Decision and Orders

Massachusetts Energy Facilities Siting Council

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COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Council

In the Matter of the Petition of West Lynn Cogeneration for Approval to Construct a Bulk Generating Facility and Ancillary Facilities	EFSC 90-102

FINAL DECISION

Frank P. Pozniak
Hearing Officer
June 14, 1991

On the Decision:

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The Energy Facilities Siting Council hereby CONDITIONALLY APPROVES the petition of West Lynn Cogeneration to construct a 125 megawatt bulk generating facility and ancillary facilities in Lynn, Massachusetts.

I. INTRODUCTION

A. Summary of the Proposed Project and Facilities

West Lynn Cogeneration ("West Lynn") has proposed to construct a 125 megawatt ("MW") combustion turbine, combined cycle cogeneration facility on property located at the West Lynn Creamery complex in Lynn, Massachusetts (Exh. WLC-1, p. 1-1). The primary fuel for the facility will be natural gas, although the facility will be capable of using distillate No. 2 oil as a backup fuel (id., p. 1-8). In order to deliver sufficient volumes of natural gas to the proposed facility, Boston Gas Company ("Boston Gas") will construct a new natural gas pipeline interconnection of approximately 1,500 feet and additional system improvements (id., pp. 2-8, 2-9; Exhs. HO-V-10, HO-V-10(A)).[1]

West Lynn's petition includes a request to construct the generating facility, along with the following ancillary facilities: (1) a 115 kilovolt ("kV") underground transmission line of approximately 1,050 feet to interconnect the generating facility to New England Power Company's ("NEPCo") transmission system; (2) a switchyard to be located adjacent to NEPCo's transmission system; and (3) a 600,000 gallon on-site storage tank for No. 2 oil, which represents a three-day supply of backup oil (Exh. WLC-1, pp. 2-8, 2-9).

West Lynn also would construct the following structures: (1) a 40,000 gallon neutralization tank; (2) a 950,000 gallon filtered water/fire water storage tank; (3) a 12,000 gallon

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1/ The pipeline proposed to be constructed by Boston Gas does not require Siting Council approval because the pipeline would be less than one mile in length. G.L. c. 164, sec. 69G.

ammonia storage tank; (4) a six-cell wet surface air-cooled condensor; (5) one 150-foot tall exhaust stack; and (6) an 8,000 gallon wastewater holding tank (Exh. WLC-1, Figure 1.2.1.a; Exh. HO-E-34(A)). In addition, West Lynn would construct a raw-water storage tank and a demineralized-water storage tank (Exh. WLC-1, Figure 1.2.1.a). The generating facility and most ancillary structures would be sited on what is currently a parking lot adjacent to West Lynn Creamery's existing processing plant (id.). Construction of the project is estimated to take about 22 months at a cost of approximately $114.4 million (Tr. 2, p. 150; Exh. HO-RR-21).

West Lynn has received certification from the Federal Energy Regulatory Commission ("FERC") that the project constitutes a "Qualifying Facility" ("QF") under the Public Utilities Regulatory Policies Act of 1978 ("PURPA"), which requires electric utility companies to purchase power from QFs for a price at or below the utility's avoided cost of production (Exh. HO-B-8(B)). The FERC certification of West Lynn is based upon a finding that West Lynn would sell enough of the facility's steam byproduct so as to qualify as a cogeneration facility under PURPA (id.). West Lynn would sell approximately 30,000 pounds per hour ("pph") of steam for process and refrigeration purposes to West Lynn Creamery during a 20-year time period (Exh. WLC-1, pp. 1-17, 3-60).

The West Lynn project has been selected in the Massachusetts Municipal Wholesale Electric Company's ("MMWEC") recent solicitation for generating capacity, and West Lynn currently is negotiating with MMWEC for the sale of approximately 45 MW to 50 MW of electricity to MMWEC (Exhs. HO-N-25a, HO-N-25(A); Tr. 1, pp. 130-139). West Lynn also has bid its entire output to the State of Vermont Department of Public Service ("Vermont"), and has been selected for contract negotiations by Vermont (Exh. WLC-1, p. 3-6; Tr. 1, p. 124).

West Lynn consists of a group of three partners: J. Makowski Company ("JMC"), Belvedere Properties ("Belvedere"), and the West Lynn Group (Exh. WLC-1, p. 1-1; Exh. HO-B-2). This is the first energy project developed by West Lynn. However, West

Lynn indicated that JMC, a gas and electric energy development and consulting company engaged in independent power production, cogeneration projects, and the management and development of natural gas fuel supplies and pipelines, has developed energy projects such as the MASSPOWER project, a cogeneration facility recently approved by the Siting Council (MASSPOWER, Inc., 20 DOMSC 301 (1990) ("MASSPOWER")),[2] the Ocean State Power ("Ocean State") project in Rhode Island, an independent power project ("IPP") which achieved commercial operation in December 1990; and other projects including combined cycle cogeneration facilities in Bethpage, New York, and Selkirk, New York (Exh. WLC-1, p. 1-1).

B. Procedural History

On April 11, 1990, West Lynn filed with the Siting Council its proposal to construct the cogeneration facility and ancillary facilities described herein (Exh. WLC-1). On July 12, 1990, the Siting Council conducted a public hearing in the City of Lynn. In accordance with the direction of the Hearing Officer, West Lynn provided notice of public hearing and adjudication.

On July 23, 1990, SeaCrest Cadillac Pontiac Mazda, Inc. ("SeaCrest") filed a petition to intervene. On July 25, 1990, Altresco-Lynn, Limited Partnership ("Altresco-Lynn") filed a petition to intervene,[3] and, on July 26, 1990, Kathyrn Scangas Diamond ("Diamond") filed a petition to intervene. On September 21, 1990, the Hearing Officer issued a Procedural Order granting the petitions to intervene of SeaCrest and Altresco-Lynn, and denying the petition to intervene of Diamond. On the same date, the Hearing Officer conducted a prehearing conference to

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2/ In MASSPOWER, the Siting Council approved the cogeneration facility subject to conditions (20 DOMSC at 370, 405). In a subsequent decision issued on December 19, 1990, the Siting Council found that MASSPOWER had complied with the conditions. MASSPOWER, Inc., EFSC 89-100A (1990).

3/ Altresco-Lynn is a non-utility developer who also has proposed to construct a generating facility in Lynn.

establish a procedural schedule for the remainder of the proceeding.

The Siting Council conducted six evidentiary hearings between December 4 and December 17, 1990. West Lynn presented 12 witnesses: John A. Whippen, project manager of the proposed project, who testified regarding steam requirements, power sales, project construction, financing, operation, and site selection; Richard J. Olsen, president of Applied Business Research, Inc., who testified on regional and Massachusetts energy need; Glenn Harkness, vice-president of ENSR Consulting Engineering ("ENSR"), who testified regarding the environmental analysis of the proposed facility; Cross DeLairre, senior associate at JMC and assistant project manager, who testified on the project description and alternative technologies analysis; Norman D. Karloff, senior associate in JMC's fuel-services group, who testified on procuring and transporting fuels to the site; Kenneth J. Kallfisch, supervising engineer at EBASCO Services Inc. ("EBASCO"), who testified regarding water requirements and treatment; Robert M. Earsy, an independent consultant, and Carl B. Miller of EBASCO, who testified regarding noise impacts; Elizabeth C. Powers, manager of urban and regional planning services at ENSR, who testified regarding the coastal zone and other land use issues; Cosmo Vaudo, ENSR, who testified regarding the air quality analysis; Stephen Smith, Assistant Planning Director of the City of Lynn, who testified regarding the consistency of the project with the City of Lynn's development plans; and Bruce E. Fishman, ENSR, a toxicologist who testified on the safety of the use of wastewater in cooling towers.

The Hearing Officer entered 212 exhibits into the record, largely composed of responses to information and record requests. Nineteen exhibits of West Lynn also were entered into the record.

Pursuant to a briefing schedule established by the Hearing Officer, West Lynn filed its brief on January 7, 1991 ("Brief").

On May 8, 1991, West Lynn filed a supplement to its Brief ("Supplemental Brief").[4]

C. Jurisdiction

West Lynn's petition to construct a bulk generating facility and ancillary facilities is filed in accordance with G.L. c. 164, sec. 69H, which requires the Siting Council to ensure a necessary energy supply for the Commonwealth with minimum impact on the environment at the lowest possible cost, and pursuant to G.L. c. 164, sec. 69I, which requires electric companies to obtain Siting Council approval for construction of proposed facilities at a proposed site before a construction permit may be issued by another state agency.

As a combined cycle cogeneration facility with a capacity of approximately 125 MW, West Lynn's proposed generating unit falls squarely within the first definition of "facility" set forth in G.L. c. 164, sec. 69G. That section states, in part, that a facility is:

> (1) any bulk generating unit, including associated buildings and structures, designed for, or capable of operating at a gross capacity of one hundred megawatts or more.

At the same time, West Lynn's proposal to construct a transmission line, switchyard, and an oil storage tank falls within the third definition of "facility" set forth in G.L. c. 164, sec. 69G, which states that a facility is:

4/ In a memorandum dated April 24, 1991, the Hearing Officer notified all parties in the proceeding that the New England Power Pool's ("NEPOOL") Forecast Report of Capacity, Energy, Loads and Transmission, 1991-2006 ("1991 CELT forecast") would be entered into evidence as an exhibit. Because West Lynn had addressed the 1990 CELT forecast (1990-2005) in the presentation of its case, the Siting Council required West Lynn to update its application and afforded West Lynn, as well as the intervenors, an opportunity to submit additional information and/or a supplemental brief. West Lynn chose to submit additional information and a supplemental brief; the intervenors chose to do neither.

(3) any ancillary structure including fuel storage facilities which is an integrated part of the operation of any electric generating unit or transmission line which is a facility.

In accordance with G.L. c. 164, sec. 69H, before approving an application to construct facilities, the Siting Council requires non-utility applicants to justify generating facility proposals in three phases. First, the Siting Council requires the applicant to show that additional energy resources are needed (see Section II.A, below). Second, the Siting Council requires the applicant to establish that its project is (1) consistent with the resource use and development policies of the Commonwealth (see Section II.B, below),[5] and (2) is viable as a source of energy over time (see Section II.C, below). Finally, the Siting Council requires the applicant to show that its site selection process has not overlooked or eliminated clearly superior sites, and (1) in cases where an alternative site has been noticed, that the proposed site for the facility is superior to the alternative site in terms of cost, environmental impacts, and reliability of supply (see Section III, below), and (2) in cases where a noticed alternative is not required, that the proposed site is acceptable in terms of cost, environmental impacts, and reliability of supply (see Section III, below.).

5/ This requirement is discussed in Section II.B, below. In the past, the Siting Council had required the non-utility applicant to establish that its proposed project was superior to alternate approaches in terms of cost, environmental impact, reliability, and ability to address the previously identified need. MASSPOWER, 20 DOMSC at 337-352; Altresco-Pittsfield, Inc., 17 DOMSC 351, 370-378 (1988) ("Altresco-Pittsfield"); Northeast Energy Associates, 16 DOMSC 335, 360-380 (1987) ("NEA"). In MASSPOWER, the Siting Council announced that it would be formulating a new standard of review for evaluating the proposed project (20 DOMSC at 350). In addition, notice of this intent was communicated to the parties in this proceeding in a memorandum from the Siting Council dated October 4, 1990.

II. ANALYSIS OF THE PROPOSED PROJECT

A. Need Analysis

1. Standard of Review

In accordance with G.L. c. 164, sec. 69H, the Siting Council is charged with the responsibility for implementing energy policies to provide a necessary 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 energy facilities in the Commonwealth, the Siting Council evaluates whether there is a need for additional energy resources[6] to meet reliability or economic efficiency objectives. The Siting Council therefore must find that additional energy resources are needed as a prerequisite to approving proposed energy facilities.

In evaluating the need for new energy facilities to meet reliability objectives, the Siting Council has evaluated the reliability of supply systems in the event of changes in demand or supply, or in the event of certain contingencies. With respect to changes in demand or supply, the Siting Council has found that new capacity is needed where projected future capacity available to a system is found to be inadequate to satisfy projected load and reserve requirements. MASSPOWER, 20 DOMSC at 314-323; Altresco-Pittsfield, 17 DOMSC at 360-369; NEA, 16 DOMSC at 344-360; Cambridge Electric Light Company, 15 DOMSC 187, 211-212 (1986) ("1986 CELCo Decision"); Massachusetts Electric Company/New England Power Company, 13 DOMSC 119, 137-138 (1985) ("1985 MECo/NEPCo Decision"); Massachusetts Electric Company/New England Power Company, 2 DOMSC 1, 9 (1977). With regard to contingencies, the Siting Council has

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6/ In this discussion, "additional energy resources" is used generically to encompass both energy and capacity additions, including, but not limited to, electric generating facilities, electric transmission lines, energy or capacity associated with power sales agreements, and energy or capacity associated with conservation and load management.

found that new capacity is needed in order to ensure that service to firm customers can be maintained in the event that a reasonably likely contingency occurs. Middleborough Gas and Electric Department, 17 DOMSC 197, 216-219 (1988); Boston Edison Company, 13 DOMSC 63, 70-73 (1985) ("1985 BECo Decision"); Taunton Municipal Lighting Plant, 8 DOMSC 148, 154-155 (1982); Commonwealth Electric Company, 6 DOMSC 33, 42-44 (1981); Eastern Edison Company/Montaup Electric Company, 1 DOMSC 312, 316-318 (1977).

The Siting Council also has determined in some instances that utilities need to add energy resources primarily for economic efficiency purposes. The Siting Council has found that a utility's proposed energy facility was needed principally for providing economic energy supplies relative to a system without the proposed facility. 1985 MECo/NEPCo Decision, 13 DOMSC at 178-179, 183, 187, 246-247; Boston Gas Company, 11 DOMSC 159, 166-168 (1984).

While G.L. c. 164, sec. 69H, requires the Siting Council to ensure an adequate supply of energy for Massachusetts, the Siting Council has interpreted this mandate broadly to encompass not only evaluations of specific need within Massachusetts for new energy resources (1985 BECo Decision, 13 DOMSC at 70-73; Hingham Municipal Lighting Plant, 14 DOMSC 7 (1985) ("1985 Hingham Decision")), but also the consideration of whether proposals to construct energy facilities within the Commonwealth are needed to meet New England's energy needs. Turners Falls Limited Partnership, 18 DOMSC 141, 151-165 (1988) ("Turners Falls"); Altresco-Pittsfield, 17 DOMSC at 359-365; NEA, 16 DOMSC at 344-360; Massachusetts Electric Company/New England Power Company, 15 DOMSC 241, 273, 281 (1986) ("1986 MECo/NEPCo Decision"); 1985 MECo/NEPCo Decision, 13 DOMSC at 129-131, 133, 138, 141. In so doing, the Siting Council has fulfilled the requirements of G.L. c. 164, sec. 69J, which recognizes that Massachusetts' generation and transmission system is interconnected with the region and that reliability and economic benefits flow to Massachusetts from Massachusetts utilities' participation in NEPOOL.

In cases where a non-utility developer seeks to construct a jurisdictional generating facility principally for a specific utility purchaser or purchasers, the Siting Council requires the applicant to demonstrate that the utility or utilities needs the facility to address reliability concerns or economic efficiency goals. Where a non-utility developer has proposed a generating facility for a number of power purchasers that include purchasers that are as yet unknown, or for purchasers with retail service territories outside of Massachusetts, need may be established on a regional basis on either reliability or economic efficiency grounds. MASSPOWER, 20 DOMSC at 314-323; Altresco-Pittsfield, 17 DOMSC at 361-365; NEA, 16 DOMSC at 344-360. However, the non-utility developer that proposes a generating facility to serve a regional need must also demonstrate to the Siting Council that the proposed facility benefits Massachusetts -- that is, it offers reliability, economic efficiency, or other benefits to the Commonwealth in sufficient magnitude so that the construction of an energy facility in the state is consistent with the energy needs and resource use and development policies of the Commonwealth. MASSPOWER, 20 DOMSC at 323-336; Turners Falls, 18 DOMSC at 153-164; Altresco-Pittsfield, 17 DOMSC at 361-362, 366-369; NEA, 16 DOMSC at 344-360.

2. Status of West Lynn's Power Purchase Agreements

West Lynn stated that it has been selected by MMWEC in MMWEC's recent solicitation for capacity, and that it currently is negotiating with MMWEC for the sale of approximately 45 MW to 50 MW of electricity (Exhs. HO-N-25a, HO-N-25(A); Tr. 1, pp. 130-139). West Lynn indicated that it also has bid its entire output of 125 MW to the State of Vermont Department of Public Service ("Vermont"), and has been selected for contract negotiations by Vermont (Exh. WLC-1, p. 3-6; Tr. 1, p. 124).

While West Lynn asserts that it is likely to be selling power to known purchasers, until purchase power agreements ("PPAs") are signed and approved, power purchasers are considered to be unknown for the purposes of our review.

Therefore, because West Lynn proposes to construct a facility for a number of power purchasers that are as yet unknown, the Siting Council evaluates whether New England needs the proposed 125 MW of additional energy resources for reliability or economic efficiency purposes beginning in 1993 and beyond, and whether Massachusetts is likely to receive reliability, economic efficiency, or other benefits from the proposed additional energy resource beginning in 1993 and beyond.[7]

3. New England's Need for Additional Energy Resources

a. Introduction

West Lynn argues that New England needs additional energy resources for reliability and economic efficiency purposes (Brief, pp. 17-21, 23, 25). West Lynn claimed that the region needs additional energy resources for reliability purposes because projected capacity in New England is inadequate to satisfy the region's projected load and reserve requirements (Exh. WLC-1, pp. 3-42, 3-56). In addition, West Lynn asserted that its facility would provide economic efficiency benefits to the region (Tr. 2, pp. 169-173).[8]

In support of its argument that New England needs

7/ The Siting Council evaluates regional need and Massachusetts benefits beginning in 1993, the first full year in which West Lynn asserts that the proposed facility will be in operation. The Siting Council notes that West Lynn's project schedule assumed that 22 months would be required for construction of the proposed project, and that, based on its expected dates for negotiating PPAs and obtaining necessary regulatory approvals, West Lynn would be able to initiate steps to obtain financing in January or February 1991, and finalize financing arrangements by the end of March 1991 (Tr. 2, pp. 148-149). However, given that West Lynn to date has provided no signed PPAs and that it is now over three months later than West Lynn's expected date for initiating steps to obtain financing, it is unclear whether West Lynn can meet its goal of providing power by 1993.

8/ West Lynn admitted, however, that it had not conducted analyses to support its position that the proposed project would provide economic efficiency benefits to the region (Tr. 2, pp. 171-172).

additional power resources for reliability purposes, West Lynn provided several analyses and reports regarding future electricity demand and supply (Exh. WLC-1, pp. 3-7 to 3-43, sec. 3.1.1.3.2.u; Exhs. HO-N-1(A), HO-N-1(B), HO-N-1(C), HO-N-1(D), HO-N-1(E), HO-N-23, HO-N-23(A), HO-N-24c, HO-N-30, HO-RR-28A, HO-RR-29, HO-RR-30). West Lynn predicated its analysis of regional need on an initial evaluation of 12 demand forecast scenario/supply forecast scenario comparisons ("demand/supply comparisons"), which West Lynn developed by relating three distinct demand forecasts to four discrete supply forecasts (Exh. WLC-1, pp. 3-25 to 3-38). Based on its evaluation of the underlying demand and supply forecasts, West Lynn designated one demand/supply comparison as the most likely or "base case" comparison (id., p. 3-33). West Lynn supplemented its regional need analysis with seven additional demand/supply comparisons, developed from two demand forecasts (the base case demand forecast and a new demand forecast) and four supply forecasts (the base case supply forecast and three new supply forecasts (Exhs. HO-RR-29, HO-RR-30). In total, West Lynn presented 19 demand/supply comparisons.

West Lynn provided (1) NEPOOL's CELT forecast, a forecast of energy needs and resources during the next 15 years, for 1989, 1990 and 1991, and (2) the related "Executive Report Assessing NEPOOL's Resource Adequacy and Potential Resources" ("NEPOOL probabilistic assessment") for 1989 and 1990 (Exhs. HO-N-1(A), HO-N-1(B), HO-N-1(C), HO-N-1(D), HO-N-1(E)). West Lynn indicated that it used these NEPOOL documents as a general reference for its need analysis, and, in particular, used the 1990 CELT forecast to support assumptions in West Lynn's four initial supply forecasts regarding future generating capacity (Exh. WLC-1, pp. 3-7 to 3-28, 3-38 to 3-42). West Lynn also cited the Massachusetts 1988 State Annual Forecast of Energy Resources ("SAFER") report as a source for developing one of the initial demand forecasts (Exh. HO-N-4).

The following is a detailed discussion and analysis of the demand and supply forecasts developed by West Lynn.

b. Discussion

i. Demand Forecasts

As the principal basis for developing its regional demand forecasts, West Lynn conducted time series regression analyses of changes in summer and winter peak load over selected historic periods (Exh. WLC-1, p. 3-28; Exhs. HO-N-27, HO-N-28A, HO-RR-27). West Lynn utilized the growth rates underlying three selected regression analyses, as well as the growth rate incorporated in the 1988 SAFER report, to develop four forecasts of future growth in regional demand (Exh. WLC-1, Table 3.1.1.i(1); Exh. HO-RR-28A).

In all, West Lynn provided 24 regression analyses of historic growth in regional peak load, developed by applying two theoretical growth models to various seasonal peak load indicators over various historic periods (Exh. WLC-1, p. 3-28; Exhs. HO-N-27, HO-N-28A, HO-RR-27).[9] In deciding which historic periods to analyze, West Lynn indicated that it selected periods for which the beginning year and ending year represent similar points in the demand cycle (Exh. HO-N-3).[10]

West Lynn designated one regression, which incorporated a constant-growth-rate model applied to summer peak load over the

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9/ West Lynn initially provided regression models, referred to herein as constant-growth-rate models, which assume load grows according to a logarithmic function, and later provided additional regression models, referred to herein as straight-line models, which assume load grows in a linear fashion through the addition of constant annual increments over the period of analysis (Exh. WLC-1, p. 3-28; Exhs. HO-N-27, HO-N-28A, HO-RR-27). With respect to indicators of peak load, West Lynn initially considered only summer peak load, but later expanded its analysis to address winter peak load and weighted summer-winter peak load (id.).

10/ The "demand cycle" refers to upward and downward swings in annual regional electricity demand trends over periods of several years, reflecting higher and lower rates of change over such swing periods as compared to the average rate of change over a longer term trend period. The demand cycle is related to and may be affected by similar cycles in regional indicators of economic activity, often referred to as the "economic cycle" or "business cycle".

1969-1989 period, as the most appropriate predictor of future growth in peak load (Exh. WLC-1, pp. 3-28, 3-30). West Lynn asserted that the 1969-1989 period was appropriate because it captured intervals of high growth (from 1982 to the present), as well as low growth (the years following the 1973 oil price shock, and two periods of national recession) (Exh. HO-N-3). West Lynn asserted that a constant-growth-rate model is more appropriate than a straight-line model, given that annual increments of growth have tended to increase rather than remain constant over the period extending from 1969 to 1990 (Exh. HO-RR-27). Based on the 1969-1989 regression analysis, West Lynn developed a base case demand forecast assuming a 2.77 percent average annual rate of growth in future summer peak load (Exh. WLC-1, p. 3-30).

West Lynn indicated that it developed an alternative high case demand forecast using an assumed 3.0 percent average annual rate of growth in summer peak load, reflecting results of a constant-growth-rate regression over the period 1981 to 1990, which West Lynn considered to be a recent period of high growth (id., p. 3-28). West Lynn stated that it developed an alternative low case demand forecast ("first low case demand forecast") using an assumed 2.2 percent average annual rate of growth in summer peak load, reflecting a growth projection contained in the 1988 SAFER report (id.; Exh. HO-N-4). West Lynn provided that it also considered an additional alternative low case demand forecast ("second low case demand forecast") using an assumed 2.44 percent average annual rate of growth in summer peak load, reflecting the results of a constant-growth-rate regression over the 1974-1990 period (Exh. HO-RR-28).

To develop future regional peak loads under the four demand forecasts, West Lynn stated that it first identified a single 1989 peak load level to serve as a common forecasting base point (Exh. WLC-1, p. 3-42). West Lynn stated that it utilized NEPOOL's unadjusted 1989 summer peak load of 20,630 MW as the common forecasting base point (id.). From the common 20,630 MW level, West Lynn then projected its four summer peak

load forecasts over the 1990-2005 forecast period based on the respective constant growth rates (Exh. WLC-1, Table 3.1.1.i(1); Exh. HO-RR-28A).

West Lynn indicated that its choice of 20,630 MW as the forecasting base point was appropriate in order to ensure that West Lynn's demand forecasts, like the CELT demand forecast, reflect NEPOOL's "unadjusted" peak load indicator -- the theoretical peak load that would occur in a given year without any weather-related service interruptions, without implementation of demand-side management ("DSM"), and without a NEPOOL allowance for changes in net customer self-generation (Exh. HO-N-29).[11] West Lynn indicated that the difference between the 1989 metered peak load of 19,641 MW and NEPOOL's 1989 unadjusted peak load of 20,630 MW is 989 MW, including 359 MW attributable to weather-related considerations and 630 MW attributable to DSM and NEPOOL's allowance for changes in net customer self-generation (Exhs. HO-N-28A, HO-N-29B).[12]

West Lynn indicated that its 1989 forecasting base point also is higher than the historically modelled, or fitted curve, peak load values for that year under its various regression

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11/ To determine "unadjusted" peak load for a historic year, NEPOOL first normalizes the metered peak load to account for weather-related considerations (e.g., effects of NEPOOL Operation No. 4 ("OP4") emergency service interruptions), and then "reconstitutes" the normalized peak load to add back allowances for four categories of DSM -- non-OP4 interruptible contracts (i.e., contracted service interruptions other than OP4 emergency interruptions), peak load management, conservation on peak, and reductions in transmission energy losses -- as well as an allowance for change in net customer self-generation. NEPOOL also uses "adjusted" peak load as an additional weather-normalized indicator, representing unadjusted peak load less the allowances for DSM and for the change in net customer self-generation. The NEPOOL 1989 adjusted peak load was 20,000 MW (Exh. HO-N-29B).

12/ West Lynn also asserted that the growth rates West Lynn derived from its regression analyses are biased downward by the increasing effect of DSM expansion on metered demand in recent years (Exh. HO-N-29). However, West Lynn did not quantify this bias.

analyses, because these regression analyses are based on metered rather than NEPOOL "unadjusted" peak load values over the respective historic periods that West Lynn considered (Exh. HO-N-29). For example, West Lynn's regression analyses show modelled 1989 summer peak load values of 19,416 MW for the regression underlying the base case, 19,017 MW for the regression underlying the second low case, and 19,329 MW for the regression underlying the high case (Exhs. HO-N-28A, HO-N-28B).[13] Thus, West Lynn's 1989 forecasting base point of 20,630 MW is higher than the modelled 1989 peak load by 1,214 MW for the base case regression, 1,613 MW for the second low case regression, and 1,301 MW for the high case regression.

With respect to model format, West Lynn did not develop any demand forecasts based on its straight-line regression analyses. However, West Lynn did present a comparison of extrapolated 1993 and 1994 peak loads under the constant-growth-rate and straight-line models for the three historic periods West Lynn analyzed (Exhs. HO-N-30A, HO-N-30B). To extrapolate historic trends in its comparison, West Lynn assumed an upward adjustment of 989 MW in 1989 for each regression trend line, reflecting the 1989 difference between metered peak load and NEPOOL's unadjusted peak load (id.). The comparison shows that extrapolated peak load would be lower under the straight-line model than the constant-growth-rate model by 1,385 MW in 1993 and 1,670 MW in 1994 for the base case, by 997 MW in 1993 and 1,203 MW in 1994 for the second low case, and by 1,011 MW in 1993 and 1,247 MW in 1994 for the high case (id.).

Table 1 shows the results of West Lynn's demand forecasts along with those of the 1990 and 1991 CELT forecasts through 2005. West Lynn forecasts future peak load levels of 23,013 MW in 1993, 23,650 MW in 1994, and 31,942 MW in 2005 under

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13/ As previously mentioned, the modelled 1989 peak loads under the second low case and the high case -- both lower than that under the base case -- reflect the inclusion of an additional year, 1990, not included in the base case.

its base case, and peak load levels ranging from 22,506 MW to 23,219 MW in 1993, from 23,001 MW to 23,916 MW in 1994, and from 29,222 MW to 33,105 MW in 2005 under its alternative demand forecasts.

With respect to the CELT forecasts, Table 1 shows that West Lynn's base case demand forecast is comparable to or slightly less than the 1990 CELT forecast for the years 1993 to 1997, but thereafter increases more rapidly and attains a level 1,152 MW greater than the 1990 CELT forecast by 2005 (Exh. WLC-1, Tables 3.1.1.b, 3.1.1.i(1)). However, West Lynn's base case demand forecast exceeds the 1991 CELT forecast by larger margins over the entire period, ranging from 1,681 MW in 1993 and 2,366 MW in 1994, to between approximately 3,000 MW and 4,000 MW for the years 1997 to 2005 (id., Tables 3.1.1.b.u, 3.1.1.i(1)).

Commenting on differences between its demand forecasts and the 1991 CELT forecast, West Lynn asserted that the 1991 CELT forecast incorporates an average annual growth rate of 1.93 percent over the 1990-2006 period (Supplemental Brief). West Lynn further asserted that the 1991 CELT forecast growth rate is well below even the lowest historic growth rate reflected in West Lynn's constant-growth-rate regression analyses, and is in fact outside the 99.9 percent confidence interval for each of those regression analyses (id.).[14] Thus, West Lynn argued that there is an exceedingly small probability that the 1991 CELT forecast will prove accurate, and that the 1991 CELT forecast should be considered only if NEPOOL can demonstrate that the next 15 years will be so radically different from the past that history is no guide (id.).

With respect to the short run, West Lynn stated that the 1991 CELT forecast anticipates little change in regional peak demand through 1992 (id.). West Lynn asserted that the short

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14/ West Lynn's first low case forecast, included with the other demand forecasts in Table 1, is derived from the SAFER report and does not reflect any of West Lynn's historic regression analyses.

run expectations of the 1991 CELT forecast are inconsistent with patterns of peak demand during and after previous economic recessions (id.). As an example, West Lynn stated that peak demand rebounded quickly following a recession in 1974 and 1975 (id.).

During the course of the proceeding, West Lynn stated that its base case, high case and second low case demand forecasts for summer peak load were developed using regression results that were based on historic winter peak load data for years prior to 1989 and summer peak load data for 1989 and 1990, instead of summer peak load data for all years (Exh. HO-RR-27). In order to present a consistent analysis, West Lynn provided revised regression analyses based entirely on summer peak load data (id.). These analyses indicated a growth rate of 3.16 percent for the base case, 3.56 percent for the high case, and 2.89 percent for the second low case (id.). These growth rates are higher than the growth rates used by West Lynn in its demand/supply comparisons (see Section II.A.3.b.iii, below). West Lynn stated that, because the revised growth rates were higher than the original growth rates, the results of West Lynn's demand/supply comparisons are conservative in demonstrating need (i.e., the comparisons tend to underestimate capacity deficiencies) (id.). With respect to the base case, West Lynn provided an analysis indicating that use of the revised higher growth rate of 3.16 percent would result in an additional 317 MW of demand growth between 1989 and 1993, and an additional 409 MW of demand growth between 1989 and 1994, as compared to the demand increases forecasted using the original 2.77 percent growth rate (Exh. HO-N-30A).

ii. Supply Forecasts

With respect to supply, West Lynn initially presented four supply forecast scenarios: (1) the 1990 CELT supply forecast; (2) a no-Seabrook Nuclear Generating Station ("Seabrook") forecast, composed of the CELT supply forecast assumptions without the capacity of Seabrook; (3) a moderate DSM forecast, composed of the CELT supply forecast assumptions with reduced levels of DSM; (4) and a moderate DSM, no-Seabrook

forecast, composed of the CELT supply forecast assumptions with reduced levels of DSM and without the capacity of Seabrook (Exh. WLC-1, pp. 3-28 to 3-29). West Lynn indicated that the moderate DSM forecast represents the base case supply forecast (id., p. 3-30).

West Lynn noted that, with the exception of Seabrook, all four supply forecast scenarios assume the availability of committed capacity amounts included in the 1990 CELT forecast (id., p. 3-30). In support of its use of the CELT forecast assumptions concerning future capacity, West Lynn stated that the CELT forecast is widely regarded as a benchmark for utility planning purposes (Exh. HO-N-6). West Lynn further asserted that reliance on the CELT forecast is consistent with a conservative approach to estimating need, because capacity additions included in the CELT forecast are far more likely to be delayed or cancelled than to become available ahead of schedule (id.).[15]

West Lynn stated that it developed the reduced DSM levels included in its moderate DSM scenarios by assuming that DSM implementation would follow an S-curve pattern typically exhibited in connection with the penetration of new technologies or products, where implementation typically begins slowly, accelerates, and then levels off (Tr. 3, pp. 61-69). West Lynn presented a quantitative comparison showing relative future DSM trends under the 1990 CELT forecast and the moderate DSM forecast (Exh. HO-RR-26). However, West Lynn did not provide

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15/ Although two of West Lynn's four supply forecasts assume the unavailability of Seabrook, Seabrook is now on line. Conceptually, however, West Lynn's two no-Seabrook supply forecasts may be viewed as generally representative of the delay or cancellation of any sizable committed resource included in the CELT forecast. Because the availability of Seabrook also increases the reserve requirements of NEPOOL's member utilities, the net effect of West Lynn's exclusion of Seabrook from two of its supply forecasts is to increase forecasted supply deficiencies (or decrease forecasted supply surpluses) under such forecasts by approximately 500 MW, rather than by the full capacity of Seabrook (see Section II.A.3.b.iii and Table 2, below).

any quantitative methods to explain the development of the reduced DSM levels underlying its moderate DSM forecast.

West Lynn asserted that the moderate DSM levels represent the most likely DSM levels, and therefore, were included in West Lynn's base supply case (Exh. WLC-1, p. 3-30; Tr. 3, pp. 54-56, 61-77). In support of its assertion, West Lynn presented an analysis indicating that the 1987, 1988 and 1989 CELT forecasts overestimated DSM levels for the first year of their respective forecast periods by 25 to 30 percent (Exh. HO-N-24). West Lynn's analysis further indicates that the 1987 and 1988 CELT forecasts overestimated DSM levels for the second year of their respective forecast periods by 7 to 52 percent, and that the 1987 CELT forecast overestimated DSM for the third year of its forecast period by 8 percent (id.).

While maintaining that the committed capacity estimates in the CELT forecast provide the most reliable assumptions about future generation, West Lynn did provide three additional supply forecasts to reflect the potential for implementation of additional generating capacity by June 1993 and June 1994, based on listings of uncommitted and contingency capacities contained in the 1990 CELT forecast (Exh. WLC-4, pp. 6-9, Appendix JAW-2; Exhs. HO-N-23, HO-N-23(A)).[16] The additional capacity options listed in the CELT forecast include: (1) uncommitted new utility generation; (2) uncommitted utility repowerings; (3) contingency utility generation; and (4) uncommitted proposed non-utility generation ("NUG") (id.).

With respect to utility capacity, West Lynn identified 82 MW of uncommitted and contingency capacity that potentially could be available in 1993, and 388 MW of such capacity that could be available in 1994 (Exh. WLC-4, p. 7; Exh. HO-RR-30). With respect to uncommitted NUG facilities, West Lynn first

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16/ Our understanding of West Lynn's use of the term "uncommitted resource" is a resource that is neither operating, approved by an appropriate regulatory agency, nor contracted for by a utility.

adjusted the expected start dates shown in the CELT forecast for each facility, assuming, as of January, 1990, that 1 to 1.5 years of additional lead time for acquiring remaining permits and 2 to 2.25 years of additional lead time for construction would be required to bring each facility on line (Exh. HO-N-23(A)). Based on its start-date adjustments, West Lynn identified a potential for 248 MW of additional NUG capacity which could be available by June 1993 and 1,130 MW which could be available by June 1994 (id.). Combining the utility and NUG categories, West Lynn identified total potential additional capacity of 330 MW in 1993 and 1,518 MW in 1994 (id.).

Having identified total potential additional generating capacity above committed levels, West Lynn addressed the possibility that the facilities providing such capacity might be further delayed, beyond the 1993 or 1994 cut-off dates, or cancelled outright (Exh. HO-RR-30). To reflect such possible future attrition, West Lynn developed three supply forecast scenarios for the additional capacity, incorporating alternative completion rates of 30 percent, 50 percent and 70 percent, while otherwise reflecting the assumptions in the moderate DSM forecast ("30 percent uncommitted forecast," "50 percent uncommitted forecast," "70 percent uncommitted forecast") (id.). These supply forecasts were compared with the base case demand forecast and the second low case demand forecast to develop six new demand/supply comparisons.

iii. Demand/Supply Comparisons

In order to determine whether there will be future capacity deficiencies or surpluses under its various demand and supply forecasts, West Lynn presented a total of 19 regional demand/supply comparisons. Table 2 shows the results of West Lynn's demand/supply comparisons.

The surplus/deficiency balances under West Lynn's 19 comparisons range from a surplus of 1,053 MW to a deficiency of 1,034 MW in 1993, and from a surplus of 364 MW to a deficiency of 2,134 MW in 1994 (Exh. WLC-1, Table 3.1.1.j(1); Exhs. HO-RR-29, HO-RR-30). For 1993, eight of the 19

comparisons indicate a need for at least 125 MW of additional capacity, while two comparisons indicate a need for less than 125 MW of additional capacity (id.). Nine comparisons indicate a capacity surplus in 1993 (id.). By 1994, however, 16 of West Lynn's 19 demand/supply comparisons indicate a need for at least 125 MW of additional capacity, while one comparison shows a need for 105 MW and two comparisons show a capacity surplus (id.).

The demand/supply comparisons in West Lynn's analysis show the relative effects of varying key determinants of future need -- including assumptions about future rates of demand growth, future levels of DSM, and future implementation of uncommitted capacity. For example, with respect to demand forecasts, the comparisons of both the first low demand forecast and the second low demand forecast with the base case supply forecast show 1993 surpluses, while the comparison of the high demand forecast with the base case supply forecast shows a 1993 deficiency of 550 MW. With respect to supply forecasts, a 1993 surplus also is shown by the comparison of the base case demand forecast with the 1990 CELT supply forecast, which incorporates higher DSM levels than West Lynn's base case supply forecast. However, the comparisons of the base case demand forecast with the uncommitted capacity supply forecasts show reduced deficiencies rather than surpluses in 1993 -- amounting to 192 MW under the 30 percent uncommitted forecast, 126 MW under the 50 percent uncommitted forecast, and 60 MW under the 70 percent uncommitted forecast. With respect to 1994, deficiencies significantly greater than 125 MW are shown under all the demand/supply comparisons referred to in this paragraph (id.).

To further support its assertions that additional energy resources are needed by the region for reliability purposes in 1993 and beyond, West Lynn provided the NEPOOL probabilistic assessment (Exh. HO-N-1(D)). This document is based on an

analysis of statistical confidence,[17] which West Lynn presented as an additional possible methodology available for assessing resource adequacy (id.). The NEPOOL probabilistic assessment essentially evaluates NEPOOL's ability to meet or exceed its reliability standard at various confidence levels, and described the amounts of capacity additions required to achieve each of the confidence levels identified (id.). NEPOOL identified confidence levels ranging from 10 to 90 percent (id.).[18]

West Lynn stated that it was not relying on the NEPOOL probabilistic assessment, or the need to attain any particular confidence level, as part of its position that there is a need for the proposed project beginning in 1993 (Exh. WLC-1, p. 3-42). Nonetheless, West Lynn presented an analysis of possible future need based on attaining a 70 percent confidence level, consistent with the methodology reflected in the NEPOOL probabilistic assessment (id., Table 3.1.1.j(2), pp. 3-21 to 3-26). To provide for a "reliability reserve" consistent with the 70 percent confidence level, West Lynn indicated that an additional 1,000 MW and 1,050 MW of regional capacity, above the capacity responsibilities of NEPOOL's member utilities, would be required in 1993 and 1994, respectively (id.). Table 3 shows

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17/ In the NEPOOL probabilistic assessment, NEPOOL identified and assigned probabilities to selected values of eight major forecasting variables, as follows: (1) load levels; (2) effectiveness of utility-sponsored DSM programs; (3) reserve requirements; (4) amounts of committed NUG development; (5) amounts of uncommitted NUG development; (6) the on-line dates of Ocean State Phases I and II; (7) the attrition rate of existing generating resources; and (8) the on-line date of Hydro-Quebec II (Exh. HO-N-9).

18/ NEPOOL identified its reliability standard as the average of no more than one disruption of service to firm customers in ten years due to a generating deficiency (Exh. HO-N-1(C), Glossary, p. 16). The NEPOOL probabilistic assessment projected that the region had a 61 percent chance of meeting or exceeding the reliability standard in 1991, decreasing to 55 percent by 1992 and to 31 percent by 1995 (id., Technical Supplement, pp. 6-7).

the results of West Lynn's demand/supply comparisons with these reliability allowances.

Table 3 shows that, with the reliability allowances, the surplus/deficiency balances under West Lynn's 19 comparisons range from a surplus of 53 MW to a deficiency of 2034 MW in 1993, and from a deficiency of 686 MW to a deficiency of 3,184 MW in 1994 (id.). In terms of the additional capacity required to provide adequate supply at that level of reliability, West Lynn's analysis shows a need for at least 125 MW beginning in 1993 under 18 of its 19 demand/supply comparisons, and under the remaining comparison a need for less than 125 MW in 1993 but at least 125 MW beginning in 1994 (id.).

Based on its base case demand forecast/supply forecast comparison, West Lynn stated that 1,291 MW and 2,386 MW of additional capacity would be required in 1993 and 1994, respectively, to meet regional demands with a 70 percent level of confidence (Exh. WLC-1, Table 3.1.1.j(2)).

c. Analysis

West Lynn's assessment of regional need is in large part based on 19 scenarios which include a range of assumptions such as high and low rates of load growth, inclusion and exclusion of Seabrook capacity, and three levels of uncommitted utility and NUG facility development. The Siting Council notes that the scenarios presented by West Lynn are more comprehensive than those provided in any of the Siting Council's previous reviews of regional need. See MASSPOWER, 20 DOMSC at 314-323; Altresco-Pittsfield, 17 DOMSC at 362-365.

i. Demand Forecasts

West Lynn developed demand forecasts based on time series regressions of historic trends. The forecasts were independent of NEPOOL's CELT forecasts. As part of its methodology, West Lynn considered historic trends extending back 20 years, and generally utilized appropriate criteria for selecting a range of specific historic periods over which to conduct its time series regressions. Nonetheless, West Lynn's development of demand forecasts raises some methodological concerns.

First, West Lynn directly utilized metered peak load data, without any apparent normalization adjustments for weather, in order to develop historic time series regressions as a basis for estimating future growth. To the extent that warmer-than-normal conditions or colder-than-normal conditions may have been predominant for particular years of the historic periods analyzed, the resultant growth trends could be biased upward or downward. Further, OP4 emergency service curtailments associated with weather extremes may have reduced peak load in certain years and also biased the resultant growth trends.[19]

Second, West Lynn utilized NEPOOL's unadjusted 1989 summer peak load of 20,630 MW as a common forecasting base point from which to project its summer peak load forecasts over the 1995-2005 forecast period. West Lynn defended its use of the 20,630 MW base point as necessary to account for the 989 MW difference between actual metered peak load and NEPOOL's unadjusted peak load in 1989.

However, the 20,630 MW peak load is not only well above the actual metered 1989 summer peak load of 19,641 MW, but also well above the modelled (fitted curve) peak load values for 1989 summer peak load under West Lynn's constant-growth-rate regression analyses. In fact, the record shows that West Lynn's 1989 base point of 20,630 MW is higher than its modelled 1989 peak load values by 1,214 MW for the 1969-1989 regression (base case), 1,613 MW for the 1974-1990 regression (second low case), and 1,301 MW for the 1981-1990 regression (high case) (Exhs. HO-N-28A, HO-N-28B). These differences are significantly larger than the 989 MW difference between 1989 metered and unadjusted peak load.

In addition, the record indicates that the relationship between metered and unadjusted peak load in 1989 is not

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19/ In justifying use of a 20,630 MW base point to extrapolate regression trends, West Lynn appeared to recognize the need to account for weather-related conditions, including OP4 emergency service curtailments, as reflected in the difference between metered peak load and adjusted peak load (Exh. HO-N-29).

particularly representative of trends over the regression period (Exhs. HO-N-28A, HO-N-28B). West Lynn's review of available NEPOOL data prior to 1989 showed DSM levels (as represented by the difference between adjusted and unadjusted peak load) of 483 MW, 404 MW, and 406 MW for 1986, 1987, and 1988, respectively (Exh. HO-N-29B). These DSM levels not only are significantly lower than the 1989 DSM level of 630 MW, but also show no upward trend in DSM prior to 1989. In addition, NEPOOL's 1989 normalization adjustment of 359 MW to account for OP4 emergency curtailments (as represented by the difference between metered and adjusted peak load) is not typical of trends over the regression period. Only one year prior to 1989 -- 1987 -- shows any difference between metered and adjusted peak load (Exhs. HO-N-28A, HO-N-29B).

Thus, it is not clear that the 989 MW difference -- taken from a single year in multi-year regression analyses -- represents the appropriate basis for recalibrating the underlying peak load trends. While data limitations likely constrained West Lynn's analysis, derivation of a predicted 1989 difference between metered and unadjusted peak load based on a regression of such differences over a number of years including 1989 would provide a more reliable basis for adjusting historic trends.[20]

Therefore, West Lynn has failed to establish the applicability of the 989 MW difference between NEPOOL's metered and unadjusted peak load in 1989 as a basis for adjusting historic trends, and further has failed to document the extent, if any, to which other factors justify such adjustments. Therefore, West Lynn has not adequately supported its use of a common forecasting base point of 20,630 MW for projecting its demand forecasts.

20/ NEPOOL did not identify adjusted and unadjusted peak load trends separately prior to 1986 (Exh. HO-N-29B). The Siting Council recognizes that, without actual or proxy values for these indicators in earlier years, it may not be possible to derive a statistically significant regression.

Third, West Lynn provided little basis to support its selection of a constant-growth-rate regression format as the appropriate model for explaining past trends and then extrapolating future trends. In questioning the applicability of a straight-line regression format as a possible alternative model, West Lynn noted that the average annual growth increment was significantly higher in the recent 1981-1990 period than in the longer 1969-1989 period -- detracting from the appropriateness of a straight-line model (Exhs. HO-RR-27, HO-N-27, HO-N-28B). However, West Lynn also acknowledged that the average annual growth increment was slightly lower in the recent 1979-1989 period than in the longer 1969-1989 period (Tr. 3, pp. 108-111).

Thus, West Lynn did not clearly establish the appropriateness of a constant-growth-rate regression format relative to a straight-line regression format for purposes of developing demand forecasts based on historic trends. In addition, regardless of the merits of West Lynn's contention that the constant-growth-rate format is superior to the straight-line format, the possibility of using other models -- for example, models that would result in forecasted peak load trend lines mid-way between those forecasted under the constant-growth-rate format and the straight-line format -- was not considered.

The Siting Council notes that West Lynn also relied on its constant-growth-rate regression analyses to assert that, over the full 1990-2006 period, the 1991 CELT forecast failed to accurately reflect historic trends. West Lynn maintained that the 1991 CELT forecast, which predicts peak load levels that are lower than those in West Lynn's base case by 1,681 MW in 1993 and 2,366 MW in 1994, falls outside the 99.9 percent confidence level of each of West Lynn's constant-growth-rate regression analyses. However, based on West Lynn's comparison of extrapolated 1993 and 1994 demand under its constant-growth-rate and straight-line models, the differences between West Lynn's demand forecasts and the 1991 CELT forecast would be reduced by more than half had West Lynn's forecasts been based on the

straight-line regression format rather than the constant-growth-rate format.

At the same time, to the extent that the 1991 CELT forecast predicts future peak loads that are lower still than those that would be expected based on a straight-line regression of historic trends, we share, based on this record, West Lynn's concerns as to the weight to be placed on the 1991 CELT forecast in this review. While West Lynn did not clearly establish that incremental annual increases in peak load have tended to increase over time, particularly to the extent reflected in a constant-growth-rate regression format, there is also nothing in the record to suggest that they have tended to decrease over time. Thus, absent a theoretical basis for considering a significantly lower long-run trend, a straight-line regression appears to represent an approximate minimum for the level of future peak loads that it is reasonable to consider in the context of an historically based long-run planning analysis.

For purposes of this review, the Siting Council accepts West Lynn's use of metered load data for developing peak load forecasts. With respect to West Lynn's recalibration of regression trend lines, the Siting Council agrees that, conceptually, it was appropriate to consider possible upward adjustments. However, for the reasons mentioned above, the Siting Council finds that West Lynn has not adequately supported its use of a common forecasting base point of 20,630 MW for projecting its demand forecasts. Additionally, for the reasons mentioned above, the Siting Council finds that West Lynn has not adequately supported its sole reliance on the constant-growth-rate model for developing demand forecasts based on historical regressions.

Nonetheless, West Lynn's demand forecasts represent a substantial and largely successful effort by a NUG applicant to present an independently developed and statistically based assessment of regional need. As such, West Lynn's regional demand forecasts are a marked improvement over those in past NUG proposals reviewed by the Siting Council.

The Siting Council recognizes that the methodological concerns with West Lynn's approach are being raised here for the first time in a Siting Council facility review. Additionally, the Siting Council notes that the record is sufficiently detailed for the Siting Council to make necessary adjustments and otherwise reasonably interpret West Lynn's forecast results for purposes of determining whether West Lynn has established that the proposed project is needed.

In the future, if extrapolation of historic trends is to be the conceptual basis of regional demand forecasts, applicants will be expected to fully explain and support the selection of a measure of historic demand levels and any adjustments deemed necessary to allow extrapolation of past trends. Further, applicants must consider a range of regression formats, and not implicitly assume that a constant-growth-rate format necessarily is the appropriate model.

ii. Supply Forecasts

With respect to supply, West Lynn presented two DSM scenarios as well as a number of generating scenarios, surpassing supply forecast presentations in previous regional need reviews. However, while West Lynn documented the tendency toward overestimation of DSM in past CELT forecasts, West Lynn failed to document its methodology for the development of the moderate DSM levels which underlie the base case supply forecast. In addition, while West Lynn addressed several important variables affecting regional need, other important variables were not included. The Siting Council notes that West Lynn could have developed additional scenarios to assess the effects on regional need of other supply variables, such as existing plant performance, fuel prices, and the availability of new gas supplies in the region.

Overall, however, West Lynn has utilized an appropriate supply forecast methodology for purposes of this review. In the future, the Siting Council will require project proponents to provide a more comprehensive assessment of regional need including a sensitivity analysis of major supply variables affecting regional need.

iii. Demand/Supply Comparisons

With respect to the balance between demand and supply, the record shows that West Lynn relied on 19 demand/supply comparisons. West Lynn also provided an analysis of possible future need based on providing a "reliability reserve," consistent with the methodology reflected in the NEPOOL probabilistic assessment (id., Table 3.1.1.j(2), pp. 3-21 to 3-26). To provide a regional supply capable of meeting future needs with a 70 percent level of confidence, West Lynn indicated that an additional 1,000 MW and 1,050 MW of regional capacity would be required in 1993 and 1994, respectively (id.).

The Siting Council previously has found that a 70 percent reliability reserve was reasonable for one utility's system planning purposes. Boston Edison Company, 18 DOMSC 201, 277 (1989) ("1989 BECo Decision"). We note, however, that our previous acceptance of a particular reliability reserve level in considering the planning needs of one utility system does not constitute acceptance of such a reliability reserve level in considering the planning needs of an integrated power pool made up of a number of such systems. Further, the Siting Council previously has held that project proponents who present the NEPOOL probabilistic assessment to establish regional need must fully explain and analyze that document's advantages and impact on an assessment of regional need. MASSPOWER, 20 DOMSC at 321-322.

Nonetheless, for purposes of this review, the Siting Council accepts West Lynn's presentation of the NEPOOL probabilistic assessment as providing support for the use of reserve allowances to help establish regional need. Conceptually, it is appropriate for project applicants to consider some level of reliability reserve in developing regional need analyses. In developing the level of reliability reserve, it is important that project applicants consider the implication of different confidence levels, and make recommendations as to which confidence levels are appropriate for planning purposes. The Siting Council reiterates that facility applicants who present the NEPOOL probabilistic

assessment to establish regional need must fully explain and analyze that document's advantages and impact on an assessment of regional need, including justification for selection of a particular confidence level.

Overall, the Siting Council generally has accepted West Lynn's regional need forecast methodology. However, the Siting Council has found that West Lynn failed to justify its use of a 1989 forecasting base point of 20,630 MW and its sole reliance on a constant-growth-rate regression format in its demand forecast. As described above, the 1989 forecasting base point was 1,214 MW to 1,613 MW greater than the historically modelled 1989 peak load levels, and the constant-growth-rate regression format resulted in extrapolated peak load levels that were 997 MW to 1,385 MW greater in 1993, and 1,203 MW to 1,670 MW greater in 1994, than those resulting from a straight-line regression format. West Lynn's use of an unsupported 1989 forecasting base point and its sole reliance on the constant-growth-rate regression format could, at a minimum, bring into question West Lynn's position that additional energy resources are needed beginning in 1993 rather than beginning in 1994.

We recognize that the ranges identified above in connection with our methodological concerns with West Lynn's analysis do not provide a direct basis for making adjustments to West Lynn's forecast results, and that only additional analyses could support more precise estimates of appropriate adjustments. For example, although we disagree with the forecasting base point assumption West Lynn made in this proceeding, some adjustment of historic trends is appropriate for forecasting future demand. West Lynn has indicated that DSM levels have ranged between 400 and 500 MW over a three-year period from 1986 to 1988, and an adjustment in at least this range may have been appropriate. Such an adjustment would account for approximately 25 to 40 percent of the 1,214 MW to 1,613 MW difference between West Lynn's historically modelled 1989 peak loads and West Lynn's assumed 1989 forecasting base point. Similarly, although we have questioned West Lynn's sole

resources under West Lynn's base case and a majority of West Lynn's demand/supply comparisons (see Table 3).

Accordingly, based on the record in this proceeding, the Siting Council finds that West Lynn has established that, as early as 1993, and in any event, by 1994, New England will need at least 125 MW of additional energy resources for reliability purposes.[21]

4. Benefits to Massachusetts

Having established that New England will need at least 125 MW of additional energy resources for reliability purposes as early as 1993 and in any event by 1994, the Siting Council determines whether the proposed project is likely to provide reliability, economic, environmental, or other benefits to Massachusetts.

21/ In regard to West Lynn's assertion that 125 MW are needed in the region for economic efficiency reasons, the Siting Council notes that West Lynn's position regarding economic efficiency is largely unsupported by quantitative comparisons with other supply options (Tr. 2, pp. 171-172). In order to support West Lynn's expectation that the proposed project would provide economic energy resources, West Lynn's witness, Mr. Whippen, merely cited his familiarity with another NUG project which had successfully marketed its power (id.). However, West Lynn provided no indication of how it did or could update fuel price assumptions and other key assumptions in order to compare a previous project with the proposed project. While the Siting Council recognizes that comparison of levelized cost information is generally a sound methodology for establishing relative economic competitiveness of various projects, the Siting Council also notes that the results of such a methodology cannot be evaluated without a full description of underlying data and assumptions. We note that in Section II.B.3, below, the Siting Council accepts West Lynn's comparison of offered power to utilities' avoided costs as an appropriate methodology for establishing that a proposed project is at or below the avoided cost of such utilities. However, in MASSPOWER, the Siting Council declined to accept the "less than avoided cost" standard as dispositive for purposes of determining whether New England needs additional energy resources for economic efficiency purposes (20 DOMSC at 323). Therefore, for purposes of this proceeding, the Siting Council finds that West Lynn has failed to establish that New England needs at least 125 MW of additional energy resources for economic efficiency purposes.

reliance on a constant-growth-rate regression format, use of peak load levels mid-way between forecast results based on West Lynn's chosen format and results based on the alternative straight-line regression format may have been appropriate.

Additionally, the Siting Council recognizes that West Lynn has demonstrated that its regional need analysis was based on conservatively developed demand forecasts, and that applicable revisions to the need analysis to offset this conservatism would increase the base case deficiencies by over 300 MW in 1993 and 400 MW in 1994 (see Section II.A.3.b.i, above).

West Lynn's analysis shows a need for 1,291 MW under its base case in 1993, and a need for 125 MW or more under 18 of its 19 forecast scenarios in that same year, assuming a reliability reserve consistent with the 70 percent confidence level. Based on a balanced consideration of possible adjustments to account for our methodological concerns with West Lynn's demand forecast and any conservatism in that forecast, however, West Lynn's base case would barely indicate a need for at least 125 MW of additional energy resources in 1993. In addition, based on a balanced consideration of such adjustments, the need for at least 125 MW of additional energy resources in 1993 would be unclear under approximately half of West Lynn's remaining 18 demand/supply comparisons (see Table 3). Nonetheless, West Lynn's analysis establishes that there is some likelihood that New England will need at least 125 MW of additional energy resources in 1993.

With respect to 1994, West Lynn's analysis shows a need for 2,386 MW under its base case, and a need for at least 686 MW under all of its 19 demand/supply comparisons, assuming a reliability reserve consistent with the 70 percent confidence level. These deficiency balances are 158 MW to 1,168 MW greater than the corresponding balances in 1993. Even after consideration of possible adjustments to account for our methodological concerns with West Lynn's demand forecast and any conservatism in that forecast as discussed above, there is a clear need in 1994 for at least 125 MW of additional energy

a. Power Sales

In NEA, the Siting Council found that, consistent with current energy policies of the Commonwealth, Massachusetts benefits economically from the addition of cost effective QF resources to its utilities' supply mix (16 DOMSC at 358). In that case, the Siting Council also found: (1) that a signed and approved PPA between a QF and a utility constitutes prima facie evidence of the utility's need for additional energy resources for economic efficiency purposes; and (2) that a signed and approved PPA which includes a capacity payment constitutes prima facie evidence of the need for additional energy resources for reliability purposes. Id.

Here, West Lynn argues that its proposed project is consistent with policies of the Commonwealth, and that its pending PPA with MMWEC demonstrates that Massachusetts will benefit from additional energy resources for both reliability and economic efficiency purposes (Brief, pp. 12-16). In support of this argument, West Lynn submitted a draft copy of a PPA to sell 45 to 50 MW to MMWEC beginning in 1993 (Exh. HO-RR-10; Tr. 1, pp. 130-139).

West Lynn also stated that it would respond to pending requests for proposals ("RFP") for capacity, expected to be issued by Boston Edison Company ("BECo"), Eastern Utilities Associates and Fitchburg Gas and Electric Company (Tr. 1, p. 141).

Even in the absence of signed PPAs or active RFP submittals relating to specific Massachusetts utilities, West Lynn argued that there is evidence its facility will provide reliability and economic efficiency benefits to Massachusetts (Brief, pp. 24-25). With respect to reliability, West Lynn presented a separate analysis showing Massachusetts' need for power under 12 demand/supply scenarios comparing the electricity demand of Massachusetts consumers to the aggregate capacity of Massachusetts utilities (Exh. WLC-1, pp. 3-43 to 3-55). West Lynn's analysis indicates that, under all 12 comparisons, there will be a need in Massachusetts for at least 125 MW of capacity

in 1993 and beyond (id., Table 3.1.1.m(1), pp. 3-50 to 3-52).[22]

Beyond reliability benefits, West Lynn asserted that its proposed project would provide economic efficiency benefits to Massachusetts utilities because it would be dispatched ahead of higher-cost oil-fired capacity (Brief, p. 25). West Lynn provided an avoided cost comparison that it developed in response to BECo's previously solicited second RFP, and provided a summary of similar avoided cost comparisons that it has developed in connection with possible power sales to other non-municipal Massachusetts utilities (Exh. WLC-1, pp. 3-93 to 3-94; Tr. 1, p. 77). West Lynn indicated that these avoided cost analyses demonstrate that West Lynn could sell power to these Massachusetts utilities at less than their avoided costs (Tr. 6, pp. 51-53).

The Siting Council consistently has assessed reliability and economic efficiency benefits to Massachusetts in terms of signed and approved PPAs with Massachusetts utilities, as opposed to forecasts of need. MASSPOWER, 20 DOMSC at 323-327; Altresco-Pittsfield, 17 DOMSC at 366-367; NEA, 16 DOMSC at 354-360.

Here, West Lynn cited its ongoing negotiations with MMWEC, but did not provide a signed PPA with MMWEC. In addition, the Siting Council notes that the Massachusetts Department of Public Utilities ("MDPU") does not have the authority to review and approve PPAs of municipal electric companies. Further, the Siting Council -- which does have jurisdiction over MMWEC's supply plan -- found in its most recent review of MMWEC's supply plan, that MMWEC had failed to establish that its supply plan ensured a least-cost energy supply and rejected the supply plan. Massachusetts Municipal Wholesale Electric Company, 20 DOMSC 1, 92 (1990).

22/ The estimated Massachusetts deficiencies range from 227 MW to 943 MW for 1993, and from 559 MW to 1446 MW for 1994 (Exh. WLC-1, Table 3.1.1.m(1); Exh. HO-RR-28).

West Lynn also stated its intention to respond to upcoming RFPs of three Massachusetts utilities, but provided no evidence that it has a signed and approved PPA with any Massachusetts utility. In addition, West Lynn provided no evidence that it is included within an RFP award group that could lead to an approved PPA with any Massachusetts utility. In MASSPOWER, 20 DOMSC at 326-327, the Siting Council found that a petitioner's inclusion in such an award group (or award groups), while not alone constituting Massachusetts benefits, does represent an important first step toward reaching approved PPA status. In this case, West Lynn has failed to demonstrate any such step toward obtaining an approved PPA with a Massachusetts utility.

As evidence of economic efficiency benefits, West Lynn also cited the avoided cost comparison that it developed in response to BECo's second RFP, and summarized similar avoided cost comparisons that it has developed in connection with possible power sales to other non-municipal Massachusetts utilities. However, consistent with the Siting Council's statutory mandate to ensure a necessary energy supply to the Commonwealth, it is necessary that project proponents demonstrate reliability and economic efficiency benefits to Massachusetts with signed and approved PPAs, because without signed and approved PPAs, there is no "guarantee" that such power would be sold to Massachusetts utilities. West Lynn failed to provide an approved PPA with any Massachusetts utility, and further failed to demonstrate that it was included in any RFP award group which would represent progress toward obtaining such an approved PPA.

For all the above reasons, the Siting Council rejects West Lynn's argument that its analysis of Massachusetts' need, its draft PPA with MMWEC, and its avoided cost analyses relating to possible power sales to non-municipal Massachusetts utilities demonstrate that its project will provide reliability and economic efficiency benefits to Massachusetts. Accordingly, the Siting Council finds that West Lynn has not established that its proposed project offers economic efficiency or reliability

benefits to the Commonwealth through signed and approved PPAs with Massachusetts utilities.

b. Economic Benefits to Steam Users

In its NEA decision, the Siting Council established that a non-utility developer proposing the addition of energy resources in the Commonwealth must demonstrate that it offers reliability or economic efficiency benefits to the Commonwealth in sufficient magnitude to offset the impact on the Commonwealth's resources of construction and operation of the facilities (16 DOMSC at 349). In Altresco-Pittsfield, the Siting Council found that a non-utility developer also may demonstrate benefits to the Commonwealth based on economic grounds outside of a PPA, or on environmental grounds (17 DOMSC at 368-369).

