm and Well No. 3 at up to 400 gpm (Exh. EFSB-W-12-S8; Tr. at 1021). The Company stated that a third well capable of producing 400 gpm would be needed in order to provide redundancy in the event of a failure of either Well No. 2 or Well No. 3 (Exh. EFSB-W-12-S8; Tr. at 1021). The Company reported that, during the pump test, Well No. 4 yielded 400 gpm (Exh. EFSB-W-12-S8). The Company initially planned to test the Tupper Road well site to 400 gpm; however following input from local and state authorities, the Company tested the ability of the well to yield 770 gpm (Exhs. EFSB-W-12-S7; EFSB-W-12-S8). The pump test of the existing Tupper Road well indicated that it would yield 457 gpm; however the Company noted that the Tupper Road well is over 50 years old, and argued that a new well or wells, with a more efficient pump, could yield 770 gpm (Exhs. EFSB-W-12-S7; EFSB-W-12-S8). The pump tests indicated that with the proposed withdrawals, drawdown would be 4 feet or less at 100 to 1000 feet from Well No. 4, and drawdown would be 2 feet or less at 100 to 1000 feet from the Tupper Road Well, with a gradient moving from the aquifer towards the saline water (Exhs. EFSB-W-12-S7; EFSB-W-12-S8).

The Company stated that the nearest known water supply wells were 2000 feet from the Tupper Road well site and 1200 to 1400 feet from the proposed Well No. 4 site (Exhs. EFSB-W-12-S7; EFSB-W-12-S8). The Company stated that no significant drawdown would occur at these wells due to distance and relative location above the aquifer (Exhs. EFSB-W-12-S7; EFSB-W-12-S8). The Company provided maps of the recharge areas of wells in the Upper Cape Cod area which indicated that the recharge areas of town wells and of existing and proposed process water wells would not intersect (Exh. SEC-1, at 3.3-10, Fig. 3.3-4).

The Company asserted, based on geological data and its pump tests, that the proposed use of groundwater wells to provide process water would not result in drawdown or other impacts to wetlands due to the presence of underlying layers of clay and silt, which isolate the wetlands' groundwater supply from the deeper waterbearing unit from which the wells would draw water (Exhs. SEC-1, at 3.4-15; EFSB-WL-10; EFSB-W-12-S7; EFSB-W-12-S8; Tr. 8, at 994-995). The Company provided geological profiles, based on borings taken in the vicinity of Canal Station and the Tupper Road well site, that showed the location and extent of these layers (Exhs. EFSB-WL-10, Att.; EFSB-W-12-S8). The Company stated that in one set of borings it encountered clay layers 10 to 30 feet thick at depth of 50 to 70 feet; other borings going down 100 feet encountered clay throughout the bottom 70 to 90 feet (Exhs. EFSB-WL-10, Att.; EFSB-W-12-S8). The Company stated that USGS data indicates that fine-grained soils predominate between bedrock at 220 feet deep and more-permeable soils at approximately 150 feet deep (Exhs. EFSB-WL-10, Att.; EFSB-W-12-S8).

The Company noted that its on-site wells have been in use for over 20 years, and that monitoring of these wells has shown no evidence of any impacts to wetlands (Exh. SEC-1, at 3.3-1; Tr. 6, at 723). The pump tests indicated that the wetlands adjacent to the Tupper Road well site would not be affected by the proposed use of this well site (Exh. EFSB-W-12-S7). The pump test reports recommended that the permanent observation wells installed during the pump tests be monitored to allow further evaluation of the impacts of water withdrawals on neighboring wetlands and surface water bodies (Exhs. SEC-1, at 3.4-15; EFSB-WL-10, EFSB-W-12-S-8).

Subsurface geological data provided in the pump test reports indicated that the saltwater/freshwater interface at the depth of the proposed wells is beyond the shoreline of the Cape Cod Canal (Exh. EFSB-W-12-S8). The Company noted that the clay lens discussed above, coupled with the distances and relative locations of drinking water sources and contaminated areas, would prevent existing near-surface contamination at or near the Canal Station site from reaching the groundwater used for water supply (Exh. EFSB-W-12-S8; Tr. 6, at 748).[35]

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[35] Contamination at the site consists of heavy metals in the area between existing Unit 1 and (continued...)

The Company asserted that, based on the 20 year operating record of its on-site wells, the groundwater aquifer would be able to supply sufficient water for the facility even during periods of very low rainfall (Tr. 6, at 698). The Company stated that roughly 190 mgd of recharge enters the western lobe of the Cape Cod aquifer (Exhs. EFSB-W-3-B; EFSB-W-29-S Att. D; Tr. at 1021).

3. Impacts on the Cape Cod Canal

The Company stated that Canal Station currently uses once-through cooling for Units 1 and 2. Cooling water is withdrawn from the Cape Cod Canal via two intake structures 10 to 15 feet below mean sea level; after use, the heated water is combined with treated process wastewater and discharged back into the Canal via a discharge flume connected to a slot diffuser located in the Canal approximately 30 feet below mean sea level (Exh. SEC-1, at 3.3-29 to 3.3-39). The existing intake and outfall structures were installed with the original Canal Units 1 and 2, and as part of the repowering project, a third intake structure would be installed between the two existing intakes (id. at 3.3-29, 3.3-38). The Company stated that following the repowering, use of the existing Unit 2 intake would cease and be replaced by the new Unit 2 intake and that combined circulating water discharge for both Unit 1 and the repowered Unit 2 would be routed through the existing slot diffuser (id. at 3.3-38; Tr. 8, at 975).

The Company stated that, following the repowering of Unit 2, water withdrawals from the Canal would increase by 19% to 620 mgd (Exh. EFSB-W-51-S; Tr. 6, at 679). However, the Company calculated that the maximum increase in discharge water temperature over intake temperature would remain at the current level of 32 degrees Fahrenheit (Tr. 6, at 754 to 756). The Company also projected that the maximum discharge temperature would remain within its current permitted level of 86 degrees Fahrenheit in the upper 15 feet of the water column above the discharge diffuser (id.).

(...continued)

Unit 2 and small concentrations of petroleum at other locations (Tr. 6, at 741 to 744). Due to the low levels of contamination, MDEP has not required the Company to clean up these areas (id.). See Section III.H, below.

The Company asserted that, following the repowering of Unit 2, the thermal plume from the Canal Station would not cause significant impacts to the aquatic environment, since the maximum discharge temperature would remain below the critical value of 90 degrees necessary to protect fisheries from thermal impacts (Exh. EFSB-W-62; Tr. 6, at 795).[36] The Company noted that observational data suggests that thermal discharges from the existing facility have not resulted in fish kills at the diffuser, although previous diffuser designs resulted in thermal impacts to Atlantic Menhaden (Tr. 6, at 796, 798 to 799).

The Company performed several studies to assess the amount of larvae that currently are entrained in the cooling water intake (Exhs. SEC-1, at 3.3-52 to 3.3-60; EFSB-W-56). These studies included sampling of both ichthyoplankton and lobster larvae in the Canal intake (Exhs. SEC-1, at 3.3-52 to 3.3-60; EFSB-W-56).[37] Based on its studies, the Company estimated that less than 1% of the larvae in the Canal would be entrained at the higher water withdrawal levels, and argued that a 1% loss would be negligible in terms of larvae survival (Exh. EFSB-G-5-C at 4.6-77 to 4.6-78; Tr. 6, at 799 to 800). The Company stated that it also modeled larval densities using data from Buzzards Bay and Cape Cod Bay, as well as the Cape Cod Canal (Exh. EFSB-RR-47-S, Bulk Att. #4, at 4-3). The Company stated that it would update both sets of analyses using data collected over a one-year sampling period (Exh. EFSB-RR-47-S, Bulk Att. #4, at 4-3).

With respect to fish impingement, the Company stated that both a 1978 fish impingement Study by Hall and Morrow and impingement sampling by the Company's consultant, Marine Research Inc., found that generally, impingement losses at Canal Station range from 1 to 3 fish per hour and are among the lowest of any large-volume once-through cooling power plant in the

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36 The Company provided a detailed list of all the fish species that inhabit or pass through the Canal and their tolerance for thermal effects (Exh. EFSB-W-62). The Company concluded that the project would not affect these species due to the 86 degree temperature limit in the upper 15 feet of the water column above the diffuser that would be imposed by the NPDES permit (Exh. EFSB-W-62; Tr. 6, at 795). The Company noted that thermal studies of its existing discharge indicate that temperatures above the diffuser have not exceeded 81 degrees Fahrenheit (Tr. 6, at 761).

37 The Company argued that the effects of entrainment of phytoplankton would be negligible, as phytoplankton populations are replaced every 24 hours in Cape Cod Bay and Buzzards Bay (Exh. EFSB-W-63).

Northeast (Exh. EFSB-G-5-C at 4.6-75). The Company noted that on two occasions, a malfunction in the chlorine handling system resulted in significantly higher fish mortality rates (id.). The Company indicated that it has monitored the facility's intake screens and has not found any occurrences of impingement of marine mammals or sea turtles (id. at 4.6-89).

The Company stated that, to reduce impingement impacts, it engineered its proposed intake structure to incorporate the best available technology for withdrawals from surface water bodies as required by EPA, the Massachusetts Division of Marine Fisheries, the National Marine Fisheries Service and the U.S. Fish and Wildlife Service (Tr. 8, at 1026).[38] Special design components of the intake structure include: (1) minimization of approach velocities to the screen; (2) using a modified Ristroph traveling screen design; (3) improvements to the design of the chlorine feed system; (4) positioning the Unit 2 replacement intake screens to be as close as possible to "flush" with the edge of the Canal; and (5) inclusion of a new fish return system for occurrences of fish impingement on screens (Exhs. EFSB-G-5-C at 4.6-49 to 4.6-50, 4.6-79; EFSB-W-51-S; Tr. 8, at 1026). The intake design also includes a low wall situated below the intake to prevent benthic organisms from becoming entrained, fish passages to encourage fish to stay away from the intake, and revolving fish screens (Tr. 8, at 1026). The Company stated that these improvements would reduce current impingement losses by at least 20% to 50% and that as a result, the project would have a net positive impact on the number of surviving adults of commercial/recreational species compared to conditions at the existing Canal Station (Exh. EFSB-G-5-C at 4.6-79; Tr. 8, at 1032).

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[38] The Company noted that both EPA and MDEP would review the design of the project's intake and outfall structures and the characteristics of its thermal discharge for compliance with Section 316a and 316b of the Clean Water Act (Exh. EFSB-G-5-C at 4.6-50; Tr. 6, at 770). Section 316a requires that the discharge result in the protection and propagation of a balanced, indigenous population of fish, shellfish, and wildlife in and on the body of water receiving the discharge; Section 316b requires that the intake use the "Best Technology Available" to minimize adverse environmental impacts (Exh. EFSB-G-5-C at 4.6-50).

4. Analysis

Mirant Canal II has proposed to repower the existing Unit 2 at Canal Station. The proposed project would require water for three primary purposes: for process water, for potable and sanitary use, and for cooling. The Company intends to withdraw its process water from groundwater in Cape Cod's underlying aquifer via two existing on-site wells and one new on-site well; if necessary, the Company could also develop a water supply at the Tupper Road well site. The Company intends to rely on potable water from the Town for sanitary uses; the record shows that the Company is developing an agreement with the Town specifying that it would not use Town water for any other process needs, with the possible exception of addressing a short term water emergency.

The proposed project, like the existing Units 1 and 2, would be cooled by water withdrawn from, and discharged to, the Cape Cod Canal. The record demonstrates that, although the Company analyzed cooling technologies other than once-though cooling, each would present substantial environmental and technical disadvantages relative to once-through cooling. Furthermore, none of these alternate technologies would be feasible given the constraints of the Canal Station site. Most wastewater would be discharged to the Cape Cod Canal in combination with its once-through cooling discharge, although stormwater would be discharged through an upgraded stormwater management system. In order to determine whether the water impacts of the proposed project would be minimized, the Siting Board considers below the impacts of: (1) groundwater withdrawals on surface- and groundwater bodies and nearby wetlands; (2) potable water use on the Sandwich municipal water supply; and (3) once-through cooling on water quality and fisheries in the Cape Cod Canal and surrounding bays.

The record shows that following the proposed repowering, Canal Station would require a maximum of 305 mgy for process water, an increase of approximately 105 mgy over current requirements. The record shows that the proposed facility would require 0.452 mgd (314 gpm) of water to meet normal base load water needs while burning natural gas. In addition, the record shows that the proposed facility would use additional water for steam augmentation, evaporative cooling, and NO_X control, and that these additional uses would increase the proposed facility's peak water use to a maximum of 770 gpm on a short term basis.

The Company has provided evidence that it can meet its process water needs through the use of groundwater. Specifically, the record shows that 190 mgd enters the western lobe of the Cape Cod Aquifer, and that during peak usage, the repowered Canal Station would use 1.1 mgd, or approximately 770 gpm. The record shows that Canal Station currently withdraws approximately 375 gpm from existing Wells No. 2 and 3, and that 1979 pump tests indicate that these two wells could provide a combined volume of approximately 530 gpm using existing pumps. In addition, the Company's pump tests demonstrate that it could obtain at least 400 gpm from Well No. 4. The Company's plans to meet peak water demand from three on-site wells therefore are reasonable. The record also demonstrates that the Company could develop wells at Sandwich's Tupper Road well site in the event that it encountered problems with its on-site wells. The Company's pump tests show that the existing Tupper Road well could yield 457 gpm, and that with a more efficient well, this site could yield 770 gpm.

The record indicates that the proposed increase in groundwater withdrawals would not affect local drinking water supplies or prevent Sandwich from meeting its future water needs.[39] The record indicates that the relative location and distance between existing and proposed Company wells and any other Town or private wells make it highly unlikely that Town or private wells would be affected by the proposed increase in groundwater withdrawals. The Company has provided a map showing that the recharge areas for Wells No. 2, 3, and 4 and the Tupper Road well should not interfere with the recharge areas of existing and proposed Town wells. The Metcalf and Eddy Study also demonstrates that the Town's existing water supply system is adequate to meet maximum daily demand in the year 2020 assuming 24-hour pumping capacity. Thus, the Company's proposed withdrawals should not interfere with the Town's use of its water supply.

With respect to potential salinization of groundwater, the record shows that the interface of salt water and fresh water is highly likely to be located beyond the banks of the Cape Cod Canal. The record indicates that the location of this interface is unclear, and changes in the piezometric surfaces during the pump tests indicate that, with the proposed withdrawals, the

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[39] The record shows that, to date, no other municipality has requested the use of the Sandwich water supply to help meet its future needs.

interface would likely move landward. However, these tests also indicate that it is highly unlikely that salt water could enter the groundwater aquifer due to the relative levels and gradients of the groundwater aquifer and the saline water in the canal.

With regard to migration of contaminants into drinking water supplies, the record shows that the recharge areas of the facility's proposed wells are not located within the contaminated areas associated with the Massachusetts Military Reservation, and thus the additional pumping of water by the Company would not cause contaminated plumes to move toward the facility. With respect to on-site contamination, the record indicates that there is an underground clay lens at the site that would prevent contamination on-site from being pulled down into the well aquifer.

The record indicates that underlying layers of clay and silt also would protect wetlands near Canal Station and the Tupper Road well site from drawdowns caused by new or increased groundwater withdrawals. At the Canal Station site, this geological evidence is supported by observational evidence indicating that withdrawals from the existing Wells No. 2 and 3 have not significantly affected a nearby wetlands area. Similar observational evidence for the Tupper Road well site is not available, and concern about the impact on wetlands is greater at this location, both because a wetland directly abuts the well site, and because the potential increase in water withdrawal rates is greater.

The Company's pump test report calls for long-term monitoring of the effect of water withdrawals both on nearby wetlands and on salt intrusion. The Siting Board notes that the need for, and design of, long-term monitoring protocols are best determined in consultation with affected regulatory bodies – in this case, the MDEP, the Cape Cod Commission, and the Sandwich Conservation Commission. Consequently, the Siting Board directs the Company to consult with these agencies concerning the need for, and design of, well monitoring for any part of the operational lifetime of the facility, in order to assess the impact of groundwater withdrawals on salinization of groundwater and on water levels in nearby wetlands, and to file with the Siting Board a description of any plans that result from this consultation for monitoring salinization and wetland impacts.

Overall, the record indicates that the Company would be able to meet its increased process water needs by withdrawing water from Wells No. 2, 3, and 4 and, as necessary, the

Tupper Road well, without affecting the Town's ability to serve its residents and without adversely affecting neighboring groundwater or wetlands. The Siting Board therefore finds that, with the implementation of the above condition, the impacts of the Company's proposed groundwater withdrawals would be minimized.

With respect to potable water use, the record shows that, following the repowering of Unit 2, Canal Station's potable water requirements would be reduced by 2.6 million gpy, to 8.4 million gpy. As discussed above, the Metcalf and Eddy Study, which incorporated existing industrial uses into its water projections, found that the Town's existing water supply system would be adequate to meet maximum daily demand in the year 2020. The Siting Board finds that the repowered Canal Station's potable water requirements would not prevent the Town from serving its commercial and residential water customers.

With respect to the impacts of once-through cooling, the record shows that, following the repowering of Unit 2, Canal Station would increase its water withdrawals from the Cape Cod Canal by 19% to 620 mgd. The difference in temperature between water entering the facility and water exiting the facility would remain at the current level of 32 degrees Fahrenheit. In addition, the maximum discharge temperature would remain within its currently permitted level of 86 degrees Fahrenheit in the upper 15 feet of the water column above the discharge diffuser, four degrees below the critical value of 90 degrees which thermal impact studies suggest is necessary to protect fisheries from thermal impacts. In addition, the record indicates that no fish kills from thermal discharges have been recorded since the current diffuser design came into operation at Canal Station. The record indicates that the Company's existing submerged slot diffuser would dissipate heat in the thermal plume as quickly as possible. Thus, the record indicates that the thermal plume from Canal Station would not cause significant impacts to the aquatic environment.

With respect to larvae and phytoplankton entrainment, the record shows that less than 1% of the larvae in the Canal would be entrained. With respect to entrainment of phytoplankton, the Company has asserted that the effects of entrainment of phytoplankton would be negligible based on their rapid replacement rate. The Company has provided information to satisfy concerns

regarding its modeling and analysis, which will be supplemented by further data in its NPDES permit application.

With respect to fish impingement, the record includes a summary of both the 1978 fish impingement study by Hall and Morrow and impingement sampling by the Company's consultant, Marine Research Inc. The results indicate that impingement losses at Canal Station generally range from 1 to 3 fish per hour and were among the lowest of any large-volume once-through cooling power plant in the Northeast. The Company noted that there were two episodes where there were significantly higher fish mortality rates due to a malfunction of the Company's chlorine handling system, and stated that the Company would redesign this system to prevent similar episodes in the future.

The record shows that in order to reduce impingement impacts, the Company has engineered its proposed intake structure to incorporate the best available technology for withdrawals from surface water bodies as required by EPA, the Massachusetts Division of Marine Fisheries, the National Marine Fisheries Service and the U.S. Fish and Wildlife Service. The Company asserted that these improvements would reduce current impingement losses by 20% to 50% and that as a result, the project would cause an overall net positive change in the number of surviving adults of commercial/recreational species of between 0% and 50%, depending on the species. Finally, the record shows that the Company has monitored the facility's intake screens and has not found any occurrences of impingement of marine mammals or sea turtles at the intakes.

The record shows that both EPA and MDEP must review the proposed intake and thermal discharge for compliance with Section 316a and 316b of the Clean Water Act. The Siting Board notes that these regulatory requirements will help to minimize the environmental impacts to the aquatic environment that could be associated with the intake and discharge of cooling water from the Canal. Accordingly, the Siting Board finds that the impacts of the proposed project associated with the use of once-through cooling have been minimized.

Based on the review of evidence presented, the Siting Board concludes that the Company's plan to use canal water for once-through cooling, groundwater from its existing and proposed wells for process needs, and the Sandwich municipal system for its potable water

needs, would minimize the water resource impacts of the proposed facility consistent with minimizing other potential environmental impacts and cost. Accordingly, the Siting Board finds that, with the implementation of the condition set forth above regarding the submission of its long-term groundwater and wetland monitoring plans, the water resource impacts of the proposed facility would be minimized.

D. Wetlands

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

1. Description

The Company stated that Canal Station is located on a developed site bounded to the north by the Cape Cod Canal (Exhs. SEC-1, at 3.4-2; EFSB-WL-6; EFSB-WL-15; EFSB-WL-16). The Company indicated that the banks of the Cape Cod Canal are regulated as wetlands (Exh. SEC-1, at 3.3-39, 3.4-6). The Company also delineated narrow bands of freshwater wetlands associated with an existing drainage channel to the immediate north and south of the railroad tracks at the southern boundary of the Canal Station property (id. at 3.4-2). The Company added that there are forested wetlands and salt marsh present within the Canal Station property (id. at 3.4-2; Exhs. EFSB-WL-6; EFSB-WL-15; EFSB-WL-16).

The Company provided a detailed topographic survey of the Canal Station site (Exhs. EFSB-WL-4; EFSB-WL-5A, SEC-1, at 3.4-9 Fig. 3.4-3). This survey indicated that the elevation of all interior portions of the Canal Station site, including the project site, ranges between 11.6 and 16 feet above sea level, above the 10-foot contour line designating the 100-year flood level (Exhs. EFSB-WL-5A, EFSB-WL-13). The Company therefore asserted that the 100-year floodplain does not encroach upon interior portions of the site (Exh. EFSB-WL-13).[40]

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[40] The Company submitted a Federal Emergency Management Agency ("FEMA") map for the Canal Station site which appears to show that portions of the Canal Station are within the 100-year floodplain (Exh. EFSB-WL-4). The Company provided more detailed topographical information which demonstrated that the project site is outside of these

(continued...)

The Company stated that the project site is already disturbed, consisting of paved areas, compacted soil, and small buildings interspersed with small areas of scrub brush (Exhs. EFSB-G-5-C at 4.5-1; SEC-1, at 3.4-1). The Company indicated that installation of the proposed turbine building, stack, and HRSGs would not affect any wetland resource area or buffer zone (Exhs. EFSB-G-5-C at 4.5-1; SEC-1, at 3.4-2). However, the Company noted that the new cooling water intake structure would extend through the banks of the Cape Cod Canal, and would thus be subject to oversight by the EPA, MDEP, the Sandwich Conservation Commission, and the Army Corps (Exh. SEC-1, at 3.3-39, 3.4-6). The Company stated that the new intake structure would be designed and located in a manner which would minimize wetland impacts (id. at 3.4-13; Exhs. EFSB-WL-11A, B, C, D; EFSB-G-5-C at 4.5-1). In order to limit construction impacts on wetlands, the Company would: (1) install a sheet pile cofferdam to prevent communication between surface water and the excavation; (2) put in place physical barriers to silt and sediment migration, such as hay bales and silt fencing, within and surrounding the cofferdam; and (3) control groundwater flow using a well point dewatering system (Exh. EFSB-WL-11).

The Company stated that, as part of the proposed project, it would upgrade the existing Canal Station stormwater management system, resulting in a reduction in the rate of runoff discharge (Exh. EFSB-WL-3). The Company stated that the existing Canal Station Stormwater Pollution Prevention Plan ("SWPPP") would be updated to reflect changes resulting from construction of the proposed project (Exhs. SEC-1, at 3.6-5; EFSB-G-5-C at 4.6-60 to 4.6-61). The Company stated that the upgraded stormwater management system would maintain a minimum distance of 100 feet between stormwater discharges and waterways and wetland resource areas (Exhs. EFSB-G-5-C at 4.5-5; EFSB-WL-2). The Company stated that infiltration basins would be located 500 feet from the nearest wetland and that all runoff would be treated prior to discharge into wetlands (Exhs. SEC-1, at 3.4-1; EFSB-WL-2). The Company noted that the upgraded water management system would require approval by the Sandwich Conservation Commission (Exh. EFSB-WL-14).

(...continued)
areas (Exhs. SEC-1, at 3.4-8-9, Fig. 3.4-3; EFSB-WL-13).

The Company indicated that the transmission line that would interconnect the proposed facility to the Commonwealth Electric substation would cross a forested wetland area and buffer zone (Exh. SEC-1, at 4.4-11). The Company contended that no route avoiding this wetland area is available (id.). The Company stated that it would be necessary to remove the tops of some overstory trees in this area to provide clearance for the transmission lines (id.; Exh. EFSB-WL-9; Tr. 8, at 988-989). However, the Company asserted that no clearing or grading within wetland areas would be required, that the topography and water flow within the wetland would not be affected, and that the Company would restore any damage caused to buffer zones (Tr. 8, at 988-989). The Company provided a copy of the wetland restoration plan which it had submitted to the Sandwich Conservation Commission, describing its plans for mitigating the impacts of tree-topping along the transmission route (Exh. EFSB-G-5-H at 1 to 7). This proposal details a plan to eliminate an existing stand of invasive alien reed within a 10,400 square foot emergent portion of the wetland, and subsequently to plant native shrubs (id.).

The Company submitted letters from the US Fish and Wildlife Service and the Massachusetts Natural Heritage and Endangered Species Program indicating that these agencies anticipate no impacts to federal- or state-listed rare and endangered species of plants or animals, vernal pools, or exemplary natural communities as a result of the proposed project (Exh. SEC-1, App. at 3.4).

2. Analysis

The record shows that the proposed facility would be constructed on a previously-disturbed portion of the Canal Station site, and that construction of the proposed turbine building, HRSGs, and stack would take place entirely outside of wetland resource areas and buffer zones. However, the construction of a new cooling water intake structure to serve the proposed facility could result in impacts to the banks of the Cape Cod Canal, which are regulated as wetlands. The Siting Board notes that the design, construction, and operation of the new intake structure would be subject to review and approval by regulatory authorities including the Sandwich Conservation Commission, MDEP, EPA, and Army Corps and that the Company has developed plans to minimize the wetlands impacts of the construction of the new intake structure. The

Siting Board also notes that the wetland impacts would consist of modifications to the man-made banks of the Cape Cod Canal at a point between two existing intakes. The Siting Board concludes that the adoption of a discharge design agreed upon by the Company and appropriate federal, state, and local regulatory authorities would minimize the wetland impacts associated with this element of the proposed project.

The record also indicates that construction of a new electrical interconnection to serve the proposed facility would result in the topping of overstory trees within a forested wetland area. The Company plans to mitigate any wetland disturbances resulting from the construction of the transmission line interconnect by eradicating an invasive alien reed and restoring indigenous vegetation to the site. This mitigation plan also will require the approval of the Sandwich Conservation Commission.

Overall, the record demonstrates that the Company has taken reasonable measures to reduce the wetlands impacts associated with the construction and operation of the proposed facility, and that the anticipated impacts are necessitated by the location of existing electrical facilities and the proposed use of once-through cooling. The record also shows that, as part of the development of the proposed project, stormwater treatment at the Canal Station will be improved. Consequently, 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, the mitigation proposed by the Company, and the costs and benefits of any additional mitigation options.

1. Description

The Company estimated that construction of the proposed facility would generate approximately 55.5 tons of waste and debris, including general waste, scrap metals and wood and paper products (Exh. EFSB-HZ-11). In addition, 2500 cubic yards of asphalt, brick, and concrete would be generated (Tr. 2, at 141). The Company stated that it was committed to recycling all recyclable waste generated during construction (Exh. EFSB-HZ-11; Tr. 2, at 115, 141). The

Company indicated that its construction contractor, under the supervision of a Company representative, would be responsible for developing plans to reduce, reuse, and recycle construction-related wastes and for disposing of any material which is not recyclable or reusable off-site in an appropriate landfill (Exhs. EFSB-HZ-1; EFSB-HZ-11; Tr. 2, at 126 to 127, 139).

The Company indicated that the major solid wastes produced by operation of the proposed facility would include spent catalyst from the NO_X and CO removal systems, spent condensate polisher resin, and general plant refuse (Exhs. EFSB-G-5-C at 4.7-1 to 4.7-3; EFSB-HZ-5; EFSB-HZ-6). The Company indicated that office and other facility wastes would be recycled and that non-recyclable materials would be disposed of by a licensed contractor (Exh. EFSB-HZ-1). Spent catalyst from the NO_X control system would be sent to a reclamation facility, returned to the supplier for reclamation or, if reclamation were not an option, sent to an appropriate disposal facility; spent catalyst from the CO removal system would be reclaimed or disposed of by the Company's supplier of replacement catalyst (Exh. EFSB-HZ-5).[41] The Company noted that the switch from oil to natural gas firing for Unit 2 would essentially eliminate flyash production in Unit 2, and would reduce the total quantity of flyash generated at Canal Station by 50% (Exh. EFSB-G-5-C-1, at 4.7-4). The Company indicated that, when burning oil, Unit 2 would generate a small quantity of residual ash film, which would require periodic onsite cleaning (Exh. EFSB-HZ-10).

Mirant Canal II indicated that it would update the existing Canal Station solid waste management program, which includes the recycling of office waste, plastic, scrap metal, and other recyclable materials, to encompass waste reduction, composting, and on-site end-use of materials, and that it would expand its recycling plan to include potential waste streams from construction and start-up of the proposed facility (Exh. SEC-1, at 3.6-9 to 3.6-10). Mirant Canal II noted that its former parent company, the Southern Company, is an EPA WasteWi$e[42] partner,

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41 The Company estimated that 565 cubic meters of spent catalyst from the NO_X control system and 128 cubic meters of spent catalyst from the CO system would require disposal once every three years (Exh. EFSB-RR-17).

42 WasteWi$e is a voluntary EPA-sponsored program aimed at reducing municipal solid (continued...)

with programs in place to recycle coal ash, prevent pollution, recycle office waste, and purchase recycled materials (Exh. EFSB-RR-14; Tr. 2, at 115-116). The Company stated that it would implement as appropriate recycling and waste reduction strategies used at other Mirant Corporation facilities (Exh. SEC-1, at 3.6-9 to 3.6-10).

The Company provided a copy of the Massachusetts Solid Waste Master Plan 1997 Update, which sets a state-wide goal of recycling 46% of municipal solid waste, including residential and commercial waste (Exh. EFSB-RR-14; Tr. 2, at 115-116). The Company stated that it is committed to following the Commonwealth's recycling guidelines for commercial facilities, and that it would work to achieve or exceed the current overall recycling rate for commercial facilities at Canal Station (Tr. 2, at 115 to 116). The Company stated that it is not currently engaged in recycling program partnerships with Sandwich, and that it is not aware of any local recycling program run by Sandwich (Tr. 2, at 218).

The Company stated that Canal Station currently is a Small Quantity Generator of federally-regulated hazardous wastes, and a Large Quantity Generator of state-regulated waste (Exh. SEC-1, at 3.6-6; Tr. 2, at 115). The Company stated that hazardous wastes would be separated from normal wastes and stored in properly labeled containers in a segregated storage area (Exh. EFSB-HZ-11). The Company noted that federally-regulated wastes currently are stored in a building to the east of Unit 2; as part of the proposed project, storage for all hazardous wastes would be consolidated inside the Unit 2 building (Exhs. EFSB-HZ-8; SEC-1, at 3.6-7 to 3.6-8; Tr. 2, at 135). The Company stated that it attempts to recycle both state- and federally-regulated wastes whenever possible (Exh. SEC-1, at 3.6-7).

2. Analysis

The record demonstrates that, where possible and cost-effective, solid waste from construction and operation of the proposed facility would be recycled, reclaimed or reused. The record also shows that the Company or its licensed contractor(s) would dispose of all remaining

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[42] (...continued)
waste by working with partners to set recycling goals and report on waste reduction strategies (Exh. EFSB-RR-14; Tr. 2, at 115-116).

solid waste from construction and operation of the proposed facility at appropriate disposal sites in a manner consistent with applicable governmental regulations.

Mirant Canal II has indicated that it would attempt to follow the Commonwealth's recycling guidelines for commercial facilities, and would work to reduce construction and demolition debris during construction. The Siting Board encourages Mirant Canal II to work with Sandwich to develop a program with the goal of attaining a 46% recycling rate for operational wastes (the target recycling rate for 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 directs Mirant Canal II, prior to the commencement of operation, to file a copy of its 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 record shows that hazardous wastes would be segregated from normal wastes and disposed of appropriately. In addition, the record indicates that the switch from oil to natural gas firing for Canal Unit 2 will significantly reduce flyash and other solid wastes resulting from combustion. The record further demonstrates that the Company's existing plans for handling, storage, and disposal of solid wastes at Canal Station can be modified to accommodate the proposed project.

The Siting Board finds that, with the implementation of the above condition, the solid waste impacts of the proposed facility would be minimized.

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 submitted an evaluation of the potential visual impacts of: (1) the proposed facility and related structures, (2) exterior lighting, and (3) the facility plume. The Company stated that the principal new structures associated with the proposed facility include a

new turbine building, 503 feet long, 115 feet wide and 96 feet tall, which would enclose four new combustion turbines, and a 230-foot penthouse-like stack with four flues ("stack structure") (Exh. SEC-1, at 1-9). Four new HRSGs would be located in a "courtyard" bounded by a proposed compressor building to the north, the new turbine building to the east, a wall extending from the new turbine building to the south, and the existing Unit 2 building to the west (id. at 1-9, Fig. 1-2). The Company stated that it designed the new buildings to be harmonious with the existing site and noted that at 230 feet, the new stack structure would be only 20 feet above the roof line of the current Unit 2 power block building, and less than half the height of the existing 498 foot stack (id. at 3.9-1).[43] The Company indicated that the proposed facility layout was oriented to minimize views of the new structures from the Sagamore Bridge, and that the forested areas spread throughout Sandwich generally limit views of Canal Station from other areas (id. at 3.9-1 to 3.9-2).

The Company stated that the northwest portion of Sandwich is an area of mixed visual character, with the existing Canal Station Units 1 and 2 as a major visual element (id. at 3.9-1). The Company noted that the Cape Cod Canal, Sandwich Marina and Scusset Beach establish a recreational character, while single family homes and historic landmarks are interspersed with recreation-oriented commercial and retail establishments along Route 6A (id.). Nearby recreational facilities include the marina, a state forest, and bike trails on both sides of the canal (id.). The Company noted that, while the north side of Canal Station is in full view from the bike trail on the far side of the canal, the view from the Canal Walk is blocked to a large extent by a berm supporting a fence and vegetation (id.).

In order to assess the visual impacts of the proposed facility, the Company conducted a comprehensive viewshed analysis of the area (id. at 3.9-1 to 3.9-40). In consultation with Town

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[43] The Company argued that its use of once-through cooling also helped minimize visual impacts (Exhs. EFSB-W-47; EFSB-W-100). The Company noted that the use of either closed-loop or dry cooling would require the construction of large, highly visible cooling structures that would enlarge the facility footprint (Exhs. EFSB-W-43; EFSB-W-47; EFSB-W-99; EFSB-W-100). The Company also stated that water evaporation from the two cooling towers required for a closed-loop cooling system would result in visible plumes on cold days (Exh. SEC-1, at 1-16).

officials, Cape Cod Commission members, and local residents, the Company identified 14 locations that potentially could have views of the proposed facility (id. at 3.9-3, Fig. 3.9-2A-15b; Tr. 3, at 289).[44] The Company indicated that it selected these locations based on an evaluation of the site using topographic maps and other mapping techniques, site visits, and the experience of its landscape architect (Exh. EFSB-V-1). Photographs looking toward the Canal Station site were taken from each identified location; where foliate conditions were a factor, photographs were either taken or simulated in both leaf-on and leaf-off conditions (Exh. SEC-1, at 3.9, Fig. 3.9-8d, 3.9-8f). The Company then developed a computer-generated perspective of the proposed facility as it would appear from each location and superimposed the perspective on the associated photograph to present a visual depiction of the proposed facility and stack (id. at 3.9-3). The Company later analyzed three additional viewsheds at the request of Siting Board staff (Exh. EFSB-V-2).[45]

The Company's visual analysis indicated that much of the new stack structure and the new turbine building would be visible from the Sandwich Marina, located just to the east of the proposed facility (Exh. SEC-1, at 3.9-4; Company Brief at 74). The Company's analysis also suggested that much of the stack structure and a portion of the new turbine building would be visible from the Merchants Square shopping plaza, located directly south of Canal Station off Tupper Road; however, the Company asserted that the Cape Cod Commission has recently permitted the expansion of a neighboring Stop and Shop, which should reduce the visual impact of the project from that location (Exh. SEC-1, at 3.9-4; Figs. 3.9-13b and 13c; Tr. 3, at 284-285). Portions of the stack structure and the new turbine building also would be visible against the

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44 The receptor locations were: Scussett Beach; the Sandwich Marina; the Sandwich boardwalk; the Marshland Restaurant; Spring Hill Beach; the intersection of Jarves Street and Route 6A; the parking lot of Daniel Webster Inn; Route 130 before the Route 6 Overpass; the Canal Walk; the Sagamore Bridge; the Bourne/Sandwich town line; the Merchant's Square shopping plaza; Oyster Hill (residential); and High View (residential) (Exh. SEC-1, at Fig. 3.9-1).

45 The Siting Board requested additional viewshed analyses from Phillips Road (located across the canal, to the north of the Scusset Beach area), Dillingham Road in the "Town Neck" area of Sandwich, and the Sandwich Motor Lodge parking area (Exh. EFSB-V-2).

backdrop of the existing Canal Station buildings from Scusset Beach, located approximately 2000 feet from Canal Station on the opposite side of the Cape Cod Canal, and, distantly, from the adjoining Phillips Road neighborhood (Exhs. SEC-1, Figs. 3.9-2A and 3.9-2b; EFSB-V-2).

The Company's visual analysis indicated more limited visual impacts from other locations. From one location, the Daniel Webster Inn, there would be no view of the new facility structures (Exh. SEC-1, at 3.9-4). The Sagamore Bridge would provide a distant view of the top of the stack structure above existing Canal Station buildings, with the new turbine building visible against the existing buildings (id. at Fig. 3.9-11A, B). From the High View neighborhood, the top of the stack structure would be visible above existing Canal Station buildings, and the top of the new turbine building would be visible above trees (id. at Fig. 3.9-15A, B). Finally, from eight other mid-range to distant locations,[46] views of the new facility would be limited to the top of the stack structure above either trees or existing Canal Station structures (Exhs. SEC-1, at Figs. 3.9-4, 3.9-5, 3.9-6, 3.9-7, 3.9-11, 3.9-13; EFSB-V-2).