West Lynn stated that the proposed project would provide the following economic benefits to the steam host, West Lynn Creamery, and consequently to Massachusetts: (1) a supply of steam, up to 30,000 pph; (2) treatment of wastewater effluent of an average of 167,000 gallons per day ("gpd"); and (3) lease payments for use of the 4.6 acre proposed project site currently owned by West Lynn Creamery (Exh. HO-N-13). West Lynn stated that these three economic benefits had been negotiated based on achieving a mutually agreed target of $1,200,000 per year in overall benefits, escalated over 20 years, for West Lynn Creamery (Tr. 2, pp. 38-41). As an additional benefit, West Lynn stated that the costs of certain remedial measures that West Lynn Creamery currently is required to perform at the proposed site, stemming from the former use of the site as a municipal landfill, would be partially absorbed by West Lynn as part of the proposed project (id., pp. 49, 68-69). West Lynn stated that the above benefits would have a highly favorable impact on West Lynn Creamery's ability to stay competitive in a very low-margin business (id., p. 69; Exh. WLC-1, p. 66).

i. Steam Sales Benefits

West Lynn stated that the maximum of 30,000 pph of steam to be sold to West Lynn Creamery under the steam sales agreement includes: (1) 25,000 pph for refrigeration, which would displace refrigeration currently provided by electric compressors; and (2) 5,000 pph for process purposes, including dairy heating and operating and cleaning plastic sealing equipment (Tr. 1, p. 149). West Lynn indicated that the steam sales agreement would provide savings amounting to approximately 50 percent of West Lynn Creamery's current operating costs for the production of process steam and refrigeration (Tr. 2, p. 41). West Lynn further stated that the steam sales agreement would enable West Lynn Creamery to expand its production in the future, if desired, without expending capital for new boilers to provide necessary process steam (Exh. WLC-1, p. 3-67).

West Lynn stated that the proposed project would be capable of producing a minimum of 5,000 pph of steam (equivalent to 300 tons of refrigerant) above West Lynn Creamery's current maximum requirements (Exh. HO-N-18; Tr. 1, pp. 150-152). West Lynn stated that such an availability of additional steam is a potential future benefit not only for West Lynn Creamery, but also for any future industries that may seek to locate in the immediate area (id.). With respect to the nearby Lynn harbor waterfront -- a designated port area ("DPA") under the state Office of Coastal Zone Management ("CZM") program -- West Lynn noted that the availability of steam for possible future development of marine industries in that area is a benefit that potentially furthers CZM policies encouraging such development in DPAs (Exh. HO-E-22).

In a previous case, the Siting Council accepted a steam sales agreement that reduced steam user costs as evidence of economic benefits to Massachusetts. Altresco-Pittsfield, 17 DOMSC at 367-369. Such savings are made possible, in part, by energy efficiencies inherent in cogeneration technologies, as compared to possible alternative production of the same amounts of process steam and electricity in separate facilities. Id., pp. 367-368. As such, the savings to the steam host represent a

real economic benefit rather than simply a transfer of costs from the steam host to the project proponent.

In Altresco-Pittsfield, the petitioner established that its cogeneration steam would be sold at a unit cost substantially below that of the steam purchaser. Id., p. 368. In that case, the petitioner showed that its cogeneration project would provide its steam host with annual savings of $6,000,000 in steam costs -- a reduction of over 85 percent. Id.

Here, the annual steam cost savings amount to a fraction of those in Altresco-Pittsfield, stated in absolute terms. Nonetheless, the savings reflect a 50 percent reduction in the cost of providing up to 30,000 pph of steam-based energy for West Lynn Creamery, and are a part of a steam host benefit package amounting to $1,200,000 per year. In addition, 25,000 pph of the overall steam output of up to 30,000 pph represents a substitution of direct thermal energy for electricity as a means of producing refrigeration, thereby achieving a measure of electricity conservation for Massachusetts and New England.

Based on the foregoing, the Siting Council finds that West Lynn has established that Massachusetts would receive economic benefits from West Lynn's steam sales agreement with West Lynn Creamery.

ii. Other Economic Benefits

West Lynn stated that it is negotiating an agreement to accept all of West Lynn Creamery's 167,000 gpd of sewage effluent as a direct water supply input for the proposed project, which is part of the overall package providing $1,200,000 per year of benefits to the steam host over 20 years (Exh. HO-N-13; Tr. 2, pp. 38-41; Tr. 4, pp. 29, 31-32).[23] By directly accepting this effluent, the proposed project would

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23/ The sewage effluent from the West Lynn Creamery currently is discharged to the Lynn Water and Sewer Commission ("LWSC") municipal sewerage system.

enable the West Lynn Creamery to avoid the costs associated with discharge to the LWSC wastewater treatment plant. In addition, West Lynn expects that the package of benefits totalling $1,200,000, escalated over 20 years, would defray the cost of a separate wastewater treatment facility which West Lynn Creamery is installing at its plant in order to comply with pre-treatment requirements for industrial discharges to the LWSC system (id.).

West Lynn further stated that it had signed an agreement to lease the proposed site of the cogeneration facility from West Lynn Creamery, representing the final part of the overall package providing $1,200,000 per year of benefits to the steam host over 20 years (Tr. 1, pp. 154). West Lynn noted that use of this site would require completion of state-mandated remedial measures associated with closing the former the site as a municipal landfill (id., pp. 77-79). West Lynn stated that it expects to assume 43 percent of West Lynn Creamery's landfill closure costs, and to provide necessary measures to control the quantity and quality of stormwater runoff, as part of the proposed project (id., pp. 79-80; Tr. 2, p. 49).

With respect to wastewater, West Lynn asserted that its acceptance of West Lynn Creamery effluent represents a real economic benefit, as opposed to merely a cost transfer, based on efficiencies in bypassing the LWSC system (Tr. 2, pp. 49-56, 61-62). West Lynn stated that West Lynn Creamery would avoid the costs of discharging sewage to the LWSC system, while LWSC and the public would in turn realize benefits in the form of an increase in reserve sewerage system capacity and/or a delay in the need for sewerage system expansion (id.).

In fact, West Lynn stated that it would not be required to make any additional capital investment in West Lynn Creamery's wastewater treatment facility -- above what West Lynn Creamery would have expended anyway to meet LWSC's pre-treatment requirements -- in order to adapt the facility to provide effluent suitable for use in the proposed project (Exh. HO-RR-45).

As noted in Section II.A.4.b.i, above, the proposed project would provide savings in West Lynn Creamery's costs of

steam, which, in part, represent a real economic benefit attributable to efficiencies in cogeneration technologies. Here, West Lynn has presented evidence that its steam host also would reduce its wastewater costs through an arrangement that, in part, involves savings from design configuration efficiencies in handling wastewater. The two situations are similar in that economic savings to the steam host are, to a significant degree, attributable to technological or design efficiencies, rather than merely reflecting cost transfers from one party to another. In addition, the wastewater savings would not only be realized by West Lynn Creamery, but would in turn be realized by the LWSC in the form of reduced demands on the municipal sewerage system.

In MASSPOWER, we declined to find that payments to the steam host for reuse of the steam host's cooling water discharge, taken alone, constituted Massachusetts benefits under our standard (20 DOMSC at 331-332). In that case, however, the cooling water stream proposed for reuse was being discharged to a river after treatment, rather than to a municipal sewerage system. Id., pp. 390-393. In addition, only a portion of the steam host's cooling water discharge was to be reused, and the wastewater generated by the cogeneration project was to be discharged to the municipal sewerage system resulting in a net increase in demands on that system. Id.

In the instant case, the wastewater reuse agreement would result in a net reduction, rather than an increase, in industrial discharges to the municipal sewerage system. As such, the arrangement would reduce demands on public facilities, as well as provide a benefit to West Lynn Creamery. In addition, the reuse arrangement would apply to the steam host's full wastewater discharge of 167,000 gpd. Considering all the foregoing, the arrangement will represent not only a real economic benefit, but a benefit that is realized by the community as well as the steam host.

However, while West Lynn is pursuing a wastewater reuse agreement with West Lynn Creamery, to date it has not provided the Siting Council with a signed agreement.

Accordingly, based on the foregoing, the Siting Council finds that, at such time as West Lynn submits to the Siting Council an appropriate agreement to directly accept all wastewater generated by West Lynn Creamery up to 167,000 gpd, or more if so agreed, for use as a water supply for the proposed project, West Lynn will be able to establish that Massachusetts would receive economic benefits from West Lynn's wastewater reuse agreement with West Lynn Creamery. Within 45 days of the receipt of an executed wastewater reuse agreement with West Lynn Creamery, the Siting Council will issue a decision determining whether West Lynn has demonstrated that Massachusetts would receive economic benefits from such an agreement.

With respect to West Lynn's payment of land lease costs and West Lynn's assumption of landfill closure costs, the record indicates that any economic benefits would accrue largely to West Lynn Creamery. To the extent that West Lynn Creamery could make economic use of the proposed site or lease the proposed site to another user, in the absence of the lease arrangement with West Lynn, there may be little or no net benefit to Massachusetts from the lease arrangement. Similarly, West Lynn's assumption of landfill closure costs appears to represent primarily a cost/benefit transfer with no net benefit to Massachusetts, in that West Lynn Creamery would expend funds to close the landfill anyway.

Based on the foregoing, the Siting Council finds that West Lynn has established that its land lease agreement with West Lynn Creamery and its assumption of landfill closure costs at the proposed site represent transfer benefits to West Lynn Creamery but, taken alone, do not establish that the proposed project would provide economic benefits to Massachusetts.

c. Environmental Benefits

i. Water Quality

West Lynn argues that the operation of the proposed project would reduce both the level of pollution in Lynn Harbor and the total loading on the LWSC wastewater treatment plant (Brief, p. 34).

In support of its argument, West Lynn stated that the proposed project would utilize 1,060,000 gpd of wastewater for process water supply purposes, including 893,000 gpd from LWSC and 167,000 gpd from West Lynn Creamery (Exh. WLC-1, App. C, pp. 5-3 to 5-4; Tr. 5, pp. 4, 40). West Lynn provided a signed letter of intent and a draft contract to utilize effluent from LWSC (Exh. WLC 1, App. A; Exh. HO-E-13(A)). As discussed in Sec. II.A.4.b.ii, above, West Lynn indicated it is negotiating a wastewater reuse agreement with West Lynn Creamery.

To allow the proposed reuse of wastewater for water supply purposes, West Lynn noted that it would need to control the quality of these effluent streams for two reasons: (1) to meet process equipment requirements at the cogeneration plant; and (2) to limit the concentrations of pollutants in the project's redischarge of wastewater to the LWSC outfall pipe as necessary to conform to the levels specified under existing governmental permits for LWSC's overall discharge to Lynn Harbor (id.; Exh. HO-E-17). West Lynn further stated that, by reusing 167,000 gpd of effluent from West Lynn Creamery which otherwise would be discharged to the LWSC sewerage system, the proposed project would reduce the loading on the LWSC treatment plant (Exh. HO-E-17).

With respect to reducing wastewater discharges to Lynn Harbor, West Lynn indicated that the proposed project's cooling towers would reduce the effluent stream passing through the cogeneration facility by 841,000 gpd (Exh. HO-E-17). West Lynn noted that the remaining 219,000 gpd of wastewater from the proposed project would be treated and discharged to the LWSC outfall pipe, and that, under contract with LWSC, West Lynn would be required to limit concentrations of pollutants in its wastewater to the same levels specified under existing governmental permits for LWSC's overall discharge to Lynn Harbor (id.). By reducing the volume of wastewater discharged to Lynn Harbor by 841,000 gpd, West Lynn estimated the proposed project would result in a net reduction of 210 pounds per day ("ppd") in the discharge of oxygen demanding wastes (measured as biochemical oxygen demand (BOD)) and a net reduction of 210 ppd

in the discharge of suspended solids (id.).

The proposed project would reduce both the volume of and the pollutant loadings in existing LWSC wastewater discharges to Lynn Harbor.[24] However, while West Lynn is pursuing wastewater reuse agreements with LWSC and West Lynn Creamery, to date it has not provided the Siting Council with signed agreements.

Accordingly, based on the foregoing, the Siting Council finds that, at such time as West Lynn submits to the Siting Council appropriate agreements with LWSC and West Lynn Creamery to utilize a total wastewater effluent volume of 1,060,00 gpd as a water supply for the proposed project, West Lynn will be able to establish that Massachusetts would receive environmental benefits relating to water quality. Within 45 days of the receipt of executed wastewater reuse agreements with LWSC and West Lynn Creamery, the Siting Council will issue a decision determining whether West Lynn has demonstrated that Massachusetts would receive environmental benefits from such agreements.

24/ With regard to West Lynn's argument that the proposed reuse of West Lynn Creamery's effluent also would reduce demands on the wastewater treatment plant, the Siting Council agrees that such reduction may improve the effectiveness of the treatment process with respect to the remaining sewerage passing through the treatment plant. According to West Lynn, however, the average dry-weather flow currently is 22.5 million gallons per day ("MGD"), with recent flows under actual weather ranging from approximately 25 to 30 MGD (Exh. HO-E-15). West Lynn further stated that it understands the treatment plant has a design average flow of 25.8 MGD and a design maximum flow of 110 MGD (id.). Thus, given that West Lynn Creamery currently contributes less than one percent of the average dry-weather flow at the LWSC treatment plant, any improvement in treatment effectiveness likely would be minor. In addition, West Lynn provided no documentation of environmental benefits related to reduced sewerage flow through the treatment plant.

Economic benefits of the proposed wastewater reuse arrangements, including reduced demands on the LWSC treatment plant, are discussed in Section II.B.4.b.ii, above.

ii. Air Quality

West Lynn argues that the proposed project would be dispatched before, and thus displace, oil-fired generating capacity, thereby benefiting air quality in Massachusetts and the region (Brief, p. 35).

In support of its argument that the proposed project would be dispatched before oil-fired plants, West Lynn's witness, Mr. Whippen, cited his experience in planning and developing another gas-fired project in New England (Tr. 2, pp. 169-173). In terms of relative emissions or air pollution, West Lynn stated that the proposed natural gas units would emit lower amounts of nitrogen oxides ("NO_x"), sulfur dioxide ("SO_2") and particulates, and comparable amounts of carbon monoxide ("CO") and hydrocarbon, as compared to other generating technologies (Exh. WLC-1, p. 3-106).

The Siting Council previously has held that a project proponent must provide full documentation of its assumptions pertaining to the potential displacement of existing generating facilities. MASSPOWER, 20 DOMSC at 388; Altresco-Pittsfield, 17 DOMSC at 400. The Siting Council notes that West Lynn has compared expected emission levels from the proposed project with those from alternative generating technologies. However, West Lynn has failed to document key assumptions relating to potential capacity displacement, including NEPOOL plant dispatch procedures, plant availability projections, fuel price projections, reserve requirement projections, transmission system capability estimates, and likely revisions to environmental permitting. Thus, absent a comprehensive assessment of significant institutional, economic and regulatory factors and their effect on existing as well as proposed facilities, a determination of the air quality advantages or disadvantages of a specific project, resulting from displacement of existing capacity, cannot be made. MASSPOWER, 20 DOMSC at 388.

Accordingly, the Siting Council finds that West Lynn has failed to establish that Massachusetts would receive environmental benefits relating to air quality.

d. Conclusions on the Benefits to Massachusetts

The Siting Council has found that West Lynn has not established that its proposed project offers economic efficiency or reliability benefits to the Commonwealth through signed and approved PPA's with Massachusetts utilities. The Siting Council also has found that West Lynn has established that: (1) Massachusetts would receive economic benefits from West Lynn's steam sales agreement with West Lynn Creamery; (2) at such time as West Lynn submits to the Siting Council an appropriate agreement to directly utilize West Lynn Creamery's full wastewater discharge of 167,000 gpd as a water supply for the proposed project, West Lynn will be able to establish that Massachusetts would receive economic benefits relating to wastewater reuse; and (3) Massachusetts would not receive economic benefits from West Lynn's land lease agreement with West Lynn Creamery and its assumption of landfill closure costs at the proposed site. Further, the Siting Council has found that (1) West Lynn has established that, at such time as West Lynn submits to the Siting Council appropriate agreements with LWSC and West Lynn Creamery to utilize a total wastewater effluent volume of 1,060,00 gpd as a water supply for the proposed project, West Lynn will be able to establish that Massachusetts would receive environmental benefits relating to water quality; and (2) West Lynn has failed to establish that Massachusetts would receive environmental benefits relating to air quality.

In MASSPOWER, the Siting Council, for the first time, addressed a situation in which a developer requested Siting Council approval before PPAs were signed and approved (20 DOMSC at 323-327). In that decision, we stated that the barriers to a showing that allows Siting Council approval before the marketing of power is final are not insurmountable. Id., p. 335. The Siting Council further stated that, in those cases where the proponent attempts to make such a showing, it is important for proponents to establish that the proposed project will provide meaningful benefits to Massachusetts that are not associated with power sales. Id.

In MASSPOWER, the Siting Council stated that the level of benefits required to meet the Massachusetts benefits test must be commensurate with the size and nature of the proposed facility (20 DOMSC at 334). The Siting Council also stated that the Massachusetts benefit standard should be set to allow the state to remain a host to those necessary least-cost, least-environmental-impact generating projects designed to serve the entire region, while at the same time, ensuring that they bring some meaningful benefit to Massachusetts. Id.

Importantly, here, the proposed project would include 30,000 pph of steam capacity, which would provide Massachusetts benefits in the form of process steam and refrigerant for West Lynn Creamery and possibly other steam users in the West Lynn area. The steam supply also represents a 50 percent reduction in West Lynn Creamery's current steam production costs.

In addition, for the first time in a Siting Council review, a significant portion of the steam to be provided to the steam host -- 25,000 pph or 83.3 percent of the overall 30,000 pph capacity -- is contracted to provide refrigerant to a steam host. As such, the 25,000 pph share represents a substitution of direct thermal energy for electricity as a means of producing refrigeration, thereby achieving a measure of electricity conservation for the local utility, Massachusetts Electric Company.

Finally, the proposed project incorporates both economic and environmental benefits for Massachusetts related to the handling of wastewater. The reduction in West Lynn Creamery's current wastewater costs is a significant component of the project's total economic benefit of $1.2 million per year for the steam host. The 841,000 gpd reduction in municipal wastewater discharge to Lynn Harbor, together with the associated reductions in pollutant loadings, represents a significant component of the LWSC's existing 22,500,000 gpd dry weather discharge.

Based on all of the above, the Siting Council finds that West Lynn has established that, upon confirmation by the Siting Council of adequate completion of the above conditions, the

proposed project will provide benefits to the Commonwealth of sufficient magnitude to offset the impacts on the Commonwealth's resources from construction and operation of the proposed facility.

5. Conclusions on Need

The Siting Council has found that West Lynn (1) has established that, as early as 1993, and, in any event by 1994, New England will need at least 125 MW of additional energy resources for reliability purposes; and (2) has established that, upon confirmation by the Siting Council of adequate completion of the conditions contained in Sections II.A.4.b.ii and II.A.4.c.i, above, the proposed project will provide benefits to the Commonwealth of sufficient magnitude to offset the impacts on the Commonwealth's resources from construction and operation of the proposed facility.

Accordingly, the Siting Council finds that, upon confirmation by the Siting Council of adequate completion of the above conditions, West Lynn will be able to establish that there is a need for the additional energy resources.

B. Project Approach

1. Standard of Review

a. Development of Standard

The Siting Council, pursuant to G.L. c. 164, sec. 69H, is required to evaluate proposed projects in terms of their consistency with providing a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. In addition, G.L. c. 164, sec. 69I, requires a project proponent to present "alternatives to planned action" which may include (a) other methods of generating, manufacturing or storing, (b) other sources of electrical power

or gas, and (c) no additional electrical power of gas.[25]

In implementing its statutory mandate, the Siting Council has required a petitioner to show that, on balance, its proposed project is superior to alternate approaches in the ability to address the previously identified need and in terms of cost, environmental impact and reliability. Additionally, where a non-utility developer proposes to construct a generating facility in Massachusetts, the Siting Council determines whether the project offers power at a cost below the purchasing utility's avoided cost. MASSPOWER, 20 DOMSC at 341-343; Altresco-Pittsfield, 17 DOMSC at 370-378; NEA, 16 DOMSC at 360-380; 1986 CELCo Decision, 15 DOMSC at 212-218; 1985 MECo/NEPCo Decision, 13 DOMSC at 141-183; 1985 BECo Decision, 13 DOMSC at 67-68, 73-74.

In past reviews of proposals of non-utility developers to construct generating facilities, the Siting Council has focussed its evaluation on the comparison of the applicant's proposed generating technology and other generating technologies capable of delivering necessary energy resources. MASSPOWER, 20 DOMSC at 337-352; Altresco-Pittsfield, 18 DOMSC at 370-378; NEA, 16 DOMSC at 360-380. In MASSPOWER, the project proponent compared its proposed project, a natural gas-fired, combustion turbine combined cycle plant,[26] with the following generic alternative technologies: a distillate-oil-fired combined cycle plant; a residual-oil-fired steam plant; a circulating fluidized bed coal plant; and a conventional coal-fired plant (20 DOMSC at 338).

In MASSPOWER, however, the Siting Council stated its concerns with a method that analyzes various project approaches

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25/ G.L. c. 164, sec. 69I, also requires a petitioner to provide a description of "other site locations." The Siting Council reviews West Lynn's proposed site, as well as other site locations, in Section III, below.

26/ The facility proposed in MASSPOWER would utilize distillate No. 2 oil as a backup fuel. MASSPOWER, 20 DOMSC at 305.

based exclusively on a comparison of technologies. Id. at 349. First, the Siting Council stated that such a review is somewhat incompatible with our review of proposals filed by utilities to construct facilities. Id. at 350. In those reviews, a utility also is required to show that its proposed project approach is superior to alternate approaches in terms of cost, environmental impact, reliability, and meeting an identified need. However, the Siting Council reviews utility proposals within the context of a utility's overall supply planning process. Id. Thus, the Siting Council could determine whether the utility's decision to pursue the proposed project was the result of a process which fully evaluated a comprehensive range of resource options, including C&LM, on an equal footing, and that the proposed project represented the least-cost, least-environmental-impact approach available to the utility. Id.

Second, as indicated above, the Siting Council stated in MASSPOWER that a technology-based review of project approaches in non-utility cases fails to evaluate a complete range of project approaches. Id. at 351. An approach which compares different technologies for cogeneration projects ignores several other generic approaches to meeting a need for additional energy resources, such as C&LM, smaller generating projects, or power purchases from other states or regions. Id. In stating this concern, however, the Siting Council recognized that it is inappropriate to require a non-utility developer to establish that it has selected a superior project approach from among a full range of resource options when the non-utility developer only has full access to data for one option -- its proposed project. Nonetheless, the Siting Council stated that the fact that a non-utility developer does not have access to a full range of resource options does not mean that the Siting Council is any less committed to ensuring that the developer's proposed project is superior to alternate project approaches in terms of cost, environmental impact, reliability, and meeting the identified need. Id.

Therefore, in MASSPOWER, the Siting Council stated that, in future cases, it would consider different methods of

reviewing whether a non-utility developer's project proposal is superior to alternate project approaches in terms of environmental impact, reliability and meeting the identified need, and the tradeoffs of each of these criteria with cost.[27] Id. The Siting Council also stated that in formulating a new standard of review in this area, we would attempt to find mechanisms which: (1) allow the Siting Council to compare proposals by non-utility developers with a full range of resource options available to the state and region; and (2) place greater emphasis on determining whether a non-utility developer's proposed project is consistent with our statutory mandate and the resource use and development policies of the Commonwealth.[28] Id., at 351-352.

b. West Lynn's Response to the Development of the Project Approach Standard

In the instant case, West Lynn responded to the Siting Council's request to address the appropriate standard that should be used to analyze one project versus other approaches that might meet the identified need. West Lynn stated that non-utility developers must compare their projects to realistic alternatives which are reasonably likely to be available to satisfy some or all of the identified need within the necessary time frame (Brief, p. 3). West Lynn stated that it believes that judgments regarding what is reasonably likely to be

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27/ With respect to cost, the Siting Council found that the requirement that a non-utility developer establish that its proposed project offers power below purchasing utilities' avoided costs remains essential to our review of project approaches.

28/ In addition to notifying the parties in the West Lynn proceeding of the intent to formulate a new standard of review, the Siting Council notified the parties in the Eastern Energy Corporation ("EEC") and Enron Power Enterprise Corporation ("Enron") proceedings currently before the Siting Council of this intent. See October 4, 1990 Siting Council Memorandum. EEC and Enron are non-utility developers, and each proceeding involves a proposal to construct generation facilities.

available must be made in a manner consistent with the statutory mandate of the Siting Council to implement policies "to provide a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost" (Exh. WLC-4, pp. 3-4).

With respect to comparing its proposed project with a full range of resource options available to the state and region, West Lynn presented an analysis comparing its proposed project to four categories of uncommitted resources it identified which might be available to meet regional need (id., pp. 4-10). The four general categories of uncommitted resources identified by West Lynn are: (1) expansion of demand-side management ("DSM") programs; (2) additional power purchases; (3) additional utility generation; and (4) additional non-utility generation (id., p. 4; Brief, pp. 45-46). For each of these categories, West Lynn determined whether new resources beyond those already considered in its need analysis were reasonably likely to be available to meet 1993 summer peak, the year in which West Lynn assumes the proposed project will commence commercial operation (Exh. WLC-4, p. 4).

West Lynn also compared the proposed project to other resource options with respect to environmental impact, cost, and reliability. West Lynn asserted that it remained generally appropriate to do this by comparing the proposed project to generic projects using alternative generation technologies (id., pp. 10-12). West Lynn maintains that this is necessary because detailed data for other, specific, non-utility projects could not be obtained, in part because developers of non-utility projects view themselves as competitors (id., p. 10).

West Lynn also argues that, with respect to environmental impacts, the Integrated Resource Management ("IRM") process, developed jointly by the Siting Council and MDPU, should provide the Siting Council, in the future, with a method for determining the relative environmental impacts of a proposed project (id., p. 11). In addition, West Lynn maintains that the six New England states may adopt some form of environmental externality assessment methodology which is uniform or at least comparable

across some or all of the six states (id., p. 12).

West Lynn further maintains that non-quantitative or "subjective" judgments regarding the relative environmental costs and benefits of facilities should be considered (id.). For example, West Lynn maintains that a proposed project should receive "credits" for environmental benefits such as choosing a site which requires neither a lengthy transmission line nor a lengthy high pressure gas pipeline (id.). Therefore, West Lynn argues that the Siting Council should continue to evaluate generic comparisons of technologies coupled with its own specific knowledge of the environmental advantages and weaknesses of the major facilities proposed for the region (id., p. 12).

Finally, West Lynn stated that it analyzed its proposed project in terms of its consistency with the resource use and development policies of the Commonwealth (Exh. WLC-4, p. 4; Brief, pp. 52-55). West Lynn divided the resource use and development policies into three general categories: (1) environmental policies; (2) energy policies; and (3) economic policies (Brief, p. 52).

c. Discussion and Analysis

As noted above, the Siting Council's statutory mandate requires the Siting Council to ensure a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. In effect, this mandate requires the Siting Council to ensure that Massachusetts utilities acquire the least-cost, least-environmental-impact resources to meet the resource needs of their service territories. For a utility proposal to build a facility, the Siting Council has consistently evaluated proposed utility projects within the context of the utility's supply planning process. See Massachusetts Electric Company/New England Power Company, 18 DOMSC 295, 348-371 (1989); 1989 BECo Decision, 18 DOMSC at 201, 250-281. Such a review enables the Siting Council to ensure that the proposed facilities represent the least-cost, least-environmental-impact resource addition for the utility relative to a comprehensive set of alternative resource options.

For non-utility generating facility proposals, however, the Siting Council has traditionally focused on whether a particular project is the least-cost, least-environmental impact option relative to generic projects of a comparable size using alternative generating technologies. As indicated in MASSPOWER, however, we no longer deem this approach effective in ensuring the Siting Council's ultimate goal that the resource additions of Massachusetts utilities are least-cost, least-environmental-impact. The old approach failed to consider the full range of alternative approaches available to meet a particular identified need. In addition, it is difficult, if not impossible, to compare, in any meaningful way, a "real" project, with its associated real cost and environmental characteristics, to the generic costs and environmental characteristics of a hypothetical alternative. For example, a generic generation technology may require large amounts of cooling water. If that water were to be supplied by the wastewater discharge from the industrial host or a wastewater treatment facility, however, the associated environmental impact on the state may be minimal. Thus, the site-specific aspects of a generating facility dictate in large part the facility's environmental impacts.

In addition, our traditional project approach review ignores one of the most fundamental tenets of least cost supply planning -- that in order for a utility to make truly least cost planning decisions, those decisions must be made based on a comprehensive consideration of the characteristics of the utility's existing resource mix, alternative resource options and customer base. In effect, without knowledge regarding these utility-specific characteristics, the Siting Council could conceivably reject a project based on our traditional generic technology comparison, which might have proven to be the most appropriate resource addition for a particular utility.

Finally, our traditional review of proposed non-utility generating projects relative to generic technology alternatives has not furthered the Siting Council's statutory obligation of evaluating fully whether such projects are in fact consistent with the resource use and development policies of the

Commonwealth. For example, a simple technology-based comparison cannot ensure that a particular project will be consistent with: (1) the state's energy policies relating to a diverse fuel mix; (2) economic or environmental policies relating to development in a particular area; or (3) other specific policies with regard to project development or environmental protection. In fact, our traditional technology-based project approach review had little connection to any of the resource use and development policies of the Commonwealth.

In light of the above, the Siting Council concurs with West Lynn in certain respects. The Siting Council agrees with West Lynn that proposed projects ideally should be compared to a complete menu of uncommitted resource options available to the state and the region. Further, the Siting Council agrees with West Lynn that such comparison should be to real alternatives which are reasonably likely to be available to satisfy some or all of the identified need within the necessary time frame. We also recognize, however, that usually it is not practically possible to compare a proposed project with specific, real alternatives within the scope of a non-utility generating facility review.

West Lynn also asserts, however, that continuing to compare proposed projects to alternative generic approaches with respect to cost and environmental impacts is appropriate for non-utility generating project reviews. As indicated by our discussion above, we disagree. Even where such a generic comparison addresses the full range of resource types which could reasonably be available to meet a particular need, the comparison would suffer from the same flaws as our traditional review.[29] The Siting Council is now convinced that it should

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29/ While the Siting Council rejects herein the framework of a generic technology-based comparison as a valid basis for purposes of ensuring that our least-cost least-environmental standard is met, the Siting Council recognizes that such a comparative methodology may have some place in discussing how a particular project is consistent with a specific policy of the Commonwealth.

not attempt to make findings regarding the general superiority of one type of project relative to others within our review of non-utility generating proposals.

In reaching our conclusions above, the Siting Council is in no way retreating from its committment to a project level analysis or from its statutory committment to ensure a least-cost, least-environmental-impact energy supply for the Commonwealth. Rather, we believe the necessary analysis can best be achieved through: (1) reliance on other portions of the existing Siting Council review; (2) reliance on the newly-developed IRM program to be implemented jointly by the DPU and the Siting Council; and (3) renewed emphasis on the resource use and development policies of the Commonwealth.

First, much of our review of non-utility generating facilities, regardless of whether they will provide power to Massachusetts or other regional utilities, comprehensively evaluates the specific cost, environmental and reliability characteristics of proposed projects. The Massachusetts benefits test specifically addresses whether construction and operation of a proposed project within the Commonwealth will provide reliability, economic and/or environmental benefits to the Commonwealth in sufficient magnitude to offset the impacts on the Commonwealth's resources of construction and operation of such a facility (see Section II.A.4, above). Further, the Siting Council reviews the viability of the proposed project to ensure that it will provide the region with a least-cost reliable energy resource over the life of its PPAs (see Section II.C, below).[30] Finally, the Siting Council extensively reviews the cost and environmental impacts of the proposed project in our analysis of the proposed facilities (see Section III, below).

30/ To ensure that a proposed project is viable, the non-utility developer is required to establish that its proposed project offers power below purchasing utilities' avoided costs.

Second, while utility supply planning in the past was often conducted and regulated via multiple, non-coincident processes at both the MDPU and the Siting Council, the new IRM process for utility supply acquisition will ensure that each effected utility will make resource decisions based on a consistent and comprehensive evaluation of all the resource options available to it.[31] In fact, the IRM process will provide precisely the appropriate format to conduct the type of comprehensive evaluation of alternative resource options necessary to determine on a utility-by-utility basis which resources represent the least-cost, least-environmental-impact options.[32]

Third, the Siting Council, as stated in MASSPOWER, will now place greater emphasis on determining whether a non-utility developer's proposed project is consistent with the resource use and development policies of the Commonwealth. Generally, the policies set forth by West Lynn -- energy, environmental, and economic -- are the relevant resource use and development policies to be considered.

As we have stated, the Siting Council's review already incorporates many aspects of a project's consistency with the resource use and development policies of the Commonwealth, and this review need not be repeated. Nevertheless, we recognize that our current review does not provide for an explicit evaluation of a proposed project's consistency with many of the Commonwealth's specific energy, economic and environmental policies. Accordingly, the Siting Council finds that it is

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31/ All investor-owned utilities in Massachusetts except the Nantucket Electric Company are subject to IRM.

32/ IRM, of course, may well affect the Siting Council's review in areas separate from project approach. For example, a project that has bid in IRM and is fully subscribed by utilities at the time of its Siting Council filing would not need to demonstrate regional need or Massachusetts benefits. In addition, a fully-subscribed project can address certain elements of the Siting Council's viability standard through its PPAs.

appropriate to evaluate a proposed project's attributes relative to a broad range of resource use and development policies.[33]

In the following section the Siting Council reviews West Lynn's consistency with the resource use and development policies of the Commonwealth.

2. Consistency with Resource Use and Development Policies of the Commonwealth

In accordance with the standard discussed above, the Siting Council, in this section, assesses the consistency of West Lynn's proposed project with the broad resource use and development policies of the Commonwealth. The Siting Council further evaluates the proposed facilities relative to specific environmental policies in Section III, below.

West Lynn asserted that its proposed project is consistent with the resource use and development policies of the Commonwealth (West Lynn Brief, pp. 52-55). West Lynn divided the resources and development policies it analyzed into three general categories: (1) energy policies; (2) economic policies; and (3) environmental policies (Exh. WLC-4, pp. 15-19). Resource use and development policies considered by West Lynn in these general categories included: appropriate land use; ecological resource preservation; water quality protection; water supply maximization; air quality protection; cultural resource protection; minimization of visual impacts; wetlands protection; coastal zone use policies; Massachusetts Releaf policy; encouragement of siting cogeneration facilities at existing industrial hosts; use of natural gas for incremental energy supplies; minimization of energy price fluctuations for consumers; protection of Massachusetts manufacturing jobs; and minimization of non-utility generation rates (id.).

33/ In the EEC and Enron proceedings, hearings have concluded and the records are closed. The Siting Council will decide those proceedings based on the record created in each case. However, we would expect that the reasoning applied in regard to the standard of review here would equally apply in those two cases.

West Lynn asserted that its proposed use of natural gas and, in particular, its long-term gas supply contract with Boston Gas, is consistent with the state's energy policy of providing greater fuel diversity, more stable energy prices, and more reliable energy supplies (id., pp. 15-17). Citing its long-term steam sales contract with West Lynn Creamery, West Lynn asserted that the cost and reliability advantages of using natural gas also would accrue to its steam host, thereby providing economic benefits (id., p. 17).

In support of its position that use of natural gas increases fuel diversity, West Lynn indicated that the region currently relies on natural gas for less than five percent of its in-service firm generation, compared with reliance on oil of about 40 percent (Exh. HO-N-10; Tr. 1, pp. 121-124). West Lynn cited the recent sudden increase in petroleum prices, following the 1990 occupation of Kuwait by Iraq, as evidence that the proposed project would help ensure price stability (Exh. WLC-4, p. 17).

West Lynn further asserted that, by pursuing cogeneration development, the proposed project is consistent with Massachusetts' approach to maintaining the strength of its manufacturing sector through increased productivity (id., p. 18). West Lynn stated that the proposed project would provide steam and refrigerant to West Lynn Creamery at a substantial cost savings, thereby enabling the steam host to increase its productivity (id., p. 18). West Lynn noted that increases in productivity help maximize employment opportunities and are consistent with the economic development policies of the Commonwealth (id., p. 17).

Finally, West Lynn asserted that the proposed use of natural gas also is consistent with state policies aimed at minimizing environmental impacts of overall development, including those from electrical generation (id., p. 16). As part of its representation of the relevant resource use and development policies of the Commonwealth, West Lynn provided a categorical overview of the Commonwealth's statutory provisions and implementing programs for a range of environmental and

resource use concerns (id., p. 15; Exh. WLC-1, pp. 1-24 to 1-34). West Lynn also stated that the proposed facility would minimize environmental impacts because it would be constructed on previously filled industrial land, and would not require construction of a major high pressure gas delivery pipeline or a major electric interconnection line (Exh. WLC-4, p. 11).

The Siting Council recognizes that the proposed project would reduce the region's dependence on imported oil, consistent with Massachusetts' policy supporting fuel diversity as a means of enhancing the reliability and cost stability of energy supply. The Siting Council notes, however, that by basing its diversity argument solely on in-service firm generation, West Lynn may have underrepresented the large and growing role of natural gas in providing interruptible supplies that are used over significant periods of the year. Nonetheless, for purposes of this review, West Lynn has adequately supported the consistency of natural gas projects with the region's fuel diversity objectives.[34]

The record also demonstrates that the proposed project would utilize cogeneration technology, together with the specific terms of a steam sales agreement, to provide significant cost savings to its steam host. As such, the project would enhance the productivity and competitiveness of an established Massachusetts manufacturing firm, and thereby be consistent with state policies relating to economic development.

Further, the record demonstrates that the proposed use of natural gas as a primary fuel would support state policies to minimize air emissions and the potential for other environmental impacts associated with new development including new electrical generation. In addition, cogeneration is consistent with the efficient use of fuel resources, thereby minimizing environmental impacts due to energy production.

34/ The Siting Council emphasizes that its finding that the use of natural gas is consistent with the region's fuel diversity policies in no way excludes other fuel sources from also being consistent with diversity objectives.

In light of the above, West Lynn has adequately demonstrated that the proposed project would further a number of broadly representative state policies relating to energy, economic development, and environmental protection. Accordingly, the Siting Council finds that West Lynn has established that the proposed project approach is consistent with the broad resource use and development policies of the Commonwealth.

Finally, the Siting Council notes that, in the future, we may request project developers to address the consistency of their projects with specific policies of the state in response to relevant policy issues at that time or in the event that existing policies change or new policies develop.

C. Project Viability

1. Standard of Review

The Siting Council has determined that a proposed non-utility generating project is likely to be viable as a source of energy if: (1) the project is reasonably likely to be financed and constructed so that the project will actually go into service as planned; and (2) the project is likely to operate and be a reliable, least-cost source of energy over the life of its power sales agreements. MASSPOWER, 20 DOMSC at 352; Altresco-Pittsfield, 17 DOMSC at 378; NEA, 16 DOMSC at 380.

In order to meet the first test of viability, the proponent must establish: (1) that the project is financiable; and (2) that the project is likely to be constructed within applicable time frames and capable of meeting performance objectives. In order to meet the second test of viability, the proponent must establish: (1) that the project is likely to be operated and maintained in a manner consistent with appropriate performance objectives; and (2) that the proponent's fuel acquisition strategy reasonably ensures low-cost, reliable energy resources over the terms of the power sales agreements. MASSPOWER, 20 DOMSC at 352; Altresco-Pittsfield, 17 DOMSC at 378.

In this case, West Lynn asserts that its proposed project meets these tests and therefore would be a viable source of energy over time (Brief, pp. 75-76).

2. Financiability and Construction

In considering a proponent's strategy for financing a proposed project, the Siting Council considers whether the project is reasonably likely to be financed so that the project actually will go into service as planned. Here, West Lynn stated that the project principals -- JMC, Belvedere and West Lynn Group -- would share responsibility for securing financing for the proposed project in proportion to their equity shares (Exh. WLC-1, p. 4-3). West Lynn asserted that the project principals have had extensive experience in obtaining financing for major projects, including cogeneration and energy-related projects or industrial and commercial projects (id., p. 4-1). In support of this assertion, West Lynn reported that JMC has been a participant in developing or financing the TBG cogeneration project in Bethpage, New York; the Selkirk cogeneration project in Selkirk, New York; the Ocean State I and Ocean State II projects in Rhode Island; the MASSPOWER project in Springfield, Massachusetts; and the Iroquois Gas Transmission System ("Iroquois") project (id., pp. 1-2 to 1-5, 4-1 to 4-2).[35] West Lynn also cited the experience of Belvedere affiliates in developing a 70-acre industrial complex and an 80-acre office and research park in Massachusetts, as well as the management experience of members of the West Lynn Group in serving as principals of the privately held West Lynn Creamery and its affiliates (id., p. 4-2).

With respect to the proposed project, West Lynn stated that JMC's parent company, J. Makowski Associates Inc., would manage the financing plan (id., p. 4-3). West Lynn stated that, as a first step to securing financing for the project, it expects to issue a descriptive memorandum to financial institutions when: (1) all or nearly all of the project capacity is under contract or the subject of ongoing negotiations; and

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35/ Iroquois proposes to construct a new pipeline beginning in Iroquois, Canada at the New York/Canadian border and extending into New York and Connecticut. See Boston Gas Company, 19 DOMSC 332, 409, n. 37A (1990).

(2) all or nearly all necessary permits and licenses for the project are received (Tr. 2, pp. 146-150). West Lynn stated that it expects to be in a position to issue its financing memorandum during January or February 1991 and to complete financial arrangements by the end of March 1991 (id.).

West Lynn stated that, in order to receive construction financing for the proposed project, it must sell sufficient capacity and energy under long-term PPAs to achieve a debt coverage ratio of 1.2 to one (id., pp. 83, 147). West Lynn estimated that approximately 93 percent of the capacity should be sold under long term PPAs to meet this requirement (id.). West Lynn reported that any percentage of the project not sold under long-term PPAs would be sold to NEPCo at its short-term QF rate, or to one or more other utilities under short-term contract (id., pp. 29, 147-148).[36] However, West Lynn stated that such sales would be an interim measure only, as West Lynn's marketing goal is to enter into more favorable long-term PPAs for its entire output (id., p. 30).

West Lynn asserted that debt coverage ratios are an index used by financial institutions to assess a project's ability to repay its debt, and that financial institutions typically require a minimum monthly debt service coverage ratio of about 1.2 to one (Tr. 2, pp. 83-84; Exh. HO-V-6). West Lynn provided pro forma financial statements for its project under scenarios involving different levels of total installation cost, operating and maintenance costs, interest rate, and plant availability (Exhs. HO-RR-21, HO-C-1(A), HO-C-1(B)).[37] Based on its pro forma financial statements, West Lynn projected that the debt service coverage ratios over a 20-year period would meet the

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36/ PURPA mandates that the utility within whose service territory a QF is located, in this case NEPCo, make short-term purchases from the QF if power is available and below that utility's avoided cost.

37/ West Lynn's pro formas indicate that West Lynn will be able to offer its power below utilities' avoided cost (Exhs. HO-C-1(A), HO-RR-20, HO-RR-55).

typical debt coverage requirements of financial institutions (id.).

West Lynn stated that, in developing pro forma cost estimates, it assumed the project would be financed based on 75 percent debt and 25 percent equity (Tr. 2, p. 84). Mr. Whippen indicated that, if less than 90 percent of the capacity and energy of the proposed facility is sold under long-term PPAs, West Lynn's ability to obtain debt financing could be less and the rates of return required by project equity participants could be higher than assumed in West Lynn's cost analysis (id., pp. 28-32). Mr. Whippen stated that obtaining the equity participation needed to allow greater reliance on short-term contracts is a possibility, but likely would depend on the extent to which equity investors expected future power shortages would occur, enabling West Lynn to recontract its output at higher prices when initial contracts expired (id., p. 32).

West Lynn has presented scenarios to address sensitivities of the project to important variables such as plant availability and installation cost. In each instance, West Lynn has demonstrated that its project would be financiable based on debt coverage ratio performance.

In addition, West Lynn has maintained that it has some flexibility to consider alternative financing strategies in conjunction with possible reliance on short term contracts. However, West Lynn failed to present specific alternative strategies, and acknowledged that the flexibility to use short-term contracts depends on investor perceptions of future power market conditions.

Nonetheless, West Lynn's analysis of debt coverage ratio performance provides a significant measure of confidence regarding the financiability of the project. Further, West Lynn's avoided cost comparisons and its establishment of a need for the project based on reliability indicate that the output of the project is likely to be contracted for in a manner that can support project financing (see Sections II.A.3.b.iii, and II.A.4.a, above).

Based on the foregoing, the Siting Council finds that West Lynn has established that its proposed project is financiable.

In considering a proponent's construction strategy for a proposed project, the Siting Council considers whether a project is reasonably likely to be constructed so that the project will actually go into service as planned. Here, West Lynn indicated that it had executed a letter agreement with EBASCO Services ("EBASCO") to provide engineering, procurement and construction ("EPC") services for the project (Exh. WLC-1, p. 1-16). As part of that agreement, West Lynn stated that it expects to negotiate an "open book" EPC contract which will later be converted to a fixed cost turn-key construction agreement ("TCA") (id., p. 4-9). West Lynn stated that it expects to finalize its TCA with EBASCO in late winter or early spring of 1991 (Tr. 2, p. 27).[38]

West Lynn indicated that its TCA would be structured around a fixed price with bonus/penalty provisions for early/late delivery (Tr. 2, p. 144). In addition, West Lynn indicated that performance requirements will be specified relating to capacity availability and the reliability of the refrigeration system (id.).

West Lynn stated that the actual amount of the fixed price would be based on the construction schedule as established during negotiations (id.). West Lynn estimated that construction of its project would require about 22 months from the date of financial closing (id., p. 150).

West Lynn asserted that EBASCO is internationally recognized as a premier EPC firm (Exh. WLC-1, p. 1-16). West Lynn indicated that, since 1983, EBASCO had commenced or completed construction and related development work for 31 cogeneration or independent power projects (Exh. HO-RR-22).

38/ West Lynn provided a draft TCA (Exh. HO-RR-23). However, as of the date of this decision, a final TCA has not been submitted.

In terms of its facility site and access arrangements, West Lynn provided a copy of its site lease agreement with West Lynn Creamery for the proposed cogeneration plant (Exh. HO-RR-12(A)). However, as discussed in Sec. II.A.4, above, West Lynn to date has not provided a signed agreement with LWSC ensuring West Lynn access to wastewater effluent for water supply purposes or West Lynn's ability to discharge wastewater to LWSC's sewer outfall.

With regard to electrical interconnection arrangements, West Lynn reported that NEPCo is conducting an interconnection study that will jointly address the transmission capabilities required to accommodate the power output of the proposed project and the nearby proposed Altresco-Lynn cogeneration project (Exh. HO-S-14a; Tr. 1, pp. 169-171). West Lynn indicated that an interconnection agreement has not been executed, pending completion of the interconnection study (id.).

The record indicates that EBASCO has a great deal of experience as a builder of power plants and cogeneration facilities. In addition, the Siting Council notes that a major strength of West Lynn's construction arrangement is its fixed price provision -- a provision which inherently mitigates financial risk to West Lynn. Nonetheless, a TCA between West Lynn and EBASCO has yet to be finalized. In addition, installation of the proposed facility is predicated on an electrical interconnection agreement that has not been entered into. Thus, while West Lynn has made progress towards finalization of its facility construction, site and access arrangements, several major items remain incomplete.

In the past, the Siting Council has found that a signed TCA for the design and construction of a proposed project provides reasonable assurances that the project is likely to be constructed on schedule and able to perform as expected. Altresco-Pittsfield, 17 DOMSC at 380. Here, West Lynn has not submitted an executed TCA. Further, NEPCo has not completed an interconnection study for the proposed project and an interconnection agreement between NEPCo and West Lynn has not been completed. Therefore, the Siting Council finds that, at

this time, West Lynn has not established that its proposed project is likely to be constructed within applicable time frames and to be capable of meeting performance objectives. However, the Siting Council also finds that, at such time as (1) West Lynn executes an appropriate TCA, and (2) NEPCo completes its interconnection study, West Lynn will be able to establish that its proposed project meets the second part of the first test of viability. In addition, the Siting Council ORDERS that West Lynn provide the interconnection agreement with NEPCo when it is executed.[38A]

The Siting Council has found that West Lynn (1) has established that its proposed project is likely to be financed; and (2) at this time, has not established that the project is likely to be constructed within applicable timeframes and to be capable of meeting performance objectives. Accordingly, the Siting Council finds that West Lynn, at this time, has not established that its proposed project meets the Siting Council's first test of viability. Within 45 days of receipt of an executed TCA and the NEPCo interconnection study, the Siting Council will issue a decision determining whether West Lynn has established that the project has met the first test of viability.

3. Operations and Fuel Acquisition

In determining whether a QF project is likely to be viable as a reliable, least-cost source of energy over the life of its power sales agreements, the Siting Council evaluates the ability of the project proponent or other responsible entities to operate and maintain the facility in a manner which ensures a reliable energy supply. MASSPOWER, 20 DOMSC at 359; Altresco-Pittsfield, 17 DOMSC at 381. In a case where the proponent has relatively little experience in the development and operation of a major energy facility, that proponent must

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38A/ We understand that the timing of the execution of the interconnection agreement between West Lynn and NEPCo may be affected by negotiation of a similar agreement between Altresco-Lynn and NEPCo.

establish that experienced and competent entities are contracted for, or otherwise committed to, performance of critical tasks. These tasks should be set out pursuant to detailed contracts or other agreements that include financial incentives and/or penalties which ensure reliable performance over the life of the power sales agreements. MASSPOWER, 20 DOMSC at 359; Altresco-Pittsfield, 17 DOMSC at 381-382.

Here, West Lynn has indicated that it expects to sign an operation and maintenance ("O&M") contract with a vendor for a six-year period (Tr. 1, pp. 72-73). West Lynn stated that it is discussing an O&M contract with three candidates -- Creole Production Services ("Creole"), Bechtel Corporation ("Bechtel"), and a consortium of Pacific Gas and Electric Company and EBASCO ("PG&E/EBASCO") (id., p. 73). West Lynn provided a copy of a draft O&M contract, and noted that it intends that contract terms include performance-based incentives and penalties (Tr. 2, p. 144). West Lynn stated that it currently is pursuing letters of intent from the candidate vendors based on draft contract terms, and would finalize an O&M contract with a selected vendor when power sales contracts are finalized (Tr. 1, p. 73).

With respect to vendor experience, West Lynn indicated that Bechtel currently operates, under long-term contract, two 120 MW gas-fired combined cycle power plants, an 80 MW coal-fired cogeneration plant and a 54 MW waste-to-energy plant, and has been selected to negotiate an O&M contract for a 750 MW gas-fired combined cycle plant (Exh. HO-RR-22). West Lynn stated that Creole, although it has not operated a power plant, is the premier O&M firm in the petrochemical industry and that it also maintains over 22,000 MW of gas combustion turbines (id., Tr. 2, pp. 139-140). West Lynn stated that, while PG&E/EBASCO is a new consortium, PG&E currently operates 9,000 MW of gas-fired generation including over 400 MW of gas turbine facilities, and EBASCO currently maintains a cogeneration facility (Exh. HO-RR-22, Tr. 2, p. 141).

Finally, West Lynn asserted that JMC's expanding experience with contract negotiation and management relating to O&M services renders it competent to ensure reliable project

operation even in the absence of a signed O&M agreement (Brief, p. 73).

The record shows that West Lynn is pursuing O&M contracts with two vendors that have extensive experience in operating generating facilities, and a third vendor with experience in maintaining gas turbines (Exh. HO-RR-22). The Siting Council recognizes that an O&M contract between West Lynn and an experienced vendor could provide the means to demonstrate that the proposed project is likely to be operated and maintained in a manner consistent with reliable performance over the life of the PPAs.

Nonetheless, the Siting Council notes that West Lynn has not finalized an O&M contract. West Lynn stated that, while discussions with candidate vendors are ongoing, completion of an O&M agreement is not expected until power sales contracts are finalized (Tr. 1, p. 73).

In a previous case, the Siting Council found that an executed O&M contract assured the Siting Council that a project is likely to be operated and maintained in a manner consistent with reliable performance over the life of the power sales agreements. Altresco-Pittsfield, 17 DOMSC at 382. Here, the absence of a finalized O&M agreement effectively prevents the Siting Council from evaluating the ability of the project proponent or other responsible entities to operate and maintain the facility in a manner which ensures a reliable energy supply.

Accordingly, based on the foregoing, the Siting Council finds that, at this time, West Lynn has failed to establish that the proposed project is likely to be operated and maintained in a manner consistent with appropriate performance objectives. However, the Siting Council also finds that, at such time as West Lynn and a qualified vendor execute an appropriate O&M agreement, including financial incentives and/or penalties which ensure reliable performance over the life of the unit, West Lynn will be able to establish that its proposed project meets the first part of the second test of viability.

In considering an applicant's fuel acquisition strategy, the Siting Council considers whether such a strategy reasonably

ensures low-cost, reliable energy resources over the terms of the power sales agreements.

West Lynn provided a copy of an executed 20-year contract with Boston Gas for 26,000 million Btus per day of natural gas on a firm basis for 330 days per year and, beyond 330 days per year, on a "best efforts" basis (Exh. WLC-1, p. 1-16; Exh. HO-RR-33; Tr. 4, p. 47). The contracted daily supply from Boston Gas would allow full operation of the 125 MW cogeneration plant (Exh. HO-V-10). When gas is not available, West Lynn indicated that No. 2 oil would be available from proposed on-site storage tanks providing a three-day capability (Tr. 4, p. 48). West Lynn also identified 12 off-site fuel oil suppliers and their local storage capacities, and indicated that oil may be contracted from such suppliers and delivered to the site by truck (id.; Exh. HO-V-11(A)). Additionally, West Lynn indicated that it may procure propane volumes and contract with Boston Gas to deliver such volumes to the site on a 365-day basis (id., pp. 49, 53-54).[39]

With respect to its natural gas supply, West Lynn stated that the November 1990 certification of the Iroquois pipeline by FERC ensures that the gas volumes contracted for from Boston Gas will be fully available (id., p. 36). West Lynn indicated that, in addition to installing a gas interconnection line of 1,500 feet in length between the Lynnway and the cogeneration plant, Boston Gas would need to perform limited compressor upgrades and make limited pipeline adjustments on its system to serve West Lynn (Exh. HO-V-10). West Lynn indicated that Boston Gas estimated a cost of $980,000, to be paid by West Lynn, for the installation of the interconnection line and system upgrades (id.).

West Lynn indicated that the gas contract price is composed of three parts, including a commodity component and a

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39/ The propane volumes, to be independently acquired by West Lynn, would be injected via Boston Gas' air gasification facilities in Everett for delivery to the cogeneration facility (Tr. 4, p. 49).

demand component which escalate in accordance with Boston Gas' weighted average cost of gas, and a second demand component which escalates in accordance with Boston Gas' approved customer rates (Exh. WLC-1, p. 3-87). West Lynn provided an analysis indicating that the levelized busbar cost of its project over the period 1993-2012 would be less under its Boston Gas contract than under a benchmark weighted cost of gas pricing approach (id., pp. 3-89 to 3-90).

West Lynn stated that it conducted a comparison of alternative gas supply approaches before selecting the firm 330-day supply and transportation service contract with Boston Gas (Tr. 4, pp. 66-71).[40] West Lynn indicated that criteria such as environmental impacts, quality of service, cost and rate structure, financiability, in-service date, and viability to producers and power purchasers were used to compare alternative gas supply approaches (id.). West Lynn's witness, Mr. Karloff, stated that the Boston Gas firm supply and transportation service was chosen because: (1) the price structure, commodity-demand components and other terms best meet West Lynn's needs; (2) the firm supply provisions and the ease of tracking contract price adjusters enhance project financiability; (3) the large size and supply diversity of Boston Gas enhance expected reliability; and (4) regulatory or legal delays associated with bypass issues are avoided (id., p. 71).

West Lynn has described a fuel acquisition strategy with several important advantages for the proposed project. First, West Lynn has acquired a long-term gas supply commitment that offers timely access to a firm 330-day fuel supply independent of pending regulatory approvals of pipeline facilities. Second,

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40/ The alternatives West Lynn considered included: (1) a firm independent supply with (a) firm Tennessee transportation to the site, (b) interruptible Tennessee transportation to the site, or (c) firm Tennessee transportation and firm Boston Gas transportation to the site; (2) a firm Boston Gas supply; or (3) an interruptible Boston Gas supply (Tr. 4, pp. 66-67).

West Lynn's fuel is indexed to a price escalator which is likely to rise more slowly than other energy price escalators, with subsequent cost advantages for the proposed project. Third, West Lynn has identified a backup fuel supply strategy that includes a three-day on-site oil storage capability supplemented by two options for contracting additional fuel from local sources.

Thus, West Lynn has described a fuel acquisition strategy that involves reliable supplies and addresses important cost issues. Accordingly, the Siting Council finds that West Lynn has established that its fuel acquisition strategy reasonably ensures low-cost, reliable energy resources over the terms of its power sales agreements.

The Siting Council has found that, at this time, West Lynn (1) has failed to establish that the proposed project is likely to be operated and maintained in a manner consistent with appropriate performance objectives, and (2) has established that its fuel acquisition strategy reasonably ensures low-cost, reliable energy resources over the terms of its power sales agreements. Accordingly, the Siting Council finds that, at this time, West Lynn has not established that its proposed project meets the Siting Council's second test of viability. However, the Siting Council also has determined that at such time as West Lynn and a qualified vendor execute an appropriate O&M agreement which includes financial incentives and/or penalties which ensure reliable performance over the life of the unit, West Lynn will be able to establish that its proposed project meets the second test of viability. Within 45 days of receipt of an executed O&M agreement, the Siting Council will issue a decision determining whether West Lynn has established that the project has met the first part of the second test of viability.

4. Conclusions on Project Viability

The Siting Council has found that West Lynn will be able to establish that its proposed project (1) is reasonably likely to be financed and constructed so that the project will actually go into service as planned if it enters into an appropriate TCA

and NEPCo completes its interconnection study; and (2) is likely to operate and be a reliable, least-cost source of energy over the life of its power sales agreements if West Lynn and a qualified vendor execute an appropriate O&M agreement which includes financial incentives and/or penalties which ensure reliable performance over the life of the unit. In addition, the Siting Council has ORDERED West Lynn to provide to the Siting Council the interconnection agreement between West Lynn and NEPCo when it is executed.

Accordingly, upon confirmation by the Siting Council of adequate completion of the above conditions, West Lynn will have established that its proposed project is likely to be viable as a source of energy.

D. Conclusions on the Proposed Project

The Siting Council has found that: (1) West Lynn has established that, as early as 1993 and, in any event, by 1994, New England will need 125 MW of additional energy resources for reliability purposes; (2) West Lynn will be able to establish that the proposed project is likely to provide benefits to the Commonwealth of sufficient magnitude to offset the impacts on the Commonwealth's resources from construction and operation of the proposed facility if (a) West Lynn enters into appropriate wastewater reuse agreements with LWSC and West Lynn Creamery, and (b) West Lynn presents these agreements to the Siting Council for review, consistent with the conditions contained in Sections II.A.4.b.ii, and II.A.4.c.i, above:; (3) West Lynn has demonstrated that the proposed project is consistent with the resource use and development policies of the Commonwealth; and (4) West Lynn will be able to establish that the proposed project is likely to be viable as a source of energy if (a) West Lynn enters into an appropriate TCA and NEPCo completes its interconnection study, (b) West Lynn and a qualified vendor execute an appropriate O&M agreement which includes financial incentives and/or penalties which ensure reliable performance over the life of the unit, and (c) West Lynn presents these documents to the Siting Council for review, consistent with the Sections II.C.2, and II.C.3, above.

III. ANALYSIS OF THE PROPOSED FACILITIES

A. Standard of Review

G.L. c. 164, sec. 69I, requires a facility proponent to provide information regarding "other site locations." In implementing this statutory mandate, the Siting Council requires the petitioner to show that its proposed facilities siting plans are superior to alternatives and that its proposed facilities are sited at locations that minimize costs and environmental impacts while ensuring supply reliability.

In order to determine whether the facility proponent has shown that its proposed facilities siting plans are superior to alternatives, the Siting Council has required a facility proponent to demonstrate that it has examined a reasonable range of practical facility siting alternatives. MASSPOWER, 20 DOMSC at 371; Berkshire Gas Company (Phase II), 20 DOMSC 109, 148 (1990) ("1990 Berkshire Decision"); Boston Edison Company/Massachusetts Water Resources Authority, 19 DOMSC 1, 38-42 (1989) ("BECo/MWRA"); Turners Falls, 18 DOMSC at 175-178; Braintree Electric Light Department, 18 DOMSC 20, 31-40 (1988) ("1988 Braintree Decision"); Altresco-Pittsfield, 17 DOMSC at 387; NEA, 16 DOMSC at 381-409. In order to determine that a facility proponent has considered a reasonable range of practical alternatives, the Siting Council typically has required the proponent to meet a two-prong test. First, the facility proponent must establish that it has developed and applied a reasonable set of criteria for identifying and evaluating alternatives in a manner which ensures that it has not overlooked or eliminated any alternatives which are clearly superior to the proposal. MASSPOWER, 20 DOMSC at 373-374, 382; 1990 Berkshire Decision, 20 DOMSC at 148-149, 151-156. Second, the facility proponent must establish that it has identified at least two noticed sites or routes with some measure of

geographic diversity.[41] MASSPOWER, 20 DOMSC at 67-68; 1990 Berkshire Decision, 20 DOMSC at 148; Turners Falls, 18 DOMSC at 175-178; 1988 Braintree Decision, 18 DOMSC at 31-40; Commonwealth Electric Company, 17 DOMSC 249, 301-303 (1988) ("1988 CELCo Decision"); NEA, 16 DOMSC at 381-409. Further, a noticed alternative site will not be required in cases involving proposals to construct cogeneration facilities if the cogeneration proponent (1) has a steam sales agreement with existing steam purchaser(s) sufficient to qualify it for QF status; and (2) has a proposed site fully within the property boundaries of the principal steam host. MASSPOWER, 20 DOMSC at 382.

Finally, in order to determine whether the facility proponent has shown that its proposed facilities are sited at locations that minimize costs and environmental impacts while ensuring supply reliability, the facility proponent must demonstrate that the proposed site/route for the facility is superior to the noticed alternative(s) on the basis of balancing cost, environmental impact, and reliability of supply. Id.; 1990 Berkshire Decision, 20 DOMSC at 36; BECo/MWRA, 19 DOMSC at 38-42; Turners Falls, 18 DOMSC at 175-178. If noticed alternative(s) are not required, the facility proponent still must demonstrate that the proposed site for the facility has acceptable cost, environmental, and reliability impacts. MASSPOWER, 20 DOMSC at 383-404.

41/ When a facility proposal is submitted to the Siting Council, the petitioner is required to present: (1) its preferred facility route or site; and (2) at least one alternative facility route or site. These routes and sites often are described as the "noticed" alternatives because these are the only routes and sites described in the notice of adjudication published at the commencement of the Siting Council's review. In reaching a decision in a facility case, the Siting Council can approve a petitioner's preferred route or site, approve an alternative route or site, or reject all routes and sites. The Siting Council, however, may not approve any site, route, or portion of a route which was not included in the notice of adjudication published at the commencement of the proceeding.

B. Description of Proposed Facility

West Lynn proposes to construct a 125 MW natural gas-fired combined cycle cogeneration facility in the City of Lynn (Exh. WLC-1, p. 2-1). The site is located in the southeast quadrant of Lynn, between the Lynnway and Lynn Harbor (id., Figure 1.2.3.a). The 4.6-acre site is owned by the West Lynn Creamery, and is part of a larger 10.4-acre parcel currently used for Creamery truck parking and equipment storage (id., p. 1-12). The proposed site is located approximately 100 feet east of the West Lynn Creamery (id., p. 2-9). The major components of the proposed project include a single gas-fired combustion turbine, heat recovery steam generator ("HRSG"), steam turbine generator, mechanical induced cooling tower, absorption refrigerator system, and a water treatment facility (id., p. 2-1). Additional components include a gas compressor, electric switchyard, fuel and water storage tanks, and an exhaust stack (id.).

The proposed facility would be powered by natural gas supplied by Boston Gas, with distillate oil as backup fuel. A three-day fuel supply of oil would be stored on site in an above-ground 600,000 gallon tank (id., p. 1-6). A 1,500-foot gas interconnection line would be constructed to the west of the facility (id., p. 1-16). The proposed facility would be capable of providing West Lynn Creamery with at least 30,000 pph of steam for processing and refrigeration, through a series of underground lines (id., p. 2-9). The electricity generated is to be transmitted via a 0.2-mile underground 115 kV electric interconnection line to an existing overhead 115 kV transmission line (id., p. 1-8).[42] A switchyard would be constructed on the east side of the proposed site (id., App. C, p. 2-5).

42/ Pending the outcome of the study, West Lynn, in conjunction with the City of Lynn and NEPCo, may relocate and bury the existing NEPCo 115 kV line, thereby shortening the interconnection distance (Exh. WLC-1, App. C., p. 2-10). If this is not feasible, one 115 kV underground circuit will extend from the facility switchyard to the existing NEPCo 115 kV transmission line (id., p. 2-11).

The water treatment facility would recycle approximately 893,000 gpd of effluent water from the LWSC (Exh. HO-E-17). The effluent would be pumped by a 1,500-foot main, built by West Lynn, to the proposed treatment facility (Exh. WLC-1, pp. 1-20, 2-9). A one-day backup supply of water will be stored on-site in an above-ground 950,000 gallon tank (id., p. 2-6).

The basic power generation equipment would be located in a single 60-foot high enclosed structure (id.). Adjacent to the building would be the HRSG and absorption refrigeration plant (id.). The proposed stack will be 150-feet high (id., p. 2-4). Air emissions would be controlled through pollution control technology including selective catalytic reduction ("SCR") and steam injection (id.).

C. Site Selection Process

West Lynn argued that it utilized a site selection process that meets the Siting Council's requirements (Brief, p. 79). West Lynn asserted that it developed a reasonable set of siting criteria, and applied its criteria in a manner that ensures it did not overlook or eliminate a clearly superior site (id.).

West Lynn indicated that its site selection process was conducted over two distinct project planning phases which preceded detailed project development (Tr. 3, pp. 4-5). West Lynn identified these phases as a pre-feasibility phase and a feasibility phase (id., pp. 4-5). West Lynn stated that, during the pre-feasibility phase, it reviewed potential siting issues in a qualitative sense to identify potential fatal flaws for the development of the proposed project at identified sites (id.). West Lynn stated that, during the feasibility phase, it reviewed the same potential siting issues in quantitative terms with respect to those issues which pose the greatest risk of becoming fatal flaws for the use of the identified sites (id.).

The following sections discuss West Lynn's development and application of siting criteria as part of its site selection process.

1. Development of Siting Criteria

West Lynn stated that it utilized two sets of criteria -- a set of macro selection criteria and a set of micro selection criteria -- to select West Lynn Creamery as the steam host (Exh. WLC-1, pp. 3-64 to 3-65). At the macro level, West Lynn stated that it considered: (1) the region's potential for electricity demand growth; (2) the state's need for electricity; (3) the state's climate for cogeneration development; and (4) the familiarity of the principal developer and partners with the region and state (id., p. 3-64). Based on its macro selection criteria, West Lynn stated that it selected New England, and Massachusetts in particular, as a location for its proposed cogeneration project (id.).

At the micro level, West Lynn indicated that it considered the following criteria to select a steam host within Massachusetts: (1) the size of the steam host's thermal energy requirement; (2) the economic viability and stability of the steam host's operations; and (3) the potential availability of a project site with (a) an adequate amount of suitable land, (b) economic access to the steam host, (c) economic access to the electric transmission grid, (d) economic access to fuel supplies, (e) economic access to water and other project operating requirements, and (f) no major economic, environmental, social, technical or other problems (id., pp. 3-64 to 3-65).

West Lynn stated that it used the following site screening criteria to identify and evaluate possible sites in the West Lynn area: (1) site size; (2) site zoning and land use compatibility; (3) proximity to West Lynn Creamery; (4) access to transmission; (5) access to a gas pipeline; (6) access to process and cooling water; and (7) access to a wastewater discharge point (id., pp. 3-67 to 3-69). West Lynn indicated that it evaluated the proposed site according to its criteria, and determined that the proposed site met siting prerequisites or offered siting advantages with respect to each of the criteria (id., pp. 3-69 to 3-72).

With respect to the weighting and quantification of criteria, West Lynn stated that its site selection criteria implicitly were weighted equally for purposes of pre-feasibility evaluation, given that the purpose of that evaluation was to identify the potential for a fatal flaw under each criterion (Exh. HO-S-12b). For purposes of later planning evaluations, West Lynn indicated that weighting must reflect the circumstances of individual projects and cannot be pre-specified in standardized terms (id.). Similarly, West Lynn stated that any quantitative thresholds or ranges used in conjunction with the application of siting criteria must be set on a project-specific rather than a standardized basis (id.; Exh. HO-S-12a). For example, in explaining the applicability of this case-specific approach to its own project, West Lynn noted that it identified access to water supply as one potential fatal flaw for its selection of West Lynn Creamery as the steam host, and recognized specific financial limits that defined its flexibility to develop water supply strategies (Tr. 3, pp. 7-9).

In previous decisions regarding cogeneration facilities, the Siting Council has found that criteria such as those developed by West Lynn are at least minimally acceptable for use in the preliminary identification and evaluation of potential steam hosts. MASSPOWER, 20 DOMSC at 376-379; Altresco-Pittsfield, 17 DOMSC at 391-393. With regard to both the selection of a steam host and the selection of a specific site, however, the Siting Council has criticized the use of criteria that: (1) are overly broad; (2) are not expressed in quantitative or other specific terms; (3) are not assigned relative weights; and (4) focus on factors associated with successful project development and operation while omitting other significant concerns such as environmental impacts. MASSPOWER, 20 DOMSC at 378-379.

Here, West Lynn has presented siting criteria for both the selection of a steam host and the selection of a site that, like those presented in past Siting Council reviews of cogeneration proposals, generally focussed on factors associated with successful project development and operation, and largely

failed to incorporate quantification or weighting of criteria. West Lynn defended its use of such criteria by emphasizing that its steam host selection process was based on screening alternatives for fatal flaws, rather than systematically comparing alternatives.

The Siting Council recognizes that screening alternatives for fatal flaws is an effective first step to developing a cogeneration project. However, a standardized set of criteria, such as would be employed in a more systematic and comprehensive evaluation of alternatives, also is appropriate for the process of selecting a steam host. Regardless of whether a steam host is being evaluated on its own merits or in a comparative context, a standardized set of criteria is important for ensuring that important siting considerations are not overlooked. Standardized criteria likewise are important for ensuring that all siting factors are considered in selecting a site in the vicinity of the chosen steam host.

West Lynn's evaluation of its steam host could have been improved in two specific areas, had more detailed criteria been employed. First, West Lynn evaluated its access to the transmission system in terms of the proximity to 115 kV transmission lines, without considering: (1) the capabilities of such lines; (2) the likely constraints for expanding such lines; or (3) other specific factors which ultimately could affect the ease of interconnecting the proposed project. Given the potentially significant cost and environmental considerations related to possible needs to upgrade existing transmission lines or site new transmission lines, more detailed criteria related to electrical interconnection requirements would enhance the site selection process.

As noted in Section II.C.2, above, the results of a NEPCo interconnection study for the proposed project are still pending. The Siting Council recognizes that West Lynn does not control the timing of the NEPCo interconnection study. However, in the absence of any information as to the areas that could be affected by possible transmission improvements, and associated cost and environmental impacts, the Siting Council is hindered

in its ability to make findings as to the adequacy of West Lynn's siting process.

Second, West Lynn could have set forth a more complete set of criteria related to environmental impacts. Consistent with the fatal flaw approach underlying its steam host selection process, West Lynn identified as a single catch-all criterion that a siting option should pose no major economic, environmental, social, technical or other problems. However, such an approach leaves open the possibility that significant environmental or community concerns may not be considered an important factor in site selection simply because they are not so major as to constitute a potential fatal flaw. Additionally, such an approach does not systematically consider macro-level siting differences in the relative sensitivity of various geographic sections of the state to particular environmental concerns -- for example, differences in background levels of air pollution or differences in the prevalence of pristine resources.

With respect to selecting a site in the vicinity of the chosen steam host, West Lynn likewise could have set forth a more complete set of criteria related to environmental impacts. While some land use and community considerations are included, natural resource considerations such as the presence of wetlands and wildlife habitat are omitted.

Accordingly, the Siting Council finds that West Lynn has developed a minimally reasonable set of criteria for identifying and evaluating alternatives.

2. Application of Siting Criteria

In order to apply the criteria to select the proposed steam host, West Lynn indicated that two of the project principals -- JMC and Belvedere -- had distinct roles in the selection process (Tr. 2, pp. 152-155; Tr. 3, pp. 21-25). West Lynn stated that Belvedere, in the normal course of its business as a real estate development company, found potential cogeneration and IPP opportunities, which Belvedere then reviewed with JMC in order to assess the feasibility for cogeneration or IPP development (id.). West Lynn stated that

Belvedere brought the proposed project and a number of other potential projects to JMC's attention, including an opportunity for cogeneration development at a plastics extrusion plant in Haverhill, Massachusetts as well as two or three IPP opportunities (id.).

West Lynn stated that it selected West Lynn Creamery as the steam host during the pre-feasibility stage of its overall planning process (Tr. 2, pp. 160-162). West Lynn stated that West Lynn Creamery met all the micro criteria, and was an obvious choice because it provided the opportunity to develop an efficient cogeneration facility consistent with providing significant steam sales benefits for the steam host, and thus for Massachusetts, while minimizing costs of access and environmental impacts (Exh. WLC-1, pp. 3-65 to 3-66; Exh. HO-S-3). Mr. Whippen stated that, based on his knowledge of the universe of steam hosts and given the economy of New England, he concluded that West Lynn Creamery is an excellent choice to be the project's steam host (Tr. 2, p. 168).

West Lynn stated that the one identified alternative cogeneration project -- the cogeneration opportunity in Haverhill -- was rejected for failing to meet the criteria on viability and environmental grounds (id., pp. 154-155, 164-165; Exh. HO-S-3).

While presenting an assessment of two distinct steam hosts as part of West Lynn's site-selection process, Mr. Whippen stated that he did not view potential steam hosts as competing with each other or as preclusive of each other (Tr. 2, pp. 159-168). According to Mr. Whippen, cogeneration and IPP developers review potential projects on their own merits rather than in competitive terms to identify those which warrant further action (id.). Additionally, he stated that, given the large number of potential steam hosts in a region such as New England and New York, it is impractical to apply the Siting Council's standard that a superior site not have been overlooked as part of the steam host selection process.

After selecting West Lynn Creamery as the steam host, West Lynn stated that it met with representatives of the Lynn

Office of Economic Development ("LOED") and the Lynn Planning Department to discuss possible development sites near West Lynn Creamery (Exh. HO-S-8). West Lynn's witness, Mr. Smith, stated that two possible development sites west of the Lynnway, identified by LOED, appeared unsuitable for a cogeneration facility (Tr. 6, p. 7). Mr. Smith testified that one site is less than two acres in area and is located in a zone along a portion of the Lynnway for which a City of Lynn land use development plan encourages office and retail activity (id., p. 8). He stated that the second site abuts a low-density residential area, an incompatible land use for the siting of an industrial facility (id., pp. 8-9).

Although no alternative sites were identified on the east side of the Lynnway, West Lynn discussed land use policies affecting a section of the City of Lynn known as the South Harbor planning area, including both vacant and developed land along the Lynn Harbor waterfront (id., pp. 9-10). Mr. Smith stated that the City of Lynn has adopted development policies for the South Harbor planning area encouraging commercial and mixed residential-commercial uses south of Harding Street, which abuts the proposed site, while encouraging marine industrial uses in the area along the waterfront east and northeast of the proposed site (id., p. 10). Mr. Smith noted that the proposed site is not part of the South Harbor planning area, but instead is part of an adjacent industrial core area that includes West Lynn Creamery and other existing industries along the Lynnway (id., pp. 10-11).

With regard to West Lynn's argument that it would be impractical to compare an almost unlimited range of steam host opportunities, the Siting Council previously has provided that an exhaustive evaluation of numerous conceivable siting possibilities or permutations is not required to satisfy the standard that a clearly superior site or route has not been overlooked or eliminated. 1990 Berkshire Decision, 20 DOMSC at 153-154.

In this case, West Lynn has presented one alternative steam host, rejecting it based on likely fatal flaws. However,

West Lynn's approach to considering alternative steam hosts potentially limited the scope of its analysis in two ways. First, by attributing a lead role to Belvedere in identifying siting options for the proposed project, West Lynn apparently limited the range of alternatives considered to those within Belvedere's experience and omitted a potentially wider range of siting possibilities within the experience of JMC. Second, by emphasizing that its evaluation of alternative steam hosts was focussed on screening options for fatal flaws rather than on an actual comparison of options, West Lynn failed to demonstrate how its approach would enable it to choose between steam host alternatives when no fatal flaw is identified.

Given that the choice of a steam host often substantially limits the range of siting options, a diverse representation of a range of possible steam hosts is useful for establishing that a cogeneration project meets the Siting Council's standard that necessary energy supplies be provided at the least cost, with a minimum impact on the environment. The Siting Council's preference for a diverse range of alternatives is not meant to detract from West Lynn's reliance on Belvedere to identify possible steam hosts in this case, nor on Belvedere's capabilities and performance in carrying out that role. Nonetheless, to demonstrate that a superior siting opportunity is not being overlooked or eliminated, petitioners should present, by a summary overview or specific examples, a discussion of representative alternatives that reflect the overall range of experience of all principles in a case -- including in this instance JMC.

In regard to the selection of specific sites in the vicinity of West Lynn Creamery, the Siting Council notes that West Lynn, in conjunction with LOED and the Lynn Planning Department, discussed the availability of vacant land, and considered two specific alternative sites, for a cogeneration plant within the vicinity of West Lynn Creamery. West Lynn also reviewed in detail whether a cogeneration plant is consistent with the City of Lynn's land use plans and policies for the area. Given the inconsistencies with existing land use or with

applicable land use plans and policies cited by West Lynn, West Lynn appropriately applied its criteria to reject its two alternative sites and to conclude that other conceivable sites near the waterfront also would be unacceptable.

Accordingly, the Siting Council finds that West Lynn has established that it appropriately applied a reasonable set of criteria for identifying and evaluating alternatives in a manner that ensures it has not overlooked or eliminated any clearly superior sites.

3. Geographic Diversity

West Lynn has established that: (1) West Lynn Creamery is an existing steam purchaser in the vicinity of the proposed site, and West Lynn Creamery has executed a steam sales agreement with West Lynn for an annual steam supply of 30,000 pph, which qualifies the facility for QF status; and (2) West Lynn Creamery has executed a site lease agreement with West Lynn to allow the facility to be fully located within West Lynn Creamery's property boundaries. Thus, consistent with the standard set forth in MASSPOWER, the Siting Council does not require West Lynn to provide an alternative site with some measure of geographic diversity (20 DOMSC at 382).[43]

4. Conclusions on Site Selection Process

The Siting Council has found that: (1) West Lynn has developed a minimally reasonable set of criteria for identifying and evaluating alternatives; (2) West Lynn appropriately applied a reasonable set of criteria for identifying and evaluating alternatives in a manner that ensures it has not overlooked or eliminated any clearly superior sites; and (3) West Lynn is not

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43/ Although installation of the cogeneration plant at the proposed site also is subject to consistency review under the CZM program, the CZM office likewise has determined that, given the steam host's current location in the coastal zone, it is unnecessary for West Lynn to pursue analysis of alternative sites (see Section IV.E.4, below).

required to provide an alternative site with some measure of geographic diversity.

Accordingly, the Siting Council finds that West Lynn has considered a reasonable range of practical facility siting alternatives.

D. Cost Analysis of the Proposed Project

Although West Lynn is not required to provide a noticed alternative to its proposed site (see Section III.C, above), the Siting Council nevertheless must determine whether the proposed facilities are consistent with ensuring a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. Therefore, the Siting Council evaluates the proposed facilities to determine whether the cost estimates associated with construction are: (1) realistic for a facility of the size and design of West Lynn; and (2) minimized consistent with the mitigation of environmental impacts.

West Lynn estimated that the installation costs of the proposed facility, which include construction and development of the facility, would total about $114.4 million (Exh. HO-RR-21).[44]

West Lynn stated that the proposed facility and site are the least-cost option available to West Lynn both in financial and environmental terms (Exh. WLC-1, p. 3-174). First, West Lynn stated that it is located adjacent to the existing steam generating facility, 100 feet from the steam host (id., p. 3-176). Second, West Lynn asserted that the site is the appropriate size for the project and is compatible with the surrounding land use (id.). West Lynn also stated that the proposed site would provide easy access to a process and cooling

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44/ Some of the larger items included in the overall development costs are financing, administration during construction, and contingency costs, as well as a gas reservation charge (Exh. HO-C-1(A)). Land costs (property lease) are not included (id.).

water supply and waste water discharge point (id.).[45] In addition, West Lynn indicated that fuel supply cost risks would be minimized because of the use of a firm twenty-year gas supply contract with Boston Gas and the location of the proposed site relative to the regional fuel supply (id., pp. 2-9, 3-87). Finally, West Lynn asserted that interconnection costs would be minimized, based on the use of a 1,500-foot natural gas pipeline to an existing Boston Gas distribution line, and a .02-mile transmission line to an existing New England substation (id., p. 2-8).

In sum, West Lynn has shown that the location of its proposed site provides ready access to the existing steam user, electric transmission system, and regional fuel supply, thereby minimizing costs. In addition, West Lynn has shown that its water use and waste water discharge arrangements minimize costs. The Siting Council notes that each of these cost minimization measures is consistent with the mitigation of environmental impacts.

Accordingly, the Siting Council finds that West Lynn has established that the cost estimates associated with the proposed facility are: (1) realistic for a facility of the size and design of West Lynn; and (2) minimized consistent with the mitigation of environmental impacts.

E. Environmental Analysis of the Proposed Facilities

Although West Lynn has established that there are no practical alternatives to its proposed site (see Section III.C, above), the Siting Council must determine whether the proposed facility is consistent with ensuring a necessary energy supply for the Commonwealth with a minimum impact on the environment at

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45/ West Lynn stated that the use of water effluent, although requiring incremental water treatment facilities, allows a reduction in the quantity of effluent going into Lynn Harbor (Exh. WLC-1, p. 3-179). West Lynn further stated that the use of water effluent gives the project more control over its long-term water costs (id.).

the lowest possible cost. The following analysis addresses the minimization of such impacts.

1. Air Quality

West Lynn asserted that operation of its facility will not lead to a deterioration of local or regional air quality (Exh. HO-E-32, p. 1-5). West Lynn asserted that the primary fuel for its facility, natural gas, is the cleanest fuel available and, therefore, the proposed facility would have insignificant air quality impacts when burning natural gas (Exh. WLC-1, p. 1-29).[46] West Lynn stated that low sulfur distillate oil and propane would serve as backup fuel for the proposed facility (id., App. C, p. 1-3). West Lynn asserted that when burning low sulfur distillate oil, the facility's emissions would be higher for some parameters, notably SO_2, but would remain within acceptable limits (Exh. HO-E-32, p. 1-6).

In addition, West Lynn has evaluated whether water evaporating from the cooling towers at the proposed project would contribute to fogging or icing problems on local roadways (Exh. WLC-1, p. 3-145). West Lynn asserted that cooling tower emissions from the proposed project would not contribute to fogging or icing problems (Tr. 5, p. 116).[47]

West Lynn provided that the design of the proposed facility would incorporate Best Available Control Technology ("BACT") for control of NO_x, SO_2, CO, total suspended particulates ("TSP"), particulate matter, lead, volatile organic compounds, and ammonia emissions (Exh. WLC-1, App. C, pp. 5-24). West Lynn stated that it would use Selective

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46/ West Lynn indicated that it has a contract with Boston Gas for a firm supply of natural gas for 330 days per year, and, for the other days in the year, Boston Gas is obligated to supply gas on a "best effort" basis (Exh. WLC-1, p. ES-6).

47/ Both icing and plume-induced fogging are caused by "drift." Drift is the water droplets that are emitted from the cooling tower into the ambient air (Exh. WLC-1, App. C, p. 5-5).

Catalytic Reduction ("SCR") for control of nitrogen dioxide ("NO_2") emissions (Exh. HO-E-6).

In support of its assertions, West Lynn presented analyses of air emissions and ambient air quality changes, as well as an analysis of potential fogging/icing impacts, that would be produced by the proposed project (Exh. WLC-1, pp. 3-132, 3-145). West Lynn noted that its ambient air quality analyses are based on burning oil 55 days per year, the upper limit specified in the air permit application, and the use of natural gas for the remainder of the year (Tr. 5, p. 171).

West Lynn stated that new sources of air pollution must meet ambient air quality standards which regulate concentration of pollutants in the air (Exh. WLC-1, p. 1-29).[48] Based on its initial analyses, West Lynn stated that the proposed project would not be subject to Prevention of Significant Deterioration regulations, National Emission Standards for Hazardous Air Pollutants, and other specific non-attainment regulations, but would be subject to New Sources Performance Standards (id., pp. 3-119 to 3-128).

West Lynn stated that 24-hour average SO_2 emissions are the only emissions from the proposed facility for which estimated concentrations exceed significant impact levels established by the Environmental Protection Agency ("EPA") (Exh. WLC-1, p. 5-61).[49] However, West Lynn asserted that, over the five-year period modelled for 24-hour average SO_2

48/ An area in violation of the National Ambient Air Quality Standards is classified as a non-attainment area (Exh. WLC-1, p. 3-119). Lynn is a non-attainment area for ozone ("O_3") and TSP (id.). All of Massachusetts is a non-attainment area for O_3 (id., p. 3-133)

49/ The EPA defines significant impact levels ("SILs") for certain pollutants, including SO_2. The SILs are used to define the area potentially affected by a project and to identify the appropriate level of air quality analysis. The SIL for SO_2 for a 24-hour average period is 5 micrograms per cubic meter (mg/m^3) (id., pp. 3-132, 3-140). West Lynn stated that the highest impacts predicted for the proposed facility for 24-hour average SO_2 concentrations are 9.9 mg/m^3 (id.).

emissions, oil-fired operation would result in concentrations in excess of significant impact levels on only 14 days (Tr. 5, pp. 129, 130, 136).[50] West Lynn stated that, when averaged over 365 days, predicted SO_2 impacts from the proposed facility are less than three percent of the ambient SO_2 standards (Exh. WLC-1, p. 3-149). In addition, when averaged over 24 hours, West Lynn claimed that the proposed facility only would contribute about two percent to the 24-hour average SO_2 concentration of the area (Exh. WLC-18, p. 6-33).[51]

West Lynn stated that its analysis also indicates that the modelled background level of 24-hour SO_2 for the area already amounts to approximately 80 percent of the ambient standard -- the highest such percentage for the parameters modelled (Tr. 6, pp. 57-58). West Lynn acknowledged that it is appropriate to evaluate environmental factors such as ambient air quality on a site specific basis, taking into account locational variations in the background concentrations for different parameters (id.).

West Lynn further stated that ammonia would be used as part of the SCR process to reduce NO_x emissions, thereby minimizing NO_2 formation in the atmosphere (Exh. HO-E-6). With respect to possible ammonia odors, West Lynn asserted that the highest predicted one-hour ammonia concentration is below the odor recognition threshold for ammonia used in federal and state approved models (Exh. WLC-1, App. C, pp. 5-52 to 5-53).

50/ In order to show compliance with federal and state ambient air standards, SO_2 levels are averaged over 3-hour, 24-hour, and annual periods. Other pollutants levels are averaged over varying periods (i.e., TSP is averaged over 24-hour and annual periods, and O_3 levels are averaged over 1-hour periods) (Exh. WLC-1, Table 3.3.6.a).

51/ West Lynn cited another cogeneration facility in the metropolitan Boston area, Everett Energy Cogeneration, which had received an approval by DEP to increase the total 24-hour average SO_2 concentrations by 15 percent (Exhs. HO-E-2, HO-E-36).

With respect to possible vapor emission concerns, West Lynn reported that its modelling shows that plume-induced fogging would occur only under conditions that coincide with natural fogging (Exh. HO-E-7). In addition, West Lynn stated that vapor emissions from the project will not cause any icing along the Lynnway (Exh. WLC-1, p. 3-146).

West Lynn has provided adequate support for its assertion that the impacts of emissions from the proposed facility would not add significantly to the existing air quality pollutant concentrations. Further, West Lynn has supported its position that cooling tower vapor emissions would not significantly increase fogging or icing problems in the surrounding community.

Accordingly, based on the foregoing, the Siting Council finds that, with use of West Lynn's proposed BACT, the proposed facility would have an acceptable environmental impact with respect to air quality.

2. Water Supply and Wastewater

West Lynn stated that it proposes to use recycled effluent from the LWSC municipal wastewater treatment facility ("WWTF") to meet process water requirements, thereby minimizing use of potable water by the proposed facility (Exh. WLC-1, p. 3-116).[52] The proposed facility would require approximately 1,060,000 gpd of process water, of which the principle uses are cooling tower makeup (or replacement), gas turbine steam injection, and boiler makeup (id., App. C, p. 4-11; Exh. HO-E-17). West Lynn asserted that the only use of municipal potable water would be for plant sanitary purposes (Exh. WLC-1, App. C, p. 5-2). West Lynn stated that the project would not require a water allocation permit from the DEP, Division of Water Supply (id.).

West Lynn reported that the proposed project would reduce LWSC's discharge to Lynn Harbor by approximately 841,000 gpd

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52/ The existing municipal WWTF was constructed in September 1990 (Exh. HO-E-15).

(Exh. HO-E-17). The proposed facility would intake approximately 1,060,000 gpd of process water from both the LWSC and the West Lynn Creamery, and return approximately 219,000 gpd to the LWSC outfall pipe (id.).[53] Further, West Lynn noted that the project would provide a net reduction in the discharge of wastewater constituents, including reductions of 210 pounds per day in both BOD and suspended solids (id.; Exh. HO-RR-44).

West Lynn stated that there are negligible health problems associated with the use of treated effluent for cooling purposes (Exh. HO-E-10). In support of its assertion, West Lynn indicated it has surveyed available studies of air-borne health impacts of wastewater (Exh. HO-RR-42).[54] In addition, West Lynn reviewed the experiences at eight operating facilities that use waste treatment effluent for cooling, and found no evidence of health or other problems (Exh. HO-RR-46).[55] West Lynn stated that the effluent from LWSC would be pretreated at the proposed facility, providing an additional level of control of potential microbes (Exh. HO-E-10). West Lynn indicated that the process would include treating the cooling tower makeup water with chlorine, clarifying and filtering the water, then treating the

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53/ West Lynn has entered into a letter of agreement with LWSC that provides that the facility would receive 893,000 gpd of effluent directly from LWSC (Exh. HO-E-17; Exh. WLC-1, App. A). In addition, the West Lynn Creamery will provide 167,000 gpd of effluent (id.).

54/ In the study, Review of Information Addressing the Health Implications of Theoretical Emissions of Pathogens from Cooling Towers, a number of potentially pathogenic microorganisms have been identified in municipal wastewater (Exh. HO-RR-42, p. 7). The study indicated that a series of effective methods have been developed for removal of pathogens, such as sedimentation, activated sludge treatment, chlorination, and bromination (id.).

55/ The eight surveyed sites are located in Florida, Texas, California, Arizona, and Nevada (Exh. HO-RR-46). Three of the eight sites are located in urban/residential areas (id.).

water with bromine inside the cooling tower (Exh. HO-RR-42, p. 4).[56]

West Lynn stated that the project's 219,000 gpd discharge to the LWSC outfall pipe would be treated to conform to requirements applicable to LWSC's overall discharge to Lynn Harbor under existing permits (Exh. WLC-1, p. 1-28, App. C, pp. 5-8, 5-10). In addition, West Lynn indicated that the 800 gpd of sanitary wastewater discharged from the facility and routed directly to the WWTF, would represent a small volume of municipal discharge (id., App. C, p. 5-10).

West Lynn asserted that the project would avoid degradation of the City of Lynn's water supply, and minimize stress to the sewerage system by separating the industrial, sanitary, and stormwater discharges (Exh. WLC-1, p. 1-28). In addition, West Lynn stated that the project would include a process water storage tank with a one-day supply in the event of an interruption in the availability of effluent (id., p. 2-6).

In this proceeding, West Lynn demonstrated that its proposed use of recycled effluent for cooling will be beneficial in terms of both reduced wastewater flow into Lynn Harbor and discharge of wastewater constituents into the harbor. In addition, West Lynn has provided sufficient documentation to support its claim that water supplies are available to support the proposed facilities without adverse impact.[57]

Accordingly, the Siting Council finds that the proposed facilities would have an acceptable impact with respect to water supply and waste water discharge, including impacts on facilities of the City of Lynn and Lynn Harbor.

56/ Chlorine oxidizes the BOD, while bromine controls the growth of algae (Exh. HO-E-10).

57/ West Lynn noted that the Massachusetts Water Resources Authority ("MWRA") commended the project for its proposed use of secondary treatment effluent (Exh. HO-E-32). The use of the effluent ultimately will relieve demand on the MWRA water supply system by almost one mgd (id.)

3. Noise

West Lynn stated that the principal sources of noise from the operation of the proposed facility would be: (1) gas turbine exhaust noise from the stack; (2) noise radiated from the HRSG and duct work; (3) noise from air intake to the gas turbine; and (4) noise from the cooling tower (Exh. WLC-1, p. 3-160).

West Lynn asserted that the project would meet applicable state noise criteria and have insignificant noise impacts on the community (Exh. HO-RR-1, p. 7-18). In support of this assertion, West Lynn submitted an analysis of ambient background noise levels, and expected noise increases resulting from the construction and operation of the proposed project (Exh. HO-RR-1).

West Lynn stated that it carried out its survey of ambient noise levels during both daytime and nighttime periods since the facility will be in operation 24 hours per day (id.; Exh. WLC-1, p. 3-157).[58] West Lynn selected four receptor points in the community where adverse effects could occur -- reflecting the nearest inhabited residences and public places (Exh. WLC-1, p. 3-157). The record shows that the closest residential dwelling receptor is located 2,100 feet away from the project, and the nearest public receptor is a nightclub and hotel complex located approximately 1,700 feet from the facility (id., p. 3-158). Property line noise levels also were evaluated by West Lynn for each of the four sides of the proposed site (id., App. C, p. 5-83).

The West Lynn analysis reported that the highest estimated increase in noise at the four receptors would be three decibels ("dB") or less (Exh. HO-RR-1, Table F-2). In addition, West Lynn indicated that noise level increases at the property lines would range from 2 dB at the west property line to 13 dB

58/ West Lynn stated that it determined the ambient background noise level based on the level of noise that is exceeded more than 90 percent of the time (Exh. WLC-1, p. 3-157).

at the east property line located adjacent to the former municipal landfill (id., p. 7-13).[59]

West Lynn noted that DEP regulations prohibit an increase in noise levels in excess of 10 dB above background noise (Exh. WLC-1, p. 3-157). West Lynn argued that the 13 dB increase at the east property line would be acceptable, and that West Lynn expects DEP to approve that increase based on DEP precedent relating to facilities located in industrial areas where public access is limited (Tr. 5, p. 60).[60] While not making any specific assumptions regarding limits on future access to the former landfill, West Lynn noted that at present there is no public access to the portion of the landfill adjacent to the proposed facility site (Exh. HO-E-45a). West Lynn further stated that the coexistence of industrial land uses within urban areas, particularly where lot sizes are limited, as in the proposed project area, provides a good example of a situation warranting flexible implementation of the DEP guideline (id.). West Lynn further noted that the 13 dB

59/ West Lynn stated that repositioning the buildings would serve to reduce noise at some of the monitoring locations, although other plant boundary lines would experience an increase in dB (Tr. 5, p. 83). West Lynn emphasized that any possible changes in the positioning of the buildings relate to the extent of the uncertainty of construction and design plans (id., p. 76). West Lynn indicated that if any changes are made, they will be provided to the Siting Council (Exh. HO-RR-48).

60/ According to West Lynn, examples of projects which received DEP approval with predicted property line noise increases above dB 10 are: Sterling Power (Sterling, MA), L'Energia Cogeneration Project (Lowell, MA), Riverside Cogeneration Project (Holyoke, MA), and Everett Energy Cogeneration (Everett, MA) (Exh. HO-E-45b).

estimate was developed in a conservative manner.[61] In addition, West Lynn reported that the expected noise level increases would drop to a level of 10 dB or less at distances of 75 to 100 feet or more beyond the east property line (Tr. 5, p. 83).

West Lynn stated that the proposed project would incorporate noise mitigation through the use of the following equipment and design features: (1) air inlet silencers for the combustion gas turbines; (2) lagging on the HRSG and turbine generators surfaces; (3) and enclosure of most equipment within buildings (WLC-1, p. 3-164).[62] West Lynn maintained that, although the choice of mitigation techniques is not final (pending final vendor selection), the project would meet applicable state and federal noise criteria and have little impact on the community (Exh. HO-RR-1, p. 7-18).

West Lynn stated that the maximum noise level increase related to construction activities, including the excavation and steel erection phases, would be a three dB increase at the nightclub and hotel (Exh. WLC-1, Table 3.3.8.b). West Lynn indicated that construction noise impacts would be barely discernable at receptors in residential areas, based on expected increases of one to two dB (id., p. 3-164).

61/ West Lynn stated that it used stack noise estimates supplied by the manufacturer which included other elements of noise, such as noise from the boiler and cooling tower. (Tr. 5, pp. 67, 68). This generic estimate, which reflects measurements at a distance from the source, is the figure that the manufacturer will guarantee (id.). However, West Lynn indicated that it had included separate estimates of all noise sources in its overall noise model, and, therefore, use of the manufacturer-guaranteed estimate of stack noise reflects more noise than is likely to actually occur (id.). In order to correct the estimate, West Lynn's witness, Mr. Miller, presented an additional analysis incorporating his independent estimate of stack noise (id., p. 71). Mr. Miller reported that his analysis shows an increase of 10 dB for the east property line (Exh. HO-E-45a).

62/ Lagging refers to a material used for insulation.

Generally, West Lynn has utilized an appropriate methodology to develop and evaluate noise impacts from the proposed facility. In addition, West Lynn has identified the various components of its proposed facility that could contribute to increased noise levels, and has proposed measures which would largely mitigate those increases.

In past decisions, the Siting Council has reviewed estimated noise impacts of proposed facilities for general consistency with applicable state and local requirements, including the DEP's 10 dB guideline. MASSPOWER, 20 DOMSC at 85; Altresco-Pittsfield, 17 DOMSC at 48. In addition, the Siting Council has considered the significance of expected noise increases which, although below 10 dB, may adversely affect existing residences or other sensitive receptors such as schools. Altresco-Pittsfield, 17 DOMSC at 48.

In this case, the record demonstrates that construction and operation of the proposed facility would increase noise levels at existing residences and other sensitive receptors by no more than 3 dB -- a level well below both the DEP guideline and levels accepted in previous Siting Council reviews. While noise increases of up to 10 dB, and possibly as much as 13 dB, were estimated at the facility's eastern property line, residential and other sensitive land uses do not exist there and are not likely to be developed in the areas adjacent to the proposed project

The Siting Council notes, however, that there is no guarantee that other uses involving public access may not be developed in the future on land adjacent to the facility, including the area of the former municipal landfill.[63] Additionally, there is no guarantee that DEP will accept the expected noise impacts of the proposed facility at the east

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63/ Mr. Smith, stated that although the City of Lynn does not have any firm plans for the landfill site, it has considered potential uses of the site, including consideration of parking or public recreation uses. (Tr. 6, p. 19).

property line. Therefore, we expect West Lynn to comply with all DEP requirements with respect to noise and to submit an approved DEP noise plan to the Siting Council.

Based on the foregoing, the Siting Council finds that construction and operation of the proposed facilities would have an acceptable impact on community noise levels.

4. Land Use

West Lynn stated that the general character of the land uses contiguous to the site are industrial and retail/ commercial, and therefore, West Lynn asserted that the facility would be compatible with existing land use (Exh. WLC-1, p. 1-31). West Lynn provided that land uses directly abutting the site include the municipal WWTF and an active ash landfill to the north, a municipal landfill to the east, car storage lots to the south, and the West Lynn Creamery to the west (id.).

West Lynn indicated that the proposed site, which is located 1,200 feet from the shoreline of Lynn Harbor, partially consists of historic filled tidelands (id., App. C, p. 5-102). West Lynn stated that, due to the presence of the historic filled tidelands and its location in a DPA, the project is subject to a Massachusetts Chapter 91 License review conducted by DEP's Division of Wetlands and Waterways (id.; Exh. HO-E-32, Table 1).[64] West Lynn stated that the DPA designation is designed to encourage industrial development uses (Tr. 5, p. 92). Although the Chapter 91 review is still ongoing, West Lynn stated that DEP's position is that the project is in compliance with the industrial nature of the DPA (id., p. 97).

West Lynn also stated that the project is subject to a consistency review under the CZM program (Exh. WLC-1,

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64/ West Lynn stated that it filed the application for a Chapter 91 license in May 1990 (Tr. 5, pp. 106-108). DEP held a public hearing on this application in August, 1990 in the City of Lynn (id.).

p. 3-167). West Lynn asserted that the project is consistent with CZM policies, particularly CZM policies seven and eight (Exh. HO-E-21, p. 116). CZM policy seven governs development in a DPA (Exh. WLC-1, App. C, p. 7-2). The intent of this policy is to encourage the location of water-dependent industry in segments of ports and harbors designated as having certain development attributes (id., App. C, p. 5-103). However, CZM policy seven does not prohibit non-water dependent or non-industrial use of vacant port land, provided that such use does not result in the exclusion of maritime commerce to any significant degree (id.). West Lynn asserted that the project is not in conflict with any water dependent industrial uses of the area (Tr. 5, p. 98). West Lynn stated that the project is designed and sited to provide maximum benefits to industrial development in the DPA without precluding marine industrial development (Exh. WLC-1, App. C, p. 5-113; Exh. HO-E-21, p. 117).

CZM policy eight pertains to the analysis of alternative sites for coastal energy facilities (Exh. WLC-1, App. C, p. 5-112). Under this policy, all electric generating facilities are classified as non-coastal dependent, and therefore an alternative in-land site is required (id.; Exh. HO-E-32, p. 4-9). However, West Lynn stated that CZM has interpreted policy eight for the proposed project in a flexible manner, and will not request an alternative site due to the fact that cogeneration facilities are clearly steam host-dependent (id., p. 4-9). West Lynn indicated that CZM determined that since the existing steam host is located within the coastal zone, it is unnecessary to pursue analysis of alternative sites beyond the generic siting evaluation presented in the Draft Environmental Impact Report (id., Exh. WLC-1, App. C, Tab H).

Accordingly, based on the foregoing, the Siting Council finds that the proposed project will have an acceptable impact on land use.

5. Wetlands and Water Resources

West Lynn stated that the proposed site does not contain any wetlands as defined in the State Wetlands Protection Act,

G.L. c. 131, sec. 40 (Exh. WLC-1, p. 3-115). West Lynn also stated that the site is devoid of standing surface water bodies and is not in the watershed of any surface water body used for drinking water (id., p. 3-116). In addition, West Lynn stated that the proposed facility site does not fall within the coastal flood zone, nor is it located in the 100-year floodplain of the Pines or Saugus Rivers (id.).

West Lynn stated that the stormwater runoff from the project property would be discharged to the Saugus River estuary by an existing municipal storm sewer outfall that is allowed under a National Pollutant Discharge Elimination System ("NPDES") permit (id., p. 3-117). West Lynn indicated that the Saugus River estuary and the project is within the Rummey Marsh Area of Critical Environmental Concern ("Rummey Marsh ACEC") (id., App. C, Tab H).[65]

West Lynn stated that developing the facility would increase the impervious surface of the site, potentially resulting in an increase in quantity and changes in quality of site runoff conditions (Exh. HO-E-32, p. 3-3). To avoid such impacts, West Lynn provided that the stormwater runoff would be handled by increased on-site detention and treatment of the runoff prior to discharge to the permitted outfall (id., p. 3-2). To ensure that the post-development runoff does not exceed pre-development levels, the project will install a system consisting of open swales, catch basins, drainage pipes, and enlarged detention ponds (id., p. 3-3).

West Lynn asserted that the stormwater runoff system would reduce the peak runoff by approximately 33 percent and will incorporate oil/grease separators, floating absorbent booms, and skimmers (id., p. 3-4; Tr. 5, p. 111). In addition, West Lynn stated that standard sedimentation and erosion control measures will be installed during the construction of the

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65/ West Lynn stated that CZM deems it unacceptable to increase the stormwater discharge into the Rummey Marsh ACEC (Exh. WLC-1, App. C, Tab H).

facility (Exh. WLC-1, p. 3-117). West Lynn claimed that the quality of the Rummey Marsh ACEC will be enhanced as a result of the detention and treatment of stormwater collected on-site (Exh. HO-E-32, p. 1-2).

The detailed mitigation measures presented by West Lynn to treat stormwater runoff is responsive to the identified environmental concerns. Accordingly, based on the foregoing, the Siting Council finds that the facility would have an acceptable impact on wetlands and water resources.

6. Visual Impacts

West Lynn stated that the most prominent structures on the proposed site are expected to be one 150-foot stack and the 60-foot main operations building (Exh. WLC-1, p. 3-166). West Lynn asserted that the proposed heights of the structures are consistent with the City of Lynn's zoning limits (id.). West Lynn asserted that the proposed dimensions of the cogeneration facility stack is 150 feet high and 16 feet in diameter (Exh. HO-RR-9). At the 60-foot mark (the roof line of the operations building), appendages will include a steam drum, a platform for environmental equipment, and a catwalk for environmental monitoring (id.). West Lynn reported that line-of-sight views of the facility from the north and the east would be limited by surrounding berms (Exh. WLC-1, p. 3-166).

West Lynn stated that the proposed site is part of an urban/industrial skyline, and that the skyline already includes exhaust stacks and storage tanks (id.). The existing exhaust stacks are located at the General Electric Riverworks plant, the Saugus Resco Plant, and the Boston Gas Liquefied Natural Gas ("LNG") facility (id.). The Boston Gas LNG storage facility stack is 140 feet high, and West Lynn Creamery presently has milk storage tanks 60 feet high (Exh. HO-E-25). West Lynn stated that there are no sites located in the vicinity of the proposed facility that were identified as unique or significant visual resources according to the Massachusetts Landscape Inventory listings prepared by the Massachusetts Department of Environmental Management ("DEM") (Exh. WLC-1, p. 1-32).

West Lynn conducted a survey of the visual impacts using five potentially sensitive receptors in residential areas that have line-of-sight to the proposed project location (id., p. 3-166). According to West Lynn, the appearance of the facility from the five receptors either blends in with the existing industrial area, is barely discernible due to distance, or is completely blocked (id., App. C, pp. 5-91 to 5-100). West Lynn indicated that the receptor with the least obstructed view of the facility is an apartment complex, located one-half mile northwest of the site, especially the apartments facing the proposed projects on the ninth through the twelfth floors (id., p. 5-100). West Lynn asserted that such views of the proposed facility would not be dissimilar from existing views, because industrial structures are common features along Lynn Harbor (id.). West Lynn stated that they would consult with City of Lynn officials concerning possible color schemes to minimize visual impacts of the stack (Exh. HO-E-24).

West Lynn stated that a landscaping plan would be submitted to the Planning Department of the City of Lynn when financing and construction of the facility begins (Tr. 1, p. 72). The plan contains an agreement to repave Circle Avenue (because it will undergo extensive damage during the construction of the project), and details landscaping along Circle Street up to Harding Street and then east on Harding Street to Lynn Harbor (id., p. 94). The landscaping plan will be done by a landscape architect hired by West Lynn (id.). In addition, West Lynn stated that they have agreed to provide landscaping barriers to mask the facility from nearby properties (Exh. HO-E-20). West Lynn stated that as a condition of the special permit granted by the City of Lynn for this project a landscaping plan must be in place (Tr. 1, p. 94). In addition, West Lynn stated it is planting trees on-site to provide support

to the Mass Releaf Program and to minimize the visual impact of the facility (Exh. WLC-1, p. 1-34).[66]

The record indicates that the proposed site and the surrounding land uses are industrial in nature, and that the proposed dimensions of the project are in keeping with the characteristics of nearby uses.[67] However, we expect West Lynn to consult with City of Lynn officials concerning possible color schemes to minimize visual impacts of the facility. In addition, due to the possibility of reuse of the land to the east, West Lynn should undertake extra precautions to visually shield this area with landscaping and foliage.

Accordingly, based on the foregoing, the Siting Council finds that the construction of the proposed facilities would have an acceptable visual impact on the surrounding community.

7. Traffic

West Lynn asserted that there would be no significant impacts on traffic at area intersections due to construction and operation of the proposed facility (Exh. WCL-1, p. 3-150). West Lynn stated that although the proposed project would increase the average delays at the signalized intersections and increase traffic flow at the unsignalized intersections, the extent of such changes would be minimal, and no decrease of traffic operational performance would be evident (id., App. C, p. 5-72).

66/ Mass Releaf is a state policy administered by the DEM, Bureau of Shade Tree Management and Pest Control linking tree planting and care to the global climate, using trees and seedlings as natural means to absorb carbon dioxide (Exh. WLC-1, p. 1-33.)

67/ The Siting Council recognizes that the City of Lynn has authorized a stack height 10 percent higher than that contained in West Lynn's application with the Siting Council (Exh. HO-E-26). However, in the case of changes to the stack or to any aspect of the proposed facility, other than minor variations, West Lynn is required to submit that information to the Siting Council so that the Siting Council may decide whether to inquire further into that issue.

In support of its assertion, West Lynn presented estimates of project trip generation and related traffic impacts, broken down into construction-related traffic and facility operation-related traffic (id., p. 3-150). West Lynn indicated that the hours of construction-related traffic would extend from 7:00 a.m. to 3:00 p.m., and encompass 120 vehicle trips per day (id., p. 3-151). With respect to facility operation, West Lynn stated that the number of employees at the facility would be 16 during the work week and six over the weekend (id.). In addition to staff, operational traffic would include up to 20 truck deliveries per day during parts of the winter to provide backup fuel supply (id., App. C, p. 5-69).

West Lynn stated that the peak traffic hours for the Lynnway area are 7:30 a.m. to 8:30 a.m. and 5:15 p.m. to 6:15 p.m. (id., p. 3-151). West Lynn noted that construction traffic and operating employee trips would generally avoid morning and afternoon peak-hour periods, and that fuel delivery trips would avoid the afternoon peak-hour (id., App. C, p. 5-69). West Lynn further stated that the expected scheduling of construction vehicle trips during off-peak traffic periods would serve as a mitigation measure (id., p. 6-3).

To help quantify traffic generation, West Lynn presented a comparison of expected peak-hour level of service ("LOS") traffic ratings with and without the project, both during construction and for the first year of operation (id., p. 3-156).[68] While West Lynn did not analyze the level of service for the hours that fall before and after the peak hours, including times when the project-related trips would be occurring, they provided percentage comparisons of traffic

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68/ LOS are designated based on a rating system measuring delays in traffic (Tr. 1, pp. 50-52). The ratings range from A to F, with A being a low volume free-flow condition and F a forced-flow condition (id.). In urban areas, a rating of D or better is a good operating condition (id.). D reflects the borderline between a stable flow condition, and a flow condition that is slightly unstable during peak periods (id.). B indicates a stable flow condition (Exh. WLC-1, App. C, p. 4-30).

counts for the peak and surrounding hours, which indicated that traffic counts were 55 to 95 percent below the peak hours (Exh. HO-RR-6). West Lynn also estimated that the baseline 1989 peak hour traffic generally would increase one percent per year (id.).

West Lynn stated that it expects no additional changes in future LOS ratings as a result of the project (Exh. WLC-1, p. 3-157).[69] West Lynn indicated that the service level for peak hour periods, rated at D for the morning and at a B level for the afternoon, would remain unchanged with or without the project (id., Table 3.3.7.b).

In sum, the record indicates that the scheduling of project related trips would largely avoid morning and afternoon peak-hour periods, with the exception of possible periodic backup fuel deliveries that could overlap the morning peak-hour period. As a result, project impacts on peak-hour traffic conditions would be minimal, and involve no changes in peak-hour LOS ratings.

However, the Siting Council remains concerned about traffic during the morning peak period and the hours before the morning period. Specifically, the one hour before the morning peak, which also involves a LOS of D, is of special concern because of the higher number of project related trips. This time period should be carefully monitored by West Lynn to ensure that traffic conditions do not worsen during construction.

Nevertheless, the Siting Council finds that West Lynn has provided adequate support for its claim that traffic impacts during construction and operation of the proposed project would be minimal.

69/ Construction is expected to begin in 1991, and 1993 is slated to be the first full year of operation (Exh. WLC-1, App. C, p. 5-68). See Section II.A, above, for a discussion of the need for the proposed facility.

8. Conclusions on Environmental Impacts

The Siting Council has found that, with the environmental mitigation techniques proposed by West Lynn, the environmental impacts of construction and operation of the proposed facilities at the proposed site would have an acceptable impact on air quality, water supply and wastewater, noise, land use, wetlands and water resources, and traffic, and would have an acceptable visual impact as well.

Accordingly, the Siting Council finds that construction and operation of the proposed facilities at the proposed site would have acceptable environmental impacts.

F. Conclusions on the Proposed Facilities

The Siting Council has found that West Lynn has considered a reasonable range of practical facility alternatives. In addition, the Siting Council has found that West Lynn has established that the cost estimates associated with the proposed facility are (1) realistic for a facility of the size and design of West Lynn; and (2) minimized consistent with the mitigation and of environmental impacts. Further, the Siting Council has found that the environmental impacts of construction and operation of the proposed facilities at the proposed site are acceptable.

Accordingly, the Siting Council finds that the construction and operation of the proposed facilities at the proposed site is acceptable in terms of cost and environmental impacts.

IV. DECISION AND ORDER

The Siting Council finds that upon compliance with the conditions set forth in Section II.D, the construction of the proposed generating facility and ancillary facilities is consistent with providing a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

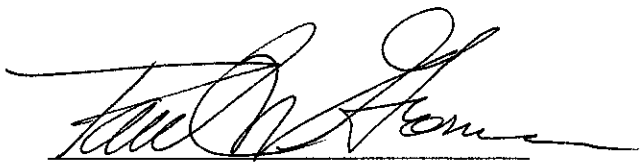
The Siting Council ORDERS West Lynn to comply with the ORDER set forth in Section II.C.2.

Accordingly, the Siting Council hereby APPROVES the petition of West Lynn to construct a bulk generating facility and ancillary facilities subject to the conditions set forth in Section II.D.

Frank P. Pozniak
Hearing Officer

Dated this 14th day of June, 1991

UNANIMOUSLY APPROVED by the Energy Facilities Siting Council at its meeting of June 14, 1991 by the members and designees present and voting. Voting for approval of the Tentative Decision as amended: Paul W. Gromer (Commissioner of Energy Resources); Penelope Wells (for Gloria Larson, Secretary of Consumer Affairs and Business Regulation); Andrew Greene (for Susan Tierney, Secretary of Environmental Affairs); Joseph Donovan (for Daniel S. Gregory, Secretary of Economic Affairs); Mindy Lubber (Public Environmental Member); and Michael Ruane (Public Electricity Member).



Paul W. Gromer
Chairperson

Dated this 14th day of June, 1991

Table 1

Forecasted Summer Peak Load
West Lynn's Demand Forecasts and 1990 and 1991 CELT Forecasts

Year	1st Low Case	2nd Low Case	Base Case	High Case	1990 CELT	1991 CELT
1993	22506 MW	22718 MW	23013 MW	23219 MW	22931 MW	21250 MW
1994	23001	23273	23650	23916	23862	21500
1995	23507	23841	24305	24633	24540	21788
1996	24025	24422	24978	25372	25187	22262
1997	24553	25018	25670	26133	25746	22833
2000	26210	26895	27863	28557	27739	24701
2005	29222	30340	31942	33105	30790	27849

Source: Exh. WLC-1, Tables 3.1.1.b, 3.1.1.b.u, 3.1.1.i(1); Exh. HO-RR-28A

Table 2

Demand/Supply Comparisons under West Lynn's Need Scenarios

Demand Scenario	Supply Scenario	Surplus/Deficiency 1993	1994
High Case	No Seabrook	-1034 MW	-2134 MW
Base Case	No Seabrook	-782	-1809
High Case	Base Case	-550	-1668
High Case	No Seabrook/Rapid DSM	-340	-1267
Base Case	Base Case	-291	-1336
Base Case	30% Uncommitted	-192	-881
1st Low Case	No Seabrook	-164	-1018
Base Case	50% Uncommitted	-126	-577
Base Case	No Seabrook/Rapid DSM	-88	-942
Base Case	70% Uncommitted	-60	-273
2nd Low Case	Base Case	+76	-864
High Case	1990 CELT (Rapid DSM)	+161	-779
2nd Low Case	30% Uncommitted	+175	-409
2nd Low Case	50% Uncommitted	+241	-105
2nd Low Case	70% Uncommitted	+307	+199
1st Low Case	Base Case	+342	-525
Base Case	1990 CELT (Rapid DSM)	+420	-447
1st Low Case	No Seabrook/Rapid DSM	+530	-151
1st Low Case	1990 CELT (Rapid DSM)	+1053	+364

Source: Exh. WLC-1, Table 3.1.1.j(1); Exhs. HO-RR-29, HO-RR-30

Table 3

Demand/Supply Comparisons under West Lynn's Need Scenarios with Reliability Reserve based on 70 Percent Confidence Level

Demand Scenario	Supply Scenario	Surplus/Deficiency 1993	1994
High Case	No Seabrook	-2034 MW	-3184 MW
Base Case	No Seabrook	-1782	-2859
High Case	Base Case	-1550	-2718
High Case	No Seabrook/Rapid DSM	-1340	-2317
Base Case	Base Case	-1291	-2386
Base Case	30% Uncommitted	-1192	-1931
1st Low Case	No Seabrook	-1164	-2068
Base Case	50% Uncommitted	-1126	-1627
Base Case	No Seabrook/Rapid DSM	-1088	-1992
Base Case	70% Uncommitted	-1060	-1323
2nd Low Case	Base Case	-924	-1914
High Case	1990 CELT (Rapid DSM)	-839	-1829
2nd Low Case	30% Uncommitted	-825	-1459
2nd Low Case	50% Uncommitted	-759	-1155
2nd Low Case	70% Uncommitted	-693	-851
1st Low Case	Base Case	-658	-1575
Base Case	1990 CELT (Rapid DSM)	-580	-1497
1st Low Case	No Seabrook/Rapid DSM	-470	-1201
1st Low Case	1990 CELT (Rapid DSM)	+53	-686

Source: Exh. WLC-1, Tables 3.1.1.j(1), 3.1.1.j(2); Exhs. HO-RR-29, HO-RR-30

Appeal as to matters of law from any final decision, order or ruling of the Siting Council 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 Council modified or set aside in whole or in part.

Such petition for appeal shall be filed with the Siting Council within twenty days after the date of services of the decision, order or ruling of the Siting Council or within such further time as the Siting Council may allow upon request filed prior to the expiration of 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. (Sec. 5, Chapter 25, G.L. Ter. Ed., as most recently amended by Chapter 485 of the Acts of 1971).

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Council

In the Matter of the Petition of Commonwealth Electric Company and Cambridge Electric Light Company for Approval of their 1989 Long-Range Forecast of Energy Requirements	EFSC 90-4

FINAL DECISION

Frank P. Pozniak
Hearing Officer
July 11, 1991

On the Decision:

Timothy Wang

APPEARANCES: James M. Avery, Esq.
Rich, May, Bilodeau & Flaherty, P.C.
294 Washington Street
Boston, Massachusetts 02108
FOR: Commonwealth Electric Company
Cambridge Electric Light Company
Petitioners

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APPENDIX:

The Energy Facilities Siting Council hereby APPROVES the 1989 demand forecast of Commonwealth Electric Company and hereby REJECTS the 1989 demand forecast of the Cambridge Electric Light Company.

I. INTRODUCTION

A. Background

Commonwealth Electric Company ("Commonwealth" or "CECo") is an investor-owned utility engaged in the generation, distribution, and retail sale of electricity to approximately 298,000 customers in forty communities in southeastern Massachusetts, including Cape Cod and Martha's Vineyard (Exh. C-1, p. 1.1.2). In 1988, CECo sold approximately 3,282,122 megawatthours ("MWh") of electricity and experienced a peak demand of 697 megawatts ("MW") (id.). In the same year, approximately 46.4 percent of CECo's total annual energy output was to the residential sector, 33 percent to the commercial sector, 10.5 percent to the industrial sector, and 10.1 percent to the miscellaneous sector (id., Table E-8). Commonwealth has been a winter-peaking system since 1981 (id., Table E-11).

In its last review of the demand forecast of Commonwealth, the Siting Council approved the demand forecast.[1] Commonwealth Electric Company, Cambridge Electric Light Company, 12 DOMSC 39, 51-71 (1985) ("1985 CECo/CELCo Decision").

Cambridge Electric Light Company ("Cambridge" or "CELCo") is an investor-owned utility engaged in the generation, distribution, and retail sale of electricity to approximately 43,100 customers in the city of Cambridge, Massachusetts (Exh. C-1, p. 1.1.1). In addition, Cambridge sells power for resale

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1/ In its last review of the supply plan of Commonwealth, the Siting Council conditionally approved the supply plan. Commonwealth Electric Company, Cambridge Electric Light Company, 15 DOMSC 125, 133-166 (1986) ("1986 CECo/CELCo Decision").

to the Town of Belmont, Massachusetts ("Belmont") (id.). CELCo also sells steam from its electric generating plants to an affiliated company, Commonwealth Energy Steam Company (id.). In 1988, Cambridge sold approximately 1,369,225 MWh of electricity and experienced a peak demand of 271.5 MW (id.). In the same year, approximately 10.4 percent of CELCo's total annual energy output was to the residential sector, 70.4 percent to the commercial sector, 7.3 percent to the industrial sector, and 11.9 percent to the miscellaneous sector (id., Table E-8). Cambridge has been a summer-peaking system since at least 1976 (id., Table E-11).

In its last review of the demand forecast of Cambridge, the Siting Council approved the demand forecast.[2] 1985 CECo/CELCo Decision, 12 DOMSC at 45-50.

Finally, Commonwealth and Cambridge are wholly-owned subsidiaries of the Commonwealth Energy System ("COM/Energy" or "system") (Exh. C-1, p. 1.1.1).[3]

B. Procedural History

Commonwealth and Cambridge filed their 1989 demand forecasts with the Siting Council on December 1, 1989 (Exh. C-1).[4] On September 18, 1990, the Hearing Officer issued a Notice of Adjudication for the 1989 demand forecasts and directed Commonwealth and Cambridge to post and publish the notice in accordance with 980 CMR 1.03(2). Commonwealth and Cambridge subsequently submitted confirmation of publication and

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2/ In its last review of the supply plan of Cambridge, the Siting Council conditionally approved the supply plan. 1986 CECo/CELCo Decision, 15 DOMSC at 133-166.

3/ Canal Electric Company, which is engaged in the business of selling electricity from Canal Units 1 and 2 and the Seabrook Nuclear Generating Station, also is a subsidiary of COM/Energy.

4/ These Companies filed their 1989 supply plans with the Siting Council on April 27, 1990. The Siting Council did not review the 1989 supply plan of Commonwealth and Cambridge in this proceeding. See Section I.C, below.

posting. The Siting Council received no petitions to intervene in the proceeding.

The Siting Council held evidentiary hearings on March 8 and 13, 1991. Commonwealth and Cambridge presented two witnesses: Beauford L. Hunt, manager of utility planning, who generally testified on the demand forecasts of both companies; and Paula M. Connor, forecast analyst, who testified on the methodologies Commonwealth and Cambridge used in the development of their forecasts.

The Hearing Officer entered 97 exhibits into the record, largely comprised of Commonwealth's and Cambridge's responses to information and record requests. Commonwealth and Cambridge entered three exhibits into the record.

Pursuant to a briefing schedule established by the Hearing Officer, Commonwealth and Cambridge filed a letter brief on April 5, 1991. The Siting Council issued supplemental information requests on April 19, 1991. The responses to these information requests were received on April 30, 1991, and are part of the exhibits entered into the record by the Hearing Officer.[5]

C. Scope of Review

In this proceeding, the Siting Council only reviewed the 1989 demand forecasts of Commonwealth and Cambridge. The demand forecasts and supply plans of these companies next will be reviewed in the integrated resource management ("IRM") process jointly developed by the Siting Council and the Massachusetts Department of Public Utilities ("MDPU"). This comprehensive IRM process requires coordinated regulatory review of electric companies' IRM practices by both the Siting Council and the MDPU in the exercise of each agency's statutory authority. On

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5/ These exhibits, as well as many of the other exhibits, contain updated information on the demand forecasts of Commonwealth and Cambridge. In addition, during the evidentiary hearings, the witnesses for these companies provided updates to the demand forecasts.

November 30, 1990, the Siting Council issued an Order and final regulations regarding the IRM procedures (by which additional resources are to be planned, solicited, and procured to meet an investor-owned electric company's obligation to provide reliable electric service to ratepayers in a least-cost, least-environmental impact manner). EFSC 90-RM-100A (1990); 980 CMR 12.00. On August 31, 1990, the MDPU issued an Order and final regulations for its portion of the IRM regulatory framework. D.P.U. 89-239 (1990); 220 CMR 10.00.