The Company stated that it would minimize the visual impacts of the facility by minimizing building and stack heights, by maintaining the existing mature tree cover along the site boundary, and by implementing a landscaping plan (Exh. SEC-1, at 3.9-38). The Company stated that it would select colors for buildings and other facility structures that blend with the background, and that a final color scheme would be chosen in cooperation with the local community through its workshop and community input efforts (id. at 3.9-38; Tr. 3, at 304).

The Company also initially proposed on-site landscaping to reduce near-field impacts along the Canal Walk, at the Sandwich Marina, and along Freezer Road (Exhs. SEC-1, at 3.9-4; EFSB-G-5-C at 4.4-75). Specifically, the Company proposed to install a vegetative buffer along the Canal Walk and on the eastern side of the site adjacent to the public access to the Canal Walk and the marina (Exh. EFSB-G-5-C at 4.4-75). The Company stated that existing stone areas would be replanted with indigenous meadow grasses, and that a combination of moderately sized conifers, native deciduous trees and shrubs, and herbaceous plants would be planted along the

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46 These include: the Sandwich boardwalk; the Marshland Restaurant; Spring Hill Beach; the intersection of Jarves Street and 6A; Route 130; the Bourne/Sandwich town line; the Oyster Hill neighborhood; and Dillingham Road (Exhs. SEC-1, at sec. 3.9-4; EFSB-V-2).

Canal Station fence line (id. at 4.4-75, Figs. 4.4-16, 4.4-17). The Company asserted that this mixed planting would help screen the near views of the proposed facility and would divert attention away from the large structures towards the low to mid-level environment (id. at 4.4-75).

On March 24 and 25, 2000, the Company hosted a Community Character Workshop to help establish community priorities for addressing "Historic Preservation/Community Character" as defined in the Cape Cod Commission's Regional Policy Plan (Exh. EFSB-RR-23-S at 1). The workshop was attended by 28 invitees, including town officials, abutters, members of the Cape Cod Commission and other local committees, elected officials, merchants, and state and federal officials (id. at 2). Participants first developed a list of approximately 50 projects that could enhance Canal Station and nearby areas, including the Sandwich Marina; these projects ranged from short-term visual improvements, such as painting and landscaping at Canal Station, to long-term recreational, transportation, and infrastructure improvements (id. at 2-3, Fig. 1). Subsequently, the participants prioritized these projects, in groups and individually (id. at 3). Participants expressed support for a variety of landscaping options (including gateway enhancements and Canal Walk plantings); for painting the facility to blend with its surroundings; for expanding sidewalks and bikeways in the area; for burying overhead wires in the Town's historic district; and for building a desalinization plant to meet the area's water needs (id. at 22, Fig. 4B). The Company stated that it would attempt to focus its visual impact mitigation on priorities identified by the workshop members, and that while it likely would paint the facility, it might substitute improvements to bike and pedestrian access for some of the initially-proposed site edge landscaping (Tr. 3, at 311-312, 349).

The Company stated that, while the existing facility is illuminated, additional exterior lighting would be required for the new access road and the pedestrian entrance to the new turbine building (Exh. SEC-1, at 3.9-39). The Company proposed to use a lighting system which would direct light downward (id.). The Company noted that the new stack structure would not be tall enough to require aviation lights (id.).

With respect to visible emissions, the Company stated that vapor plumes from combustion turbine exhaust are typically wispy and translucent in nature and do not extend for great distances downwind (id.). The Company argued that the repowered Unit 2 would burn

natural gas and low sulfur distillate fuel for backup, fuels which minimize any plume opacity (Tr. 3, at 320). The Company asserted that visible plumes would occur only in cold weather, and that for over 95% of the time that plumes are visible, they would be less than 200 meters long (Exh. SEC-1, at 3.9-39; Tr. 3, at 317 to 322).

2. Analysis

The Company has proposed to repower Unit 2 at its existing Canal Station, resulting in the construction of a new turbine building 503 feet long, 115 feet wide and 96 feet tall, and a new 230-foot stack structure containing four flues. The record indicates that the Company's proposed facility design incorporates building sight lines, structure height, construction materials, and lighting which would serve to minimize its visual impacts. Specifically, the proposed facility was sited to optimize the buffering effect of existing on-site buildings, and the new stack would be only 20 feet taller than the existing Unit 2 power block building and would be enclosed in a penthouse structure. The Company intends to work with Sandwich and the local community to choose colors for the exterior of the proposed structures.

The record demonstrates that the Company analyzed the potential visual impacts of the proposed facility at 17 receptor locations in the surrounding area by superimposing computer-generated views of the new structures on photographs showing the current view from each location. Where appropriate, visual impacts in leaf-off conditions also were analyzed. The Company's analysis indicates that, from most mid-range to distant viewpoints, views of the proposed facility would be limited to the top of the stack structure. From two distant locations -- the Sagamore Bridge and the High Point neighborhood -- portions of the new facility structures would be viewed against the backdrop of larger existing Canal Station structures, but would not expand the length of visible building mass. Visible exhaust plumes from the new stack would be present mostly during colder months and would appear wispy and translucent.

However, the record also demonstrates that the proposed project would result in the addition of significant new building mass east of the existing Canal Station equipment. The viewshed analysis for the Sandwich Marina demonstrates that this additional building mass would result in significant new visual impacts for open areas in close proximity to the eastern

portion of the Canal Station site, including the Sandwich Marina, Freezer Road, and the segment of the Canal Walk which borders the eastern end of the site.

The record indicates that the Company has been pursuing the input of the community in determining strategies for minimizing and mitigating the visual impacts of both the existing and new facilities at Canal Station. Specifically, the Company hosted a Community Character Workshop to help establish community priorities for mitigation. Following the workshop, the Company suggested that it would put most of its resources for visual impact mitigation into painting the facility, and that it might spend money originally intended for on-site landscaping on other priorities of the workshop members. While the Siting Board believes that the Company should be responsive to community concerns, we note that the impacts of the proposed project on the Sandwich Marina, and on the segment of the Canal Walk that directly abuts the new facility structures, would be significant enough to require some level of mitigation regardless of any other commitments which the Company intends to make to the community. The Siting Board therefore directs the Company, in conjunction with appropriate local and regional authorities, to develop and implement a landscaping plan for the eastern boundary of the Canal Station site, and for the northern boundary in the vicinity of the proposed new structures, to reduce the visual impacts of the project at the Sandwich Marina and Freezer Road and along the Canal Walk.

In addition, as reflected in the viewshed analyses for Scusset Beach and Merchant Square, construction of the proposed project could significantly enlarge the visible mass of Canal Station from areas with open mid-range views of the eastern end of Canal Station. In two recent reviews involving urban sites already occupied by electric generation or transmission facilities, the Siting Board has required off-site tree planting in neighboring residential areas where the added mass of the new facility structures was of special concern. Sithe Edgar Decision, 10 DOMSB at 82-83; Sithe Mystic Decision, 9 DOMSB at 159. Consistent with this precedent, 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 new turbine building or compressor building at affected residential properties, roadways and other locations within one-half mile to the east of the proposed facility, or within one-half mile to the southeast or south of the proposed facility east of the

Commonwealth Electric substation, 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 owners, 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 30 days prior to the commencement of structural work on either the new turbine building or compressor building, whichever occurs first; (3) may limit requests for mitigation measures from local property owners and municipal officials to a specified period ending no less than twelve 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.

The Siting Board finds that, with the implementation of the above conditions, the visual impacts of the proposed facility 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, with the use of its proposed noise mitigation, the proposed project would leave noise levels near Canal Station essentially unchanged (Exh. SEC-1, at 3.10-21). The Company stated that noise mitigation for the proposed project would meet all statutory

and regulatory noise guidelines[47] (id. at 3.10-1 to 3.10-21; Exhs. EFSB-G-5-C at 4.3-1 to 4.3-8; EFSB-A-2, Bulk Att. at 7-1 to 7-32).

The Company stated that the repowered Unit 2 would operate essentially continuously and produce steady noise levels (Exh. SEC-1, at 3.10-18). The Company noted that the existing Canal Units 1 and 2 have been in operation for over 20 years and contribute to noise levels of about 50 decibels (A-weighted) ("dBA") in the community near the plant (id. at 3.10-21). The Company stated that no noise-related complaints have been filed with Sandwich or the MDEP against Canal Station within the last three years (Exh. EFSB-N-14).

The Company stated that it employed an industry-standard noise modeling methodology[48], previously accepted by the Siting Board, to model the potential noise impacts from the proposed facility (Exhs. SEC-1, at 3.210-1 to 21; EFSB-G-5-C at 4.3-1 to 8; EFSB-A-2, Bulk Att. at 7-31 to 7-32). The Company stated that its modeling was based on information from equipment vendors, in-house information and standard climatic conditions and attenuation assumptions, but excluded any allowance for absorption of noise by vegetation or ground cover (Exh. SEC-1, at 3.10-18).

To determine existing background noise levels, the Company monitored daytime and nighttime noise levels at seven noise monitoring locations ("NMLs") near the proposed facility[49]

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[47] The Company indicated that noise is regulated in Massachusetts under 310 CMR 7.10, which prohibits increases in broadband sound levels of 10 dBA or higher and "pure tone" conditions at new sources. A pure tone is defined as a sound pressure level in any given octave band which exceeds the levels in adjacent bands by 3 decibels or more (Exh. SEC-1, at 3.10-3 to 3.10-4).

[48] The Company stated that its noise model has been used in performing noise assessments for over 25 electrical generating station projects similar to the proposed facility (Exh. EFSB-N-6).

[49] These locations were Freezer Road, Briarwood Road, the Canal Station fenceline nearest to the Town Marina, Tupper Road, the parking lot across the Cape Cod Canal from Canal Station, Dexter Avenue, and the Canal Walk at a point 400 feet from the Canal Station fenceline (Exh. SEC-1, at 3.10-7). The Company stated that an additional location at the Town Marina, further away from the Canal Station fenceline location included in the monitoring program, was added for purposes of modelling noise impacts at the Marina

(continued...)

(id. at 3.10-5 to 3.10-16) (see Table 4). The Company stated that it used continuous noise monitoring at four of these NMLs and short-term monitoring at the remaining NMLs (id.). Based on its noise monitoring data, the Company modeled ambient L_{90} noise levels[50] at the seven NMLs at levels ranging from 43 to 51 dBA (id. at 7-30 (Table 7-7)) (see Table 4)[51].

The Company noted that its noise monitoring data reflected noise currently generated by Canal Units 1 and 2 (Exh. SEC-1, at 3.10-7). The Company also modeled the hypothetical ambient levels which would exist if Units 1 and 2 were not present ("greenfields ambient level") (Exh. EFSB-A-2-S-A at 7-30, (Table 7-7)). The Company stated that this greenfields ambient level was calculated to represent average nighttime noise levels excluding noise from Units 1 and 2, but including the noise generated by the two electric substations located adjacent to Canal Station[52] (Exh. SEC-1, at 3.10-16). The modeled greenfields ambient levels ranged from 39 to 40 dBA at the seven NMLs (Exh. EFSB-A-2-S-A, at 7-30, (Table 7-7)) (see Table 4).

The Company noted that, following the repowering of Unit 2, total noise levels (including noise from Unit 1 and Unit 2) would be lower than current ambient noise levels (including noise from existing Units 1 and 2) (id. at 7-30, (Table 7-7); Exh. EFSB-N-2). The Company stated that

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(...continued)

(Exh. EFSB-A-2-S-A at 7-28). The Company also stated that it did not model noise impacts at the Canal Walk monitoring location because (1) this point was not close to the project site; (2) it was shielded from facility noise by on-site structures; and (3) there were no residences in the vicinity (Tr. 7, at 872).

50 The Company stated that L_{90} measurements refer to the sound level that is exceeded 90 percent of the time during the measurement period (Exh. SEC-1, at 3.10-5).

51 Existing ambient L_{90} levels measured in September 1998 at the seven NMLs ranged from 42 to 50 dBA (Exh. EFSB-A-2-S-A at 7-20 (Table 7-4)). However, the Company's most recent noise analyses are based, not on the measured ambient noise levels, but on modeled ambient noise levels. Because these modeled ambient noise levels are similar to the measured ambient noise levels, the Siting Board accepts the modeled noise levels as a basis for analyzing noise impacts in this case and reports them in Table 4, below.

52 The Company stated that, after consultation with MDEP, it determined that noise from the electric transformers at the Comonwealth Electric substation should be included in the greenfields ambient calculations because a transmission substation would be needed at this location even if Canal Station did not exist (Exh. EFSB-RR-52; Tr. 7, at 851 to 855).

anticipated nighttime L_{90} sound following the repowering of Unit 2 would be 3 to 8 dBA over the modeled greenfields ambient levels (Exh. EFSB-N-2; Tr. 7, at 858-861).

TABLE 4
Comparison of modeled nighttime L_{90} in the vicinity of Canal Station in the absence of a facility, with the current facility, and with the repowered facility (in dBA)

Location	Greenfields ambient (excluding existing Units 1 and 2)	Current ambient (including existing Units 1 & 2)	Projected Ambient (including Unit 1 & repowered Unit 2)
Freezer Rd.	40	49	48
Briarwood Rd.	40	51	48
Marina	40	48	47
Tupper Rd.	39	44	43
Parking lot across the Canal	40	45	44
Dexter Ave.	39	43	42

(Exhs. EFSB-N-2; EFSB-A-2-S-A at 7-30, (Table 7-7)).

The Company also provided estimates of day-night noise levels (L_{dn})[53] under existing conditions, under greenfields conditions and following repowering (see Table 5). The Company's data indicated that, following the repowering of Unit 2, L_{dn} levels would remain the same or decrease slightly from current conditions at all NMLs (Exh. EFSB-N-4). The data also indicated that, following the repowering of Unit 2, L_{dn} levels would be 1 to 4 dBA higher than greenfields ambient levels (id.).

[53] L_{dn} refers to a measurement of the day-night average sound level, with a 10 dBA penalty added to sounds occurring between 10:00 p.m. and 7:00 a.m. (Exh. EFSB-A-2 Bulk Att., App. G at 13). The Company provided a 1974 EPA document titled "Information On Levels Of Environmental Noise Requisite To Protect Public Health And Welfare With An Adequate Margin Of Safety" ("Levels Document"), which states that L_{dn} levels of up to 55 dBA are protective of human health and welfare with an adequate margin for safety (Exh. EFSB-A-2 Bulk Att., App. G at 17 to 24).

TABLE 5
Comparison of L_{dn} noise levels in the vicinity of Canal Station in the absence of a facility, with the current facility, and with the repowered facility (in dBA)

Location	Greenfields ambient (excluding existing Units 1 and 2)	Current ambient (including existing Units 1 & 2)	Projected Ambient (including Unit 1 & repowered Unit 2)
Freezer Rd.	53	57	57
Briarwood Rd.	53	58	57
Marina	53	56	56
Tupper Rd.	52	53	53
Parking lot across the Canal	53	54	54
Dexter Ave.	52	53	53

(Exh. EFSB-N-4)

The Company provided noise sampling data which indicated that a pure tone condition in the 63 Hertz ("Hz") range was measured at three NMLs (Exh. SEC-1, at 3.10-13; Tr. 7, at 882 to 884). The Company testified that this tone was not audible to the field team dispatched to perform noise sampling; notes from the field team indicate several potential sources of the apparent tonal quality[54] (Exhs. EFSB-N-5; EFSB-N-13; Tr. 7, at 883). The Company stated that the proposed project has been designed to prevent any tonal quality to its noise emissions (Exh. EFSB-N-13; Tr. 7, at 882).

The Company also modeled the noise impacts which could result from additional electrical transmission lines. This modeling indicated that, under worst-case scenarios, the transmission lines would create a 1 dBA increase in noise levels at Freezer Road and the Sandwich Marina (Exh. EFSB-RR-56).

The Company stated that the repowering of Unit 2 would eliminate a number of existing noise sources at the Canal Station site (Exh. EFSB-G-5-C at 1-7 to 1-8). In addition, the Company proposed to incorporate extensive noise mitigation measures into the design of the proposed facility, including the use of specially designed acoustic buildings for the turbines and

[54] The Company stated that, in addition to Canal Station, significant noise sources in the area included vehicular traffic, boat traffic in the Cape Cod Canal, aircraft overflights, and insects (Exh. SEC-1, at 3.10-7).

auxiliary equipment, the gas compression system, and the water circulation pump system (id.). The Company also stated that it would employ mufflers and casing treatment on equipment, (including turbine inlet and exhaust systems, building and equipment ventilation systems, and steam relief and vent valves) that would produce noise during start-up and shut-down of the facility (id.). In addition, the Company proposed to use low noise transformers, barriers to noise at specific locations, and acoustic lagging and vibration isolation of steam piping (Exhs. EFSB-N-2; SEC-1, at 3.10-20; EFSB-G-5-C at 4.3-8; EFSB-A-2, Bulk Att. at 7-31). The Company stated that the total cost of its proposed noise mitigation ("Case A") would be $10.6 million (Exh. EFSB-A-2-S-A at 7-31).

The Company presented three options for additional noise mitigation, Cases B, C, and D. Case B would reduce the noise impacts of the Canal Station (calculated as the increase in L_{90} noise levels over the greenfields noise levels) at Briarwood Road, the receptor location closest to the proposed project, from 8 dBA to 6 dBA above the modeled greenfields level at an incremental cost of $12.5 million (Exh. EFSB-A-2-S-A at 7-31). Case C would reduce the post-repowering noise impact of the Canal Station at Briarwood Road from 8 dBA to 3 dBA above the modeled greenfields level at an incremental cost of $13.7 million (id.). Case D would reduce the post-repowering noise impact of the Canal Station at Briarwood Road from 8 dBA to 0 dBA above the modeled greenfields level at an incremental cost of $41.2 million (id.). The Company stated that these incremental costs represent the net present value of the capital cost of additional control measures,[55] but do not include added fuel cost from losses in thermal efficiency, and the value of lost plant capacity (Exh. EFSB-N-11). The Company asserted that these additional costs would render the proposed project non-competitive in the deregulated New England electric generation market (Exhs. EFSB-A-2, Bulk Att., at 7-31; EFSB-N-11).

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[55] Additional noise mitigation measures could include: turbine and HRSG building walls; additional levels of muffler equipment, roof and ventilation fans; vent silencers; gas turbine stack baffles or silencers; gas turbine air intake filter and silencers; cooling tower noise barriers on intake and exhaust; building enclosures, and step-up transformer noise barriers (Exhs. EFSB-N-11; EFSB-A-2-S-A at 7-29 to 7-31). More extensive measures would be required for Unit 1 equipment as well as new equipment in order to reach higher levels of noise reduction (Exh. EFSB-A-2-S-A at 7-29 to 7-31).

The Company stated that it expects that construction-related noise impacts would be limited by the developed nature of the site, which eliminates the need for extensive clearing or grading in the early stages of project construction (Exh. EFSB-RR-54; Tr. 7, at 894-895). The Company stated that construction would last for 24 months, and that noise produced during construction would be intermittent and limited in duration (Exh. SEC-1, at 3.10-17; Tr. 7, at 894-897). The Company stated that project construction hours would generally be from 6:00 a.m. to 4:00 p.m., Monday through Friday, although some work would occur at night and on Saturdays (Exhs. EFSB-T-4; EFSB-T-17). The Company stated that nighttime construction work would be limited to quieter activities such as welding, interior work and equipment installation (Exh. EFSB-RR-55).

The Company stated that construction noise impacts would vary at different stages of construction, but would be most intense during the first seven months of work (Exh. EFSB-RR-54). The Company stated that the noise generated by typical construction equipment, including trucks, cranes, bulldozers, backhoes, loaders, generators, welders, and other equipment, ranges between 35 and 47 dBA, on average, at 800 feet (Exhs. SEC-1, at 3.10-18; EFSB-N-7). The Company indicated that pile-driving, which can produce noise levels of 75 to 101 dBA at 100 feet, would take place during the early stages of construction (Exh. EFSB-N-8). The Company stated that pile driving would be limited to extended weekday daytime hours, which the Company stated would be 10 hours per day, and would last for 6 to 9 weeks (Exh. EFSB-N-8).

The Company stated that steam blows, which can produce noise levels of up to 140 dBA at 100 feet, would be limited to daytime hours, and that the Company would employ a muffler to attenuate steam blows by at least 40 dBA (Exhs. EFSB-N-10; EFSB-N-16; EFSB-N-17; EFSB-RR-53). The Company indicated that it would notify local police and fire departments prior to any steam blows (Exh. EFSB-RR-53).

The Company stated that construction-related noise impacts would be governed by Sandwich's Zoning By-Law, which restricts the hours during which noise audible at 400 feet from the property line may occur (Exh. EFSB-RR-1). The Company stated that a Company representative would be assigned to monitor and be directly responsible for the oversight of noise mitigation efforts by the construction contractor (Exh. EFSB-RR-55). The Company indicated

that the contractor would be responsible for providing and ensuring the effectiveness of mufflers on construction equipment and for compliance with EPA construction noise regulations (Exhs. SEC-1, at 3.10-17; EFSB-RR-55).

2. 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 at 322; Brockton Power Decision, 10 DOMSB at 217; Altresco Pittsfield, Inc., 17 DOMSC 351, at 401 (1988) ("Altresco Decision"). 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 Decision, 9 DOMSB at 311; Sithe Mystic Decision, 9 DOMSB at 164; Northeast Energy Associates, 16 DOMSC 335, at 402-403 (1987) ("NEA Decision").

The record demonstrates that the current measured nighttime L_{90} noise levels at the residential NMLs with Canal Station in operation range from to 42 dBA to 50 dBA, while modeled nighttime L_{90} noise levels at these NMLs range from 43 dBA to 51 dBA. Current L_{dn} noise levels at residential NMLs range from 53 dBA to 58 dBA, levels that approach or are slightly above the 55 dBA guideline identified by EPA as requisite to protect public health and welfare with an adequate margin of safety. Thus, there is reason for the Company to use all cost-effective noise mitigation to limit noise increases at residential receptors closest to the Canal Station site.

Here, the Company has committed to installing noise mitigation that would reduce modeled L_{90} noise levels by 1 to 3 dBA at all NMLs. These anticipated levels represent a maximum increase of 8 dBA above modeled greenfield ambient levels. The Company also provided three options for further noise mitigation which would significantly reduce noise from current levels. The record reflects that these options, Cases B, C, and D, would further reduce existing noise levels by 2 to 8 dBA, resulting in maximum increases above modeled greenfields

levels of 6 dBA, 3 dBA, and 0 dBA, at an additional cost of $12.5 million, $13.7 million, and $41.2 million, respectively.

The Siting Board notes that in two recent decisions concerning projects proposed for brownfield sites in areas with comparable or louder background noise levels, it approved expansion proposals which were expected to result in maximum residential receptor noise increases of up to 2 dBA above measured ambient levels at residential receptors. Sithe Mystic Decision, 9 DOMSB at 160-166; Southern Kendall Decision, 11 DOMSB at 337-345. Here, it is significant that while Mirant Canal II likewise proposes to increase generating capacity at a brownfield site, it would reduce noise levels at all residential receptors as part of replacing existing Unit 2 with higher capacity equipment.

In addition, the record demonstrates that, even if evaluated against the modeled greenfield noise levels, the maximum residential noise impact of the post-repowering Canal Station would be an increase of 8 dBA, which falls within the range of noise increases that have been accepted by the Siting Board for projects at greenfield sites.[56] The Siting Board notes that a "greenfields" analysis of noise at a brownfields site such as Canal Station cannot be directly compared with its prior analyses of noise at actual greenfields sites, both because the "greenfields" baseline is modeled rather than measured, and because it represents conditions that have not obtained in the area for several decades. Community perception of a new source of noise, resulting in an increase of 8 dBA over actual existing ambient noise levels, is likely to be very different from community perception of a longstanding existing source of noise which, although clearly detectable, has been present for some time and would be slightly reduced. Nonetheless, in this

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[56] 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. In cases where measured background and calculated facility noise levels at the most affected residential receptors were neither unusually noisy, (e.g., noise levels substantial exceeding 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.

case the greenfields analysis provides evidence that the overall noise impact of Canal Station on nearby residences is acceptable, and that the Company's proposed level of mitigation is therefore appropriate.[57]

The Siting Board therefore concludes that the options for additional noise mitigation, Cases B, C, and D, would not provide cost-effective mitigation of noise impacts. The Siting Board finds that with the implementation of the Company's proposed level of noise mitigation, the operational noise impacts of the proposed facility would be minimized.

With respect to construction noise impacts, the Siting Board agrees that adherence to the construction site practices proposed by the Company would help minimize construction-related noise impacts. The Siting Board notes that such practices are consistent with approaches to construction noise mitigation that it has reviewed in recent generating facility cases.

The Company has stated that, although construction generally would occur between 6:00 a.m. and 4:00 p.m., some construction activities may take place in the evenings and on Saturdays. The Company has agreed to limit evening work to relatively quiet activities, and to limit steam blows and pile driving to "extended daytime hours". However, the record is not clear as to the types of activities which the Company considers suitable on weekends, or as to the precise definition of "extended daytime hours". The Siting Board recognizes that extended construction hours may be necessary at times, either due to the nature of the tasks to be completed (e.g., concrete pouring) or to minimize the period during which Unit 2 is off-line and unable to provide electricity to the Commonwealth. However, such work must be carefully planned so as to minimize the noise impacts at neighboring residences.

The Siting Board therefore directs Mirant Canal II to consult with local authorities prior to undertaking pile driving, steam blows, or other noisy construction activity outside the hours of 6:00 a.m. to 4:00 p.m., Monday to Friday, and to provide advance notice of such activities to any neighborhood representatives that request such notice. The Company shall provide the Siting

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[57] The Siting Board notes that, in cases where background noise levels are relatively high, and a "greenfields" analysis indicates that existing facilities owned and operated by a proponent are a primary contributor to those high background levels, the Siting Board would expect the proponent to aggressively pursue measures to reduce overall noise impacts from its existing and proposed facilities.

Board with a copy of its protocol for consultation and advance notification regarding construction outside of normal hours prior to commencement of construction. The Siting Board also anticipates that the Company will abide by local noise ordinances governing construction activities. The Siting Board finds that, with the implementation of this condition, the construction noise impacts of the proposed facility would be minimized.

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

H. Safety

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

1. Construction and Access

The Company indicated that it would take appropriate security measures to prevent unauthorized access to the site during construction and operation of the proposed facility (Exh. EFSB-HS-11). The Company noted that the Canal Station site is surrounded by a security fence and is monitored at all times (Exhs. EFSB-T-16; EFSB-G-5-C at 5-12). During construction, safety would be ensured by requiring contractors to comply with all applicable federal, state and local regulations; by including safety-related performance criteria in contracts; by requiring contractors to have an emergency response plan in place for any construction activities that may result in a spill or release of any hazardous materials or wastes; and by managing and containing chemicals in an appropriate manner (Exh. SEC-1, at 3.7-8; Tr. 5, at 633 to 640, 657 to 659). The Company and its engineering, procurement, and construction ("EPC") contractor would consult with Sandwich to ensure that construction equipment and deliveries are safely directed to and from the site during construction (Exhs. EFSB-T-2; EFSB-T-14; EFSB-T-17). The Company indicated that construction and plant equipment too large or too heavy to transport across the Cape Cod Canal bridges or by rail would be brought in by barge, under the supervision of the Army Corps (Exh. EFSB-HS-13).

The Company stated that safe navigation within the Cape Cod Canal would not be affected by activities related to the normal operation of the proposed facility (Exhs. EFSB-HS-6; EFSB-HS-10). The Company indicated that it would take measures to ensure that, with temporary exceptions, the Canal Walk and the canal itself would remain accessible for existing uses during construction and operation of the proposed facility (Exhs. EFSB-HS-14; EFSB-RR-37; Tr. 5, at 651 to 654).

2. Materials Handling and Storage

The Company stated that it currently stores approximately 50,000,000 gallons of No. 6 fuel oil at Canal Station in six aboveground storage tanks ("ASTs") and two smaller "day tanks" (Exh. SEC-1, at 3.7-8). As part of the proposed project, one of the large ASTs and one of the day tanks will be modified to store No. 2 fuel oil (id. at 3.6-6; Exh. EFSB-HZ-5). The Company stated that the proposed changes in status of the two storage tanks would require approval by local and state authorities (Exh. SEC-1, at 3.6-5).

The Company stated that it would use a urea-based AOD system to generate the ammonia used as a catalyst for the proposed SCR NO_X controls for Unit 2 (id. at 1-9, 3.6-4). The Company stated that urea is a stable, non-volatile, environmentally benign material commonly employed as a fertilizer (id. at 3.6-4). Urea pellets would be stored onsite in silos located adjacent to the Unit 1 and 2 buildings (id. at 1-9). The Company stated that the urea pellets would be combined with a catalyst and with steam, producing the ammonia required for the SCR process (id. at 3.5-4, 3.6-4). The Company stated that the urea is immediately converted into ammonia and would be completely consumed in the SCR process, leaving no waste (Exh. EFSB-HZ-4; Tr. 5, at 640 to 643). The Company asserted that the use of AOD would eliminate the need for the transportation, handling, and storage of aqueous ammonia (Exh. SEC-1, at 3.5-4, 3.6-4).

The Company stated that chemicals used for water treatment, HRSG, and cooling processes would be stored on site in accordance with applicable regulations (id. at 3.7-7, Table 3.6-1 and 3.6-2; Exh. EFSB-RR-17; Tr. 2, at 154 to 161). The Company noted that most of these chemicals are currently used and stored on site (Exh. EFSB-RR-17; Tr. 2, at 154 to 161).

3. Deliveries of Oil

The Company stated that fuel oil for the proposed facility would be delivered by ocean-going tank barges to an existing on-site berthing and fuel-unloading facility (Exhs. EFSB-G-5-C at 5-11; SEC-1, at 3.7-8; Tr. 1, at 40 to 42). The Company indicated that the fuel unloading area would be upgraded to accommodate low sulfur distillate No. 2 fuel oil (Exh. EFSB-G-5-C at 5-11). The Company indicated that Canal Station is currently accessible to barge traffic via a well-dredged navigational route (Exhs. SEC-1, at 1-19, 2-8; EFSB-G-5-C at 4.7-4). The Company stated that barge deliveries of oil and of heavy equipment would take place in compliance with all applicable federal, state, and local regulations and standards (Exhs. EFSB-HS-10; EFSB-HS-13; EFSB-HS-14; EFSB-SRR-60; EFSB-T-9; EFSB-T-18). The Company stated that the existing terminal operator, ESCO Terminals, would schedule all barge deliveries in advance and would not permit delivery of oil during unsafe conditions (high waves or strong winds) (Exh. EFSB-HS-10).

The Company stated that barged fuel oil would be unloaded and stored in accordance with Canal Station's Facility/Emergency Response Action Plan ("ERP") and Spill Prevention, Control, and Countermeasure ("SPCC") Plan (Exhs. SEC-1, at 3.6-5; EFSB-G-5-C at 5-11; EFSB-SRR-60; EFSB-HS-3; EFSB-WL-8). The Company indicated that back-up fuel would be stored on-site in bulk storage tanks, equipped with secondary containment, leak monitoring systems, level gauges, and high-level alarms (Exh. EFSB-G-5-C at 4.9-8). The Company stated that during operation, all storage areas, secondary containment areas, tank piping valves, pipe supports, expansion joints, and pumping equipment would receive daily visual inspections for deterioration, leaks, or malfunctions (id. at 4.9-9).

The Company stated that the existing Canal Station SPCC Plan would be updated to reflect changes resulting from construction of the proposed project (Exhs. SEC-1, at 3.6-5; EFSB-G-5-C at 4.6-60 to 4.6-61). The Company stated that EPA regulations require the submission of an updated SPCC Plan, which would address the storage and handling of oil and other hazardous chemicals (Exh. EFSB-HS-3; Tr. 5, at 634 to 635). The Company stated that it had committed to filing its SPCC Plan within 30 days of any upgrades (Tr. 2, at 204; Tr. 5, at

634). The Company noted that it did not anticipate that the repowering of Unit 2 would require major changes to its existing SPCC Plan (Tr. 2, at 204; Tr. 5, at 634).

4. Fogging and Icing

The Company testified that the repowered Unit 2 would not cause ground level fogging and icing (Tr. 5, at 649 to 650). The Company stated that fogging and icing impacts are generally associated with cooling towers, which would not be required at Canal Station, where once-through cooling is used (id.). The Company argued that the exhaust stack would not present a fogging or icing hazard because of the height of the stack and the low level of water vapor emissions (id.).

5. Emergency Response

The Company stated that the proposed facility design incorporates surveillance and automatic shutdown systems (Exhs. EFSB-G-5-C at 5-12 to 5-13; EFSB-A-17; Tr. 5, at 628 to 629, 642), that designated structures and equipment would be constructed of fire-retardant materials (Exh. SEC-1, at 3.7-6), and that the design and layout of the facility would ensure safe access for fire, emergency response, and other vehicles (id.; Exh. EFSB-HS-9). The existing on-site fire suppression system would be upgraded and a large volume raw water storage tank suitable for firefighting needs would be incorporated as part of the facility design, with municipal water available as a backup source (Exh. EFSB-G-5-C at 5-12, 5-13). The Company stated that its employees would be trained in the use of emergency response equipment, Federal Occupational Safety and Health Administration ("OSHA") safety procedures, emergency first aid, cardiopulmonary resuscitation, and basic fire prevention (id. at 5-13; Exh. SEC-1, at 3.7-7). The Company added that safety and training procedures would comply with all Federal, state, and local laws and regulations (Exh. EFSB-G-5-C at 5-12, 5-13).

The Company stated that historically, the Canal Station owners have worked in close cooperation with local emergency management agencies, including the Sandwich Fire Department (Tr. 5, at 628 to 631, 638), and that Sandwich and Bourne have developed an evacuation plan for the Cape Cod Canal area (id. at 638). The Company stated that it would

continue to work with the local emergency management agencies to provide adequate training and equipment (id. at 638).

6. Existing Hazardous Conditions

The Company stated that the Canal Station site historically has been used for oil-fired electric generation, and that this long-term use has resulted in the presence of hazardous substances on portions of the property (Exh. EFSB-G-5-D at 10-12). The Company stated that ten past releases of hazardous materials at Canal Station have warranted issuance of tracking case numbers under the Massachusetts Contingency Plan ("MCP"), 310 CMR 40.000. While nine of the releases have been attenuated, one case remains active due to a single site ("MW-8"), where nickel, arsenic, and lead, have been identified in a localized area near an existing wastewater pond (id. at 10-13, 10-14, Fig. 10-1). The Company stated that it is monitoring MW-8 as required by the MCP, and that contaminant concentration levels are nearing natural attenuation (id. at 10-15; Tr. 5, at 609-617; Tr. 2, at 195 to 196).

7. Analysis

The Company has demonstrated that it would properly store 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 demonstrates that the Company has arranged for the proper storage, use, and secondary containment of hazardous materials associated with the construction and operation of the proposed facility and that emergency training would be provided concerning the safe handling of those chemicals. The record also demonstrates that the Company would manage construction traffic and activities in a manner consistent with federal, state, and local regulations.

The Company proposes to use an emerging ammonia-on-demand technology to generate aqueous ammonia for its SCR system on site from urea pellets. The Siting Board notes that the Company's proposed use of this technology would eliminate many of the concerns raised in prior proceedings regarding the transportation, storage, and handling of aqueous ammonia, while retaining the benefits of the SCR NO_X-control technology. The Siting Board commends the

Company for its willingness to explore and implement new technologies in response to public safety concerns, and notes that success with this innovation could lead to improved safety at future generating facilities.

The record indicates that Canal Station currently receives deliveries of No. 6 fuel oil, and that the fuel unloading area would be upgraded to accommodate deliveries of No. 2 distillate by barge to be used as back-up fuel for Unit 2. The record demonstrates that the Company has in place procedures to ensure the safe delivery and storage of oil, and to ensure appropriate response to accidental spills; these procedures are documented in the Company's ERP and SPCC plans. The Company has indicated it will file an updated SPCC plan for Canal Station with the EPA within 30 days of commercial operation. The Siting Board directs the Company to consult with the appropriate Sandwich officials in preparing its updated SPCC plan.

The record indicates that the municipalities of Sandwich and Bourne have emergency response plans for the Cape Cod Canal area, and that the Company would continue to work with the Sandwich Fire Department to increase its ability to handle emergencies. The Company intends to update existing emergency procedures and response plans for the repowered Canal Station within 30 days of commercial operation. The Siting Board notes that certain elements of the ERP may require revisions to reflect procedures to be followed during the construction period. Consequently, the Siting Board directs the Company to update the construction section of its ERP in consultation with appropriate Sandwich officials and file it with Sandwich before facility construction begins in order to cover possible emergencies related to construction accidents.

The record contains no evidence that ground level fogging or icing would result from the operation of the proposed facility.

The record shows that the Canal Station has been assessed for the presence of hazardous materials, and that several contaminated areas, known as MCP sites, have been identified. All but one of these sites have achieved a permanent resolution under state regulations. The Company is monitoring the remaining site, designated MW-8, in accordance with MDEP requirements; the monitoring suggests that contamination at the site is nearing natural attenuation. The Siting Board notes that MW-8, a localized contaminated area near wastewater

pond D, is located away from the 9.4-acre area that would be affected by construction of the proposed facility, and is therefore unlikely to be disturbed by the construction of the proposed facility. Further, as discussed in Section III.C., above, the Company will continue to monitor the site to ensure that contamination does not migrate as a result of increased use of on-site wells for process water. Consequently, the Siting Board finds that the safety concerns associated with existing on-site contamination would be minimized.

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

I. Traffic

This Section describes the impacts to local traffic conditions of the construction and operation of the proposed facility, and the costs and benefits of any additional mitigation options.