In EFSC 90-RM-100A, the Siting Council set forth a schedule whereby Commonwealth and Cambridge were required to file their first IRM submission on August 1, 1991 (p. 60). In light of this filing date, the Siting Council decided not to review CECo's and CELCo's supply plan in this proceeding, and would review only the demand forecast of each company.[6] Id.

As part of its statutory mandate "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, sec. 69H), the Siting Council determines whether "projections of the demand for electric power ... are based on substantially accurate historical information and reasonable statistical projection methods." G.L. c. 164, sec. 69J. To ensure that the foregoing standard is met, the Siting Council applies three criteria to demand forecasts: reviewability, appropriateness, and reliability.

A demand forecast is reviewable if it contains enough information to allow a full understanding of the forecasting methodology. A forecast is appropriate if the methodology used to produce that forecast is technically suitable to the size and nature of the utility that produced it. A forecast is reliable

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6/ In a letter dated March 26, 1991 from the Siting Council and MDPU to Commonwealth and Cambridge, these companies were informed that the filing date for their first IRM submission would be delayed until September 19, 1991. The new filing date did not change the Siting Council's decision not to review the 1989 supply plans of Commonwealth and Cambridge.

if the methodology provides a measure of confidence that its data, assumptions, and judgments, produce a forecast of what is most likely to occur. Nantucket Electric Company, EFSC 90-28, p. 3 (1991) ("1991 Nantucket Decision"); Massachusetts Municipal Wholesale Electric Company, 20 DOMSC 1, 14 (1990) ("1990 MMWEC Decision"); Massachusetts Electric Company/New England Power Company, 18 DOMSC 295, 302 (1989) ("1989 MECo/NEPCo Decision"); Boston Edison Company, 18 DOMSC 201, 208 (1989) ("1989 BECo Decision"); Eastern Edison Company/Montaup Electric Company, 18 DOMSC 73, 79 (1988) ("1988 EECo/Montaup Decision"); Northeast Utilities, 17 DOMSC 1, 6 (1988) ("1988 NU Decision"); Boston Edison Company, 15 DOMSC 287, 294 (1987); 1985 CECo/CELCo Decision, 12 DOMSC at 42.

II. ANALYSIS OF THE DEMAND FORECAST OF COMMONWEALTH

A. Energy Forecast

1. Demographic/Employment Forecast

Commonwealth stated that Data Resources Inc. ("DRI") produced its demographic and employment forecasts (Exh. C-1, p. 1.4.8). Specifically, CECo stated that DRI developed service area-specific forecasts of population, number of households, manufacturing sector employment, and non-manufacturing sector employment (id.).

With respect to the demographic forecast, CECo stated that DRI forecasts service area population as a percentage of Massachusetts population, and then disaggregates the forecast into five age groups (id.). Commonwealth indicated that DRI creates a forecast of the number of households in CECo's service territory by applying age-specific headship rates[7] to 1980 federal census data from Commonwealth's service area (id.).

With respect to the employment forecast, Commonwealth stated that DRI projected service area manufacturing employment, disaggregated by 2-digit standard industrial classification ("SIC") codes (id., p. 1.4.10). CECo stated that DRI also forecasted non-manufacturing employment, disaggregated by 1-digit SIC codes (id.).

For the purposes of this review, the Siting Council accepts Commonwealth's demographic and employment forecasts.

2. Electricity Price Forecast

a. Description

Commonwealth indicated that the same methodology is used to forecast electricity prices for both Commonwealth and Cambridge (Exh. C-1, pp. 1.2.15, 1.4.52). The methodology incorporates the use of two computer software packages, the Load Management Strategy Testing Model ("LMSTM") and the Electric

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7/ Headship rates are the percentage of an age group that are heads of households (Exh. C-1, p. 1.4.8).

Generation Expansion Analysis System ("EGEAS") (id., p. 1.4.52). CECo's price forecasting methodology is an iterative process involving the sequential use of both computer models (id.). The methodology projects an average price for COM/Energy as a whole over the forecast period (Tr. 1, p. 24).

Commonwealth's witness, Mr. Hunt, stated that Commonwealth develops its price forecast by applying the system average price growth rate to base year Commonwealth electric prices (id.).[8] CECO stated that this method is appropriate because COM/Energy is represented as one participant in the New England Power Pool ("NEPOOL"), and operates and dispatches generating units as one system (id.). NEPOOL presents COM/Energy with one charge, which is then distributed between the two companies (id., p. 48). Mr. Hunt further stated that although the MDPU determines rates separately for Commonwealth and Cambridge, COM/Energy determines costs on a one-system basis and apportions those costs to the two companies (id., p. 25). Commonwealth did not indicate how the costs were apportioned.

To develop its system price forecast, COM/Energy enters an estimated system load forecast into EGEAS, which performs generation optimization, production costing, and reliability calculations to produce an optimal supply plan based on Commonwealth's and Cambridge's combined resources (Exh. C-1, p. 1.4.52). The cost and performance characteristics of the EGEAS-produced supply plan are entered into LMSTM which produces the resultant revenue requirements (id.).

COM/Energy divides these revenue requirements by the forecast of total system sales to obtain COM/Energy average prices by year (id.). The growth rate of the average price is then applied to Commonwealth and Cambridge base year prices by class to yield class nominal prices (id.). These prices are deflated by either the Consumer Price Index ("CPI") or the Wholesale Price Index ("WPI") to generate forecasts of real

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8/ Both the Commonwealth and Cambridge price forecasts use 1988 as a base year (Exh. C-1, Tables I.2.4, I.4.11).

prices by class for Commonwealth and Cambridge (id.). These real price forecasts are entered into the Commonwealth or Cambridge forecasting models to produce new load forecasts, and the entire process is repeated again until a price forecast is developed (id.).

b. Analysis

Commonwealth's price forecast methodology has improved greatly since Commonwealth's 1984 forecast filing which was reviewed by the Siting Council in the 1985 CECo/CELCo Decision (Exh. HO-4A). In particular, the Siting Council notes that to develop its price forecast, Commonwealth has employed two sophisticated computer models which have the ability to account for a comprehensive range of variables which may affect electricity price.

Nevertheless, the Siting Council has concerns regarding Commonwealth's methodology of forecasting a system-wide average price to determine the growth rates for both Commonwealth and Cambridge electricity prices. The Siting Council notes that the electricity prices to which the consumer responds are the sum of fuel charges and rates. In regard to fuel charges, despite NEPOOL's treatment of Commonwealth and Cambridge as one participant, Commonwealth and Cambridge each own or purchase power from their own generating facilities. Thus, the dispatch of individual units designated exclusively for Commonwealth or Cambridge in fact may cause the fuel charge price component to change at a significantly different rate for each company.

The Siting Council further observes that rates can change independently of the operating costs of generating facilities. For instance, rapid demand growth in Commonwealth's service territory as opposed to Cambridge's service territory could create a need for more transmission capacity and ancillary structures in Commonwealth's service territory. In this situation, the cost of these structures would only be reflected in Commonwealth's rates. Similarly, the cost of any conservation programs implemented by one company would appear only in the rate-base and fuel charges of that company.

Consequently, the effects of company-specific conservation programs also could trigger different electricity price growth rates for each company.

Finally, the Siting Council notes that historical data indicate that the growth rates of Commonwealth's electricity prices and Cambridge's electricity prices differed markedly between 1980 and 1990. Commonwealth's prices increased at a compound annual growth rate of 3.48 percent and Cambridge's prices increased at a compound annual growth rate of 2.82 percent (Exh. HO-RR-3-1). This difference raises additional concerns regarding the applicability of the system-wide, average growth rate. We note, however, that the difference in the two companies' historical growth rates alone is not sufficient to render the price forecast unreliable.

Based on the above, the Siting Council finds that CECo has failed to fully establish the appropriateness of using a system-wide average growth rate to project prices for the individual companies. Nevertheless, due to the improvements in the price forecast methodology and the implementation of EGEAS and LMSTM, the Siting Council accepts Commonwealth's price forecast methodology for the purposes of this review. The Siting Council ORDERS Commonwealth in its next filing to provide full justification of the appropriateness of its price forecast methodology, or to implement a separate price forecast for Commonwealth's service territory.[9]

3. Residential Energy Forecast

In 1988, the residential class accounted for 46.4 percent of Commonwealth's total annual energy output requirements (Exh. C-1, Table E-8). Commonwealth forecasts total residential

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9/ CECo's, as well as CELCo's, next forecast filing is its first IRM submission. As part of the IRM process, electric companies are required to submit a draft initial filing, and an initial filing in Phase I of the process. Commonwealth and Cambridge are scheduled to submit their draft initial filings to the Siting Council and the MDPU on September 19, 1991; their initial filings are due on December 19, 1991.

consumption to grow from 1,653,904 MWh in 1989 to 2,177,090 MWh in 1998, a compound annual growth rate of 3.1 percent (id.). See Table 1, below. Historically, Commonwealth's total residential energy requirements increased from 964,768 MWh in 1976 to 1,643,064 MWh in 1988, a compound annual growth rate of 4.54 percent (id.).

Commonwealth stated that it projects residential energy requirements using a disaggregated end-use methodology (id., p. 1.4.15). Energy consumption for residential annual customers is projected as the sum of the energy consumption of nineteen appliance-types.[10] The energy consumption of each appliance-type is obtained by multiplying the number of appliances by the average annual energy consumption for each appliance-type (id.). The energy consumption of seasonal customers is then added to the energy consumption of residential annual customers to produce the total residential sector energy consumption (id., pp. 1.4.27-1.4.28; Tr. 1, p. 106). An explanation of how Commonwealth determined each component of its residential energy forecast is provided below.

a. Number of Appliances and Seasonal Customers

i. Description

Commonwealth stated that it calculates the total number of appliances in an appliance-type, except for electric heating, fossil heating auxiliaries, electric water heaters, lighting and miscellaneous use, by summing the numbers of appliances by

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10/ The nineteen electric appliance-types are electric ranges, microwave ovens, frost-free refrigerators, standard refrigerators, frost-free freezers, standard freezers, dishwashers, electric clothes washers, electric dryers, controlled electric water heaters, uncontrolled electric water heaters, color televisions, black and white televisions, room air conditioners, central air conditioners, electric heating, fossil heating auxiliaries, lighting, and miscellaneous use (Exh. C-1, pp. 1.4.15, 1.4.27-1.4.28).

housing-age and housing-type categories (Exh. C-1, p. 1.4.16).[11] The numbers of appliances for each housing-age/housing-type category, except for electric heating, fossil heating auxiliaries, electric water heaters, lighting and miscellaneous use, are calculated as a product of: (1) appliance saturations by housing-age/housing-type category; (2) residential annual customers by housing-age/housing-type category; (3) appliance multiple ownership weights; and (4) appliance saturation trends (id.). CECo indicated that it calculates the numbers of electric heating, fossil heating auxiliaries, electric water heaters, lighting and miscellaneous use appliances using various other methodologies (id., pp. 1.4.18, 1.4.21-1.4.22, Table R3).

With regard to appliance saturations by housing-age/housing-type category, CECo indicated that Consulting Statisticians Inc. determined the relationships between appliance saturation and housing characteristics for CECo by using Commonwealth service area survey data for the years 1979, 1980, 1981, and 1986 (id., p. 1.4.15).

Commonwealth forecasts the number of residential annual customers by using a regression equation to calculate the ratio of population to residential annual customers (id., Figure I.4.2). In this equation, household size is employed as the explanatory variable (id.). Commonwealth calculates household size by dividing DRI's population forecast by DRI's forecast of the number of households (Exh. HO-58; Tr. 1, p. 118). CECo calculates the number of residential annual customers by multiplying the ratio of population to residential annual customers by DRI's population forecast (Exh. C-1, Figure I.4.2).

11/ The housing-age categories are: (1) less than 6 years old; and (2) 6 to 50 years old (Exh. C-1, Table I.4.3). The housing-type categories are single-family and multi-family (id.). These housing-age and housing-type categories combine to produce four housing-age/housing-type categories (id.).

CECo stated that in previous filings, it relied upon DRI's forecast of the number of households to project the number of residential annual customers (Tr. 1, p. 121). CECo noted, however, that in preparing this filing it discovered that the actual number of residential annual customers diverged from the estimated number of households over the historical period (id.). Consequently, Commonwealth stated that it developed the current specifications to improve forecast performance (id.).

Commonwealth stated that the distribution of customers by housing-age and housing-type is derived from a 1980 Commonwealth appliance saturation survey (Exh. C-1, p. 1.4.8). CECo updated the distribution of customers by aging the 1980 housing-age and housing-type allocations, and adding new customers by type of housing every year (id.). New customers are distributed according to housing-type by using a fixed ratio of 87.3 percent in single family homes and 12.7 percent in multi-family homes (id.).

Commonwealth stated that it obtained the multiple appliance ownership weights from service area-specific appliance saturation surveys (id., p. 1.4.18). CECo stated that it only developed these weights for color televisions and air conditioning because the surveys specifically obtained multiple ownership data for only these two appliance-types (Tr. 2, p. 5). Commonwealth indicated, however, that the effects of multiple ownership of other appliance-types actually can be captured directly by the saturation factor (id., p. 7; Exh. C-1, Table I.4.3).

CECo stated that it developed appliance saturation trends to reflect time dependent trends in appliance ownership (Exh C-1, p. 1.4.18). CECo's witness, Ms. Connor, stated that CECo uses saturation survey data from 1979 and 1986 to determine saturation trends into the early 1990's (Tr. 2, p. 10). Beyond the early 1990's, Ms. Connor stated that saturation trends are either taken from NEPOOL data or determined through judgment (id.). CECo further indicated that saturation trends for seven of the appliances had been updated in 1988 using information

from a survey conducted by National Analysts (Exh. C-1, p. 1.4.18).[12] Commonwealth also indicated it had completed an appliance saturation survey for 1990 and plans to incorporate the data into the residential forecast sometime in the future (Tr. 1, pp. 17-18, 30).

Commonwealth stated that it uses different methodologies for determining the number of appliances for the following appliance-types: electric heating; fossil heating auxiliaries; electric water heaters; lighting; and miscellaneous use. First, with respect to electric heating, Commonwealth indicated that initial electric heating saturations were determined by the 1986 appliance saturation survey (Exh. HO-59A). Commonwealth stated that it projects saturation trends for electric heating through an econometric penetration rate equation (id.). The penetration rate is defined as the ratio of annual change in electric heating customers to annual change in total customers (id.). Commonwealth indicated that it calculates the electric heating penetration rate using a two-year lag on electric heating cost and a dummy variable as explanatory variables (id., Figure I.4.3). Commonwealth included the dummy variable to account for speculative building during the 1980's (id.). CECo stated that the data demonstrated that penetration rates increased in spite of increases in the operating costs of electric heating systems (Exh. HO-26). CECo stated that the dummy variable attempts to account for variables such as the low installation costs of electric heat (id.)

Second, Commonwealth stated that it defined fossil-heating auxiliaries as the electric equipment necessary

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12/ Commonwealth updated saturation trends for ranges, clothes washers, dishwashers, dryers, freezers, central air conditioning, and microwave ovens (Exh. C-1, p. 1.4.18). CECo stated that the saturation trend for microwave ovens specifically is constrained so that the saturation of microwave ovens does not exceed one hundred percent over the forecast period (id.). CECo indicates that at current rates, the saturation of microwave ovens would exceed one hundred percent in "a very short period of time" (Tr. 2, p. 8).

to operate fossil-fuel heating systems in non-electrically heated households (Exh. C-1, p. 1.4.22). Therefore, CECo calculated the number of fossil-heating auxiliaries by subtracting the number of electric heating households from the total number of households (id.).

Third, Commonwealth stated that it assumed that 100 percent of electric heating households have electric water heaters (id.). Saturation values for electric water heaters by housing-age/housing-type category are available for non-electric heating households (id.). The allocation between controlled and uncontrolled water heaters is determined by the current ratio of controlled water heaters to the total number of water heaters (id.).

Finally, Commonwealth indicated that it assumes that the number of lighting appliances and the number of miscellaneous "appliances" are each equal to the number of residential annual customers, based on the assumption that every household has lighting and miscellaneous uses (id., Table R3).

Commonwealth indicated that it forecasts the total number of seasonal customers as a percentage of residential annual customers, based on the historical relationship between the two (Exh. HO-18). Commonwealth provided that from 1985 to 1988, the last four years of the historical period, the ratio of seasonal customers to annual customers has declined (id.). Commonwealth stated that it separates the total number of seasonal customers into "June - September customers" and "other customers" categories (Exh C-1, p. 1.4.27; Tr. 1, p. 111). The number of June - September customers is projected to remain constant at 1986 levels, therefore all new seasonal customers fall into the "other customers" category (Exh. HO-19). CECo could not provide a definition for the "other customers" category (Exh. HO-RR-9; Tr. 1, p. 111).

ii. Analysis

The Siting Council considers Commonwealth's methodology for forecasting numbers of appliances sufficiently comprehensive and detailed, and generally appropriate for projecting

residential energy consumption for a company of CECo's size. The Siting Council recognizes that Commonwealth's methodology captures a wide variety of variables that determine the number of appliances in CECo's service territory. In the past, the Siting Council has found this type of end-use methodology and level of disaggregation for determining the number of appliances to be appropriate for companies of CECo's size or larger. 1989 MECo/NEPCo Decision, 18 DOMSC at 7-10; 1988 EECo/Montaup Decision, 18 DOMSC at 85-86; 1988 NU Decision, 17 DOMSC at 10-12. The accuracy of CECo's forecast of the number of residential annual customers is particularly important in light of its crucial role in determining the number of appliances. The Siting Council commends Commonwealth on its implementation of the current methodology for forecasting the number of residential annual customers, which incorporates service area-specific data in addition to the use of DRI's forecast of the number of households.

However, the Siting Council has some concerns with several other elements of CECo's methodology. First, in regard to Commonwealth's multiple appliance ownership weights, the Siting Council notes that CECo developed these weights for only color televisions and air conditioning even though the record indicates that multiple ownership weights could apply to other appliance-types as well. The record also indicates that appliance saturations can incorporate the effects of multiple appliance ownership. Therefore, the Siting Council notes that a set of reliable appliance saturations may negate the need for appliance multiple ownership weights.

Second, with respect to Commonwealth's appliance saturation trends for most appliance-types, the Siting Council considers trends developed from just two data points -- 1979 and 1986 -- to be unreliable. In its last review of Commonwealth's demand forecast, the Siting Council noted the need for Commonwealth to repeat its appliance saturation surveys at regular intervals. 1985 CECo/CELCo Decision, 12 DOMSC at 55. However, since that decision, Commonwealth has conducted its survey only twice -- in 1986 and in 1990. In order for

saturation trends developed from the surveys to be statistically meaningful, the surveys must be conducted at regular intervals and more frequently than every seven years. When reliable service territory-specific data is available, Commonwealth should not have to rely on NEPOOL data to determine appliance saturation trends.[12A] We note that CECo has recently completed an appliance saturation survey. While the results of CECo's 1990 appliance saturation survey were not used to develop appliance saturation trends for the instant filing, the Siting Council is confident that our concerns can be remedied by CECo's use of the 1990 saturation survey data in its next filing, and CECo's regular performance of appliance saturation surveys in the future.

Finally, the Siting Council has concerns regarding CECo's forecast of seasonal customers. Commonwealth's forecasting methodology fails to account for the historic patterns in the number of seasonal customers. In the last four years of the historic period, the ratio of seasonal customer to residential annual customers demonstrated a consistent, declining trend. CECo, however, continues to forecast a constant number of seasonal customers over the entire forecast period. CECo's failure to fully address this historic data casts doubt on the reliability of CECo's forecast of seasonal customers.

Nevertheless, on balance, the Siting Council accepts CECo's methodology for forecasting the number of appliances and seasonal customers. However, the Siting Council ORDERS Commonwealth in its next filing to (1) utilize the 1990 appliance saturation survey data to determine appliance saturations and saturation trends; (2) detail how it plans to conduct regular appliance saturation surveys in the future, and to produce reliable saturation trends; (3) justify the use of multiple appliance ownership weights; and (4) provide full,

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12A/ The Siting Council notes that NEPOOL data may be valuable in some instances to affirm the validity of the service territory-specific data.

detailed documentation and data on its method for determining the number of seasonal customers.

b. Appliance and Seasonal Customer Average Use

i. Description

Commonwealth indicated that to develop a forecast of appliance average use it first obtained base year appliance average use figures for all appliance-types, except water heaters and miscellaneous use, from studies conducted by Midwest Research Institute ("MRI") in 1977, by Edison Electric Institute ("EEI") in 1982, by Commonwealth in 1970 and 1986, and by NEPOOL in 1980, 1982 and 1987 (Exh. C-1, Table I.4.5). CECo stated that it projected appliance average uses for the historical and forecast periods from the base year data for each appliance-type, except water heaters and miscellaneous use, through a function of price of electricity, appliance efficiency standards, household size, and appliance interrelationships (id., pp. 1.4.22-1.4.23). Commonwealth did not indicate the actual function it used to project appliance average uses (id.).

Commonwealth indicated that it utilized price elasticities to account for the effects of price on average use figures (id.).[13] CECo produced two sets of price elasticities: short-run and long-run. Commonwealth stated that the effects of price changes on electricity demand are limited to the magnitude of the long-run price elasticities (id., p. 1.4.39). The effects of the long-run price elasticities are spread over the "useful lifetimes" of end uses (id.). Commonwealth presented data on the assumed useful lifetimes of all residential end uses (id., Table I.4.10). CECo obtained the data from NEPOOL, which based its data on a study conducted by the United States Department of Energy in 1978 (Exh. HO-28).

CECo indicated that price elasticities for residential end uses, except residential heating, are obtained from NEPOOL

13/ Price elasticity factors measure the effect of a change in price on electricity demand.

data based on "published elasticity studies, engineering knowledge, and practical judgment" (id.). CECo stated that the NEPOOL data are approximately ten years old (id.). Commonwealth developed price elasticities for residential heating in 1983 from service territory-specific data (id.). CECo stated that it is not currently updating any price elasticity data (Exh. HO-68). CECo failed to describe the methodology by which price elasticities and assumed useful lifetimes are employed in the residential forecast (Exh. C-1, pp. 1.4.22, 1.4.39).

Commonwealth stated that it derived its appliance efficiency trends from a NEPOOL study (id., p. 1.4.27). The NEPOOL study bases its figures on federal appliance efficiency standards and information from an EPRI study, Trends in the Energy Efficiency of Residential Electric Appliances, conducted in 1986 (Exh. HO-RR-14).

Commonwealth stated that household size affects the average use of five types of appliances (Exh. C-1, p. 1.4.27).[14] CECo accounted for household size effects by employing household size effect variables obtained from MRI and NEPOOL (id.).

In regard to the interrelationship among appliances and the effect that interrelationship has on appliance average use, Commonwealth stated that the only effect addressed in its forecast is the effect of the interrelationship between microwave ovens and electric ranges (id.). CECo indicated that it assumes that in a household which owns both an electric range and a microwave oven total cooking energy is reduced by 16 percent, based on a study conducted by the Association of Home Appliance Manufacturers (Exh. HO-27).

With respect to water heaters, CECo separated water heating average use into controlled water heating and uncontrolled water heating average use (Exh. C-1, p. 1.4.22).

14/ The five appliance-types are electric ranges, clothes washers, clothes dryers, microwave ovens, and lighting (Exh. C-1, p. 1.4.27).

Commonwealth forecasts controlled water heating average use through a regression equation, using lagged controlled water heating average use and the average real price of electricity to a controlled water heating customer as explanatory variables (id., Figure I.4.4). CECo assumes that uncontrolled water heating customers have an average use of approximately 91 percent of controlled water heating customers (id., Table I.4.5). CECo stated that this relationship is based on NEPOOL judgment regarding the higher energy consumption of controlled water heaters due to their larger storage capacity (Exh. HO-RR-13).

Commonwealth calculated average use of the miscellaneous category as a residual of total average use in 1980, and projected it using a regression equation with price as the explanatory variable (Tr. 2, p. 22).

Electricity use for seasonal customers is separated into June - September customers and "other" seasonal customers (Exh. C-1, pp. 1.4.27-1.4.28). CECo stated that it holds the total use for June - September customers constant from 1980 through the forecast period, apparently on the assumption that average use for June - September customers will remain constant during that period (id.). Commonwealth stated that it increased average use for other seasonal customers at the same rate as the average use of annual customers (id.).

Commonwealth indicated that it is currently collecting territory-specific appliance average use data through a Load Research Committee (Tr. 1, p. 27; Exhs. HO-16, HO-53). CECo also stated that it already has obtained such data from its participation in the Joint Utilities Monitoring Project ("JUMP") (Tr. 2, p. 27).

ii. Analysis

Generally, in regard to CECo's derivation of appliance average use, the Siting Council notes that although Commonwealth has obtained base-year appliance average use data from a number of sources, much of this data is extremely old. The Siting Council also is concerned about CECo's reliance on non-service

territory-specific data to determine base-year average use data. However, we expect Commonwealth, through its Load Research Committee and the results of its participation in JUMP, to obtain enough information to produce service territory-specific base-year average use data in the future.

The Siting Council has some concerns, however, with CECo's methodology to forecast appliance average use. First, although CECo estimates appliance average uses for the historical and forecast periods from the base-year average use data by using a variety of factors, there are no actual measured average use figures available in the historical period to corroborate the accuracy of CECo's estimates. Consequently, as a result of the vintage of the base year data and CECo's inability to confirm the accuracy of its estimates, the reliability of the projected appliance average use figures is questionable.

Second, with respect to price elasticities, CECo did not describe the methodology by which price elasticities and assumed useful lifetimes are implemented in the residential forecast. Moreover, the Siting Council notes that most of CECo's price elasticity data are approximately ten years old, and the assumed useful lifetime data is over twelve years old. Further, CECo stated that it is not currently updating these data. Therefore, CECo's methodology does not capture changes over the last decade in consumer behavior and appliance manufacturing standards. As a result, it is necessary for Commonwealth to systematically update price elasticity and appliance lifetime data.

Finally, in regard to CECo's assumptions regarding average use for its seasonal customers, CECo failed to justify its assumptions regarding the constant energy requirements of the June - September customers. In addition, the Siting Council notes that the undocumented and unjustified breakdown of seasonal customers into June - September and "other" categories presents a potentially unreliable basis for disaggregating average use for these customers.

However, the employment of appliance average use is appropriate in implementing an end-use methodology for a company

of Commonwealth's size. The employment of average use figures allows CECo to account for changes in customer use patterns and mandated efficiency standards. Therefore, despite various concerns mentioned above, the Siting Council accepts CECo's methodology for forecasting appliance and seasonal customer average use for the purposes of this review.

The Siting Council ORDERS Commonwealth in its next filing to: (1) incorporate the service territory-specific appliance average use data produced by its Load Research Committee and JUMP into its derivation of appliance average use, or to justify why it cannot do so; (2) document fully the means by which it employs price elasticities and assumed useful lifetime of appliances in its residential forecast methodology; (3) investigate and document the specific relationship between household size and average use in CECo's service territory; and (4) fully explain and justify its methodology of forecasting seasonal customers' electricity requirements.

c. Conclusions on Residential Energy Forecast

The Siting Council has accepted Commonwealth's methodology for forecasting the number of appliances. The Siting Council also has accepted CECo's methodology for forecasting appliance average use.

The Siting Council considers an end-use methodology incorporating appliance types and appliance average use to be generally appropriate for a company of Commonwealth's size. In addition, CECo generally has provided sufficient documentation to enable the Siting Council to understand CECo's end-use methodology. Further, an end-use methodology allows CECo to account for the effects of naturally-occurring conservation, mandated efficiency standards and significant changes in customer use patterns, and the Siting Council considers these factors to be crucial in an accurate forecast of residential energy consumption.

Accordingly, based on the foregoing, the Siting Council finds that Commonwealth has established that its methodology for forecasting residential energy requirements is reviewable, appropriate, and reliable.

4. Commercial Energy Forecast

a. Description

In 1988, Commonwealth's commercial sector accounted for 33 percent of its total annual energy output requirements (Exh. C-1, Table E-8). Commonwealth forecasted commercial sector energy consumption to grow from 1,203,376 MWh in 1989 to 1,450,382 MWh in 1998, a compound annual growth rate of 2.10 percent (id.). See Table 1, below. Historically, CECo's commercial sector energy requirements increased from 700,420 MWh in 1976 to 1,167,876 MWh in 1988, a compound annual growth rate of 4.35 percent (id.).

Commonwealth forecasts commercial energy requirements using a disaggregated end-use model with employment as the key forecast driver (id., p. 1.4.29). Commonwealth stated that it forecasts total commercial energy requirements by summing the energy requirements of seven employment categories (id., Table I.4.6).[15]

CECo stated that within each employment category, it projects the energy requirements of four end-uses (id.). Commonwealth indicated that these end-uses are: (1) air conditioning; (2) electric space heating; (3) fossil heating auxiliaries; and (4) baseload, which consists of lighting and miscellaneous end-uses (id.; Tr. 2, p. 48; Exh. HO-RR-17). CECo stated that the energy requirements of each end-use in an employment category are added together to determine an employment category's total energy requirements (Exh. C-1, p. 1.4.29).

Commonwealth stated that it calculates the energy requirements of each end-use as the product of the following variables: employment levels; end-use saturations; energy

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15/ The seven employment categories are (1) construction, agriculture, forestry, fishing, and mining; (2) transportation and public utilities; (3) wholesale trade; (4) retail trade; (5) finance, insurance, and real estate; (6) services; and (7) government and military (Exh. C-1, Table I.4.6).

intensity per employee; normal heating degree days;[16] short- and long-term price elasticities; and a post-1977 construction efficiency factor[17] (id., pp. 1.4.29-1.4.30; Exh. HO-RR-17).

With respect to the employment level variable, Commonwealth stated that it used the DRI forecast of employment to project employment levels (Exh. C-1, p. 1.4.30). CECo indicated that the employment forecast produced by DRI represents employment levels for the month of March in each forecast year (id.). Commonwealth stated that, since employment in its service area is seasonal, it used service area-specific employment data to determine a relationship between average annual employment and March employment levels (id.). CECo stated that this relationship was used to adjust DRI's employment forecast to obtain the forecasted annual employment levels used in the commercial model (id.).

With respect to end-use saturations, Commonwealth provided that actual electric space heating saturation and air conditioning saturation were obtained from 1981 survey data (id., p. 1.4.34). Commonwealth stated that its projections of electric space heating saturations in the forecast period were "judgmental," and that NEPOOL data "may have been accessed" (Tr. 2, p. 49). CECo further stated that the saturation of fossil heating auxiliaries was calculated as a "residual" for 1981 by subtracting the number of electric space heating customers from the total number of commercial customers in that year (id., p. 50).

16/ CECo did not indicate how it calculated the number of heating degree days. However, Cambridge stated that it calculated the number of heating degree days as an average of historical degree days from 1951 to 1982 (Exh. HO-RR-1).

17/ CECo based much of its commercial forecast on information it obtained from a study performed by Jerry Jackson and Associates (Tr. 2, p. 30). The base year of the data used in that study was 1977 (id.) The post-1977 construction efficiency factor reflects building efficiency changes since that time (id.). CECo stated that this efficiency factor is .92 (Exh. C-1, p. 1.4.29).

Ms. Connor stated that CECo determined the end-use saturations of lighting and miscellaneous baseload from non-service territory-specific data (id., p. 38). Ms. Connor could not specify the source of that data (id.). CECo indicated that the end-use saturations of lighting and miscellaneous loads equal 80 percent and 20 percent of baseload end-use, respectively (id., p. 34; Exh. C-1, Table C-4). Commonwealth assumed that these saturations would remain constant over the forecast period (id.).

With respect to the energy intensity per employee variable, Commonwealth stated that these values for temperature-sensitive end uses were derived from two sources: CECo's 1984 study of service territory-specific temperature-sensitive loads, and the NEPOOL Model database (Exh. C-1, p. 1.4.34).[18]

Commonwealth stated that its 1984 service territory-specific study determined total heating load, which was disaggregated into electric space heating and fossil heating auxiliaries using NEPOOL distributions (id.). CECo stated, however, that these distributions were undocumented (Tr. 2, p. 46). CECo indicated that the heating and cooling loads then were divided by the actual number of employees, end-use saturations, and number of degree days to obtain kilowatt-hour/saturated employee/degree day ("KDD") estimates (Exh. C-1, p. 1.4.34).[19] CECo stated that the term saturated employee refers to the "underlying assumption that the percentage of employees occupying electrically heated or cooled space is approximately equal to the saturation of electric heat and air conditioning, respectively" (id.). CECo, however, could not provide any support for this assumption (Tr. 2, p. 42-45).

18/ The NEPOOL Model database is the informational database contained in the NEPOOL forecasting model.

19/ CECo calculates saturated employees by multiplying end-use saturations by the number of employees (Exh. C-1, p. 1.4.32).

Commonwealth stated that the values of energy intensity per employee for the baseload category were determined by two equations through a function of historic baseload, employment levels, short- and long-term price elasticity factors, and a post-1977 construction efficiency factor (Exh. C-1, p. 1.4.32). CECo stated that it specifically excluded the effects of efficiency impacts in calculating baseload (id.).

Commonwealth stated that it obtained commercial sector short- and long-term price elasticity factors from Jerry Jackson and Associates in 1986, and assumed useful lifetime data for commercial end uses from NEPOOL in 1978 (Exh. HO-28). CECo further stated that it has not updated these factors since that time (id.).

Commonwealth stated that it had recently obtained a new commercial forecasting model (Exhs. HO-38, HO-67; Tr. 2, p. 30). CECo also stated that it is preparing the model for the next filing but may not have sufficient time to implement it (Tr. 2, p. 30).

b. Analysis

In general, the Siting Council recognizes that end-use forecasting of commercial energy consumption is an appropriate methodology. 1989 BECo Decision, 18 DOMSC at 218-219. However, the Siting Council has significant concerns with the actual implementation of CECo's methodology as well as with many of the underlying data and assumptions.

First, CECo's projection of the saturations of electric heating, fossil heating auxiliaries, and air conditioning is based on judgment and some NEPOOL information. Such a methodology clearly is not based on any reliable statistical techniques. In addition, CECo failed to provide the basis for its judgments. Thus, the Siting Council has no way to determine the potential impact of their judgments on the reliability of the saturation projections.

Second, CECo's assumption of an 80 percent/20 percent split between lighting and miscellaneous end-uses in the baseload category throughout the forecast period is undocumented and unsupported. The Siting Council notes that the

miscellaneous category includes office automation equipment such as personal computers, printers, and other types of office equipment. CECo admits that the proliferation of this type of equipment, coupled with improving lighting efficiency measures, may severely alter the ratio CECo uses to allocate energy consumption between lighting and miscellaneous end-uses in the baseload category (Tr. 2, pp. 38-40). In fact, these changes even may alter the energy consumption of the baseload category as a whole. Furthermore, CECo is not currently researching any changes or trends which may affect baseload end-use saturations, or considering further disaggregation of this category (id., p. 41).

Third, with regard to energy intensity per employee for temperature-sensitive end uses, the record indicates that Commonwealth's use of NEPOOL distributions to determine the allocation of total heating load into electric space heating and fossil heating auxiliaries is undocumented. Since the accuracy of energy intensity per employee figures is extremely important to the accuracy of the entire commercial forecast, the Siting Council considers the lack of documentation a serious deficiency. CECo utilizes the concept of saturated employee to calculate KDD. This concept inherently assumes a uniform distribution of employees over floor space. An assumption of this type must be fully supported and justified by data and documentation.

Fourth, CECo's commercial forecast does not include a methodology for forecasting heating degree days. Since this variable is a crucial element in the forecast of temperature-sensitive loads, the Siting Council considers the lack of documentation a serious deficiency. Inaccuracies in the forecast of heating degree days may adversely affect the performance of the energy forecast.

Fifth, although Commonwealth incorporated price elasticities in its methodology for forecasting commercial energy requirements, it failed to describe its implementation of assumed useful lifetimes in that methodology. Further, its assumed useful lifetime data is extremely old and may not remain accurate.

Sixth, the Siting Council notes that Commonwealth's commercial forecasting methodology neglects to account for changes in energy and lighting efficiencies. The only energy efficiency effects accounted for are price elasticities and pre- and post-1977 building efficiencies (Tr. 2, p. 38). CECo did not account for major factors such as naturally-occurring conservation, mandated energy efficiency measures, and changes in building codes. We are particularly concerned about the inability of its forecast methodology to capture improvements in the efficiency of lighting. The lighting end-use forms a large portion of the commercial sector baseload. Nonetheless, CECo stated that it specifically excluded the effects of efficiency impacts in calculating baseload.

Finally, the Siting Council regulations specifically state that "[e]ach forecasting methodology must explicitly consider and quantify ... conservation programs and policies of the Commonwealth; ... conservation programs and policies of the federal government; ... [and] improvements in the efficiencies of new and existing appliances and machinery, including building insulation" (980 CMR 7.09(2)(d)). In this proceeding, CECo has not complied with Siting Council regulations, and has not considered efficiency impacts in forecasting commercial energy requirements.

Overall, the presentation of Commonwealth's commercial forecasting methodology is inadequate and difficult to review. The methodology is presented in a piecemeal fashion. In addition, CECo's use of unsubstantiated variables impacts the appropriateness and reliability of the overall forecast. The Siting Council, in the past, has held that "a company's filing must be self-contained and supported by sufficient documentation. A forecast filing not supported by sufficient documentation could lead to a rejection of that forecast." 1989 MECo/NEPCo Decision, 18 DOMSC at 335. Siting Council regulations also require that sufficient documentation accompany any filing (980 CMR 7.03(5)(c)). Therefore the lack of documentation in various portions of the commercial forecast has been viewed as a serious deficiency.

The individual flaws in Commonwealth's commercial forecasting methodology may lead to either an overforecast or an underforecast of CECo's commercial energy requirements. For example, CECo's failure to account for naturally-occurring conservation, mandated energy efficiency measures, and changes in building codes may lead to an overforecast of CECo's commercial energy requirements. However, the Siting Council was unable to determine the impact of several of the other flaws in CECO's commercial forecasting methodology because Commonwealth failed to document those variables. Consequently, the Siting Council cannot determine the overall effect of these flaws in CECo's commercial forecast methodology on CECo's forecast of commercial energy requirements.

Accordingly, based on the foregoing, the Siting Council finds that Commonwealth has failed to establish that its methodology for forecasting commercial energy requirements is reviewable, appropriate, and reliable.

The Siting Council notes, however, that CECo has obtained a new commercial forecasting model. The Siting Council is confident that the implementation of this new model may alleviate many of the Siting Council's concerns. The Siting Council expects Commonwealth to implement its new commercial forecasting model in its next filing.[20] We also expect Commonwealth, in any end-use methodology that it presents in its next filing, to: (1) model office automation as a separate end use employing service territory-specific data; (2) provide full documentation of each source of data and its vintage; and

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20/ CECo stated that it was planning to implement its new commercial forecasting model in its IRM filing (Tr. 2, p. 30). However, Commonwealth stated that it was not certain whether it could implement that model by the August 1, 1991, the original date for Commonwealth's first IRM submission (id.). The Siting Council notes that CECo's first IRM submission has since been delayed, and CECo's draft initial filing now is due on September 19, 1991, and its initial filing now is due on December 19, 1991. Accordingly, this delay should afford CECo sufficient time to implement its new commercial forecasting methodology.

(3) present a full and detailed analysis of the effects of naturally-occurring conservation and energy efficiency improvements on electricity demand.

5. Industrial Energy Forecast

a. Description

Commonwealth's industrial class comprised 10.5 percent of its total annual energy output requirements in 1988 (Exh. C-1, Table E-8). CECo forecasted industrial energy consumption to grow from 374,385 MWh in 1989 to 425,842 MWh in 1998, a compound annual growth rate of 1.44 percent (id.). See Table 1, below. Commonwealth's industrial energy consumption increased historically from 327,832 MWh in 1976 to 370,415 MWh in 1988, a compound annual growth rate of 1.02 percent (id.).

Commonwealth stated that it used an econometric model developed by DRI to forecast industrial energy consumption (id., p. 1.4.36). CECo stated that the DRI model uses a regression equation to project sales to industrial customers (id.). The equation contains two explanatory variables: (1) an employment weighted industrial production index for the Commonwealth service area; and (2) a nine-year moving average of electricity price deflated by the WPI (id.). CECo stated that DRI produced the industrial production index variable by summing all the individual industrial production indices by industry (id., p. 1.4.37). Commonwealth stated that DRI calculated the individual industrial production indices by multiplying the ratio of service area employment to national employment in an industry by a national industrial production index (id.).

To comply with the Siting Council's requirements for disaggregation by SIC code in the industrial sector, Commonwealth stated that it disaggregated DRI's total industrial sales forecast, which is based on a national industrial production index, by using SIC allocations derived from CECo's historical sales data (Exh. HO-40).

b. Analysis

Commonwealth's industrial forecast methodology is appropriate for a company the size of Commonwealth. Therefore,

for the purposes of this review, the Siting Council accepts Commonwealth's methodology for forecasting industrial energy requirements.

However, the Siting Council is concerned with CECo's failure to base its industrial forecast methodology entirely service territory-specific data. This concern is heightened due to the fact that CELCo has collected such data beginning in 1978. See 1985 CECo/CELCo Decision, 12 DOMSC at 62-63. Most other electric companies in Massachusetts have used industrial forecast methodologies based on service territory-specific data, and the Siting Council has approved these methodologies. 1989 MECo/NEPCo Decision, 18 DOMSC at 322-326; 1989 BECo Decision, 18 DOMSC at 219-220; 1988 EECo/Montaup Decision, 18 DOMSC at 91-93. While we have accepted CELCo's industrial forecast methodology in this decision, we may not be able to reach the same conclusion in the future if Commonwealth does not begin to employ an industrial forecast methodology based on service territory-specific data by SIC code.

Therefore, the Siting Council ORDERS Commonwealth in its next filing to implement an industrial forecast methodology based entirely on service territory-specific data by SIC code. However, we realize that CECo may not be able to comply fully with this ORDER by its IRM initial filing date. In the event that CECo cannot fully comply, the Siting Council FURTHER ORDERS CECo to present (1) its current methodology, and (2) a detailed plan for the implementation of an industrial forecast methodology based entirely on service territory-specific data by SIC code.[21]

21/ The Siting Council notes that resubmittal of the current industrial forecast methodology in the IRM filing does not guarantee approval of such methodology. However, if Commonwealth presents the current industrial forecast methodology in its IRM filing, the Siting Council will determine whether such methodology will lead to an overall demand forecast that could be used for purposes of the IRM process.

6. Miscellaneous Energy Forecast

a. Description

Commonwealth stated that, in 1988, the miscellaneous energy sector accounted for approximately 10.1 percent of its total annual energy output requirements (Exh. C-1, Table E-8, p. 1.4.38; Exh. HO-66). CECo forecasted miscellaneous sector energy consumption to grow from 389,552 MWh in 1989 to 482,857 MWh in 1998, a compound annual growth rate of 2.41 percent (Exh. C-1, Table E-8). See Table 1, below. CECo stated that the miscellaneous energy forecast consists of the forecasts of energy requirements of Canal, Otis Air Force Base ("Otis"), AT&T's computer center at Fairhaven, Massachusetts ("AT&T"), streetlighting, unbilled sales, company use, and system losses (id., p. 1.4.38). CECo did not present the forecasts for each of the components of the miscellaneous sector in a disaggregated manner (id.).

CECo stated that it projects sales to Canal and Otis to remain constant over the forecast period at 15,490 MWh per year for Canal and 22,400 MWh per year for Otis (id.). CECo indicated that historical sales to Otis have remained constant, while sales to Canal have fluctuated but with no discernible pattern (Exh. HO-66)

Commonwealth stated that it forecast sales to AT&T to be 40,000 MWh in 1989 (Exh. C-1, p. 1.4.38). CECo projected that after 1989, consumption by AT&T would grow at the same rate as SIC 40 (Transportation, Communications, and Utilities) (id.).

CECo projected streetlighting sales as a function of a per capita consumption ratio (KWh/person) and electricity price (id.). CECo stated that it last calculated the consumption ratio in 1982 using ten years of historical sales and population data (Exh. HO-44). Commonwealth indicated that to determine streetlighting consumption, the consumption ratio is multiplied by the population forecast, and adjusted for electricity price changes and conservation effects (id.). CECo accounted for the effects of price changes on streetlighting consumption through the use of a price elasticity factor (Exh. C-1, Table I.4.9). Commonwealth indicated that it obtained this price elasticity

factor from NEPOOL, and that the data is approximately ten years old (Exh. HO-28). CECo further stated that it is not currently updating this price elasticity data (Exh. HO-68).

CECo stated that it forecasts unbilled sales using a combined growth rate of the residential, commercial and municipal classes (Tr. 1, p. 91). Commonwealth stated that it first totals the historic sales to the above three classes, and develops a growth rate based on the total sales (id.). Commonwealth stated that it then applies this growth rate to an accounting term called "unbilled amount" to obtain the value for unbilled sales (id.).

CECo projected system losses using the most recent historical loss ratio (Exh. C-1, p. 1.4.38). CECo calculated the loss ratio by estimating losses as a percentage of total sales (Tr. 2, p. 55). CECo provided no documentation regarding historic trends in the loss ratio.

CECo stated that company use is estimated to remain constant at the current level through the forecast period (Exh. C-1, p. 1.4.38). CECo indicated, however, that company use has consistently increased from 6,401 MWh in 1983, to 9,315 MWh in 1988, a compound annual growth rate of 7.79 percent (Exh. HO-RR-18).

b. Analysis

With respect to streetlighting, the record demonstrates that Commonwealth has not recalculated the per capita consumption ratio used in projecting streetlighting sales since 1982. Thus, an update of this data is necessary. Commonwealth also has failed to document the methodology by which price elasticity is applied to streetlighting consumption. In addition, the price elasticity data is ten years old and needs to be updated. Consequently, the Siting Council finds that Commonwealth has failed to establish that its forecast of streetlighting energy requirements is reviewable, appropriate, and reliable.

In addition, although CECo forecasted that Company use will remain constant at the current level throughout the

forecast period, Commonwealth has provided no support for this assumption. In fact, historical data provided by CECo indicates that company use has grown significantly. Accordingly, the Siting Council finds that Commonwealth has failed to establish that its forecast of company use is reviewable, appropriate, and reliable.

The Siting Council accepts the remaining forecasts that form Commonwealth's miscellaneous forecast -- Canal, Otis, AT&T, system losses and unbilled sales. Although the Siting Council has accepted CECo's methodology for forecasting system losses, the Siting Council has concerns regarding the appropriateness of using the most recent historical loss ratio to forecast system losses. Therefore, the Siting Council ORDERS Commonwealth in its next forecast filing to find alternate methodologies for forecasting system losses, or fully justify why the current methodology is appropriate.

Although the Siting Council has found Commonwealth has not established that its forecasts of streetlighting and Company-use energy requirements are reviewable, appropriate, and reliable, the Siting Council notes that these two sectors represent a small portion of the miscellaneous forecast and, in fact, account for less than one percent of CECo's total energy output requirements.

Accordingly, on balance, the Siting Council finds that Commonwealth has established that its methodology for forecasting miscellaneous energy requirements is reviewable, appropriate, and reliable. However, the Siting Council ORDERS Commonwealth in its next filing to (1) implement a new methodology for forecasting system losses, or justify the appropriateness of using the most recent historical loss ratio to forecast system losses; (2) update the base year of the per capita consumption ratio used to forecast streetlighting sales; and (3) update the price elasticity data used to determine price effects on electricity consumption in the streetlighting forecast, and document the methodology by which it is applied.

7. Conclusions on Energy Forecast

The Siting Council has accepted Commonwealth's: (1) demographic and employment forecasts; (2) price forecast; and (3) methodology for forecasting industrial energy requirements. The Siting Council also has found that CECo has established that its (1) methodology for forecasting residential energy requirements is reviewable, appropriate, and reliable, and (2) methodology for forecasting miscellaneous energy requirements is reviewable, appropriate, and reliable. Further, the Siting Council has found that CECo has failed to establish that its methodology for forecasting commercial energy requirements is reviewable, appropriate, and reliable.

In this proceeding, Commonwealth has presented a sophisticated and comprehensive residential forecast. CECo's implementation of an end-use residential forecast methodology allows it to capture the effects of variables such as improving appliance efficiencies and significant changes in customer use patterns. In addition, with respect to the commercial forecast, CECo has indicated that it is preparing a new commercial forecasting model for the IRM filing. We expect that this model will address many of our concerns with Commonwealth's current commercial forecasting methodology.

Accordingly, on balance, the Siting Council finds Commonwealth's energy forecast to be reviewable, appropriate, and reliable.

B. Peak Demand Forecast

1. Description

Commonwealth indicated that, in the past, it has been a winter-peaking system (Exh. C-1, Table E-11). In the winter of 1988/89, Commonwealth's peak demand reached an all-time high of 697 MW (id., p. 1.1.1). Historically, CECo's peak load increased from 429 MW in 1976 to 698 MW in 1988, a compound annual growth rate of 4.14 percent (id., Table E-11). Commonwealth projects peak demand to grow during the forecast period from 699 MW in 1989 to 917 MW in 1998, a compound annual growth rate of 3.06 percent (id.). See Table 2, below.

Commonwealth's peak demand forecast methodology and data remain unchanged from its 1987 forecast filing (Exh. HO-71). Specifically, Commonwealth stated that it forecasts peak demand using an Hourly Load Value ("HLV") model (Exh. C-1, p. 1.4.49). CECo adapted this peak load methodology from a NEPOOL model used to forecast electricity demand (id.). CECo stated that the HLV model adopts a "top-down" approach which allocates annual energy across daily hours (id.).

Commonwealth indicated that the HLV model uses two sets of hourly use patterns: one for temperature-insensitive loads; and the other for temperature-sensitive loads (id.). Commonwealth stated that it calculates temperature-insensitive hourly loads as a function of: (1) hourly use pattern factors; and (2) annual energy demand (id.). CECo indicated that it forecasts temperature-sensitive hourly loads as a function of: (1) annual energy demand; (2) the use pattern integral;[22] (3) the temperature-sensitive use pattern matrix; and (4) a 13-year average of peak day hourly temperatures (id.). Commonwealth stated that the temperature-insensitive and temperature-sensitive hourly loads are summed over all end uses and adjusted for transmission and distribution losses to produce the total system hourly loads from which peak days and peak demand are determined (id., p. 1.4.50).

Commonwealth indicated that it inputs territory-specific hourly load shape use patterns into the HLV model for seven end uses (id.).[23] Previously, Commonwealth employed use patterns obtained from NEPOOL (id.).

22/ The use pattern integral is the sum of use pattern factors for one end-use over all hours, day-types and months.

23/ The seven end-use categories are: (1) 12 of 19 industrial SICs; (2) commercial baseload by employment category; (3) commercial heating load by employment category, except for wholesale and retail sectors; (4) residential baseload (single use pattern representing ranges, microwaves, refrigerators, freezers, dishwashers, clothes washers, dryers, television, lighting and miscellaneous; (5) seasonal customers; (6) Otis; and (7) AT&T.

2. Analysis

Overall, Commonwealth's methodology for forecasting peak demand appears to be sound. In the past, the Siting Council has accepted similar peak demand forecasting methodologies from other electric companies. 1989 MECo/NEPCo Decision, 18 DOMSC at 329, 1989 BECo Decision, 18 DOMSC at 222, 1988 NU Decision, 17 DOMSC at 17. The Siting Council commends CECo on improving the quality of the use patterns by using service territory-specific data. The incorporation of service territory-specific data demonstrates a commitment by Commonwealth to improve the quality of its forecast. The Siting Council consistently has endorsed the use of service territory-specific data to forecast peak demand. 1989 MECo/NEPCo Decision, 18 DOMSC at 333, 1988 NU Decision, 17 DOMSC at 17.

However, in spite of inquiries by the Siting Council, CECo did not fully document its peak load forecast. CECo failed to fully document load research data that is the basis of the load shape use patterns. In fact, CECo failed to produce the load research data, which would have included the number of customers, geographic areas, and the years covered by such data. The Siting Council consistently has held that a company's filing must be self-contained and supported by sufficient documentation. 1989 MECo/NEPCo Decision, 18 DOMSC at 335; Bay State Gas Company, 16 DOMSC 283, 307 (1987); Eastern Utilities Associates, 11 DOMSC 61, 65 (1984). Therefore, the Siting Council ORDERS Commonwealth in its next forecast filing to provide (1) full and detailed documentation of its methodology for determining load shape use patterns, and (2) full documentation of all data used in the development of the peak demand forecast.

Nevertheless, due to the sophistication of Commonwealth's methodology, the Siting Council finds, for the purposes of this review, CECo's methodology for forecasting peak demand to be reviewable, appropriate, and reliable.

C. Conclusions on the Demand Forecast

The Siting Council has found Commonwealth's energy forecast to be reviewable, appropriate, and reliable. The Siting Council also has found Commonwealth peak demand forecast to be reviewable, appropriate, and reliable.

Accordingly, the Siting Council hereby APPROVES Commonwealth's demand forecast.

III. ANALYSIS OF THE DEMAND FORECAST OF CAMBRIDGE

A. Energy Forecast

1. Electricity Price Forecast

Cambridge indicated that it employs the same electricity price forecast methodology as Commonwealth (Exh. C-1, p. 1.2.15) (see Section II.A.1, above). CELCo asserts that it is appropriate to use the same methodology as Commonwealth because COM/Energy operates as one system, participates as one member in NEPOOL, and is dispatched as one system under the New England Power Exchange (Tr. 1, p. 24). CELCo noted that the price forecast is based on an entirely new forecast methodology from that presented in CELCo's 1984 filing (Exh. HO-4A).

As stated above, CELCo uses the same electricity price forecast methodology as Commonwealth, and we have found that Commonwealth's electricity price forecast is acceptable. See Section II.A.2.a, above. Accordingly, for the purposes of this review, the Siting Council also accepts Cambridge's electricity price forecast methodology. However, as indicated in the discussion of the electricity price forecast of Commonwealth, we have concerns with the methodology of forecasting a system-wide average price to determine changes in both Cambridge and Commonwealth electricity prices. Therefore, similar to the ORDER contained in Section II.A.2.a, above, here the Siting Council ORDERS Cambridge in its next forecast filing to perform a separate electricity price forecast for Cambridge's service territory, or to justify the use of a system-wide forecast.

2. Residential Energy Forecast

a. Description

Cambridge's residential class comprised 10.4 percent of its total annual energy output requirements in 1988 (Exh. C-1, Table E-8). Historically, CELCo's residential energy requirements increased from 102,129 MWh in 1976 to 143,783 MWh in 1988, a compound annual rate of 2.89 percent (id.). Cambridge projects its residential energy requirements to

increase over the forecast period from 150,700 MWh in 1989 to 197,940 MWh in 1998, a compound annual growth rate of 3.08 percent (id.). See Table 3, below.

Cambridge stated that its residential model is disaggregated into electric heating customers and non-electric heating customers (id., p. 1.2.4). Cambridge projects the energy consumption of these categories using econometric equations (id., Figures I.2.1, I.2.2).

CELCo stated that its residential electric heating equation forecasts total electric heating sales using three independent variables: the number of electric heating customers; heating degree days; and real price of electricity for electric heating customers (as derived from its price forecast) (id.). Cambridge provided that the number of customers variable accounts for 98 percent of the variations in the electric heating equation, and that the heating degree day variable possesses an unacceptable t-statistic (id.; Exh. HO-RR-20).[24]

Cambridge stated that its residential non-electric heating equation projects average use for non-electric heating residential customers by using (1) a one-year lag on non-electric heating average use, and (2) the real price of electricity for non-electric heating customers (as derived from its price forecast) as independent variables (Exh. C-1, Figure I.2.2). Non-electric heating average use then is multiplied by the projected number of non-electric heating customers to produce total non-electric heating sales (id., p. 1.2.4). CELCo stated that the variable for lagged non-electric heating average use accounts for over 92 percent of the variations in the average use equation (Exh. HO-RR-22). CELCo further stated that the equation also possesses an autoregressive format, meaning non-electric heating average use is regressed on a time-lagged value of itself (Exh. C-1, Figure I.2.2). CELCo indicated that combined, these two facts

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24/ The t-statistic is a statistical indicator of the significance of an explanatory variable.

imply possible autocorrelation between non-electric heating average use and lagged non-electric heating average use.[25] Ms. Connor stated that she was "not sure if autocorrelation would be a concern" between these two variables, and that she relied on the Durbin-Watson d-test to determine the degree of autocorrelation (Tr. 2, p. 66; Exh. HO-RR-23).[26]

Cambridge stated that it forecasts the number of residential electric heating and non-electric heating customers using data obtained from new project development information collected by CELCo and the City of Cambridge (Exh. HO-4; Tr. 1, p. 41). CELCo stated that there are two project development lists: one for electric heating customers; and one for non-electric heating customers (id.).

Cambridge projected the heating degree day variable as a constant number, determined by averaging historical degree days from 1951 to 1982 (Exh. HO-RR-1; Tr. 1, pp. 41-42). Cambridge indicated that the range of the degree day data is determined by availability (id.).

Cambridge indicated that it has not significantly changed its methodology for forecasting residential energy requirements since the Siting Council's previous review of its demand forecast in the 1985 Cambridge Decision (Exh. C-1; Exh. HO-4A). Cambridge stated that the 1988 aggregate residential energy consumption levels projected by the forecast reviewed in the 1985 Cambridge Decision were 18.9 percent below actual levels (Tr. 1, p. 39).

The only notable changes in the two forecasts appear in the residential electric heating equation. CELCo indicated that this methodology previously forecasted electric heating average use per customer using heating degree days and nominal price as

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25/ Autocorrelation represents the effect of one variable on another in an econometric equation. The greater the autocorrelation, the more detrimental it is to the reliability of the econometric equation.

26/ The Durbin-Watson d-test determines the degree of autocorrelation in an econometric equation.

explanatory variables (Exh. HO-4A, p. 1.2.10). Total residential electric heating sales were previously determined by multiplying electric heating average use per customer by the number of customers (id.). In the current forecast, CELCo indicated that it simply integrates the number of customers directly into the electric heating equation, and alters nominal price to real price (Exh. C-1, Figure I.2.1). CELCo stated that this specification enables it to directly forecast electric heating sales (id.).

Finally, CELCo stated that it had conducted appliance saturation surveys for Cambridge's service territory in 1986 and 1990 (Tr. 1, pp. 30-31). CELCo also has formed a Load Research Committee to obtain appliance average use data (Exh. HO-16). However, CELCo asserted that it has not yet obtained enough data to formulate the appliance saturation trends necessary for a disaggregated, end-use methodology (Tr. 1, p. 31).

b. Analysis

With respect to the residential electric heating equation, the Siting Council notes several weaknesses in CELCo's methodology that significantly affect the reliability of the residential electric heating sales forecast. First, the inclusion of the number of customers variable in the residential electric heating equation -- a change in methodology from CELCo's previous electric heating forecast -- actually may not improve the statistical performance of the electric heating sales forecast. In fact, the high percentage of the variations in electric heating sales accounted for by the number of customers variable raises serious questions regarding the reliability of the residential electric heating equation. The dependence of total residential electric heating sales predominantly on the effects of one variable does not represent a reliable statistical projection method.

Second, although we acknowledge that, intuitively, the number of heating degree days intuitively should account for a significant portion of the variations in sales to electric

heating customers, this variable failed to produce an acceptable t-statistic in CELCo's equation. The failure of the heating degree day variable to perform according to reasonable expectations erodes further the credibility of the residential electric heating equation. The Siting Council notes that all variables which do not conform to reasonable statistical expectations should be subjected to further scrutiny before they can be accepted.

Further, with respect to the residential non-electric heating sales forecast, the non-electric heating equation is subject to the same fundamental problem as the electric heating equation -- the impact of a single, dominating explanatory variable. In addition, the Siting Council notes that the Durbin d-test used by Cambridge is not valid for determining autocorrelation in autoregressive models. The tendency of autoregressive models, by their very nature, to skew the Durbin d-test and create an illusion of the absence of autocorrelation, causes the Durbin d-test to be an invalid predictor of autocorrelation when applied to autoregressive models.

As previously stated, the forecast reviewed by the Siting Council in the 1985 Cambridge Decision underforecasted residential energy consumption by 18.9 percent. Although factors external to Cambridge's residential equations may have contributed to the underforecast of residential energy consumption, the magnitude of the underforecast should have indicated to Cambridge possible weaknesses in its residential forecast methodology.

Based on the foregoing, the Siting Council finds that Cambridge has failed to established that its methodology for forecasting residential energy requirements is reviewable, appropriate, and reliable.

The above problems in forecasting residential energy consumption can be attributed in part to Cambridge's use of an econometric methodology instead of an end-use model. Cambridge's econometric models are based on single equations for projecting total residential heating and non-heating

consumption. The reliability of these projections may be significantly affected -- as in the case with Cambridge -- if there is a variable that dominates other variables. In addition, unlike end-use models, econometric models cannot capture the effects of naturally-occurring conservation, improving appliance efficiencies, and significant changes in customer use patterns -- variables that a company of Cambridge's size must consider.

Generally, end-use models represent a more reliable, state-of-the-art method for projecting residential energy consumption. In fact, most companies of Cambridge's size and larger employ end-use methodologies for forecasting residential energy consumption, and the Siting Council consistently has found such methodologies to be appropriate. 1989 MECo/NEPCo Decision, 18 DOMSC at 305-310; 1989 BECo Decision, 18 DOMSC at 217-218; 1988 EECo/Montaup Decision, 18 DOMSC at 84-88; 1988 NU Decision, 17 DOMSC at 10-12. More recently, a much smaller electric company than CELCo -- Nantucket Electric Company ("Nantucket")[27] -- developed and implemented an end-use model to project residential energy consumption. 1991 Nantucket Decision, EFSC 90-28 at 12-19. The Siting Council also found Nantucket's methodology to be appropriate. Id.

CELCo indicated that it has accumulated data to develop a disaggregated end-use methodology. Accordingly, the Siting Council ORDERS CELCo in its next filing to implement a new methodology that is appropriate for a company of Cambridge's size. However, we realize that Cambridge may not have sufficient time to fully comply with this ORDER by its IRM initial filing date. In the event that Cambridge cannot fully comply, the Siting Council FURTHER ORDERS CELCo to: (1) provide alternate specifications for the residential heating equation that achieves statistically acceptable results; (2) perform the

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27/ The Siting Council notes that Nantucket's peak load in 1990 was approximately 19 MW. 1991 Nantucket Decision, EFSC 90-28 at 1. CELCo's 1989 peak load was 271.5 MW (Exh. C-1, p. 1.1.1).

necessary analyses on the residential non-heating equation to justify its validity; and (3) present a detailed plan for the implementation of a new methodology for forecasting residential energy requirements.[28]

3. Commercial Energy Forecast

a. Description

In 1988, Cambridge's commercial sector accounted for 70.4 percent of its total annual energy output requirements (Exh. C-1, Table E-8). Historically, CELCo's commercial energy requirements increased from 531,941 MWh in 1976 to 970,317 MWh in 1988, a compound annual growth rate of 5.14 percent (id.). Cambridge projects its commercial energy requirements to increase from 998,820 MWh in 1989 to 1,368,150 MWh in 1998, a compound annual growth rate of 3.56 percent (id.). See Table 3, below

Cambridge stated that it forecasted commercial sector energy requirements by summing the energy requirements of new load and the increasing energy requirements of existing load (Exh. C-1, p. 1.2.4). CELCo indicated that although it projected the energy requirements of its municipal customers separately, it summed municipal energy requirements and commercial energy requirements to obtain the projections it used as the forecast of commercial sector energy requirements (id., Table E-8; Exh. HO-7). CELCo indicated that existing commercial load is broken into large customer and baseline load (id.). New commercial load is separated into a short-term, four-year forecast and a subsequent long-term average new load

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28/ The Siting Council notes that resubmittal of the current residential forecast methodology in the IRM filing with the required modifications contained in the above ORDER does not guarantee approval of such methodology. However, if Cambridge presents the current residential forecast methodology with modifications in its IRM filing, the Siting Council will determine whether such methodology will lead to an overall demand forecast that could be used for purposes of the IRM process.

(Exh. HO-11). Municipal sales are separated into large-customer load and baseline load (Exh. C-1, p. 1.2.5).

CELCo stated that it utilizes surveys as its basis for forecasting the energy consumption of the existing large-customer load (id.). CELCo indicated that it surveyed 23 large commercial customers which comprise 45 percent of Cambridge's total current commercial load (Exhs. HO-8, HO-49). Cambridge indicated that the surveys requested each customer to forecast its own energy consumption for the next ten years (Exh. HO-9A). CELCo indicated that it summed the estimated energy consumptions of the large customers to produce the large customer forecast (Exh. HO-9).

Cambridge's witness, Ms. Connor, stated that CELCo is currently in the process of interviewing each surveyed large customer to determine each customer's methodology and assumptions for forecasting energy requirements (Tr. 2, pp. 57-58). The goal of this interview process is to affirm that all customers are utilizing similar, if not the same, forecasting assumptions (id.). Company survey data demonstrated that 13 of the 23 large customers projected constant consumption over the forecast period (Exh. HO-48A).

Cambridge stated that the remaining 55 percent of its total current commercial load is the baseline load (Exh. HO-49). CELCo assumed that baseline load would grow at the same rate as the large customer load (Exh. C-1, p. 1.2.4). CELCo justified this assumption by asserting that there are similar customer mixes in both groups (Exh. HO-10).[29] CELCo indicated that it previously had utilized an econometric model to project baseline commercial load (id.; Exh. HO-49). Cambridge stated that the model forecasted the growth rate of average use by a dummy variable and the growth rate of real

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29/ Cambridge indicated that the surveyed large-customer group does not include retail establishments (Tr. 1, p. 76). CELCo noted its concern regarding the inaccuracies that may be caused by the omission of retail establishments (id., p. 77).

price (id.). CELCo stated that it discontinued using that model for forecasting baseload because it yielded an unrealistically high eight percent compound annual growth rate for this portion of the forecast (id.). Cambridge indicated that the dummy variable alone contained an improbably high intrinsic growth rate of 5.8 percent (id.). CELCo further stated that it evaluated other specifications before abandoning the econometric model and implementing the current model (Tr. 1, p. 66).

Cambridge stated that it projects short-term new customer loads using its Development Project Information System ("DPIS") (Exh. C-1, p. 1.2.4).[30] This is the same methodology Cambridge used in its previous forecast (Exh. HO-4A, p. 1.2.9). CELCo stated that it developed the current DPIS forecast using information from the City of Cambridge's Community Development Department Project List of July 1989, an information database listing all known commercial projects (Exh. HO-11). Cambridge indicated that the design energy requirement of each project is weighted by a probability factor indicating its likelihood of completion (id.). Cambridge stated that the resulting expected energy requirements of each project were summed to produce the expected new system load (id.). CELCo indicated that it does not normally track the accuracy of the DPIS forecast, although it has implemented this methodology since 1984 (Exh. HO-RR-6). In fact, CELCo indicated that the 1987 DPIS forecast of 1990 new system load underforecasted new system load by as much as 49.7 percent (id.). Cambridge stated that it is only currently beginning to develop software to monitor the accuracy of the DPIS (id.).

Cambridge indicated that DPIS only forecasts four years into the future (id.). CELCo stated that for the remaining years of the forecast, it uses a constant annual new system load projection to forecast long-term new commercial energy requirements (id.). Cambridge indicated that it calculates the

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30/ The DPIS is a list of development projects in Cambridge and their projected energy requirements, adjusted for their probability of completion.

constant annual new system load by multiplying (1) a "ten-year potential" of 500,000 square feet, obtained from the City of Cambridge's Department of Community Development, by (2) an "historic average use figure" of 15 KWh per square foot (Exh. HO-RR-5). Cambridge provided that the resultant constant annual new system load of 7,500 MWh is used as the new load forecast for every year after the DPIS forecast ends (id.). CELCo stated that it could not document the values used to calculate the constant annual new system load. However, CELCo stated that for its next forecast, it is currently in the process of updating and documenting the values used to calculate the constant annual new system load (id.).

CELCo stated that its current commercial forecast employs essentially the same methodology as its 1984 commercial forecast (Exh. HO-4A, pp. 1.2.8-9). With regard to the 1984 forecast of 1988 commercial consumption, Ms. Connor stated that the 1984 forecast of commercial consumption was 24.8 percent below actual 1988 levels (Tr. 1, p. 39).

In 1989, municipal sales were 9.75 percent the size of total sector sales (Exh. HO-7). Cambridge stated that the large customer load for the municipal sector consists exclusively of one customer -- the Massachusetts Bay Transit Authority ("MBTA") (Exh. C-1, p. 1.2.5). CELCo developed the municipal sector forecast based on discussions with MBTA staff (id.). CELCo stated that it projected baseline municipal sales using a historical compound annual growth rate (id.).

CELCo argues that it is impossible for Cambridge to implement an employment-driven end-use methodology similar to the methodology used by Commonwealth for its commercial sector (Exh. HO-56). CELCo states that an employment forecast cannot be produced for a geographical area as small as Cambridge (id.; Tr. 1, pp. 100-105). However, while Commonwealth retained the services of DRI to provide an employment forecast, Ms. Connor stated that Cambridge has not approached DRI for the purposes of obtaining an employment forecast (Tr. 2, p. 73). Finally, Cambridge's witness, Mr. Hunt, stated that CELCo finds no

compelling reason to alter a methodology approved by the Siting Council in the past, and will continue to use the same methodology with updated data (Tr. 1, p. 63).

b. Analysis

Overall, CELCo's methodology for forecasting commercial energy consumption contains several major flaws that significantly affect the reliability of the forecast.

First, with regard to Cambridge's forecast of existing load, the Siting Council is particularly troubled by the fact that CELCo for many years has relied on a survey methodology which requires its large commercial customers to forecast their own energy requirements. While it may be appropriate for Cambridge's customers to provide data to CELCo for use in a commercial forecast methodology (i.e., floor space data, energy intensity data, data on lighting efficiency measures), here CELCo has inappropriately shifted its forecasting responsibility to its customers. Cambridge's commercial customers should be able to rely on CELCo to produce an appropriate and reliable forecast of commercial energy requirements. In addition, CELCo's large commercial customers may not possess the data and expertise to accurately project their energy requirements. In fact, many of the returned surveys assumed constant consumption with no justification for the assumption. Moreover, Cambridge failed to monitor these customer-generated forecasts since the inception of this methodology, and only now is CELCo beginning to validate the forecasting methodologies and assumptions of its customers. At a minimum, we would have expected CELCo to evaluate the validity of the forecasting methodologies used by its large customers and the accuracy of these forecasts particularly in light of the significant error in earlier forecasts. Hence, CELCo's continued reliance on customer self-forecasts may result in supply decisions that clearly do not serve the best interests of its commercial customers, and in fact, may continue to lead to an underprojection of commercial energy consumption.

Second, CELCo has failed to provide any documentation supporting its assumption that baseline load will grow at the same rate as large customer load or that the large customer group and baseline group have similar customer mixes. Further, the Siting Council notes that Cambridge's abandonment of its econometric model for forecasting baseline load in favor of a methodology which increases baseline load at the same rate as large customer load, was based on only a limited evaluation of the old econometric model and alternatives. Cambridge's failure to improve the econometric model is particularly serious in light of its unsupported assumptions regarding similar customer mixes and the growth rate of baseline load. The Siting Council notes that Cambridge's failure to fully explore the econometric model and other alternatives is contrary to its obligation to improve its demand forecasting technologies.

Third, with respect to Cambridge's forecast of new load, the Siting Council is extremely concerned that Cambridge has not evaluated the accuracy of the DPIS forecast. Clearly, CELCo's failure to evaluate the accuracy of this forecast affects the reliability of this portion of the commercial forecast. Similarly, Cambridge has failed to support its assumption regarding its constant annual new system load projections during the later forecast years. CELCo has provided no analysis in support of the reliability of such an assumption. Clearly, a more appropriate methodology for forecasting new customer load in the long term is needed.

Fourth, the Siting Council notes that, based on this record, the inclusion of the municipal sector in the commercial sector may be inappropriate. Energy consumption in CELCo's municipal sector is sufficiently large such that, with the two sectors combined, a different growth pattern in the municipal sector may disguise the true growth pattern of the commercial sector. Importantly, Siting Council regulations require a separate railway forecast. 980 CMR 7.03(7)(a)6.

Finally, we are particularly troubled by Cambridge's suggestion that there is no compelling reason to change a

forecast methodology that the Siting Council approved in the past. We note that Cambridge is under a continuing obligation to its ratepayers, in the absence of any specific instruction from the Siting Council, to produce a reviewable, appropriate, and reliable demand forecast. Significantly, this is an obligation that Cambridge's sister company, Commonwealth, has fulfilled. The fact that Cambridge's commercial forecast underprojected energy consumption to such a significant degree provides Cambridge a sufficient basis to change or to begin to take steps to change or improve its methodology. Instead, Cambridge has failed to demonstrate that it has adequately researched or otherwise considered obtaining an employment forecast necessary for implementing an end-use methodology.

Further, the Siting Council notes that a number of companies employ end-use methodologies for their commercial sectors. 1991 Nantucket Decision, EFSC 90-28 at 20-32; 1989 MECo/NEPCo Decision, 18 DOMSC at 310-322; 1989 BECo Decision, 18 DOMSC at 218-219; 1988 EECo/Montaup Decision, 18 DOMSC at 88-91; 1988 NU Decision, 17 DOMSC at 12-16. In fact, no electric company in the Commonwealth employs the survey-driven methodology used by Cambridge to project commercial energy consumption.

Accordingly, based on the foregoing the Siting Council finds that Cambridge has failed to establish that its methodology for forecasting commercial energy requirements is reviewable, appropriate, and reliable. The Siting Council ORDERS Cambridge in its next filing to implement a new methodology that is appropriate for a company of Cambridge's size. However, we realize that CELCo may not have sufficient time to fully comply with this ORDER by the IRM initial filing date. In the event that Cambridge cannot fully comply, the Siting Council FURTHER ORDERS CELCo to: (1) implement an econometric methodology, or a reasonable proxy, using available data; and (2) present a detailed plan for the implementation of a new methodology for forecasting commercial energy

requirements.[31]

4. Industrial Energy Forecast

a. Description

In 1988, Cambridge's industrial sector accounted for 7.3 percent of its total annual energy output requirements (Exh. C-1, Table E-8). Historically, CELCo's industrial energy requirements declined from 156,754 MWh in 1976 to 100,612 MWh in 1988, a compound annual growth rate of negative 3.63 percent (id.). CELCo projects its industrial energy requirements to increase from 100,560 MWh in 1989 to 111,730 MWh in 1998, a compound annual growth rate of 1.18 percent (id.). See Table 3, below.

Cambridge's methodology for forecasting industrial energy requirements has not changed significantly since the Siting Council's last review of CELCo's industrial forecast. 1985 CECo/CELCo Decision, 12 DOMSC at 47-49. CELCo stated that it separates existing industrial load into baseline load and large customer load (Exh. C-1, p. 1.2.4). Cambridge indicated that it does not expect any new loads during the forecast period (id.).

Cambridge stated that the large industrial customer forecast uses the same survey forms as the large commercial customer forecast (Exhs. HO-9, HO-9A). Each large industrial customer returns a survey stating its predicted electric requirements for the forecast period (id.). The survey results are then summed by year to produce the large industrial customer forecast (id.). CELCo stated that it surveyed 17 large customers accounting for approximately 89.7 percent of total industrial energy consumption (Exh. HO-48B; Exh. C-1,

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31/ The Siting Council notes that submittal of an econometric methodology, or a reasonable proxy, for forecasting CELCo's commercial energy requirements in its IRM filing does not guarantee approval of such methodology. However, if Cambridge presents an econometric methodology, or a reasonable proxy, in its IRM filing, the Siting Council will determine whether such methodology, or reasonable proxy, will lead to an overall demand forecast that could be used for purposes of the IRM process.

Table E-5). CELCo projected that large customer load would increase at a compound annual growth rate of 1.36 percent from 1989 to 2000 (Exh. HO-48B). However, CELCo indicated that, from 1979 to 1988, large industrial customer energy consumption has declined at a compound annual rate of 3.75 percent (id.). In addition, CELCo indicated that during the historical period, eleven firms in Cambridge's industrial sector closed (id.). CELCo noted that its industrial forecast methodology does not allow it to capture the possibility that a surveyed large industrial customer account would cease operations during the forecast period (Tr. 1, p. 90).

Cambridge stated that it calculated industrial baseline load in the base year 1988 by subtracting 1988 actual large-customer load from actual total industrial load (id., p. 83). CELCo asserted that baseline load will remain at 1988 levels over the forecast period, with all load growth accounted for by growth in the large-customer load (Exh. C-1, p. 1.2.4).

Finally, CELCo's 1984 filing forecasted a positive growth rate for industrial load between 1984 and 1988 (Exh. HO-4A). However, CELCo indicated that industrial energy consumption during that period actually declined, leading to a 56 percent error in the forecast (Tr. 1, p. 39).

b. Analysis

Since Cambridge uses a survey to forecast large industrial load that is the same as its survey to forecast large commercial load, the Siting Council's analysis and findings regarding the commercial survey methodology apply here as well. See Section III.A.3, above. In addition, the Siting Council addresses particular concerns it has with the industrial forecast, below.

As indicated above, CELCo's 1984 forecast contained a 56 percent error in its forecast of industrial load over the period from 1984 to 1988. Further, over the historical period, from 1979 to 1988, the record indicates that large industrial customer load has declined. Despite this trend, CELCo presented

a forecast in this proceeding, as well as the last proceeding, with an increasing growth rate over the forecast period. Yet, CELCo maintains that its survey methodology for forecasting industrial energy consumption is sound. In this proceeding, CELCo has failed to support or justify this growth rate. The Siting Council notes that electric companies are required to use reasonable statistical projection methods based on accurate historical data. G.L. c. 164, sec. 69H.

In addition, the Siting Council has concerns with CELCo's survey methodology which is based on projections provided by its large customers. First, customers may be reluctant to forecast declines in consumption or less rapid increases in consumption, and the record indicates that CELCo's methodology cannot capture the possibility that a large industrial customer account would close during the forecast period. Second, customers may not have the data and expertise to include state economic indicators and other relevant factors in their projections of industrial consumption. In this proceeding, Cambridge has not shown that its customers have this expertise. Finally, Cambridge has provided no assurances that this survey methodology will not lead to a significant overprojection of industrial energy consumption as evidenced by the historical results of this methodology.

With respect to Cambridge's forecast of baseline load, CELCo's projection of a constant industrial baseload consumption is merely a mathematical exercise without any support or justification. In fact, industrial baseload consumption may increase or decrease over the forecast period. CELCo simply has failed to account for the actions of the customers represented by the baseload figure.

Accordingly, based on the above, the Siting Council finds that Cambridge has failed to establish that its methodology for forecasting industrial energy consumption is reviewable, appropriate, and reliable. The Siting Council ORDERS Cambridge in its next filing to implement a new methodology for forecasting industrial energy requirements which is appropriate

for a company of CELCo's size and is based on service territory-specific data disaggregated by SIC. However, we realize that Cambridge may not have sufficient time to comply fully with this ORDER by its IRM initial filing date. In the event that Cambridge cannot fully comply, the Siting Council FURTHER ORDERS CELCo to: (1) implement an econometric methodology, or a reasonable proxy, using available historical data; and (2) present a detailed plan for implementing a new methodology for forecasting industrial energy requirements which is appropriate for a company of CELCo's size and is based on service territory-specific data disaggregated by SIC.[32]

5. Miscellaneous Energy Forecast

a. Description

Cambridge stated that, in 1988, the miscellaneous energy sector accounted for approximately 11.9 percent of its total annual energy output requirements (Exh. C-1, Table E-8, p. 1.4.38; Exh. HO-66). CELCo forecasted miscellaneous sector energy consumption to grow from 150,780 MWh in 1989 to 167,460 MWh in 1998, a compound annual growth rate of 1.17 percent (Exh. C-1, Table E-8). See Table 3, below. CECo stated that the miscellaneous energy forecast consists of the forecasts of energy requirements of sales for resale, streetlighting, unbilled sales, company use, and system losses (Exh. C-1, p. 1.2.5).

CELCo indicated that its sales for resale are made entirely to Belmont (id., Table E-7). In 1988, sales to Belmont amounted to 99,479 MWh (id.). Cambridge indicated that Belmont is part of the Massachusetts Municipal Wholesale Electric

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32/ The Siting Council notes that submittal of an econometric methodology, or a reasonable proxy, for forecasting CELCo's industrial energy requirements in its IRM filing does not guarantee approval of such methodology. However, if Cambridge presents an econometric methodology, or a reasonable proxy, in its IRM filing, the Siting Council will determine whether such methodology, or reasonable proxy, will lead to an overall demand forecast that could be used for purposes of the IRM process.

Company ("MMWEC"), and therefore, it used MMWEC's electric requirements forecast for Belmont as its sales for resale forecast (id., p. 1.2.5). CELCo noted that up until July 1985, however, Belmont was considered a total requirements customer (id., Table E-7). Since 1985, Belmont has purchased some power from the New York Power Authority, and has since been considered by Cambridge to be a partial requirements customer (id.). MMWEC's forecast for Belmont is adjusted to reflect Belmont's purchases from the New York Power Authority (id., p. 1.2.5). CECo indicated, however, that sales to Belmont are not included in Cambridge's total energy output requirements (id., Table E-7). CECo also indicated that in March, 1993, it would terminate sales to Belmont (id., p. II.6.25).

Cambridge forecasts its streetlighting energy requirements to remain constant at current levels (id., p. 1.2.5). CELCo stated that a streetlighting conversion program in Cambridge has been completed and therefore, CELCo does not anticipate any new streetlighting requirements (id.).

Cambridge stated that it forecasts unbilled sales using a combined growth rate of the residential, commercial and municipal classes (Exh. HO-15). First, CELCo totals the sales to the three sectors over the historical period and develops a growth rate based on the total sales (Tr. 1, p. 91). Then, it applies this growth rate to an accounting term called "unbilled amount" to obtain the value for unbilled sales (id.)

Cambridge stated that it forecasts company use to remain constant at its current level over the forecast period, based on historical data (Exh. HO-RR-7). Ms. Connor stated that company use has remained "relatively constant" over the last three years (Tr. 1, p. 92).

In regard to system losses, Cambridge stated that it calculates this forecast by using the most current ratio of losses to total sales (Exh. HO-15). Cambridge multiplies this constant ratio by future total sales projections to obtain a system losses forecast (id.).

b. Analysis

In general, the Siting Council accepts the Cambridge's methodologies for forecasting the energy requirements of the sales for resale, streetlighting, unbilled sales, company use, and system losses sectors. The Siting Council, however, is concerned that the sales to Belmont are excluded from Cambridge's total energy output requirements. In order to present an accurate forecast, CELCo must include all of its energy requirements in the forecast. Importantly, the failure to do so could lead to an underforecast of energy requirements. Therefore, the Siting Council ORDERS Cambridge in its next filing to include all sales to Belmont in its calculation of total energy output requirements.

6. Conclusions on Energy Forecast

The Siting Council has accepted Cambridge's methodology for forecasting: (1) electricity price; and (2) energy requirements of the sales for resale, streetlighting, unbilled sales, company use, and system losses sectors. However, the Siting Council has found that Cambridge has failed to establish that its methodology for forecasting: (1) residential energy requirements is reviewable, appropriate and reliable; (2) commercial energy requirements is reviewable, appropriate and reliable; and (3) industrial energy requirements is reviewable, appropriate and reliable.

The Siting Council is greatly concerned with Cambridge's failure to improve its methodologies for forecasting energy requirements. With respect to the residential forecast, Cambridge has not taken sufficient steps to implement an end-use methodology despite having conducted two appliance saturation surveys and load usage research. In regard to the commercial and industrial forecasts, Cambridge continues to use unreliable survey data to project energy consumption for these sectors. Moreover, with respect to commercial baseline use, Cambridge has abandoned an econometric methodology which has a greater potential for producing an accurate projection of this use than

the methodology CELCo currently employs. Electric companies are under a continuing obligation to their ratepayers to improve their forecasting techniques. The Siting Council notes that CELCo's has not adopted an end-use methodology by this date. Many other electric companies in the state, including Commonwealth, have adopted end-use methodologies for forecasting consumption in their energy forecasts. 1991 Nantucket Decision, EFSC 90-28 at 20-32; 1989 MECo/NEPCo Decision, 18 DOMSC at 305-322; 1989 BECo Decision, 18 DOMSC at 217-219; 1988 EECo/Montaup Decision, 18 DOMSC at 84-91; 1988 NU Decision, 17 DOMSC at 10-16.

Finally, the Siting Council notes that the problems in Cambridge's forecast stand in sharp contrast with Commonwealth's forecast. The Siting Council is confident that the joint relationship of these two companies can help Cambridge address the problems in its forecast in the future.

On balance, the Siting Council finds Cambridge's energy forecast not to be reviewable, appropriate, and reliable.

B. Peak Demand Forecast

1. Description

Cambridge indicated that, in the past, it has been a summer-peaking system (Exh. C-1, Table E-11). In the summer of 1989, Cambridge's peak demand reached an all-time high of 271.5 MW (id., p. 1.1.1). Historically, CELCo's peak load increased from 163 MW in 1976 to 237 MW in 1988, a compound annual growth rate of 3.17 percent (id., Table E-11). Cambridge projects peak demand to grow during the forecast period from 256 MW in 1989 to 344 MW in 1998, a compound annual growth rate of 3.34 percent (id.). See Table 4, below.

Cambridge stated that it uses an HLV model to forecast

peak demand by customer class (id., p. 1.2.12).[33] CELCo indicated that it bases the HLV model on use patterns derived from service-territory-specific load data (id.). In its filing, Cambridge indicated that it obtained the load data from: (1) 48 percent or 20 of its large customers in the industrial class; (2) 12 percent or 22 of its large customer in the commercial class; (3) or two percent or six of its large customers in the municipal class; (4) 100 of Cambridge's residential customers; and (5) Belmont (id., p. 1.2.13). However, CELCo also stated, in a response to an information request, that load shape use patterns were obtained only from the commercial, industrial, and municipal classes (Exhs. HO-4A, p. 1.2.19, HO-53).

The HLV model develops two sets of hourly system loads, one for normal days and one for peak days (Exh. C-1, pp. 1.2.12-13). The normal temperature hourly system loads are calculated as a function of forecasted annual consumption and use patterns classified by month, day, hour and customer class (id.). Peak temperature hourly system loads are calculated by multiplying the normal temperature hourly system loads by a normal to peak temperature hourly scaling factor (id.).[34] The scaling factor for the industrial class is set at one because CELCo assumes that weather does not affect industrial energy consumption (id.).

Cambridge used 1981 research data in developing load shape use patterns (Exhs. HO-4A, p. 1.2.19, HO-53). The research conducted on load shape use patterns apparently

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33/ The customer classes are the residential, commercial, industrial, municipal, Belmont, and miscellaneous classes (Exh. C-1, p. 1.2.12). The loads of various other consumption classes also are included in the peak demand forecast. Company use is included in the commercial class, system losses in the miscellaneous category, and unbilled sales are divided between the residential, commercial and municipal classes (id., p. 1.2.13).

34/ Cambridge calculated scaling factors using actual system load data from 1980 and 1981 (Exh. HO-52). CELCo developed 288 individual peak day to average day hourly relationships (id.).

measured only 12 percent of commercial customers and 2 percent of municipal customers (id.). When questioned about the statistical significance of this sample size, Ms. Connor stated that she did not know "what statistical tests may have been run or any of the details of what data might have been available..." (Tr. 1, pp. 93-94). In spite of the vintage of the data, Ms. Connor stated that there have been no further studies since 1981, and that there is no current research being conducted (id., pp. 95-96).

2. Analysis

CELCo's overall peak load forecast methodology -- using an HLV model based on service-territory-specific use patterns -- is appropriate for a company of Cambridge's size. However, the Siting Council has numerous concerns regarding CELCo's implementation of this methodology. First, in response to questions, CELCo could not produce any documentation supporting the load shape use patterns which it employs (Exhs. HO-16, HO-53). In addition, it is unclear from the record whether CELCo obtained the load data on the 100 residential customers and Belmont. Thus, Cambridge failed to provide sufficient documentation to allow a full and proper review of its peak demand forecast.

Second, the Siting Council notes that the load shape use patterns may be based on a statistically insignificant sample size -- 12 percent of commercial customers and 2 percent of municipal customers. The appropriateness and reliability of using such a small sample to determine the use patterns for all classes has not been shown by Cambridge in this proceeding.

Finally, the Siting Council is concerned with the vintage of Cambridge's use pattern data. This, in addition to the fact that Cambridge is not attempting to update the data, raises further serious questions about the reliability of the load shape use patterns and Cambridge's concern for forecasting reliability.

Based on the above, the Siting Council finds that CELCo has established that its methodology for forecasting peak demand

is appropriate. The Siting Council also finds, however, that CELCo has not established that its methodology for forecasting peak demand is reviewable and reliable.[35]

The Siting Council ORDERS Cambridge in its next forecast filing to: (1) provide full and detailed documentation of all data and procedures used in the peak demand forecast; (2) fully justify the statistical significance and application of any and all data used; (3) present the data and documentation in a comprehensible and easily reviewable format, and (4) report on the efforts of the load research committee to obtain new data and use patterns.

C. Conclusions on the Demand Forecast

The Siting Council has found that Cambridge has failed to establish that its methodology for forecasting energy requirements is reviewable, appropriate, and reliable. The Siting Council also has found that Cambridge has established that its methodology for forecasting peak demand is appropriate, but has failed to establish that its methodology for forecasting peak demand is reviewable and reliable.

Accordingly, the Siting Council REJECTS Cambridge's demand forecast.

35/ The record on this issue, however, does not allow the Siting Council to estimate whether Cambridge's peak demand forecast underprojects or overprojects peak consumption.

IV. DECISION AND ORDER

The Siting Council hereby APPROVES the 1989 demand forecast of the Commonwealth Electric Company and hereby REJECTS the 1989 demand forecast of the Cambridge Electric Light Company.

The Siting Council ORDERS Commonwealth Electric Company and the Cambridge Electric Light Company in its next forecast filing to comply with the ORDERS contained herein.

Frank P. Pozniak
Hearing Officer

Dated this 11th day of July, 1991.

UNANIMOUSLY APPROVED by the Energy Facilities Siting Council at its meeting of July 11, 1991 by the members and designees present and voting. Voting for approval of the Tentative Decision as amended: Gloria Cordes Larson (Secretary of Consumer Affairs and Business Regulation); Andrew Greene (for Susan Tierney, Secretary of Environmental Affairs); Joseph Donovan (for Daniel S. Gregory, Secretary of Economic Affairs); Chris Donodeo Cashman (for Paul W. Gromer, Commissioner of Energy Resources); Mindy Lubber (Public Environmental Member); and Joseph Faherty (Public Labor Member).

Gloria C. Larson

Gloria Cordes Larson
Chairperson

Dated this 11th day of July, 1991

TABLE 1

COMMONWEALTH ELECTRIC COMPANY
Base Case Forecast of Total Annual Energy Output Requirements
and Energy Output By Customer Class
1989-1998
(MWh)

Year	Residential	Commercial[a]	Industrial	Miscellaneous[b]	Total Annual Energy Output
1989	1,653,904	1,203,376	374,385	389,552	3,621,217
1990	1,666,725	1,237,790	381,547	395,280	3,681,342
1991	1,696,482	1,268,491	386,379	404,046	3,755,398
1992	1,755,174	1,292,623	389,238	414,895	3,851,930
1993	1,814,782	1,316,135	394,721	425,205	3,950,573
1994	1,880,819	1,339,475	401,220	436,170	4,057,684
1995	1,952,460	1,368,133	407,854	448,794	4,177,236
1996	2,020,223	1,396,541	414,880	460,149	4,291,793
1997	2,098,610	1,425,892	419,104	473,311	4,416,917
1998	2,177,090	1,450,382	425,842	482,857	4,536,171

Notes:

a. Commonwealth's figures for commercial load in Table E-8 included sales to AT&T, Otis, and Canal. In this table, these three figures are disaggregated to the miscellaneous sector.

b. The miscellaneous sector includes the figures for AT&T, Canal, Otis, streetlighting, unbilled sales, company use, and system losses. In this table, the Commonwealth figure of 40,000 MWh was used to forecast AT&T consumption in 1989. For subsequent years, the 1989 figure of 40,000 MWh was increased at the same rate as SIC 40.

Source: Exh. C-1, p. 1.4.38, Table E-8, Table C3

TABLE 2

COMMONWEALTH ELECTRIC COMPANY
Base Case Forecast of Peak Demand[a]
1989-1998

Year	Summer Peak (MW)	Winter Peak (MW)
1989	637	699
1990	646	714
1991	658	737
1992	674	759
1993	692	782
1994	711	809
1995	731	837
1996	748	866
1997	768	895
1998	788	917

Notes:

a. Unadjusted for Company-sponsored C&LM

Source: Exh. C-1, Table E-11, Part 4

TABLE 3

CAMBRIDGE ELECTRIC LIGHT COMPANY
Base Case Forecast of Total Annual Energy Output Requirements
and Energy Output By Customer Class
1989-1998
(MWh)

Year	Residential	Commercial[a]	Industrial	Miscellaneous[b]	Total Annual Energy Output
1989	150,700	998,820	100,560	150,780	1,400,860
1990	155,090	1,081,940	101,500	157,460	1,495,990
1991	162,140	1,128,550	103,000	157,420	1,551,110
1992	166,110	1,176,700	103,980	159,370	1,606,160
1993	170,610	1,209,120	105,260	159,670	1,644,660
1994	175,920	1,233,320	106,460	160,780	1,676,210
1995	181,320	1,265,560	107,700	162,420	1,717,000
1996	186,470	1,288,760	109,000	163,050	1,747,280
1997	192,130	1,320,750	110,330	164,680	1,787,890
1998	197,940	1,368,150	111,730	167,460	1,845,280

Notes:

a. Includes sales to the municipal sector

b. The miscellaneous sector includes the figures for sales for resale, streetlighting, system losses, company use, and unbilled sales.

Source: Exh. C-1, Table E-8

TABLE 4

CAMBRIDGE ELECTRIC LIGHT COMPANY
Base Case Forecast of Peak Demand[a]
1989-1998

Year	Summer Peak (MW)	Winter Peak (MW)
1989	256	221
1990	275	236
1991	286	244
1992	297	254
1993	304	260
1994	310	266
1995	318	273
1996	324	278
1997	332	284
1998	344	294

Notes:

a. Unadjusted for Company-sponsored C&LM

Source: Exh. C-1, Table E-11, Part 2

Appeal as to matters of law from any final decision, order or ruling of the Siting Council 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 Council modified or set aside in whole or in part.

Such petition for appeal shall be filed with the Siting Council within twenty days after the date of services of the decision, order or ruling of the Siting Council or within such further time as the Siting Council may allow upon request filed prior to the expiration of 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. (See. 5, Chapter 25, G.L. Ter. Ed., as most recently amended by Chapter 485 of the Acts of 1971).

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Council

In the Matter of the Petition of Eastern Energy Corporation for Approval to Construct a Bulk Generating Facility and Ancillary Facilities	EFSC 90-100

FINAL DECISION

Robert D. Shapiro
Robert P. Rasmussen
Hearing Officers
August 2, 1991

On the Decision:

Phyllis Brawarsky
Pamela M. Chan

Diedre Matthews
JoAnne Pierce
Barbara Shapiro

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TABLES:

The Energy Facilities Siting Council hereby CONDITIONALLY APPROVES the petition of Eastern Energy Corporation to construct a 300 megawatt bulk generating facility and ancillary facilities in New Bedford, Massachusetts.

I. INTRODUCTION

A. Summary of the Proposed Project and Facilities

Eastern Energy Corporation ("EEC" or "Company") has proposed to construct a 300 megawatt ("MW") circulating fluidized bed ("CFB") boiler cogeneration power plant on a 282 acre parcel of land currently owned by Polaroid Corporation ("Polaroid") in the Greater New Bedford Industrial Park ("GNB Industrial Park") located in New Bedford, Massachusetts (Exh. HO-1A, p. 1). The facility, as proposed, would be fired with medium sulfur eastern bituminous coal[1] with No. 2 fuel oil to be used for startup and for stabilizing combustion (id., pp. 13, 27, Exhs. HO-RR-28, HO-RR-29). The fuel and limestone needed for the facility would be delivered in covered railroad cars by way of an active Conrail line that abuts the project site and a railway spur that would be constructed on the site (Exh. HO-1A, pp. 2, 24). The resultant ash from the facility would be removed from the site for disposal and returned in the covered railroad cars, via the same rail system (id.). A fifteen-day supply of coal and a ten-day supply of limestone would be stored on-site in covered buildings (id., pp. 2, 26-27, 43).

1/ During the course of this proceeding, the Company has referred to the coal that will be used in the proposed facility as "low sulfur" coal (Exh. HO-1A, p. 2) and "medium sulfur" coal (Tr. 4, p. 18). The Company indicated that it intends to limit coal purchases to coal with a maximum sulfur content of 1.8 percent (Exh. HO-E-99, see also, Exh. HO-2A, Table 2.3-1). As the Company's witness, Mr. King, indicated that coal with a sulfur content between approximately 1 percent and 2.0 - 2.5 percent is considered medium sulfur coal (Tr. 4, p. 11), the Siting Council will use the term "medium sulfur" coal when referring to the coal that EEC has plans to use in the proposed facility.

The proposed facility would utilize air-cooled condensors to minimize the water requirements of the facility (id., p. 16). In addition, approximately 50 percent of the facility's water requirements would be provided by the discharge from Polaroid's wastewater treatment plant and recycled process water from the proposed cogeneration facility (id., p. 137). The balance of EEC's water requirements would be provided by the City of New Bedford water system (Exh. HO-E-12A, p. 1-21).

EEC's petition includes a request to construct the generating facility, along with the following ancillary facilities: (1) two 600-foot, 115 kilovolt ("kV") transmission lines, from the generating facility to the existing Commonwealth Electric Company ("Com/Electric") transmission lines bordering the proposed facility site (Exhs. HO-1A, p. 31, HO-RR-34; Tr. 8, p. 99); (2) an electric switchyard with four 115 kV gas circuit breakers and associated disconnect and grounding switches (Exh. HO-1A, p. 31); and (3) an oil storage facility (Exh. HO-E-83). The proposed facility would be situated primarily on approximately 50 acres in the northwest corner of the 282 acre parcel of land (Exhs. HO-1A, pp. 134-135, HO-E-77, HO-E-83). The land is bordered on the North by the Com/Electric transmission right-of-way, on the East by the existing Conrail line, and on the South and West by the Acushnet Cedar Swamp State Reservation (Exh. HO-1A, p. 132). Access to the facility would be from an existing roadway North of the parcel and outside the GNB Industrial Park boundary (Exh. HO-E-83).

The proposed facility also would include the following major components and structures: (1) a two-level turbine building; (2) a boiler building housing the three CFB boilers; (3) a control building; (4) an administration/warehouse building; (5) a water treatment building housing all equipment necessary for processing water resources required for plant operation and subsequent discharge to the sewer system; (6) fuel and limestone storage buildings; (7) a 380-foot tall

exhaust stack; (8) an air-cooled condenser; (9) a main electrical transformer; (10) a ladder type train breakdown yard for handling fuel, limestone, and ash; and (11) nine storage tanks for water, wastewater, and condensate (Exh. HO-1A, pp. 15-17, 24-25, 40-43, Attachment 2). EEC anticipates commercial operation of the facility within approximately 47 months from financial closing (Exh. HO-PV-1). Total capital costs for the proposed facility will be approximately $593 million (Exh. HO-PV-17).

EEC stated that the proposed facility would be a "Qualifying Facility" ("QF") under the Public Utilities Regulatory Policies Act of 1978 ("PURPA"), which requires electric utility companies to purchase power from QFs for a price at or below the utility's avoided cost of production (Exhs. HO-1A, p. 1, HO-B-22). EEC has filed for certification of the proposed facility as a QF with the Federal Energy Regulatory Commission ("FERC") (Exh. HO-RR-50). FERC certification of the proposed facility would be based upon a finding that EEC would sell enough of the facility's steam byproduct so as to qualify as a cogeneration facility under PURPA (Exhs. HO-B-22, HO-B-23). EEC has an agreement to sell steam to the adjacent Polaroid facility and currently is pursuing additional steam hosts in the area of the GNB Industrial Park (Exhs. HO-1A, pp. 66-67, HO-1C, HO-B-9).

EEC has executed separate 20-year power purchase agreements ("PPAs") with Cambridge Electric Light Company ("Cambridge") and Com/Electric for a combined total of 83 MW of power (Exhs. HO-1A, p. 47, HO-MN-1).[2] Both of these agreements were approved by the Massachusetts Department of Public Utilities ("MDPU") in 1989. EEC has indicated that it had bid in the second Com/Electric and Cambridge Request For Proposals ("RFP"), and that it would submit bids in the upcoming Eastern Utilities Associates, Boston Edison Company,

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2/ The PPA with Cambridge is for 33 MW of power and the PPA with Com/Electric is for 50 MW of power (Exh. HO-MN-1).

and Northeast Utilities solicitations for power (Exhs. HO-35, HO-MN-25; Tr. 11, pp. 122-133). EEC also has indicated that it likely would attempt to negotiate PPAs directly with major utilities (Tr. 14, p. 29). In addition, EEC indicated its intention to continue discussions with the Massachusetts Municipal Wholesale Electric Company ("MMWEC") and other municipal electric companies regarding power sales (id.; Exh. HO-RR-45; Tr. 11, pp. 122-133).

EEC was formed in 1987 to pursue the proposed project and other cogeneration and alternative energy projects. The proposed project is being developed by EEC and PG&E - Bechtel Generating Company ("Generating Company"). The Generating Company is a partnership comprising PG&E Generating Company and Bechtel Generating Company, Inc.[3] This is the first energy project developed by EEC. However, EEC indicated that: (1) its president, James L. Croyle, has previous finance experience with cogeneration projects and has arranged financing for such projects by securing loans totalling $2 billion; (2) PG&E has developed and currently owns and operates more than 15,000 megawatts of electric generation; and (3) BEn is the leading engineering, construction and development company to the American utility industry and has built more than 400 power plants worldwide (Exhs. HO-1A, p. 6, HO-B-1, HO-B-16).

B. Procedural History

On January 29, 1990, EEC filed with the Siting Council its proposal to construct the coal-fired cogeneration facility and ancillary facilities described herein (Exh. HO-1A). The

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3/ EEC has executed a Development Agreement for the proposed project with Bechtel Enterprises ("BEn") and PG&E Enterprises ("PG&EE")(Exh. HO-B-16). Bechtel Generating Company and PG&E Generating Company are special purpose subsidiaries of BEn and PG&EE, respectively (Exh. HO-B-1). BEn is a wholly owned subsidiary of the Bechtel Group, Inc.; PG&EE is a wholly owned non-utility subsidiary of Pacific Gas and Electric Company ("PG&E") (id.).

Siting Council docketed this petition as EFSC 90-100. On April 2, 1990, the Siting Council conducted a public hearing in the City of New Bedford. In accordance with the direction of the Hearing Officer, EEC provided notice of public hearing and adjudication.

Petitions to intervene were filed by the Office of the Attorney General ("Attorney General"), the Department of Environmental Management ("DEM"), the City of New Bedford ("CNB"), Codman & Shurtleff, Inc. ("C&S"), and the Greater New Bedford NO-COAL Coalition ("NO-COAL"). Petitions to participate as an interested person were filed by Robert H. Ladino, Henry B. Riley, and Mary T. and Donald J. Marshall. On May 17, 1990, the Hearing Officer conducted a pre-hearing conference at which all petitions to intervene and all petitions to participate as an interested person were allowed[4] and discovery and hearing schedules were established.

On July 3, 1990, in response to the first set of information requests propounded by C&S, EEC filed a motion to limit discovery, or, in the alternative, to object to certain information requests. EEC filed supplemental objections on July 5, 1990. A response to EEC's motion was filed by C&S on July 10, 1990. On July 11, 1990, a hearing was held on the motion and objections. At this hearing, the Hearing Officer denied EEC's motion to limit discovery propounded by C&S but sustained objections to certain C&S information requests.

The intervention of C&S was withdrawn on July 16, 1990. In the letter of withdrawal, C&S noted it did not expect responses to outstanding discovery.

On July 20, 1990, the Attorney General filed a motion to submit designated requests propounded by former intervenor C&S,

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4/ At the May 17, 1990 pre-hearing conference, Michael Josefek and Charles Rainville, members of NO-COAL, were granted intervenor status as individuals; however, for purposes of this proceeding, they were to be known as the GNB NO-COALition.

and to extend the deadline for filing intervenor pre-filed testimony. On July 3, 1990, EEC filed a response to the motion of the Attorney General. In its response, EEC agreed to provide the responses requested, but objected to the extension of the deadline for submitting intervenor pre-filed testimony. On July 27, 1990, NO-COAL filed a request for EEC to provide the responses to the remaining information requests of C&S -- those responses not designated by the Attorney General. EEC agreed to provide these responses as well.

On July 30, 1990, the Hearing Officer acknowledged EEC's agreement to provide the responses as requested by the Attorney General and NO-COAL. In addition, the Hearing Officer allowed the Attorney General's motion for an extension of time to submit pre-filed testimony.

Following a pre-hearing conference on October 4, 1990, the Siting Council conducted 14 days of evidentiary hearings commencing October 9, 1990 and ending November 7, 1990. EEC presented 13 witnesses: Robert M. Earsy, a noise consultant, who testified regarding noise impacts of the facility; Steven P. Damiano, an environmental scientist employed by ENSR Consulting and Engineering ("ENSR"), who testified regarding impacts to wetlands, wildlife and the Acushnet Cedar Swamp State Reservation; James H. Slack, senior program manager for ENSR, who testified regarding air permits and air resource impacts; Denis King, project engineer for Bechtel Power Corporation ("BPC"), who testified regarding project design and technical activities of the project; Ronald C. Denhardt, a senior economist with Jensen Associates, Inc., who testified regarding natural gas issues relating to the proposed facility; Glen Harkness, vice president of ENSR, who testified regarding the environmental studies and permits that were prepared by ENSR; Theodore F. Kuhn, an executive economist with R. W. Beck and Associates ("R. W. Beck"), who testified regarding demand forecasts; James L. Croyle, general manager for the project, who testified regarding steam sales, PPAs, project construction, financing, operation, and site selection;

Gary W. Warner, partner and manager of the Boston Engineering Office of R. W. Beck, who testified regarding local electric system reliability and transmission issues; John P. Smith, an independent consultant in the coal industry who testified regarding fuel procurement issues; William R. Lane, an engineering specialist for BPC, who testified regarding pollution control issues; and Roger M. Cotte, a partner and manager of the Boston Consulting Office of R. W. Beck, and James A. Booth, principal engineer of the Boston Consulting Office of R. W. Beck, both of whom testified regarding power supply and need assessment.

The Attorney General presented two witnesses: Dr. Barbara D. Beck, a principal with the Gradient Corporation, an environmental consulting firm, who testified regarding health risk assessments, and Dr. C. Michael Mohr, of Energy and Environmental Engineering, Inc. and the Massachusetts Institute of Technology, who testified regarding fluidized bed coal combustors.

DEM presented one witness, Andrew E. Backman, a natural resource planner, who testified regarding environmental impacts to wetlands and the Acushnet Cedar Swamp State Reservation.

In addition, pre-filed testimony was introduced for CNB by Mark J. Mello, the acting director of the Lloyd Center for Environmental Studies, regarding wetland delineation for the project area, and for NO-COAL, by Stephen B. Cook, a NO-COAL member, regarding the location of power generating facilities in southeastern Massachusetts.[5]

The initial brief of DEM ("DEM Brief") was filed on December 11, 1990. Initial briefs were filed by EEC ("EEC Initial Brief"), the Attorney General ("AG Initial Brief"), CNB ("CNB Brief"), NO-COAL ("NO-COAL Initial Brief"), and

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5/ Although pre-filed testimony was submitted by both Mark J. Mello and Stephen B. Cook and introduced into the record, neither witness testified at the hearings.

Robert Ladino ("R. Ladino Initial Brief") on December 12, 1990. On December 21, 1990, Reply briefs were filed by EEC ("EEC Reply Brief"), the Attorney General ("AG Reply Brief"), and by NO-COAL and Robert Ladino jointly ("NO-COAL/Ladino Reply Brief").

On April 24, 1991, in response to the release of the 1991 New England Power Pool ("NEPOOL") Forecast Report of Capacity, Energy, Loads and Transmission, 1991-2006 ("1991 CELT Report"), the Hearing Officers reopened the record for the limited purpose of receiving additional information relative to that document. Because EEC had addressed the 1989 and 1990 CELT Reports in this case, the Hearing Officers required EEC to update its application and afforded EEC, as well as the intervenors and interested persons, an opportunity to submit additional information and/or a supplemental brief. EEC filed a supplemental brief ("EEC Supplemental Brief") and revised exhibits on May 7, 1991. Supplemental briefs were also filed by the Attorney General ("AG Supplemental Brief"), and by NO-COAL ("NO-COAL Supplemental Brief") on May 7, 1991, and by Robert Ladino ("R. Ladino Supplemental Brief") on May 9, 1991. NO-COAL also introduced an additional exhibit on May 7, 1990. Supplemental reply briefs were filed by EEC ("EEC Supplemental Reply Brief") and by NO-COAL ("NO-COAL Supplemental Reply Brief") on May 14, 1991.

The Hearing Officers entered 413 exhibits into the record, consisting largely of responses to information and record requests. EEC entered 57 exhibits into the record. The Attorney General entered 181 exhibits into the record. DEM entered 7 exhibits into the record. CNB entered 3 exhibits into the record. NO-COAL entered 10 exhibits into the record.

C. Jurisdiction

EEC's petition to construct a bulk generating facility and ancillary facilities is filed in accordance with G.L. c. 164, sec. 69H, which requires the Siting Council to ensure a necessary energy supply for the Commonwealth with

minimum impact on the environment at the lowest possible cost, and pursuant to G.L. c. 164, sec. 69I, which requires electric companies to obtain Siting Council approval for construction of proposed facilities at a proposed site before a construction permit may be issued by another state agency.

As a cogeneration facility with a capacity of approximately 300 MW, EEC's proposed generating unit falls squarely within the first definition of "facility" set forth in G.L. c. 164, sec. 69G. That section states, in part, that a facility is:

> (1) any bulk generating unit, including associated buildings and structures, designed for, or capable of operating at a gross capacity of one hundred megawatts or more.

At the same time, EEC's proposal to construct a transmission line, switchyard, and oil storage facilities, falls within the third definition of "facility" set forth in G.L. c. 164, sec 69G, which states that a facility is:

> (3) any ancillary structure including fuel storage facilities which is an integrated part of the operation of any electric generating unit or transmission line which is a facility.

In accordance with G.L. c. 164, sec. 69H, before approving an application to construct facilities, the Siting Council requires non-utility applicants to justify generating facility proposals in three phases. First, the Siting Council requires the applicant to show that additional energy resources are needed (see Section II.A, below). Second, the Siting Council requires the applicant to establish that its project is (1) consistent with the resource use and development policies of the Commonwealth (see Section II.B, below),[6] and (2) is

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6/ In the past, the Siting Council had required a non-utility applicant to establish that its proposed project was superior to alternative approaches in terms of cost, environmental impact, reliability, and ability to address the (footnote continued)

viable as a source of energy over time (see Section II.C, below). Finally, the Siting Council requires the applicant to show that its site selection process has not overlooked or eliminated clearly superior sites and that the proposed site is acceptable in terms of cost, environmental impacts and reliability of supply (see Section III, below). In cases where a noticed alternative is required, the Siting Council also requires the applicant to show that the proposed site for the facility is superior to the alternative site in terms of cost, environmental impacts, and reliability of supply.

(footnote continued) previously identified need. MASSPOWER, Inc., 20 DOMSC 301, 337-352 (1990) ("MASSPOWER"); Altresco-Pittsfield, Inc., 17 DOMSC 351, 370-378 (1988) ("Altresco-Pittsfield"); Northeast Energy Associates, 16 DOMSC 335, 360-380 (1987) ("NEA"). In MASSPOWER, the Siting Council announced that it would be formulating a new standard of review for evaluating the proposed project. MASSPOWER, 20 DOMSC at 350. In addition, notice of this intent to formulate a new standard of review was communicated to the parties in this proceeding in a memorandum from the Siting Council dated October 4, 1990.

II. ANALYSIS OF THE PROPOSED PROJECT

A. Need Analysis

1. Standard of Review

In accordance with G.L. c. 164, sec. 69H, the Siting Council is charged with the responsibility for implementing energy policies to provide a necessary 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 energy facilities in the Commonwealth, the Siting Council evaluates whether there is a need for additional energy resources[7] to meet reliability or economic efficiency objectives. The Siting Council, therefore, must find that additional energy resources are needed as a prerequisite to approving proposed energy facilities.

In evaluating the need for new energy facilities to meet reliability objectives, the Siting Council has evaluated the reliability of supply systems in the event of changes in demand or supply, or in the event of certain contingencies. With respect to changes in demand or supply, the Siting Council has found that new capacity is needed where projected future capacity available to a system is found to be inadequate to satisfy projected load and reserve requirements. West Lynn Cogeneration, EFSC 90-102, at 7-32 ("West Lynn"); MASSPOWER, 20 DOMSC at 314-323; Altresco-Pittsfield, 17 DOMSC at 360-369; NEA, 16 DOMSC at 344-360; Cambridge Electric Light Company, 15 DOMSC 187, 211-212 (1986) ("1986 Cambridge Decision"); Massachusetts Electric Company/New England Power Company, 13 DOMSC 119, 137-138 (1985) ("1985 MECo/NEPCo Decision"); Massachusetts

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7/ In this discussion, "additional energy resources" is used generically to encompass both energy and capacity additions, including, but not limited to, electric generating facilities, electric transmission lines, energy or capacity associated with power sales agreements, and energy or capacity associated with conservation and load management ("C&LM").

Electric Company/New England Power Company, 2 DOMSC 1, 9 (1977). With regard to contingencies, the Siting Council has found that new capacity is needed in order to ensure that service to firm customers can be maintained in the event that a reasonably likely contingency occurs. Middleborough Gas and Electric Department, 17 DOMSC 197, 216-219 (1988); Boston Edison Company, 13 DOMSC 63, 70-73 (1985) ("1985 BECo Decision"); Taunton Municipal Lighting Plant, 8 DOMSC 148, 154-155 (1982); Commonwealth Electric Company, 6 DOMSC 33, 42-44 (1981); Eastern Edison Company/Montaup Electric Company, 1 DOMSC 312, 316-318 (1977).

The Siting Council also has determined in some instances that utilities need to add energy resources primarily for economic efficiency purposes. The Siting Council has found that a utility's proposed energy facility was needed principally for providing economic energy supplies relative to a system without the proposed facility. 1985 MECo/NEPCo Decision, 13 DOMSC at 178-179, 183, 187, 246-247; Boston Gas Company, 11 DOMSC 159, 166-168 (1984).

While G.L. c. 164, sec. 69H, requires the Siting Council to ensure an adequate supply of energy for Massachusetts, the Siting Council has interpreted this mandate broadly to encompass not only evaluations of specific need within Massachusetts for new energy resources (Hingham Municipal Lighting Plant, 14 DOMSC 7, 14-18 (1985) ("1985 Hingham Decision"); 1985 BECo Decision, 13 DOMSC at 70-73), but also the consideration of whether proposals to construct energy facilities within the Commonwealth are needed to meet New England's energy needs. West Lynn, EFSC 90-102 at 7-32; MASSPOWER, 20 DOMSC at 311-323; Turners Falls Limited Partnership, 18 DOMSC 141, 151-165 (1988) ("Turners Falls"); Altresco-Pittsfield, 17 DOMSC at 359-365; NEA, 16 DOMSC at 344-360; Massachusetts Electric Company/New England Power Company, 15 DOMSC 241, 273, 281 (1986) ("1986 MECo/NEPCo Decision"); 1985 MECo/NEPCo Decision, 13 DOMSC at 129-131, 133, 138, 141. In so doing, the Siting Council has fulfilled the requirements of G.L. c. 164, sec. 69J, which recognizes that Massachusetts' generation and transmission system is

interconnected with the region and that reliability and economic benefits flow to Massachusetts from Massachusetts utilities' participation in NEPOOL.

In cases where a non-utility developer seeks to construct a jurisdictional generating facility principally for a specific utility purchaser or purchasers, the Siting Council requires the applicant to demonstrate that the utility or utilities needs the facility to address reliability concerns or economic efficiency goals. Where a non-utility developer has proposed a generating facility for a number of power purchasers that include purchasers that are as yet unknown, or for purchasers with retail service territories outside of Massachusetts, need may be established on a regional basis on either reliability or economic efficiency grounds. West Lynn, EFSC 90-102 at 10-32; MASSPOWER, 20 DOMSC at 314-323; Altresco-Pittsfield, 17 DOMSC at 361-365; NEA, 16 DOMSC at 344-360. However, the non-utility developer that proposes a generating facility to serve a regional need must also demonstrate to the Siting Council that the proposed facility benefits Massachusetts -- that is, it offers reliability, economic efficiency, or other benefits to the Commonwealth in sufficient magnitude to offset the impacts of construction and operation of the proposed facility on the Commonwealth's resources. West Lynn, EFSC 90-102 at 9; MASSPOWER, 20 DOMSC at 323-336; Turners Falls, 18 DOMSC at 153-164; Altresco-Pittsfield, 17 DOMSC at 361-362, 366-369; NEA, 16 DOMSC at 344-360.

2. Status of EEC's Power Purchase Agreements

The Company presented signed PPAs which were approved by the MDPU in 1989 for (1) the sale of 50 MW to Com/Electric, and (2) the sale of 33 MW to Cambridge (Exh. HO-MN-1). EEC also has presented a draft PPA with MMWEC for the sale of 17 MW or more (Exh. HO-RR-45; Tr. 11, pp. 128-131). Further, EEC stated that it: (1) has responded to the second Com/Electric and Cambridge RFPs, with an offer of 25 MW to each; (2) intends to respond to all upcoming RFPs issued by Massachusetts utilities; (3) is

pursuing a PPA with the Public Power Resource Development Group ("PPRDG");[8] and (4) may begin PPA negotiations with Boston Edison Company ("BECo") (Exhs. HO-35; Tr. 11, pp. 122-133).

EEC has presented signed and approved PPAs for 83 MW of its total output of 300 MW, and has indicated that it intends to sell the remaining portion of its output to Massachusetts utilities. Nevertheless, until PPAs for the remaining 217 MW are signed and approved, power purchasers for that portion of the project's output are considered to be unknown for the purposes of our review. Therefore, because EEC proposes to construct a facility for a number of power purchasers that are as yet unknown, the Siting Council evaluates whether New England[9] needs the proposed 300 MW of additional energy resources for reliability or economic efficiency purposes beginning in 1995 and beyond, and whether Massachusetts is likely to receive reliability, economic efficiency, or other benefits from the proposed additional energy resource beginning

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8/ The PPRDG is a relatively new association of municipal electric utilities (Tr. 11, p. 132).

9/ NO-COAL and Mr. Ladino argued that, instead of addressing the issue of regional need, the Siting Council should evaluate need for additional energy resources in the local area only (NO-COAL Initial Brief, pp. 9, 14-15, R. Ladino Initial Brief, pp. 18-19). NO-COAL and Mr. Ladino further argued that the Siting Council only has jurisdiction over need as it relates to Massachusetts (id.). As stated in Section II.A.1, above, generating facilities which are proposed to serve the need of one or more specific utilities are evaluated relative to the needs of those specific utilities. West Lynn, EFSC 90-102 at 10-32; MASSPOWER, 20 DOMSC at 314-323; Altresco-Pittsfield, 17 DOMSC at 361-365; NEA, 16 DOMSC at 344-360. However, because of the nature of the regional power supply system in New England, a project proposed for construction in Massachusetts may sell all or part of its output to non-Massachusetts utilities. Likewise, Massachusetts utilities frequently purchase power from generating facilities outside the state to serve their load. A review of need which is limited to a particular local area or service territory would fail to acknowledge our integrated regional power and transmission system, a system which provides benefits to all utilities and ratepayers.

in 1995 and beyond.[10, 11]

3. New England's Need for Additional Energy Resources

a. Introduction

EEC argued that New England needs additional energy resources for reliability purposes (EEC Initial Brief, pp. 15-32, 46-47, EEC Reply Brief, pp. 5-11, EEC Supplemental Brief, pp. 5-30, EEC Supplemental Reply Brief, pp. 1-2). Specifically, EEC argued that additional energy resources will be needed in the region for reliability purposes in the 1995-1998 time period because projected capacity is inadequate to satisfy the region's projected load and reserve requirements (EEC Supplemental Brief, pp. 9, 15-18, 30).[12]

10/ EEC asserted that its analyses support the need for the entire 300 MW output of the proposed project, but EEC also stated that, in light of its signed and approved PPAs for 83 MW, it believed that it must demonstrate regional need for only the remaining 217 MW (Exh. HO-1A, p. 48). While the Siting Council recognizes that it consistently has found signed and approved PPAs to be determinative on the issue of need for the subscribed power, the Siting Council also consistently has evaluated regional need for the entire output of a generating facility. West Lynn, EFSC 90-102 at 10; MASSPOWER, 20 DOMSC at 314; Altresco-Pittsfield, 17 DOMSC at 361. This approach enables the Siting Council to comprehensively evaluate regional need, giving appropriate weight to the signed and approved PPAs, while ensuring that "double-counting" of the committed portion of the project's output does not occur.

11/ The Company initially asserted that its proposed project would be in operation in 1994 (Exh. HO-1A, p. 46). In addition, the Company's PPAs require the facility to commence operation in 1994 (Exhs. HO-36, HO-MN-1). The Siting Council recognizes, however, that the Company has stated that it anticipates an in-service date 47 months after financial closing, including a 40-month construction period, and that the Company has indicated that it intends to renegotiate its PPAs to delay the in-service date "a year or two" (Tr. 11, pp. 109, 116, 121; Exh. HO-PV-1). Therefore, the Siting Council evaluates regional need beginning in 1995.

12/ The Company initially argued that additional energy resources were needed in the region for reliability purposes in the 1994-1995 time period (EEC Initial Brief, pp. 15, 29, 32, 46). However, in response to a request by the (footnote continued)

In support of its argument regarding need on reliability grounds, EEC presented a series of forecasts of demand and supply for the region, based in part on the 1989 and 1990 CELT Reports, which together were used as a means to produce a series of need scenarios. These need scenarios were then subjected to a variety of contingency tests to evaluate the sensitivity of the need projected by the scenarios to the uncertainty inherent in the underlying forecast assumptions (Exhs. HO-RN-1, HO-RN-2).[13] In addition, the Company provided the 1989 and 1990 NEPOOL assessments of resource adequacy ("resource assessments") (Exhs. HO-RN-17, HO-55). The Company asserted that these documents provide a comprehensive probability analysis of the sensitivity of the CELT Report results to an "almost infinite variety of combinations of input variables" (EEC Initial Brief, p. 15). The Company argued that, together, the need scenarios and resource assessments strongly support the need for significant additional energy resources in the region

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(footnote continued) Hearing Officers to update the record on need in this proceeding to consider the 1991 CELT Report, the Company presented additional analyses of need (Exhs. HO-RN-4, rev., HO-RN-7, rev., HO-RN-9, rev., HO-RN-11, rev., HO-RN-13, rev., HO-RN-14, rev., HO-39, rev., HO-40, rev., HO-52, rev., EEC-42, rev.; EEC Supplemental Brief, Appendix B). The Company argued that, together with the balance of the record on need in this proceeding, the analyses presented in response to the Hearing Officers' request support the need for the proposed project on reliability grounds in the 1995-1998 time frame (EEC Supplemental Brief, pp. 7-18, 30).

13/ The Company indicated that it drew heavily on the Petition for Approval to Construct a Bulk Cogenerating Facility by Altresco-Lynn ("Altresco-Lynn filing") in developing its approach to analyzing regional need through the use of demand and supply forecasts and contingency tests (Exh. HO-1A, pp. 49, 52-57, 69-75). The Altresco-Lynn project currently is under review by the Siting Council. The Company stated that it decided to adopt this approach after consideration of what had been presented in cases previously reviewed by the Siting Council (Tr. 13, pp. 13-15, 40-49). The Company further stated that the approach to regional need presented in the Altresco-Lynn filing allowed it to consider several alternative views of the future and to evaluate a wide range of sensitivities (id.).

within the time frame of commercial operation of the proposed project (id., pp. 28-29).[14]

Subsequent to the close of hearings and the filing of briefs in this proceeding, the Hearing Officers requested that the Company and all other parties update the record of the proceeding to reflect the 1991 CELT Report. The Hearing Officers specifically asked the Company to provide revised versions of several exhibits in the record which addressed regional need, and provided all parties with the opportunity to submit additional arguments and evidence regarding the 1991 CELT Report and its impact on the need analyses contained in the record. In response, EEC provided the requested updated exhibits along with an analysis of the 1991 CELT Report prepared by the Reed Consulting Group ("Reed Report") (Exhs. HO-RN-4, rev., HO-RN-7, rev., HO-RN-9, rev., HO-RN-11, rev., HO-RN-13, rev., HO-RN-14, rev., HO-39, rev., HO-40, rev., HO-52, rev., EEC-42, rev.; EEC Supplemental Brief, Appendix B).[15]

14/ The Company also presented a series of reports issued by a variety of regional analysts and governmental agencies which, the Company asserted, support a need for new capacity in the region (Exhs. HO-1A, p. 64, HO-RN-18). Specifically, the Company submitted: (1) the Federal Reserve Bank of Boston 1987 report entitled "Planning for New England's Electricity Requirements;" (2) the New England Governors' Conference 1986 report entitled "Assessment of New England's Electricity Situation;" (3) the North American Electric Reliability Council's 1988 and 1989 Reliability Assessments; and (4) the Executive Office of Energy Resources 1988 report entitled "Developing Energy Resources: A Five Point Plan" (id.). The Company argued that, despite their age, these reports remain a valuable resource for evaluating regional demand (EEC Initial Brief, pp. 29-30). In fact, EEC asserted that the validity of documents which forecast long-term trends should largely be unaffected by the passage of a small portion of the forecast period (id.).