1. Description

The Company asserted that traffic associated with the proposed project would not adversely affect local traffic conditions and would be minimized in accordance with Siting Board standards (Company Brief at 89). In support of its position, the Company submitted an analysis of 1998 traffic volumes and future traffic impacts (Exhs. SEC-1, at 3.11-4 (Fig. 3.11-2); RR-EFSB-3; RR-EFSB-4). The Company asserted that during project construction, the Company would require its EPC contractor to provide a satellite parking facility and to transport its workers to the site in order to mitigate potential roadway impacts (Exh. SEC-1, at 3.11-1).

The Company stated that to reach the Canal Station site from the north, vehicles would proceed over the Sagamore Bridge to Exit 1 (Route 6A) (id.). Approximately 1.5 miles from the Route 6A exit ramp, vehicles would turn left onto Tupper Road and travel 0.8 mile to Freezer Road and the access drive to Canal Station (id.). Vehicles approaching from the southeast on

Route 6A would turn right at the intersection of Tupper Road and proceed to Freezer Road and the access drive (id.).[58]

The Company performed a traffic capacity and level of service ("LOS") analysis of the intersections of: (1) Route 6A with Tupper Road/Route 130 ("western Tupper Road/6A intersection"); (2) Tupper Road with Freezer Road; and (3) Tupper Road with Route 6A ("eastern Tupper Road/6A intersection") (id. at 3.11-4, 3-11-5 (Figs. 3.11-1, 3.11-2)).[59] To establish baseline traffic conditions, the Company recorded traffic counts at these locations on August 26, 1998 from 6:30 a.m. to 9:30 a.m. and from 3:00 p.m. to 6:30 p.m. (id. at 3.11-4). The Company's data indicated that existing traffic conditions at the three intersections range from LOS A to LOS C during the morning peak hour and LOS A to LOS F during the evening peak hour (id. at 3.11-7, 3.11-8).[60] The analysis indicated that during the evening peak hour, LOS F conditions occur at both the eastern and western Tupper Road/6A intersections (id. at 3.11-7 (Tables 3.11-1, 3.11-3)). The Company stated that the worst-case traffic conditions are confined to the peak summer months of July and August; however, it did not analyze traffic flow for off-peak months (Exh. SEC-1, at 3.11-8; Tr. 1, at 20).

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58 Freezer Road is a north/south roadway with one lane per direction (Exh. SEC-1, at 3.11-2, Fig. 3.11-2). Tupper Road is a two-lane east-west roadway that affords access to Route 6A in two locations (id.). Route 6A is an east/west roadway with one lane in each direction (id. at 3.11-4). Route 130 is a two-lane undivided roadway that intersects with Tupper Road and Route 6A (id.).

59 A capacity analysis is a method by which traffic volumes are compared to the calculated roadway and intersection capacities to evaluate future conditions (Exh. SEC-1, at 3.11-5 (App. 3.11)). LOS is classified from best to worst operating conditions from A to F (id.). LOS A, B and C represent an under capacity of traffic, LOS D and E represent near capacity and LOS F represents over capacity (id. at 3.11-5). For example, LOS A represents an under capacity of traffic (less than 1,400 vehicles per hour) with an average delay of less than 5.0 seconds (id. at 3.11-5 (App. 3-11)). LOS F represents an over capacity of traffic (more than 2,000 vehicles per hour) with an average delay in excess of 45.0 seconds (id.).

60 The Company stated that the morning peak traffic hour is from 8:30 a.m. to 9:30 a.m. and the evening peak traffic hour is from 4:15 p.m. to 5:15 p.m. (Exh. SEC-1, at 3.11-4). The Company added that the second highest morning and evening traffic volumes occur between 7:30 a.m. and 8:30 a.m., and 3:15 p.m. and 4:15 p.m. (Exh. RR-EFSB-3).

To evaluate traffic impacts from operation of the proposed facility, the Company projected traffic volumes for the same intersections in 2003, the first full year of operation (Exh. SEC-1, at 3.11-8 (Tables 3.11-4 through 3.11-6)). The Company assumed that baseline traffic would increase at a rate of 2% per year, but that the number of workers at Canal Station would remain at the current level of 115 employees (Exhs. SEC-1, at 3.11-8; EFSB-T-16). The Company also assumed that there would be one urea truck delivery per week, and that a limited number of diesel fuel and liquid magnesium deliveries would be made (Exhs. SEC-1, at 3.11-8; EFSB-T-19). The Company stated that fuel oil would be delivered by barge (Exh. EFSB-T-10).

The Company's analysis projected that in 2003, absent any traffic improvements, morning peak traffic conditions on Tupper Road southbound would deteriorate from LOS C to LOS D at the western Tupper Road/6A intersection (Exh. SEC-1, at 3.11-7, 3.11-10 (Tables 3.11-1, 3.11-4)). Similarly, morning peak traffic conditions on Tupper Road northbound would deteriorate from LOS C to LOS D at the eastern Tupper Road/6A intersection (id. at 2.11-7, 3.11-10 (Tables 3.11-3, 3.11-6)). Further, evening peak traffic conditions on southbound Tupper Road would deteriorate from LOS B to LOS C at the eastern Tupper Road\6A intersection, while Tupper Road northbound traffic would remain at LOS F (id. at 3.11-7, 3-11-10 (Tables 3.11-3, 3.11-6)).

The Company noted that the Town of Sandwich Comprehensive Plan concluded that the eastern Tupper Road/6A intersection needs traffic control improvements (e.g., traffic signals) (id. at 3.11-11). The Company's analysis indicated that with a traffic signal, evening peak traffic conditions at this intersection would be LOS B instead of LOS F (id.).[61] However, the Company noted that Sandwich had no firm plans for upgrading this intersection (Tr. 1, at 19-22).

The Company anticipated that the total construction period for the proposed project would be 24 months, with a three-month peak construction period (id. at 3.11-12). During the peak construction period, the Company expects to employ a maximum of 465 construction workers (id. at 3.11-13, Fig. 3.11-4). The Company argued that construction worker traffic

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61 The Company noted that because Route 6A would be stopped temporarily with traffic signals, it would operate at LOS B instead of LOS A in the morning (Exh. SEC-1, at 3.11-11).

would not have an impact on peak traffic conditions because the standard construction shift would be from 6:00 a.m. to 4:00 p.m., Monday through Friday (Exhs. SEC-1, at 3.11-13; EFSB-T-1). The Company stated that it would require its EPC contractor to provide a satellite parking facility[62] for construction workers and bus service to transport workers to the project site (Exh. SEC-1, at 3.11-13; Tr. 1, at 22-23). The Company also stated that it would encourage construction workers to carpool to the satellite parking area (Exh. EFSB-T-14).[63] The Company noted that construction workers would be unlikely to take public transportation to the project because public transportation in the vicinity is limited (Exh. EFSB-T-12).

The Company stated that during construction, it expects an average of 25 to 30 trucks per day (excluding cement trucks) and asserted, based upon this number, that no traffic control officers would be necessary (Exh. RR-EFSB-7). The Company asserted that the majority of trucks arrivals and the delivery of very large equipment would occur during non-peak traffic periods (Exhs. SEC-1, at 3.11-13; EFSB-T-2). The Company stated that it would attempt to deliver large equipment by barge (Exhs. EFSB-T-2; EFSB-T-9).

2. Analysis

The Company has provided an analysis of traffic conditions at intersections in the vicinity of the proposed project in 1998 and in 2003, after Unit 2 has been repowered. The Company's analysis predicts that, by 2003, absent traffic control improvements, (1) morning peak traffic conditions would deteriorate from LOS C to LOS D on two sections of Tupper Road, and

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62 The Company identified possible areas for satellite parking at: (1) the Route 3 rotary by the Sagamore Bridge; (2) the intersection of Route 28 with Route 6 by the Bourne Bridge; and (3) a parcel of land on the Massachusetts Military Reservation by Exit 1, off of Route 3 (Exh. EFSB-T-17). The Company stated that it has not secured any of the sites because the EPC contractor would be responsible for providing the satellite parking (Exhs. EFSB-T-8; EFSB T-17; Tr. 1, at 24-25).

63 The Company stated that, based upon current ride-sharing level for workers installing SCR equipment at Canal Station, it anticipates the overall vehicle occupancy rate for the construction phase of the project to be 1.11 occupants per vehicle (Exh. RR-EFSB-5).

(2) evening peak traffic conditions at the eastern Tupper Road/6A intersection would deteriorate from LOS B to LOS C on Tupper Road southbound and would remain at LOS F on Tupper Road northbound. However, this projected deterioration in traffic conditions is driven by expected increases in general traffic, and is not associated with the proposed project. The Company does not intend to increase operational staff at Canal Station as a result of the proposed project, and projected truck deliveries would be relatively infrequent, since fuel oil would be delivered by barge. Given these factors, it seems likely that the proposed changes to Unit 2 would have minimal impact on Tupper Road traffic conditions. The Siting Board therefore finds that the traffic impacts of the operation of the proposed project would be minimized.

The record demonstrates that the Company has proposed a number of measures to minimize traffic impacts from the construction of the proposed facility, including: (1) scheduling worker arrivals and departures for the off-peak hours of 6:00 a.m. and 4:00 p.m.; (2) requiring its EPC contractor to provide satellite parking and bus transportation from the satellite parking area to the project site; (3) encouraging carpooling; (4) delivering large equipment by barge; and (5) to the extent practicable, scheduling truck deliveries during off-peak hours. The Siting Board therefore finds that the impacts of construction traffic in the immediate vicinity of Canal Station would be minimized.

The Siting Board notes, however, that the Company does not yet know the location of the satellite parking area(s) and the availability of and costs related to shuttle bus service from the satellite parking area(s) to the project. Consequently, the Siting Board does not have a sufficient record to determine whether traffic impacts near the satellite parking area(s) would be minimized. Therefore, the Siting Board directs the Company, prior to construction, to file with the Siting Board final plans for satellite parking for construction workers, including a supporting analysis of LOS and other traffic impacts near the satellite parking area(s) and specific measures (e.g., carpooling) to mitigate any traffic impacts during construction of the project. In developing final plans for satellite parking and other traffic mitigation measures, the Siting Board directs the Company, together with its EPC contractor, to coordinate with appropriate municipal authorities concerning procurement of satellite parking and to identify and implement appropriate measures to address traffic impacts and ensure pedestrian safety in the vicinity of the satellite parking

area(s) and the related bus route(s) to the project site. The plan should allow the Company to maintain communication with local officials and safety departments to address any traffic impacts arising from construction of the proposed facility, and to ensure smooth passage of safety and emergency vehicles at all times. The Siting Board will expeditiously review the Company's filing to determine whether traffic impacts at the satellite parking area(s) would be minimized.

The Siting Board finds that, with the development of a satellite parking traffic analysis and mitigation plan and acceptance of such plan by the Siting Board, the Company will have established that the traffic impacts of the proposed facility would be minimized.

J. Electric and Magnetic Fields[64]

This Section describes the electric and magnetic field impacts of the proposed facility, the mitigation proposed by the Company, and the costs and benefits of any additional mitigation options.

1. Description

The Company indicated that operation of the proposed facility would produce magnetic fields associated with increased power flows on certain existing transmission lines (Exh. SEC-1, at 3.8-7).[65] The Company indicated that the proposed facility would interconnect with two 345 kV transmission lines and two 115 kV transmission lines that extend along a right-of-way ("ROW") beginning at a point just southwest of the facility and running to the Bourne switching station ("Canal-Bourne ROW") (id. at 3.8-5).

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64 Electric fields produced by the presence of voltage, and magnetic fields produced by the flow of electric current, are collectively known as EMF.

65 The Siting Board notes that Commonwealth Electric Company's and other utilities' existing transmission lines are not ancillary facilities as defined in G.L. c. 164, § 69G. However, in order to allow comprehensive analysis of environmental impacts associated with the construction and operation of the proposed generating facility, the Siting Board may identify and evaluate any potentially significant effects of the facility on magnetic field levels along existing transmission lines. See Sithe Mystic Decision, 9 DOMSB at 178; ANP Blackstone Decision, 8 DOMSB at 183-186; Boston Edison Company, 1 DOMSB 1, at 148, 192 (1993) ("1993 BECo Decision").

The Company modeled magnetic field strengths along the Canal-Bourne ROW assuming year 2001 demand levels (Exh. SEC-1, at 3.8-15). The Company's modeling indicated that edge-of-ROW magnetic fields would range from 16 to 65 milligauss ("mG") assuming that the existing Canal Station facility operates at peak loading, and would range from 22 to 83 mG assuming the Canal Station, with the proposed facility, was running at peak loading (id.).[66] The Company stated that the closest residence to the Canal-Bourne ROW is located 178 feet from the ROW edge and indicated that operation of the proposed facility would increase maximum magnetic field levels at that residence from 3 mG to 4 mG (Exh. EFSB-E-15).[67] The Company stated that predicted magnetic field levels along the ROW are consistent with the EFSB guideline of 85 mG (Exh. SEC-1, at 3.8-17). The Company stated that because the voltages on the Canal-Bourne ROW would not change due to operation of the proposed facility, edge-of-ROW electric fields would remain at their current level of 0.65 kV/m, well below the Siting Board guideline level for electric fields of 1.8 kV/m (id. at 17).

The Company stated that the proposed project would affect load flows, and hence magnetic fields, on transmission line rights-of-way other than the Canal-Bourne ROW (Exh. SEC-1, at 3.8-15). The Company stated that during off-peak load periods, increases in load flows would occur along the 345 kV circuits that leave the Cape for the Carver substation and the Jordan Road Tap to the north (id.). The Company noted that for the peak load scenario, increases in load flows would occur along both the 115 kV and 345 kV circuits beyond the Bourne switching station, although increases on the 115 kV lines would be less than 100 amperes (id.).

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66 The Company noted that during light loading conditions, magnetic field levels at the edges of the Canal-Bourne ROW in the year 2001would range from 8 to 47 mG with the existing facility operating, and would range from 22 to 65 mG when Unit 2 is repowered (Exhs. SEC-1, at 3.8-15; EFSB-E-9).

67 The Company provided a table that shows magnetic field strength rapidly drops off with distance from the edge of the Canal-Bourne ROW (Exh. EFSB-E-15). For instance, the Company's data show that the maximum magnetic field level with the repowered facility during peak conditions would drop from 83 mG at the edge of the ROW to 39 mG at a location 25 feet from the edge of the ROW (id.).

The Company did not attempt to quantify these impacts in terms of increased magnetic fields (id.).

The Company stated that existing magnetic fields levels along the Canal Station property line range from 2 mG to 38 mG, with the highest level occurring near the transmission line interconnect (Tr. 5, at 544). The Company asserted that magnetic field levels at the Canal Station property line would not increase following the repowering of Unit 2, due to the relatively large area of the site (Exh. SEC-1, at 3.8-15).

The Company indicated that it did not expect that the Canal-Bourne ROW would need to be reconductored to support the proposed project (Tr. 5, at 546). The Company noted that Commonwealth Electric is in the process of performing a system impact study to assess the need for transmission upgrades to support the proposed project, and that upon completion of the study, Commonwealth Electric would explore cost-effective design changes that could lower magnetic field levels along transmission lines requiring upgrades (Exh. EFSB-E-1).

2. Analysis

In a previous review of proposed transmission line facilities, the Siting Board accepted edge-of-ROW levels of 1.8 kV/meter for the electric field and 85 mG for the magnetic field. Massachusetts Electric Company, et al., 13 DOMSC 119, 228-242 (1985) ("1985 MECo/NEPCo Decision"). Here, off-site electric and magnetic fields would remain below the levels found acceptable in the 1985 MECo/NEPCo Decision. Although consistent with edge-of-ROW levels previously accepted by the Siting Board, the estimated worst case magnetic fields along the Canal-Bourne ROW would range from 22 to 83 mG once the proposed facility is in operation. These levels represent a substantial increase above the current maximum field levels of approximately 16 to 65 mG at the edge of the ROW. 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, design features have been incorporated into proposed transmission lines that would reduce magnetic fields at little or no additional cost. See, e.g., New England Power Company - Uxbridge, 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 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.

Here, the Company has committed to request that Commonwealth Electric consider potential magnetic field reductions and costs associated with different electrical phasing arrangements, as well as their feasibility, environmental impact and safety implications, in selecting the final design for any required upgrades. As in previous reviews, the system interconnection study for the proposed facility had not been completed as of the close of the record. The Siting Board therefore does not have complete information as to the extent or design of transmission upgrades required to support the proposed facility and the related ability to minimize EMF impacts. The Company's commitment to work with transmission providers is similar to that of previous generating facility applicants, and the Siting Board accepts that approach as meeting its standard of review for EMF. However, the Siting Board seeks to remain informed as to the progress and outcome of transmission upgrade designs related to interconnecting the proposed project. Therefore, the Siting Board directs Mirant Canal II to provide the Siting Board with an update on the extent and design of any required transmission upgrades, and the measures incorporated into such transmission upgrade designs to minimize magnetic field impacts, at such time as the Company reaches final agreement with all transmission providers regarding transmission upgrades.

The Siting Board finds that, with the implementation of the above condition, and 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, the mitigation proposed by the Company, and the costs and benefits of any additional mitigation options.

1. Description

The Company asserted that the development of the proposed facility at the Canal Station site would be compatible with current land use characteristics and zoning for the site, and would be consistent with the development objectives of Sandwich and the region (Exh. SEC-1, at 3.2-2, 3.2-8, 4-40, 4-42 to 4-43). The Company further asserted that the proposed project would be compatible with surrounding land uses and would provide economic benefits to the region during both construction and operation of the proposed facility (id. at 3.2-11 to 3.2-12).

The Company stated that the proposed facility would be located on 9.4 acres in the northeast quadrant of the Company's 87-acre Canal Station in Sandwich, Massachusetts, which is now principally occupied by approximately 1,200 MW of oil and natural gas-fired electric generation facilities (id. at 3.2-1 to 3.2-2, ES-1 to ES-3). The Company stated that the project site is located adjacent to the existing Unit 2 building, and is primarily undeveloped, with gravel and scrub grass cover (id. at 3.2-1, 3.2-10).

The Company indicated that the project site is abutted to the east by Freezer Road, which forms Canal Station's eastern boundary; the Sandwich Town Marina and assorted commercial establishments predominate as land uses to the east (id. at 3.2-2). Immediately to the south of the project site are the tracks of the New York, New Haven, and Hartford Railroad, which are currently in use for passenger and freight traffic (id. at 3.2-2; Tr. 1, at 68). Commonwealth Electric retains the ownership of an undeveloped parcel of land located between the railroad tracks at the project site boundary and Tupper Road to the south (Exh. SEC-1, at 3.2-6). To the west of the project site are the existing Unit 1 and 2 buildings, fuel storage tanks, and a Commonwealth Electric substation, which forms the western border of the Canal Station site (Exh. EFSB-G-5-C at 4.10-8). To the north of the project site are the Cape Cod Canal and an adjacent Canal Walk used by pedestrians, cyclists, and fishermen, both maintained by the Army Corps; the Scusset State Beach Reservation is located on the opposite side of the canal (Exhs. SEC-1, at 3.2-2; EFSB-G-5-C at 2-3; Tr. 1, at 66). The Company stated that it would take measures to ensure that, with temporary exceptions, the Canal Walk and the canal itself would remain accessible for existing uses during construction and operation of the proposed facility (Exhs. EFSB-HS-14; EFSB-RR-37; Tr. 5, at 651 to 654).

The Company stated that land use within a one-half mile radius of the project is: 33% industrial, 23% water, 13% recreation, 13% woody perennial, 9% low-density residential, and 9% commercial (Exh. SEC-1, at 3.2-6, Table 3.2-1). Within a one mile radius, land use is: 12% industrial, 23% water, 9% recreation, 28% woody perennial, 5% low-density residential, 3% medium-density residential, and 14% commercial (id.). The closest residence is located 60 feet from the Canal Station fenceline and approximately 420 feet from the nearest existing or proposed on-site structure. The next closest residences to the Canal Station are located between 480 and 520 feet from the fenceline and 560 and 620 feet from the nearest existing or proposed on-site building (Exh. EFSB-L-5). The Company indicated that sensitive receptor locations within a one-half mile radius of the plant include the Sandwich and Sandcatcher recreation areas, the Sandwich Marina, and the Cape Heritage Rehabilitation Facility (Exh. EFSB-L-8).

The Company indicated that the Canal Station site is zoned for Industrial Limited Use ("IND") (Exh. SEC-1, at 3.2-8 to 3.2-9). The purpose of the IND zone is "to preserve uniquely serviced areas for exclusive industrial or commercial use, while providing a visually pleasing area compatible with the town's history" (id. at 3.2-8 to 3.2-9; Exh. EFSB-G-5-C at 4.10-7). Electric generation is an approved principal use in the IND district with a Special Permit from the Town of Sandwich Zoning Board of Appeals (Exhs. EFSB-G-5-C at 4.10-7; EFSB-RR-9; Tr. 1, at 60 and 69). However, the Company indicated that the proposed project may require an additional Special Permit or a height variance (Exh. SEC-1, at 3.2-8 to 3.2-9; Tr. 1, at 69).

The Company stated that, pursuant to applicable provisions of the Cape Cod Commission Act (Chapter 716 of the Acts of 1989), the proposed project is considered a Development of Regional Impact ("DRI"), and as a result requires a DRI permit from the Cape Cod Commission. The Company stated that the project would undergo a joint review by the Cape Cod Commission and by the Massachusetts Environmental Policy Act Unit ("MEPA") office, consistent with a Memorandum of Understanding ("MOU") between the Commission and MEPA (Exhs. EFSB-L-1; EFSB-L-2). Following the issuance of the DRI permit, local permitting agencies would review the project (id.). Permits required from local agencies include a Special Permit, and if necessary, a variance, from the Sandwich Zoning Board of Appeals; an Order of Conditions from the Sandwich Conservation Commission under the provisions of G.L. c. 131, § 40; a Certificate

of Appropriateness from the Old King's Highway Historic District Committee pursuant to Section 6 of Chapter 470 of the Acts of 1973; a septic permit from the Board of Health; and a building permit (Exh. EFSB-L-2).

The Company stated that in evaluating the land use impacts of the project, it considered issues related to physical relocation of existing land uses, compatibility with existing onsite and adjacent land uses, and conformity with the objectives of the Town of Sandwich's Comprehensive Plan (Exh. SEC-1, at 3.2-10). The Company stated that it would minimize the land use impacts of the proposed project through the use of an existing industrial site, designing the proposed facility to blend in to the existing facility to the greatest degree possible, visual impact mitigation, and use of local construction workers for construction and currently employed station workers during operation of the existing facility (id. at 2-8; Exh. EFSB-G-5-C at 4.10-1). The Company asserted that the proposed facility would be consistent with the goals of the Sandwich Comprehensive Plan to encourage sustainable development in the industrially zoned districts[68] (Exh. SEC-1, at 3.2-11). The Company noted that it organized a community input process to determine the best methods to enhance the aesthetics of the development and to provide a ground-level buffer from nearby site locations (Exhs. EFSB-G-5-C at 4.10-8; EFSB-RR-23-S).

The Company asserted that construction and operation of the proposed facility would have no impacts on any historical or archeological resource areas, or on the habitat of any federally- or state-listed rare or endangered species (Exh. SEC-1, at 4-31, 4-48). In support of its assertion, the Company provided letters from the relevant jurisdictional authorities (id. at Apps. 3.4, 3.12).

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[68] The Company provided the Open Space and Recreation Element of the Comprehensive Plan (Exh. EFSB-RR-11; Tr. 1, at 73). Among the stated goals of the plan is the encouragement of "sustainable development that is consistent with the carrying capacity of the Town's natural, historic, and social environments, and supports economic health and quality of life" (Exhs. EFSB-RR-11; SEC-1, at 3.2-10). The Company argued that the proposed facility would be consistent with the goals of this plan due to the brownfields nature of the site (Exhs. EFSB-RR-11; SEC-1, at 3.2-10).

The Company stated that its gas supply would be delivered to Canal Station from Duke Energy's Algonquin "G" lateral, originating in Mendon, Massachusetts (id. at 2-7). The Company indicated that the existing line would need to be upgraded for some sections of the route between Mendon and Canal Station (id.; Exh. EFSB-L-3). The Company testified that some expansion of the ROW would be required for this upgrade; however, because the project would be conducted by Duke Energy, the Company was unable to provide any information regarding the nature or extent of environmental impacts that could result from the expansion of the G lateral (Exhs. EFSB-L-2; EFSB-L-11; Tr. 1, at 76).

The Company proposed to locate the transmission line interconnect to the Commonwealth Electric substation by crossing over an intercepting forested wetland area and buffer zone (Exh. SEC-1, at 4.4-11). The Company stated that this interconnection would result in limited impacts to wetland areas, as discussed in Section III.D, Wetland Impacts, above (Tr. 8, at 988-989). In order to mitigate these impacts, the Company submitted a wetland restoration plan to the Sandwich Conservation Commission (Exh. EFSB-G-5-H at 1 to 7). In addition, as discussed in Sections III.D and III.J, above, the Company stated that ISO New England and Commonwealth Electric are conducting an interconnect study to determine the need for, and extent of, any transmission line upgrade requirements along the Canal-Bourne ROW (Exhs. SEC-1, at 2-6; EFSB-E-1). The Company did not provide information regarding the potential for land use impacts resulting from this electric interconnect.

2. Analysis

As part of its review of land use impacts, the Siting Board considers whether a proposed facility would be consistent with existing land uses, and state and local requirements, policies or plans relating to land use and terrestrial resources.

Here, the record demonstrates that the existing Canal Units 1 and 2 have established the character of the site. The undeveloped land comprising the project site is suited for electric power generation given its proximity to the existing station and the availability of supporting infrastructure, including fuel storage and delivery equipment, support buildings, and electrical transmission facilities. The record shows that neighborhoods characterized by residential and

commercial use, with some recreational space, lie to the east, west, and south of the Canal Station site, while the main use to the north is the Cape Cod Canal and the Canal Walk. The record also shows, however, that construction of the proposed facility is consistent with the present use of the Canal Station site, and that operation of the proposed facility would not result in an additional incursion of industrial use beyond the existing Canal Station boundary.

Based on the record, the proposed project is an allowed use under the Sandwich zoning ordinances. However, the project will require approval from several other local bodies, including the Cape Cod Commission and the Old King's Highway Historic Commission. The Company has stated that it intends to apply for variances to construct structures for the proposed facility as required. The Siting Board notes that the Company would be required to submit written notification to the Siting Board in the event that denial of any variance for onsite structures required redesign of the proposed facility.

The record shows that pedestrian and cyclist access to the Canal Walk adjacent to the Cape Cod Canal and Canal Station would not be permanently affected by construction or operation of the proposed facility due to the relative location of the walkway to the construction site for the proposed facility. The record indicates that the Company has committed to preserving access to the walkway with only the possibility of temporary restrictions during construction.

Because of the extent of seasonal tourist activity in the area and the proximity of several recreational areas to the project, the potential visual impacts and land use impacts of the proposed project are closely linked. Due to the existing industrial nature of the site, and the design of the facility to minimize visual impacts from the near- and far-fields, the Siting Board finds that the visual character for sensitive receptor locations, such as the Sandcatcher Recreational Area and the Scusset State Beach Reservation, would not be adversely affected by the construction of the proposed project. The Siting Board has considered the visual impacts of the proposed facility in Section III.F, above, and has imposed conditions to mitigate such impacts. The Siting Board notes that these conditions address, to a significant degree, the issue of consistency with land use objectives.

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

The record indicates that the project site is already developed and no tree-clearing mitigation would be required. However, the record provides no indication of the nature or extent of environmental impacts related to the interconnection of gas or transmission lines that could result from the project. In Section III.B above, the Siting Board has directed the Company to adjust its CO_2 offset calculation to account for any carbon sequestration losses resulting from tree-clearing impacts associated with any upgrades to gas and electric transmission interconnections. The record indicates that the Company has set forth a wetland restoration program to mitigate overstory impacts to trees in a wetland transversed by the electric interconnection between the Canal Station and the adjacent Commonwealth Electric property.

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 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. 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 information from four reports produced within the last ten years documenting health conditions in the Sandwich area. The Company identified a Massachusetts Department of Public Health study of cancer incidence in the upper Cape ("Cape Cancer Incidence Report") which examined cancer incidence rates by census tract between 1990 and 1995 (Exh. EFSB-RR-39; Tr. 5, at 583). The Company stated that the Cape Cancer Incidence Report compared the incidence rate of 22 types of cancer for each Cape Cod town with the state-wide average for males, females, and the total population, and noted statistically significant deviations (Exh. EFSB-RR-39; Tr. 5, at 583, 664). The Company testified that in Sandwich, the Cancer Incidence Report found no statistically significant elevations in cancer occurrences (Tr. 5, at 584). In the neighboring town of Bourne, elevated rates of bronchus and lung cancer were found (significant at $p <= 0.05$)[69] (id. at 584).

In addition to the Cape Cancer Incidence Report, the Company identified a 1997 report published by Silent Spring Institute entitled the Cape Cod Breast Cancer and Environment Study ("Silent Spring Study"), and the 1997 Aschengrau and Ozonoff Upper Cape Cancer Incidence Study ("Cape Cancer Incidence Study") (Exh. EFSB-HS-1, Tr. 5, at 581 to 584). The Company stated that these studies found elevations in some types of cancer on Cape Cod; however, neither study found an identifiable environmental cause for these elevated rates, and both recommended further study as to whether demographic differences exist between the population of women on the Cape versus populations of women elsewhere in Massachusetts (Tr. 5, at 578).

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[69] The term statistically significant at $p <= 0.01$ 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-1, Bulk Att.). Similarly, the term statistically significant at $p <= 0.05$ means that there is at most one chance in 20 that the excess of observed cancer cases is due to chance alone (id.).

The Company also provided data generated by a 1999 study conducted by ICF Kaiser Consulting which examined the health-related impacts which could be attributable to the existing Canal Station ("ICF Kaiser Study") (Exh. EFSB-G-5-C at App. 4.9; Tr. 5, at 575 to 577). The ICF Kaiser Study was a multimedia, multipathway risk assessment for Canal Station's primary emissions sources, Units 1 and 2 (Exh. EFSB-G-5-C at App. 4.9). The Company stated that the ICF Kaiser Study concluded that elevated cancer rates on Cape Cod were unlikely to be the result of emissions from the existing Canal Station (Tr. 5, at 575 to 582).

2. Criteria Pollutants

As discussed in Section III.B, above, the MDEP regulates the emissions of six criteria pollutants under NAAQS: SO_2, PM-10, NO_2, CO, ozone, and lead. The Company indicated that SO_2, NO_X, and VOCs are primarily respiratory irritants, which could lead to edema at high enough concentrations; that PM-10, and particulate matter in general, are associated with increases in mortality or hospital admission from respiratory diseases such as chronic bronchitis; that CO would be expected to aggravate heart disease conditions; that SO_2 might increase sensitivity to asthma; and that lead is a neurotoxin (Tr. 5, at 589 to 590).

The Company's witness, Dr. Valberg, provided an overview of how the EPA determines NAAQS for each criteria pollutant. Dr. Valberg indicated that EPA develops a standard that is protective of public health with an adequate margin for safety, and that protects sensitive subgroups (id. at 587 to 588). The Company asserted that, when a geographical area is in compliance with NAAQS for a particular pollutant, there would be no discernable health effects in that area from that pollutant (id. at 586).

The Company asserted that its air modeling demonstrated that the predicted cumulative impacts from Canal Station would meet NAAQS/MAAQS with regard to NO_X, SO_2, PM-10, and CO (Exh. EFSB-A-2, Bulk Att., at 4-10, 4-11). The Company also noted that the proposed Canal Redevelopment, including the repowering of Unit 2 and other non-jurisdictional improvements at Canal Station, would lead to a 60% annual reduction in NO_X emissions, a 46% annual reduction in SO_2 emissions, a 62% annual reduction in CO emissions, a 16% annual reduction in PM-10

emissions, and a 20% annual reduction in emissions of VOCs from Canal Station (Exh. EFSB-A-2-S at 2 to 4).

The record indicates that the EPA sets NAAQS for six criteria pollutants -- SO_2, PM-10, NO_2, CO, ozone, and lead -- which are designed to be protective of human health, including the health of sensitive subgroups, with an adequate margin for safety. 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.

The record also shows that MDEP has set procedures for reviewing the compliance with NAAQS of proposed new sources of criteria pollutants, such as the proposed project. Specifically, new sources are not permitted to cause or contribute significantly to a violation of NAAQS. In addition, 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% 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 health impacts of a proposed facility have been minimized.

The Company stated that the Sandwich area is "unclassified" or "in attainment" for SO_2, PM-10, NO_X, CO, and lead, but is categorized, with the rest of Massachusetts, as "non-attainment" for ozone. In addition, the record indicates that for all criteria pollutants except ozone, regional background levels are well below standards set by NAAQS.

As discussed in Section III.B, above, the proposed repowering of Unit 2 would result in significant reductions in annual emissions of criteria pollutants, including ozone precursors NO_X and VOCs. While short-term concentrations of SO_2 and PM-10 would exceed SILs, the Company's cumulative impact analysis makes it clear that the resulting air quality would be well within applicable health-based standards. The Siting Board therefore concludes that there is no

evidence that the project's emissions of SO_2, PM-10, NO_X, and CO would have a discernable impact on public health. In addition, because the repowering of Unit 2 would significantly reduce the number of days per year that Unit 2 would run on oil, the proposed project should significantly improve regional air quality for much of the year, and could have a net positive impact on health by reducing emissions of ozone precursors during a significant part of the year.

Finally, the record indicates that repowered Unit 2 would incorporate BACT or LAER, as applicable, for each criteria pollutant. Based on the stated compliance with MDEP emissions standards, and the proposed reductions in annual emissions of criteria pollutants from Unit 2, the Siting Board finds that the cumulative health impacts of criteria pollutant emissions from the proposed facility 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 (Tr. 5, at 587). Toxics include chemicals such as arsenic, beryllium, lead, mercury, nickel, dioxins, and formaldehyde (Exh. SEC-1, at 3.7-5 (Table 3.7-1)).

The MDEP has in place an air toxics program, the primary purpose of which is to protect public health (id. at 3.7-5; Tr. 5, at 586). The program sets a Threshold Effects Exposure Limit ("TEL") which is protective of public health from threshold effects, and a Non-threshold Effects Exposure Limit ("NTEL"), the lower of which is selected as the Allowable Ambient Limit ("AAL") (Exhs. SEC-1, at 3.7-5; EFSB-G-5-C, at 4.9-5). Where carcinogenicity is the most sensitive effect, and adequate data are available to derive a cancer unit risk, the AAL is set to correspond to an incremental lifetime risk of developing cancer of one in one million (Tr. 5, at 586). The Company asserted that AALs and TELs were designed to ensure that contributions from a single source would have an insignificant impact on public health (Exh. SEC-1, at 3.7-5). The Company also asserted that because repowered Unit 2's predicted emissions of regulated air toxics would be below AALs and TELs, the health impacts which could result from these emissions have been minimized (id. at 3.7-5; Exh. EFSB-G-5-C, at 4.9-5 to 4.9-6).

The Company provided the results of a 1998 EPA study titled "Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units – Final Report to Congress" ("HAPs Study"). The HAPs Study assessed emissions of 67 hazardous air pollutants ("HAPs") from 52 fossil fuel generating units, and used this data to model human inhalation exposures to HAPs from all 684 fossil fuel plants nation-wide (Exh. EFSB-G-5-C, at 4.9-2 to 4.9-6). The HAPs Study included a detailed analysis of inhalation exposures and risks for 14 priority HAPs, and conducted multipathway assessments for the four highest-priority HAPs: arsenic, mercury, dioxins, and radio nuclides (id.). The HAPs Study eliminated 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 non-cancer hazards were identified" (Exh. SEC-1, at 3.7-2). 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 gas-fired generating facility should be considered to have no discernable public health impacts.

The Company also provided the abstract and summary of a 1998 Mostardi-Platt and General Electric Company study entitled "Inhalation Health Risk Assessment of Air Toxic Emissions from Large Combustion Turbine Power Projects" ("GE Study") which concluded that neither cancer nor non-cancer risks could be expected from ground-level exposure in the vicinity of combined-cycle combustion turbine plants firing either natural gas or low sulfur distillate (Exh. SEC-1, at 3.7-3).

Although the Company proposes to use natural gas as the primary fuel for repowered Unit 2, 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. However, as noted in Section III.B, above, even when operating on oil, Unit 2'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 indicating 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. Impacts 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 construction dewatering that infiltrate groundwater used to supply potable water, and through wastewater discharges to surface water bodies (Exhs. EFSB-RR-36). In addition, as discussed in Section III.C, above, the record indicates that there are contaminants in the area which could affect public health were they to migrate into local drinking water supplies as a result of the project.

The Company indicated that groundwater quality is protected by MDEP through the establishment of drinking water standards which limit the levels of specific contaminants that may be present in drinking water sources (Exh. EFSB-RR-36; Tr. 5, at 566, 619). The Company asserted that the Canal Station site is not located over an area of the underlying aquifer used as a source of drinking water, and that hydrologic properties of the site and its underlying aquifer make it highly unlikely that runoff from the site would contaminate drinking water (Exh. EFSB-RR-36; Tr. 4, at 429). The Company identified measures that would prevent the release of any pollutants to groundwater during the construction and operation of the proposed facility (Exhs. EFSB-G-5-C at 4.6-60; SEC-1, at 3.3-46 to 3.3-47). The Company stated that sanitary wastewater at the site would be managed in an on-site subsurface disposal system, a procedure used throughout the Town of Sandwich, which the Company stated has resulted in no adverse impacts to human health within the past 25 years (Exh. EFSB-RR-36). The Company stated that the facility will be designed in compliance with its NPDES permit and with MDEP's Stormwater Management Policy, which is designed to control non-point source pollution (Exhs. SEC-1, at 3.3-46 to 3.3-47; EFSB-RR-36).