15/ The Company stated that the 1989 and 1990 CELT Reports were presented in this proceeding along with the 1989 and 1990 resource assessments which discuss the assumptions and uncertainty associated with the major elements of those reports, thereby providing the means of evaluating the validity of the 1989 and 1990 CELT Reports. The Company further noted (footnote continued)

Further, the Company argued that: (1) the 1991 CELT Report should be afforded little or no weight in this proceeding due to inherent flaws which lead the report to substantially underforecast the need for additional resources; (2) even if the 1991 CELT Report and associated exhibits are considered, the weight of the evidence in the record still overwhelmingly supports a finding that there is a need for the proposed project on reliability grounds; and (3) if the 1991 CELT Report were considered to be the only credible forecast in the proceeding, the proposed project would be needed on economic efficiency grounds (EEC Supplemental Brief, pp. 6-30, Appendix C).[16]

The Siting Council reviews the various elements of the Company's regional need analysis below.

(footnote continued) that NEPOOL did not generate a comparable resource assessment for the 1991 CELT Report. EEC argues that without such an accompanying assessment, use of the 1991 CELT Report is problematic, particularly in light of the fact that the results of the 1991 CELT Report vary dramatically from CELT Reports of previous years. Finally, the Company stated that it attempted to compensate for the lack of a NEPOOL resource assessment for the 1991 CELT Report by providing the Reed Report which analyzes the underlying assumptions and methodologies of the 1991 CELT Report.

16/ In support of its argument that its proposed project would be needed on economic efficiency grounds if the 50 percent probability case from the 1991 CELT Report were considered to be the only valid forecast of regional need in this proceeding, the Company provided a dispatch analysis of the region's resources with and without the EEC project (EEC Supplemental Brief, pp. 25-30, Appendix C). The Company based this analysis on the same fuel price assumptions which underlie the 1991 CELT Report. Specifically, the Company noted that the 1991 CELT Report is based on an assumed average increase in oil prices of 9.26 percent per year, and an assumed average increase in coal prices of 4.82 percent per year (id., pp. 26-27). The Company argued that the acceptance of the 1991 CELT Report results implies acceptance of these underlying fuel price assumptions. Further, the Company argued that when these fuel price assumptions are used to analyze the impact of the EEC project on NEPOOL's dispatch, significant economic benefits are shown as a direct result of (1) displacement of oil and gas fired generation sources, and (2) reductions in the average fossil fuel index for NEPOOL, which is used to determine the energy prices for the Hydro Quebec Phase II ("HQ II") power purchase contract (id., pp. 27-28).
(footnote continued)

b. Description

i. Demand Forecasts

During the course of this proceeding, the Company presented three distinct base case demand forecasts and three alternative demand forecasts for NEPOOL adjusted summer peak load. These forecasts, which are described below, were used as the basis for EEC's need scenarios.

(A) Base Case Demand Forecasts

As noted above, EEC presented a total of three base case demand forecasts. As part of its initial petition, the Company presented as its base case demand forecast the 1989 CELT Report projections of adjusted summer peak load ("1989 CELT forecast") (Exhs. HO-1A, pp. 50-53, HO-RN-19a).[17] The 1989 CELT forecast projected NEPOOL adjusted summer peak load to increase by an average of 2.15 percent per year through 2004 (id.; Exh. HO-RN-1). Shortly after the commencement of this proceeding, NEPOOL issued its 1990 CELT Report (Exhs. EEC-42, p. 11, HO-RN-19b). The Company, therefore, presented as a second base case demand forecast the 1990 CELT Report projections of adjusted summer peak load ("1990 CELT forecast"). The 1990 CELT forecast projected NEPOOL adjusted summer peak load to increase by an average of 1.99 percent per

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(footnote continued) The Company asserted that its analysis shows total savings over 20 years of $2.9 billion (id., pp. 28-29). In sum, the Company argued that these economic efficiency benefits alone are sufficient to warrant a finding of need in this proceeding (id.).

17/ The Company stated that the adjusted NEPOOL load, as described in NEPOOL CELT reports, is the weather adjusted peak demand on the system after the inclusion of impacts on load from: (1) non-Operating Procedure 4 ("OP 4") interruptible contracts; (2) peak load management; (3) conservation on peak; and (4) non-utility generation netted from load (Exhs. HO-1A, p. 50, HO-12, HO-RN-9, Appendix A; Tr. 13, pp. 28-30). The Company indicated that these adjustments represent NEPOOL's attempt to account for the impacts of utility sponsored and naturally occurring C&LM measures and that portion of total load which is served by non-utility generation capacity not claimed as supply capability, i.e., self-generation (id.).

year through 2005 (id.; Exhs. HO-RN-2, HO-RN-4, HO-RN-7).[18] Finally, at the request of the Hearing Officers, the Company presented the 1991 CELT Report projections of adjusted summer peak load ("1991 CELT forecast"), which it argued should not be considered (EEC Supplemental Brief, pp. 5-6; Exh. HO-RN-4, rev.). The 1991 CELT forecast projected NEPOOL adjusted summer peak demand to increase by an average of 1.3 percent per year through 2006 (Exhs. HO-RN-4, rev., HO-RN-7, rev., HO-65).

EEC noted that the 1990 CELT forecast was provided to supplement the 1989 CELT forecast, not to replace it as a base case forecast in this proceeding (Tr. 13, pp. 23-25). The Company argued that both the 1989 and 1990 CELT forecasts are credible and constitute the minimum level of need for additional energy resources in New England (EEC Initial Brief, p. 20). In addition, the Company stated that its identification of both the 1989 and 1990 CELT forecasts as base case forecasts was not intended to imply that these forecasts had a greater probability of occurrence than the other forecasts presented in this case; rather, it reflects the fact that NEPOOL has identified the forecasts as appropriate starting points for resource planning in the region (Exh. HO-RN-10).[19] In fact, the Company

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18/ The Company noted that the 1989 CELT forecast and the 1990 CELT forecast differ principally as a result of slightly different patterns of growth in unadjusted load through 1993 and a higher forecast of C&LM on peak in latter years of the 1990 CELT forecast relative to the 1989 CELT forecast (Exh. EEC-10, pp. 4-5). The Company further noted that the difference between the 1989 and 1990 CELT forecasts is fairly insignificant with respect to a four-year or five-year planning horizon, and effectively implies a slight delay in the timing of a particular level of capacity shortfall (Exhs. EEC-42, pp. 15-16, HO-41; Tr. 7, pp. 85-88).

19/ The Company stated that the CELT Reports should not be used as the definitive blueprint for resource planning in New England (Exhs. EEC-10, pp. 5-6, HO-13). The Company noted that the CELT Reports expressly state that the associated forecasts should be used as a starting point only, and that higher or lower load growth is a possibility "with important implications for future power system reliability and/or economics" (id.; Exhs. HO-RN-19a, p. 1, HO-RN-19b, p. 1).

stated that the 1989 and 1990 CELT forecasts should be considered low case forecasts, since the NEPOOL CELT Reports historically have underestimated demand (Exhs. HO-1A, pp. 50-53, EEC-10, p. 6, Attachment A, EEC-42, pp. 17-18).[20]

In support of its use of the 1989 and 1990 CELT forecasts in its regional need analysis, EEC noted that the CELT forecast is the only long-term forecast of regional peak electricity demand published annually. The Company stated that the forecast is developed using an econometric model which uses class-specific data from utilities along with economic and demographic assumptions (Tr. 13, pp. 26-28). EEC's witness, Mr. Kuhn, stated that the CELT forecasts are prepared by a knowledgeable group of people who consider a wide range of appropriate inputs in developing the forecasts (Tr. 7, pp. 105-106). Mr. Kuhn cautioned, however, that NEPOOL itself acknowledges a considerable degree of uncertainty associated with the CELT forecasts, and, consequently, NEPOOL suggests that alternative forecasts be evaluated as contingencies (id.).

While EEC submitted the 1991 CELT forecast at the request of the Hearing Officers, the Company argued that this forecast does not constitute a reliable or credible forecast of regional energy loads (EEC Supplemental Brief, pp. 19-23). The Company noted that, while it sponsored the 1989 and 1990 CELT forecasts in this proceeding, it identified them as low case forecasts because of the historic tendency of NEPOOL forecasts to underestimate demand (id.). The Company also noted that the annual growth rate set forth in the 1991 CELT forecast is substantially lower than the growth rate set forth in the 1989 and 1990 CELT forecasts (id., pp. 10, 20). Further, EEC noted

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20/ The Company noted that, between 1982 and 1988 NEPOOL's actual summer peak load grew at an average rate of 4 percent per year, a rate which was consistently higher than growth rates forecast in NEPOOL CELT reports for that period (Exhs. HO-1A, pp. 50-53, EEC-10, p. 6, Attachment A, EEC-42, pp. 17-18). In addition, the Company noted that the estimates of C&LM which NEPOOL uses to develop adjusted peak load have been consistently high (EEC Supplemental Brief, p. 24, Appendix B).

that the 1991 CELT forecast projects a significantly different pattern of growth than the 1989 and 1990 CELT forecasts, particularly in the 1991-1997 time frame (id.). Specifically, the Company noted that the 1991 CELT forecast projects that peak demand levels are expected to drop between 1990 and 1992 and are not projected to return to 1990 levels until 1997 (id.).

As noted above, EEC also presented the Reed Report to help evaluate the validity of the 1991 CELT forecast. The Reed Report indicates that the differences between the 1991 CELT forecast and earlier CELT forecasts arise from the 1991 CELT forecast's use of different economic assumptions and methodologies (id., pp. 21-23, Appendix B, pp. 9-22).[21] In particular, the Reed Report criticizes the economic growth and fuel price assumptions on which the 1991 CELT forecast is based (id.).[22]

Specifically, the Reed Report notes that the economic forecasts used to develop the 1991 CELT forecast project a decline in real personal income in New England through 1991 with only a modest recovery over the rest of the forecast period (id., Appendix B, p. 10). The Company noted that the economic decline projection on which the 1991 CELT forecast is based lasts longer than the declines experienced in the region during both the 1973-1975 and 1981-1982 recessions, and that the rate of recovery predicted in the economic projections used in the 1991 CELT Report is much slower than the actual regional recovery which followed the historic recessionary

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21/ The Reed Report identifies a change in the method used to project electricity prices in the 1991 CELT forecast relative to the method used in previous CELT forecasts. Specifically, the Reed Report notes that, in the 1991 CELT forecast, NEPOOL did not smooth the electricity price forecast to account for such impacts as rate phase-ins and fluctuations in oil prices, a method which was employed in previous CELT forecasts of the electricity price (EEC Supplemental Brief, Appendix B, p. 18). The Company stated that this change in methodology resulted in higher real electricity prices in the 1991 CELT forecast (id., pp. 22-23).

22/ The Reed Report notes that the 1991 CELT forecast of peak demand is strongly influenced by the underlying economic growth rates (EEC Supplemental Brief, Appendix B, p. 10).

periods (id., p. 20). In addition, the Reed Report notes that the 1991 CELT Report does not recognize the historic relationship between economic growth and electricity sales growth, a relationship which shows that (1) electricity sales fall at a slower rate than economic output as the region enters a recessionary period, and (2) electricity sales grow at a faster rate than economic output as the region emerges from a recessionary period (id., Appendix B, p. 10).

The Reed Report also notes that the 1991 CELT forecast is based on a fuel price forecast issued immediately following the 1990 invasion of Kuwait by Iraq. The Reed Report indicates that the use of this fuel price forecast results in a sharp, short term rise in electricity prices which in turn drives down electricity sales (id., Appendix B, pp. 12-13). The Reed Report also notes that the fuel price forecast on which the 1991 CELT forecast is based projects the price of residual oil to be over $22 per barrel in 1991, while the price as of the date of issuance of the Reed Report was approximately $15 per barrel (id.).

In sum, the Company argued that reliance on the 1991 CELT forecast to determine the need for additional energy resources could lead to a significant risk of capacity deficiency.

(B) Alternative Demand Forecasts

In addition to the three base case forecasts, EEC presented three alternative demand forecasts which were intended to provide high forecast alternatives to the forecasts based on the 1989, 1990, and 1991 CELT Reports.

The Company's first alternative demand forecast was derived from a report issued by the New England Governors' Conference, Inc. in December 1986 ("NEGC forecast") (Exh. HO-1A, pp. 49, 51-52). The NEGC forecast projected NEPOOL adjusted summer peak load to increase by an average of 4 percent per year through 1991 and by 2.85 percent per year between 1991 and 2004 (id., Exhs. HO-RN-1, HO-RN-6). The Company noted that the NEGC forecast, while considered to be a high case contingency forecast when issued in 1986, has proven to predict NEPOOL demand more accurately than the CELT forecasts over recent years

(Exhs. HO-1A, p. 50, HO-RN-6). Therefore, while the Company acknowledged the age of the NEGC forecast, it argued that the NEGC forecast still represents a sufficiently plausible high case so as to warrant consideration in a regional need analysis (EEC Initial Brief, pp. 21-22).

EEC presented a second alternative forecast developed by its witness, Mr. Kuhn ("Kuhn forecast") (Exhs. EEC-10, pp. 11-12, EEC-42, pp. 12-13).[23] The Kuhn forecast is based on an analysis of the average long-term historical growth rate of NEPOOL peak demand from 1972 through 1988, and projects NEPOOL adjusted summer peak demand to increase by an average of 3.2 percent per year through 2005 (id.; Exhs. HO-RN-2, EEC-42, Exhibit 2).[24] Mr. Kuhn stated that the 1972 to 1988 historical period meets three basic criteria which make it appropriate for use in projecting future load: (1) the historical period is relatively long compared to the forecast period of interest; (2) the historical period contains recent data; and (3) the historical period contains a variety of external conditions and events which significantly affect forecast demand (Exh. EEC-10, pp. 11-12).[25] Mr. Kuhn further

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23/ Once again, the Company indicated that its second alternative forecast was not intended to replace the original alternative forecast, but rather to supplement it with an additional, alternative view of a plausible future outcome developed by independent means (Tr. 13, pp. 23-25). The Company stated that its four forecasts of peak demand represent a reasonable band width of alternatives which all deserve consideration as valid projections of future load in the region (id.).

24/ Mr. Kuhn noted that the Kuhn forecast appears to reflect the 60 percent point on the 1993 NEPOOL probability band (Exhs. EEC-10, p. 12, AG-89). For a further discussion of NEPOOL's probabilistic analysis of resource adequacy, see Section II.A.3.b.iv, below.

25/ In particular, EEC noted that the 1972 to 1988 historical period contained a wide variety of external conditions which had a direct impact on electricity demand, including oil embargos and electricity price changes, periods of economic growth and recession, periods of high and low inflation, and major regulatory restructuring (Exh. EEC-10, pp. 11-12).

stated that, in developing the Kuhn forecast, he attempted to provide an alternative to the CELT forecasts which was based on a different methodology (Tr. 7, pp. 48-55). Mr Kuhn stated that he considered the CELT forecasts to be fairly robust, mainstream forecasts, and that in preparing his alternative forecast, he selected a simple forecast method which did not replicate the relationships in the CELT model (id., pp. 51, 62-63).

To support the reasonableness of the growth rate set forth in the Kuhn forecast, Mr. Kuhn analyzed the long-term relationship between NEPOOL summer peak load and gross national product ("GNP")[26] (Exh. EEC-10, pp. 12-13). Mr. Kuhn stated that this analysis shows a one-to-one long-term relationship in percentage growth between GNP and NEPOOL summer peak loads (id.). Mr. Kuhn further noted that several current forecasts of growth for the national economy project annual growth at three percent as early as 1991 (id.). Therefore, Mr. Kuhn asserted that a regional demand forecast with a 3.2 percent annual growth rate over the long-term must be considered a viable alternative demand forecast for purposes of a regional need analysis (id.).

When EEC submitted the 1991 CELT forecast at the Hearing Officers' request, it also submitted a revised version of the Kuhn forecast ("second Kuhn forecast") which reflected actual peak loads through 1990 (EEC Supplemental Brief, pp. 5-6; Exhs. HO-RN-4, rev., HO-RN-7, rev.). The second Kuhn forecast projects NEPOOL adjusted summer peak demand to remain constant from 1990 to 1991 and to increase by an average of 2.5 percent

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26/ Mr. Kuhn stated that he evaluated the relationship between NEPOOL peak load and GNP, rather than the relationship between NEPOOL peak load and the regional economy, because national economic data are more readily available and less subject to fluctuation than regional data (Exh. AG-90). Mr. Kuhn also noted that national economic forecasts are major drivers of regional forecasts (id.). He further noted that publicly available reports, such as Federal Reserve publications, support his assumption that the national economy is an appropriate proxy for the regional economy (Exh. AG-91).

per year from 1991 to 2006 (Exh. HO-RN-7, rev.).[27] The Company indicated that it developed the second Kuhn forecast to provide an alternative to the 1991 CELT forecast consistent with the alternatives previously provided in the proceeding (EEC Supplemental Brief, p. 11).

(C) Reserve Margin

In order to account for the overall capacity requirements of the NEPOOL system in its regional need analysis, the Company added a reserve margin to its demand forecasts before using them to develop the need scenarios (Exh. HO-1A, pp. 52-53). The Company applied a 20 percent reserve requirement to each of the demand forecasts which were used in need scenarios which did not include the capacity from the Seabrook generating unit (id.). For those demand forecasts used in need scenarios which included the capacity from the Seabrook generating unit, the Company used a reserve margin of 22.5 percent (id.). The Company asserted that the 22.5 percent reserve margin reflects the impact of particularly large generating units on the overall loss of load probability faced by NEPOOL (id.; Exh. HO-RN-8). The Company further asserted that its reserve margin assumptions are conservatively low when compared to actual NEPOOL reserve requirements and in light of the concept of adjusted reserve margins ("ARM") (id.).

In support of its assertion that its reserve margin assumptions are conservative in light of actual NEPOOL practice, the Company provided the Technical Supplements to the 1989 and 1990 NEPOOL resource assessments, and a NEPOOL "working paper"

27/ The Company noted that the actual long-term average growth rate for NEPOOL summer peak load from 1974 to 1990 was 2.9 percent per annum (EEC Supplemental Brief, pp. 11-12). In addition, the Company stated that it reevaluated the relationship between NEPOOL peak load and GNP for the 1974-1990 period. The Company stated that this relationship remained essentially unchanged from the previous periods analyzed, but noted that the current consensus of economic forecasters is that GNP will grow at a 2.5 percent rate over the long-term (id.). Therefore, the Company chose to use the 2.5 percent annual growth rate for its second Kuhn forecast (id.).

addressing system-required reserves and objective capability for the period 1989 through 1994 (Exhs. HO-RN-17, HO-RN-22, HO-55). According to EEC, these documents show that NEPOOL is projecting a reserve requirement with the addition of Seabrook which is greater than the reserve levels used by the Company in need scenarios which included Seabrook (id.). Similarly, EEC maintained that these documents also show that NEPOOL is projecting a reserve requirement without the addition of Seabrook which is greater than the reserve levels used by the Company in need scenarios which did not include Seabrook (id.).

The Company also presented a discussion of ARM as it relates to the current and projected capability situation in New England. The Company defined ARM as the system reserve margin after subtracting the generating capacity which would not be available to meet peak demand due to scheduled maintenance and unscheduled plant outages (Exh. HO-1A, pp. 58-60).

The Company provided a recently completed study prepared by the C. C. Pace Corporation ("CC Pace Study") for the U. S. Department of Energy ("DOE") which addresses the ARM issue (Exh. HO-RN-15). The CC Pace Study stated that the application of ARM to the NEPOOL system yielded results which are particularly troubling (id., p. 13). The CC Pace Study noted that the ARM for NEPOOL at the time the study was written was negative 5.3 percent and that the ARM was expected to drop to negative 11.9 percent by 1997 (id., p. 15). Further, the CC Pace Study noted that the DOE considers an ARM of positive 5 percent or lower to be marginally unsafe for reliability purposes (id., p. 11).

The Company stated that, for the five-year historic period 1985 through 1989, on average, NEPOOL had approximately 22 percent of capability unavailable due to a combination of planned and unplanned outages (Exh. HO-RR-56). Utilizing the 1990 CELT Report and assuming that outage history is a reasonable predictor of future levels of unavailable capability, the Company noted that NEPOOL could face an ARM of negative 9.7 percent in 1997. Therefore, the Company indicated that the CC Pace Study's concerns were valid. Finally, the Company noted

that, based on the 1990 CELT Report, in order to achieve the minimal ARM of positive 5 percent NEPOOL would need approximately 4,300 MW of additional capacity in 1997 (id.).

While the Company did not take the position that the Siting Council should adopt the use of ARM for purpose of its regional need determination, the Company asserted that the concept of ARM lends support to EEC's argument that the CELT forecasts are conservatively low in terms of identifying a regional need for capacity (EEC Initial Brief, p. 31).

ii. Supply Forecasts

As part of its initial petition, the Company presented three supply forecasts based on the 1989 CELT Report. These three supply forecasts were used to develop the initial need scenarios (Exhs. HO-1A, pp. 53-54, HO-RN-1). During the course of the proceeding, the Company provided three additional supply forecasts based on the 1990 CELT report, which were used to develop additional need scenarios (Exhs. EEC-42, pp. 12-13, HO-RN-9).

EEC presented two base case supply forecasts, as follows: (1) a base case supply forecast which reflected the resources identified in the 1989 CELT Report ("1989 base case supply forecast"), and (2) a base case supply forecast which reflected the resources identified in the 1990 CELT Report ("1990 base case supply forecast") (id.; Exhs. HO-1A, p. 53-54, HO-RN-1, HO-RN-19a & b). The Company noted that the 1989 and 1990 CELT Reports include: (1) all existing generation; (2) all committed but as yet unrealized utility and non-utility generation;[28] (3) all planned unit life extensions and retirements within

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28/ The Company stated that NEPOOL includes all existing resources and all planned resources which are under construction or have regulatory approvals as committed resources in the CELT Reports (Tr. 13, p. 197). The Company noted that the 83 MW from this proposed project which will be sold under already approved PPAs are identified by NEPOOL as committed, but that the Company omitted this capacity in its analysis of need so as not to "double count" the 83 MW (id., pp. 197-198).

NEPOOL; and (4) all firm purchases and sales with entities outside of NEPOOL. EEC stated that NEPOOL generally is considered to be an authoritative source for this type of aggregate data because NEPOOL's data sources are the member utilities who ultimately decide to acquire non-utility generation capacity, retire or life extend their units, or implement C&LM programs (Exh. HO-RN-10).[29]

EEC presented two high case supply forecasts, as follows: (1) a forecast developed by adjusting the 1989 base case supply forecast with an assumed higher success rate for planned additions and the extension of the HQ II resource beyond the year 2000 ("1989 high case supply forecast"), and (2) a forecast developed by making similar adjustments to the 1990 base case supply forecast ("1990 high case supply forecast").

Finally, EEC presented two low case supply forecasts, as follows: (1) a forecast developed by adjusting the 1989 base case supply forecast based on the assumed cancellation of the Seabrook generating unit ("1989 low case supply forecast") and (2) a forecast developed by making similar adjustments to the 1990 base case supply forecast ("1990 low case supply forecast").

The Company stated that it considered these supply forecasts to be appropriate proxies for use in developing need scenarios (Tr. 13, pp. 40-48). The Company further stated that it was appropriate to use the NEPOOL CELT Reports as the basis for its base case supply forecasts. However, the Company suggested that, in developing high case and low case supply forecasts, it was important to consider whether the assumptions used were reasonable, and how they might be representative of other supply variations (id.).

In response to the request of the Hearing Officers, the Company provided a set of additional base case, high case and low case supply forecasts based on the 1991 CELT Report ("1991

29/ As noted above, NEPOOL forecasts of C&LM impacts are netted against unadjusted load to create the CELT forecasts of adjusted peak load.

base case supply forecast", "1991 high case supply forecast", "1991 low case supply forecast") (Exh. HO-RN-9, rev.). The Company argued that the 1991 CELT Report may overstate supply as a result of optimistic forecasts of C&LM implementation and non-utility generation availability (EEC Supplemental Brief, pp. 3-24). In addition, the Reed Report notes that the forecast of utility capability in the 1991 CELT Report may be overstated, since several member utilities currently are attempting to market their excess capability outside of the region (id., Appendix B, p. 27). The Reed Report notes that if these utility efforts to market excess capacity are successful, then the estimates of utility capacity set forth in the 1991 CELT Report will not be available to serve NEPOOL load (id.).

iii. Need Cases

In order to evaluate the need for additional energy resources in New England, EEC developed need scenarios based on a comparison of its demand forecasts and its supply forecasts. The Company then subjected these need scenarios to a variety of contingency tests to evaluate the sensitivity of the results to the uncertainty inherent in the underlying forecast assumptions (Exh. HO-1A, pp. 54-56).

Initially, the Company presented six need scenarios which were developed by relating two demand forecasts (the 1989 CELT forecast and the NEGC forecast) to three discrete supply forecasts (the 1989 base case supply forecast, the 1989 high case supply forecast and the 1989 low case supply forecast) (id.). The Company subjected each of these six need scenarios to up to eight contingency tests and two cross-contingency tests (id.). The Company identified the eight contingencies as: (1) 46 percent of planned but uncommitted non-utility generating projects commence operation as scheduled;[30] (2) a 25 percent

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30/ The Company presented a report published by the Massachusetts Electric Company which indicates that the long-term (1978-1989) success rate for non-utility generation projects was 47 percent and the near-term (1985-1989) success (footnote continued)

increase in the number of life extensions of existing units occurs beyond what is included in the base case; (3) operation of the Seabrook generating unit is delayed for five years beyond the 1990 on-line date of the base case;[31] (4) 70 percent of committed but as yet unrealized non-utility generation is delayed by one year; (5) 25 percent of the units operating beyond their original retirement dates are shut down; (6) the commencement of purchases from HQ II is delayed by two years; (7) all committed gas-fired non-utility generation is delayed by two years in combination with the cancellation of 50 percent of the planned, uncommitted gas-fired resource additions; and (8) 33 percent of all coal units scheduled for life extension are retired, 15 percent of all existing coal units are shut down for retrofit, 50 percent of all existing or committed non-utility coal-fired generation is eliminated, and all non-committed non-utility coal-fired generation is cancelled (id., pp. 55-56, Exh. HO-38). The Company stated that the two cross-contingencies considered were the combination of contingencies (1) and (7), above, and the combination of contingencies (1) and (8), above (id.). Thus, the Company initially generated a total of 64 need cases.[32] Of these 64 need cases, all but two identify a need of at least 300 MW by 1994, while all cases show a need of at least 300 MW by 1995 (Exh. HO-RN-11). Table 3 sets forth these results.

As described above, the Company updated the record shortly after the beginning of the proceeding to include the 1990 CELT forecast, the Kuhn forecast, the 1990 base case supply forecast, the 1990 high case supply forecast, and the 1990 low

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(footnote continued) rate was only 36 percent (Exh. HO-RN-13). Therefore, the Company asserted that its 46 percent success rate was reasonable (id.).

31/ This contingency test was not applied to the two need scenarios developed from the low case supply forecasts.

32/ The 64 need cases were derived by summing (1) the original six need scenarios and (2) the 58 need cases which resulted from subjecting the six need scenarios to the ten contingency tests.

case supply forecast. The Company developed six additional need scenarios by relating the two demand forecasts (the 1990 CELT forecast and the Kuhn forecast) to the three discrete supply forecasts (the 1990 base case supply forecast, the 1990 high case supply forecast, and the 1990 low case supply forecast). EEC subjected these six additional need scenarios to the same ten contingency tests, resulting in the development of 64 additional need cases. In addition, in response to requests by the Siting Council, the Company subjected its six additional need scenarios to two new contingency tests.[33] The new contingency tests requested by the Siting Council resulted in the generation of 36 additional need cases (Exh. HO-RN-13).

Further, in response to other requests of the Siting Council, the Company evaluated the impact of both an increase in regional reliance on C&LM and a decrease in regional reliance on C&LM (Exh. HO-RN-14). In order to evaluate the impact of an increase in regional reliance on C&LM, the Company used the amounts of C&LM defined in the Technical Supplement to the 1989 NEPOOL resource assessment as having a 10 percent chance of occurring. To evaluate the impact of a decrease in regional reliance on C&LM, the Company used the amounts of C&LM defined as having a 90 percent chance of occurring. Based on these high and low levels of C&LM, the Company developed twelve new need scenarios which were then subjected to the original ten contingency tests (id.). Finally, in response to requests by intervenors, the Company evaluated the impact of a 25 percent increase in C&LM and a 25 percent increase in non-utility generation netted against load beyond the levels identified in

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33/ The two new contingency tests requested by the Siting Council were revisions of the Company's first contingency test. They were (1) 25 percent of planned but uncommitted non-utility generating projects come on-line as scheduled, and (2) 66 percent of planned but uncommitted non-utility generating projects come on-line as scheduled (Exh. HO-RN-13). Thus, each need scenario was tested against a total of six new tests -- the two described above, and revisions of each of the Company's two cross-contingency tests to reflect the assumptions of the two new contingencies.

the 1990 CELT report (Exh. HO-52). Based on these assumptions, the Company again developed 12 additional need scenarios and subjected them to the original ten contingency tests (id.).

In sum, the Company evaluated a total of 356 need cases based on the 1990 CELT forecast, the Kuhn forecast, the 1990 base case supply forecast, the 1990 high case supply forecast, the 1990 low case supply forecast, the ten contingency tests developed by the Company, and the additional contingency tests requested by the Siting Council and intervenors.[34] Of these, 312 cases (88 percent) show a need for at least 300 MW of additional resources by 1995, and 342 cases (96 percent) show a need for at least 300 MW of additional resources by 1996.[35] Table 4 sets forth these results.

Finally, in response to the request of the Hearing Officers, the Company provided revised exhibits showing the application of all the aforementioned contingency tests to need scenarios based on the 1991 CELT forecast, the second Kuhn forecast, the 1991 base case supply forecast, the 1991 high case supply forecast, and the 1991 low case supply forecast. These analyses produced an additional 356 need cases. Of these 356 cases, 67 cases (19 percent) indicate a need for 300 MW by 1995, 121 cases (34 percent) indicate a need for 300 MW by 1996, and 181 cases (51 percent) indicate a need for 300 MW by 1998.[36] Table 5 sets forth these results.

34/ The Company indicated that it developed a total of 448 need cases based on the 1990 CELT forecast, the Kuhn forecast and the three 1990 supply cases (Tr. 13, p. 22; EEC Initial Brief, p. 26). The Siting Council notes, however, that 92 of these cases actually duplicated other need cases within the 448, resulting in a total of 356 unique need cases.

35/ All 356 cases show a need for at least 300 MW by 1998.

36/ The Siting Council notes that the need cases based on the 1991 CELT forecast show a distinctly different pattern of need than the need cases based on the second Kuhn forecast. All of the 178 need cases based on the second Kuhn forecast indicate a need for at least 300 MW by 1998 while only 3 of the 178 need cases based on the 1991 CELT forecast indicate a need for at least 300 MW by 1998 (see Table 5).

In support of its choice of contingency tests, the Company stated that its tests serve to establish the level of uncertainty associated with values of several important underlying forecast and supply assumptions which influence capacity need in the short- and long-term (EEC Reply Brief, p. 7). The Company stated that it considered its contingency tests to provide a fairly broad approach to the issue of sensitivity and that each appeared to be realistic (Tr. 13, pp. 48-53). In addition, the Company noted that, while only two of its contingency tests effectively increase available supply, and thus decrease need, there simply are more potential events that can reduce the level of available supply identified in the CELT Reports than can increase available supply in the near term planning horizon (EEC Reply Brief, pp. 7; Tr. 13, p. 50). Further, the Company noted that the consequences of not having sufficient capacity are considerably more serious from both a reliability and cost perspective than the consequences of having excess capacity (Tr. 13, pp. 50-51). Finally, the Company asserted that most of the contingency tests requested by the Siting Council and intervenors resulted in need cases which reflected increases in available resources (id.).

The Company argued that its analyses of need based on the 1989 and 1990 CELT forecasts, the NEGC and Kuhn forecasts, and the six 1989 and 1990 supply forecasts, clearly show a need for at least 300 MW of additional capacity in the region by 1995 (EEC Initial Brief, pp. 26, 32).[37] In addition, the Company argued that its analyses are based on conservative assumptions regarding reserve margin requirements and the impacts of C&LM measures on peak load (id., pp. 22-24, 30; EEC Supplemental Brief, pp. 17-18). Further, the Company argued that, even with the inclusion of the need cases based on the 1991 CELT forecast, the second Kuhn forecast and the three 1991 supply cases, the

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37/ Of the 420 need cases developed based on the 1989 and 1990 CELT forecasts, the NEGC and Kuhn forecasts, and the 1989 and 1990 supply forecasts, 376 cases (90 percent) identify a need for at least 300 MW by 1995, and 406 cases (97 percent) identify a need for at least 300 MW by 1996.

weight of the evidence still supports a need for at least 300 MW in the 1995-1998 time frame (EEC Supplemental Brief, pp. 15-18).[38]

Finally, the Company argued that its analyses of need for additional capacity in the region for reliability purposes are supported by the NEPOOL resource assessments, the concept of adjusted reserve margin, and numerous independently developed studies and reports.

iv. NEPOOL Resource Assessments

To further support the validity of the results of the Company's need analyses, the Company provided the 1989 and 1990 NEPOOL resource assessments (Exhs. HO-RN-17, HO-55). The Company noted that the NEPOOL resource assessments emphasize the uncertainty surrounding both the 1989 and 1990 CELT forecasts and the adequacy of the projected available resources as identified in the 1989 and 1990 CELT reports (Exh. HO-1A, pp. 60-61). The Company stated that the NEPOOL resource assessments identify the probabilities that NEPOOL will have adequate resources to meet its reliability criterion on an annual basis (id., p. 62).[39] The Company stated that, in contrast to its contingency analyses which evaluated the impact of uncertainty related to specific values of variables, the NEPOOL resource assessments evaluate uncertainty in a probabilistic fashion (EEC Initial Brief, p. 27).

38/ Of the total 776 need cases developed in this proceeding, 443 cases (57 percent) show a need for at least 300 MW by 1995, 527 cases (68 percent) show a need for at least 300 MW by 1996, and 601 cases (77 percent) show a need for at least 300 MW by 1998.

39/ The Company stated that NEPOOL develops its reliability criterion based on studies of load variations due to weather, availability of generating facilities relative to planned and forced outages, and availability of capacity assistance from neighboring utility systems over existing interconnection facilities (Exh. HO-1A, p. 62). The Company further noted that NEPOOL sets its reliability criterion to ensure that the probability of disconnecting non-interruptible customers due to generation deficiency is no more than once in ten years (Exh. EEC-10, p. 7).

The Company noted that the probabilities associated with the different capacity positions identified in the NEPOOL resource assessments are the result of thousands of iterations using random selections of values for the underlying variables (id.).[40] Specifically, the Company stated that the 1989 and 1990 NEPOOL resource assessments evaluated the impacts of the following variables on the resource adequacy of the basic 1989 and 1990 CELT Report results ("1989 CELT case", "1990 CELT case"): (1) load growth; (2) reserve requirements; (3) C&LM impacts on peak load; (4) timing and amounts of planned, uncommitted non-utility generation; (5) attrition of existing resources; (6) timing and amounts of committed non-utility generation; and (7) the in-service date of HQ II (id., p. 28; Exhs. HO-1A, pp. 61-62, HO-RN-17, EEC-42, pp. 18-19).[41] In the 1990 NEPOOL resource assessment, in addition to the evaluation of the 1990 CELT case, NEPOOL evaluated a second resource scenario identified as the "CELT case with contingency resources" (id.).[42] This latter case was evaluated against

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40/ The Company explained that the NEPOOL resource assessments initially identify individual probability distributions for each of the underlying variables examined. The probability associated with a specific capacity position reflects the individual probabilities associated with the values of the underlying variables which form the basis of the specific capacity position (Exh. EEC-10, pp. 6-9). NEPOOL then develops probability bands around each capacity position to reflect the uncertainty associated with each position (id.).

41/ In addition, the 1989 NEPOOL resource assessment evaluated the impact of two additional variables on the CELT case -- the in-service dates for the Ocean State Power Units 1 and 2. While the 1990 NEPOOL resource assessment did not evaluate the impact of the Ocean State variables, it did evaluate the impact of a variable addressing the timing and amounts of utility generation (EEC Initial Brief, p. 28; Exhs. HO-1A, pp. 61-62, HO-RN-17, EEC-42, pp. 18-19).

42/ The Company stated that the CELT case with contingency resources included uncommitted resources with planned on-line dates within the study period and additional C&LM resources (Exh. EEC-42, p. 20). Further, the Company noted that NEPOOL stated that the results of the evaluation of the CELT case with contingency resources must be used with caution (footnote continued)

the variables identified above and against two additional variables: (1) variations in contingency capacity and (2) variations in contingency C&LM resources (id.).

The Company noted that the 1989 NEPOOL resource assessment concluded that there was only a 38 percent chance that NEPOOL would have adequate resources in 1994 to meet its reliability criterion for the 1989 CELT case, while the 1990 NEPOOL resource assessment concluded that there was a 53 percent probability that NEPOOL would have sufficient resources in 1994 for the 1990 CELT case (Exh. EEC-42, p. 19). The Company also noted that the 1989 NEPOOL resource assessment of the 1989 CELT case identified a need for 760 MW of additional capacity in 1994 to achieve a 50 percent confidence level, and a need for 2,215 MW in 1994 to achieve a 70 percent confidence level (id., p. 20). In contrast, the 1990 NEPOOL resource assessment of the 1990 CELT case identified a capacity surplus of approximately 200 MW at the 50 percent confidence level, and a need for 2,100 MW to achieve an 80 percent confidence level in 1994 (id.).[43] Under the CELT case with contingency resources, the 1990 NEPOOL resource assessment identifies a need for approximately 1,600 MW to achieve the 80 percent confidence level in 1994 (id., p. 21).

The Company noted that the 1989 and 1990 NEPOOL resource assessments state that there is considerable uncertainty surrounding the capacity values associated with these confidence levels (id., p. 22). Further, the Company noted that NEPOOL identifies the load forecast variable as having by far the greatest impact on the uncertainty associated with the capacity positions, effectively dwarfing the impact of the remaining variables (Exh. EEC-10, p. 9). Finally, the Company noted that

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(footnote continued) as most of the contingency resources have a four-year to five-year lead time and only will be available in 1995 if decisions to proceed are made within 12 to 18 months of the issue date of the 1990 NEPOOL resource assessment (Exh. EEC-42, p. 22).

43/ The Company noted that the 1990 NEPOOL resource assessment did not identify the necessary capacity additions to achieve a 70 percent confidence level (Exh. EEC-42, p. 20).

NEPOOL cautions that system reliability decreases much faster with the region in a negative capacity position than system reliability increases in a positive capacity position. The Company, therefore, notes that a significant reliability risk arises from even a slightly negative capacity position (Exh. EEC-42, p. 23). Therefore, the Company argued that responsible supply planning should focus on achieving the 70 to 80 percent confidence levels for adequate capacity rather than the 50 percent "mid-point" level (EEC Reply Brief, pp. 9-10).

c. Arguments of the Parties

The Attorney General argued that the Company has failed to establish that the additional energy resources from its proposed project are needed on either reliability or economic efficiency grounds (AG Initial Brief, p. 7, AG Supplemental Brief, pp. 1-4). Specifically, in regard to the Company's analyses of need on reliability grounds, the Attorney General asserted that: (1) EEC's supporting data are biased and unreliable; (2) the demand forecasts used by EEC are too high; (3) EEC's arguments in favor of high reserve margins are unsound; and (4) EEC's supply variations are too limited (AG Initial Brief, p. 8).

The Attorney General asserted that the Company's NEGC forecast is extremely outdated. Further, the Attorney General asserted that the Company's characterizations of the 1989 and 1990 CELT forecasts as low forecasts implies that the Siting Council should give the CELT forecasts less weight than the alternative demand forecasts (id.). The Attorney General argued that, in fact, the CELT forecasts should be viewed as "true" base case forecasts and that the alternative high demand forecasts only should be considered if "true" low forecasts also are considered as well (id., p. 9). Finally, the Attorney General asserted that the Company's characterization of the 1989 and 1990 CELT forecasts as low forecasts is not based on an evaluation of underlying methodology, and is therefore unsubstantiated (id.).

In regard to the Company's arguments that its reserve margin assumptions are conservative and that the Siting Council should consider a 70 to 80 percent regional reliability standard, the Attorney General argued that a reserve margin of 22.5 percent is the appropriate margin for planning purposes and that a reliability standard of greater than 50 percent is inconsistent with Siting Council precedent regarding the likelihood of contingencies occurring (id., pp. 10-11).

In regard to the Company's development of supply forecasts and contingency tests, the Attorney General argued that EEC's analysis of supply contingencies is flawed because (1) the majority of the Company's contingencies lead to low supply scenarios, and (2) the Company provided no analyses of the probability that its various supply contingencies would occur (id., pp. 12-13).

The Attorney General also argued that the Company's failure to sell 217 MW of the total 300 MW output of its proposed project between the January 1990 filing of the petition in this proceeding and the present, effectively counters the Company's arguments that the project's power is needed and least-cost (id., pp. 16-17). The Attorney General further contended that the Siting Council should presume that there is no need for any project which has not yet signed contracts for a substantial majority of its output (id.).

Finally, the Attorney General argued that the 1991 CELT Report clearly demonstrates that the Company's need analyses are wholly unreliable (AG Supplemental Brief, p. 1). The Attorney General stated that the 1991 CELT Report reveals that no new capacity is needed in the New England region until the year 2000 (id., pp. 2-3). In sum, the Attorney General argued that if the Siting Council approves the proposed project, ratepayers would be subject to paying for unnecessary power (id., p. 4).

NO-COAL argued that the Company's analyses of need are fatally flawed and based on false premises and dubious forecasts (NO-COAL Initial Brief, pp. 3, 7-18). Mr. Ladino similarly argued that the Company's alternative demand forecasts "have no basis in fact and little if any credibility in the NEPOOL

community" (R. Ladino Initial Brief, pp. 3-4). In regard to the Company's regional need analyses, NO-COAL and Mr. Ladino argued that the Company's analyses focused on those demand forecasts and supply cases which reduce available supply to artificially support need for the project (NO-COAL Initial Brief, p. 7, R. Ladino Initial Brief, p. 17). NO-COAL and Mr. Ladino further argued that the Company's need analyses do not include the effects of C&LM programs, specifically those being implemented by Com/Electric, or the effects of "the definite warming trend phenomenon presently occurring" (NO-COAL Initial Brief, pp. 8, 14, R. Ladino Initial Brief, pp. 18, 27-28). In addition, NO-COAL asserted that EEC's demand forecasts are invalid because they do not reflect recent events in the Persian Gulf or the current economic environment (NO-COAL Initial Brief, p. 13). Finally, NO-COAL argued that the failure of the Company to sell the remaining 217 MW of the proposed project's output should be viewed as "prima facie evidence of non-need" (id., p. 17).

In response to the Hearing Officers memorandum regarding the 1991 CELT Report, NO-COAL presented the 1990 NEPOOL Annual Report and argued that the two documents together prove that the need analyses presented by EEC in this proceeding are erroneous, exaggerated and unreliable (Exh. NC-9; NO-COAL Supplemental Brief, p. 1). NO-COAL asserted that these documents also show that, where need may exist in the future, such need can be meet by gas-fired generating facilities and C&LM (NO-COAL Supplemental Brief, p. 3). In sum, NO-COAL argued that the 1991 CELT Report should be ample evidence to establish that there is no need for the proposed project (NO-COAL Supplemental Reply Brief, p. 2).

Finally, Mr. Ladino argued that the 1991 CELT Report is in dramatic conflict with the need analyses presented by the Company and that, therefore, both cannot be correct. Mr. Ladino asserted that the 1991 CELT Report indicates that sufficient time is available to consider all the resource options available to the region and that the Siting Council should not respond to any pressure to approve the facility on the basis of need

(R. Ladino Supplemental Brief, p. 3).

In response to the arguments of the intervenors, EEC asserted that the intervenors "pick and choose" the particular results which serve their arguments, while the Company has addressed the full range of analyses (EEC Reply Brief, p. 5). EEC reiterated that its supply forecasts include all resources which are in the planning process and may be available to serve load in the next four to five years and, therefore, there simply are not that many contingencies which can serve to increase the resources available to the region in the relatively short planning horizon under consideration (id., p. 8). Further, the Company noted that, even accepting the Attorney General's argument that a 50 percent reliability standard is appropriate for planning purposes, EEC's analyses demonstrate that the proposed project still would be needed in 1995 (id., p. 9). At the same time, EEC asserted that (1) accepting a 50 percent reliability standard, and (2) analyzing need without supply contingencies, would be inappropriate because system reliability decreases much faster in a negative capacity situation than it increases in a positive capacity situation (id., pp. 9-10). Finally, the Company argued that NO-COAL and Mr. Ladino are incorrect in their assertions that EEC has failed to include C&LM in the Company's analyses (id., pp. 10-11).

d. Analysis

In the course of this proceeding, EEC has developed and presented a total of 776 separate need cases based on six distinct demand forecasts, nine distinct supply cases, and 20 distinct resource contingencies. In addition, the Company has presented a comprehensive explanation of the NEPOOL resource assessments for purposes of providing insight regarding the levels of uncertainty surrounding demand and supply forecasting. Further, the Company has provided extensive analyses and documentation in support of its various assertions regarding the conservative nature of its underlying forecast assumptions. Such a comprehensive analysis of regional need never before has been presented to the Siting Council as part of

a non-utility developer's proposal to construct a generation facility. See West Lynn, EFSC 90-102 at 10-32; MASSPOWER, 20 DOMSC at 314-322; Altresco-Pittsfield, 17 DOMSC at 362-365; NEA, 16 DOMSC at 351-354.

In this case, the Company presented three base case demand forecasts prepared between 1989 and 1991. The Company has argued: (1) that the 1989 and 1990 CELT forecasts are appropriate demand forecasts for use in evaluating regional need; (2) that the 1989 and 1990 CELT forecasts should be considered low case forecasts as opposed to "true" base case forecasts; and (3) that the 1991 CELT forecast is not credible and, therefore, not appropriate for use in evaluating regional need.

In past decisions, the Siting Council has accepted the use of NEPOOL CELT forecasts for the purposes of evaluating regional need. MASSPOWER, 20 DOMSC at 321; Altresco-Pittsfield, 17 DOMSC at 364; NEA, 16 DOMSC at 354. The Siting Council agrees with the Company that the NEPOOL CELT forecasts generally can provide an appropriate starting point for resource planning in New England. However, the Siting Council does not agree with EEC that both the 1989 and 1990 CELT forecasts should be used to evaluate regional need. Rather, we find that it is not appropriate to rely on multiple versions of the same forecast to develop a range of possible future resource needs. The value of the use of multiple forecasts to develop a range of plausible future resource needs lies in the differences in the underlying methodologies and assumptions used to develop the various forecasts. The use of multiple forecasts based on essentially the same assumptions and methodologies adds little in the way of forecast reliability and, in fact, may tend to increase the influence of any inappropriate assumptions or any errors contained within a methodology. Here, the 1989 and 1990 forecasts presented by EEC rely on similar methodologies and assumptions. Therefore, because the 1990 CELT forecast relies on more recent data than the 1989 CELT forecast, the Siting Council considers the 1990 CELT forecast and the need cases developed from it to be more appropriate than the 1989 CELT forecast and associated need cases for purposes of evaluating regional need in this proceeding.

The Siting Council also accepts EEC's position that the 1990 CELT forecast represents a low case forecast of demand. In particular, the Siting Council is persuaded by the Company's analyses of the consistent historic tendency of CELT forecasts to understate load growth and to overstate the near-term impacts of C&LM.

Finally, the Siting Council shares the Company's concerns regarding the appropriateness of using the 1991 CELT forecast to evaluate regional need. While we have stated that more recent data justifies use of the 1990 CELT forecast rather than the 1989 CELT forecast, it does not follow that the 1991 CELT forecast is an appropriate replacement for the 1990 CELT forecast for purposes of evaluating regional need in this proceeding. While the 1989 and 1990 CELT forecasts employ similar assumptions and methodologies, the 1991 CELT forecast is based on substantially different assumptions and methodologies.

Our concerns with the 1991 CELT Report arise from (1) its failure to reflect discernable long-term historic trends, and (2) its marked inconsistency with other long-term forecasts of similar vintage. In our recent West Lynn decision, we specifically noted that the 1991 CELT forecast failed to accurately reflect historic trends and we also expressed our concerns as to the weight that should be accorded that forecast in a review of regional need (EFSC 90-102 at 26-27). Here, the Siting Council has the benefit of a record that includes an analysis of the underlying assumptions and methodologies used to develop the 1991 CELT forecast, a record that convinces us that the 1991 CELT forecast should be accorded little weight in our review of regional need in this case.

In particular, the validity of the 1991 CELT forecast for purposes of evaluating regional need is compromised (1) by its reliance on an economic forecast which is unduly bleak, and (2) by its reliance on a fuel price forecast which was generated at the time of the Persian Gulf crisis. We note that the economic forecast used to develop the 1991 CELT forecast projects an economic decline in the region which lasts much longer than the economic declines that accompanied the two other

recessionary periods experienced in the last twenty years. Further, we note that the economic forecasts used in the 1991 CELT forecast project a much slower economic recovery than the actual recoveries which followed the 1973-1975 and the 1981-1982 recessions. At the same time, the fuel price forecast used for the 1991 CELT forecast already has proven to be seriously inaccurate in its significant overforecast of the price of fuel in the short-term.

Accordingly, based on the foregoing, the Siting Council finds that the 1991 CELT forecast and the need cases developed from it should not be used for purposes of evaluating regional need in this proceeding.

In regard to the Company's alternative forecasts, the Siting Council finds that the 1986 NEGC forecast is outdated and is no longer appropriate for purposes of evaluating regional need. In the MASSPOWER decision, issued in August 1990, the Siting Council noted that the NEGC forecast used data "which may be unreliable due to age" (20 DOMSC at 321). While the Siting Council recognizes that the reliability of long-range forecasts generally should not be impacted by short-term events, the Siting Council also recognizes that the NEGC forecast, when initially developed, was not intended as a base case forecast for long-term planning purposes, but instead was developed as a high case contingency forecast more appropriate for short-term planning. The fact that the NEGC forecast seems to have predicted short-term demand growth more accurately than certain long-term forecasts of the same vintage does not justify a continued reliance on the 1986 forecast. Instead, the NEGC forecast's past success simply underscores the importance of relying on more current contingency forecasts. Accordingly, the Siting Council finds that the NEGC forecast and the need cases developed from it should not be used for purposes of evaluating regional need in this proceeding.

At the same time, the Siting Council finds that EEC's use of the Kuhn forecast as an alternative forecast is appropriate for purposes of evaluating regional need in this proceeding. First, the Kuhn forecast is based on a completely different

methodology than the CELT forecasts. Second, the Company supported the reasonableness of the growth rate contained in the Kuhn forecast by comparing it to the growth rate of the GNP, a variable which has been shown to have a strong relationship to regional peak load. The Siting Council notes, however, that the Kuhn forecast is developed from a relatively basic methodology. Clearly, a forecast based on such a basic methodology would not be acceptable for use as a principal or base case demand forecast. However, an alternative forecast based on a simplified methodology is appropriate in cases where that alternative forecast is compared to a base case forecast developed through a more sophisticated methodology.

In regard to the second Kuhn forecast, the Siting Council recognizes that this alternative demand forecast was presented by EEC as a high case companion forecast to the 1991 CELT forecast. In light of (1) our previous findings regarding the 1991 CELT forecast, and (2) the relatively insignificant differences between the Kuhn forecast and the second Kuhn forecast, it is not necessary to consider the second Kuhn forecast or the need cases developed from it for purposes of evaluating regional need in this proceeding.

Finally, in regard to the Company's incorporation of 20 percent and 22.5 percent reserve margins in its demand forecasts, the Siting Council finds that these reserve margins are conservatively low relative to actual NEPOOL reserve requirements and, therefore, appropriate for purposes of evaluating regional need. In regard to the Company's presentation on the ARM concept, the Siting Council finds that it would be inappropriate to base resource need decisions on use of ARM rather than reserve margins more closely related to actual NEPOOL practice. However, the Siting Council notes that the implications of ARM relative to the NEPOOL system provide further support for the practice of applying sensitivity or contingency tests to resource plans as a means of ensuring system reliability.

In regard to the Company's choice of base case, low case and high case supply forecasts, the Siting Council finds that

the Company's 1990 supply cases provide a reasonable starting point for the evaluation of resource need in this proceeding. The Siting Council recognizes that EEC's 1990 low case supply forecast is based on a "no Seabrook" assumption. However, it does not follow that Seabrook's present operating status automatically invalidates the Company's 1990 low case supply forecast. Instead, the Siting Council notes that it is appropriate for a low case supply forecast to address the possibility that a portion of the region's existing generating capability will be unavailable, provided that applicable contingency tests do not address the same possibility. In this case, we find that the "no Seabrook" assumption in EEC's 1990 low case supply forecast is a reasonable proxy for the possibility that other generating units may be unavailable.

The Siting Council also finds EEC's choice of resource contingency tests to be generally appropriate. In previous decisions, the Siting Council has criticized regional need analyses that failed to consider a full range of resource contingencies. Specifically, the Siting Council has criticized regional need analyses which have not addressed contingencies such as: (1) the timing and magnitude of supply additions or reductions in existing supplies; (2) the impacts of existing plant performance, fuel prices and utility-sponsored C&LM programs; and (3) the impact of the availability of new gas supplies in the region. West Lynn, EFSC 90-102 at 28; MASSPOWER, 20 DOMSC at 321-322; Altresco-Pittsfield, 17 DOMSC at 364-365. The Siting Council notes that, here, the Company has presented the most comprehensive set of resource contingencies to date in a Siting Council review of a proposal to construct a non-utility generating facility. Further, the Siting Council notes that the Company's tests have addressed most of the important types of contingencies identified by the Siting Council in previous reviews of regional need.

Nevertheless, the Siting Council recognizes that the Company could have provided further support for some of its contingency tests. Specifically, the Siting Council agrees with the Attorney General that some evaluation of the relative

probability that the various contingencies may occur would have provided the necessary information to determine the appropriate weight to be accorded the results of the various contingency tests. Further, the Company should have presented a discussion of other types of contingencies which could impact the region's supply mix and an explanation of why it selected its particular contingency tests.[44]

In regard to the arguments of the other parties in this proceeding that the Company's analyses primarily focused on contingencies which reduce available resources as opposed to contingencies that increase available resources, the Siting Council acknowledges that there simply are not as many possible events which can increase available resources as there are possible events which can reduce available resources. Further, the record in this case was augmented by the Company's preparation of numerous need cases developed in response to requests of the Siting Council and other parties, including need cases which addressed contingencies of higher than expected C&LM. Accordingly, we find that the need cases developed by EEC represent a balanced evaluation of resource need.

In regard to the Company's arguments relating to the 1990 NEPOOL resource assessment, the Siting Council notes that, in previous cases, we have stated that project proponents who present NEPOOL resource assessments as part of a regional need analysis must analyze and explain fully both the resource assessment and its effect on the regional need analysis. MASSPOWER, 20 DOMSC at 322. Here, the Company has presented a

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44/ We note that the Company chose to present to the Siting Council the same contingency tests presented by another non-utility project developer in a seperate Siting Council proceeding (see p. 16 n 13, above). The Siting Council recognizes the comprehensive nature of the Company's contingency tests, and further notes that the Company has been able to establish that this set of contingency tests is appropriate for use in our evaluation of regional need in this proceeding. However, the Siting Council cautions other non-utility developers that the wholesale adoption of contingency tests submitted as part of other proponents' regional need analyses, without adequate support for their continued validity, may make it more difficult for the Siting Council to determine whether specific tests are appropriate.

thorough explanation of the 1990 resource assessment and its underlying assumptions and methodologies, as well as a discussion of the appropriate use of its results. The Siting Council finds that the 1990 resource assessment and the Company's analysis of that document provide persuasive support for the practice of evaluating high case demand forecasts and a broad range of resource contingencies in making determinations of regional need.

At the same time, the Siting Council does not agree with the Company that the results of the 1990 resource assessment require that resource need determinations be based on achieving a 70 to 80 percent confidence level. In a previous decision, the Siting Council found that a 70 percent reliability level was reasonable for a particular utility's planning purposes. See Boston Edison Company, 18 DOMSC 201, 277 (1989) ("1989 BECo Decision"). However, the Siting Council also has stated that a reliability reserve which may be appropriate for a particular utility is not necessarily appropriate for addressing the resource needs of an integrated power pool. West Lynn, EFSC 90-102 at 29. While the Siting Council recognizes that it is appropriate for non-utility developers to consider some level of reliability in developing regional need analyses, the Company has failed in this case to provide ample documentation in support of the use of a 70 to 80 percent confidence level. In future cases, if project proponents argue for the adoption of specific reliability levels, they will be expected to provide (1) analyses of the implications of the proposed reliability levels on the regional power system, and (2) a discussion of how the proposed reliability levels relate to the contingency tests performed.

In sum, EEC's regional need analysis is the most comprehensive analysis which the Siting Council has reviewed to date. Even (1) without the need cases developed from the 1989 CELT forecast, NEGC forecast, 1989 base case supply forecast, 1989 high case supply forecast, and 1989 low case supply forecast, and (2) without the need cases developed from the 1991 CELT report, second Kuhn forecast, 1991 base case supply forecast, 1991 high case supply forecast and 1991 low case

supply forecast, the record contains 356 distinct need cases based on two discrete demand forecasts, three supply forecasts and 20 distinct resource contingency tests. Further, the Siting Council has found that the demand and supply forecasts used to develop the need cases identify an appropriate range of values for evaluation, and that the range of contingency tests applied to these forecasts are appropriately broad and representative of reasonably likely contingencies. Finally, the Siting Council notes that of the 356 need cases which the Siting Council has determined are appropriate for use in evaluating regional need in this proceeding, 312 or 88 percent of the cases identify a need for at least 300 MW of additional energy resources by 1995, the first year in which the proposed project is likely to commence operation. Such results provide credible evidence of the need for at least 300 MW of additional energy resources in 1995.

Accordingly, the Siting Council finds that EEC has established that New England needs at least 300 MW of additional energy resources for reliability purposes beginning in 1995 and beyond.[45]

45/ In regard to the Company's arguments that its proposed project would be needed on economic efficiency grounds if the 1991 CELT report was considered to be the only credible forecast of need in the proceeding, the Siting Council agrees with the Company that, under such a scenario, it would be appropriate to evaluate the economic efficiency benefits of the proposed project using the relevant assumptions which form the basis of the 1991 CELT report. Further, the Siting Council notes that the Company's analysis of the economic efficiency benefits associated with its proposed project under such assumptions is the most comprehensive economic efficiency analysis presented thus far in a Siting Council proceeding on a non-utility generating facility. West Lynn, EFSC 90-102 at 32; MASSPOWER, 20 DOMSC at 19. Finally, the Siting Council notes that the Company's analysis appears to address many of the concerns raised by the Siting Council in previous non-utility generating facility cases where economic efficiency arguments have been presented. Id. Nevertheless, in light of the fact that the Siting Council has found that the 1991 CELT forecast should not be used for purposes of evaluating need in this proceeding, the Siting Council must likewise find that the Company's economic efficiency argument, based on some of the same underlying assumptions as the 1991 CELT forecast, should not be relied upon for the purposes of determining need on economic efficiency grounds in this proceeding.

4. Benefits to Massachusetts

In NEA, the Siting Council established that a non-utility developer proposing the addition of energy resources in the Commonwealth must demonstrate that it offers reliability or economic efficiency benefits to the Commonwealth in sufficient magnitude to offset the impact on the Commonwealth's resources of construction and operation of the proposed facilities (16 DOMSC at 349). In Altresco-Pittsfield, the Siting Council found that a non-utility developer also may demonstrate benefits to the Commonwealth based on economic grounds outside of a PPA or on environmental grounds (17 DOMSC at 368-369).[46] Therefore, having established that New England needs at least 300 MW of additional energy resources for reliability purposes beginning in 1995 and beyond, the Siting Council determines whether the proposed project is likely to provide reliability, economic, environmental, or other benefits to Massachusetts.

a. Power Sales

In NEA, the Siting Council found that, consistent with current energy policies of the Commonwealth, Massachusetts benefits economically from the addition of cost effective QF resources to its utilities' supply mix (16 DOMSC at 358). In that case, the Siting Council also found (1) that a signed and approved PPA between a QF and a utility constitutes prima facie evidence of the utility's need for additional energy resources for economic efficiency purposes, and (2) that a signed and approved PPA which includes a capacity payment constitutes prima facie evidence of the need for additional energy resources for reliability purposes. Id.

Here, EEC argued that its PPAs with Com/Electric and Cambridge demonstrate that Massachusetts will receive both economic efficiency and reliability benefits from the proposed project (EEC Initial Brief, pp. 32-34). EEC submitted copies of

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46/ In Turners Falls, the Siting Council found that a non-utility developer also may demonstrate benefits to the Commonwealth in the form of community benefits (18 DOMSC at 162-164).

its signed agreements with Com/Electric (for 50 MW) and Cambridge (for 33 MW) for power sales commencing not later than January 1, 1994 (Exh. HO-MN-1).[47] These agreements provide for capacity payments to the Company and were approved by the DPU in 1989 (id., Exh. HO-1A, pp. 3, 47).[48]

Based on the foregoing, the Siting Council finds that EEC has established that the ratepayers of Com/Electric and Cambridge are likely to receive economic efficiency and reliability benefits from the proposed additional power resources. Accordingly, the Siting Council finds that EEC has established that its proposed project offers reliability and economic efficiency to Massachusetts through its signed and

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47/ As previously noted, the Company stated that it intends to renegotiate its PPAs to delay the required in-service date (see p. 15 n 11, above). In addition, the Company indicated that it intended to offer the remaining output of its proposed project to purchasers on a NEPOOL dispatchable basis (Exhs. HO-MN-21, HO-MN-22, HO-32). The Company's current contracts with Com/Electric and Cambridge provide for operation of the unit on a must-run basis (Exh. HO-MN-1). Mr. Croyle stated that three options exist for the Company to address this discrepancy: (1) to operate one boiler on a must-run basis and the other two on a dispatchable basis; (2) to change to a two turbine configuration with one boiler and one turbine operating on a must-run basis and the other turbine and two boilers on a dispatchable basis; or (3) to amend the PPAs with Com/Electric and Cambridge to enable the facility to be dispatched by NEPOOL as a single unit (Tr. 11, pp. 99-106). Mr. Croyle also stated that the first option presented problems with NEPOOL accounting procedures and that the second option did not appear to be economically desirable (id.). Further, Mr. Croyle stated that Com/Electric seemed receptive to changing the must-run clause to a dispatchable clause and that such a change would be in the best interests of the utilities (id.). Finally, the Company noted that the pricing terms of the contracts would need to be restructured to reflect dispatch operation (id., pp. 109-110).

48/ The Company also provided an analysis of Massachusetts' need for additional energy resources as part of its argument that Massachusetts will benefit from the proposed project (Exh. HO-1A, pp. 69-75). The Siting Council has always evaluated Massachusetts benefits based on signed and approved PPAs rather than the potential for power sales within Massachusetts. NEA, 16 DOMSC at 358-360; Altresco-Pittsfield, 17 DOMSC at 366-367. Therefore, the Siting Council does not evaluate the Company's analysis of Massachusetts' need for additional energy resources.

approved PPAs with Com/Electric and Cambridge.[49]

b. Economic Benefits From Steam Sales

The Company presented an executed steam sales contract with Polaroid which provides for the sale of a maximum of 121,000 pounds per hour ("lbs/hr") of steam for use in Polaroid's existing facility and 89,000 lbs/hr of steam for use in future Polaroid facilities at the New Bedford site (Exhs. HO-1C, Appendix F, HO-B-7).[50] Mr. Croyle stated that the contract has a term of 20 years with renewal provisions and provides that Polaroid will purchase its entire steam load from EEC (Tr. 11, p. 156).[51]

The Company argued that its steam sales agreement with Polaroid will provide significant economic benefits to Polaroid, the local area, and, therefore, to Massachusetts (EEC Initial Brief, pp. 34-36). Further, EEC argued that the level of economic benefits to Polaroid and the local area as a result of the steam sales contract has not been equalled by projects which previously have received Siting Council approval (id.). Finally, EEC asserted that it will be able to provide similar

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49/ The Siting Council notes that this finding is based on the continued validity of the Company's PPAs with Com/Electric and Cambridge. If these PPAs are terminated for any reason prior to construction of the proposed project, this finding may no longer be valid.

50/ EEC indicated that it had filed an application with FERC in February, 1991 for certification as a QF under PURPA (Exhs. HO-B-6, HO-RR-50). The Company also stated that the minimum level of steam sales necessary for the project to satisfy PURPA requirements for QF status would be 43,500 lbs/hr at 585 pounds per square inch absolute and 698 degrees Fahrenheit (Exhs. HO-B-22, HO-B-23). The Siting Council notes that the steam load for Polaroid's existing facility is well beyond the minimum level necessary for QF certification.

51/ Mr. Croyle stated that the steam contract specifies an initial financial disbursement date for the EEC project of December 31, 1991 and an initial operation date of June 30, 1994 (Tr. 11, p. 158). Mr. Croyle also stated, however, that the contract includes delay provisions which extend the financial milestone to December 31, 1992 and the operation milestone to June 30, 1996 (id.).

benefits to other industrial steam users within the industrial park (id.).

EEC identified the Polaroid facility in New Bedford as Polaroid's "key photographic plant" (Exh. HO-1A, p. 66). EEC stated that Polaroid produces 98 percent of its light-sensitive materials at the New Bedford facility and that approximately 80 percent of Polaroid's "environmentally highly fragile" inventory is stored at the facility (id., p. 67). EEC noted that Polaroid currently uses approximately 240 million pounds of steam per year for its film coating process and building heating and chilling, and approximately 445 million pounds of steam per year for electricity generation (id.; Exhs. HO-B-7, HO-MN-6). EEC stated that Polaroid currently produces this steam with two on-site boilers which burn No. 6 fuel oil and natural gas (Exhs. HO-1A, p. 67, HO-31, HO-MN-6). EEC further stated that the proposed project would allow Polaroid to discontinue use of these oil and gas-fired boilers except for periods during the summer when the utilities purchasing power from EEC have their greatest need for power and Polaroid coincidentally has its greatest need for steam, or during periods when the EEC facility is shut down for maintenance activities (Exhs. HO-1A, p. 67, HO-MN-7).[52]

EEC stated that Polaroid anticipates the equivalent of a 40 percent savings in its fuel costs associated with steam production by purchasing steam directly from EEC

52/ The Company stated that when Polaroid's existing boilers are shutdown and steam is delivered from the EEC facility, local SO_2 concentrations will be reduced leading to a net improvement in local air quality (Exh. HO-1A, p. 67). The Company stated that this reduction would be a result of the higher emission stack used by EEC which would reduce ground level impacts in the immediate area (id.). While the Company asserted that this effect represents a benefit associated with its steam sales agreement, the Company did not specifically address how such an effect would impact overall Massachusetts air quality. The Siting Council evaluates the air quality impacts of construction and operation of the proposed project in Section III.E.2, below.

(Exh. HO-MN-7).[53] EEC further stated that these fuel cost savings are expected to increase over time as the cost of steam will escalate based on the price of coal rather than the price of oil (Exh. HO-1A, p. 67). EEC presented analyses of the potential fuel cost savings associated with steam generation for process uses (Exh. HO-MN-29). These analyses indicate savings in fuel costs for process steam generation of from 48 percent, based on 1989 data, to 60 to 65 percent over the 20-year contract period (id.).[54] These analyses indicate annual savings in fuel costs of over 600,000 dollars in 1994, escalating to over 2.5 million dollars in 2013 with a present value of total savings of approximately nine million dollars (id.). The Company noted that its analyses do not include savings associated with the operation and maintenance of the existing steam production system (id.). In addition, the Company noted that there would be additional savings associated with sewer bill reductions (id.).[55]

EEC also noted that Polaroid is considering adding a new film coating plant to its New Bedford facilities, which would represent a substantial increase in its New Bedford operations (id., p. 68, Exh. HO-B-7).[56] EEC indicated that the new

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53/ EEC did not quantify the impact of the savings in fuel costs on the overall operating costs of the Polaroid facility (Exh. HO-MN-30).

54/ The Company presented analyses of savings under two different fuel price scenarios (Exh. HO-MN-29).

55/ The steam sales contract between Polaroid and EEC provides for the use of Polaroid wastewater in the EEC facility, thereby eliminating the need for Polaroid to discharge its wastewater into the local sewer system (Exhs. HO-1C, Appendix F, Exh. HO-E-86). The Siting Council notes that, as a result of the Company's use of Polaroid's waste stream, there will be a net decrease in flow into the local sewer system (see Section III.E.6.b, below). The Company, however, neither asserted that this reduction in waste flow into the sewer system constituted a Massachusetts benefit, nor presented any analyses of the significance of this reduction on the sewer system.

56/ Mr. Croyle stated that Polaroid's expansion plans are firm, noting that the site has been cleared, design is ongoing and the facility should be operational in 1992 or 1993 (Tr. 11, pp. 154-155). Therefore, EEC anticipates that it will be providing steam to both the existing and new Polaroid facilities as soon as the EEC facility comes on-line (id.).

Polaroid film-coating facility would require 486 million pounds of steam per year for both process and electricity generation purposes (id.). EEC noted that in the event that Polaroid expands its New Bedford facility, annual savings in process steam costs could reach almost 5 million dollars by 2013 (id.).

EEC also stated that it currently is negotiating with the Acushnet Corporation ("Acushnet") to sell steam for use in Acushnet's Titleist Ball Plant II facility located in the GNB Industrial Park (Exh. HO-B-9).[57] The Company stated that the Acushnet facility is currently operating at approximately 40 percent of capacity and is undergoing testing and startup operations (Exh. HO-B-24). EEC also stated that the Acushnet facility currently uses steam as a heat exchange medium in its molding processes and for plant heating and chilling, and noted that the Acushnet facility's steam supply is provided by two natural gas/fuel oil boilers rated at 13,000 lbs/hr each (Exhs. HO-B-25, HO-B-26). The Company indicated that total steam demand for the Acushnet facility was not expected to exceed 30,000 lbs/hr (Exh. HO-RR-48).[58] The Company provided

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57/ The Company provided a draft steam sales agreement with Acushnet (Exh. HO-B-9). Mr. Croyle stated that no significant issues remained to be resolved and indicated that he expected the agreement to be finalized and executed without any problem (Tr. 11, p. 163). Mr. Croyle also noted that the terms of the steam contract with Acushnet would be similar to the terms of the Polaroid steam contract (id., p. 165). At the time of this decision, however, the Siting Council has not received an executed steam sales agreement between EEC and Acushnet.

58/ The Company stated that the EEC facility design would provide for a maximum auxiliary steam flow of 207,000 lbs/hr (Exhs. HO-B-32, HO-RR-48). The Company also stated, however, that in order to accommodate the combined maximum potential steam loads of Polaroid (210,000 lbs/hr) and Acushnet (30,000 lbs/hr), steam extraction levels could be increased, resulting in a reduction in electrical power output of less than one percent (id.). The Company noted that the resulting time at reduced power would be short and that the increase in auxiliary steam would have no effect on the design or rated capacity of the boilers and, therefore, would not affect facility emissions (id.).

no information on the potential economic benefits to Acushnet of purchasing steam from EEC (Exh. HO-MN-31).

In Altresco-Pittsfield, the Siting Council accepted a steam sales agreement that reduced steam user costs as evidence of economic benefits to Massachusetts (17 DOMSC at 367-369). In that decision, the petitioner showed that its cogeneration project would provide steam to the steam purchaser at a unit cost substantially lower (over 85 percent less) than the cost to the steam purchaser of producing its own steam, resulting in annual savings of six million dollars. Id. at 268. In West Lynn, while the annual dollar savings were substantially less than the savings in Altresco-Pittsfield, the Siting Council nonetheless found that the steam sales agreement provided economic benefits to Massachusetts. West Lynn, EFSC 90-102 at 38. In that case, the petitioner established that its cogeneration project would provide steam to the steam purchaser at approximately 50 percent less than the purchaser's unit cost of generating its own steam. Id.

Here, EEC has established that its steam sales agreement with Polaroid will result in significant savings in fuel costs for process steam generation. While the Company did not specifically quantify the additional savings associated with non-fuel costs of process steam production or savings associated with the production of steam for electricity generation, it is nonetheless clear that Polaroid will receive significant economic benefits as a direct result of its steam sales agreement with EEC. In addition, these savings are likely to increase over the life of the steam contract as a result of the relative cost increases of coal as opposed to gas and fuel oil. Finally, the Siting Council notes that Polaroid uses more steam for electricity generation than for process purposes, and, therefore, should realize savings associated with electricity generation of at least the magnitude of the savings associated with process steam production.

Accordingly, based on the foregoing, the Siting Council finds that EEC has established that its proposed project offers economic benefits to Massachusetts from EEC's steam sales agreement with Polaroid.

In regard to the potential economic benefits associated with steam sales to Polaroid's new facilities and the Acushnet plant, the Siting Council recognizes the significant potential benefit such additional sales represent, and commends the Company for continuing to pursue steam sales well beyond the level necessary to maintain its certification as a QF. It is precisely this type of true cogeneration project that the Siting Council and other governmental agencies have sought to encourage. By maximizing the use of the thermal capability of the proposed project during non-peak periods, EEC is significantly improving the overall energy efficiency of its proposed project during the majority of its operating life without negatively impacting the availability or reliability of the electric capability of the unit.

c. Other Economic Benefits

The Company indicated that as a result of construction and operation of the proposed facility, significant economic benefits would flow to both New Bedford and Massachusetts through jobs, tax revenues and purchases of construction materials (Exh. HO-MN-8). The Company stated that during the four-year construction period for this project, the average number of construction employees working at the site would be 600, with as many as 1400 people employed during the 10 to 14 month peak construction period (id.). During operation, EEC stated that the facility will require a minimum of 80 employees (id.). The Company further stated that the construction payroll likely would result in approximately 1.3 million dollars in Massachusetts income taxes on an annual basis, and that the facility will pay approximately two million dollars in annual taxes to the City of New Bedford -- an amount equal to the current top ten City taxpayers combined (id.). Finally, the Company noted that, during construction, the economy of southeastern Massachusetts would benefit from significant building material purchases as well as the purchases of services by construction employees (id.).

The Siting Council notes that the construction and operation of new generating facilities typically results in the creation of jobs, new tax revenues and an overall positive impact on the local economy through the local purchase of services and materials. Such benefits may be considered to be "generic" to new generating facilities in a manner similar to the "generic" benefit represented by the addition of cost-effective resources to the regional supply mix and, therefore, typically would not represent significant Massachusetts benefits consistent with our Massachusetts benefits standard. The Siting Council notes, however, that in this case, these benefits are in fact significant as a direct result of specific characteristics of the project proposed and go well beyond the "generic" level of a typical non-utility project. In particular, the size of the facility, the length of time required for construction and the capital cost of the facility all contribute to the creation of substantial local economic benefits in the form of jobs and tax revenues. This contribution is all the more meaningful because of the current economic environment in New Bedford and southeastern Massachusetts. Accordingly, the Siting Council finds that the proposed project offers a level of additional economic benefits to the local New Bedford area and Massachusetts through the creation of jobs and tax revenues.[59]

d. Fuel Diversity

The Company stated that its project offers significant diversity benefits to Massachusetts and the region by reducing dependence on oil for power generation (EEC Initial Brief, pp. 36-41). The Company further stated that the overdependence of both Massachusetts and the region on oil for power generation subjects ratepayers to an unacceptable level of reliability and price risk (id.). EEC noted that the Siting Council has

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59/ While the Siting Council notes that economic benefits of the magnitude presented in this case clearly meet our Massachusetts benefits test, we can envision few instances when these sort of "other" benefits alone, would satisfy our Massachusetts benefits test.

recognized diversity of fuel for electricity generation as an important goal which is consistent with providing a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost (id., pp. 36-37).

In addition, the Company contended that, while new gas-fired generation projects contribute to reducing both the Commonwealth's and the region's dependence on oil, reliance solely on new gas-fired generation will not completely solve the problem of dependence on oil (id., pp. 38-41, EEC Reply Brief, pp. 11-12). EEC argued that significant concerns exist regarding the reliability of gas supplies and the stability of gas prices, and that coal offers an abundant fuel supply with significant price stability (id.). Thus, EEC argued that, in terms of fuel diversity, coal offers substantial advantages over natural gas (EEC Reply Brief, p. 12).

No other party to the proceeding specifically addressed the issue of whether fuel diversity constitutes a Massachusetts benefit.[60]

In past reviews of proposals by non-utility developers to construct additional energy resources in the Commonwealth, the Siting Council has found that a number of different project attributes constitute Massachusetts benefits under our standard. These project attributes have included: the economic and reliability benefits that flow to Massachusetts ratepayers by virtue of signed and approved PPAs (NEA, 16 DOMSC at 358-360; Altresco-Pittsfield, 17 DOMSC at 366-367); the economic benefits that flow to Massachusetts industries by virtue of cost-effective steam purchases from cogeneration facilities (West Lynn, EFSC 90-102 at 37-38; Altresco-Pittsfield, 17 DOMSC at 367-369); the specific environmental benefits that flow to the surrounding community as a result of the addition of the proposed energy resource (West Lynn, EFSC 90-102 at 41-43;

60/ EEC and other parties presented extensive arguments regarding the importance of diversity and whether the EEC project, in fact, contributes to diversity. These arguments are addressed in Section II.B.2, below.

Altresco-Pittsfield, 17 DOMSC at 367-369); and the community benefits that flow to the surrounding population when a project proponent provides a civic enhancement designed to offset the impact of the proposed resource addition (Turners Falls, 18 DOMSC at 162-164).

In each of these cases, the project attributes which constituted Massachusetts benefits (1) were tangible, project-specific benefits which flowed directly to Massachusetts ratepayers, businesses, or communities, and (2) were guaranteed, quantifiable and likely to continue throughout the life of the project.

In the MASSPOWER decision, the Siting Council addressed the question of what level of benefits must flow to the Commonwealth in order to satisfy the Massachusetts benefits test (20 DOMSC at 29-31). As part of that analysis, the Siting Council observed that the Massachusetts benefits standard should be set in such a manner as to allow the state to remain a host to those necessary, least-cost, least-environmental-impact generating projects designed to serve the entire region, while, at the same time, ensuring that these projects bring some meaningful benefit to Massachusetts. Id. at 30.

As an initial matter, the Siting Council rejects EEC's contention that the project offers significant diversity benefits simply because it is a coal plant in a region that depends to a large extent, on oil-fired generation. The Siting Council, as indicated above, has never found Massachusetts benefits without specific benefits to Massachusetts, Massachusetts ratepayers or Massachusetts citizens. The mere fact that the plant burns coal does not, by itself, warrant a finding of Massachusetts benefits.

In regard to benefits that may be realized by purchasers of the output of the plant, the record indicates that most of the plant's capacity remains unsold and thus cannot contribute to a finding of Massachusetts benefits. In addition, while the Siting Council recognizes that Com/Electric and Cambridge have purchased a portion of the output of the proposed facility (and

are the only known purchasers at this time) and that these two utilities currently have no coal in their supply mixes, the record contains no information regarding: (1) the specific diversity goals of either utility; (2) the manner in which the power from EEC will contribute to meeting those goals; or (3) the quantity and duration of the diversity benefits which would flow to ratepayers of the utilities as a result of the power purchases. Therefore, based on this record, the Com/Electric and Cambridge PPAs do not provide a basis for a finding of Massachusetts benefits on diversity grounds.

Accordingly, the Siting Council finds that the Company has not established that its project offers quantifiable reliability or economic benefits to Massachusetts through increased fuel diversity. Finally, the Siting Council notes that, under the new integrated resource management ("IRM")[61] framework, utilities will be required to identify specific diversity goals and to evaluate resource options relative to those goals. Projects which have PPAs which are the result of an IRM acquisition process may be able to establish that their projects offer specific, quantifiable, guaranteed diversity benefits to the purchasing utilities for the term of their PPAs, and hence to the ratepayers of Massachusetts.[62]

61/ IRM is a coordinated regulatory framework through which most electric companies operating in the Commonwealth will acquire new resources. See Siting Council's Final Order on IRM Rulemaking, EFSC 90-RM-100A (1990), 980 CMR 12.00 et seq.

62/ It is not our intention to imply that a signed and approved PPA resulting from IRM is the only form of PPA which can establish that diversity benefits flow to Massachusetts ratepayers. With the necessary support and documentation, a signed and approved PPA resulting from negotiations or other solicitations may be used to establish Massachusetts benefits on diversity grounds.

e. Transmission System Impacts

i. Description

The Company argued that the proposed project offers specific and measurable reliability and transmission benefits to the New Bedford and southeastern Massachusetts areas and to New England as a whole (EEC Initial Brief, pp. 42-44). The Company asserted that these benefits are particularly significant in light of recent transmission-related problems in southeastern Massachusetts (id.). Specifically, the Company argued that its project will provide: (1) reliability benefits as a result of improved load/generation matching within the New Bedford Division of Com/Electric; (2) improved reliability of the local transmission and distribution system due to the installation of necessary interconnection facilities; (3) improved regional bulk power transmission system performance in the event of the loss of large generating units in southeastern Massachusetts; and (4) peak load transmission line loss savings of 12 MW on a NEPOOL-wide basis (id.).

The Company stated that the recent transmission problems in southeastern Massachusetts have been caused by increased demand for electricity, availability problems with existing generating capacity, and insufficient transmission capability to move power to certain load centers. The Company further stated that a related problem in southeastern Massachusetts was that the existing generating sources were large in size but few in number, thus placing an excessive load on the transmission system in the event of the outage of one of the units during peak load periods (Exhs. HO-1A, pp. 76-78, HO-MN-12). As a result, according to the Company, NEPOOL has been forced to reduce voltage levels in the southeastern Massachusetts area several times in recent summers, most notably in the summer of 1988 (Exh. HO-1A, p. 75).[63] The Company noted that the entire

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63/ The Company stated that the principal reasons for the problems in the summer of 1988 were the outage of the Pilgrim nuclear generating unit, lack of sufficient reactive power reserves, and a number of extended heat spells (footnote continued)

eastern portion of REMVEC has been affected, but that southeastern Massachusetts frequently has been the focal point of such problems (id.). The Company provided reports regarding these problems which were generated by independent entities, as well as documentation of instances in which NEPOOL was required to initiate its OP 4[64] during the period 1987 to 1989 (id., pp. 75-78, Exh. HO-MN-12).

As set forth above, EEC first argued that its proposed project would provide reliability benefits to the local New Bedford area as a result of improved load/generation matching. In support of this assertion, the Company stated that because its proposed project is located in southeastern Massachusetts near the load centers of New Bedford and Fall River, the EEC project will increase the availability of capacity in proximity

(footnote continued) (Exhs. HO-1A, pp. 76-78, HO-MN-12). The Company indicated that the problems were somewhat alleviated in 1989 by less severe weather, reinforcements to the transmission interconnection system between the Rhode Island-Eastern Massachusetts-Vermont Energy Control Area ("REMVEC") and the neighboring energy control area, and initiation of capacitor installation programs directed at reducing the reactive power reserve problems (Exhs. HO-1A, pp. 76-78, HO-MN-12; Tr. 8, p. 6). While the Company could not provide details of these programs, it noted that the REMVEC utilities have installed approximately 700 megavars of capacitor capability, of which Com/Electric has installed approximately 110 megavars (Exh. HO-18; Tr. 8, p. 27).

The Company explained that reactive power is needed to maintain voltage levels and the stability of the transmission grid and to supply inductive loads to motors, transformers and air conditioning systems (Exh. HO-1A, p. 77-78). The Company noted that the possible sources of reactive power are generating facilities and capacitor installations (id.).

64/ NEPOOL Procedure OP 4 -- Action During a Capacity Deficiency -- sets out sequential steps to be utilized by NEPOOL during periods of capacity shortages (Exh. HO-MN-11, October 1989 revision). The steps include ordering all on-line units to maximum claimed capability, curtailment of interruptible loads, purchases from neighboring power pools, load curtailment at NEPOOL member facilities, use of customer generation, reduction of reserves, implementation of voltage reductions and media appeals for voluntary customer load curtailment (id.).

to load, and thus reduce the burden on the transmission system in the local area (Exh. HO-1A, p. 78). Specifically, the Company stated that its project will supply additional reactive power for local voltage support and eliminate some import of additional power from other areas (id.).

In order to support its position, the Company presented preliminary load flow studies conducted by Com/Electric which evaluated the impact of the proposed project on the Com/Electric system (Exhs. HO-16, HO-22).[65] The Company indicated that these studies addressed 1994 forecasted summer conditions at 95 percent of anticipated peak load (Exh. HO-MN-10).[66] These studies indicate that, with the addition of the proposed project, the power flow from the overall Com/Electric service territory to surrounding areas would increase from approximately 130 MW to approximately 400 MW (id.). The Company noted, however, that the addition of the EEC project would result in a resource surplus of 144 MW in the New Bedford division, whereas without the EEC project the New Bedford division would suffer a resource deficiency of 156 MW (Exhs. HO-MN-10, EEC-12, p. 7; Tr. 8, pp. 49-51). In addition, the New Bedford division would shift from importing reactive power to exporting reactive power with the addition of the EEC project (id.). Thus the Company asserted that the addition of the EEC project will result in an improved local resource balance (id.). The Company indicated that the addition of the EEC project would not only provide a

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65/ The Company stated that additional, extensive system load flow, short circuit and stability analyses remain to be conducted in response to NEPOOL requirements to further evaluate the impact of the proposed project on the stability, reliability and operating characteristics of the bulk power system and to finalize interconnection requirements (Exh. EEC-12, p. 12; Tr. 8, pp. 67, 71-74, 77-80).

66/ The Company noted that in addition to the existing units in the area, the load flow studies assume that a new, 68 MW non-utility generator would be operating in Dartmouth, Massachusetts (Exh. HO-MN-10).

source of reactive power close to local inductive loads, but would improve local voltage levels, thereby improving the ability of recently installed static capacitors to supply reactive power (Exh. EEC-12, pp. 11-12).[67]

Second, the Company asserted that installation of necessary interconnection facilities will improve the reliability of the local 115 kV transmission system (Exh. EEC-12, p. 8). The Company stated that preliminary studies indicated that system reinforcements to the local Com/Electric transmission system would be necessary in order to ensure the integrity of the local transmission system and a reliable method for exit of the power from the EEC project under single contingency conditions (id., Exhs. HO-MN-15, HO-16, HO-22).[68] Com/Electric's preliminary studies indicate that an existing 5.2-mile 795 kcmil 115 kV single circuit transmission line serving the Industrial Park Tap will need to be replaced with a 2338 kcmil double circuit steel pole line, and a new six breaker ring bus switching station at the Industrial Park Tap will need to be installed (id.).[69]

EEC stated that installation of the switching station at the Industrial Park Tap would improve system reliability by decreasing the length of switchable line sections, thereby reducing exposure to line outages, improving protective relay system performance and improving system operating capabilities for normal operations and maintenance activities

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67/ The Company stated that the reactive power output of a static capacitor varies as the square of the applied voltage and indicated that the EEC project is expected to increase 115 kV system voltage by 0.8 to 2.4 percent in the New Bedford division (Exhs. EEC-12, pp. 11-12, HO-20).

68/ The preliminary Com/Electric load flow studies evaluated a variety of line outage contingencies both with and without a variety of interconnection arrangements for the EEC project (Tr. 8, pp. 54-67).

69/ Mr. Warner stated that it was unlikely that the need for these specific facilities would change as a result of the more detailed studies which remain to be performed (Tr. 8, pp. 81-82).

(Exh. EEC-12, pp. 8-9).[70] In addition, the Company stated that the replacement of the single circuit line with a double circuit line would result in a more reliable supply to the Industrial Park Tap (id.).

Third, EEC argued that the proposed project would provide benefits to the bulk power transmission system in southeastern Massachusetts by reducing the need to transfer power over the 345 kV system, especially during times when other units in the southeastern Massachusetts area are out of service. The Company stated that the project will be able to provide both real and reactive power in excess of immediate area requirements, thereby reducing the need to import both real and reactive power into the surrounding region over the 345 kV system (Exh. EEC-12, pp. 9-10). Mr. Warner noted that the preliminary load flow studies indicate that without the EEC project there would be a significant net inflow of power to the Southeastern Massachusetts area from the 345 kV bulk power system (Tr. 8, pp. 31-37; Exh. HO-22). Mr. Warner further noted that with the EEC project, the load flow studies reflect a significant reduction in the import of power to the southeastern Massachusetts area (id.).[71]

Finally, EEC stated that its project would result in reduced peak load line loss reductions throughout the NEPOOL system by approximately 12 MW (Exhs. EEC-12, p. 11, HO-17, HO-22). The Company stated that these loss savings would occur

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70/ The Com/Electric preliminary study report states that "(t)he overall goal when planning transmission facilities for the Eastern Energy plant was to minimize the impact on the EUA system of the power flow from the plant" (Exhs. HO-16, HO-22). In addition, the study indicates that the existing 115 kV transmission system would not need to be rebuilt in the absence of the EEC project until approximately 1999 (id.).

71/ The Com/Electric studies indicate that without the EEC project there is a net inflow of approximately 390 MW into southeastern Massachusetts through the West Medway 345 kV substation (Exh. HO-22; Tr. 8, pp. 31-37). With the addition of the EEC project, the net inflow to southeastern Massachusetts is reduced to approximately 160 MW (id.).

primarily in the NEPOOL system outside the Com/Electric territory, indicating a reduction in imports to southeastern Massachusetts over the bulk power system (id.; Tr. 8, p. 89). Mr. Warner stated that the peak capacity cost savings would amount to 1.2 million dollars per year to NEPOOL participants (Tr. 8, pp. 15-16, 87-88).[72]

In response to the Company's contentions regarding transmission system impacts, NO-COAL argued that the Com/Electric system has no current or expected imbalance in load relative to generation (NO-COAL Initial Brief, pp. 12, 15). NO-COAL stated that "if one were to isolate (Com/Electric) from the grid, it would not only be self-sufficient but would have excess power" (id.). NO-COAL based this argument on a comparison of the Com/Electric winter peak load relative to the combined output of the Canal and Cannon Street generating facilities (id.).

ii. Analysis

In the Turners Falls decision, the Siting Council found that transmission system benefits must be significant and carefully documented in order to meet our Massachusetts benefits standard (18 DOMSC at 159). Here, the Company has provided extensive information in support of its assertions that significant transmission system benefits would result from construction and operation of its proposed project.

In regard to reliability benefits to the immediate New Bedford area as a result of improved local load/generation matching and installation of necessary interconnection facilities, the Siting Council finds that, while the Company has established that some level of improved system reliability will

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72/ Mr. Warner noted that, as the costs of peaking capacity increased over time, the loss savings likewise would increase (Tr. 8, p. 89). Mr. Warner also noted that additional savings in energy costs would accrue, but did not quantify these savings (id., p.88).

occur, the Company has failed to establish that such benefits are in fact significant. The Siting Council notes that Com/Electric has indicated that, in the absence of the EEC project, Com/Electric's existing transmission and distribution facilities would not need to be upgraded until at least 1999. Further, while the load/generation match for New Bedford clearly will improve as a result of the introduction of the proposed project, the Company has failed to establish that the local New Bedford area currently suffers reliability problems as a direct result of a load/generation imbalance.

In regard to the potential benefits to the bulk power transmission system in southeastern Massachusetts, however, the Siting Council finds that the Company has established that real and significant benefits will result from operation of the EEC project. Further, these benefits are supported with detailed, project-specific load flow studies. While the record indicates that the reactive power problems experienced in the summers of 1987 to 1989 have been alleviated somewhat by system enhancements, it is possible that such problems may recur in the future, if only at a reduced level. Therefore, the Siting Council finds that the addition of the 300 MW proposed project near local load centers in southeastern Massachusetts will provide a significant additional level of protection to the southeastern Massachusetts bulk power transmission system. The Siting Council further finds that this additional level of transmission protection constitutes direct benefits to the electric customers in that region. In making this finding, the Siting Council notes that the Company's analyses could have addressed this issue more comprehensively by evaluating the costs and reliability impacts of alternative options available to the region's utilities to improve system reliability. Such analyses would have enabled the Siting Council to quantify the reliability and cost benefits of the proposed project's impact relative to the transmission system.

Finally, in regard to the line loss savings associated with operation of the proposed project, the Siting Council

recognizes that, on a NEPOOL-wide basis, these savings are significant. However, the Company provided no analyses describing how these savings would be apportioned among the NEPOOL utilities. Thus, the Siting Council is unable to evaluate the degree, if any, to which such savings would provide project-specific, guaranteed and quantifiable benefits to Massachusetts.

Accordingly, the Siting Council finds that the Company has established that its proposed project offers reliability benefits to Massachusetts as a result of the effect of the operation of the proposed project on the bulk power transmission system in southeastern Massachusetts.

f. Dispatch Impacts

EEC argued that its proposed project also would provide additional economic and environmental benefits to the region, and, therefore, to Massachusetts, as a result of NEPOOL dispatch practices (EEC Initial Brief, pp. 45-46). The Company stated that it intends to make its project available for NEPOOL dispatch.[73] The Company provided an "order of magnitude" analysis of regional generating unit dispatch in 1994 (Exh. EEC-8).[74] EEC stated that the analysis was based on load and resource information contained in the 1990 CELT Report, and that separate computer simulations were run for two cases -- one with the proposed project and one without the proposed project (id.).[75] The Company also stated that the dispatch

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73/ As noted in Section II.A.4.a, above, EEC's current PPAs with Com/Electric and Cambridge would need to be revised in order to allow the project to be dispatched as a unit by NEPOOL.

74/ Mr. Booth stated that NEPOOL dispatches units on the basis of energy costs, including fuel and other variable costs (Tr. 13, p. 164).

75/ The Company stated that it used the Westinghouse Automatic Generation Planning program to conduct its dispatch analysis (Exh. EEC-8).

simulations were performed for both summer and winter periods utilizing the appropriate capacity ratings for each resource (id.).[76]

The Company stated that the results of the two simulations indicate that approximately 70 percent of the resources whose energy is expected to be displaced by dispatch of the EEC project are projected to be fueled by No. 6 fuel oil (id.; Tr. 13, pp. 159-160).[77] The Company argued that this displacement of oil-fired generating resources has significant economic consequences (EEC Initial Brief, pp. 45-46). First, the Company argued that through displacement of units with higher energy costs, the resultant costs of supplying electricity to customers would be reduced. Second, the Company contended that an increase in coal-fired energy in the overall NEPOOL supply mix would reduce the average fossil fuel cost for NEPOOL as a whole, thereby reducing costs to customers who receive power through contracts tied to the NEPOOL fossil fuel index (id.).

The Company also argued that the dispatch of the EEC unit would result in significant reductions of sulfur dioxide ("SO_2") and particulate emissions on a region-wide basis (id.). The Company considered the reduction in emissions

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76/ The Company stated that in its analysis: (1) it used fuel price estimates which were consistent with those used elsewhere in its filing; (2) it assumed dual-fuel facilities would run on gas for eight months of the year and on oil for four months of the year; and (3) it used energy costs which were based on each unit's average full load heat rate (Exh. EEC-8; Tr. 13, pp. 154-158, 165-166). In addition, the Company stated that it assumed availability factors for all resources based on NEPOOL estimates, that it assumed a 22.5 percent reserve margin, and that all existing and committed non-utility generating facilities were assumed to be "must-run" facilities and, therefore, dispatchable ahead of the EEC project (id.).

77/ The Company noted that the actual quantities of energy from the various resources which would be displaced by the EEC project can be expected to vary from the projections in the analysis (Exh. EEC-8). However, EEC asserted that the analysis "provides a reasonable approximation of expected NEPOOL energy dispatch" (id.).

associated with the displaced No. 6 fuel oil resources only (Exh. EEC-8). The analysis indicated essentially no change in total nitrogen oxide ("NOx") emissions and an increase in emissions of carbon monoxide and volatile organic compounds ("VOCs") (id.).

The Attorney General argued that while dispatch of the proposed unit in fact may serve the region's economic needs, it could lead to environmental harm by resulting in the displacement of natural gas-fired facilities which have a higher energy cost than the proposed project (AG Initial Brief, pp. 15-16).

The Siting Council consistently has held that in order for a company to establish economic or environmental benefits as a result of the displacement of other resources by dispatch of its proposed project, it must provide full documentation of its assumptions regarding such displacement. West Lynn, EFSC 90-102 at 44-45; MASSPOWER, 20 DOMSC at 388; Turners Falls, 18 DOMSC at 158-159; Altresco-Pittsfield, 17 DOMSC at 400. Here, the Company has proceeded beyond a mere claim of benefits resulting from dispatch and, for the first time in a Siting Council proceeding, has presented an analysis of the impact of its proposed project on the NEPOOL dispatch of regional generating resources. While the Company has provided full documentation of the underlying assumptions of its analysis, it has stopped short of providing sufficient documentation of the impacts of the dispatch to allow the Siting Council to evaluate and quantify those impacts.

In regard to the Company's argument that Massachusetts would receive economic benefits as a result of the dispatch of the proposed project ahead of existing, primarily oil-fired generating facilities, the Siting Council notes that the Company's dispatch analysis is based on conservative, well founded assumptions. Nevertheless, the Company provided no analysis of the actual economic impact of its projected dispatch of regional resources on the utilities of Massachusetts. The Siting Council consistently has assessed economic efficiency benefits to Massachusetts in terms of signed and approved PPAs

with Massachusetts utilities specifically because such benefits are guaranteed and quantifiable. Here, the Company has failed to document whether, and if so, in what magnitude, the NEPOOL-wide economic benefits which would result from displacement of oil-fired generating resources by the proposed project would flow to Massachusetts utilities and their ratepayers. Therefore, the Siting Council finds that the Company has failed to establish that the regional economic benefits associated with the dispatch of the proposed project represent guaranteed, quantifiable benefits to Massachusetts consistent with our Massachusetts benefits standard.

In regard to the Company's argument that Massachusetts would receive environmental benefits as a result of the dispatch of the proposed project ahead of existing, primarily oil-fired generating facilities, the Siting Council notes that the addition of any new resource which results in overall emission reductions from the regional supply mix provides indirect environmental benefits to the entire region. However, there is an inherent difficulty in attempting to quantify such benefits and identify the significance of those benefits in different areas within the region.

First, the Siting Council notes that the Company's assumptions regarding dispatch order which were conservative from the perspective of an economic analysis, in fact, may not be conservative from the perspective of an environmental analysis. The Siting Council agrees with the Attorney General that the proposed project may displace some of the gas-fired facilities which the Company has assumed would be "must run" facilities. Therefore, the Company's analysis may overstate the reductions in emissions that would result from dispatch of its project ahead of other projects. In addition, the Company's assumptions regarding when dual-fuel units would run on gas and when they would run on oil may not reflect actual permit restrictions facing dual-fuel units or the availability of gas for these units. Finally, the Siting Council notes that the actual beneficial or detrimental impacts of facility emissions largely are dependent on the ambient conditions in the vicinity

of such emissions and the dispersion of those emissions. Therefore, the Siting Council finds that the Company has failed to establish that the regional environmental benefits associated with the dispatch of the proposed project represent guaranteed, quantifiable benefits to Massachusetts consistent with our Massachusetts benefits standard.

g. Conclusions on the Benefits to Massachusetts

The Siting Council has found that EEC has established that its proposed project offers: (1) reliability and economic efficiency benefits to Massachusetts through its signed and approved PPAs with Com/Electric and Cambridge; (2) economic benefits to Massachusetts from its steam sales agreement with Polaroid; (3) a level of additional economic benefits to the local New Bedford area and Massachusetts through the creation of jobs and tax revenues; and (4) reliability benefits to Massachusetts as a result of the effect of the operation of the proposed project on the bulk power transmission system in southeastern Massachusetts. The Siting Council also has found that EEC has not established (1) that its proposed project offers quantifiable reliability or economic benefits to Massachusetts through increased fuel diversity or (2) that the regional economic and environmental benefits associated with the dispatch of the proposed project represent guaranteed, quantifiable benefits to Massachusetts consistent with our Massachusetts benefits standard.

EEC argued that its proposed project meets the Massachusetts benefits standard set out in the MASSPOWER decision (EEC Initial Brief, pp. 33-34). EEC argued that its PPAs for 83 MW exceed the 54 MW level accepted in the MASSPOWER decision. In addition, EEC argued that its PPAs constitute a greater percentage of plant capacity -- 27.7 % -- than the 22.5% level accepted in MASSPOWER (id.).

In MASSPOWER, the Siting Council stated that the level of benefits required to meet the Massachusetts benefits test must be commensurate with the size and nature of the proposed

facility (20 DOMSC at 334).[78] Importantly, however, in MASSPOWER, the Siting Council did not state that a specific megawatt level or a specific megawatt percentage would constitute a threshold for establishing Massachusetts benefits. The Siting Council recognizes that EEC's PPAs for 83 MW represent a significant benefit to Massachusetts. However, the Siting Council finds that this benefit, by itself, is not sufficient to offset the impacts on the Commonwealth's resources from construction and operation of the proposed 300 MW coal-fired CFB facility. In this case, (1) the significant level of emissions which would be generated by the proposed project, and (2) the size and nature of the proposed site, together require that the project offer substantial benefits to Massachusetts to offset the anticipated impacts to the Commonwealth's resources. The Siting Council has found, however, that the proposed project offers significant benefits to Massachusetts in addition to the reliability and economic efficiency benefits associated with its PPAs. The combination of: (1) the project's PPAs; (2) its steam sales agreements; (3) the "other" economic benefits associated with the production of jobs and tax revenues; and (4) the reliability impacts to the bulk power transmission system convince the Siting Council that the proposed project offers benefits to Massachusetts in sufficient magnitude to meet our Massachusetts benefits test.

Accordingly, the Siting Council finds that EEC has established that the proposed project would provide benefits to the Commonwealth of sufficient magnitude to offset the impacts on the Commonwealth's resources from construction and operation of the proposed project.

78/ The MASSPOWER project is a 240 MW natural gas-fired, combustion turbine combined cycle cogeneration facility proposed for construction at the Monsanto industrial complex in Springfield, Massachusetts. MASSPOWER, 20 DOMSC at 305.

5. Conclusions on Need

The Siting Council has found that EEC has established that (1) New England needs at least 300 MW of additional energy resources for reliability purposes beginning in 1995 and beyond, and (2) the proposed project would provide benefits to the Commonwealth of sufficient magnitude to offset the impacts on the Commonwealth's resources from construction and operation of the proposed project.

Accordingly, the Siting Council finds that EEC has established that there is a need for the additional energy resources from the proposed project.

B. Project Approach

1. Standard of Review

a. Development of Standard

The Siting Council, pursuant to G.L. c. 164, sec. 69H, is required to evaluate proposed projects in terms of their consistency with providing a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. In addition, G.L. c. 164, sec. 69I, requires a project proponent to present "alternatives to planned action" which may include (a) other methods of generating, manufacturing or storing, (b) other sources of electrical power or gas, and (c) no additional electrical power or gas.[79]

In implementing its statutory mandate, the Siting Council has required a petitioner to show that, on balance, its proposed project is superior to alternate approaches in the ability to address the previously identified need and in terms of cost, environmental impact and reliability. New England Power Company, EFSC 89-24 at 31-47 (1991); Altresco-Pittsfield, 17 DOMSC at 370-378; NEA, 16 DOMSC at 360-380; 1986 Cambridge Decision, 15 DOMSC at 212-218; 1985 MECo/NEPCo Decision, 13 DOMSC at 141-183; 1985 BECo Decision, 13 DOMSC at 67-68, 73-74.

79/ G.L. c. 164, sec. 69I, also requires a petitioner to provide a description of "other site locations." The Siting Council reviews EEC's proposed site, as well as other site locations, in Section III.C., below.

Additionally, where a non-utility developer proposes to construct a generating facility in Massachusetts, the Siting Council determines whether the project offers power at a cost below the purchasing utility's avoided cost. West Lynn, EFSC 90-102 at 50 n 27, 55 n 30; MASSPOWER, 20 DOMSC at 341-343; Altresco-Pittsfield, 17 DOMSC at 372-374; NEA, 16 DOMSC at 360-364.

In past reviews of proposals of non-utility developers to construct generating facilities, the Siting Council has focussed its evaluation on the comparison of the applicant's proposed generating technology and other generating technologies capable of delivering necessary energy resources. MASSPOWER, 20 DOMSC at 337-352; Altresco-Pittsfield, 17 DOMSC at 370-377; NEA, 16 DOMSC at 360-380.

In MASSPOWER, however, the Siting Council stated its concerns with a method that analyzes various project approaches based exclusively on a comparison of technologies (20 DOMSC at 349). First, the Siting Council stated that a review of non-utility generation proposals based exclusively on a comparison of technologies is somewhat incompatible with our review of proposals filed by utilities to construct facilities. Id. at 350. In those reviews, a utility also is required to show that its proposed project approach is superior to alternate approaches in terms of cost, environmental impact, reliability, and meeting an identified need. However, the Siting Council reviews utility proposals within the context of a utility's overall supply planning process. Id. Thus, the Siting Council could determine whether the utility's decision to pursue the proposed project was the result of a process which fully evaluated a comprehensive range of resource options, including C&LM, on an equal footing, and whether the proposed project represented the least-cost, least-environmental-impact resource available to the utility. Id.

Second, the Siting Council stated in MASSPOWER that a technology-based review of project approaches in non-utility cases fails to evaluate a complete range of project

approaches. Id. at 351. A review which compares different technologies for cogeneration projects ignores several other generic approaches to meeting a need for additional energy resources, such as C&LM, smaller generating projects, or power purchases from other states or regions. Id. In stating this concern, however, the Siting Council recognized that it is inappropriate to require a non-utility developer to establish that it has selected a superior project approach from among a full range of resource options when the non-utility developer only has full access to data for one option -- its proposed project. Nonetheless, the Siting Council stated that the fact that a non-utility developer does not have access to a full range of resource options does not mean that the Siting Council is any less committed to ensuring that the developer's proposed project is superior to alternate project approaches in terms of cost, environmental impact, reliability, and meeting the identified need. Id.

Therefore, in MASSPOWER, the Siting Council stated that, in future cases, it would consider different methods of reviewing whether a non-utility developer's project proposal is superior to alternate project approaches in terms of environmental impact, reliability and meeting the identified need, and the tradeoffs of each of these criteria with cost.[80] Id. The Siting Council also stated that, in formulating a new standard of review in this area, we would attempt to find mechanisms which (1) allow the Siting Council to compare proposals by non-utility developers with a full range of resource options available to the state and region, and (2) place greater emphasis on determining whether a non-utility developer's proposed project is consistent with our statutory mandate and the resource use and development policies

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80/ With respect to cost, the Siting Council found that the requirement that a non-utility developer establish that its proposed project offers power below purchasing utilities' avoided costs remains essential to our review of project approaches. MASSPOWER, 20 DOMSC at 351.

of the Commonwealth.[81] Id. at 351-352.

In West Lynn, the Siting Council further developed the project approach standard consistent with our discussion in MASSPOWER. West Lynn, EFSC 90-102 at 52-57. The West Lynn decision is discussed in Section II.B.1.c, below.

b. Responses of the Parties to the Development of the Project Approach Standard

At the close of the evidentiary hearings in this proceeding, the Hearing Officers requested that the parties address the development of the project approach standard in their briefs (Tr. 14, pp. 105-111). The Company and the Attorney General specifically addressed this issue in their briefs while the other parties generally discussed this issue or did not address it at all. The arguments of the parties are detailed below.

i. The Company's Response

In its initial brief, the Company set forth its view of the Siting Council's role in reviewing a non-utility developer's proposed generating project. Generally, EEC stated that, in order to evaluate non-utility developers' proposals relative to a full range of resource options, the Siting Council should identify specific energy options for comparison with proposed non-utility facilities (EEC Initial Brief, pp. 50-51).[82] EEC also contended that the Siting Council's stated goal of

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81/ In addition to notifying the parties in this proceeding of the intent to formulate a new standard of review, the Siting Council similarly notified the parties in the West Lynn and Enron Power Enterprise Corporation ("Enron") proceedings, which were pending as of the time of notification. See October 4, 1990 Siting Council Memorandum. West Lynn and Enron are non-utility developers, and the proceedings involve proposals to construct generation facilities.

82/ EEC also argued that it was appropriate for the Siting Council to identify specific options for comparison because (1) a non-utility developer does not have the same legal obligation as a utility to develop a least-cost planning process, and (2) a non-utility developer only has access to one resource option -- its own project (EEC Initial Brief, pp. 51-52).

emphasizing consistency with the resource use and development policies of the Commonwealth as part of its project approach standard, could be met if the Siting Council identified a generic set of state energy policies (id.).

Specifically, the Company argued that in order to review the proposal relative to a full range of resource options and for consistency with the Commonwealth's resource use and development policies, the Siting Council should: (1) establish a minimum regional demand for proposed facilities coming on-line from 1995 through 1998; (2) find that non-utility developers do not have to compare their projects with other specific utility purchases, specific utility facilities, or specific non-utility facilities unless such options were identified by the Siting Council as least-cost options; and (3) find both generic gas-fired combined cycle and generic coal-fired CFB technologies to be acceptable, and that comparisons between specific projects and generic standards is acceptable (id., pp. 58-59).[83]

In addition, the Company presented arguments regarding how the Siting Council should implement each of these elements of its proposed project approach standard.

First, EEC suggested that the Siting Council develop generic conclusions on regional need based on the CELT Report. The Company stated that this would be preferable to the current Siting Council practice of making a determination of need for the specific capacity of a proposed facility (id., pp. 52-54). The standard of review used to determine need is set forth in Section II.A.1, above.

The Company also related its need argument to a second argument regarding comparison of a non-utility project with C&LM. EEC stated that a non-utility project should not be

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83/ The Company specifically rejected the Attorney General's position that non-utility facilities should be evaluated in the same manner as utility facilities, and that the Siting Council should rely on MDPU's environmental externalities in its project approach analysis. (The MDPU's values for environmental externalities are set out in Department of Public Utilities' Final Order on IRM Rulemaking, DPU 89-239, p. 85, (Table 1).) The Attorney General's arguments are presented in Section II.B.1.b.ii, below.

compared with the option of providing an equal amount of C&LM. Instead, the Company asserted that pursuant to its regional need analysis using the 1989 and 1990 CELT Reports, a need existed for generating facilities under the most optimistic assumptions regarding C&LM, and that since EEC did not consider C&LM and its proposed project to be mutually exclusive, there was no need for direct comparison (EEC Initial Brief, pp. 54-55, EEC Reply Brief, pp. 19-20; Exh. HO-RN-14).

Second, with regard to comparison of a proposed non-utility project with specific utility purchases, specific utility-owned facilities, or specific non-utility facilities,[84] EEC argued that the Siting Council should identify those options which have been determined to be least-cost options (EEC Initial Brief, p. 56). The Company further argued that a non-utility developer should only have to prove the superiority of its proposal to an identified least-cost option if the Siting Council has determined that the identified option was a mutually exclusive alternative (id.). EEC argued that given the minimum regional need which it estimated in its analysis of the 1989 and 1990 CELT Reports, there would be a need for non-utility generating facilities even with identified least-cost out-of-state purchases and utility-owned facilities in the resource mix (id.). EEC concluded that, although it evaluated its project relative to a reasonable range of resource options, it should not be required to compare its project with specific utility purchases, utility facilities or non-utility facilities, because these purchases and facilities are not mutually exclusive options (id., p. 80).[85]

84/ EEC argued that the Siting Council should allow non-utility developers to assume that their projects generally are preferred over a utility's out-of-state purchases. EEC argued that this preference arises from the state's policy of encouraging cogeneration and other types of non-utility generation (EEC Initial Brief, p. 55).

85/ EEC stated that under its proposed project approach standard, the burden of proof rests with the intervenors to show that an alternative resource is a mutually exclusive alternative and that such an alternative is superior to the non-utility proposal (EEC Initial Brief, p. 59).

In addition, although the Company presented its comparison of technologies, the Company contended that a generic comparison of its proposed project and other non-utility proposals was neither practical nor desirable. EEC further stated: (1) that the large number of potential non-utility projects made such a comparison burdensome; (2) that the record demonstrated a need for many non-utility projects to meet future demand; and (3) that marketplace competition would ensure that only the best projects are built (EEC Initial Brief, pp. 57-58).

Third, the Company argued that the Siting Council should establish that certain types of technologies are generically acceptable (id., pp. 56-57). Specifically, EEC stated that both gas-fired combined cycle and coal-fired CFB are acceptable technologies pursuant to a policy favoring diversity of supply (id., EEC Reply Brief, p. 14). EEC stated that, in addition to increasing diversity, CFB units are acceptable because they use an abundant fuel source and are the most environmentally acceptable method of burning coal (EEC Initial Brief, p. 62). The Company asserted that a finding that CFB is an acceptable technology would be consistent with the energy policies of the Commonwealth (id., p. 80). EEC stated that, under its proposed standard, it would not have to compare a generic coal-fired CFB plant with a generic gas-fired combined cycle plant (EEC Initial Brief, pp. 59-60, EEC Reply Brief, p. 14). However, the Company argued that CFB technology compares favorably with alternative technologies previously reviewed by the Siting Council, such as pulverized coal and gas-fired technologies, even if site-specific impacts are considered (EEC Initial Brief, pp. 62-63).[86]

86/ The Company asserted that, under its comparison of alternative generic technologies, its specific project was superior with respect to cost, environmental impacts and reliability to the following five generic alternatives: (1) a CFB coal unit; (2) a conventional pulverized coal unit; (3) a natural gas-fired combined cycle unit with a firm gas supply; (4) a natural gas-fired combined cycle unit with an interruptible gas supply; and (5) a residual oil-fired steam unit (Exh. EEC-HO-1A, p. 88-119; EEC Initial Brief, pp. 59, 63-82).

EEC stated that a more appropriate project-level standard of review would be to compare a non-utility developer's specific project and site with a generic standard -- in this case, comparing the Company's CFB plant to a generic coal CFB project (EEC Reply Brief, p. 14). EEC argued that a non-utility developer should be required to prove that its project and site meet or exceed the characteristics of the generic technology and that the environmental impacts of the non-utility developer's project are comparable or less than those of the generic technology's environmental impacts (EEC Initial Brief, pp. 59-60). The Company asserted that its project is superior to a generic CFB plant or generic gas-fired combined cycle plant, and that the environmental impacts of its proposed project have been minimized and are less than those of the generic technologies (id., pp. 81-82).

Further, the Company argued that the Siting Council should express a general preference for non-utility developers' projects for meeting established need (id., p. 58). EEC stated that this was appropriate given state policy favoring cogeneration facilities (id., p. 55).

Finally, EEC addressed the role of the state's new IRM regulatory framework in the Siting Council's review of a non-utility developer's proposal. The Company stated that the IRM process should not have a role in the Siting Council's non-utility facility review process because the value and weight of environmental externalities under IRM, and the weight of non-price factors under IRM have not been established (EEC Initial Brief, pp. 60-61, EEC Reply Brief, p. 13). EEC stated that, in the future, the selection of a non-utility project by a Massachusetts utility in the IRM process should weigh heavily in the Siting Council's project approach analysis when the Siting Council reviews the non-utility developer's proposed project (EEC Initial Brief, p. 61).

ii. The Attorney General's Response

The Attorney General's brief and reply brief discussed the project approach standard at length. The Attorney General

stated that the purpose of the new project approach standard was to broaden the Siting Council's analysis of alternatives to include non-generation project approaches and to provide a more level playing field for utilities and non-utilities (AG Initial Brief, p. 21). The Attorney General stated that in light of this purpose, the Siting Council should apply the same standard of review to both utility and non-utility proposals (id., pp. 21-22). The Attorney General further argued that the use of different standards, as EEC suggested, failed to protect the public interest (id.).

The Attorney General contended that EEC's three major arguments: (1) that the Siting Council determine the minimum regional need; (2) that the Siting Council identify specific resource options for comparison with non-utility proposals; and (3) that the Siting Council express a preference for non-utility facilities and coal-fired CFB technology on a generic basis -- fail to meet the requirements set forth in the Siting Council's statute (AG Reply Brief, pp. 2-3). The Attorney General stated that the adoption of EEC's proposed standard of review would result in an inappropriate shift of the proponent's burden to the Siting Council. The Attorney General also argued that EEC's proposed standard of review would not allow the Siting Council to compare non-utility proposals to a full array of resource options (id., pp. 3-4).

With respect to the comparison of a non-utility developer's project with alternatives, the Attorney General disputed EEC's suggestion that the Siting Council only require a non-utility developer to demonstrate the superiority of its project to an alternative resource which has been identified as mutually exclusive. He stated that (1) the burden of proof for suggesting alternatives for comparison properly rests with non-utility developers, and (2) that EEC sought to inappropriately place too great a burden on intervenors (AG Reply Brief, p. 4 n 3). The Attorney General further argued that a non-utility developer's proposal should be compared to both theoretical and real project alternatives, including C&LM (AG Initial Brief, pp. 22-23). With respect to C&LM, the Attorney General argued that non-utility developers should be

required to show that a comprehensive policy has been proposed and implemented to save energy in the state and region (id.).

In addition, the Attorney General rejected EEC's arguments regarding the establishment of general preferences for non-utility generating facilities and coal-fired CFB units. The Attorney General stated that the Siting Council should not express a preference for non-utility facilities on a generic basis and always should consider C&LM superior to power development (AG Reply Brief, p. 5). Similarly, the Attorney General argued that the Siting Council should not allow non-utility developers to consider their projects to be generally superior to out-of-state purchases or utility facilities (id.). With respect to EEC's argument that it should not have to compare its coal-fired CFB technology to gas-fired combined cycle technology, the Attorney General countered that rather than finding coal-fired CFB technology to be acceptable, the Siting Council should find CFB technology to be unacceptable as long as natural gas is available in the region and C&LM has not been maximized (id., pp. 7-8).

With respect to the role of the new IRM process in the Siting Council's review of a non-utility developer's project, the Attorney General argued that the Siting Council should recognize, incorporate and apply the IRM regulations in its review. He stated that doing so would accomplish the goals of: (1) promoting consistency in the MDPU and Siting Council processes; (2) weighing and balancing the characteristics of fuel types and technologies; and (3) protecting the public health, welfare, and environment (AG Initial Brief, p. 31). Finally, the Attorney General argued that the Siting Council should apply MDPU environmental externality values to non-utility developer's proposals because the monetization of the externality values is useful in determining whether dirtier technologies should be rejected (id., pp. 26-27). He stated that the consideration of environmental externalities would not create an "insurmountable bias" against a particular fuel or

technology (id., p. 30).[87]

iii. The Other Parties' Responses

CNB generally addressed the project approach standard, stating that EEC should be required to prove that its project is superior to other technologies and fuel sources in terms of reliability, financial cost, and environmental impact (CNB Initial Brief, p. 3).

In addition, NO-COAL and Mr. Ladino generally discussed the project approach standard in their individual briefs and combined reply brief. NO-COAL and Mr. Ladino argued that the Company has failed to respond to the October 4, 1990 memorandum from the Siting Council which notified EEC that the project approach standard had changed as a result of MASSPOWER (NO-COAL/Ladino Reply Brief, p. 9).

With respect to alternative fuels, NO-COAL stated that natural gas has advantages that make it superior to coal (NO-COAL Brief pp. 19-24).[88] NO-COAL argued that coal is the least acceptable fuel for power generation (id., p. 50). Mr. Ladino stated that coal was not superior to alternative fuels because it is the dirtiest burning fuel and is second only to nuclear power in terms of environmental degradation (R. Ladino Initial Brief, p. 4).

With respect to comparisons of alternative technologies, NO-COAL stated that the Company should have considered coal-gasification (NO-COAL Initial Brief, pp. 26-27). Mr. Ladino stated that the Company should have considered C&LM as an alternative (R. Ladino Initial Brief, pp. 2-3).

87/ The Attorney General cited his concern that, by not employing environmental externalities in the Siting Council's review process, a non-utility developer could avoid a review of the environmental externalities of the unsold portion of its project's power output (AG Initial Brief, pp. 30-31).

88/ NO-COAL noted that, while it viewed gas as a superior fuel to coal, it did not endorse the use of gas for power generation in general (NO-COAL Initial Brief, p. 24).

Finally, with respect to the role of the IRM regulations in the project approach standard, NO-COAL and Mr. Ladino appear to state that IRM environmental externalities should be applied under the Siting Council review of project approaches. NO-COAL and Mr. Ladino also reject EEC's argument that the IRM regulations should have no role in the facility review process (R. Ladino Initial Brief, p. 10, NO-COAL/Ladino Reply Brief, pp. 9-10).

c. West Lynn Decision

In West Lynn, the Siting Council acknowledged (1) that proposed non-utility projects ideally should be compared to a complete menu of uncommitted resource options available to the state and the region, and (2) that such comparison should be to real resource alternatives which are reasonably likely to be available to satisfy some or all of the identified need within the necessary time frame (EFSC 90-102 at 54). However, the Siting Council also recognized that generally it is not practical or effective to compare a proposed project with specific, real alternatives within the scope of a non-utility generating facility review. Id.

In West Lynn, consistent with its MASSPOWER decision, the Siting Council also held that it was no longer appropriate to use technology as the basis for comparing proposed non-utility projects to alternative generic project approaches as part of a review of a non-utility facility proposal.[89] Id. The Siting Council stated that such a comparison failed to evaluate non-utility proposals relative to a full range of resource options and to address whether such proposals were consistent with the resource use and development policies of the Commonwealth. Id. at 53-54.

89/ While the Siting Council in West Lynn rejected the generic technology-based comparison as a valid basis for ensuring that our least-cost least-environmental-impact standard is met, the Siting Council recognized that such a comparison may have some place in discussing whether a particular project is consistent with a specific policy of the Commonwealth (EFSC 90-102 at 54).

Nonetheless, the Siting Council stated in West Lynn that it was in no way retreating from its commitment to a project level analysis of non-utility proposals or from its statutory commitment to ensure a least-cost, least-environmental-impact energy supply for the Commonwealth. Id. at 55. Instead, the Siting Council stated that the necessary project level analysis could best be achieved through: (1) reliance on other portions of the Siting Council review; (2) reliance on the newly-developed IRM regulatory framework implemented jointly by the MDPU and the Siting Council; and (3) a renewed emphasis on the resource use and development policies of the Commonwealth. Id.

First, the Siting Council stated in West Lynn that much of its review of non-utility generating facilities, regardless of whether they will provide power to Massachusetts or other regional utilities, comprehensively evaluates the specific cost, environmental and reliability characteristics of proposed projects. Id. The Siting Council noted that its Massachusetts benefits test specifically addresses whether construction and operation of a proposed project within the Commonwealth will provide reliability, economic and/or environmental benefits to the Commonwealth in sufficient magnitude to offset the impacts on the Commonwealth's resources of construction and operation of such a facility (see Section II.A.4, above). Id. In addition, the Siting Council noted that its review of the viability of the proposed project ensures that the project will provide the region with a least-cost and reliable energy resource over the life of its PPAs (see Section II.C, below).[90] Id. Finally, the Siting Council noted that it extensively reviews the cost and environmental impacts of proposed projects in its analysis of proposed facilities (see Section III.D and E, below). Id.

Second, the Siting Council stated in West Lynn that, while utility supply planning in the past often was conducted

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90/ To ensure that a proposed project is viable, the non-utility developer is required to establish that its proposed project offers power below purchasing utilities' avoided costs.

and regulated via multiple, non-coincident processes at both the MDPU and the Siting Council, the new IRM process for utility supply acquisition will ensure that each affected utility will make resource decisions based on a consistent and comprehensive evaluation of all the resource options available to it.[91] Id. at 56. The Siting Council recognized that the IRM process will provide precisely the appropriate format to conduct the type of comprehensive evaluation of alternative resource options necessary to determine on a utility-by-utility basis which resources represent the least-cost, least-environmental-impact options.[92]

Third, the Siting Council reiterated in West Lynn its decision, as stated in MASSPOWER, to now place greater emphasis on determining whether a non-utility developer's proposed project is consistent with the resource use and development policies of the Commonwealth. Id. The Siting Council noted in West Lynn that, although we already considered many aspects of a project's consistency with the resource use and development policies of the Commonwealth in our review, we recognized that our review did not provide for an explicit evaluation of a proposed project's consistency with many of the Commonwealth's specific energy, economic and environmental policies. Id. Therefore, the Siting Council found that it is appropriate to evaluate a proposed project's attributes relative to a broad

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91/ All investor-owned utilities in Massachusetts except the Nantucket Electric Company are subject to IRM. Siting Council's Final Order on IRM Rulemaking, EFSC 90-RM-100A at 8-9; Department of Public Utilities' Final Order on IRM Rulemaking, DPU 89-239 at 47.

92/ IRM may well affect the Siting Council's review in areas other than project approach. For example, a project that has bid in IRM and, at the time of its Siting Council filing, has obtained signed and approved PPAs with regional utilities for a substantial portion of its output, would not need to demonstrate regional need or Massachusetts benefits. In addition, a fully-subscribed project can address certain elements of the Siting Council's viability standard through its PPAs.

range of resource use and development policies.[93]

d. Discussion and Analysis

The Siting Council's statutory mandate requires the Siting Council to ensure a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. G.L. c. 164, sec. 69H. As discussed in Section II.B.1, above, for non-utility generating facility proposals, the Siting Council traditionally has focussed on whether a particular project is the least-cost, least-environmental impact project when compared to a number of different generating technologies. As indicated in MASSPOWER and further discussed in West Lynn, however, the Siting Council no longer views this comparative technology approach as effective in ensuring that resource additions proposed for the Commonwealth are necessary, least-cost, and minimize environmental impact. West Lynn, EFSC 90-102 at 53; MASSPOWER, 20 DOMSC at 350-352. As noted in West Lynn, the traditional approach of comparing generic technologies (1) failed to consider the full range of alternative approaches available to meet a particular identified need, and (2) failed to adequately fulfill the Siting Council's statutory obligation to evaluate projects consistent with the resource use and development policies of the Commonwealth (EFSC 90-102 at 53-54).

In light of the above, we consider the arguments of the parties in this proceeding concerning the project approach standard.