As discussed in Section III.H, above, a single contaminated area, known as MW-8, is located directly beneath the existing Canal Station (Exh. EFSB-G-5-D at 10-5). The site is currently being monitored due to the presence of nickel at 120 micrograms per liter, which exceeds the MCP standard of 100 micrograms per liter (Tr. 5, at 610). The Company asserted that pump tests conducted for Sandwich had established that there is no hydrologic connection between groundwater associated with the active MCP site and any drinking water sources (id. at

613 to 615). The Company also stated that monitoring and remediation, as appropriate, would continue in accordance with the MCP until contamination at the site has reached levels below the MCP standard (id.).

As discussed in Section III.C, above, the construction and operation of the proposed facility would not draw on-site contaminated groundwater into groundwater adjacent to the Canal Station site, and the proposed withdrawals would not affect groundwater recharge areas associated with portions of the underlying aquifer used for public or private potable wells. Consequently, the Siting Board finds that the proposed project poses no health risks related to contamination of potable groundwater. As discussed in Section III.C, above, wastewater would be pretreated prior to being discharged to the Cape Cod Canal and all applicable state and local guidelines will be met. Consequently, the Siting Board finds that the proposed project poses no health risks related to the disposal of cooling water and other wastewater.

5. Handling and Disposal of Hazardous Materials

As discussed in Section III.H, above, the Company stated that it would store and use fuel oil and chemicals for water treatment, HRSG, and cooling processes (Exh. SEC-1, at 3.7-7). The Company stated that most of these chemicals were already in use and stored at the existing facility, and that hazardous materials would be handled in accordance with federal, state, and local laws and regulations (id. at 3.6-6 to 3.6-9, 3.7-6 to 3.7-8). Additionally, the Company noted that its planned use of urea, which it identified as non-hazardous, as the source of ammonia for NO_X control for the proposed facility would obviate the need for on-site storage and transportation of aqueous ammonia (id. at 3.5-4, 3.6-4; Tr. 5, at 646-649).

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 Siting Board notes that the Company's use of urea as a source of ammonia for NO_X control would virtually eliminate any health concerns associated with aqueous ammonia. Consequently, the Siting Board finds that the health risks related to the handling and disposal of hazardous materials at the proposed project would be minimized.

6. Noise

As discussed in Section III.G, above, Canal Station currently produces noise that is noticeable in some surrounding community areas. These noise levels are expected to remain unchanged or to decrease slightly following the repowering of Unit 2. The Company has assessed the current and anticipated noise impacts of Canal Station in relation to applicable criteria for acceptable ambient noise, including the MDEP standard which limits allowable noise increases from new sources.

With respect to the health effects of noise, the Company asserted that human health is affected by noise primarily when noise is loud enough to damage the ear and reduce hearing acuity (Tr. 5, at 622-623). The Company noted that studies have been conducted of the long-term effects of noise annoyance on health; however, it argued that the noise created by Canal Station during normal operation is below the levels that cause such health impacts (id. at 623). The Company also stated that impulse noises produced by the construction and operation of the proposed facility would fall below the levels established by federal and state regulations both onsite and offsite (Tr. 7, at 902 to 904). The Company provided the EPA Levels Document, 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-A-2 Bulk Att., App. G at 3, 4, D-34).

The record demonstrates that, following the repowering of Unit 2, L_{dn} noise levels at Briarwood Road would decrease from 58 dBA to 57 dBA, while noise at all other receptors would remain at current levels, which range from 53 dBA to 57 dBA. The resulting noise levels are well below thresholds where hearing loss from long-term noise exposure could occur, although both existing and anticipated noise marginally exceed the 55 dBA standard at one residential and two commercial locations. The Siting Board has found that the Company's noise mitigation proposals would minimize the operational noise impacts of the proposed project, and has imposed conditions on particularly noisy construction activities which should serve to

minimize disruptions during the construction period. Consequently, the Siting Board finds that the health effects, if any, of noise from the proposed project would be minimized.

7. Electromagnetic Fields

As discussed in Section III.J, above, the repowered Unit 2 would require the construction of a new transmission interconnection to the adjacent Commonwealth Electric substation; from the substation, power would flow along two existing 115 kV and two existing 345 kV transmission lines to the Bourne switching station. This interconnection would consist of two 115 kV and two 345 kV transmission lines. The Company stated that the closest residence to the Canal-Bourne ROW lies 178 feet northwest of the ROW edge, substantially reducing the peak magnetic field level at that location (Exh. EFSB-E-1). At this residence, magnetic fields would increase from 3 mG to 4 mG (id.).

The Company stated that the highest projected magnetic field level at the edge of the Canal-Bourne transmission line ROW would be 83 mG (id.; Exh. EFSB-E-15). This represents a substantial increase above the maximum level of the existing facility of approximately 65 mG at the edge of the ROW (Exh. EFSB-E-15). The Company stated that Commonwealth Electric is in the process of performing the system impact study for the proposed project, and that upon completion of the study, Commonwealth Electric would explore cost-effective design changes that could lower magnetic field levels (Exh. EFSB-E-1).

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 at 240. In this case, the Company has provided a summary of existing state and non-regulatory guidance regarding exposure to EMF (Exh. SEC-1, at 3.8-4). The Company indicated that other states have adopted EMF guidelines which are generally based on levels in existing transmission corridors (id.). The Company stated that the International Commission on Non-Ionizing Radiation Protection recommends that occupational exposure to 60 Hz magnetic fields be limited

to 833 mG (id.). The Company stated that the International Radiation Protection Association recommends that occupational exposure be limited to magnetic fields below 5000 mG; that routine exposure for the general public be limited to 1000 mG; and that general public exposure to fields between 1000 and 10,000 mG be limited to a few hours per day (Tr. 5, at 555 to 557). The Company also stated that the American Conference of Governmental Industrial Hygienists had established a Threshold Limit Value (a level to which nearly all workers may be exposed repeatedly without adverse health effects) of 10,000 mG (id. at 556 to 557).

The Company also provided a 1997 report by the National Research Council, 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, studies on whole animals, and epidemiological studies (Exh. EFSB-E-16). The report concludes that the current body of evidence does not show that exposure to such fields presents a human health hazard (id.). 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, and childhood cancers other than leukemia (id.). 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.). 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.). 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 also provided an update on research published since the 1997 report (id.). The Company's witness, Dr. Valberg, discussed two recent epidemiological studies which focused on a potential link between EMF levels and childhood leukemia. Dr. Valberg indicated that the first study, conducted by the National Cancer Institute ("NCI"), found no correlation between exposure to present-day measured fields of over two mG and leukemia (Tr. 5, at 550 to 552). He noted that the researchers later regrouped the study data and found statistically significant correlations for some groups with higher levels of exposure, but could not conclude

that there was a consistent pattern that would support a dose response effect (id. at 555 to 556). Dr. Valberg also noted that recent animal studies, including a recent Japanese study, where field exposure of up to 50,000 mG was assessed upon animals, did not support a relationship between field exposure and excess cancer (id.).

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-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. Nonetheless, the Company has agreed to pursue an interconnection plan that minimizes edge-of-ROW magnetic fields. Accordingly, the Siting Board finds that the health effects, if any, of electric and magnetic fields associated with 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, noise, and electric and magnetic frequencies. 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 proposed project poses no health risks related to contamination of potable groundwater; (4) the proposed project poses no health risks related to the disposal of cooling water and other wastewater; (5) the health risks of the proposed project related to the handling and disposal of hazardous materials at the proposed project would be minimized; (6) the health effects, if any, of noise from the proposed project would be minimized; and (7) the health effects, if any, of electric and magnetic fields associated with 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 Canal Station is the existence of statistically elevated

levels of bronchus and lung cancers. However, there is no evidence in the record suggesting that the pollutants which the repowered Unit 2 would emit are linked to these types of cancer. Moreover, the record shows that the proposed project would result in significant reductions in the emissions of criteria pollutants and would emit air toxics, including carcinogens, at levels below TELs and AALs. The Siting Board concludes that there is no evidence that the repowering would exacerbate any existing public health problems in the communities surrounding the proposed project. Consequently, 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 and 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 the implementation of CO_2 mitigation, the air quality impacts of the proposed project would be minimized.

In Section III.C, the Siting Board has found that, with the implementation of the condition directing the Company to submit a description of its plans for long-term monitoring of water withdrawal impacts on groundwater and wetlands, 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 the Company 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 conditions relating to on-site landscaping and off-site mitigation of visual impacts, the visual impacts of the proposed project would be minimized.

In Section III.G, the Siting Board has found that, with the implementation of the condition relating to consultation and advance notification regarding construction outside of normal hours, 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 the Company 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 development of a satellite-parking traffic analysis and mitigation plan, and acceptance of such plan by the Siting Board, 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, with the implementation of the condition to provide an update on the extent and design of any required transmission upgrades, 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, Mirant Canal II'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 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.[70]

B. Analysis

In Sections II and III, above, the Siting Board has reviewed the process by which the Company 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 that result from modifications to existing sources such as Canal Station. The Company has demonstrated that it expects to comply with all applicable MDEP standards.

As discussed in Section III.C, above, the EPA, the Army Corps, the National Marine Fisheries Service, U.S. Fish and Wildlife Service, MDMF and the MDEP regulate various wastewater discharges, and the impact of the proposed project on surface and groundwater

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[70] 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.D 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.

bodies, water quality, and fisheries in the Cape Cod Canal and Massachusetts Bay. The Company has demonstrated that it expects to comply with all applicable regulatory standards.

As discussed in Section III.D, above, the Company has demonstrated that it is working to evaluate design options consistent with MDEP, Sandwich Conservation Commission, EPA and Army Corps environmental protection policies that would result in minimizing the wetlands impacts of (1) the proposed cooling water intake/discharge on the banks of the Cape Cod Canal and (2) a transmission line to a substation that crosses over a forested wetland area.

As discussed in Section III.G, above, the Company has demonstrated that it will maintain Canal Station noise at or below existing levels, consistent with MDEP Policy 90-001, which limits noise increases to 10 dBA.

As discussed in Section III.K, above, the Company has demonstrated that it has complied with state programs protecting rare and endangered species and habitats, and historic and archaeological resources.

The proposed project also is subject to federal coastal zone consistency review pursuant to policies implemented by the Commonwealth of Massachusetts Office of Coastal Zone Management ("CZM") (Exhs. SEC-1, at 2-12-2-15; EFSB S-12-A (Att.)). The Company is required to obtain a certification from CZM that the Company's activities comply with policies under the Massachusetts Coastal Zone Management Program (Exh. EFSB-G-5-C at 5-8). CZM policies require non-coastal-dependent sites in a coastal zone to submit an alternative inland siting analysis (Exh. EFSB-S-12). However, CZM does not require an inland siting analysis if a developer can demonstrate that: (1) the proposed project would be dependent on the existing facility's infrastructure that is located in the coastal zone; (2) the effects of ancillary construction on the costal zone are fully addressed; (3) the effects of the proposed project on the land and water resources and uses of the costal zone are fully evaluated and mitigated; and (4) the effects of additional generating capacity on residential and commercial growth can be described (Exhs. EFSB-G-5-A; EFSB-S-12, at 2; EFSB-S-12-B (Att.)). The Company provided an analysis of the proposed project's consistency with CZM requirements (Exh. SEC-1, at 2-12 to 2-15). The Siting Board concludes that the proposed project appears consistent with the policies of the Commonwealth regarding development in costal zone areas.

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 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.

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 a 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 waste, visual, noise, safety, traffic and EMF 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.G, III.H, III.I, and III.J 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 hereby APPROVES, subject to conditions, the petition of Mirant Canal II, L.L.C. for approval to upgrade generating facilities at the existing Canal Station in Sandwich, Massachusetts. This upgrade would increase the electrical generating capacity of Unit 2 at Canal Station from 560 megawatts to 1225 megawatts.

The Company shall comply with the following conditions during construction and operation of the proposed generating facility:

Prior to the commencement of construction:

A. In order to minimize safety impacts, the Siting Board directs the Company to update the construction section of its ERP in consultation with appropriate Sandwich officials and file it with Sandwich before facility construction begins in order to cover possible emergencies related to construction accidents.

B. In order to minimize traffic related impacts, the Siting Board directs the Company to file with the Siting Board plans for satellite parking for construction workers, including a supporting analysis of LOS and other traffic impacts near the satellite parking area(s), and specific measures (e.g., carpooling) to mitigate any traffic impacts during construction of the project. In developing final plans for satellite parking and other traffic mitigation measures, the Siting Board directs the Company, together with its EPC contractor, to coordinate with appropriate municipal authorities concerning procurement of satellite parking and to identify and implement appropriate measures to address traffic impacts and ensure pedestrian safety in the vicinity of the satellite parking area(s) and the related bus route(s) to the project site. The plan should allow the Company to maintain

communication with local officials and safety departments to address any traffic impacts arising from construction of the proposed facility, and to ensure smooth passage of safety and emergency vehicles at all times. The Siting Board will expeditiously review the Company's filing to determine whether traffic impacts at the satellite parking area(s) would be minimized.

C. In order to minimize noise impacts, the Siting Board directs the Company to consult with local authorities prior to undertaking pile driving, steam blows, or other noisy construction activity outside the hours of 6:00 a.m. to 4:00 p.m., Monday to Friday, and to provide advance notice of such activities to any neighborhood representatives that request such notice. The Company shall provide the Siting Board with a copy of its protocol for consultation and advance notification regarding construction outside of normal hours prior to commencement of construction.

Prior to Operation:

D. In order to minimize solid waste impacts, the Siting Board directs the Company to file a copy of its 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.

During Construction and Operation:

E. In order to minimize air quality impacts, the Siting Board directs the Company to develop, in consultation with the Siting Board staff, a plan to provide CO_2 mitigation beginning no later than the end of the first year following commencement of commercial operation of the proposed project. Consistent with the Siting Board's rulings in recent cases, Mirant Canal II shall either: (1) by the end of the first year of operation, make a monetary contribution of $1,134,498 (plus an adjustment for tree-clearing) to a cost-effective program or programs for

CO_2 mitigation to be selected upon consultation with the staff of the Siting Board; or (2) by the end of the first year of operation, make a monetary contribution $474,050 (plus an adjustment for tree-clearing), 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% of the proposed project's maximum net CO_2 emissions (plus an adjustment for tree-clearing) based on voluntary curtailment of operations of other existing equipment at Canal Station, or of equipment at another existing source, subject to conditions 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 satisfy or avoid emissions offset requirements relating to other air pollutants emitted from Canal Station and/or to provide emissions offsets for any air pollutants emitted by other sources. If the Company elects one of the monetary contribution options, it should provide the Siting Board with detailed information regarding the program or programs to which the contribution will be made.

F. In order to minimize water impacts, the Siting Board directs the Company to consult with the MDEP, the Cape Cod Commission, and the Sandwich Conservation Commission concerning the need for, and design of, well monitoring for any part of the operational lifetime of the facility, in order to assess the impact of groundwater withdrawals on salinization of groundwater and on water levels in nearby wetlands; and to file with the Siting Board a description of any plans that result from this consultation for monitoring salinization and wetland impacts.

G. 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 new turbine building or compressor building at affected residential

properties, roadways and other locations within one-half mile to the east of the proposed facility, or within one-half mile to the southeast or south of the proposed facility east of the Commonwealth Electric substation, 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 owners, 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 30 days prior to the commencement of structural work on the new turbine building or compressor building, whichever occurs first; (3) may limit requests for mitigation measures from local property owners and municipal officials to a specified period ending no less than twelve 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.

H. In order to reduce the visual impacts of the project at the Sandwich Marina and Freezer Road and along the Canal Walk, the Siting Board also directs the Company, in conjunction with appropriate local and regional authorities, to develop and implement a landscaping plan for the eastern boundary of the Canal Station site, and for the northern boundary in the vicinity of the proposed new structures.

I. In order to minimize safety impacts, the Siting Board directs the Company to consult with the appropriate Sandwich officials in preparing its updated SPCC plan.

J. In order to minimize EMF impacts, the Siting Board directs the Company to provide the Siting Board with an update on the extent and design of any required transmission upgrades, and the measures incorporated into such transmission upgrade designs to minimize magnetic field impacts, at such time as the Company reaches final agreement with all transmission providers regarding transmission upgrades.

Because the 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.

William H. Stevens, Jr.
Hearing Officer

Dated this 15th day of June, 2001

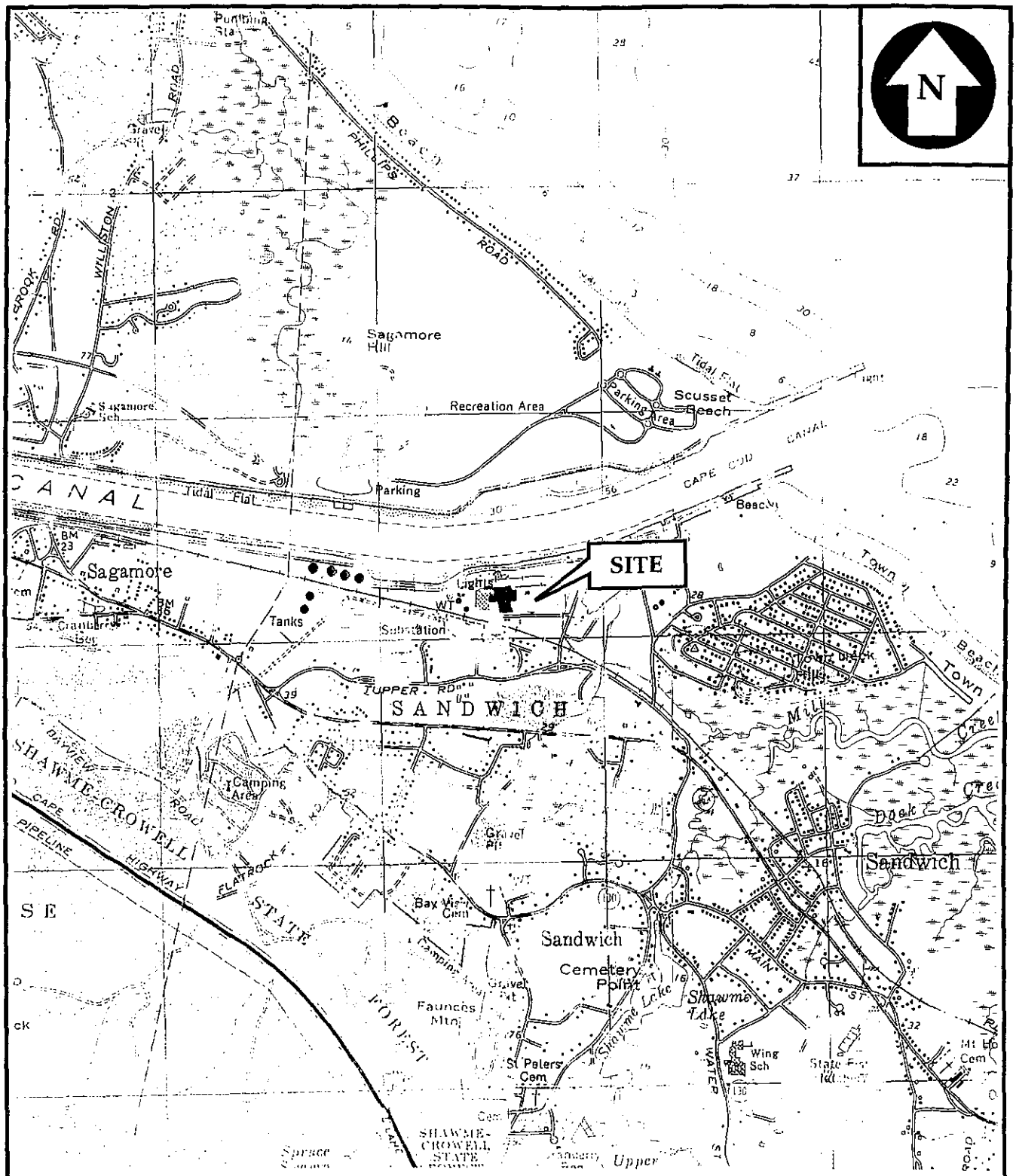
APPROVED by the Energy Facilities Siting Board at its meeting of June 14, 2001, by the members and designees present and voting: James Connelly (Chairman, DTE/EFSB); Deirdre K. Manning (Commissioner, DTE); W. Robert Keating (Commissioner, DTE); David L. O'Connor (Commissioner, Division of Energy Resources); and Joseph Donovan (for Elizabeth Ames, Director of Economic Development).

James Connelly, Chairman
Energy Facilities Siting Board

Dated this 14th day of June, 2001.

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: SAGAMORE, MA 1967, PHOTOREVISED 1979; SANDWICH, MA 1972; POCASSET, MA 1967, PHOTOREVISED 1979

CANAL REDEVELOPMENT PROJECT

SITE LOCATION MAP

CANAL STATION
SANDWICH, MASSACHUSETTS

FIGURE 1

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 RULING ON MOTION TO VACATE

ACTION BY CONSENT

I. PROCEDURAL HISTORY

On April 1, 1999, Nickel Hill Energy, LLC ("Nickel Hill") filed with the Energy Facilities Siting Board ("Siting Board") a petition for approval to construct a 750 megawatt ("MW") gas-fired combined-cycle generating facility in the Town of Dracut ("proposed project") pursuant to G.L. c. 164, § 69J¼. The Siting Board issued its Final Decision approving the project on November 13, 2000. Nickel Hill Energy, LLC, 11 DOMSB 83 (2000) ("Final Decision"). On December 20, 2000, Merrimack Valley Residents for the Environment, Inc. ("MVRE") and the Town of Andover ("Andover") filed a joint petition to appeal the Final Decision, pursuant to G.L. c. 25, § 5 and G.L. c. 164, § 69P, with the Supreme Judicial Court.[1]

On June 1, 2001, MVRE filed a Motion to Vacate the Final Decision of the Energy Facilities Siting Board ("MVRE Motion").[2] On June 7, 2001, Nickel Hill and the Town of Dracut each filed an opposition to MVRE's Motion ("Nickel Hill Opposition;" "Town of Dracut Opposition"). Also on June 7, 2001, MVRE filed a Reply to Nickel Hill's Opposition ("MVRE Reply"). On June 21, 2001, MVRE filed a Supplement to the MVRE Motion ("MVRE Supplement"). On June 25, 2001, Nickel Hill filed a response to the MVRE Supplement ("Nickel Hill Response"). On June 27, 2001, MVRE filed a Second Reply ("MVRE Second Reply").

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[1] The parties filed a Joint Motion to Reserve and Report the matter to the full Supreme Judicial Court. This motion was granted by the Single Justice on March 21, 2001. Briefing has concluded and oral argument before the Supreme Judicial Court is scheduled for September 6, 2001 (Supreme Judicial Court Notice of Oral Argument, August 3, 2001).

[2] In its cover letter, MVRE requests oral argument on its Motion.

II. POSITIONS OF THE PARTIES

A. Position of MVRE

MVRE argues that the Final Decision should be vacated because certain representations made by Nickel Hill during the proceeding may no longer be accurate (MVRE Motion at 1). In support, MVRE asserts that affidavits[3] submitted in support of MVRE's Motion and the public announcement[4] by Constellation Power, Inc. ("Constellation"), Nickel Hill's parent company, indicating that Constellation will not develop the proposed project at this time contradict testimony and evidence offered by Nickel Hill during the evidentiary hearings (MVRE Motion at 1-2; MVRE Supplement at 2). MVRE argues that such contradicted testimony and evidence cannot serve as a basis for any finding in the Final Decision (id.).[5]

MVRE also contends that because Nickel Hill has "abandoned the Project because of . . . its inability to compete," a controversy no longer exists and, consequently, it is appropriate to vacate the Final Decision as moot (MVRE Motion at 1-2, citing Building Comm'r of Cambridge v. Building Code Appeals Bd., 34 Mass. App. Ct. 696 (1993); Jones v. Superintendent, Massachusetts Correctional Inst. at Bridgewater, 5 Mass. App. Ct. 880 (1977); Lebel v. Cardone, Mass. Superior Court, No. Civ. A 990646, 1999 WL 674247; Connolly v. Moreno, Mass. Superior Court, No. Civ. A 98-00325, 1998 WL 472038).

Finally, MVRE notes the possibility that Nickel Hill may seek a purchaser for the proposed project, and argues that any transfer of the Siting Board approval is prohibited by G.L.

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3 MVRE provided an affidavit of an MVRE officer indicating that she had been told that Constellation would not develop the proposed project and that Nickel Hill had withdrawn from a Payment in Lieu of Taxes ("PILOT") Agreement with the Town of Dracut and an agreement to lease with the site owner (MVRE Motion at 2, Affdiavit A). MVRE also provided affidavits by counsel of record for MVRE, with appended newspaper articles (MVRE Motion at 2; Affidavit B, and attachment, Affidavit C).

4 MVRE provided an "External Statement" authored by Constellation Power Source dated May 22, 2001, which indicates it will not build the proposed facility "due primarily to the changed conditions in the New England energy market" (MVRE Supplement at Exhibit A).

5 MVRE argues that the contradicted testimony and evidence concern a proposed noise easement; an executed term sheet for the potential lease and option to purchase of the 25-acre site; displacement of New England regional emissions; a special permit issued by the Town of Dracut addressing the widening of an intersection and street; "the entire pollution profile assigned to the plant;" and other "numerous representations" (MVRE Motion at 1-3; MVRE Supplement at 2; MVRE Reply at 1).

c. 164, § 1F (MVRE Motion at 4). In the alternative, MVRE asserts that the Siting Board relied in its Final Decision upon the expertise of Constellation as a major reason for approving the project, and argues that another developer might not have similar expertise (id.).

In summary, MVRE requests that the Siting Board vacate its Final Decision, after which the pending appeal may be dismissed as moot (MVRE Motion at 6). In the alternative, MVRE requests that the Siting Board schedule an evidentiary hearing and/or briefing of the issues raised in MVRE's Motion to allow for appeal of this ruling on MVRE's Motion as part of the current appellate proceeding (MVRE Motion at 3, 5-6; MVRE Supplement at 3). In support, MVRE argues it is appropriate to add newly discovered evidence to a motion and argues a judgment may be vacated based upon newly discovered evidence or subsequent developments (id.)(citing Mass. R. Civ. P. 59; Commonwealth v. Lanigan, 419 Mass. 15 (1994); Commonwealth v. Jones, 432 Mass. 623 (2000)).

B. Position of Nickel Hill

Nickel Hill argues MVRE's Motion lacks any basis because it raises issues not currently before the Siting Board and is not a proper pleading (Nickel Hill Opposition at 1). Nickel Hill argues that, although Constellation has made an initial determination not to proceed with the project, the formal announcement of this determination has been postponed to allow other qualified entities to acquire Nickel Hill and its assets (id. at 2). Nickel Hill states that it has not formally withdrawn from any permits, contracts, or approvals, and that it remains in complete compliance with the Siting Board's approval (id. at 2-4). Nickel Hill also argues that the Final Decision rendered by the Siting Board must be considered as final because if an agency retained jurisdiction to vacate its own decision after it has become appealable to the court system, no agency decision could ever be considered final under G.L. c. 30A, § 14 (id. at 2).

Nickel Hill further argues that even if MVRE's Motion were properly before the Siting Board, the interests of Constellation in this project are freely assignable (id. at 1). Nickel Hill notes that, in the past, Siting Board approvals have been validly transferred to other entities and that such approvals are transferable and assignable as long as the Siting Board is noticed and the substantive requirements of the Final Decision are followed (id. at 3-4). Nickel Hill states that should a transfer occur, the Siting Board would be informed (id. at 4). Nickel Hill further argues G.L. c. 164, § 1F is irrelevant and inapplicable to Nickel Hill or this proceeding (id. at 3-4).

In response to MVRE's argument that the Final Decision is moot, Nickel Hill argues MVRE has not demonstrated that Nickel Hill has relinquished its stake in the validity of the Siting Board's Final Decision (id. at 5)(citing Blake v. Massachusetts Parole Bd., 369 Mass. 701, 703 (1976)(holding litigation is considered moot when the party who claimed to be aggrieved ceases to have a personal stake in its outcome)). Nickel Hill notes that MVRE's Motion is based solely on two newspaper articles and conversations between MVRE and the Town Manager, the press, or agents for Nickel Hill (Nickel Hill Opposition at 5). Nickel Hill asserts that such

information cannot serve as a basis for the Siting Board to vacate its own decision as moot (id. at 3-4). Finally, Nickel Hill argues that the statements attributable to Nickel Hill and Constellation regarding a possible or expected event, printed in a newspaper, are not "binding admissions" and MVRE's arguments are therefore based on speculation, hearsay, and a desire to see this project terminated (id.).

C. Position of the Town of Dracut

The Town of Dracut asserts that, contrary to MVRE's assertions, the Dracut Town Manager did not state to an officer of MVRE that Nickel Hill was withdrawing from its PILOT Agreement or its agreement with the owner of the site of the proposed project (Town of Dracut Opposition at 1).[6] The Town of Dracut also argues that the affidavit of an MVRE officer describing her conversation with the Town Manager regarding Nickel Hill's plans constitutes hearsay and should not be given any weight (id. at 2). The Town of Dracut asserts that while hearsay statements may be admissible in administrative proceedings to support the truth of the matter asserted, the Hearing Officer should determine the reliability of the statements by looking to the circumstances under which the statements were made (id.).

The Town of Dracut also notes that the Town Manager has no authority to speak on behalf of Nickel Hill (id.). Moreover, the Town of Dracut asserts such statements cannot be used for estoppel purposes (id.).

D. Analysis and Findings

1. Request for Oral Argument

Under Siting Board regulations, the scheduling of oral argument on a motion is discretionary. 980 CMR, §1.04(3). Because the parties have submitted extensive written argument, MVRE's request for oral argument is hereby denied.

2. Motion to Vacate

After taking into consideration all argument presented, MVRE's Motion to Vacate the Final Decision is denied on two grounds: first, the motion is not properly before the Siting Board at this time, and second, MVRE's substantive arguments do not support its Motion to Vacate.

A motion to vacate a Siting Board final decision currently on appeal with the Supreme Judicial Court is inappropriate. Because an appeal of a Siting Board final decision may be taken to the Supreme Judicial Court by an aggrieved party in interest pursuant to G.L. c. 164, § 69P and

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[6] The Town of Dracut submitted an affidavit from the Town Manager to this effect (Town of Dracut Opposition).

c. 25, § 5, the Siting Board may not reverse or vacate its Final Decision absent certain extraordinary circumstances which are not present in this case. See G.L. c. 30A, § 14 ("[w]here a statutory form of judicial review is provided such statutory form shall govern in all respects, except as to standards of review"); Fitchburg Gas and Elec. Light Co. v. Department of Public Utilities, 394 Mass. 671, 677 (1985); Federman v. Board of Appeals of Marblehead, 35 Mass. App. Ct. 727 (1994); Pastene Wine & Spirits Co., Inc., v. Alcoholic Beverages Control Comm'n, 16 Mass. App. Ct. 156 (1983). Moreover, an administrative agency may not reverse or vacate a decision on the basis of evidence obtained after the close of an administrative proceeding without reopening the proceeding. See Vitale v. Planning Bd. of Newburyport, 10 Mass. App. Ct. 483 (1980). Therefore, because an appeal of the Final Decision may be and was filed, MVRE's Motion to Vacate the Final Decision is denied on procedural grounds.

MVRE's substantive arguments in support of its Motion to Vacate also are inapposite. MVRE argues that the Final Decision should be vacated on two grounds. First, MVRE argues that because Constellation has decided not to pursue development of this project, no controversy exists and the Final Decision is moot and should be vacated. Second, MVRE argues that Constellation's decision not to pursue development of the proposed project undercuts certain testimony of Nickel Hill's witnesses offered during the proceeding, which testimony may have served as a basis for findings in the Final Decision.

MVRE's argument that no controversy exists, and that the Final Decision therefore is moot and should be vacated, fails because the procedural posture of this matter has not changed.[7] Nickel Hill's petition to construct a generating facility was properly adjudicated and decided by the Siting Board. The decision is final, and is in fact on appeal. No credible evidence altering this procedural posture has been presented. Newspaper articles notwithstanding, it is evident from the pleadings that Nickel Hill retains an interest in either constructing or selling the Nickel Hill project and a strong interest in the continuing validity of the Final Decision. Logically, no person other than Nickel Hill is capable of determining or authorized to determine when Nickel Hill no longer retains any interest in the project. If Nickel Hill ever determines that it has no remaining interest in the Final Decision, it may, if it chooses, withdraw its petition to construct. See Silver City Energy Limited Partnership (Action by Consent), 4 DOMSB 445 (1994); Eastern Energy Corporation (Action by Consent), 4 DOMSB 213 (1996); Altresco Lynn, Inc. (Action by Consent), 4 DOMSB 459 (1993). The Siting Board will consider a motion to withdraw if and when Nickel Hill chooses to file one.

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[7] The Siting Board also notes that MVRE cites case law that addresses the mootness of complaints and appeals rather than mootness of an adjudicated administrative law decision. See Lebel v.Cardone, Mass. Superior Court, No. Civ. A 990646, 1999 WL 674247; Connolly v. Morneo Mass. Superior Court, No. Civ. A 98-00325, 1998 472038; Building Comm'r. of Cambridge v. Building Code Appeals Bd., 34 Mass. App. Ct. 696 (1993); Jones v. Superintendent, Massachusetts Correctional Institution at Bridgewater, 5 Mass. App. Ct. 880 (1977).

Moreover, as a general matter, an issued Final Decision does not necessarily become moot simply because the applicant declines to proceed with the proposed project. The Siting Board issues an approval, through the process of an adjudication, of an applicant's petition. See G.L. c. 164, § 69J¼; c. 30A, § 11. Neither statutory nor regulatory law requires the recipient of a Siting Board approval to construct an approved project. However, if the project is to be constructed, construction generally must commence within three years of the date of the Final Decision.[8] See Nickel Hill Energy, LLC, 11 DOMSB 83, at 250 (2000); Sithe West Medway, LLC, 10 DOMSB 274, at 372; Southern Energy Kendall, LLC, 11 DOMSB 255, at 396 (2000). Because an applicant is not compelled to construct an approved project, and because the Final Decision affords the applicant three years in which to begin construction, an interim decision not to construct the proposed project does not warrant vacating the Final Decision. See Building Comm'r. of Cambridge, 34 Mass. App. Ct. 696 (1993).

Finally, after reviewing MVRE's pleadings and the content of the Final Decision, the Siting Board concludes that nothing offered by MVRE directly contradicts testimony relied on in the Final Decision. Changes in the status of the development of the proposed project, if they occur, do not automatically make prior sworn testimony incorrect. Further, a number of issues raised by MVRE, including the economics of the proposed project and the power development expertise of the developer, are clearly outside the statutory scope of the Siting Board's review of power plants. See G.L. c. 164, § 69J¼; Notice of Inquiry with regard to the Siting Board's Standard of Review for Generating Facility Viability, 7 DOMSB 19 (1998). The Siting Board concludes that Constellation's decision not to pursue the Nickel Hill project at this time does not invalidate or make the Final Decision moot.

For the reasons stated above, MVRE's Motion to Vacate the Final Decision also is denied on substantive grounds.

3. Motion for Further Hearings, Disclosure of Plans, and Briefing

MVRE seeks, in the alternative, an order requiring: (1) a further evidentiary hearing; (2) that Nickel Hill disclose its plans to transfer the project; and (3) that the parties be given the opportunity to brief the issue of how the Final Decision may be affected by Constellation's statement that it has abandoned the project. Given the current lack of information regarding the status of the Nickel Hill project, MVRE's motion for further evidentiary hearings, disclosure of plans, and briefing is premature. See Lahey Clinic Found., Inc. v. Health Facilities Appeals Bd., 376 Mass. 359, 376 (1978). However, the Siting Board does have in place procedures for reviewing proposals to alter a project after a final decision has been issued; for purposes of clarity, we discuss these briefly here.

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[8] The Siting Board notes that, if Nickel Hill or its successor does not commence construction within three years of the date of issuance of the Final Decision, the project approval is void unless an extension is timely sought and granted.

As a preliminary matter, we note that, in the Final Decision in this matter, the Siting Board approved the petition of Nickel Hill to construct a 750 MW generating facility in Dracut, Massachusetts, subject to conditions. Final Decision, at 102, 246-252. 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. In that decision, the Siting Board also required 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." Id. at 250.

The Siting Board routinely imposes this notification requirement in its final decisions because, by statute, it is the agency of first permit. Specifically, G.L. c. 164, § 69J¼ states that "no state agency of the commonwealth shall issue a construction permit for any such generating facility unless the petition to construct such generating facility has been approved by the [siting] board pursuant to this section." G.L. c. 164, § 69J¼. Because of its role as grantor of the first permit, the Siting Board has long recognized that changes may be made to a project after the Siting Board issues its decision. For this reason, the Siting Board has put into place a process that allows it to determine whether it should take action if specific changes to a project are proposed (or are required by sister agencies) after the Siting Board has rendered its decision. When it is notified of such a change, the Siting Board reviews the scope and detail of the change to determine whether to inquire further into the issue. If further inquiry is necessary, it then determines whether the project change alters in any substantive way either the assumptions or conclusions reached in its analysis of the project's environmental impacts in the underlying proceeding. IDC Bellingham LLC Final Decision on Compliance, 11 DOMSB, 38-39 (2000); Berkshire Power Decision on Compliance, 7 DOMSB 423 (1997).

MVRE's motion for further hearings rests at this time on affidavits and newspaper articles, both indicating that Constellation has determined not to construct the Nickel Hill project and that certain elements of the proposed project are in flux. Nickel Hill in its pleadings has indicated that it is seeking a qualified purchaser for the project,[9] and that it is currently in compliance with the Final Decision. Nickel Hill has not filed any information with the Siting Board regarding proposed project changes, nor has any other person provided the Siting Board with any evidence that any entity plans to build the project in a manner inconsistent with the

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[9] In response to a motion filed at the Supreme Judicial Court, Nickel Hill stated that Constellation has signed an agreement with a prospective purchaser to engage in a due diligence review of the project. Town of Andover, et al. v. Energy Facilities Siting Board, SJC-08532, Respondents' Joint Response To The Appellant's Motion to (a) To Stay Appeal; (b) To Remand Case To Energy Facilities Siting Board; and (c) To Dismiss Appeal As Moot. The fact that Nickel Hill is negotiating with a purchaser does not by itself signify that a project change has occurred that would warrant inquiry by the Siting Board.

Final Decision. Speculation that project changes may occur subsequent to a hypothetical transfer of project ownership does not and should not warrant the expenditure of resources to hold further evidentiary hearings. Such action would serve no useful purpose, and would not foster administrative efficiency. If, in the future, specific substantive changes to the project are proposed, either by Nickel Hill or by another entity that has acquired the Nickel Hill project, the Siting Board will consider the proposed changes to determine whether to inquire further into the issue, and, if so, whether the project changes alter in any substantive way either the assumptions or conclusions reached in our analysis of the project's environmental impacts in the underlying proceeding.

Absent information regarding definitive plans for specific changes to the Nickel Hill project as approved, MVRE's motion for further hearings, disclosure of plans, and briefing is premature. Accordingly, MVRE's motion for further hearings, disclosure of plans, and briefing is denied.

4. Transferability of Approval

MVRE argues that the Nickel Hill approval may not be transferred to another entity, either because G.L. c. 164, § 1F prohibits such a transfer, or because the Siting Board relied on Constellation's expertise in approving the Nickel Hill project. Although this argument is not directly related to the Motion to Vacate, we address it here for clarity.

MVRE's interpretation of c. 164, § 1F as prohibiting transfer of a Siting Board approval because it requires disclosure of an applicant's technical ability is incorrect. Chapter 164, § 1F addresses the licensure, by the Department of Telecommunications and Energy, of generation companies that sell electricity at retail. This statutory provision is wholly inapplicable to the adjudication by the Siting Board of a petition to construct a generating facility. Compare G.L. c. 164, §1F with G.L. c. 164, § 69J¼.

MVRE also suggests that the Siting Board relied on the expertise of Constellation in approving the proposed project. This suggestion is incorrect. The Siting Board could not have considered such information in rendering the Final Decision, because our statutory mandate allows us to review only the environmental impacts of generating facilities, consistent with the Commonwealth's policy of allowing market forces to determine the need and cost of such facilities. G.L. c. 164, § 69H. Further, in 1998, the Siting Board issued a determination concluding that issues such as the experience and expertise of a project proponent had been placed outside the scope of the Siting Board's review by enactment of the 1997 Electric restructuring Act. Notice of Inquiry with regard to the Siting Board's Standard of Review for Generating Facility Viability, 7 DOMSB 19 (1998).

The Siting Board concludes that neither of MVRE's arguments support the proposition that a Siting Board approval may not be transferred to another entity. Changes in corporate

ownership of a project are, in fact, commonplace. See IDC Bellingham LLC, EFSB 97-5, at 15, 16 n. 22 (1999); see also Southern Energy Canal II, LLC, 98-9, at 1 n.1 and 3 (2001); and Sithe West Medway Development, LLC, EFSB 98-10 (Letter to EFSB, Jan. 4, 2000). However, the Siting Board notes that any future developer of the Nickel Hill project must build the project in full compliance with the Final Decision, unless it first seeks and receives Siting Board approval of a change to the project.

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 Elizabeth Ames, Director
Department of Economic
Development

David L. O'Connor
Commissioner
Division of Energy Resources

Signed:

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Louis Mandarini, Jr.
Public Member

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Commissioner
Department of Telecommunications and Energy

Joseph Donovan
For Elizabeth Ames, Director
Department of Economic
Development

David L. O'Connor
Commissioner
Division of Energy Resources

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
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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 ON MOTION FOR CLARIFICATION

Sheila R. McIntyre
Hearing Officer
August 31, 2001

On the Decision:
William Febiger

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I. INTRODUCTION

On December 15, 2000, the Energy Facilities Siting Board ("Siting Board") issued its final decision in Southern Energy Kendall, LLC, 11 DOMSB 255 (2000) ("Final Decision"). The Final Decision conditionally approved the petition of Mirant Kendall, LLC ("Mirant Kendall" or "Company"), formerly known as Southern Energy Kendall LLC, to upgrade generating facilities at the existing Kendall Square Station ("Kendall Station") in Cambridge, Massachusetts. The proposed project would upgrade the existing cogeneration plant into a natural gas-fired, combined cycle, electric generating facility and increase generating capacity at Kendall Station from approximately 64 megawatts to approximately 234 megawatts. Final Decision, 11 DOMSB 255, 266.

On January 2, 2001, Mirant Kendall timely filed a motion to extend the judicial appeal period of the Final Decision. The Siting Board granted this motion and subsequently granted timely requests to further extend the appeal period.[1] On April 20, 2001, Mirant Kendall filed a Motion for Clarification of Condition G of the Final Decision ("Motion").[2] Condition G states the following:

> 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.

Id. at 293, 393.[3,4]

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1 Final Decision, 11 DOMSB 255 (rulings on extension of judicial appeal periods; January 25, 2001, February 16, 2001, March 3, 2001).

2 Mirant Kendall also filed for further extension of the judicial appeal period until 10 days after action on the Motion. On April 20, 2001 we granted the requested extension.

3 Mirant Kendall states that its Motion concerns only the first sentence of Condition G and that it has already complied with the last sentence of Condition G (Motion at 1, 2).

4 In its Motion, Mirant Kendall seeks clarification or reconsideration of Condition G.

(continued...)

II. BACKGROUND

The existing Kendall Station produces steam using three main steam boilers (boilers 1, 2, and 3) and two back-up steam package boilers (boilers 4 and 5). Id. at 267. Mirant Kendall has proposed to expand the existing Kendall Station by constructing a new building to house a 170 MW combustion turbine generator ("CTG") and a heat recovery steam generator ("HRSG"). The CTG would run primarily on natural gas, with a 30-day back-up supply of oil. Id. The new CTG would generate electricity and the new HRSG would produce steam for use in the steam turbines of the existing plant and for sale to COM/Steam. Id. at 267-268. 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 268. 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.[5] Id.

III. STANDARD OF REVIEW

The Siting Board has established a standard of review for motions for clarification of a final decision by adopting the standard of review for clarification used by the Department of Public Utilities (now the Department of Telecommunications and Energy). See Eastern Energy Corporation, EFSB 90-100R (final decision on remand from the Supreme Judicial Court), Procedural Order on Motions for Clarification and Extension of Judicial Appeal Period (December 14, 1993) ("Eastern Energy Procedural Order"). That standard is as follows:

> A Motion for Clarification of a Final Decision may be granted when a Final Decision is silent as to the disposition of a specific issue requiring determination in the Final Decision, or when the Final Decision contains language that is sufficiently ambiguous to leave doubt as to its meaning. Clarification does not involve reexamining the record for the purpose of substantively modifying the

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4 (...continued)
Since, as indicated below, we determine that Mirant Kendall's request falls within the standard of review for clarification, we need not address any issues regarding reconsideration of a final decision.

5 Mirant Kendall has an obligation to meet its steam sale requirements on an uninterruptible basis. Final Decision, 11 DOMSB 255, 281.

decision. Eastern Energy Procedural Order at 3.

IV. ANALYSIS

Mirant Kendall states that it seeks clarification regarding the application of Condition G for two reasons (Motion at 6). First, Mirant Kendall argues that the exceptions for ozone season oil-firing allowed by the Massachusetts Department of Environmental Protection ("MDEP") in its Proposed Conditional Major Comprehensive Plan Approval ("Proposed Conditional Approval") for the Mirant Kendall project are more broad in scope than those set forth in Condition G (id.).[6] Second, Mirant Kendall argues that the Proposed Conditional Approval does not restrict oil-firing in boilers 1, 2 and 3 (id.). The Siting Board examines these issues in turn.

A. Exceptions to Prohibition on Ozone Season Oil-Firing

Mirant Kendall has provided a copy of the MDEP's Proposed Conditional Approval for the Mirant Kendall project. In its Proposed Conditional Approval, the MDEP set limits on the use of fuel oil in the CTG. Specifically, Proviso E of the Proposed Conditional Approval provides that Mirant Kendall "shall not burn transportation distillate fuel oil during the time period May 1 through September 30 inclusive of any calendar year, except during initial compliance testing, initial plant demonstration and performance testing, periodic readiness testing, in the event of the unavailability of natural gas, or in the case of a variance obtained from the Department to operate during an emergency."

The Siting Board's Condition G also restricted the use of oil during the ozone season, specifically requiring the Company to "limit oil firing . . . 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 . . ." Final Decision, 11 DOMSB 255, 296. A comparison of the two conditions makes it clear that, while the Final Decision addresses the use of oil only during normal operations, the Proposed Conditional Approval also addresses the use of oil during

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[6] The Siting Board notes that the MDEP may issue a Proposed Conditional Major Comprehensive Plan Approval for a proposed generating project pursuant to 310 CMR 7.02.

periods of testing and during emergency conditions. The lack of explicit discussion in the Final Decision regarding either testing periods or emergency conditions creates sufficient ambiguity as to leave doubt as to the meaning of Condition G. Consequently, the Siting Board grants Mirant Kendall's request for clarification on this issue.

In the Final Decision, the Siting Board approved the construction and operation of the Kendall Station project. The Siting Board notes that the project cannot move from construction into commercial operation without initial testing of the new equipment, and cannot continue to operate as designed and in compliance with its permits without further periodic testing. Thus, any condition imposed in the Final Decision should be construed to allow testing as necessary to comply with the requirements of our sister agencies. Similarly, the Siting Board has a fundamental duty to provide for "a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost." G.L. c. 164, § 69H. Thus, the conditions imposed by the Board in the Final Decision should not be read to preclude the use of oil at Kendall Station during emergency conditions, provided that Mirant Kendall has sought and obtained a variance from the MDEP.

Consequently, the Siting Board clarifies that the restriction on oil-firing set forth in Condition G was intended to apply to periods of normal operation, and not to periods of testing or to operation during emergency conditions. The exceptions allowed under Condition G should be construed to be consistent with the exceptions allowed in the MDEP Proposed Conditional Approval.

B. Use of Oil in Boilers 1, 2 and 3

In its Motion, Mirant Kendall also identifies a discrepancy between Condition G of the Final Decision and the Proposed Conditional Approval with respect to the issue of oil-burning in existing boilers 1, 2 and 3 (Motion at 7). Specifically, Condition G 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." Final Decision, 11 DOMSB 255, 296. The Proposed Conditional

Approval, however, places no condition on oil-firing in boilers 1, 2 and 3.

Mirant Kendall suggests that the Siting Board intended in Condition G to require that the Company "comply with permit conditions imposed by MDEP regarding air quality," and on this ground seeks clarification or reconsideration of Condition G as it applies to boilers 1, 2 and 3 (Motion at 8-9). The Siting Board notes that its intent in imposing Condition G was not simply to ensure that Mirant Kendall complied with conditions imposed by the MDEP. The obligation to comply with permits issued by agencies of the Commonwealth is incumbent upon any person proposing any project requiring such permits; no special condition is required to impose such an obligation. Rather, the Siting Board in the Final Decision sought to restrict the use of oil in both the new CTG and boilers 1, 2 and 3, and to provide for consistency of resource use permits between state agencies by instructing Mirant Kendall to seek a consistent permit from the MDEP.[7] However, the Final Decision was silent as to the Company's responsibilities pursuant to Condition G if the MDEP did not similarly restrict the use of oil in both the new CTG and boilers 1, 2 and 3. Because the Final Decision specifically references the MDEP air plan approval, but is silent as to the disposition of any inconsistency between the terms of the Proposed Conditional Approval and Condition G, the Siting Board grants Mirant Kendall's request for clarification on this issue.

In determining the disposition of this specific issue, the Siting Board considers both its intent in the Final Decision, and the information contained in the MDEP's Proposed Conditional Approval. As noted above, the Siting Board in the Final Decision sought both to place restrictions on the use of oil in existing boilers 1, 2 and 3, and to provide for consistency in permitting between state agencies dealing with related matters. The Proposed Conditional Approval places no restrictions on the use of oil in existing boilers 1, 2 and 3, and thus introduces a level of inconsistency between the Final Decision and the MDEP permits. This inconsistency could be resolved simply by requiring Mirant Kendall to comply with the stricter Siting Board requirements. However, the Proposed Conditional Approval also notes that further restrictions on the use of the CTG may be imposed to mitigate the project's increased thermal

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[7] The Siting Board notes that Siting Board staff also communicated directly with the MDEP regarding Condition G after the Final Decision was issued.

impacts on the Charles River from the discharge of cooling water (Proposed Conditional Approval at 44). Specifically, the Proposed Conditional Approval states that:

> Based on its preliminary review of the NPDES application, the Department foresees that facility operations may have to be significantly curtailed during the period from late spring to early fall in order to adequately protect the habitat and fish population. . . . Detailed facility operational limitations, design modifications and mitigation measures will be established, as necessary, in the final NPDES permit and Water Quality Certification (id.).

Thus, it appears that the operating and related economic assumptions upon which the Siting Board relied when it placed restrictions on the use of oil in boilers 1, 2 and 3 during the ozone season (which also runs from late spring to early fall) may no longer be accurate. Further, the Siting Board is concerned that if it continues to restrict the use of oil in boilers 1, 2 and 3, it may unnecessarily complicate the MDEP and the Environmental Protection Agency's review of the project's NPDES permit and Water Quality Certification. In this specific situation, and in light of the sizable reductions in NO_X and SO_2 emissions provided by the Kendall Station project,[8] the goal of achieving consistent resource permits for the project takes precedence over the goal of restricting oil use in the existing boilers. Consequently, the Siting Board clarifies that Mirant Kendall need not restrict its use of oil in boilers 1, 2 and 3 pursuant to Condition G if the MDEP does not impose a similar requirement in its Conditional Air Permit.

The Siting Board notes that if the operation of the CTG is significantly curtailed during the period from late spring to early fall, the air quality analysis upon which the Siting Board relied in the Final Decision may no longer accurately represent the projected operation of the proposed project. The Siting Board therefore directs Mirant Kendall, at such time as it receives the NPDES permit and Water Quality Certification for the proposed project, to notify the Siting Board and describe any changes in its projected operation so that the Siting Board may decide whether to inquire further into the issue.

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[8] The project would reduce annual station-wide emissions from 365 tons per year ("tpy") to 204 tpy for NO_X, and from 247 tpy to 166 tpy for SO_2. Final Decision, 11 DOMSB 255, 284, 294.

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 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.

In Section III, above, the Siting Board granted Mirant Kendall's request for clarification concerning Condition G of the Final Decision. Specifically, the Siting Board has clarified that the restriction on oil-firing set forth in Condition G was intended to apply to periods of normal operation, and not to periods of testing or to operation during emergency conditions and should be construed to be consistent with the exceptions allowed in the MDEP Proposed Conditional Approval. In Section III, above, the Siting Board also has clarified that Mirant Kendall need not restrict its use of oil in boilers 1, 2 and 3 pursuant to Condition G if the MDEP does not impose a similar requirement in its Proposed Conditional Approval. Further, in Section III, above, the Siting Board has directed Mirant Kendall, at such time as it receives the NPDES permit and Water Quality Certification for the proposed project, to notify the Siting Board and describe any changes in its projected operation so that the Siting Board may decide whether to inquire further into the issue.

Accordingly, the Siting Board finds that upon compliance with the standing conditions in the Final Decision as clarified in Section III, above, the construction and operation of the proposed facility will contribute to a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

In addition, the Siting Board notes that the findings in this decision are based upon the record that supported the Final Decision and information contained in the MDEP Proposed Conditional Approval. 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 31st day of August, 2001

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 Cambridge Electric Light Company for Approval to Construct One New, Underground 115 kV Transmission Line in the City of Cambridge, Massachusetts.	)	EFSB 00-3; D.T.E. 00-103

FINAL DECISION

Sheila R. McIntyre
Hearing Officer
September 25, 2001

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TABLE OF CONTENTS

LIST OF ABBREVIATIONS

Abbreviation	Explanation
ANP Blackstone Decision	ANP Blackstone Energy Company, 8 DOMSB 1 (1999)
BECo	Boston Edison Company
CELCo	Cambridge Electric Light Company
City	City of Cambridge as intervener
Com/Electric	Commonwealth Electric Company
Company	Cambridge Electric Light Company
Company brief	Cambridge Electric Light Company's brief
CRA	Cambridge Redevelopment Authority
Department	Department of Telecommunications and Energy
EIR	Environmental Impact Report
EMF	Electric and magnetic fields
HPOF	High pressure oil filled
Kendall Station	Kendall Generating Station
kV	Kilovolt
MDC	Metropolitan District Commission
MDEP	Massachusetts Department of Environmental Protection
MEPA	Massachusetts Environmental Policy Act
mG	Milligauss
MHC	Massachusetts Historical Commission
Mirant	Southern Energy Kendall, LLC
MIT	Massachusetts Institute of Technology
MMWEC Decision	Massachusetts Municipal Wholesale Electric Company, EFSB 97-4 (2001)
MW	Megawatt
MWRA	Massachusetts Water Resources Authority
1995 NEPCo Decision	New England Power Company, 4 DOMSB 109, 167 (1995)
1997 BECo Decision	Boston Edison Company, 6 DOMSB 208 (1997)

NEPOOL	New England Power Pool
NFA	No Further Action
NRC	National Research Council
NRHP	National Register of Historic Places
OHM	Oil and hazardous material
Putnam Substation	Putnam Bulk Substation
RAO	Response Action Outcome
Restructuring Act	1997 Electric Utility Restructuring Act
ROW	Right-of-way
SE Kendall Decision	Southern Energy Kendall, LLC, 11 DOMSB 255 (2000)
Siting Board	Energy Facilities Siting Board
Turner Falls Decision	Turner Falls Limited Partnership, 18 DOMSC 141 (1988)

The Energy Facilities Siting Board hereby APPROVES the petition of Cambridge Electric Light Company to construct, maintain and operate one new 115 kilovolt underground transmission line in the City of Cambridge, Massachusetts using the Company's Primary Route.

I. INTRODUCTION

A. Summary of the Proposed Project and Facilities

Cambridge Electric Light Company ("CELCo" or "Company") is an electric operating subsidiary of NSTAR Electric and Gas Corporation (Company Brief at 1). CELCo has proposed to construct an approximately 2.6 mile, 115 kilovolt ("kV") underground transmission line between the Kendall Generating Station ("Kendall Station") and CELCo's Putnam Bulk Substation ("Putnam Substation") on Putnam Avenue in Cambridge (Exh. KSE-1, at 1-1). The proposed project is required to accommodate Mirant Corporation's repowering project at Kendall Station (id.).[1] The proposed transmission facilities will connect the repowered Kendall Station to the New England transmission grid via Putnam Substation (id.). The proposed transmission line will consist of 3 conductors placed in a concrete encased duct bank consisting of 9 ducts in a 3 x 3 design (id. at Figure 1.2.2). The duct bank will be buried under approximately 3 feet of cover (id. at 5-53).

CELCo's Primary Route for the transmission line exits Kendall Station, proceeds generally to the north to Athenaeum Street, then easterly to First Street, turning south on First Street, continuing across the Broad Canal to Memorial Drive, and then following Memorial Drive to Pleasant Street, where the facilities would extend over private property to reach the Putnam Substation (Company Brief at 1). CELCo identified an alternate route and a number of route variations that could be employed between Kendall Station and Putnam Substation (id.).

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[1] Mirant Corporation plans to upgrade generating equipment by adding 170 MW at the existing Kendall Station, located at 265 First Street, Cambridge, Massachusetts (Exh. KSE-1, at 1-1). This repowering project was approved by the Siting Board in EFSB 99-4, Southern Energy Kendall, LLC, 11 DOMSB 255 (2000) ("SE Kendall Decision").

B. Procedural History

On November 15, 2000, CELCo filed a petition with the Energy Facilities Siting Board ("Siting Board") seeking approval to construct a 2.6 mile, 115 kV underground electric transmission line between Kendall Station in Cambridge and CELCo's Putnam Substation in Cambridge. This petition was docketed as EFSB 00-3. In addition, CELCo filed two related petitions with the Department of Telecommunications and Energy ("Department"). The first petition, seeking a determination pursuant to G.L. c. 164, § 72 that the proposed facilities are necessary and will serve the public convenience and be consistent with the public interest, was docketed as D.T.E. 00-103. The second petition, seeking exemptions from the zoning by-laws of Cambridge for the proposed transmission line pursuant to G.L. c. 40A, § 3 ("Petition for Zoning Exemption"), was docketed as D.T.E. 00-104. On November 22, 2000, the Department petitions were referred to the Siting Board for consolidation and decision with EFSB 00-3. On January 17, 2001, the Siting Board conducted a public hearing on the consolidated petitions in Cambridge. In accordance with the direction of the Hearing Officer, CELCo provided notice of the public hearing and adjudication.

Timely petitions to intervene were submitted by: the City of Cambridge ("City"); Southern Energy Kendall, LLC ("Mirant");[2] the Cambridge Redevelopment Authority ("CRA"); and the Massachusetts Institute of Technology ("MIT"). In addition, Kendall Square, LLC petitioned to participate as an interested person.

The Hearing Officer allowed the petitions to intervene of the City, Mirant, CRA, and MIT. The Hearing Officer also allowed the petition of Kendall Square, LLC to participate as an interested person (Cambridge Electric Light Company, EFSB 00-3/D.T.E. 00-103, Hearing Officer Procedural Order, February 21, 2001).

The Siting Board conducted evidentiary hearings on May 31 and June 7, 2001. CELCo presented eight witnesses: Joseph W. Freeman, Program Director of Earth Tech, who testified regarding site selection and temporary and permanent environmental impacts; M. Robert Hebert, Senior Engineer at Power Engineers, Inc., who testified regarding site selection and project

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[2] Mirant Kendall, LLC was formerly known as Southern Energy Kendall, LLC.

alternatives; Calvin W. Layton, an arborist with Commonwealth Electric Company ("Com/Electric"), an affiliate of CELCo, who testified regarding temporary and permanent environmental impacts; William J. McMullan, Senior Electrical Engineer of Com/Electric, who testified regarding the need for the proposed facility, project alternatives, and the magnetic field impacts of the proposed facility; Peter A. Valberg, Ph.D., Principal and Senior Health Scientist at Gradient Corporation, who testified regarding magnetic fields associated with the proposed facility; Joseph L. Jerz, Manager of Energy Forecast Estimation and Research for NSTAR Electric & Gas Corporation, who testified regarding load forecasting; Lynda A. Lee, Lead Forecasting Analyst for NSTAR Electric & Gas Corporation, who testified regarding load forecasting; and Charles P. Salamone, Director of System Planning for NSTAR Electric & Gas Corporation, who testified regarding load forecasting.

The Hearing Officer entered 141 exhibits into the record, consisting primarily of CELCo's responses to information and record requests. On June 28, 2001, the Company, MIT and the City filed briefs. On July 10, 2001, the City filed a reply brief. On July 13, 2001, the Company filed a reply brief.

On July 20, 2001, the Company filed a motion to withdraw its petition for an exemption from the zoning by-laws of Cambridge (D.T.E. 00-104). On August 21, 2001, the motion to withdraw was allowed in accordance with 220 CMR 1.04(4).

C. Jurisdiction

The Company's petition is filed in accordance with G.L. c. 164, § 69H, which requires the Siting Board "to implement the energy policies . . . to provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost," and pursuant to G.L. c. 164, § 69J, which requires electric companies to obtain Siting Board approval for construction of proposed facilities at a proposed site before a construction permit may be issued by another state agency.

The Company's proposal to construct an approximately 2.6-mile, 115 kV electric transmission line falls squarely within the second definition of "facility" set forth in G.L. c. 164, § 69G. That section states, in part, that a facility is:

> (2) any new electric transmission line having a design rating of sixty-nine kilovolts or more and which is one mile or more in length except reconductoring or rebuilding of existing transmission lines at the same voltage.

As discussed above, CELCo filed a petition with the Department requesting a determination of public convenience and necessity relative to the proposed underground transmission line.[3] Although the Department has initial jurisdiction over such petitions, G.L. c. 164, § 69H(2) provides that the Siting Board may accept such petitions for review and approval or rejection when they are referred to the Siting Board by the Chairman of the Department pursuant to G.L. c. 25, § 4. The Chairman referred D.T.E.00-103 to the Siting Board on November 22, 2000. The Siting Board hereby accepts D.T.E. 00-103 for review.

D. Scope of Review

In accordance with G.L. c. 164, § 69H, before approving an application to construct facilities, the Siting Board requires applicants to justify facility proposals in three phases. First, the Siting Board requires the applicant to show that additional energy resources are needed (see Section II.A, below). Next, the Siting Board requires the applicant to establish that its project is superior to alternative approaches in terms of cost, environmental impact, reliability, and ability to address the previously identified need (see Section II.B, below). Finally, the Siting Board requires the applicant to show that its site selection process has not overlooked or eliminated clearly superior sites, and that the proposed site for the facility is superior to a noticed alternate site in terms of cost, environmental impact, and reliability of supply (see Section III, below).[4]

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[3] As discussed above, CELCo also filed a related Petition for Zoning Exemption with the Department; however, this petition has been withdrawn.

[4] When a transmission line proposal is submitted to the Siting Board, the petitioner is required to present: (1) its primary route; and (2) at least one alternate route. These routes are described as noticed alternatives because they are the only routes described in the notice of adjudication published at the commencement of the Siting Board's review. In reaching a decision in such a facility case, the Siting Board can approve a petitioner's primary route, approve an alternate route, or reject all routes. The Siting Board, however, (continued...)

Additionally, in the case of an electric company which is required by G.L. c. 164, § 69I to file a long-range forecast with the Department, the applicant must show that the facility is consistent with the electric company's most recently approved long-range forecast. G.L. c. 164, § 69J. CELCo is an electric company required to make such a filing and to make such a showing.

II. ANALYSIS OF THE PROPOSED PROJECT

A. Need Analysis

1. Standard of Review

In accordance with G.L. c. 164, § 69H, the Siting Board is charged with the responsibility for implementing energy policies to provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. In carrying out this statutory mandate with respect to proposals to construct electrical transmission facilities in the Commonwealth, the Siting Board is required to evaluate whether there is a need for additional transmission resources.

In Turner Falls Limited Partnership, 18 DOMSC 141, 154-155 (1988) ("Turner Falls Decision"), the Siting Board found that once the additional energy resources provided by a power plant were needed, the determination of need for an interconnecting transmission line followed directly. In ANP Blackstone Energy Company, 8 DOMSB 1 (1999) ("ANP Blackstone Decision"), the Siting Board determined that a proposed transmission line was needed because a proposed generating facility could not supply energy to the region in the absence of an adequate and reliable transmission interconnection. In each of these cases, a need determination was made based on the need for additional energy resources to be provided by a proposed generating facility. Consistent with the 1997 Electric Utility Restructuring Act, ("Restructuring Act"), the Siting Board no longer reviews the need for proposed generating facilities, relying on the market to determine need for such facilities. However, G.L. c. 164, § 69J¼ provides that, once approved by the Siting Board, "a generating facility shall be deemed to contribute to a necessary energy

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4 (...continued)
may not approve any route or portion of a route which was not included in the published notice of adjudication.

supply for the commonwealth with a minimum impact on the environment at the lowest possible cost."

2. Description of the Existing System

The Company stated that the CELCo service territory includes Cambridge and certain areas of Belmont, with over 46,000 customers and a predicted peak load of 348 MW for summer 2001(Exh. KSE-1, at 1-1). The Company stated that the CELCo system is made up of the 64 MW Kendall Station and the 13.5 MW Blackstone Street Station,[5] with an integrated network of 13.8 kV and 115 kV transmission lines that interconnect generation, substations, and BECo's surrounding 115 kV transmission system (id. at 2-2 to 2-7). Kendall Station currently is directly connected to the local 13.8 kV network; there are no 115 kV transmission facilities in Kendall Station (Tr. 2, at 152).[6] The Company explained that transmission lines within the CELCo service territory supply three 115 kV substations -- CELCo's Putnam Substation and BECo's Somerville and North Cambridge substations (Exh. KSE-1, at 2-5). In addition, two 13.8 kV substations, CELCo's Alewife and Prospect substations, are located within CELCo's system, and interconnecting 13.8 kV tie circuits extend between the Kendall, Putnam, and Prospect substations to ensure system reliability (id. at 2-5 to 2-7). The Company stated that BECo 115 kV lines 329-510 and 329-511 interconnect Everett Station #250 to Brighton Station #329; and BECo 115 kV lines 150 and 151 connect the North Cambridge substation with the Putnam

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5 The Company stated that 40% of CELCo's peak load has historically been supplied by generation within CELCo's service territory at Kendall and Blackstone Street Stations, and the remaining 60% of peak load is met by imports from the surrounding Boston Edison Company ("BECo") territory (Exh. KSE-1, at 2-2).

6 The Company stated that, as part of another project separate from the proposed transmission line, it is currently developing plans to upgrade the supply of power to its customers in the Kendall Square area near Kendall Station (Tr.1, at 59-60, 65-66). The Company indicated that one upgrade option would be the construction of a new 115 kV-13.8 kV distribution substation (id.; Exh. EFSB-1-16). The new substation would be required to accommodate future load growth in the Kendall Square area, and in Cambridge (id.; Tr. 2, at 176).

Substation (id.). In addition, BECo's 345 kV transmission lines 324 and 372 pass through the CELCo area but do not interconnect to the system (id. at 2-5 to 2-6).

3. Need for the Proposed Transmission Line

The need for the proposed transmission interconnection project is reviewed here in the context of the proposed Kendall Station repowering, which was approved by the Siting Board in the SE Kendall Decision. In that decision, the Siting Board approved, subject to conditions, the petition of Mirant to upgrade the generating facilities at its existing Kendall Square Station, increasing its generation capacity from approximately 64 MW to approximately 234 MW. In light of this approval and pursuant to G.L. c.164, § 69J¼, the Siting Board finds that the repowered Kendall Station would contribute to a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

The Company stated that an electrical interconnection of some type is required in order to give the new generation facilities at Kendall Station access to the regional transmission system (Exh. KSE-1, at 2-2). The Company also asserted that under its Federal Energy Regulatory Commission-approved open access transmission tariff, owners of transmission facilities, such as CELCo, are required to provide independent power plant operators access to the regional transmission system (id.; Tr. 2, at 152).

The Siting Board has found that the repowered Kendall Station project would contribute to a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. However, the record shows that some form of electrical interconnection is required to provide the regional transmission system with the additional energy provided by the repowered Kendall Station. Further, the record indicates that the Company is required under its federal open-access tariff to provide generators with access to the transmission system. Consequently, the Siting Board finds that there is a need for additional energy resources to interconnect the repowered Kendall Station facilities with the regional transmission system.

4. Consistency with Forecast

G.L. c. 164, § 69J requires that a facility proposed by an electric company required to file

a long-range forecast pursuant to G.L. c. 164, § 69I be consistent with that company's most recently approved long-range forecast. CELCo is an electric company required to file a long-range forecast pursuant to G.L. c. 164, § 69I. Consequently, to satisfy the statutory requirement, the Siting Board reviews the consistency of the proposed transmission line with CELCo's forecast of system load.

CELCo argued that its petition for the proposed facilities is consistent with the most recent fully-litigated Department-approved forecast -- the 1991 long-term system forecast filed by CELCo ("1991 forecast") in D.P.U. 91-292 (1994) (Tr. 2, at 154).[7] The Company stated that it regularly develops forecasts for the CELCo service territory, including Cambridge and portions of Belmont (Tr. 2, at 160). The Company indicated that the 1991 Cambridge load growth forecast is consistent with the internal forecast currently used to allocate load within the CELCo system (Tr. 2, at 154).

The Company stated that it conducts facility planning by developing base and extreme projections of peak load growth for areas within its service territory (Exh. HO-RR-5; Tr. 2, at 159-162). The Company indicated that these projections include the highest recorded area base and peak load, anticipated large new load additions, and the expected base and peak load growth forecast (Exh. HO-RR-5). The Company stated that its forecast of customer load in a geographic area such as Cambridge is important in determining the timing and magnitude of enhancements to the transmission and distribution systems (Tr. 2, at 158-160). However, enhancements and upgrades might also be required for reasons other than load growth (id. at 170). The Company provided historical and forecast peak loads for the CELCo system for the years 1996 through 2006, based on the Company's records and internal forecasts (Exh. RR-HO-5; Tr. 2, at 164).[8]

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[7] CELCo filed a subsequent forecast with the Department in 1995, D.P.U 95-95 (1996) which was accepted in a settlement by the Department. CELCo noted that, although the 1995 forecast updated components of the 1991 forecast and was methodologically consistent with the 1991 forecast, the 1995 settlement dealt primarily with the Company's demand-side management programs, and did not contain forecast information relevant to this proceeding (Exh. RR-HO-7; Tr. 2, at 154-157).

[8] The Company indicated that summer peak loads for the CELCo service territory ranged (continued...)

G.L. c. 164, § 69J requires that a facility proposed by an electric company required to file a long-range forecast pursuant to G.L. c. 164, § 69I be consistent with that company's most recently approved long-range forecast. In prior cases where the need for a facility has been premised on the electric company's need to serve load in a localized area, the Siting Board has found the facility to be consistent with a previously approved forecast either if the need for the facility was established in that forecast, or if the localized forecast upon which a showing of need was based was methodologically consistent with that forecast. New England Power Company, 7 DOMSB 339, at 357 (1998); Norwood Municipal Light Department, 5 DOMSB 109, at 127 (1997).

Another class of projects, not clearly anticipated by statute, are those projects designed to serve a specific customer or set of customers, rather than to serve load in a specific section of a company's service territory. While the need for such projects generally is unrelated to the issues typically addressed in a long-range forecast and supply plan, the choice of project approach may affect, either positively or negatively, a company's ability to reliably meet demand in its service territory.

The Siting Board acknowledges that electric companies have a specific obligation under federal rules to interconnect new generation in a timely fashion, even if the need for such an interconnection arises between forecast review cycles. Therefore, when considering a proposed facility designed to interconnect new generation, the Siting Board will consider the facility to be consistent with a long-range forecast if any issues related to the project's effect on the company's ability to serve load in its service territory are addressed using a forecast that is methodologically consistent with the most recently approved forecast.

Here, the various approaches to interconnecting the repowered Kendall Station must be evaluated in light of their effect on the Company's ability to reliably serve its Cambridge- and Boston-area customers (see Section II.B, below). The Company has demonstrated that its current

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[8] (...continued)
from 273 MW to 305 MW between 1996 and 2000 (Exh. EFSB-RR-HO-5). The Company projected that peak load would range from 346 MW to 372 MW between 2001 and 2006, with annual growth rates ranging from -1.6% to 13.4% (id.).

internal forecasts of Cambridge and Boston-area load are methodologically consistent with its most recently approved long-range forecast. Accordingly, the Siting Board finds that the proposed facility is consistent with the Company's most recently approved long range forecast.

B. Comparison of the Proposed Project and Alternative Approaches

1. Standard of Review

G.L. c. 164, § 69H requires the Siting Board to evaluate proposed projects in terms of their consistency with providing a reliable energy supply to the Commonwealth with a minimum impact on the environment at the lowest possible cost. In addition, G.L. c. 164, § 69J requires a project proponent to present "alternatives to planned action" which may include: (a) other methods of generating, manufacturing, or storing electricity or natural gas; (b) other sources of electrical power or natural gas; and (c) no additional electric power or natural gas.[9]

In implementing its statutory mandate, the Siting Board requires a petitioner to show that, on balance, its proposed project is superior to alternate approaches in terms of cost, environmental impact, and ability to meet the identified need. 1997 BECo Decision, 6 DOMSB 208, at 252; 1997 ComElec Decision, 5 DOMSB 273, at 299; Boston Edison Company, 13 DOMSC 63, at 67-68, 73-74 (1985). In addition, the Siting Board requires a petitioner to consider reliability of supply as part of its showing that the proposed project is superior to alternative project approaches. 1997 BECo Decision, 6 DOMSB 208, at 253-257; 1997 ComElec Decision, 5 DOMSB 273, at 300; Massachusetts Electric Company, 18 DOMSC 383, at 404-405 (1989).

2. Identification of Project Approaches for Analysis

The Company considered four approaches for the interconnection of the repowered Kendall Station (Exh. KSE-1, at 3-1). These four approaches include connecting Kendall Station: (1) to CELCo's 115 kV Putnam Station via a new 2.6 mile underground transmission

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[9] G.L. c. 164, § 69J also requires a petitioner to provide a description of "other site locations." The Siting Board reviews the petitioner's Primary Route, as well as other possible routes, in Section III.B, below.

line; (2) to BECo's 115 kV lines 329-510 and 329-511 via a new 2.0 mile underground transmission line; (3) to the existing supply bus at Kendall Station; and (4) to BECo's 345 kV line 324 via a new 1.2 mile underground loop (id. at 3-1 to 3-5, 3-13).[10]

a. The Proposed Project

The Company stated that the proposed project would connect the repowered Kendall Station to CELCo's 115 kV Putnam Substation via a new 2.6-mile underground transmission line (id. at 3-1). The Company stated that the proposed electrical interconnect facilities would consist of 115 kV solid dielectric insulated transmission cables within a concrete duct (id. at 1-3). The ductbank would be constructed in a trench beneath existing street corridors for the majority of the route (id.). The Company noted that Putnam Station has the necessary space and equipment to accommodate the installation of the new cable (id. at 3-3). The line would also connect to a circuit breaker within Kendall Station (id. at 1-3). The Company stated that the proposed project is technically feasible and would fully satisfy the identified need to provide a reliable interconnection to the regional transmission system while maintaining system reliability (id. at 3-7). The Company stated that the estimated cost of the proposed project is $9.88 million (id. at 3-13).

b. Alternate Approach 1

The Company stated that its first alternate approach would connect the repowered Kendall Station to BECo's 115 kV Lines 329-510 and 329-511, which pass through Station #402 in Somerville, via a new 2.0 mile underground transmission line ("Alternate Approach 1") (Exh.

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[10] The Company also considered a no-build alternative. The Company determined that this approach would prevent the repowered Kendall Station from being interconnected to the regional transmission grid, and did not further consider it (Exh. KSE-1, at 3-5).

General Laws c. 169, § 69J requires the Company to consider the alternative of "no additional electric power." However, the Siting Board has found that there is a need for additional energy resources to interconnect repowered Kendall Station (see Section II.A.3.c, above). The Siting Board notes that the no-build alternative would not meet the identified need, and therefore eliminates it from further consideration.

KSE-1, at 3-3, 3-13).

The Company stated that the temporary construction impacts of the proposed project and Alternate Approach 1 would be essentially comparable because the transmission lines associated with the two approaches would travel through similar areas (id. at 3-13). The Company noted that Alternate Approach 1 would require expanding Station #402 (id. at 3-4). The Company stated that this expansion would be very costly, and would require extensive construction time, would result in permanent visual impacts and possibly other environmental impacts at Station #402 (id. at 3-4, 3-13; Tr. 1, at 16). The Company also noted that much of the construction process would require the de-energizing of existing facilities and that replacement power would have to be supplied at premium costs to maintain continuity of service to customers (Exh. KSE-1, at 3-4). The Company estimated the cost of this approach at $21.02 million (id. at 3-13).

The Company stated that BECo's Lines 329-510 and 329-511 serve as primary export paths for delivery of power from Mystic Generating Station in Everett to Station #329 in Brighton, and are heavily loaded on a continuous basis (id. at 3-3). The Company indicated that, depending on the magnitude of those flows, it would not always be possible to fully dispatch Kendall Station and Mystic Station at the same time (id.). The Company concluded that despite its technical feasibility, the limitations and extra work and costs associated with Alternate Approach 1 make it less attractive than the proposed project (id. at 3-10).

c. Alternate Approach 2

The Company stated that it also considered the possibility of connecting the new Kendall generator directly to the existing distribution supply bus at Kendall Station ("Alternate Approach 2") (id. at 3-4). However, the Company stated that the 13.8 kV system is designed to distribute power to customer loads, not to export large power blocks to a transmission grid (Exh. EFSB-1-15). The Company stated that to effectively implement Alternate Approach 2, it would have to install 20 to 25 additional circuits, as well as added duct banks, manholes, circuit breakers and other substation equipment (id.). The Company added that the entire 13.8 kV system at Kendall Station would have to be replaced with equipment with unusually high capacity ratings (id.). The Company concluded that this approach was impractical, given that the generator output would

overwhelm the capabilities of the existing 13.8 kV infrastructure, and did not give this option further consideration (Exh. KSE-1, at 3-4).

d. Alternate Approach 3

The Company stated that its third alternate approach would connect the Kendall generator to BECo's 345 kV line 324, a bulk load delivery cable serving downtown Boston, near its exit from the Charles River crossing in Cambridge ("Alternative Approach 3") (id. at 3-4). The Company stated that, to implement Alternate Approach 3, Line 324 would be cut into two sections at the interconnection point (id. at 3-5). One section would be spliced to a new high pressure oil-filled ("HPOF")[11] cable and associated piping that would be routed approximately 0.6 miles to Kendall Station, then routed back 0.6 miles and spliced to the other section of Line 324 (id.). The Company noted that this approach would require the construction of a new 345 kV substation transformer at Kendall Station to increase the generating facility output voltage to 345 kV (id.). The Company stated that the substation transformer would include three circuit breakers: one to connect to the 345 kV side of the generator step-up transformer, and two to protect each section of Line 324 (id.). Additional pumps and heat exchangers also would be required to accommodate the new line section (id.).

The Company stated that although Alternate Approach 3 is technically feasible, it was eliminated in initial evaluations due primarily to concerns that the project would degrade the reliability of Line 324, and also based on the higher costs associated with the use of 345 kV equipment and the HPOF cable (id. at 3-12). The Company stated that the additional cable lengths and splices and the introduction of a generator and its associated auxiliary equipment would increase the probability of failure on Line 324, thus adding risk to an essential transmission element supplying bulk power to downtown Boston (id.). The Company also stated that the planned output from Kendall Station is too low to justify connection to the 345 kV tier of the transmission network (id.).

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[11] The Company stated that HPOF cable is needed for this approach, as opposed to the solid-dielectric cable to be used for the 115 kV approaches, in order to match and reliably connect to the existing HPOF cable (Exh. KSE-1, at 3-5).

e. Analysis

The Company has identified four approaches to meeting the identified need: the proposed project and three alternate project approaches. The record indicates that the proposed project involves a longer transmission line than any of the alternate approaches. However, the record shows that each of the three alternate approaches has disadvantages with respect to reliability. Moreover, when all new facilities required for the alternate approaches are considered, including substations and distribution lines, the infrastructure requirements of each of the approaches would be substantial.

The record indicates that the cost of Alternate Approach 1 would be more than double that of the proposed project. In addition, the inability of BECo Lines 329-510 and 329-511 to consistently dispatch Kendall Station and Mystic Station generation at the same time constitutes a significant system reliability disadvantage in comparison with the proposed project. Further, given the similarity of environmental impacts associated with the transmission lines for the two approaches, and the additional environmental disadvantages associated with expanding Station #402, Alternate Approach 1 is not likely to provide an overall advantage with respect to environmental impacts. Thus, the proposed project is clearly superior to Alternate Approach 1.

The record indicates that Alternate Approach 2, which would use up to 25 new 13.8 kV distribution circuits to transfer power to the transmission grid, is infeasible. Given the extensive equipment upgrades that would be required at Kendall Station, and the numerous distribution lines that would be required, it is likely that Alternate Approach 2 would be significantly more costly than the proposed project. Further, the approach offers no significant environmental advantages over the proposed project. The Siting Board agrees with the Company's conclusion that Alternate Approach 2 does not warrant further evaluation.

Finally, the record indicates that although Alternate Approach 3 is technically feasible, it possesses significant system reliability disadvantages in comparison with the proposed project. Specifically, Alternate Approach 3 would subject an essential transmission element supplying bulk power to downtown Boston to greater reliability risk, as a result of the added technical complexity and equipment exposure associated with segmenting, splicing and extending the existing 345 kV line in order to interconnect the repowered Kendall Station. Further, given the

additions to existing infrastructure that this approach would require, it is likely that it would be considerably more costly than the proposed project, and would not offer any significant environmental advantages. The Siting Board agrees with the Company's conclusion that Alternate Approach 3 does not warrant further evaluation.

In light of the clear reliability concerns associated with Alternate Approaches 1, 2, and 3, and the lack of potential offsetting cost or environmental advantages, the Siting Board finds that the proposed project would be superior to Alternate Approaches 1, 2, and 3 with respect to providing a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

III. ANALYSIS OF THE PRIMARY AND ALTERNATE ROUTES

The Siting Board has a statutory mandate to implement the policies of G.L. c. 164, §§ 69J-69Q to provide a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. G.L. c. 164, §§ 69H and J. Further, G.L. c. 164, § 69J requires the Siting Board to review alternatives to planned projects, including "other site locations." In implementing this statutory mandate, the Siting Board requires a petitioner to demonstrate that it examined a reasonable range of practical siting alternatives, and that its proposed facilities are sited at locations that minimize costs and environmental impacts while ensuring supply reliability. Massachusetts Municipal Wholesale Electric Company, EFSB 97-4, at 89 (2000) ("MMWEC Decision"); ANP Blackstone Decision, 8 DOMSB 1, at 212-213; New England Power Company, 21 DOMSC 325, at 376 (1991).

A. Site Selection

1. Standard of Review

G.L. c. 164, § 69J provides that a petition to construct a proposed facility must include "a description of alternatives to [the applicant's] planned action" including "other site locations." In past reviews of alternate site locations identified by an applicant, the Siting Board has required the applicant to demonstrate that it examined a reasonable range of practical siting alternatives. MMWEC Decision, EFSB 97-4, at 92; ANP Blackstone Decision, 8 DOMSB 1, at 213; 1998

NEPCo Decision, 7 DOMSB 333, at 374. In order to determine whether an applicant has considered a reasonable range of practical alternatives, the Siting Board has required the applicant to meet a two-pronged test. First, the applicant must establish that it developed and applied a reasonable set of criteria for identifying and evaluating alternate sites in a manner which ensures that it has not overlooked or eliminated any sites which, on balance, are clearly superior to the proposed site. Second, the applicant must establish that it identified at least two noticed sites or routes with some measure of geographic diversity. MMWEC Decision, EFSB-97-4, at 92; ANP Blackstone Decision, 8 DOMSB 1, at 213; 1998 NEPCo Decision, 7 DOMSB 333, at 374.[12]

2. Site Selection Process

a. Description

The Company indicated that its site selection process included the following stages: development of threshold criteria; definition of a study area; identification of route options; development of screening criteria for route options; and ranking of route options based on the screening criteria in order to determine a primary and an alternate route (Exh. KSE-1, at 4-2 to 4-3).

The Company stated that it developed threshold criteria to narrow the routing options to those which would minimize environmental and community impacts and costs while maintaining system reliability (id. at 4-3). The Company indicated that the study area for its proposed project, approximately 8,000 feet long by 9,000 feet wide, was bounded by the Charles River to the east and south, Binney and Bristol Streets to the north, and the Broadway/Inman Street corridor through to Central Square to the west (id.). The Company stated that the study area allowed for a reasonable range of geographically and environmentally diverse alternatives within an urban environment (id.).

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[12] In this decision, the Siting Board has made minor modifications to the site selection standard of review as set forth in previous Siting Board decisions. These modifications reflect an effort to clarify application of the standard of review, and do not alter the standard of review substantively. In the future, the Siting Board intends to re-examine the substantive analysis required by the site selection standard of review.

Additionally, the Company stated that, to the greatest extent possible, it attempted to follow existing utility or transportation rights-of-way ("ROWs"), and avoid railroads, residential areas, streets with a construction moratorium, major intersections, narrow streets, proximity to heat-generating underground facilities, excessive turns, and streets with on-going or planned activity that could conflict with the construction of the proposed project (id. at 4-4). The Company stated that it identified street segments which best met these threshold criteria through review of maps and drawings of existing utilities within the study area, on-site inspections, and meetings with Cambridge and Metropolitan District Commission ("MDC") officials (id. at 4-4 to 4-5). The Company stated that, as a result of this process, it eliminated several routes from consideration, including routes through Kendall Square and along sections of Massachusetts Avenue between Memorial Drive and Central Square (id.).

The Company stated that six distinct route alternatives were identified through the application of its threshold criteria (id.). These included a 2.6 mile route primarily using Memorial Drive ("Memorial Drive Route"), a 2.5 mile route primarily traveling along Sydney and Erie Streets ("Sydney/Erie Street Route"), a 2.3 mile route primarily using Albany Street ("Albany Street Route"), a 2.3 mile route primarily along Vassar Street ("Vassar Street Route"), a 2.4 mile route primarily along Prospect and Magazine Streets ("Prospect/Magazine Street Route"), and a 2.4 mile route primarily along Inman and Pleasant Streets ("Inman/Pleasant Street Route") (id. at 4-5, 4-12 to 4-16).

The Company stated that it compared the six route alternatives using eleven screening criteria, including cost, three technical criteria, and seven community and environmental criteria (id. at 4-17). The Company stated that the technical screening criteria were designed to assess the technical difficulty of constructing and maintaining the interconnection facilities (id.). The three technical categories were: the congestion of underground utilities along the routes, the difficulty of crossing the CSX Corporation railroad tracks, and the difficulty of roadway intersection crossings along each route (id. at 4-17 to 4-19).

The Company stated that the community/environmental impact screening criteria were designed to assess the potential effects of construction and operation of the interconnection facilities on the human and natural environment (id. at 4-19). The seven community/

environmental criteria included construction impacts on residences, proximity of sensitive receptors, traffic impacts due to construction, presence of open space and parkland areas, presence of historical sites, presence of hazardous material, and community acceptance (id. at 4-19 to 4-23).

The Company indicated that, for each of the routes, it developed ratings and scores for each of the screening criteria (id. at 4-23). The Company explained that it rated each route as favorable, moderately effective, or unfavorable in meeting each criterion, and then assigned a score of 2 if the route was rated as favorable, a score of 1 if the route was rated as moderately effective, and a score of 0 if the route was rated as unfavorable (id. at 4-18 to 4-24).

The Company stated that to derive an overall suitability score, it assigned a weight to each criterion based on the project team's judgment of the relative importance of that criterion (id. at 4-24). Criteria that were considered very important were given a weight of 3, criteria that were considered of moderate importance were given a weight of 2, and criteria that were considered of minor importance were given a weight of 1 (id.).[13] The Company stated that the individual criterion score was then multiplied by the weight to derive the weighted score for each criterion for each route (id.). The Company stated that the weighted scores were then totaled for each route alternative (id.). Table 1 provides a comparison of the six route alternatives:

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[13] The Company's assignment of weights was distributed as follows: the weights for the seven environmental/community criteria totaled 13, the weights for the three technical criteria totaled 8, and the weight for the cost criterion was 3 (Exh. KSE-1, at 4-24).

TABLE 1: COMPARISON OF ROUTES

Route Name	Length (mi.)	Manholes required	Total Cost ($M)	Score (Weighted)
Memorial Drive	2.6	6	$12.2	41
Sidney/Erie Street	2.5	8	$12.7	33
Albany Street	2.3	8	$13.2	20
Vassar Street	2.3	7	$14.0	19
Inman/Pleasant Street	2.4	7	$13.0	16
Prospect/Magazine Street	2.4	7	$12.9	11

(id. at 4-5, 4-12 to 4-16, 4-25, 4-27).

The Company stated that the highest scoring route was the Memorial Drive Route, which outscored other routes in terms of technical criteria, community acceptance, and impact to residences, and also scored well with respect to environmental impacts (Exh. KSE-1, at 4-28). The second-ranked Sidney/Erie Street Route tied with the Memorial Drive Route on cost, and scored well on technical and community/environmental criteria; the Company noted that this route didn't score as well with respect to impacts on residences, community acceptance, and hazardous materials issues (id. at 4-27 to 4-28). The Company noted that the Vassar and Albany street routes were essentially tied for third, reflecting constraints and costs associated with underground utility congestion (id. at 4-28). Based on its analysis, the Company designated the Memorial Drive Route as its Primary Route and the Sidney/Erie Street Route as its Alternate Route (id. at 4-28).

b. Analysis

CELCo has developed a set of criteria for identifying and evaluating route options that addresses natural resource issues, land use issues, human environmental issues, cost and

reliability -- types of criteria that the Siting Board has found to be appropriate for the siting of transmission lines and related facilities. See 1997 BECo Decision, 6 DOMSB 208, at 283; 1997 ComElec Decision, 5 DOMSB 273, at 330; New England Power Company, 4 DOMSB 109, at 167 (1995) ("1995 NEPCo Decision").

To identify route options for further evaluation, the Company first identified an area that would encompass all viable routing options given the limitations imposed by the location of Kendall and Putnam Stations. The Company used threshold criteria to identify six routes within this area. The Company then developed a list of eleven environmental/community, technical, and cost criteria which it used to evaluate these six routing alternatives.

For each of the identified alternatives, the Company weighted the importance of each criterion and multiplied the unweighted assigned scores for the eleven criteria by the weights to produce weighted scores. The Company used the weighted scores to balance the community/environmental impacts, technical issues and costs of the six routing alternatives. The Company's allocation of approximately half of overall weight to community/environmental criteria and half to technical and cost criteria was reasonable. The weighting of specific environmental factors appropriately reflected their relative significance; in particular, the desirability of siting transmission lines within existing utility and transportation corridors where possible was appropriately stressed, as was the need to route the proposed facilities to minimize disruptive construction in residential and commercial areas. Thus, the Company used a comprehensive, quantitative method to compare identified alternatives on the basis of technical feasibility, cost, and environmental and community impacts.

Accordingly, the Siting Board finds that the Company has developed and applied a reasonable set of criteria for identifying and evaluating alternate routes in a manner which ensures that it has not overlooked or eliminated any routes which are clearly superior to the proposed project.

3. Geographic Diversity

CELCo considered six geographically diverse transmission line routes to connect Kendall Station with the Putnam Substation. The six alternate routes overlap only in segments proximate

to the beginning and terminating points of the proposed transmission line. Each route is clearly distinct, offering a unique set of environmental, reliability and cost constraints and advantages within the area designated by the Company as encompassing all viable siting options for its proposed transmission line. Consequently, the Siting Board finds that the Company has identified a range of practical transmission line routes with some measure of geographic diversity.

4. Conclusions on the Site Selection Process

The Siting Board has found that the Company has developed and applied a reasonable set of criteria for identifying and evaluating alternate routes in a manner which ensures that it has not overlooked or eliminated any routes which are clearly superior to the proposed project. In addition, the Siting Board has found that the Company has identified a range of practical transmission line routes with some measure of geographic diversity. Consequently, the Siting Board finds that CELCo has demonstrated that it examined a reasonable range of practical siting alternatives.

B. Description of the Primary and Alternate Routes

1. Primary Route

The Company stated that the Primary Route exits Kendall Station onto Athenaeum Street and then continues east on Athenaeum Street until it reaches First Street, where it proceeds south down the west side of First Street across the Broad Canal (Exh. KSE-1, at 4-12). The Primary Route then proceeds along the ramps connecting Main Street and the Longfellow Bridge to westbound Memorial Drive. The Primary Route follows the northern edge of Memorial Drive under the sidewalk or under the parking lane (id.). At the intersection of Memorial Drive with Massachusetts Avenue, the Primary Route follows the northern edge of the ramps to Massachusetts Avenue, crosses Massachusetts Avenue, and then returns down the northern edge of the ramp to westbound Memorial Drive (id.). As the route approaches the Reid overpass, it crosses under the railroad tracks on the Memorial Drive Bridge and follows the exit ramp to the Brookline Street Rotary (id.). The route then crosses the Brookline Street Rotary or the rotary

infield before rejoining the ramp to westbound Memorial Drive (id.). The Primary Route then rejoins Memorial Drive and continues until it reaches Pleasant Street, where it turns to the north and proceeds up Pleasant Street (id.). The Primary Route then follows a Massachusetts Water Resources Authority ("MWRA") sewer line easement to the Putnam Substation (id.). The Company stated that the Primary Route is 2.6 miles long, and its use would require the installation of 6 manholes (id. at 4-5).

The Company identified a number of variations to the Primary Route. At the beginning of the route, instead of exiting Kendall Station onto Athenaeum, the route could travel east through the Kendall switchyard and then south in the First Street sidewalk until it crosses the Broad Canal (id.).

The Company also proposed a more lengthy route variation involving Ames Street. This variation is discussed in Section III.C.2.c, below.

Farther along the route, the route could cross the Brookline Street Rotary within the Reid overpass, rather than following the Rotary itself.

At the end of the route, instead of using the MWRA sewer easement, the Primary Route could either: (1) traverse privately owned land by obtaining an easement, or (2) proceed along Pleasant Street, to Putnam Avenue, turn west on Putnam Avenue, and then enter Putnam Substation by crossing a CELCo cable storage yard (id.).

2. Alternate Route

The Company indicated that the Alternate Route begins at the new switchyard at Kendall Station and proceeds north to the intersection with Athenaeum Street (Exh. KSE-1, at 1-12). The Alternate Route then turns left (west) and proceeds overland through easements across the Lyme Properties land, crosses Third Street, then crosses through property of Commonwealth Gas (id.). From the western edge of the Commonwealth Gas property, the Alternate Route proceeds south on Fifth Street to Potter Street, across the Department of Transportation parking lot, and along a pedestrian walkway owned by the Cambridge Redevelopment Authority to Broadway (id.). The Alternate Route then turns northwest onto Broadway, crossing underneath the railroad tracks, and follows Broadway to its intersection with Portland Street. The Alternate Route turns south,

following Portland Street to Main Street, and then proceeds west on Main Street for two blocks to the intersection with Osborn Street, where it turns one block south to State Street and proceeds west on State Street (id.).

The Alternate Route follows State Street to the west to an oblique crossing of Massachusetts Avenue to Sidney Street (id.). The route then follows Sidney Street to its intersection with Erie Street, then turns west onto Erie Street and proceeds to Magazine Street, where it jogs south to Fairmont Street and continues west to Pleasant Street (id.). The Alternate Route then follows Pleasant Street south to Putnam Avenue, where it turns onto Putnam Avenue and enters the Putnam Substation (id.). The Company stated that the Alternate Route is approximately 2.5 miles long, and would require the installation of at least 8 manholes (id. at 4-14).

The Company identified two variations to the Alternate Route. One identified variation, at the beginning of the Alternate Route begins at the intersection of Athenaeum Street and Second Street, and continues north onto Second Street to the intersection with Linsky Way (id.). This variation proceeds west on Linsky Way to Third Street, crosses onto Linsky Way and proceed to Fifth Street and rejoins the Alternate Route at the Commonwealth Gas property.

The other variation begins at the intersection of Portland and Washington Streets, just south of Broadway (id.). Instead of continuing south on Portland, the route would turn to the west onto Washington and proceed to State Street where it would turn west to rejoin the Alternate Route (id.).

C. Environmental Impacts, Cost and Reliability of the Proposed and Alternative Facilities

1. Standard of Review

In implementing its statutory mandate to ensure a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost, the Siting Board requires a petitioner to show that its proposed facility is sited at a location that minimizes costs and environmental impacts while ensuring a reliable energy supply. To determine whether such a showing is made, the Siting Board requires a petitioner to demonstrate

that the proposed site for the facility is superior to the noticed alternatives on the basis of balancing cost, environmental impact, and reliability of supply. MMWEC Decision, EFSB 97-4, at 100 (2001); Berkshire Gas Decision, 9 DOMSB 1, at 40; Boston Edison Company, 6 DOMSB 208, at 287 (1997) ("1997 BECo Decision").

An assessment of all impacts of a proposed facility is necessary to determine whether an appropriate balance is achieved both among conflicting environmental concerns as well as among environmental impacts, cost, and reliability. A facility which achieves that appropriate balance thereby meets the Siting Board's statutory requirement to minimize environmental impacts at the lowest possible cost. MMWEC Decision, EFSB 97-4, at 101 (2001); Berkshire Gas Decision, 9 DOMSB 1, at 46; 1997 BECo Decision, 6 DOMSB 208, at 287.

The Siting Board recognizes that an evaluation of the environmental, cost and reliability trade-offs associated with a particular proposal must be clearly described and consistently applied from one case to the next. Therefore, in order to determine if a petitioner has achieved the proper balance among environmental impacts and between environmental impacts, cost and reliability, the Siting Board must first determine if the petitioner has provided sufficient information regarding environmental impacts and potential mitigation measures in order to make such a determination. The Siting Board then can determine whether environmental impacts would be minimized. Similarly, the Siting Board must find that the petitioner has provided sufficient cost information in order to determine if the appropriate balance among environmental impacts, cost, and reliability would be achieved. MMWEC Decision, EFSB 97-4, at 101 (2001); 1998 NEPCo Decision, 7 DOMSB 333, at 384 (1998); Commonwealth Electric Company, 5 DOMSB 273, at 337 (1997).

Accordingly, in the sections below, the Siting Board examines the environmental impacts and cost[14] of the proposed facilities along CELCo's primary and alternate routes to determine: (1) whether environmental impacts would be minimized; and (2) whether an appropriate balance

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[14] The Siting Board notes that the Primary and Alternate Routes both run underground in urban streets for approximately 2.5 to 2.6 miles, and thus are almost identical with respect to reliability; therefore, there are no differential reliability issues to be balanced against environmental and cost issues.

would be achieved among conflicting environmental impacts as well as among environmental impacts, cost and reliability. In this examination, the Siting Board compares the primary and alternate routes to determine which is superior with respect to providing a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

2. Analysis of the Proposed Facilities Along the Primary Route

a. Environmental Impacts

In this section, the Siting Board evaluates the environmental impacts of the proposed facilities along the Primary Route, the proposed mitigation for such impacts, and any options for additional mitigation. The Siting Board then determines whether the environmental impacts of the proposed facilities along the Primary Route would be minimized.

(i) Water Resources

CELCo stated that the primary water resources near the Primary Route are the Charles River and the Broad Canal (Exh. KSE-1, at 5-2). The Company asserted that water resource impacts associated with the proposed project would occur only in the vicinity of the Broad Canal, and that any such impacts would be temporary and insignificant (id.).

The Company stated that the Primary Route would enter a regulated Riverfront area[15] in the vicinity of the Board Canal, where the Route crosses the Canal Drawbridge from First Street to Memorial Drive (id.). The Company also noted that areas within 100 feet of the banks of the Broad Canal and Charles River are considered buffer zones under the Wetlands Protection Act, and stated that the Primary Route would enter the Broad Canal buffer zone at certain locations, and may enter the Charles River buffer zone, depending on the final placement of the transmission line (id.). The Company stated that no vegetated wetland resources were identified along the Primary Route (id.).

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[15] The Company stated that Riverfront Areas are defined as the areas between a river's annual high-water line, and a parallel line generally located 200 feet away measured horizontally outward from the river (Exh. KSE-1, at 5-3). The Company noted that the regulated Riverfront Area in Cambridge is limited to 25 feet, due to existing development patterns and population density (id.).

The Company stated that Chapter 91 Waterways Program approval would be required for the proposed project because the Primary Route would cross historically filled tidelands on the Kendall Station site and along Memorial Drive (id. at 5-4).[16] The Company stated that it was pursuing a strategy for compliance with Chapter 91 requirements, and that the proposed project would not adversely affect filled tidelands (id. at 5-5).

The record demonstrates that the Primary Route would enter a regulated Riverfront Area as it follows First Street over the Broad Canal drawbridge. The Primary Route also would enter wetland buffer zones along the Broad Canal and perhaps along the Charles River. In addition, the proposed project will be subject to further review under Chapter 91 because it crosses historically filled tidelands. Based on the limited encroachment into Riverfront and wetland buffer areas, and the developed nature of the Broad Canal and Memorial Drive, the Siting Board concludes that construction of the proposed facilities along the Primary Route would result in no permanent impacts, and only minimal temporary impacts, to water resources.

Accordingly, the Siting Board finds that the water resource impacts of the proposed facilities along the Primary Route would be minimized.

(ii) Land Resources

The Company indicated that the Primary Route passes through a densely developed urban area, traversing the MDC Charles River Basin Reservation as it passes along Memorial Drive (Exh. KSE-1, at 5-5 to 5-6). Other recreational resources within a short distance of the Primary Route include MIT open space and neighborhood playgrounds, parks, and schoolyards (id. at 5-6). The Company stated that the proposed transmission line would be located underground within existing street or sidewalk ROWs, minimizing any impacts to recreational resources (id.). The Company testified that its contract specifications would require that any site traversed by the proposed project be returned to its original condition (Tr. 1, at 122).

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[16] The Company noted that the Massachusetts Department of Environmental Protection ("MDEP") has determined that the transmission line is a water-dependent use under Chapter 91 because it is an integral part of the Mirant Kendall Station project (Exh. KSE-1, at 5-4 to 5-5).

The Company provided correspondence with the U.S. Fish and Wildlife Service and the Massachusetts Natural Heritage and Endangered Species Program indicating that there are no threatened or endangered species or associated habitat areas along the Primary Route (Exh. KSE-1, App. 3). The Company also stated that, because the proposed transmission line would be located underground in existing transportation corridors, the proposed project would have no impact on wildlife, with the possible exception of impacts related to construction noise (id. at 5-6).

The Company stated that there is one oil and hazardous material ("OHM") site located along the Primary Route at Kendall Station, where contamination from a former manufactured gas operation exists (id. at 5-7). In addition, the Company noted that several variations of the Primary Route also would cross the actual manufactured gas site on the neighboring Lyme Properties parcel; remediation would be required if the transmission line were installed on that OHM site (id.).

The Company stated that, if trees were lost during construction, it would replace the trees in kind or implement mitigation of a comparable cost (Exh. EFSB-1-20, Tr. 2, at 195). After the close of hearings, the Company submitted a tree-management report designed to assess the potential for impacts to trees along the Primary Route, and to recommend protection measures that would ensure safety and preserve the aesthetic character of Memorial Drive (Exh. CAM-1-37-S Att. at 4). The report inventoried 209 trees along the Primary Route, and rated the condition of each tree as good, fair, poor, or dead (id. at 16, 18). The report identified 64 trees, valued at a total of $92,964, that would be removed either because they pose hazards or because they are in general decline in areas with high construction impact (id. at 19, 20). Of these 64 trees, 5 were in good condition, 12 were in fair condition, 36 were in poor condition, and 11 were dead (id. at 24-28).

The report stated that protective measures would be required for all trees within 100 feet of any construction activity (id. at 5). The report specified general tree protection measures to be undertaken by the general contractor, including fencing and watering, and specified that a certified arborist would perform or supervise other tree conservation measures, including heavy-duty fencing, mulching, trunk protection, root collar excavations, and vertical mulching (id. at 5

to 9). The report indicated that pruning of deadwood and tree removals would be accomplished as necessary to ensure safety under the supervision of a certified arborist (id. at 9). The report did not specifically address the replacement of trees removed or injured during construction.

The City, before the tree management report was released, requested that the Siting Board require the Company to consult with, and obtain approval from, the City in the development of its tree management plan, and to submit a tree management plan prior to construction (City Brief at 13, 18). In response, the Company noted that, although most of the Primary Route falls within the jurisdiction of the MDC, it had already agreed to submit its tree management plan to the Cambridge Historical Commission and the Cambridge Conservation Commission for review (Company Reply Brief at 7). The Company argued that a further requirement to consult with the City prior to construction would be unnecessary (id.).

The record indicates that the Primary Route would run through densely populated urban areas, and would pass through or near recreational resources and open space. However, because the proposed transmission line would be located underground in existing ROWs, there would be no permanent impact on the use of recreational areas and other open space. No known rare or endangered species or endangered species habitat would be adversely affected by the construction of the proposed project along the Primary Route. The Primary Route would cross one contaminated site, at Kendall Station.

The Company's tree consultant has recommended that 64 trees, or approximately 30% of the trees along the Primary Route, be cleared to allow for project construction. Eleven of these trees are dead, and the majority of the living trees are in poor condition; nonetheless, the Siting Board is concerned that the loss of 53 live trees would have a significant effect on the urban visual environment. The Company made a general commitment at the hearing to replace trees lost during construction in kind, or to implement mitigation of a comparable cost; however, because the tree management report does not specifically address replacement plans, it is difficult to assess the expected visual impact of this level of tree removal. The Siting Board directs the Company, prior to commencing removal of trees in preparation for construction, to provide the Siting Board with an update on its tree management plan, developed in consultation with the Cambridge Historical Commission, the Cambridge Conservation Commission, the MDC and

other relevant City agencies, that sets forth specific provisions for the restoration of trees removed in preparation for or as a result of construction. The update should address the timing and the likely extent of replacement plantings and indicate the division of responsibility for such plantings between the Company, the MDC, and Cambridge. Further, to minimize impacts upon trees and vegetation, CELCo shall develop, obtain approval from the MDC and the City of Cambridge, within their respective jurisdictions, and implement a tree management plan, including a plan to avoid or mitigate impacts upon trees and vegetation. The tree management plan shall be approved by, and the field work shall be directly supervised by, a certified arborist.

Accordingly, the Siting Board finds that, with the implementation of and compliance with the mitigation contained in the tree report and with the implementation of the above condition, the land resource impacts of the proposed facilities along the Primary Route would be minimized.

(iii) Land Use

The Company submitted a description of land uses along the Primary Route (Exh KSE-1, at 5-9 to 5-17). The Company indicated that the portion of the Primary Route running along Memorial Drive largely abuts open space and transportation uses, while other parts of the route traverse residential, business, office, institutional and recreational areas (id. at 5-8 to 5-10).

The Company also discussed the zoning of areas along the Primary Route, but noted that most of the Primary Route runs through state-owned property (Memorial Drive and the Charles River Reservation), and is therefore not subject to local zoning (id. at 5-8).[17] The Company also asserted that zoning approval is not required for underground transmission lines, as they do not meet the definition of a "structure" under the State Building Code (id.). However, the Company noted that it would be required to obtain approval from the Cambridge Department of Public Works for local street openings and from the Cambridge City Council for grants of location within city streets (id. at 5-8 to 5-9).

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[17] The Company stated that it initially would seek a grant of location from the MDC in order to construct the proposed project, and later would seek an easement from the legislature (Tr. 1, at 21).

The Company stated that the proposed project requires no new above ground facilities or structures, and that, with the exception the tree removal discussed in Section III.C.2.a.(ii), above, there would be no alteration to above ground elements of the current visual environment (id. at 5-50). The Company stated that 73% of the 64 trees to be cleared currently are in poor condition or dead (Exh. CAM-1-37 Att.).

The Company noted that the segment of the Primary Route which runs along Memorial Drive passes through one historic district, the Charles River Basin National Register District, and abuts the MIT National Register District (Exh. KSE-1, at 5-17). The Company identified a number of listed historic properties along the Primary Route, including the Athenaeum Press Building on Athenaeum Street, MIT buildings at 30, 305, and 362 Memorial Drive, and the Shell gasoline station at 727 Memorial Drive (id.) Additionally, the Company stated that some of the trees along the route were considered to have historic value (Tr. 2, at 196 to 197). The Company indicated that it did not anticipate any adverse impacts to historic sites and stated that it would consult with the Cambridge Historical Commission and Massachusetts Historical Commission ("MHC") regarding appropriate procedures to prevent such impacts (Exh. KSE-1, at 5-18). The Company stated that the Primary Route does not pass through any Neighborhood Conservation District (id. at 5-17).

The Company stated that the proposed transmission line would not result in permanent noise impacts either along the Primary Route or at Putnam Substation (id. at 5-49). The Company indicated that installation of the proposed transmission line would result in normal construction noise, which typically would be confined to the hours between 7:00 a.m. and 4:00 p.m., with night work occurring only when necessary to minimize traffic impacts along heavily traveled roadways and at congested intersections and rotaries (Tr.1, at 104, 107). The Company stated that it expects construction to proceed at a rate of approximately 150 feet every four days, thus limiting the duration of construction noise in any specific location (Exh. KSE-1, at 5-50). The Company stated that it planned to mitigate potential noise impacts by restricting construction activity to daylight hours when possible, complying with federal regulations that limit truck noise, using muffling devices and keeping construction equipment in good repair, and performing any night work in accordance with local requirements, including the Cambridge

Noise Ordinance (id. at 5-50; Exh. CAM-1-8).

The City noted that conflicts may arise between the MDC's interest in minimizing traffic impacts on roads under its jurisdiction, and the City's interest in avoiding nighttime noise impacts on Cambridge residents (City Brief at 3). The City argued that a more detailed noise mitigation plan would be needed to resolve these issues, and requested that the Siting Board require the Company to develop, and obtain City and MDC approval for, a construction work plan that specifies daytime work hours, avoids night work to the extent possible, specifies noise mitigation measures for night work, and sets forth mitigation measures for noise and other construction impacts (id. at 5, 17). In response, the Company argued that construction details and noise mitigation should be developed in the context of the Company's Traffic Management Plan, which would be submitted to the City for approval (Company Reply Brief at 2).[18] The Company also noted that the Cambridge Pole and Conduit Commission may attach conditions to the street opening permit required for the proposed project (id.). The Company therefore argued that a separate noise mitigation approval process would be unnecessary and overly burdensome (id.).

The record demonstrates that the land use impacts of the proposed project would be limited primarily to temporary noise and visual impacts associated with construction activities. Construction noise impacts would be minimized by confining construction work to daytime hours to the maximum extent possible, and by maintaining nighttime construction noise within the limits established by Cambridge noise ordinances. The City has requested that the Siting Board require the Company, as a condition of approval, to develop a formal noise mitigation plan and submit it to the City for approval. The Siting Board agrees that the Company's noise mitigation plan should be developed in further detail prior to construction. However, the Siting Board also agrees with the Company that noise mitigation would be best addressed in the context of the Company's Traffic Management Plan, which necessarily will address matters such as nighttime construction along the most congested portions of the Primary Route. As the Company cannot commence construction without a Traffic Management Plan that has been approved by

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[18] The Company's Draft Traffic Management Plan is discussed in detail in Section III.C.2.a.(v), below.

both the City and the MDC (see Section III.C.2.a.(v), below), the Siting Board sees no need for a separate noise mitigation approval process.

The record demonstrates that the permanent visual impacts of the proposed project would be limited to the removal of a number of trees along the Primary Route. As discussed in Section III.C.2.a.(ii), above, the Company has developed a tree management plan to protect trees during construction, and has committed to replace trees lost during construction in kind, or to implement mitigation of a comparable cost. These steps should minimize visual impacts associated with tree clearing. The Company intends to consult with the Cambridge Historical Commission and the MHC to avoid permanent impacts to cultural and historic resources. Finally, the record indicates that the proposed project would have no permanent noise impacts.

Accordingly, the Siting Board finds that the land use impacts of the proposed facilities along the Primary Route would be minimized.

(iv) Electric and Magnetic Field Levels

In this section the Siting Board reviews the potential impacts of the proposed project with regard to Electric and Magnetic Fields ("EMF").[19]

(a) Description

In order to assess the effect of the proposed facilities on EMF along the Primary Route, the Company measured existing ambient magnetic field levels at various points along the route. The Company's measurements show that existing field levels along the Primary Route range from 5 milligaus ("mG") to 21 mG (Exh. KSE-1, at 5-51, App. D). The Company modeled the magnetic fields likely to be generated by the proposed transmission lines and determined that, during maximum generation export, magnetic fields would be 124 mG at one meter above the ground over the center of the cables (Exh. KSE-1, at 5-53). The corresponding magnetic field

[19] The Company stated that, because the proposed transmission line would be constructed with concentric shielding that will be grounded, electric fields associated with the cable would be negligible and would not be detectable at ground level (Exh. KSE-1, at 5-51, 5-53). Consequently, the Company performed no measurements or modeling of the electric fields which would be produced by the proposed transmission line (Exh. KSE-1, at 5-51).

strength 25 feet from the center line above the cables would be 10 mG (id.).[20] The Company did not calculate field strength at the edge-of-ROW; however, it stated that maximum magnetic field levels would fall below 85 mG within 5 feet of the centerline and that the proposed project thus would meet the Siting Board's 85 mG guideline within an effective ROW only 10 feet in width (Exh. RR-HO-4).

The Company identified one sensitive receptor within 25 feet of the proposed transmission line along the Primary Route: the Morse School, an elementary school located along Memorial Drive between the Brookline Street Rotary and Magazine Street (Exh. EFSB-1-24). The Company stated that the proposed transmission line would come within 15 feet of the library and the school playground, and estimated that the maximum magnetic field levels associated with the proposed transmission line would be approximately 24 mG at this distance (Exh. EFSB-2-7). The Company also stated that a small number of residences associated with MIT abut the Primary Route along Memorial Drive (id.). The Company indicated that the closest of these residences would be approximately 38 feet from the centerline of the proposed transmission line, and estimated that the maximum magnetic field levels associated with the proposed transmission line would be approximately 5 mG at this distance (Exh. EFSB-2-7).

The Company described three techniques which could be used to reduce magnetic fields generated by the proposed transmission line: metal shielding, charged coils, and uncharged coils.[21] The Company stated that installation of metal shielding above and beside the ductbank would be the most cost-effective means of reducing magnetic fields; however, it noted that the

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20 The Company's modeling assumed that the proposed transmission line's three conductors would be installed in a delta-configuration in one corner of the ductbank, in a phase arrangement that would provide maximum magnetic field cancellation (Exh. RR-HO-4). The Company stated that if one of the conductors failed and could not be removed from its duct, the Company would install a new cable in a location that would maintain the delta-configuration and phase arrangement which maximizes magnetic field cancellation (Tr. 2, at 258 to 261).

21 The Company also stated that steel plates installed between a transmission line and the surface, as is typical near bridge crossings, would reduce surface magnetic field levels, but did not estimate either the level of EMF reductions or the cost of this approach (Tr. 2, at 199).

metal shielding would reduce the ability of the transmission line to dissipate heat, thus reducing the capacity of the transmission line by 5% (Exh. RR-HO-4). The Company estimated that it would cost approximately $24,000 to install shielding sufficient to reduce maximum above-ground EMF levels from 124 mG to under 85 mG along 10 yards of transmission line (id.). The Company stated that use of a charged coil around the ductbank could theoretically mitigate maximum magnetic field impacts by a minimum of 40 mG at a cost of $32,000 over 10 yards, but noted that this technique is unproven and may not be as effective in the field as modeling would predict (id.). Finally, the Company stated that use of an uncharged metal coil surrounding the ductbank would cost approximately $21,000 over 10 yards, but added that this technique also has not been field-tested (id.).

(b) Current Research

The Company provided a summary of current research on the potential for adverse effects on human health resulting from magnetic fields. In particular, 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, studies on whole animals, and epidemiological studies (Exh. EFSB-2-9). The report concludes that the current body of evidence does not show that exposure to such fields presents a human health hazard (id. at 1). 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, and childhood cancers other than leukemia (id.).

The Company also provided the results of studies conducted since the 1997 NRC report. A 1999 World Health Organization review of EMF health effects found that "current evidence does not confirm the existence of any health consequences from exposure to low-level electromagnetic fields"(Exh. EFSB-2-9-S at 2). A 1999 study by the National Academy of Sciences and National Research Council of research projects conducted under its auspices concluded that the research does not support the contention that EMF exposures at normal residential or occupational doses produce important health effects, including cancer (id. at 3).

Studies from the American Cancer Society (2000) and the British Columbia Ministry of Health (2000) also concluded that the evidence does not support a link between EMF and human health effects (id. at 4). A 1999 National Institute of Environmental Health Sciences study stated that, while some evidence links EMF exposure with an increased risk of leukemia, virtually all laboratory data from animals and humans, and mechanistic studies in cells, fail to support a causal relationship between EMF and health effects (id. at 3).

The Company's witness described several recent epidemiologic studies, none of which conclusively supported a link between EMF exposure at residential or occupation levels, and human health effects (id. at 5-6).[22] He also stated that a 2000 study by Albohm et al. in the British Journal of Cancer re-examined pooled data from nine studies of EMF and childhood leukemia and found a statistical increase in leukemia at levels greater than 4 mG (id. at 7). However, he testified that the study's authors acknowledged that this association could be the result of selection bias and a highest-exposure category comprising under 1% of the subjects of the study, and noted that their conclusions were not borne out in animal laboratory studies (id. at 7-8).

Finally, the Company provided a summary of existing state and non-regulatory guidance regarding exposure to EMF (Exh. KSE-1, App. D at 5). The Company indicated that other states have adopted EMF guidelines which generally are based on levels in existing transmission corridors (id.). The Company stated that the International Radiation Protection Association recommends that occupational exposure be limited to magnetic fields below 5000 mG; that routine exposure for the general public be limited to 1000 mG; and that general public exposure to fields between 1000 and 10,000 mG be limited to a few hours per day (id. at 6). The Company also stated that the American Conference of Governmental Industrial Hygienists have established a Threshold Limit Value (a level to which nearly all workers may be exposed repeatedly without

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[22] Day et al. (1999), found no link between EMF from electricity supply in the United Kingdom and increased risks of childhood leukemia, cancers of the nervous system, or any other childhood cancer; Sorahan et al. (1999), found no such link in a study of EMF exposures during pregnancy; Forssen et al. (2000), found no support for the hypothesis that residential or occupational EMF levels were linked to an increased risk of breast cancer in Sweden (Exh. EFSB-2-9-S at 5 to 6).

adverse health effects) of 10,000 mG (id. at 5 to 6). Finally, 1998 guidelines from the International Commission on Non-Ionizing Radiation Protection set allowable 60 Hz EMF exposure levels at 830 mG for the general public (Exh. EFSB-2-9, Supp.).

(c) Positions of the Parties

The City asserted that no evidence was presented specific to exposure to magnetic fields for extended periods for school children (City Brief at 7). The City proposed that the Siting Board require the Company to install shielding to reduce magnetic field levels at the Morse Elementary School library and playing fields to 10 mG or less, or to some higher level approved by the Cambridge Department of Public Health (City Brief at 17). The City argued that this condition would allay fears regarding the risk to school children from magnetic fields and mitigate any effects on the computers in the library (City Brief at 8).

In response to the City's proposal, the Company asserted that it presented evidence that magnetic fields from transmission lines have no proven effect on the health of the general public (Company Reply Brief at 3). The Company also argued that the worst-case field levels along the library wall closest to the transmission line would be no greater than 24 mG, comparable with magnetic fields created by home appliances (40 to 80 mG at 1 foot) and computer video-display monitors (3 to 20 mG at 1 to 4 feet), and that field levels in the library would decline to 10 mG at a distance of 10 feet from the wall (Company Reply Brief, at 3 to 4, citing Exhs. KSE-1, Appendix D, at 3; CAM-1-50; EFSB-2-8; Tr 1, at 76-78). The Company also asserted that the anticipated magnetic field levels are unlikely to affect the school's computer monitors (Company Reply Brief, at 4 to 5, citing Exh. CAM-1-50).

(d) Analysis

In a previous review of proposed transmission line facilities, the Siting Board accepted edge-of-ROW levels of 85 mG for the magnetic field. Massachusetts Electric Company/New England Power Company, 13 DOMSC 119, at 228-242 (1985) ("1985 MECo/NEPCo Decision"). The Siting Board has used this edge-of-ROW level in subsequent facility reviews to determine whether anticipated magnetic field levels are unusually high. See, 1997 ComElec

Decision, 5 DOMSB 273, at 350; Norwood Decision, 5 DOMSB 109, at 145; MASSPOWER, Inc., 20 DOMSC 301, at 401-403 (1990). Here, assuming the maximum export of electricity from Kendall Station to the Putnam Substation, magnetic field levels would be 124 mG directly above the proposed transmission line. Because the proposed transmission line would lie almost entirely in city streets, there is no well-defined edge-of-ROW for the project; however, the record shows that the street and sidewalk areas provide an "effective ROW" of at least 10 feet in width. Outside this effective ROW, magnetic fields associated with the transmission line would drop below 85 mG. Thus, although the Company has not specifically designated a ROW for its proposed transmission line, the magnetic field levels associated with the proposed project appear to be consistent with levels approved in the 1985 MECo/NEPCo Decision.

More recently, the Siting Board has inquired into the current scientific literature regarding the possible impact of exposure to magnetic fields on human health. SE Kendall Decision, 11 DOMSB at 383-386; Nickel Hill Energy LLC, 11 DOMSB 83, at 233-235 (2000) ("Nickel Hill Decision"); Sithe Mystic Development LLC, 9 DOMSB 101, at 196-199 (1999) ("Sithe Mystic Decision"). The Siting Board has consistently found that, although some epidemiological studies suggest a correlation between exposure to magnetic fields and childhood leukemia, there is no evidence of a cause-and-effect association between magnetic field exposure and human health. SE Kendall Decision, 11 DOMSB at 385-386; Nickel Hill Decision, 11 DOMSB at 235; Sithe Mystic Decision, 9 DOMSB at 198-199. The record in this proceeding is consistent with the record developed in previous proceedings, and leads to the same conclusion. 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.

The City has argued that the Company should be required to limit magnetic field levels to 10 mG at the Morse Elementary School, both to protect school computer equipment and to allay public health concerns. The Siting Board notes that, in the past, electric companies have recognized that some members of the public are concerned about magnetic fields and therefore have incorporated design features into proposed transmission lines that would reduce magnetic fields at little or no additional cost. See, e.g., New England Power Company, 4 DOMSB 109, at 148 (1995). The Siting Board also has encouraged the use of practical and cost-effective designs

to minimize magnetic fields along transmission ROWs. See, e.g., Nickel Hill Decision, 11 DOMSB at 211; Sithe Edgar Development LLC, 10 DOMSB 1, at 117 (2000); IDC Bellingham Decision, 9 DOMSB 225, at 333. Here, CELCo already has committed to use and maintain a delta configuration within the duct bank in order to minimize magnetic fields. Further mitigation measures may be technically feasible; however, the record suggests that both the cost and effectiveness of these measures are uncertain. Moreover, there is no record evidence that supports the need for a 10 mG limit (as opposed to some higher limit) on magnetic fields at the Morse Elementary School. The Siting Board therefore cannot find that the City's proposed condition would minimize the environmental impacts of the proposed transmission line, consistent with minimizing cost. Instead, consistent with our precedent requiring the cost-effective minimization of magnetic field levels, the Siting Board directs the Company to consult with officials of Cambridge and the Morse Elementary School about cost-effective measures to minimize student exposure to magnetic fields from the proposed transmission line and, if reasonably feasible, reduce EMF levels to the City's preferred 10 mG in the school library. While the Company focused on ways to incorporate shielding into its facility design, more cost-effective measures might include changes in the alignment of the transmission line near the Morse Elementary School or the minor relocation of equipment or activities within the school. The Company should provide the Siting Board with a report on the consultation, and on any measures to be implemented, prior to commencement of construction. Should the Company be unable to achieve the City's preferred 10 mG level, the Company shall inform the Siting Board so that the Siting Board may decide whether to inquire further into this matter.

Accordingly, the Siting Board finds that, with the implementation of the above condition, the magnetic field impacts of the proposed facilities along the Primary Route would be minimized.

(v) Traffic

The Company stated that construction of the proposed transmission line would result in temporary traffic impacts along the streets making up the Primary Route and at 18 intersections (Exh. KSE-1, at 5-18 to 5-19). The Company indicated that, at any given time during the four-

month construction period, roadway and sidewalk access would be limited in areas approximately 35 feet in length, and added that construction would progress approximately 150 feet every four days, per crew (id. at 5-8, 5-18).

The Company stated that it plans to install the proposed transmission line in the sidewalk on the north side of Memorial Drive; however, if this proves infeasible due to utility or other conditions, the transmission line would be installed in the curb lane of Memorial Drive westbound (id. at 5-19). The Company indicated that traffic issues would be most difficult along Memorial Drive between the Overpass and Pleasant Street, and near Vassar Street as traffic approaches the Reid Overpass (Tr. 1, at 98 to 99). The Company noted that, in these areas, it may be necessary to close two lanes, rather than just one lane, of Memorial Drive to accommodate the delivery of construction materials and equipment (id. at 94, 99,100). The Company stated that it did not anticipate impacts on school buses or public transportation except in places where the Primary Route would cross street intersections (Exh. CAM-1-18).

The Company proposed to mitigate construction traffic impacts by: coordinating with Cambridge and the MDC on the design of traffic management plans and on the timing of construction; using industry-standard road signs and police details to control traffic; scheduling construction during off-peak traffic hours; identifying appropriate detour routes; accommodating loading zones and other business functions along the route; identifying replacement parking areas for parking areas displaced by construction; distributing advance public notice of construction; providing temporary markings, barriers, and other traffic control measures; and ensuring safe pedestrian flow (Exh. KSE-1, at 5-47). The Company provided a copy of its Draft Traffic Management Plan, which specifies in detail the location of lane and exit closings and relevant signage (Exh. EFSB-2-18). The Company stated that it would repave and restore roadways consistent with MDC and Cambridge policies (Exh. KSE-1, at 5-47).

The City noted that the final Traffic Management Plan will address a number of issues, including traffic management, parking, and repaving, that are subject to City approval, and that the Company has acknowledged that it will not receive MDC or City permits required for the project until both the MDC and the City are satisfied with the Traffic Management Plan (City Brief at 10-11). The City requested that the Siting Board require the Company to develop, obtain

City and MDC approval for, and implement a traffic, parking and street restoration plan, and to submit the plan to the Siting Board (City Brief at 18).

The record demonstrates that construction of the proposed transmission line along the Primary Route has the potential to create temporary traffic impacts on Cambridge streets and along Memorial Drive, a major transportation artery. The impacts on Memorial Drive would be mitigated in part by scheduling construction outside the evening peak travel period, when traffic volumes in the lanes affected by construction would be highest. The Company has agreed to work with Cambridge and the MDC to identify specific measures to further mitigate traffic impacts, and has provided a Draft Traffic Management Plan for the proposed project. The Company has agreed to develop a final Traffic Management Plan and submit it to the MDC and to Cambridge for approval.

The Siting Board notes that some of the signage proposed in the Company's Draft Traffic Management Plan may not provide adequate direction for drivers who are unfamiliar with the Boston area,[23] and encourages the Company to work with the MDC and Cambridge to improve the clarity and placement of signs, including, as necessary, flashing text signs and signs at the end of detours indicating the direction to important locations such as bridges, cities, or main streets. The Siting Board finds that, with the implementation of a traffic management plan that includes traffic and noise mitigation measures acceptable to the MDC and Cambridge, the traffic impacts of the proposed project along the Primary Route would minimized.

b. Cost

The Company estimated that the total cost for installation of the proposed transmission lines along the Primary Route would be $12,199,000, including $8,170,000 for the line cost, $1,392,000 for improvements to the station, $478,000 for overhead costs, $1,050,000 for engineering and construction management, and $1,109,000 for contingencies (Exh. KSE-1, at

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[23] For example, drivers entering the Brookline Rotary from Brookline Street are informed of a detour before they enter the rotary; however, once in the rotary, they are given no indication as to whether the detour continues around the rotary, up Memorial Drive eastbound, or over the Boston University Bridge (Exh. EFSB-2-18, Sheet 13).

4-25, Table 4.3-1).

c. Variations to the Primary Route

As part of the Primary Route, the Company described a route variation known at the Ames Street Variation which it proposed to use if it was unable to cross the Broad Street Canal. The Ames Street Variation would proceed north from the new switchyard at Kendall Station to the intersection of Second Street and Athenaeum Street (Exh. KSE-1, at 4-5). From this point it would proceed either across land owned by Lyme Properties, or along Second Street, Linsky Way, and Fifth Street, to property owned by Commonwealth Gas (id.). From the western edge of the Commonwealth Gas property, the Ames Street Variation would proceed along Fifth Street and Potter Street, across a Department of Transportation parking lot, and over a pedestrian walkway owned by the Cambridge Redevelopment Authority to Broadway (id. at 4-12). From Broadway, the Ames Street Variation would continue southwest onto Ames Street, crossing Main Street and following Ames Street to Memorial Drive (id. at 4-13). The Ames Street Variation is approximately one mile in length and travels up to one third of a mile from the Primary Route (id., Figure 4.2 - 1).

The Company stated that further study of Ames Street would be required if it were to use the Ames Street Variation (Tr. 2 at 233). Specifically, the Company stated that it has not developed detailed alignment drawings for the Ames Street Variation, because it does not expect to use the Ames Street Variation (Tr. 2 at 219). The Company also stated that it took a more cursory look at the trees along the Ames Street Variation than along the Primary Route and that the Company would need to do a tree management survey if a route other than the Primary Route were used (Tr. 2, 212-213). The Company noted that its Traffic Management Plan did not focus on the Ames Street Variation, and stated that additional studies would be required if the Ames Street Variation were to be used (Tr. 2 at 216). The Company also noted that contamination within the street has been confirmed at the intersection of Ames and Amherst Street, along the Ames Street Variation (id. at 239-240, 244).

MIT stated that it strongly opposes the use of the Ames Street variation to the Primary Route, due to the effects of the increased magnetic fields on sensitive research equipment (Exh.

MIT-1-1, MIT Brief). The Company expressed its commitment to ensure that there are no adverse effects on MIT research equipment if the Ames Street Variation is used (Tr. 2, at 221).

The record demonstrates that, prior to using the Ames Street Variation, the Company would need to further study tree management and traffic management issues and create a land/plan profile. Given the commitments made to MIT in this proceeding, the Company also would have to develop plans to address MIT's concerns regarding the effect of magnetic fields from the proposed transmission line on its research equipment. Such plans could have considerable cost implications. In the absence of this information, the Siting Board finds that the record is not sufficient to allow it to determine whether the environmental impacts of the proposed facilities along the Ames Street Variation to the Primary Route would be minimized, consistent with minimizing cost. Should CELCo determine that it needs to use the Ames Street Variation, it must notify the Siting Board so that the Siting Board may decide whether to further inquire into the matter.

The Company has identified four other variations to the Primary Route. As discussed in Section III.B, above, these variations include: (1) traveling through the Kendall Station switchyard and south in the First Street sidewalk for a short distance at the beginning of the route; (2) crossing the Brookline Street Rotary within the Reid Overpass, rather than following the Rotary itself; and (3) traversing privately owned land or city streets and a CELCo cable storage yard rather than a sewer easement at the end of the route. Each of these variations is relatively short, and remains close to the Primary Route. The Reid Overpass variation, which is the longest of the variations, remains essentially on Memorial Drive. Two other variations bring the transmission line out of city streets or easements onto property owned by the Company or its affiliates. In light of the length and nature of these variations, as well as the similarity between these variations and the corresponding parts of the Primary Route, the Siting Board concludes that the overall environmental impact of the proposed transmission line along the Primary Route would not change significantly if these variations were used.

d. Conclusions

In Section III.C.2.a and b, above, the Siting Board reviewed the record evidence regarding

the environmental impacts and cost of the proposed facilities along the Primary Route. The Siting Board finds that the Company has provided sufficient information regarding the environmental impacts and cost of the proposed facilities along the Primary Route for the Siting Board to determine whether environmental impacts would be minimized and whether an appropriate balance among the environmental impacts and between environmental impacts and cost would be achieved.

In Section III.C.2.a, above, the Siting Board reviewed the water resource, land resource, land use, EMF, and traffic impacts of the proposed facilities along the Primary Route. The Siting Board found that the water resource, land use, and traffic impacts of the proposed project would be minimized with the Company's proposed mitigation, and that the land resource and EMF impacts of the proposed project would be minimized with the implementation of conditions relating to tree management and to EMF levels near the Morse Elementary School. In Section III.C.2.c, above, the Siting Board found that the record is not sufficient to allow it to determine whether the environmental impacts of the proposed facilities along the Ames Street Variation to the Primary Route would be minimized, consistent with minimizing cost; however, it also found that the overall environmental impact of the proposed transmission line along the Primary Route would not change significantly if the other variations to the Primary Route were used. Accordingly, the Siting Board finds that, with the implementation of the proposed mitigation and conditions, and compliance with all applicable local, state and federal requirements, the environmental impacts of the proposed facility along the Primary Route, including variations other than the Ames Street Variation, would be minimized. The Siting Board also finds that the proposed facilities along the Primary Route would achieve an appropriate balance among conflicting environmental concerns as well as between environmental impacts, reliability, and cost.

3. Analysis of the Proposed Facilities Along the Alternate Route

a. Environmental Impacts

In this section, the Siting Board evaluates the environmental impacts of the proposed facilities along the Alternate Route. First, as part of its evaluation, the Siting Board addresses

whether the petitioner has provided sufficient information regarding the Alternate Route for the Siting Board to determine whether the environmental impacts of the proposed facilities would be minimized, and whether the proposed facilities would achieve the appropriate balance among environmental impacts and between cost and environmental impacts. If necessary for its review, the Siting Board separately addresses whether the environmental impacts of the proposed facilities along the Alternate Route would be minimized, with potential mitigation. Finally, in order to determine a best route, the Siting Board compares the environmental impacts of the Primary Route to the environmental impacts of the Alternate Route.

(i) Water Resources

The Company stated that the Alternate Route, like the Primary Route, crosses historically filled tidelands on the Kendall Station site (Exh. KSE-1, at 5-4). However, the Company stated that no jurisdictional wetland resources were identified along the Alternate Route, and that there would be no project impacts to any protected areas – Bordering Land Subject to Flooding, 100-foot Buffer Zone or Riverfront Area -- associated with the Charles River or the Broad Canal (id. at 5-3).

The record shows that the Alternate Route avoids areas where construction could affect water resources, but that the route extends into filled tidelands subject to review under G.L. c. 91. In contrast, the Primary Route crosses the Broad Canal via a bridge and traverses the 100-foot buffer zone along the canal, as well as extending into filled tidelands. However, as discussed in Section III.C.2.a.ii, above, any water resources impacts of constructing the proposed facility along the Primary Route would be minimal and temporary, given the developed nature of the Broad Canal and Memorial Drive. Accordingly, the Siting Board finds that the Primary Route and the Alternate Route would be comparable with respect to water resources.

(ii) Land Resources

The Company stated that the Alternate Route does not directly abut any public open space or recreational area (Exh. KSE-1, at 5-6). The Company stated that, due to the urban nature of the area, no significant natural habitats for wildlife are present in the vicinity of the Alternate

Route (id.). The Company also noted that, due to the nature of the proposed facilities, and the use of existing transportation corridors, no adverse impacts to wildlife are expected to result from the proposed project along either route, with the exception of temporary construction related noise disturbance (id. at 5-6). The Company stated that the U.S. Fish and Wildlife Service and the Massachusetts Natural Heritage and Endangered Species Program have confirmed that there are no threatened or endangered species or associated habitat along the Alternate Route (id.).

The Company stated that no alteration of trees is expected along the Alternate Route (id. at 5-50). The Company provide photographs indicating that some trees are present on many but not all segments of the Alternate Route, and that where present, trees often are at intermittent locations or along one side on affected roadways (id. at 5-37 to 5-43).

The Company stated that ten OHM release sites have been identified along the Alternate Route, and noted that nine of the identified sites have been issued a Response Action Outcome ("RAO"), have attained No Further Action ("NFA") status, are pending NFA status, or were preclassified (id. at 5-7). The Company noted that one of these ten OHM release sites is common to both the Primary and Alternate Routes (id.). The Company stated that the Alternate Route crosses the Lyme Properties parcel, which is the one OHM release site requiring remediation activities for the installation of the transmission line (id.).

The record indicates that the Primary Route includes segments along Memorial Drive that are proximate to numerous trees, and that the Company has developed a tree management plan that recommends removal of 64 trees, three-quarters of which currently are dead or in poor condition. Although not investigated to the same level of detail, the Alternate Route is proximate to fewer trees than the Primary Route, and its use likely would result in fewer, if any, alterations to trees. However, while use of the Primary Route is likely to lead to the removal of a significant number of trees, the record makes it clear that the anticipated removals involve trees that are predominantly in poor condition and that already require significant maintenance or replacement. Further, the Company is committed to restore features that are altered as a result of the project, and has been directed to provide more specific tree restoration plans.

Overall, the record indicates that the proposed project could be constructed along either the Primary or Alternate Route without affecting wildlife habitat, threatened or endangered

species, or the public use of parkland or open space. Use of the Primary Route would affect more trees, but most of the affected trees are dead or in poor condition, and restoration would be provided. The Alternate Route passes more OHM release sites, and traverses a site requiring remediation near Kendall Station.

Consequently, the Siting Board finds that, on balance, the Primary Route and the Alternate Route would be comparable with respect to land resources.

(iii) Land Use

The Company indicated that the Alternate Route would pass through office, commercial, light industrial, and residential areas of Cambridge, traversing various zoning districts associated with such uses (Exh. KSE-1, at 5-11 to 5-13). The Company argued that the Alternate Route traverses significantly more residential areas than the Primary Route, and therefore is the inferior route with respect to land use (Company Brief at 31, citing, Exh. KSE-1, at 5-9 to 5-17).[24]

The Company asserted that the proposed facilities would not be regulated under local zoning as they do not meet the definition of a "structure" under the State Building Code (Exh. KSE-1, at 5-8). However, the Company noted that it would be required to obtain approval from the Cambridge Department of Public Works for local street openings and from the Cambridge City Council for grants of location within city streets (id. at 5-8 to 5-9).

The Company stated that visual impacts of the proposed project along the Alternate Route would be limited to activity during the construction period, and that there would be no permanent alterations of trees or other above-ground elements of the visual environment (id. at 5-51). The Company stated that noise impacts also would be limited to construction noise associated with the installation of the duct bank and manholes for the transmission line (id. at 5-50). The Company stated that the expected rate of construction and the proposed provisions to limit construction noise would be the same for the Alternate Route as for the Primary Route (id.).

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[24] The Company provided descriptions and photographs indicating that the Alternate Route extends predominantly along roadways with two travel lanes and varying amounts of space for parking and sidewalk, and further that such roadways are narrower than the Memorial Drive corridor along which most of the Primary Route extends (Exh. KSE-1, at 5-19 to 5-46).

The Company stated that the Alternate Route does not pass through either Historic Districts or Neighborhood Conservation Districts, as designated by the Cambridge Historical Commission (id. at 5-18). The Company stated that the Alternate Route passes in the vicinity of ten locations listed on the National Register of Historic Places ("NRHP") (id.). The Company noted that the location of the proposed transmission facilities along the Alternate Route within the previously disturbed roadbed is expected to prevent any impacts to cultural or archaeological resources (id.).

The record indicates that the Alternate Route traverses more residential areas and would require construction in narrower streets than the Primary Route, increasing the importance of noise impacts along the Alternate Route. The Alternate Route also is located in the vicinity of a greater number of cultural and historic resources than the Primary Route.

Neither the Primary nor the Alternate Route has appreciable advantages or disadvantages with respect to zoning. Although use of the Primary Route would include a number of tree removals, representing alterations of the visual environment, the record indicates that in most cases the planned removals involve trees that currently are dead or in poor condition, and that the Company has committed to restore features that are altered as a result of the project. The Siting Board has directed the Company to provide the Siting Board with an update on its tree restoration plans (see Section III.C.3.a.ii, above).

The Siting Board finds that, on balance, the Primary Route would be preferable to the Alternate Route with respect to land use.

(iv) Electric and Magnetic Fields

In order to assess the effect of the proposed facilities on EMF along the Alternate Route, the Company measured existing EMF levels at various points along the Alternate Route (Exh. KSE-1, at 5-52).[25] The Company stated that existing magnetic field levels for the portion of the Alternate Route west of Portland Street were below 10 mG, with occasional spikes in the 10 and

[25] The Company noted that, because the Alternate Route had changed over time, magnetic field measurements along segments of the Alternate Route were conducted at different times (Exh. KSE-1, at 5-52).

20 mG range (id.). The Company stated that existing magnetic fields east of the Portland Street area were generally less than 5 mG (id.). The Company noted that the highest field measured in this study occurred on Windsor Street along a variation to the Alternate Route where a spike of 84 mG was measured on April 14, 2000 around 4:00 p.m. (id.).

The Company stated that there are no sensitive receptors along the Alternate Route (Exh. EFSB-1-25). However, the Company provided information indicating that the Alternate Route traverses several residential streets (Exh. KSE-1, at 5-11 to 5-13). The nearest residences to the proposed facilities along the Alternate Route would be houses on Fairmont and Erie Streets in Cambridge, which are narrow streets with small sidewalks (Exhs. EFSB-1-25; EFSB-2-7). The Company stated that the walls of residences along these streets would be approximately 13 feet from the cable centerline, resulting in magnetic field levels of approximately 30 mG at these residences (Exhs. EFSB-1-25; EFSB-2-7). The Company stated that because the proposed cable would be constructed with concentric shielding that would be electrically grounded, electric fields associated with the cable would be negligible (Exh. KSE-1, at 5-51).

The record shows that the design of the cable ductbank and its projected maximum load would be the same along either the Primary or Alternate Routes; consequently the EMF levels modeled directly above the centerline of the transmission line would be the same for either route. However, the record shows that the Alternate Route would pass within 13 feet of the nearest residences, while the closest residence on the Primary Route would be 38 feet away from the proposed transmission line, resulting in lower magnetic fields at the nearest residence. On the other hand, the Alternate Route does not pass near any sensitive receptors, while the Primary Route approaches the Morse School. Thus, each route has advantages and disadvantages. Further, as discussed in Section C.2.d, above, although the health effects of magnetic fields are still subject to considerable debate, the record in this case does not provide evidence of any health effect resulting from exposure to EMF. Accordingly, the Siting Board finds that, on balance, the Primary Route and the Alternate Route would be comparable with respect to EMF impacts.

(v) Traffic

The Company stated that traffic impacts associated with the proposed facilities along the Alternate Route would be temporary in nature, and would occur primarily during construction (Exh. KSE-1, at 5-18). The Company stated that, during construction, access to certain roadways and sidewalks would be limited (id.). The Company stated that installation of the proposed facilities along the Alternate Route generally would progress at approximately the same rate as it would along the Primary Route (id.). However, the Company noted that the Alternate Route could require use of more construction space and a longer construction time than the Primary Route for installation of the pipeline crossing underneath the railroad tracks (id.).

The Company stated that construction of the proposed facilities along the Alternate Route would require placing a utility easement along the following roadways: Fifth Street, Potter Street, Broadway, Portland Street, Main Street, Osborn Street, State Street, Sidney Street, Erie Street, Fairmont Street, Pleasant Street, and Putnam Avenue (id. at 5-35). The Company stated that between the Kendall Station site and Broadway, the Alternate Route largely travels on private property and existing easements, and therefore would not affect any significant intersections in this area (id.). The Company indicated that the rest of the Alternate Route travels primarily along one and two-lane city streets (id. at 5-36 to 5-46). The Company stated that the proposed facilities along the Alternate Route would require 8 manholes and would affect 24 intersections, compared to the 6 required manholes and 18 affected intersections for the Primary Route (id. at 4-13, 4-14, 5-19, 5-35).

The Company stated that it would employ mitigation measures to accommodate roadway traffic during construction, similar to those which would be used with the Primary Route (id. at 5-46 to 5-47).

The construction of the proposed facilities along either the Primary or Alternate Route would result in temporary impacts to traffic. Similar construction techniques and mitigation would be used for either route. The record shows that the Alternate Route traverses a larger number of intersections than the Primary Route and would require installation of more manholes. Moreover, although facility construction along the Primary Route would potentially affect Memorial Drive, a well traveled roadway, construction would not occur during the evening peak

travel period when the travel lanes affected by construction would be subject to high traffic volume. Accordingly, the Siting Board finds that the Primary Route would be slightly preferable to the Alternate Route with respect to traffic.

b. Cost

The Company estimated the cost of the proposed facility along the Alternate Route to be $12,692,000, compared with an estimated cost of $12,199,000 along the Primary Route (Exh. KSE-1, at 5-53). The Company stated that the higher cost for the proposed transmission line along the Alternate Route reflects the increased chance of encountering congested utilities, the greater number of intersections to be crossed, the greater number of manholes required, and the expected ease of installing the transmission line on the portion of the Primary Route along Memorial Drive (id. at 5-54).

Accordingly, the Siting Board finds that the Primary Route would be preferable to the Alternate Route with respect to cost.

c. Conclusions on Route Comparison

The record indicates that the Primary Route would be preferable to the Alternate Route with regard to land use, and traffic, while the Primary and Alternate Routes would be comparable with regard to water resources, land resources, and EMF. In addition, the Primary Route is preferable to the Alternate Route with respect to cost. Accordingly, the Siting Board finds that the proposed facilities along the Primary Route would be preferable to the proposed facilities along the Alternate Route with respect to providing a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

IV. PUBLIC CONVENIENCE AND INTEREST

As noted in Section I.C, above, CELCo has filed with the Department a petition seeking a determination pursuant to G.L. c. 164, § 72 that the Company's proposed electric transmission line is necessary and will serve the public convenience and be consistent with the public interest. This petition was subsequently referred to the Siting Board and consolidated for review in this

proceeding. Pursuant to G.L. c. 164, § 69H(2), the Siting Board applies the Department's standard of review for such petitions to the subject matter of the Company's petitions in a manner consistent with its findings in Sections II and III, above.

A. Standard of Review

G.L. c. 164, § 72, requires, in relevant part, that an electric company seeking approval to construct a transmission line must file with the Department a petition for:

> authority to construct and use . . . a line for the transmission of electricity for distribution in some definite area or for supplying electricity to itself or to another electric company or to a municipal lighting plant for distribution and sale . . . and shall represent that such line will or does serve the public convenience and is consistent with the public interest. . . . The [D]epartment, after notice and a public hearing in one or more of the towns affected, may determine that said line is necessary for the purpose alleged, and will serve the public convenience and is consistent with the public interest.[26]

The Department, in making a determination under G.L. c. 164, § 72, is to consider all aspects of the public interest (see Massachusetts Electric Company and New England Power Company, D.T.E. 99-70, at 2 (2000) ("MECo/NEPCo"); Boston Edison Company v. Town of Sudbury, 356 Mass. 406, 419 (1969) ("Boston Edison")). Section 72, for example, permits the Department to prescribe reasonable conditions for the protection of the public safety. Boston Edison, 356 Mass. 406, at 419-420. All factors affecting any phase of the public interest and public convenience must be weighed fairly by the Department in a determination under G.L. c. 164, § 72. Town of Sudbury v. Department of Public Utilities, 343 Mass. 428, 430 (1962).

In evaluating petitions filed under G.L. c. 164, § 72, the Department examines: (1) the need for, or public benefits of, the present or proposed use (See MECo/NEPCo, D.T.E. 99-70, at 6-7, 17-18 (2000); Massachusetts Electric Company, D.P.U. 93-29/30, at 10-14, 22-23 (1995) ("1995 MECo Decision"); New England Power Company, D.P.U. 92-278/279/280, at 19 (1994) ("1994 NEPCo Decision"); (2) the environmental impacts or any other impacts of the present or

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[26] Pursuant to the statute, the electric company must file with its petition a general description of the transmission line, provide a map or plan showing its general location, and estimate the cost of the facilities in reasonable detail. G.L. c. 164, § 72.

proposed use (see MECo/NEPCo, D.T.E. 99-70, at 20-22 (2000); NEPCo, D.P.U. 92-278/279/280, at 20-23; NEPCo, D.P.U. 92-270, at 17-20); and (3) the present or proposed use and any alternatives identified (See MECo/NEPCo, D.T.E. 99-70, at 18-20 (2000); NEPCo, D.P.U. 92-278/279/280, at 19; NEPCo, D.P.U. 92-270, at 17). The Department then balances the interests of the general public against the local interest and determines whether the line is necessary for the purpose alleged and will serve the public convenience and is consistent with the public interest.[27]

B. Analysis and Findings

As indicated in Section II.A.2, above, CELCo is an electric distribution company engaged in the distribution and sale of electricity and as such is an electric company defined by G.L. c. 164, § 1. Accordingly, CELCo is authorized to petition the Department for a determination under G.L. c. 164, § 72 that the proposed transmission line "is necessary for the purpose alleged, and will serve the public convenience, and is consistent with the public interest." As discussed in Section IV.A, above, in making a determination pursuant to G.L. c. 164, § 72, the Department first examines the need for or public benefits of the proposed use. The Department then examines the identified alternatives and the environmental and other impacts of the project. Finally, the Department balances the interests of the general public with any identified local interests. The Siting Board examines CELCo's petition consistent with these standards. In making its findings regarding the Company's petition pursuant to G.L. c. 164, § 72, the Siting

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[27] In addition, the Massachusetts Environmental Policy Act ("MEPA") provides that "[a]ny determination made by an agency of the commonwealth shall include a finding describing the environmental impact, if any, of the project and a finding that all feasible measures have been taken to avoid or minimize said impact." G.L. c. 30, § 61. Pursuant to 301 C.M.R. § 11.01(3), these findings are necessary when an Environmental Impact Report ("EIR") is submitted by the company to the Secretary of Environmental Affairs, and should be based on such EIR. Where an EIR is not required, c. 30, § 61 findings are not necessary. 301 C.M.R. § 11.01(3). In the present case, the Secretary of Environmental Affairs issued his determination that no EIR was required for the proposed project (see Certificate of the Secretary of Environmental Affairs on the Environmental Notification Form, EOEA No. 12386, dated February 9, 2001), and, therefore, a finding is not necessary in this case under G.L. c. 30, § 61.

Board relies on its analyses in Sections II and III, above.

As an initial matter, the Siting Board finds that the Company's petition, filed pursuant to G.L. c. 164, § 72, has complied with the requirements that it describe the proposed transmission line, provide a map or plan showing the general location of the transmission line, and estimate the cost of the transmission line in reasonable detail.

In Section II.A.3, above, the Siting Board found that the repowered Kendall station would contribute to a necessary supply of energy for the Commonwealth with a minimum impact on the environment at the lowest possible cost. Further, in Section II.A.3., above, the Siting Board found that there is a need for additional energy resources to interconnect the repowered Kendall Station facilities with the regional transmission system. Accordingly, we find a need for, and public benefits of, the construction and operation of the proposed transmission line.

In Section III.C.2, above, the Siting Board found that the water resource, land use, and traffic impacts of the proposed project would be minimized with the Company's proposed mitigation, and that the land resource and EMF impacts of the proposed project would be minimized with the implementation of conditions relating to tree management and to EMF levels near the Morse Elementary School. Accordingly, the Siting Board finds that, with the implementation of the proposed mitigation and conditions, and compliance with all applicable local, state and federal requirements, the Company has taken all reasonable measures to avoid, minimize or mitigate environmental impacts along the Primary Route and variations to the Primary Route with the exception of the Ames Street variation.

In Section II.B, above, the Siting Board reviewed the four approaches considered by the Company for the interconnection of the repowered Kendall Station. The Siting Board concluded that, in light of the clear reliability concerns associated with Alternate Approaches 1, 2, and 3, and the lack of potential offsetting cost or environmental advantages, the Siting Board finds that the proposed project would be superior to Alternate Approaches 1, 2, and 3 with respect to providing a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. Accordingly, the Siting Board finds that the Company's decision to pursue the proposed project was reasonable.

The Siting Board has found, above, that there is both a need for, and public benefits of the

construction and operation of the proposed transmission line. The Siting Board has also found that the Company's decision to pursue the proposed project, rather that one of the identified alternatives, was reasonable. The Siting Board further finds that, with the implementation of the proposed mitigation and conditions, and compliance with all applicable local, state and federal requirements, the Company has taken all reasonable measures to avoid, minimize or mitigate environmental impacts along the Primary Route and variations to the Primary Route with the exception of the Ames Street Variation. Accordingly, the Siting Board finds that the public benefits of the project outweigh its impacts. Consequently, pursuant to G.L. c. 164, § 72, the Siting Board finds that, with the implementation of the mitigation measures proposed by the Company, and upon compliance with the conditions regarding the tree management plan and EMF, the proposed 115 kV electric transmission line is necessary for the purpose alleged, will serve the public convenience, and is consistent with the public interest.

V. DECISION

The Siting Board's enabling statute directs the Siting Board to implement the energy policies contained in G.L. c. 164, §§ 69H to 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. In addition, the statute requires that the Siting Board determine whether plans for the construction of energy facilities are consistent with current health, environmental protection, and resource use and development policies as adopted by the Commonwealth. G. L. c. 164, § 69J. In addition, G.L. c. 164, § 69J requires that a facility proposed by an electric company required to file a long-range forecast pursuant to G.L. c. 164, § 69I be consistent with that company's most recently approved long range forecast

In Section II.A, above, the Siting Board found that there is a need for additional energy resources to interconnect the repowered Kendall Station facilities with the regional transmission system. Further in Section II.A, the Siting Board found that the proposed facility is consistent with the Company's most recently approved long range forecast.

In Section II.B, above, the Siting Board found that the proposed project would be superior to Alternate Approaches 1, 2, and 3 with respect to providing a reliable energy supply for the

Commonwealth with a minimum impact on the environment at the lowest possible cost.

In Section III.A, above, the Siting Board found that the Company has developed and applied a reasonable set of criteria for identifying and evaluating alternatives to the proposed project in a manner which ensures that it has not overlooked or eliminated any routes which are clearly superior to the proposed project. The Siting Board also found that the Company has identified a range of practical transmission line routes with some measure of geographic diversity. Consequently, the Siting Board found that CELCo has demonstrated that it examined a reasonable range of practical siting alternatives.

In Section III.C, above, the Siting Board reviewed environmental impacts of the 2.6-mile route in light of related regulatory or other programs of the Commonwealth, including programs related to wetlands protection, and rare and endangered species. As evidenced by the above discussions and analyses, the proposed 2.6-mile transmission line along the Primary Route and variations to that route, with the exception of the Ames Street variation, would be generally consistent with the identified requirements of all such programs.

In Section III.C, the Siting Board found that with the implementation of the proposed mitigation and conditions, and compliance with all applicable local, state and federal requirements, the environmental impacts of the proposed facilities along the Primary Route would be minimized. The Siting Board also found that the proposed project along the Primary Route would achieve an appropriate balance among conflicting environmental concerns as well as between environmental impacts, reliability, and cost.

In Section III.C, above, the Siting Board found that the proposed facilities along the Primary Route would be preferable to the proposed facilities along the Alternate Route with respect to providing 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 Company's petition to construct one 2.6 mile, 115-kilovolt underground electric transmission line in Cambridge, Massachusetts using the Company's Primary Route and variations to that route with the exception of the Ames Street variation, subject to the following conditions:

A. The Siting Board directs the Company, prior to commencing removal of trees in preparation for construction, to provide the Siting Board with an update on its tree management plan, developed in consultation with the Cambridge Historical Commission, the Cambridge Conservation Commission, the MDC, and other relevant City agencies, that sets forth specific provisions for the restoration of trees removed in preparation for or as a result of construction. The update should address the timing and the likely extent of replacement plantings and indicate the division of responsibility for such plantings between the Company, the MDC, and Cambridge.

B. The Siting Board directs the Company to develop and obtain approval from the MDC and the City of Cambridge, within their respective jurisdictions, and implement a tree management plan, including a plan to avoid or mitigate impacts upon trees and vegetation. The tree management plan shall be approved by, and the field work shall be directly supervised by, a certified arborist.

C. The Siting Board directs the Company to consult with officials of Cambridge and the Morse Elementary School about cost-effective measures to minimize student exposure to magnetic fields from the proposed transmission line and, if reasonably feasible, reduce EMF levels to the City's preferred 10 mG in the school library. While the Company focused on ways to incorporate shielding into its facility design, more cost-effective measures might include changes in the alignment of the transmission line near the Morse Elementary School or the minor relocation of equipment or activities within the school. The Company should provide the Siting Board with a report on the consultation, and on any measures to be implemented, prior to commencement of construction. Should the Company be unable to adhere to the City's preferred 10 mG level, the Company shall inform the Siting Board so that the Siting Board may decide whether to inquire further into this matter.

In addition, the Siting Board has found pursuant to G.L. c. 164, § 72 that CELCo's

proposed transmission line is necessary for the purpose alleged, and will serve the public convenience and is consistent with the public interest.

The Siting Board notes that the findings in this decision are based on 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 25th day of September, 2001.

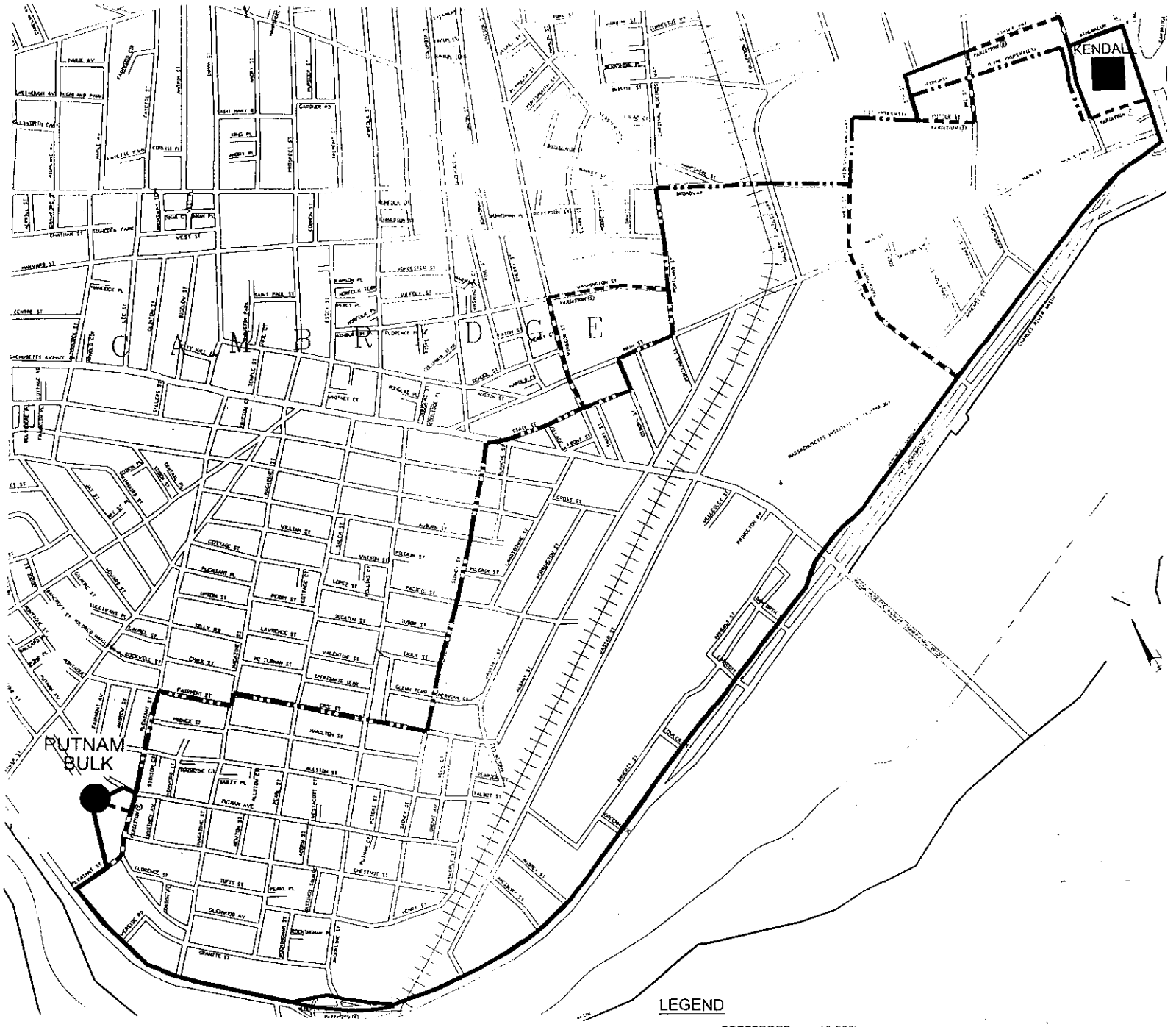
APPROVED by the Energy Facilities Siting Board at its meeting of September 24, 2001, by the members and designees present and voting: James Connelly (Chairman, DTE/EFSB); Deirdre K. Manning (Commissioner, DTE); W. Robert Keating (Commissioner, DTE); Matthew Morais (for David L. O'Connor, Commissioner, Division of Energy Resources); and Joseph Donovan (for Elizabeth Ames, Director of Economic Development).

James Connelly, Chairman
Energy Facilities Siting Board

Dated this 24th day of September, 2001.

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).



PREFERRED & ALTERNATIVE ROUTE SEGMENTS

CAMBRIDGE ELECTRIC LIGHT CO.

11/10/00

SCALE -- FEET

1000 0 1000 2000

COM/Electric

FIGURE 1

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 97-5B

FINAL DECISION
PROJECT CHANGE

Jolette A. Westbrook
Hearing Officer
September 25, 2001

On the Decision:
William Febiger, Technical Director
Barbara Shapiro

APPEARANCES:

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TABLE OF CONTENTS

The Energy Facilities Siting Board hereby approves, subject to conditions, changes to the IDC Bellingham project as further described below.

I. INTRODUCTION

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 before the Siting Board issued the Final Decision, IDC informed the Siting Board of the possibility that the Company would have to change turbine manufacturers. Id. at 242. Consequently, the Siting Board directed IDC to make a compliance filing regarding the Company's choice of turbine. Id. On March 3, 2000, IDC submitted its compliance filing ("Compliance Filing"), informing the Siting Board that the Company intended to use a different turbine manufacturer and that the net nominal capacity of the facility would be reduced to 525 MW. On September 11, 2000, the Siting Board conditionally approved the petition of IDC to construct the proposed facility with the different turbine at a reduced net nominal electrical output of 525 MW. IDC Bellingham, LLC, 11 DOMSB 27, 35 (2000) ("IDC Compliance Decision").[2]

On June 6, 2001, IDC provided the Siting Board with notice of other changes to the proposed project ("June 6 Filing"). The changes included: (1) an increase in the height of the facility stack from 190 feet to 225 feet; (2) a reduction in the projected emissions of certain criteria pollutants; (3) a change in the proposed air permit limits for short-term ammonia

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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. IDC Compliance Decision at 35.

[2] The Final Decision and the IDC Compliance Decision are collectively referred to as the "underlying decisions".

emissions; (4) a reduction in the size of the ammonia storage tank from 40,000 gallons to 29,000 gallons; and (5) a change in the departure time for the main construction shift from between 2:30 p.m. and 3:30 p.m. to between 5:00 p.m. and 6:00 p.m. (Exhs. PC-IDC-1, at 9; PC-IDC, Att. D at 1).

II. PROJECT CHANGES

A. Project Change Notification

In its approvals of the IDC project, the Siting Board required IDC to notify it of any changes other than minor variations to the proposal as presented to the Siting Board, so that it might decide whether to inquire further into such issues. Final Decision at 363; IDC Compliance Decision at 80. The standard of review to determine whether further inquiry is warranted was 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; see also IDC Compliance Decision, 11 DOMSB at 38-39.

B. The Company's Project Change Filings

In its June 6 Filing, IDC provided: (1) a January 3, 2001 Decision of the Bellingham Zoning Board of Appeals ("ZBA Decision"), approving five special permits required for the IDC project ("special permit");[3] (2) the Massachusetts Department of Environmental Protection's ("MDEP") Proposed Conditional 7.02 Air Quality Plan Approval ("proposed conditional air plan approval") for the IDC project;[4] (3) a set of visual depictions of the stack under the configuration

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[3] Individual permits are referred to as Special Permit No. 1 - 5.

[4] On August 29, 2001, IDC supplemented its June 6 Filing by providing a copy of IDC's Conditional Air Plan Approval that was issued by the MDEP on August 20, 2001 ("conditional air plan approval"). The August 29, 2001 filing consisted of (1) an August (continued...)

approved in the IDC Compliance Decision, at a height of 225 feet; and (4) a traffic analysis that assumes the main construction shift ends at 5:00 p.m.[5] On July 17, 2001, IDC submitted responses to Siting Board staff information requests ("July 17 Filing").[6] IDC submitted supplemental information request responses on July 24, 2001 and August 8, 2001 ("July 24 Filing" and "August 8 Filing" respectively).[7] On August 15, 2001, all parties were given an opportunity to issue information requests or submit comments with respect to the proposed project changes. No information requests or comments were filed by any party.

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4 (...continued)
20, 2001 letter signed by Thomas P. Cusson, approving the proposed facility subject to conditions (Exh. PC-IDC-1, Att. B(s)); and (2) Appendix A, Air Quality Plan Approval IDC Bellingham LLC, Bellingham Massachusetts, ASP# ASPIDC (Exh. PC-IDC-1, Att. B-1(S)). Each of these documents is hereby marked for identification and entered into evidence in this matter.

5 The June 6 Filing consisted of the following documents, each of which is hereby marked for identification and entered into evidence in this matter: (1) a nine-page letter dated July 6, 2001 signed by John A. DeTore regarding proposed changes to the IDC project (Exh. PC-IDC-1); (2) a January 3, 2001 ZBA Decision (Exh. PC-IDC-1, Att. A); (3) a May 14, 2001 MDEP letter signed by Thomas P. Cusson regarding MDEP's proposed conditional air plan approval (Exh. PC-IDC-1, Att. B); (4) MDEP's proposed conditional air plan approval, Appendix A (Exh. PC-IDC-1, Att.B-1); (5) MDEP's May 11, 2001 proposed Section 61 findings (Exh. PC-IDC-1, Att. B-2); (6) viewshed photographs and associated drawings depicting the project with a 225-foot stack (Exh. PC-IDC-1, Att. C); (7) a May 18, 2001 traffic analysis document entitled "Technical Memorandum" (Exh. PC-IDC-1, Att. D); and (8) a May 14, 2001 "DEPNEWS" press release (Exh. PC-IDC-1, Att. E).

6 The July 17 Filing consisted of the following documents, each of which is hereby marked for identification and entered into evidence in this matter: (1) information regarding visual mitigation (Exh. PC-EFSB-1); (2) information regarding the proposed modification to the construction schedule (Exh. PC-EFSB-2); and (3) information regarding possible traffic mitigation measures (Exh. PC-EFSB-3).

7 The July 24 Filing consisted of a supplemental response to Exh. PC-EFSB-2 and the August 8 Filing consisted of a supplemental response to Exh. PC-EFSB-1. These documents are marked for identification as Exh. PC-EFSB-2(S) and Exh. PC-EFSB-1(S), respectively, and are entered into evidence in this matter.

III. SCOPE OF INQUIRY

In its June 6 Filing, IDC provided the Siting Board with information concerning emissions limits set in the proposed conditional air plan approval.[8] The Company provided an analysis showing that the maximum modeled concentrations for all criteria pollutants would be at or below levels approved by the Siting Board in the IDC Compliance Decision (Exh. PC-IDC-1, at 4, 5). IDC specifically noted a substantial decrease in NO_X emissions, stating that the proposed conditional air plan approval limited NO_X emissions to 1.5 ppmvd @15% O_2,[9] rather than the 2.0 ppmvd anticipated in the IDC Compliance Decision (Exh. PC-IDC-1, at 5 to 6; PC-IDC-1, Att. B-1, at 4). IDC also noted that the proposed conditional air plan approval allows somewhat higher short-term ammonia emissions than anticipated in the IDC Compliance Decision, but that the annual emission rate remains the same (Exh. PC-IDC-1, at 7; PC-IDC-1, Att. B-1, at 4). Finally, IDC stated that the size of its on-site ammonia storage tank would be reduced from 40,000 gallons, as anticipated in the Final Decision, to 29,000 gallons, as required by both the proposed conditional air plan approval and the ZBA Decision (Exhs. PC-IDC-1, Att. A-1, at 13; PC-IDC-1, Att. B-1, at 9).

In the underlying proceedings, the Siting Board found that IDC had demonstrated that emissions of criteria and other pollutants, including NO_X and ammonia, associated with the proposed project would be consistent with minimizing impacts on the existing air quality. Final Decision at 271; see also IDC Compliance Decision at 74 (the Siting Board found that the air impacts of the proposed facility in the compliance configuration would be less than those reviewed by the Siting Board in the underlying case). The criteria pollutant emission limits set forth in the conditional air plan approval would result in lower emissions (particularly of NO_X) than the levels reviewed and accepted by the Siting Board in the underlying proceedings. Further, the annual ammonia emissions from the project would be no greater than that approved

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8 The parameters for emission limits, stack height and ammonia tank size are essentially the same for both the proposed and conditional air plan approvals.

9 The exception to the limit is for a period of no more than 10% of the actual operating time per rolling 12-month period when the limit shall not exceed 2.0 ppmvd (Exh. PC-IDC-1, Att. B-1(S) at 4).

in the IDC Compliance Decision, and the reduction in the size of the on-site ammonia tank would lower ammonia concentrations from a potential worst-case spill. Because the changes involving criteria pollutant emissions and ammonia emissions and storage would either reduce the environmental impacts of the proposed project, or not cause a long-term increase in emissions, the Siting Board finds that these changes do not require further inquiry.[10]

The Siting Board notes that, in the Final Decision, IDC was explicitly required to notify the Siting Board if the final design for the facility included a stack height significantly greater that 190 feet. Final Decision at 300, n.94. In light of this requirement, the Siting Board finds that further inquiry is warranted to determine whether additional mitigation is needed to minimize the visual impacts of a 225-foot stack. The Siting Board undertakes this further inquiry in Section IV.A, below.

The Siting Board also notes that the proposed change in the construction schedule conflicts directly with Condition G of the underlying decisions, which called for a traffic mitigation plan that included, inter alia, a departure time of between 2:30 p.m. and 3:30 p.m. for construction workers. Final Decision at 329; IDC Compliance Decision at 79. The Siting Board finds that further inquiry is necessary to resolve the conflict between Condition G and the requirements of the Bellingham ZBA Decision, and to determine whether additional mitigation is needed to minimize the traffic impacts of the proposed facility. The Siting Board undertakes this further inquiry in Section IV.B, below.

IV. ENVIRONMENTAL IMPACTS

A. Visual Impacts

In the underlying decision, the Siting Board noted that the proposed facility would be somewhat screened from view in most directions as a result of its proposed wooded buffer, and

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[10] The Siting Board notes that this is the first conditional air plan approval in which MDEP has established a 1.5 ppmvd limit for NO_X emissions from a power plant, and that, to our knowledge, the equipment proposed by IDC has not been field-tested at these emissions levels. If, following field testing, the conditional air plan approval is rewritten at levels consistent with those approved in the IDC Compliance Decision, IDC need not return to the Siting Board for further inquiry into its proposed project.

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. Id. at 298. In addition, the Siting Board noted that the visual impacts would be greater, overall, with the 225-foot stack than with IDC's preferred 190-foot stack. Id.. Overall, the Siting Board found that the visibility of the proposed facility would be primarily dependent upon stack height and vegetative buffer. The Siting Board then found that, with the implementation of Condition C 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 its Compliance Filing, IDC stated that as part of its proposed change in configuration the stack would be relocated 200 feet to the north, and that it would be built at a six foot higher ground elevation (see IDC Compliance Decision at 58). In the IDC Compliance Decision, the Siting Board reviewed the viewshed photographs submitted by the Company and concluded that views from most points would be essentially unchanged by the change in configuration. IDC Compliance Decision at 59. The Siting Board noted that the slight movement of the stack, the minor increase in stack elevation, and the small change in vegetative buffer resulting from the change in configuration were not likely to significantly affect visual impacts. Id. at 59-60. Therefore, the Siting Board found 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.

IDC now seeks to construct a 225-foot stack, rather than the 190-foot stack contemplated in the underlying decisions, in order to comply with a condition in Special Permit No. 1 requiring a 225-foot stack (Exhs. PC-IDC-1, at 2; PC-IDC-1, Att. A-1, at 21). The Company noted that the proposed conditional air plan approval also requires a 225-foot stack, citing the preference of the ZBA as a factor underlying such requirement (Exh. PC-IDC-1, at 2). In its June 6 Filing, the Company also proposed to use a circular, rather than a rectangular, outer shell for the stack (Exh. PC-IDC-1, at 2, 3). To illustrate the effect of the proposed change to a taller, circular stack, IDC

presented a revised viewshed analysis depicting the facility with both rectangular and circular 225-foot stacks, superimposed on photographs taken from the set of locations used in the viewshed analysis presented in the underlying case (Exh. PC-IDC-1, Att. C). The Company later proposed to construct the stack without a concrete outer shell, and provided a depiction of the proposed facility with a shell-less stack from two selected viewpoints (Exh. PC-EFSB-1(S)).[11]

IDC asserted that the documentation it has provided to the Siting Board regarding the change in stack height from 190 feet to 225 feet warrants the same determination as was made by the Siting Board in the IDC Compliance Decision (Exh. IDC-PC-1, at 2). IDC noted that in the underlying decisions, the Siting Board directed IDC to provide reasonable off-site mitigation that would screen views of the facility from residences and roadways or other locations within one mile of the proposed facility (id. at 3). The Company argued that this condition would adequately mitigate views of the 225-foot stack, and noted that in the IDC Compliance Decision, the Siting Board stated that "any slight variation in facility visibility upon residences can be addressed by this condition" (id., citing IDC Compliance Decision at 26).

The Siting Board has reviewed the Company's rendering and viewshed analyses of the stack with and without an outer shell, and concludes that while there may be some visual benefit from using a design that reduces the stack profile through elimination of an outer shell or through a change in the shape of the shell, such benefits would be limited, and likely would not contribute significantly to offsetting any increase in visual impacts created by the use of a taller stack. A change to a round or shell-less stack would not alter our findings in the underlying decisions with respect to visual impacts; therefore IDC may construct the stack in any of these configurations without further notice to the Siting Board.

In the Final Decision, the Siting Board noted that the proposed facility with a 190-foot stack would be screened from many viewpoints by the wooded buffer to be retained at the site, and that otherwise facility views would be confined to the upper portions of the stack. Final Decision at 298. Here, the Company's revised viewshed analysis demonstrates that, with the

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[11] The views of the stack without the outer shell are for viewsheds #5 (church parking lot on Route 140, Mendon) and #11 (Arbend Circle, Bellingham) (Exh. PC-EFSB-1(S), Figure 2S).

addition of 35 feet to the top of the stack structure, views of the upper portions of the stack would be more pronounced than previously from numerous viewpoints. Thus, with the addition of 35 feet to the stack, the benefit of the retained wooded buffer at the site in reducing visual impacts would be reduced.

The Company's viewshed analyses also demonstrate that the terrain drops off in elevation between the facility and a number of the receptors (e.g. 3, 4, 7, 11, 13, 14, 15 and 20), reflecting the presence of stream valleys or other features. It is clear from the viewshed analyses that, where the intervening area between the site and individual visual receptors is relatively low, screening of adequate height must be present close to the receptor location to be effective in mitigating views of the facility. Therefore, the Siting Board concludes that, in this case, a modification to the guidelines for Condition C is warranted to ensure that, in responding to valid requests for off-site visual mitigation, the Company provides plantings that are of a type and size, at the time of planting, to provide effective screening under applicable terrain conditions. Specifically, as part of IDC's compliance with Condition C, the Siting Board directs that in cases where, due to terrain, the planting of a larger tree is needed to screen a view of the facility, IDC shall make available the option of at least one tree at least 14 feet in height, in lieu of several smaller plantings.

Therefore, the Siting Board finds that it is appropriate to replace Condition C of the underlying decisions with the following condition, which reflects the change in stack height and the need for additional visual impacts mitigation:

> Consistent with Siting Board precedent concerning the minimization of visual impacts, the Siting Board directs the Company to provide reasonable off-site mitigation of visual impacts, including shrubs, trees and 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, in cases where due to terrain the planting of a larger tree is warranted, make available the option of at least one tree at least 14 feet in height, in lieu of several smaller plantings; (3)

shall provide written notice of this requirement to appropriate officials and to all potentially affected property owners, prior to the commencement of construction; (4) 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; (5) 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 (6) shall be responsible for the reasonable maintenance and replacement of plantings, as necessary, to ensure that healthy plantings become established.

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

B. Traffic Impacts

In the underlying case, IDC stated that construction traffic impacts would be minimized because construction workers would arrive between 6 a.m. and 7 a.m. and depart between 2:30 p.m. and 3:30 p.m., outside of peak commuter traffic periods.[12] Final Decision at 322. The Company also agreed to place a traffic control officer at the Hartford Avenue/Depot Street intersection during periods of maximum flow of construction traffic. Id.

The traffic analysis presented in the underlying case indicated that northbound and southbound traffic at the Hartford Avenue/Depot Street intersection experienced LOS ("level of service") C during the afternoon peak traffic period, and that this LOS could be maintained during construction if a traffic control officer was stationed at that intersection. Id. at 324-325. Further, the traffic analysis indicated that traffic westbound through the Depot Street/ North Main Street intersection experienced LOS C during the afternoon peak period, with conditions at either

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[12] In the IDC Compliance Decision, IDC indicated that it would not change either the shift schedules from those presented in the underlying case, or other aspects of the traffic plan approved in the Final Decision. IDC Compliance Decision at 69. Therefore, the Siting Board found that the traffic impacts of the proposed facility in the IDC Compliance Decision would be substantially similar to those reviewed by the Siting Board in the Final Decision. Id. at 70.

LOS A or B for all other movements, and that these conditions would be maintained during construction. Id.[13]

The Final Decision also addressed the possibility that departing construction traffic would affect afternoon school buses, which run on Depot Street and Hartford Avenue between 2:00 p.m. and 2:50 p.m. The Siting Board stated that the Company should take steps to avoid conflicts with school bus traffic, suggesting adjustments to the release rates for construction workers between 2:30 p.m. and 2:50 p.m., and perhaps to the direction of their travel on Depot Street. Final Decision at 328.

In the Final Decision, the Siting Board 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. Specifically, the Siting Board directed IDC to work with its EPC contractor and the Town of Bellingham[14] to develop and implement a traffic mitigation plan which addressed scheduling and any necessary roadway construction or improvements. Id. at 328-329. The Siting Board specified that the plan should, inter alia,: ". . . (4) include the provision of a traffic control officer at the Hartford Avenue/Depot Street intersection for a minimum of the nine to eleven months designated as peak on-site construction; (5) include an arrival schedule of between 6:00 a.m. to 7:00 a.m. and a departure schedule of between 2:30 p.m. and 3:30 p.m. for construction workers ...". Id.

IDC now proposes to use a single 10-hour shift, with workers arriving between 6:00 a.m. and 7:00 a.m. and departing between 5:00 p.m. and 6:00 p.m. (Exh. PC-IDC-1, at 9). IDC

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[13] The Company's analysis assumed that 80 percent of construction workers would travel to the site from the north and depart using the same route, thus avoiding Bellingham Center and possible construction worker traffic associated with the ANP Bellingham project to the east. Final Decision at 328. The Company noted the potential for additional traffic impacts in areas south of the site if actual construction traffic routing differed from these projections. Id.

[14] The Siting Board noted that should delivery routes include local roadways in nearby towns other than Bellingham, officials of those municipalities should be consulted in developing the traffic mitigation plan for the project. Final Decision at 329.

asserted that this schedule is required under the terms of its Special Permit from the ZBA, noting language in Special Permit No. 1 that requires IDC to comply with the work schedule limitations approved by the ZBA for the ANP Bellingham project (Exh. PC-EFSB-2). An attachment to Special Permit No. 1 indicates that the normal single day shift would run from 7:00 a.m. to 5:30 p.m. (Exh. PC-IDC-1, Att. A-1, Exhibit A).

The Company submitted a revised traffic analysis ("revised analysis"), dated May 2001, which reevaluated afternoon peak traffic conditions assuming that all construction-related workers depart between 5 p.m. and 6 p.m. (Exh. PC-IDC-1, Att. D). The revised analysis indicated that northbound and southbound movements at the Hartford Avenue/Depot Street intersection in the absence of construction traffic would operate at LOS F during the afternoon peak traffic period (Exh. PC-IDC-1, Att. D at 10). The revised analysis showed that these movements would continue at LOS F with the addition of construction traffic, but would improve to LOS C northbound and LOS B southbound if a traffic control officer were place at the intersection (id.).[15] The revised analysis also indicated that afternoon peak traffic conditions at the Depot Street/North Main Street intersection in the absence of construction traffic would operate at LOS F for westbound movements, LOS C for eastbound movements, and LOS A for all other movements (id.). With the addition of construction traffic, afternoon peak period conditions at the Depot Street/North Main Street intersection would remain at LOS F[16] westbound, degrade to LOS E eastbound, and would remain at LOS A for all other movements (id.).

The Siting Board recognizes that the proposed change in shift schedule has the approval of the Bellingham ZBA, and that it has the advantage of eliminating conflicts between construction worker traffic and school bus schedules. However, the proposed change also would

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[15] Conditions experienced by eastbound and westbound traffic would degrade from LOS A to LOS B and C respectively if a traffic control officer were assigned to the intersection (Exh. PC-IDC-1, Att. D at 10).

[16] The delay in seconds associated with the westbound movement is listed as exceeding 120 seconds, since the program does not record higher amounts. The existing LOS F delay is 60.2 seconds (Exh. PC-IDC-1, Att. D at 10).

result in construction worker traffic coinciding with the afternoon peak traffic period. The Company's revised analysis shows that the anticipated LOS at the Hartford Street/Depot Street (where the use of a traffic control officer is assumed in the Final Decision) would be unaffected by the change in shift timing. The change in shift schedule appears to have a greater impact on the Depot Street/North Main Street intersection. In the underlying decision, afternoon peak period traffic conditions at this intersection were expected to be the same with and without the construction traffic. However, with the change in afternoon departure time, construction traffic would cause eastbound movements through the Depot Street/North Main Street intersection to deteriorate from LOS C to LOS E; further, westbound movements, already at LOS F, which represents forced flow or breakdown conditions with highly unstable operating conditions, would experience a doubling in delay time from 60.2 to over 120 seconds.[17] In addition, the analysis of traffic flow at the Depot Street/North Main Street intersection assumes that only 20 percent of construction workers turn south onto Depot Street when leaving the site; however, given the later departure time, it is possible that a higher percentage of workers may turn south in an attempt to avoid rush hour traffic.

The Siting Board acknowledges that the ZBA Special Permit is consistent with the Company's proposed change in the construction shift. However, as discussed above, the record suggests that afternoon construction worker traffic would have a significant impact on traffic conditions at the Depot Street/North Main Street intersection, and that additional traffic mitigation may be needed to minimize construction traffic impacts. Therefore, the Siting Board finds that it is appropriate to replace Condition G of the underlying decisions with the following condition, which reflects the change in shift timing and the need for additional mitigation:

> The Siting Board directs IDC 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. This plan should: (1) to the extent practicable, address scheduling of arrivals and departures of construction-related traffic, including but not limited to deliveries of materials, equipment, and plant components, so as to avoid daily peak travel periods in affected areas; (2) include steps to minimize traffic impacts associated with any

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[17] See Final Decision at 323 for a full description of the flow conditions associated with the LOS scale, which runs from A to F.

roadway modifications, or other improvements, that may be required to effect delivery of large plant components; (3) include the provision of a traffic control officer at the Hartford Avenue/Depot Street intersection for a minimum of the nine to eleven months designated as peak on-site construction; (4) include the provision of a traffic control officer at the Depot Street/North Main Street intersection to coincide with the departure of workers at the end of the construction shift, for a minimum of the nine to eleven months designated as peak on-site construction; and (5) establish protocols allowing IDC to coordinate with the appropriate municipal authorities to identify and implement any traffic control measures, in addition to the traffic control officers at Hartford Avenue/Depot Street and Depot Street/North Main Street, needed to mitigate construction traffic impacts of the project at the access road to the site, and any other intersections affected by the change in the afternoon departure and associated changes in traffic patterns.

The Siting Board finds that, with the implementation of the foregoing condition, the traffic impacts of the proposed facility would be minimized.

V. DECISION

Consistent with the Siting Board's directive to IDC to inform the Siting Board of any changes to IDC's proposed project, other than minor variations, IDC has informed the Siting Board of five such changes. The Siting Board has found that changes related to a decrease in criteria pollutants, a change in the proposed air permit limits for short term ammonia and a decrease in the size of the ammonia tank from 40,000 gallons to 29,000 gallons do not require further inquiry.

With respect to changes related to visual impacts that may result from a change in stack height, the Siting Board found that further inquiry was warranted. After conducting such inquiry, the Siting Board found in Section IV.A, above, that it was appropriate to replace the existing language of Condition C with language that reflects the change in stack height and the need for additional mitigation. The Siting Board found that, with the implementation of Condition C as revised, the visual impacts of the proposed facility would be minimized. Therefore Condition C in the underlying decisions is replaced with the following:

Condition C:

> Consistent with Siting Board precedent concerning the minimization of visual impacts, the Siting Board directs the Company to provide reasonable off-site mitigation of visual impacts, including shrubs, trees and 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, in cases where due to terrain the planting of a larger tree is warranted, make available the option of at least one tree at least 14 feet in height, in lieu of several smaller plantings; (3) shall provide written notice of this requirement to appropriate officials and to all potentially affected property owners, prior to the commencement of construction; (4) 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; (5) 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 (6) shall be responsible for the reasonable maintenance and replacement of plantings, as necessary, to ensure that healthy plantings become established.

With respect to changes related to traffic impacts that may result from the change in shift time, the Siting Board found that further inquiry was warranted. After conducting such inquiry, the Siting Board found in Section IV.B, above, that it was appropriate to replace the existing language of Condition G with language that reflects the change in shift timing and the need for additional mitigation. The Siting Board found that, with the implementation of Condition G as revised, the traffic impacts of the proposed facility would be minimized. Therefore Condition G in the underlying decisions is replaced with the following:

Condition G

> The Siting Board directs IDC 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. This plan should: (1) to the extent practicable, address scheduling of arrivals and departures of construction-related traffic, including but not limited to deliveries of materials, equipment, and plant components, so as to avoid daily peak travel periods in affected areas; (2) include steps to minimize traffic impacts associated with any roadway

modifications, or other improvements, that may be required to effect delivery of large plant components; (3) include the provision of a traffic control officer at the Hartford Avenue/Depot Street intersection for a minimum of the nine to eleven months designated as peak on-site construction; (4) include the provision of a traffic control officer at the Depot Street/North Main Street intersection to coincide with the departure of workers at the end of the construction shift, for a minimum of the nine to eleven months designated as peak on-site construction; and (5) establish protocols allowing IDC to coordinate with the appropriate municipal authorities to identify and implement any traffic control measures, in addition to the traffic control officers at Hartford Avenue/Depot Street and Depot Street/North Main Street, needed to mitigate construction traffic impacts of the project at the access road to the site, and any other intersections affected by the change in the afternoon departure and associated changes in traffic patterns.

Accordingly, the Siting Board finds that, upon compliance with the revised Conditions C and G set forth in IV.A and IV.B, above, the Company's plans for the construction of the proposed facility 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.

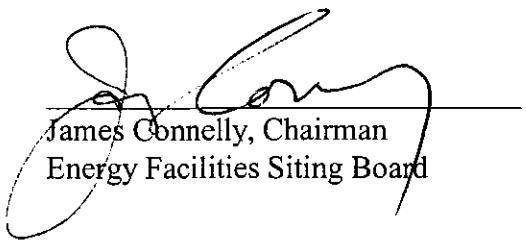
Findings in this Project Change Decision are based upon the project change information provided by the Company examined in light of findings the Siting Board made in the Final Decision and the IDC Compliance Decision. Since the project changes outlined in this decision pertain to the facility approved by the Siting Board in the underlying proceedings, the Company must construct and operate its facility in conformance with its proposal presented in the underlying proceedings; the only modifications permitted are those stated in the above conditions.

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 25th day of September, 2001

APPROVED by the Energy Facilities Siting Board at its meeting of September 24, 2001, by the members and designees present and voting: James Connelly (Chairman, DTE/EFSB); Deirdre K. Manning (Commissioner, DTE); W. Robert Keating (Commissioner, DTE); Matthew Morais (for David L. O'Connor, Commissioner, Division of Energy Resources); and Joseph Donovan (for Elizabeth Ames, Director of Economic Development).



James Connelly, Chairman
Energy Facilities Siting Board

Dated this 24th day of September, 2001.

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).