First, EEC has argued that under the new project approach standard, the Siting Council should determine a minimum

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93/ At the time of the West Lynn decision, evidentiary hearings had concluded and briefs had been filed in the EEC and Enron proceedings. The Siting Council's decisions in the EEC proceeding and Enron proceeding will be based on the record created in each case. However, in West Lynn, the Siting Council noted that it expected the reasoning applied in developing the project approach standard in that decision to apply equally in the EEC and Enron cases (EFSC 90-102 at 57 n 33).

regional need for the period 1995 through 1998, and then allow non-utility developers to demonstrate regional need greater than that determined by the Siting Council. The Attorney General has stated that this is an inappropriate shift of an essential burden from a non-utility project proponent to the Siting Council. We concur with the Attorney General. Although the MASSPOWER and West Lynn decisions expressed some dissatisfaction with the traditional project approach standard of review, we did not express any inclination to revisit our standard for determining need. See West Lynn, EFSC 90-102 at 52-57, MASSPOWER, 20 DOMSC at 350-352.

The Attorney General also argued that EEC's suggestion that the Siting Council identify specific resource options for comparison with non-utility facilities was an inappropriate shift of a non-utility proponent's burden to the Siting Council. Again, we agree with the Attorney General. We view it as the non-utility developer's responsibility to make its own case. However, as expressed in MASSPOWER and West Lynn, we have stated that comparisons of proposed projects with specific alternatives are not practical or appropriate within the review of a non-utility developer's proposal. West Lynn, EFSC 90-102 at 54; MASSPOWER, 20 DOMSC at 351.

In addition, the Attorney General contended that the Siting Council should apply the same project approach standard to facilities proposed by utilities and facilities proposed by non-utility developers. While we agree with the Attorney General that a level playing field for utility and non-utility proposals is a worthwhile and essential goal, we maintain that our traditional project approach standard clearly did not contribute to achieving that goal. As we stated in MASSPOWER and reiterated in West Lynn, it is inappropriate to require a non-utility developer to establish that it has selected a superior project approach from among a full range of resource options when the non-utility developer has access to only one option -- its own. West Lynn, EFSC 90-102 at 53-54; MASSPOWER, 20 DOMSC at 351.

In the same vein, we reject the Attorney General's argument that non-utility proponents should be required to compare their projects to real and theoretical alternatives, including C&LM. Again, the Siting Council has recognized the serious constraints facing non-utility developers in obtaining information. It would be difficult and costly for non-utility developers to obtain information regarding other non-utility projects because (1) the number of potential and planned projects is high, and (2) much of the specific information associated with such projects is confidential. In terms of theoretical projects, we reiterate that it is difficult, if not impossible, to compare a real project with its associated real cost and environmental characteristics, to the generic costs and environmental characteristics of a hypothetical alternative. West Lynn, EFSC 90-102 at 53-54. As noted in West Lynn, such comparisons ignore the site-specific characteristics of generating facilities. Id. at 53.

We also reject the Attorney General's suggestion that the Siting Council require non-utility developer's to show that comprehensive C&LM policies have been implemented as a prerequisite to project approval. It would be impractical to require non-utility developers to obtain information regarding utility C&LM programs through participation in all Siting Council reviews of utility demand forecasts and supply plans, as the Attorney General suggests. However, to the extent that such information is available to non-utility facility proponents, the Siting Council encourages its inclusion in a non-utility developer's analysis of need.

With respect to the issue of comparison of technologies, EEC argued that the Siting Council should compare proposed projects and sites with pre-approved generic technologies. In rejecting this argument, we note that the Company, in essence, is asking the Siting Council to replace one generic comparison with another. Similarly, we reject the Attorney General's argument that non-utility project proponents should be required to compare their projects to a range of technologies. As expressed in MASSPOWER, West Lynn and this decision, we view the

generic comparison of technologies as flawed. West Lynn, EFSC 90-102 at 54; MASSPOWER, 20 DOMSC at 350-352.

Additionally, the various suggestions by the parties that the Siting Council find certain types of facility proposals, fuels, resource options and technologies either generally preferable or generally unacceptable, are incompatible with our view that we should review projects in light of a full array of resource options, and the resource use and development policies of the Commonwealth. Since the Siting Council seeks to move toward a more rational review of non-utility facilities in terms of project approach, we decline to express generic preferences and reiterate our intention to conduct project-level analysis through reliance on other portions of our review of proposals, the IRM regulatory framework, and renewed emphasis on consistency with state policies.

With respect to the role of the IRM regulatory framework, the Attorney General, NO-COAL and Mr. Ladino argue for the application of MDPU's IRM environmental externalities in the context of a Siting Council review. EEC argues that IRM should have no role in the Siting Council's project approach standard. The Siting Council views the wholesale adoption of environmental externalities to be problematic in the Siting Council's review of a non-utility developer's proposal to construct a generating facility. The assignment of externality values in a Siting Council review would result in nothing more than a direct comparison of technologies, a comparative analysis which we have abandoned. We are concerned that reliance on only environmental externalities in reviewing the environmental impacts of a proposed non-utility project would ignore other significant project characteristics and important site-specific factors. As we stated in West Lynn, although we see a role for the IRM framework in our review process, our review of a non-utility developer's project must take into account concerns which are broader than simply what resources may be appropriate for a particular utility (EFSC 90-102 at 53).

In sum, it is our view that it is most appropriate to review a non-utility developer's project in light of a broad range of resource use and development policies. In the following section, the Siting Council reviews the consistency of EEC's project with the resource use and development policies of the Commonwealth.

2. Consistency with the Resource Use and Development Policies of the Commonwealth

In accordance with the standards discussed above, the Siting Council, in this section, assesses the consistency of EEC's proposed project with the broad resource use and development policies of the Commonwealth. The Siting Council further evaluates the proposed facilities relative to specific environmental policies of the Commonwealth in Section III.E, below.

As noted above, the Siting Council, in MASSPOWER, stated its intention to change its project approach standard of review. All the parties in this proceeding were notified of this intention and were given an opportunity to address the new project approach standard. In response to the Siting Council's stated intention, the Company set forth a standard of review for project approach which it believed the Siting Council should adopt. The Company did not specifically address how its proposed project was consistent with the resource use and development policies of the Commonwealth. Rather, the Company argued that the Siting Council should identify a generic set of policies with which non-utility project developers would be expected to comply (EEC Initial Brief, pp. 50-51). The Company also addressed throughout the course of this proceeding how its proposed project met certain policies of the Commonwealth.

In West Lynn, the Siting Council found that the general types of policies identified by the proponent in that case -- energy, environmental, and economic -- are the relevant resource use and development policies to be considered.

Here, EEC asserted that its proposed project is consistent with the Commonwealth's policy of encouraging cogeneration facilities (id., p. 55). Further, the Company argued that its proposed project is not inconsistent with state energy policies encouraging C&LM because the two have been shown not to be mutually exclusive options for serving the energy needs of the region (id., pp. 54-55). Finally, the Company contended that its proposed project is consistent with energy policies relating to fuel diversity (id., pp. 36-37).

In regard to the Company's assertions that its proposed project is consistent with state policies regarding development of cogeneration facilities, the record indicates that the proposed project will provide significant economic benefits to a large, existing industrial steam user. In addition, these benefits likely will increase due to a planned expansion of Polaroid's facilities. Further, the Company is pursuing steam sales agreements with other existing industrial steam users in the area of the GNB Industrial Park, even though such additional steam sales are not needed by the proposed project to meet PURPA QF requirements. As such, the project will enhance the productivity and competitiveness of established Massachusetts manufacturing firms, an outcome which is consistent with state policies relating to economic development. Accordingly, the Siting Council finds that the proposed project is consistent with broad economic policies of the Commonwealth and state policies encouraging development of cogeneration facilities. In making this finding, we do not mean to imply that all cogeneration facilities by definition would meet this test. In fact, certain cogeneration projects which may attain QF status under PURPA may do little if anything to enhance economic development in the Commonwealth. Clearly, those cogeneration facilities which bring meaningful economic benefits to existing Massachusetts steam users are the projects which are most consistent with these policies.

In regard to the consistency of the proposed project with state energy policies encouraging C&LM, the Attorney General has argued that no new generating resources should be approved until

all C&LM options have been pursued (AG Reply Brief, p. 5). The Siting Council clearly recognizes the importance of C&LM as a resource and consistently has emphasized that Massachusetts utilities must adequately consider C&LM in their resource plans. In our reviews of electric and gas companies' supply plans, pursuant to G.L. c. 164, sec. 69J, the Siting Council determines whether a utility has identified and evaluated a full range of resource options by evaluating whether the utility has (1) developed a resource evaluation process which identifies and fully evaluates all resource options, including the treatment of all resource options on an equal footing, and (2) applied its resource evaluation process to all identified resource options. Nantucket Electric Company, EFSC 90-28 at pp. 50, 79-97 (1991); 1989 BECo Decision, 18 DOMSC at 250-280; Eastern Utilities Associates, 18 DOMSC at 111-130 (1988). The Siting Council's application of its "equal footing" standard requires electric and gas utilities to view C&LM and generating options as equally capable of meeting the need for energy resources in the Commonwealth.

It is important to emphasize, however, that the Siting Council's "equal footing" standard does not require utilities to exhaust C&LM options before considering or acquiring generation resources. Rather, by ensuring that utilities consider price as well as non-price criteria such as environmental impacts in their evaluations of resource options, the "equal footing" standard drives utilities to meet their need by acquiring those resources which are truly least cost.

Here, the Company's need analysis has shown that additional energy resources are needed in the region (see Section II.A, above). Thus, should the Siting Council find that the proposed project meets the other standards discussed in this decision, the proposed project should be allowed to compete with all other available resources, including C&LM, to meet the energy needs of the state and region. Accordingly, the Siting Council finds that the proposed project is not inconsistent with state policies encouraging C&LM.

Finally, the Company argued that its proposed project is consistent with the Commonwealth's policies regarding fuel diversity. The Company stated that the Siting Council has recognized fuel diversity as an important goal consistent with providing a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost (EEC Initial Brief, pp. 36-37). EEC also noted that the Siting Council's new IRM regulations for electric utility resource acquisition specifically require utilities to evaluate diversity and develop diversity objectives (id.). Further, EEC notes that the Siting Council found in its 1982 decision on Boston Edison Company that diversity of fuel sources ensures minimal vulnerability to interruptions in fuel supplies and abrupt increases in the price of one fuel source, thereby enhancing the reliability of fuel supplies and reducing long term costs (id.).

In support of its assertions that its proposed project will enhance fuel diversity in Massachusetts and the region, EEC asserted that "it is widely accepted that utilities in Massachusetts as well as the rest of New England are presently over-dependent on oil-fired generation sources for electricity" (Exh. HO-MN-37).[94] In support of its assertion, the Company referenced (1) the December 1986 report of the New England Governors' Conference which, according to EEC, recommended consideration of all supply options, including coal CFB technologies, in order to promote reliability and diversity, and (2) state energy policies which encourage fuel diversification efforts (Exh. HO-1A, pp. 79-82). In addition, the Company presented analyses showing the relationship between electric rates in Massachusetts and the region and the cost of oil for

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94/ The Company also argued that its proposed project would provide benefits directly to Massachusetts as a result of increased fuel diversity. See Section II.A.4.d, above for an analysis of this issue.

electricity generation (Exh. HO-RR-58). EEC asserted that these analyses reveal a clear sensitivity of electric rates to major swings in oil costs (id.).

EEC stated that in 1988, Massachusetts depended on oil-fired generation to meet 57 percent of its electric power needs, and, in 1989, the state relied on oil-fired resources to meet 49 percent of its electric power need (id., p. 81; Exhs. HO-45, EEC-42, p. 27). EEC also indicated that Massachusetts' dependence on energy derived from natural gas increased from 5.2 percent in 1988 to 12 percent in 1989 (Exh. HO-45). In addition, the Company noted that only three Massachusetts utilities' supply plans currently include coal-fired resources, and that as of January 1, 1990, coal accounted for less than 13 percent of total Massachusetts generating capability (Exhs. HO-MN-16, HO-RN-19).[95] EEC also noted that opportunities for Massachusetts utilities to acquire additional coal-fired capability in the future are limited because a significant portion of the resources planned for the region will be fueled by natural gas (Exhs. HO-1A, p. 81, HO-47, HO-50).[96]

EEC stated that while there will be a general reduction in the dependence of both Massachusetts and the region on

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95/ The 1990 CELT Report indicates that Eastern Utilities Associates, New England Electric System and Northeast Utilities are the only utilities serving Massachusetts which currently have coal-fired generating capability in their resource mixes (Exhs. HO-RN-19, HO-MN-16, HO-MN-18). The Company stated that fuel diversity is important to Massachusetts utilities and indicated that the RFPs issued by several Massachusetts utilities provide additional points in the scoring process for coal-fired projects (Exhs. HO-MN-17, HO-RR-46, HO-RR-47).

96/ On a region-wide basis, the 1990 CELT Report indicates that coal represented slightly over 11 percent of total NEPOOL capability in 1989 and that this percentage is expected to decline slightly through 2005 (Exh. HO-RN-19). The same report indicates that natural gas currently represents approximately five percent of total NEPOOL generating capability and is expected to increase to approximately 10 percent by 2005 (id., Exh. HO-50).

oil-fired generation as a result of planned natural gas generating facilities, "the region will continue to lack the degree of fuel diversity necessary to insulate it from sudden fluctuations in price and supply deficits" (Exh. HO-1A, p. 81). EEC asserted that dependence on new gas-fired generation, in fact, may lead to overdependence on that fuel source (id., p. 86). In support of this position, the Company presented a December, 1989 report titled "Issues Related to the Potential use of Gas in the New Bedford Cogeneration Facility" which had been prepared for EEC by Jensen Associates, Inc. ("Jensen Report") (id., Attachment 2). The Jensen Report, which is based on a review of 37 independently developed forecasts of gas supply and costs, indicates that: (1) long-term gas prices will escalate more rapidly than coal prices and that there is less certainty regarding the rate of price escalation for gas than coal; (2) gas and oil prices are strongly related; and (3) the availability of long-term gas supply is uncertain (id.). The Company also noted that, in addition to the historic relationship between gas and oil prices shown in the Jensen Report, new long-term gas contracts typically include price escalators which are tied either directly to the price of oil or to the fossil fuel price index for New England, an index which is driven largely by the price of oil (Exhs. HO-45, HO-MN-37; Tr. 13, p. 142).

The Company stated that, in contrast to gas, coal offers Massachusetts and the region significant price stability benefits (Exh. HO-MN-37). The Company noted that coal is an abundant fuel source and presented documentation of current coal reserves (Exh. AG-81). In addition, the Company stated that, consistent with typical coal contracting practices, its coal contract would require dedicated reserves with an assured price formula, thereby assuring future availability and price stability (Tr. 9, p. 7; EEC Initial Brief, p. 41).

Finally, the Company discussed the level of coal which would be desirable in a utility's or a region's fuel mix (Exhs. HO-MN-37, HO-MN-38). EEC noted that the variables which should be considered in attempting to determine the desirable

level of coal-fired resources in a specific utility's supply mix are numerous. The Company stated that the desirable level of coal-fired power for a utility would depend on the utility's load characteristics, the utility's existing supply mix, and the likely supply options available to the utility in the future (id.).

In support of its argument that New England relies on fewer coal-fired resources than other regions, EEC presented a 1989 report published by the North America Electric Reliability Council ("NAERC Report"). The NAERC Report indicated that while the United States on the whole relied on coal-fired resources for 44 percent of its total capacity, the Northeast region relied on coal-fired power for only 14 per cent of its capacity needs (Exh. HO-MN-38). The NAERC Report also indicated that the northeast region had the lowest percentage of coal in its mix of all the regions.[97] Thus, EEC suggested that it may be appropriate for individual utilities in Massachusetts and the region to increase reliance on coal to a point where coal represents 40 to 50 percent of their total fuel mix (id., Exh. HO-MN-37).

The Attorney General argued that the current supply mix in New England actually includes a lower percentage of gas-fired generation than coal-fired generation. The Attorney General therefore contended that additional gas-fired generation is needed for diversity reasons rather than additional coal-fired generation (AG Initial Brief, p. 15). Further, in response to EEC's argument that fuel diversity is needed to offset oil price swings and supply deficits, the Attorney General noted that the region's oil supply has never been curtailed (id.)

NO-COAL argued that diversity "should not be looked upon

97/ The Company noted that the NAERC Report indicated that the three other regions in the country which relied on coal-fired resources for less than 40 percent of their capacity needs were regions which relied on alternative, locally available, price stable fuel sources as a predominant supply source (Exh. HO-MN-38).

narrowly and strictly from the viewpoint of the utilities and their service areas" (NO-COAL Initial Brief, pp. 17-18). NO-COAL appears to argue that diversity should be considered from the perspective of the geographical area surrounding a proposed generating facility (id., pp. 23-24). NO-COAL further contended that if diversity is evaluated relative to the New Bedford or southeastern Massachusetts areas, then it should be recognized that there are more coal-fired facilities than gas-fired facilities in those areas (id.). Hence, NO-COAL argued that, in order to promote diversity, gas should be the choice for any additional generation in southeast Massachusetts (id.). NO-COAL also argued that the project should be rejected because EEC failed to show that the Company could not have acquired gas at the New Bedford site (id.).

Mr. Ladino argued that Massachusetts already has a diverse mix of fuel sources (R. Ladino Initial Brief, pp. 22-24). Mr. Ladino cites nuclear, coal, gas, oil and refuse as fuel sources currently utilized in Massachusetts (id.). Mr. Ladino further noted the significant role new gas-fired facilities are expected to play in the future and stated that these new gas-fired projects will allow Massachusetts to reduce its dependence on oil-fired generation (id.). Therefore, Mr. Ladino argued that the current and projected reduction in regional dependence on oil due to additional gas-fired generation is a sufficient response to diversity concerns (id.).

Few issues in this proceeding have been the subject of as much documentation and testimony as the use of coal rather than gas to meet the state's energy needs, and, particularly, the use of coal rather than gas as the fuel source for the 300 MW EEC project. Much of this discussion has focussed on the relative environmental impacts of coal versus gas. However, as the Secretary of Environmental Affairs noted in his certificate on the Final Environmental Impact Report ("FEIR") for this project, diversity of fuel for power generation is an important concern which must be considered along with environmental impacts in the

evaluation of new generating facilities (Exh. HO-RR-14).[98] The Siting Council agrees with EEC that coal offers significant diversity benefits by virtue of its abundant supply and price stability. In addition, the Siting Council agrees with EEC that it is inappropriate for an individual utility or the state to "put all its eggs in one basket" by pursuing only one type of fuel or technology. Further, the Siting Council notes that the size of EEC's project increases the likelihood that a number of utilities in the state and region will develop more diversified resource portfolios as a result of purchases from the proposed project.

In regard to the addition of natural gas-fired facilities in the region, the Siting Council notes that EEC has raised legitimate issues regarding the availability and price of gas, and that a large percentage of the new facilities proposed for the region will be gas-fired. Nevertheless, the significant environmental benefits of gas as a fuel for both power generation and other uses, and the minimal percentage of gas currently present in the state's and region's fuel mix, suggests that the region is a long way from any risk of overdependence on gas.

In regard to the arguments of the Attorney General and Mr. Ladino, however, the Siting Council reiterates its position that diversity cannot be achieved by reliance on additions of just one fuel type or one technology. Even if sufficient new gas-fired facilities could be constructed and placed in operation in time to meet all of the region's need for additional capacity, elimination of alternative options still would be unwise. Clearly, both Massachusetts and the region need to increase their reliance on as many types of non-oil supply options as possible while maintaining an appropriate

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98/ In his certificate on the FEIR, the Secretary of Environmental Affairs also noted his concerns regarding the use of coal relative to environmental policies regarding acid and greenhouse gases (Exh. HO-RR-14). The Siting Council addresses the consistency of the proposed project with specific environmental policies in Section III.E, below.

balance between cost, environmental impacts and reliability. Thus the Siting Council emphasizes that project developers are not required to establish that their proposed projects could not acquire natural gas supplies as a necessary first step for receiving approval to construct a generating facility fueled by another energy source.[99]

Further, the Siting Council must reject NO-COAL's argument that diversity of fuel supply should be evaluated in the context of the physical location of proposed facilities. Such an approach addresses the environmental impacts of proposed facilities alone, rather than considering the environmental, reliability and cost impacts on the state's utilities and ratepayers. Indeed, if there is a concentration of a particular type of facility in a specific area and that concentration leads to unacceptable environmental impacts, those impacts are the appropriate focus of the Siting Council's environmental review as well as the reviews of other responsible environmental agencies.

In regard to the Company's position that Massachusetts utilities should increase the percentage of coal-fired resources in their overall resource mix to 40 to 50 percent, the Siting Council does not accept the argument that the level of reliance on coal in other regions of the country is, in and of itself, an appropriate benchmark for Massachusetts or New England. Further, the Siting Council emphasizes that it would be inappropriate for us to set a particular goal for the level of coal-fired resources in the region. Rather, as stated in Section II.A.4.d, above, the Siting Council finds that diversity objectives must be developed and achieved on a utility-by-utility basis taking into consideration the types of issues identified above.

99/ The Siting Council notes that such a requirement would operate to eliminate a number of potentially viable sites from consideration merely because of their distance from natural gas pipelines.

Nevertheless, the Siting Council agrees with EEC that the addition of the proposed project generally would enhance the diversity of the state's and the region's power generation resource mix. Accordingly, the Siting Council finds that the Company has established that the proposed project is consistent with broad energy policies of the Commonwealth related to diversity of energy resources. In making this finding, however, the Siting Council notes that the extent to which a particular project will fulfill the diversity goals of the state and region will be related to the existing and planned supply mix of the state and the region at the time that the particular project is proposed.

In light of the above, EEC has adequately demonstrated that the proposed project would further a number of broadly representative state policies relating to energy and economic development. Accordingly, the Siting Council finds that EEC has established that the proposed project approach is consistent with the broad resource use and development policies of the Commonwealth.

Finally, the Siting Council notes that, in the future, we may request project developers to address the consistency of their projects with specific policies of the state in response to relevant policy issues at that time or in the event that existing policies change or new policies develop.

C. Project Viability

1. Standard of Review

The Siting Council has determined that a proposed non-utility generating project is likely to be viable as a source of energy if (1) the project is reasonably likely to be financed and constructed so that the project will actually go into service as planned, and (2) the project is likely to operate and be a reliable, least-cost source of energy over the life of its power sales agreements. West Lynn, EFSC 90-102 at 60; MASSPOWER, 20 DOMSC at 352; Altresco-Pittsfield, 17 DOMSC at 378; NEA, 16 DOMSC at 380.

In order to meet the first test of viability, the proponent must establish (1) that the project is financiable and (2) that the project is likely to be constructed within applicable time frames and capable of meeting performance objectives. In order to meet the second test of viability, the proponent must establish (1) that the project is likely to be operated and maintained in a manner consistent with appropriate performance objectives and (2) that the proponent's fuel acquisition strategy reasonably ensures low-cost, reliable energy resources over the terms of the power sales agreements. West Lynn, EFSC 90-102 at 60; MASSPOWER, 20 DOMSC at 352; Altresco-Pittsfield, 17 DOMSC at 378.

In this case, EEC asserts that its proposed project is viable as a source of energy when the project is evaluated against this standard (EEC Initial Brief, p. 83).

2. Financiability and Construction

In considering a proponent's strategy for financing a proposed project, the Siting Council considers whether the project is reasonably likely to be financed so that the project will actually go into service as planned. Here, EEC stated that the experience of the principal participants in the project, combined with the particulars of the project, ensure that the project will be financed. EEC stated that it was formed by commercial bankers with extensive experience in financing energy projects (Tr. 7, p. 141). In particular, Mr. Croyle, the President of EEC, noted that he had arranged for the financing of over a dozen cogeneration projects during his tenure as chief of project financing at the Bank of New England (Exh. HO-B-15). In addition, EEC indicated that the formal equity participants in the proposed project would be EEC, PG&EE, and BEn (Tr. 14, p. 51).[100] Finally, EEC stated that it had engaged Goldman Sachs & Co. to arrange financing for the proposed project

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100/ Mr. Croyle noted that additional institutional investors also may be involved (Tr. 14, p. 51).

(Exh. HO-PV-4). EEC provided evidence that Goldman Sachs has extensive experience in financing independent power projects (Exh. HO-RR-59).

EEC indicated that, although it has not yet arranged financing for the proposed project, it has had informal discussions with several major banks (Tr. 7, p. 139). The Company stated that it expected to develop a private placement memorandum describing the project beginning in 1991 (Tr. 14, pp. 46-47). EEC indicated that it anticipated receiving a financing commitment conditioned upon finalizing construction, operations, fuel, and power sales contracts acceptable to the lender(s), and upon any other terms the lender(s) might require (id., pp. 19-23). EEC stated that it would need power sales agreements amounting to about 200 megawatts before financial closing (id., pp. 20, 25). However, Mr. Croyle noted that a bank's major concern is to guarantee a revenue stream from which its loan can be repaid, and that a long-term power sales contract with a utility is only one of a number of ways to guarantee that revenue stream (id., p. 67).

EEC stated that it has signed PPAs for 83 MW with Com/Electric and Cambridge (Exh. HO-MN-1).[101] EEC indicated that it intends to market the remainder of its energy both through direct negotiations with utility companies and by responding to utility company RFPs (Tr. 14, p. 29). EEC noted that most Massachusetts utilities are heavily dependent on oil-fired facilities, which tend to have high avoided costs; EEC indicated that it believed coal-fired energy would be especially attractive to these utilities (Exh. HO-MN-18). Further, the Company provided analyses of the projected costs of its proposed project relative to the avoided costs of several Massachusetts utilities. These analyses indicate that the Company will be able to offer its power at or below the utilities' avoided cost (Exh. HO-1B, Appendix E).

101/ As indicated in Section II.A.4.a, above, Mr. Croyle indicated that these PPAs probably would be renegotiated in order to change them from must-run contracts to dispatchable contracts (Tr. 11, pp. 100-103).

EEC also stated that it believes it can tailor PPAs to the needs of specific utilities, adjusting timing and other elements of such agreements to meet a utility's individual avoided costs and capacity needs, without affecting the viability of the proposed project (Tr. 14, pp. 35-38).[102] Finally, EEC indicated that any percentage of the project not sold under long-term PPAs would be sold to Com/Electric at that utility's short-term avoided cost (Tr. 14, p. 53).[103]

During the course of the proceeding, the Attorney General questioned the Company's ability to compete with gas-fired power plants under RFPs requiring proposed projects to include the environmental externality costs set forth in MDPU Order 89-239 (Tr. 14, pp. 70-78). Mr. Croyle testified that he believed EEC could offer power at a lower price than some gas plants, even after incorporating environmental externalities, depending on the other assumptions that were made (id., pp. 74-75).

EEC provided pro forma financial statements for its project under scenarios involving different mixes of power sales, a range of capital costs and interest rates, and varying costs for fuel, limestone, and ash disposal (Exhs. HO-1B, Appendix D, HO-RR-60). One set of pro formas focussed on the impacts of various fuel scenarios (Exh. HO-1B, Appendix D). A second set evaluated the financiability of the project under worst-case economic scenarios. This second set of pro formas assumed power purchase agreements for 200 MW, or sales of 67 percent of plant capacity, except in cases where the Siting

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102/ Mr. Croyle indicated that EEC perceived a reluctance among utilities to negotiate with the Company while it was still in the early stages of development, in part because of the local opposition to the project. Mr. Croyle stated that the Company therefore chose to defer intensive marketing of the proposed project's power until the proposed project received certification of its FEIR under the Massachusetts Environmental Policy Act ("MEPA") (Tr. 11, pp. 134-136).

103/ PURPA mandates that the utility within whose service territory a QF is located, in this case Com/Electric, make short-term purchases from the QF if power is available and below that utility's avoided cost.

Council requested pro formas based on sales of less than 200 MW (Exh. HO-RR-60). In addition, the pro formas assumed no short-term sales of power to Com/Electric (id.). The pro formas also assumed that all interest on project debt was taxable (id.).[104]

EEC indicated that a financing formula of 80 percent debt and 20 percent equity, often referred to as an industry standard, is essentially a median figure (Tr. 14, p.49). Mr. Croyle stated that he was working under an assumption of a 10 to 20 percent equity position in the project, although with only 200 megawatts of power sales the equity requirement would rise to 30 percent (id., p. 50). Mr. Croyle added that the equity participants in this transaction would be willing to contribute 40 percent, if necessary, allowing EEC the flexibility to go forward with the project under a variety of circumstances (id., pp. 50-51).[105]

The Siting Council notes that EEC has articulated a marketing strategy which likely will enable it to market its power to electric utilities. EEC has demonstrated that it will be able to offer its power at or below the avoided costs of several Massachusetts utilities. The Company's emphasis on structuring the timing of sales and other contract elements to the needs of specific utilities may give it a competitive advantage. These factors provide the Siting Council with a significant measure of confidence regarding EEC's ability to market its power.

The Siting Council recognizes that the new IRM regulatory framework will require utilities to add environmental externality costs to the economic costs of proposed resources before evaluating those resources for inclusion in utilities' supply plans. However, the Siting Council also notes that the

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104/ Mr. Croyle indicated that Goldman Sachs has identified $120 million to $125 million of capital costs in the proposed project that would be eligible for tax exempt financing.

105/ EEC did not provide any documentation from the equity participants which supported this assertion.

IRM framework will require utilities to consider other non-price criteria relative to proposed resources as part of their evaluation processes. Therefore, without more experience with the IRM process, the Siting Council concludes that any attempt to predetermine how environmental externality costs and other non-price factors will affect a proposed project's ability to compete within the IRM process would amount to mere speculation.

The Siting Council also notes that EEC's proposed project has demonstrated a considerable degree of financial strength. EEC has presented pro forma financial statements which address the sensitivity of the project to a variety of important variables such as capital costs, fuel prices, and power sales agreements. Even under some extreme economic assumptions used in the pro formas, EEC would be able to structure financing to provide acceptable debt-coverage ratios over a 20-year period.

EEC has indicated that its equity participants are willing to carry up to 40 percent of the project, thus allowing some flexibility in financial arrangements. EEC also has contracted with Goldman Sachs, an experienced investment banking firm, to arrange financing for the project.

The combination of a well-defined marketing strategy, favorable debt coverage ratios under conservative assumptions, flexibility in proposed equity financing, and the experience of Goldman Sachs provide a basis to ensure that EEC is reasonably likely to meet its financial objectives. Based on the foregoing, the Siting Council finds that EEC has established that its proposed project is financiable.[106]

106/ In Section III.E.2.b.iii, below, the Siting Council has ordered EEC to utilize ammonia or urea injection in order to reduce NOx emissions after three years of facility operation, if combustion optimization does not achieve expected reductions of NOx emissions. The Siting Council notes that the range of costs evaluated in the various pro formas would capture the cost increases associated with the addition of either urea or ammonia injection. Therefore, our finding on project financiability remains valid even if these costs are added.

In considering a proponent's construction strategy for a proposed project, the Siting Council considers whether a project is reasonably likely to be constructed so that the project will actually go into service as planned. In this case, EEC indicated that, under the terms of the development agreement, BPC is expected to provide engineering, procurement, and construction ("EPC") services for the project (Exh. HO-B-2, Sec. 10). BPC is an affiliate of BEn, which is a party to the development agreement (Exh. HO-B-3). BPC has indicated its intention to provide EPC services for the project under a turn-key contract (Exh. HO-PV-14). The Company stated that the EPC contract will be executed just prior to financial closing for the project (Exh. HO-PV-5).

EEC presented a draft EPC agreement, but indicated that it has not engaged in any substantive negotiations with BPC regarding the draft (Exhs. HO-1B, Appendix B, HO-PV-5). The Company stated that, under the terms of the development agreement, the EPC contract must be commercially competitive, and EEC, BEn, and PG&EE must each sign the contract (Tr. 11, p. 90). EEC indicated that, to be commercially competitive, the EPC contract would be structured as a fixed-price, turn-key contract with provisions for an early completion bonus and late completion penalty. EEC also stated that a commercially competitive contract would require the completed plant to pass performance tests adequate to meet all owner obligations and permitting standards (Exh. HO-RR-40). In addition, EEC stated that such a contract would call for liquidated damages which would be assessed for non-performance (id.). Finally, EEC estimated that construction of the project would require approximately 47 months from the time of financial closing (Exh. HO-PV-1).

The Company has argued that BPC is eminently qualified to take on the responsibility of EPC contractor for this project (EEC Initial Brief, p. 88). EEC stated that BPC is recognized as a leader in the engineering and construction of the CFB technology proposed for this project (Exh. HO-PV-6). In support of this assertion, EEC identified five CFB projects which BPC

has completed in the recent past (Exh. HO-PV-8). According to EEC, BPC completed these five projects either on schedule, or up to six months early (id.). EEC further indicated that four of the five projects were constructed under fixed price contracts (id.). In addition, EEC identified several other large (over 150 MW) CFB projects for which BPC has been contracted to provide EPC services (Exh. HO-B-21).

To document its site and access arrangements, EEC provided a copy of an executed purchase option agreement with Polaroid for the preferred site (Exh. HO-1C, Appendix G). EEC stated that it intends to exercise its option at financial closing (Tr. 11, p. 169). Under the agreement, the preferred site can be delivered to EEC within 30 days (Exh. HO-1C, Appendix G).

EEC reported that Com/Electric has conducted preliminary studies which identified interconnection requirements for the addition of the proposed project to Com/Electric's transmission system (Exh. EEC-12). The Company indicated that Com/Electric will perform additional detailed studies before the final design of the interconnection is developed; however, EEC does not expect the additional studies to result in changes to the facilities proposed in the preliminary study (Tr. 8, pp. 80-82).

The Siting Council previously has noted that BPC has acquired a noteworthy level of experience as a builder of power plants and cogeneration facilities. MASSPOWER, 20 DOMSC at 357. The record in this proceeding indicates that BPC has significant experience in the design and construction of plants which use the CFB technology proposed for this project and has successfully completed similar projects on time and within budget. In addition, the Siting Council notes that a major strength of EEC's proposed construction agreement is its fixed price provision -- a provision which inherently mitigates financial risk to EEC. Further, the Siting Council finds that EEC's site acquisition and interconnection plans are well-advanced. Nonetheless, the final EPC contract with BPC has yet to be executed, and will not be signed until financial closing. The Company has stated that "[i]f we could not agree

that a Bechtel Power contract is appropriate or could be entered into, we would look to other providers of EPC contract services" (Tr. 11, P. 95). Thus, while EEC has made progress towards the finalization of its facility construction, site, access, and interconnection arrangements, neither the terms nor the provider of EPC services has been confirmed.

In the past, the Siting Council has found that an executed turn-key EPC agreement with appropriate incentive and penalty terms for the design and construction of a proposed project may provide reasonable assurances that the project is likely to be constructed on schedule and able to perform as expected. Altresco-Pittsfield, 17 DOMSC at 380. Here, EEC has not submitted an executed EPC agreement. Therefore, the Siting Council finds that, at this time, EEC has not established that its proposed project is likely to be constructed within applicable time frames and to be capable of meeting performance objectives. However, the Siting Council also finds that, at such time as EEC executes an appropriate EPC agreement, EEC will be able to establish that its proposed project meets the second part of the first test of viability.

The Siting Council has found that EEC (1) has established that its proposed project is likely to be financed, and (2) at this time, has not established that the project is likely to be constructed within applicable timeframes and to be capable of meeting performance objectives. Accordingly, the Siting Council finds that EEC, at this time, has not established that its proposed project meets the Siting Council's first test of viability. Within 90 days of receipt of an executed EPC agreement, the Siting Council will issue a decision determining whether EEC has established that the project has met the first test of viability.

3. Operations and Fuel Acquisition

In determining whether a QF project is likely to be viable as a reliable, least-cost source of energy over the life of its power sales agreements, the Siting Council evaluates the ability of the project proponent or other responsible entities

to operate and maintain the facility in a manner which ensures a reliable energy supply. West Lynn, EFSC 90-102 at 66; MASSPOWER, 20 DOMSC at 359; Altresco-Pittsfield, 17 DOMSC at 381. In a case where the proponent has relatively little experience in the development or operation of a major energy facility, that proponent must establish that experienced and competent entities are contracted for, or otherwise committed to, the performance of critical tasks. These tasks should be enumerated in detailed contracts or other agreements that include financial incentives and/or penalties which ensure reliable performance over the life of the power sales agreements. West Lynn, EFSC 90-102 at 67; MASSPOWER, 20 DOMSC at 359; Altresco-Pittsfield, 17 DOMSC at 381-382.

Here, EEC indicated that, under the terms of the development agreement, PG&E Operating Services Company ("PG&E-OSC") is expected to be the operations and maintenance ("O&M") contractor for the project (Exhs. HO-B-2, Sec. 10, HO-B-3). PG&E-OSC is an affiliate of PG&EE, which is a party to the development agreement (Exh. HO-B-3). PG&E-OSC has indicated its intention to provide O&M services for the project (Exh. HO-PV-15). EEC stated that the O&M contract will be executed before construction of the project commences (Exh. HO-PV-11).

EEC stated that it is confident that PG&E-OSC is qualified to operate and maintain the proposed project (EEC Initial Brief, p. 90). EEC reported that PG&E-OSC's parent company, PG&E, operates more than 15,000 MW of electrical generating capacity (Exh. HO-B-18). In addition, the Company has indicated that PG&E-OSC has been contracted to provide O&M services for two other large CFB projects, both in New Jersey (Exhs. HO-B-20, HO-B-21).

Although EEC presented a draft O&M agreement, the Company indicated that it has not engaged in any substantive negotiations with PG&E-OSC on this draft (Exhs. HO-1B, Appendix A, HO-PV-11). EEC stated that, under the terms of the development agreement, the O&M contract must be commercially competitive, and EEC, BEn, and PG&EE must agree unanimously to

sign the contract (Tr. 11, p. 90). EEC indicated that, to be commercially competitive, the O&M contract would include guaranteed performance levels, with incentive payments if the contractor exceeded guaranteed levels, and penalties if the contractor failed to meet those levels. A commercially competitive contract also would include operating fees set at market rates and inflated at a market index (Exh. HO-RR-40).

The Siting Council accepts EEC's position that PG&E-OSC can draw on extensive experience in plant operations, and is, therefore, well qualified to operate and maintain the proposed project. The Siting Council recognizes that an O&M contract between EEC and PG&E-OSC could provide the means to demonstrate that the proposed project is likely to be operated and maintained in a manner consistent with reliable performance over the life of the power sales agreements.

Nonetheless, the Siting Council notes that a final O&M contract between EEC and PG&E-OSC has not yet been signed. The Company has stated that, as is the case with the EPC contract, failure to reach terms acceptable to all parties could lead EEC to seek a different O&M contractor (Tr. 11, p. 95).

In a previous case, the Siting Council found that an executed O&M contract assured the Siting Council that a project is likely to be operated and maintained in a manner consistent with reliable performance over the life of the power sales agreements. Altresco-Pittsfield, 17 DOMSC at 382. Here, the absence of a finalized O&M agreement effectively prevents the Siting Council from evaluating the ability of the project proponent or other responsible entities to operate and maintain the facility in a manner which ensures a reliable energy supply.

Based on the foregoing, the Siting Council finds that, at this time, EEC has failed to establish that the proposed project is likely to be operated and maintained in a manner consistent with appropriate performance objectives. However, the Siting Council also finds that, at such time as EEC executes an appropriate O&M agreement which includes financial incentives that ensure reliable performance over the life of the unit, EEC will be able to establish that its proposed project meets the first part of the second test of viability.

In considering an applicant's fuel acquisition strategy, the Siting Council considers whether such a strategy reasonably ensures low-cost, reliable energy resources over the life of the power sales agreements.

The Company stated that the fuel proposed for this project is 1.8 percent sulfur coal from the northern Appalachian area (Tr. 9, pp. 5-6). EEC indicated that it intends to enter into a contract or contracts for a 20-year supply of coal, with two optional five-year extensions (Exh. HO-RR-20). The RFP for this coal has been finalized and issued to qualified suppliers (Exh. HO-RR-20; EEC Initial Brief, p. 93).[107, 108] When bids are received, EEC intends to develop a short list of potential suppliers, who will receive copies of a draft contract.[109] After further discussion and the inspection of potential suppliers' mine operations, EEC will select one company with whom they will negotiate a final coal supply agreement (Tr. 9, pp. 47-50).

EEC asserted that its fuel procurement strategy for the proposed project will deliver low-cost, reliable coal supplies over the life of the power sales agreements (EEC Initial Brief, p. 91). EEC stated that the northern Appalachian region contains approximately 60 billion tons of uncommitted coal reserves, with between 150 and 160 million tons mined annually

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107/ EEC has provided copies of the final RFP and draft contract (Exhs. HO-RR-20, HO-1A, Appendix C).

108/ EEC did not identify the suppliers who received the RFP. However, the Company indicated that it intended to send the RFP to large companies with alternative mine sources (Tr. 9, p. 52).

109/ EEC indicated that its short list would contain up to four potential suppliers, selected based on the quantity, quality, and price of the coal offered (Tr. 9, p. 50).

(Tr. 9, p.6).[110] According to Mr. Smith, the Company's fuel consultant, there are well over 30 billion tons of coal with sulfur content in the 1.8 percent range in the Appalachian region (Tr. 9, pp. 52-53).

EEC indicated in its final coal RFP that it intends to contract for an annual coal supply of 1.0 million to 1.1 million tons (Exh. HO-RR-20). The coal RFP also requires the supplier to dedicate 33 million tons of its reserves to the proposed project, thus providing the proposed project with a designated fuel supply for the expected 30 year life of the plant (id.). The coal RFP includes quality specifications for minimum and average British thermal units per pound ("Btu/lb"), maximum and average ash content, and maximum and average sulfur content. The coal RFP also states that the contract will include a premium for exceeding Btu standards, and penalties for excess ash and sulfur content -- penalties which will reflect the incremental cost of ash disposal, limestone consumption, and waste disposal (id.).

EEC's coal RFP requires that coal suppliers arrange transportation of the coal to the proposed plant's property line (id.). Coal supplier(s) also will be required to remove and dispose of ash generated by the plant (id.). However, the coal RFP allows EEC to reserve the right under the contract to make alternative arrangements for ash disposal (id.).

The EEC coal RFP requests bidders to submit a base price made up of three components representing fuel, transportation, and ash disposal. Bidders must also propose inflators for each

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110/ DOE Report No. EIA-0529 estimates that 1987 accessible reserves for Appalachia as a whole are approximately 87 billion tons; 1987 recoverable reserves are estimated at approximately 55 billion tons (Exh. HO-RR-19).

component (id.).[111] The coal RFP also solicits proposals which allow EEC to purchase 20 percent of the plant's coal requirements on the spot market (id.).

Finally, the coal RFP indicates that a potential supplier may take exception to specific terms when making its bid. The bid forms attached to the RFP include a sheet on which the bidder indicates the terms which it does not accept (id.).

EEC indicated that it expects the coal to be transported by Conrail from the supplier's mine or mines to the project site.[112] The Company stated that the site of the proposed project is adjacent to an active Conrail line (Exh. HO-1A, p. 126). EEC plans to build a sidetrack into the site for coal deliveries (id.).[113] EEC stated that it intends to purchase coal from northern Appalachia in part because of the numerous access points to the Conrail system in that area (Tr. 9, p. 6). EEC indicated that it expects the coal supplier to hold the transportation contract with Conrail, and to acquire any needed permits, although EEC would work with Conrail whenever necessary (id., pp. 59-60).

EEC originally stated that it would be developing contingency plans in the event of interruptions in fuel supply or transportation (Exh. HO-PV-10). EEC argued, however, that the proposed terms of the coal supply agreement make a fuel interruption unlikely (Tr. 9, p. 74). EEC stated that a coal

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111/ In his testimony, Mr. Smith suggested that the RFP would request a fuel price escalator with components and indices for labor, materials and supplies, and all other items (Tr. 9, pp. 28-28). However, the final RFP does not discuss the fuel price escalator in such detail (Exh. HO-RR-20).

112/ EEC's RFP allows suppliers to propose alternate modes of transportation; however, the bid must include all costs required to deliver the coal to the proposed project's property line (Exh. HO-RR-20). EEC stated that it is willing to consider transportation proposals which do not involve Conrail, but that it has no specific alternatives in mind (Tr. 9, p. 61).

113/ EEC indicated that Conrail has determined that no improvements to its lines will be needed to accommodate the proposed coal and limestone deliveries (Exhs. HO-E-47, EEC-45).

supplier facing difficulties with one mine could provide coal from another mine (id.). In addition, EEC noted that, if a force majeure situation prevented the supplier from delivering the coal, the Company would retain the right to purchase coal from another source (id., p. 76). Finally, EEC stated that if the supplier breached the contract the supplier would be responsible for providing the fuel at its own cost (id.).

The Company stated that it had not yet considered in any detail the contingency of a transportation interruption (id., p. 74). EEC noted, however, that Conrail has two possible routes to the site (id.). EEC also noted that it intends to provide an on-site storage facility for a fifteen-day stockpile of coal to protect against short-term interruptions (id.; Exh. HO-PV-10).

EEC's coal RFP indicates that potential coal suppliers also may, but are not required to, bid to supply limestone for the project (Exh. HO-RR-20). The Company stated that it would review the responses to the coal RFP before deciding whether to issue a separate RFP for limestone (Tr. 9, p. 69). EEC indicated that it expects the limestone to be delivered to the site by Conrail (Exh. HO-RR-20).

EEC has described a fuel acquisition process with several important advantages for the proposed project. The Company has prepared a comprehensive yet flexible coal RFP, and has distributed it for bid to a number of reliable suppliers.

The Siting Council recognizes that northern Appalachia -- the region which EEC has targeted for its coal supply -- contains a large uncommitted coal reserve which will allow any of a number of producers to supply coal to the proposed project over its lifetime. The coal RFP calls for the chosen supplier to dedicate reserves for the proposed project, thus ensuring a reliable supply of coal under normal circumstances.[114]

114/ The Siting Council notes that EEC's discussion of its fuel contingency plans addresses only a contingency where its coal supplier has problems with one of its mines. The Company argues that the proposed terms of its coal supply (footnote continued)

The Siting Council also notes that the contract terms proposed in the RFP likely will result in a low-cost contract. Under the RFP, bidders must propose both a base price and a set of inflators for the price; thus, EEC may select from among a number of offers the price structure which seems most advantageous in both the short- and long-term. Further, EEC's intention to execute a contract with penalties for high ash and sulfur content ensures that EEC will not suffer financially from potential lapses in the quality of delivered coal.

EEC also intends to retain flexibility which could lead to lower overall fuel costs. Although the Company has required its suppliers to include ash disposal costs in their bids, it intends to retain the right to dispose of the ash itself. Similarly, an option to purchase some coal on the spot market would allow EEC to take advantage of lower spot market prices while benefiting from the reliability of dedicated reserves.

The Siting Council also notes that EEC has demonstrated that reliable transportation is available from the northern Appalachian area to its proposed site via Conrail. At the same time, the Company has indicated in its coal RFP that it would be willing to consider other transportation options. This flexibility again allows EEC to explore options which might lead to lower overall fuel costs.

While the Siting Council has noted that EEC's coal RFP process likely will result in a low-cost, reliable supply of coal, as of this date no coal supply contract has been executed. Further, potential respondents to the RFP are allowed significant flexibility in submitting their bids. Specifically, we note that bidders may take exception to specific requirements of the RFP and still be considered for the coal supply

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(footnote continued) contract should protect it from supply interruptions resulting from a strike on a supplier's mine. EEC has offered little or no information about EEC's options in the event of an area-wide strike or other force majeure situation.

However, the Siting Council recognizes that EEC has plans for a fifteen-day stockpile of coal on site. This supply may allow EEC time to contract for a short-term alternative supply should its supplier be unable to deliver coal for any reason.

contract. The Siting Council, therefore, is unable to conclude that many of the terms which would ensure a low-cost, reliable coal supply actually will appear in the final contract.

Finally, a major factor in the pricing of fuel contracts is the inflator which is used to determine prices in later years of the contract. In previous decisions, the Siting Council has been able to examine the chosen inflator and determine that it is likely to result in a low-cost fuel contract over time. West Lynn, EFSC 90-102 at 69-70; MASSPOWER, 20 DOMSC at 362. In the current proceeding, a set of inflators has not yet been chosen; therefore, the Siting Council cannot determine whether the fuel contract is likely to provide low-cost coal over time.

Accordingly, the Siting Council finds that, at this time, EEC has failed to establish that its fuel acquisition strategy reasonably ensures low-cost, reliable energy resources over the life of the power sales agreements. However, the Siting Council also finds that, at such time as EEC executes a coal supply agreement which includes terms similar to those found in the RFP, EEC will be able to establish that its proposed project meets the second part of the second test of viability.[115]

115/ The Siting Council notes that this finding is based squarely on a scenario where EEC uses 1.8 percent sulfur coal in its proposed project. However, in Section III.E.2.b.iii, below, the Siting Council finds that the Company has failed to establish that the SO_2 emissions of the proposed facility have been adequately minimized. In that section, the Siting Council also states that it will not be able to find that SO_2 emissions have been adequately minimized until EEC submits a comprehensive analysis of availability, environmental impacts and costs of lower sulfur coals -- an analysis which must include "a description of fuel acquisition strategies for a range of lower sulfur coals." In the event that EEC should decide, or be required, to use a lower sulfur coal in its facility, the Siting Council would (1) review the viability of EEC's acquisition strategy for lower sulfur coal as part of its review of EEC's comprehensive analysis, and (2) review the supply contract for lower sulfur coal along with the other contracts which must be filed by EEC in order to establish that its project is viable.

The Siting Council has found that, at this time, EEC (1) has failed to establish that the proposed project is likely to be operated and maintained in a manner consistent with appropriate performance objectives and (2) has failed to establish that its fuel acquisition strategy reasonably ensures low-cost, reliable energy resources over the life of its power sales agreements. Accordingly, the Siting Council finds that, at this time, EEC has not established that its proposed project meets the Siting Council's second test of viability. However, the Siting Council also has determined that at such time as (1) EEC executes an appropriate O&M agreement which includes financial incentives that ensure reliable performance over the life of the unit, and (2) EEC executes a coal supply agreement which includes terms similar to those found in the RFP, EEC will be able to establish that its proposed project meets the second test of viability. Within 90 days of receipt of the O&M agreement, the Siting Council will issue a decision determining whether EEC has established that the project has met the first part of the second test of viability. Further, within 90 days of receipt of the fuel supply agreement, the Siting Council will issue a decision determining whether EEC has established that the project has met the second part of the second test of viability.

4. Conclusions on Project Viability

The Siting Council has found that EEC has demonstrated that its proposed project (1) is reasonably likely to be financed and constructed so that the project will actually go into service as planned if it enters into an appropriate EPC contract, and (2) is likely to operate and be a reliable, least-cost source of energy over the life of its power sales agreements if (a) EEC executes an appropriate O&M agreement which includes financial incentives and/or penalties which ensure reliable performance over the life of the unit, and (b) EEC executes a coal supply agreement which includes terms similar to those found in the RFP.

Accordingly, the Siting Council finds that EEC has established that, upon confirmation by the Siting Council of adequate completion of the above conditions, its proposed project is likely to be viable as a source of energy.

D. Conclusions on the Proposed Project

The Siting Council has found that: (1) New England needs at least 300 MW of additional energy resources for reliability purposes beginning in 1995 and beyond; (2) the proposed project would provide benefits to the Commonwealth of sufficient magnitude to offset the impacts on the Commonwealth's resources from construction and operation of the proposed project; and (3) the proposed project approach is consistent with the broad resource use and development policies of the Commonwealth. In addition, the Siting Council has found that the Company's proposed project (1) is reasonably likely to be financed and constructed so that the project will actually go into service as planned if it enters into an appropriate EPC contract, and (2) is likely to operate and be a reliable, least-cost source of energy over the life of its power sales agreements if (a) EEC executes an appropriate O&M agreement which includes financial incentives and/or penalties which ensure reliable performance over the life of the unit, and (b) EEC executes a coal supply agreement which includes terms similar to those found in the RFP.

III. ANALYSIS OF THE PROPOSED FACILITIES

A. Standard of Review

G.L. c. 164, sec. 69I, requires a facility proponent to provide information regarding "other site locations." In implementing this statutory mandate, the Siting Council requires the petitioner to show that its proposed facilities' siting plans are superior to alternatives and that its proposed facilities are sited at locations that minimize costs and environmental impacts while ensuring supply reliability.

In order to determine whether the facility proponent has shown that its proposed facilities' siting plans are superior to alternatives, the Siting Council has required a facility proponent to demonstrate that it has examined a reasonable range of practical facility siting alternatives. West Lynn, EFSC 90-102 at 73; MASSPOWER, 20 DOMSC at 371; Berkshire Gas Company (Phase II), 20 DOMSC 109, 148 (1990) ("1990 Berkshire Decision"); Boston Edison Company/Massachusetts Water Resources Authority, 19 DOMSC 1, 38-42 (1989) ("BECo/MWRA"); Turners Falls, 18 DOMSC at 175-178; Braintree Electric Light Department, 18 DOMSC 1, 31-40 (1988) ("1988 Braintree Decision"); Altresco-Pittsfield, 17 DOMSC at 387; NEA, 16 DOMSC at 381-409. In order to determine that a facility proponent has considered a reasonable range of practical alternatives, the Siting Council typically has required the proponent to meet a two-prong test. First, the facility proponent must establish that it has developed and applied a reasonable set of criteria for identifying and evaluating alternatives in a manner which ensures that it has not overlooked or eliminated any alternatives which are clearly superior to the proposal. West Lynn, EFSC 90-102 at 73; MASSPOWER, 20 DOMSC at 373-374, 382; 1990 Berkshire Decision, 20 DOMSC at 148-149, 151-156. Second, the facility proponent must establish that it has identified at least two noticed sites or routes with some

measure of geographic diversity.[116] West Lynn, EFSC 90-102 at 73-74; MASSPOWER, 20 DOMSC at 371-372; 1990 Berkshire Decision, 20 DOMSC at 148; Turners Falls, 18 DOMSC at 175-178; 1988 Braintree Decision, 18 DOMSC at 31-40; Commonwealth Electric Company, 17 DOMSC 249, 301-303 (1988) ("1988 Com/Electric Decision"); NEA, 16 DOMSC at 381-409. Further, a noticed alternative site will not be required in cases involving proposals to construct cogeneration facilities if the cogeneration proponent (1) has a steam sales agreement with existing steam purchaser(s) sufficient to qualify it for QF status, and (2) has a proposed site fully within the property boundaries of the principal steam host. West Lynn, EFSC 90-102 at 73-74; MASSPOWER, 20 DOMSC at 382.

Finally, in order to determine whether the facility proponent has shown that its proposed facilities are sited at locations that minimize costs and environmental impacts while ensuring supply reliability, the facility proponent must demonstrate that the proposed site/route for the facility is superior to the noticed alternative(s) on the basis of balancing cost, environmental impact, and reliability of supply. West Lynn, EFSC 90-102 at 73-74; MASSPOWER, 20 DOMSC at 382; 1990 Berkshire Decision, 20 DOMSC at 148; BECo/MWRA, 19 DOMSC at 38-42; Turners Falls, 18 DOMSC at 175-178. If noticed alternative(s) are not required, the facility proponent still

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116/ When a facility proposal is submitted to the Siting Council, the petitioner is required to present (1) its preferred facility route or site, and (2) at least one alternative facility route or site. These routes and sites often are described as the "noticed" alternatives because these are the only routes and sites described in the notice of adjudication published at the commencement of the Siting Council's review. In reaching a decision in a facility case, the Siting Council can approve a petitioner's preferred route or site, approve an alternative route or site, or reject all routes and sites. The Siting Council, however, may not approve any site, route, or portion of a route which was not included in the notice of adjudication published at the commencement of the proceeding.

must demonstrate that the proposed site for the facility has acceptable cost, environmental, and reliability impacts. West Lynn, EFSC 90-102 at 74; MASSPOWER, 20 DOMSC at 383-404.

B. Description of Proposed Facilities

EEC proposes to construct a 300 MW coal-fired CFB cogeneration facility in the City of New Bedford (Exh. HO-1A, p. 1). The site is located in the GNB Industrial Park (id.). The facility would occupy approximately 50 acres of a 282 acre undeveloped parcel of land currently owned by Polaroid (id., pp. 2, 127, Exh. HO-E-77). The proposed site is located adjacent to an existing Polaroid manufacturing facility (Exh. HO-1A, p. 1). The major components of the proposed project include three coal-fired CFB boilers with baghouse, a 300 MW steam turbine generator, and an air-cooled condensor (id., pp. 2, 16, 22-23). Additional components include enclosed coal, limestone and ash handling and storage systems, electric switchyard, oil and water storage tanks, a 380-foot exhaust stack, and a train breakdown yard (id., pp. 2, 15, 24-25, 31, Attachment 2, Exhs. HO-E-83, HO-E-86, HO-RR-28).

The facility as proposed would be powered by medium sulfur eastern bituminous coal, with No. 2 fuel oil to be used for startup and for stabilizing combustion (id., pp. 2, 13). A 15-day supply of coal and a 10-day supply of limestone would be stored on-site in covered buildings (id., pp. 2, 26-27, 43). Coal and limestone would be delivered to the site over existing Conrail lines (id., p. 2). A new section of railway track would be installed parallel to the existing Conrail line to the east of the project site, and a new rail spur would connect this new parallel track to a ladder-type train breakdown yard and the unloading area of the plant (id., pp. 24-25).

The proposed facility would be capable of providing the existing Polaroid manufacturing facility with 121,000 lbs/hr of steam for process purposes, operation of rotating equipment and chillers, building heating, and electricity generation for

internal uses (Exh. HO-B-7). The proposed facility would utilize municipal water as well as Polaroid wastewater and would store both municipal water and wastewater in two separate 400,000 gallon on-site storage tanks (Exh. HO-E-86).

The electricity generated by the proposed cogeneration facility would be delivered to the electric transmission grid from take-off towers in the electric switchyard, via two 600-foot, 115 kV electric transmission lines (Exh. HO-1A, p. 31). The electric switchyard would be constructed in the northwest corner of the proposed site and would contain four 115 kV gas circuit breakers and associated disconnect and grounding switches (id., Attachment 2).

C. Site Selection Process

EEC asserted that it has developed a reasonable set of criteria for identifying facility site alternatives as required in MASSPOWER (EEC Initial Brief, p. 99). EEC further stated that the chosen site satisfies its site selection criteria and is otherwise consistent with the Siting Council standards for minimizing economic costs and environmental impacts and ensuring reliable operation of the needed energy facility (Exh. HO-1A, p. 122).

EEC indicated that its site selection process consisted of two distinct phases (Exh. HO-E-2A, p. 3-1). EEC identified these phases as a steam host selection phase and a facility site selection phase (id.). The following sections discuss EEC's development and application of its siting criteria as part of its site selection process.

1. Development of Siting Criteria

As indicated above, EEC presented two sets of criteria, one set of criteria for selecting a steam host, and a second set of criteria for selecting a site for the facility in the vicinity of the steam host (id.).

EEC stated that it determined a pool of steam hosts by actively applying three broad criteria: (1) seeking a bona fide

steam user; (2) seeking a location near a need for electrical output; and (3) seeking positive environmental factors that would be taken into account in licensing a facility (Tr. 11, p. 23). However, EEC reiterated that, in the final analysis, it is the business judgment of a company that determines the best location to locate a cogeneration project (id., p. 21).

EEC stated that it used the following criteria to evaluate the steam hosts it had identified: (1) the steam host needed to have substantial steam requirements; (2) the steam host needed to be financially sound and willing to make a long term commitment to purchase steam; (3) the steam host needed to be in an area where electrical power is needed; (4) the steam host needed to have available land zoned for industrial use; (5) the steam host needed to have a site with easy access to the project's fuel source; (6) the steam host needed to have a site with close proximity to electrical transmission lines that could accept the facility output; (7) the steam host needed to have a site with access to adequate water supply and wastewater discharge locations; (8) the steam host needed to have a larger site area than that required for active site development, so as to allow for buffers; (9) the steam host needed to offer a site which was environmentally compatible with the surrounding land use, consistent with MEPA (Exh. HO-E-2, sup.);[117] and (10) the steam host needed to offer a site with direct access from a major highway and/or local streets in an industrial area (Exh. HO-1A, pp. 122-124). In addition, EEC stated that during its steam host evaluation process it identified a preference to locate the project in the Com/Electric service territory, because EEC had a signed and approved PPA for 50 MW with that utility (Exh. HO-E-2, sup.).

117/ EEC stated that it intended to consider the general MEPA guidelines and goals established in power plant cases (Tr. 11, p. 11). However, EEC did not identify any specific guidelines or goals.

EEC stated that it used the following site screening criteria to identify and evaluate possible sites in the vicinity of Polaroid:[118] (1) the site must be within 1.5 miles from Polaroid;[119] (2) the site must not be subject to an adverse land use restriction;[120] (3) the site must avoid the Acushnet Cedar Swamp State Reservation; (4) the site must be no less than 50 acres including buffer space; (5) the site location must maximize a buffer to existing residential uses; (6) the site location must minimize the costs for the steam line interconnection; (7) the site location must minimize the costs for the electric line interconnection; (8) the site development costs must be limited; (9) wetland impacts must be minimized; and (10) MEPA environmental review criteria must be satisfied (Exh. HO-E-5, sup.).

EEC stated that the first three criteria -- 1.5 mile maximum site distance from Polaroid, absence of adverse site restrictions, and avoidance of the Acushnet Cedar Swamp State Reservation -- served as minimum threshold requirements (id.). In addition, EEC stated that it assigned appropriate weights to all of the site specific criteria (id.). EEC asserted that generally the environmental criteria were weighted more heavily than the other criteria (id.).

In previous decisions regarding cogeneration facilities, the Siting Council has found that criteria such as those developed by EEC are acceptable for use in the preliminary

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118/ EEC applied its steam host selection criteria and chose Polaroid as the steam host. The Siting Council reviews the application of the steam host selection criteria in the following section.

119/ EEC stated that 1.5 miles is the maximum feasible distance at which it would transmit steam to Polaroid at the required pressure, temperature and quality (Exh. HO-E-5).

120/ The adverse land use restrictions refer to restrictions imposed by Polaroid due to their plans for future expansion.

identification and evaluation of steam hosts. West Lynn, EFSC 90-102, at 79; MASSPOWER, 20 DOMSC at 376-379; Altresco-Pittsfield, 17 DOMSC at 391-393. The criteria used by EEC to identify a steam host address significant items that are fundamental to selecting a legitimate steam host. In addition, environmental concerns were addressed early in the selection process as an important component of EEC's steam host criteria. Thus, EEC has addressed concerns raised in MASSPOWER, in which the Siting Council found that the petitioner focused on business development factors and generally bypassed environmental criteria (20 DOMSC at 379).

In regard to EEC's site selection criteria for identifying and evaluating possible sites, although EEC has made significant strides to limit the use of overly broad criteria, some of the site selection criteria could have been narrowed further. Specifically, criteria referring to the requirement for buffers -- criteria 4 and 5 -- should refer to a quantitative measure or range of the acreage needed for an appropriate buffer zone, taking into consideration surrounding land uses. Such a measure or range would enable EEC to develop a more specific site size criterion, rather than the general requirement that a site be more than 50 acres.

Nonetheless, the Company's criteria used to select a site for the facility in the vicinity of the steam host are appropriate and show significant improvement over criteria presented in previous Siting Council facility reviews. See West Lynn, EFSC 90-102 at 81; MASSPOWER, 20 DOMSC at 378-379. With its first three site-specific criteria, EEC incorporated minimal threshold requirements into the process. The minimum threshold requirements serve as an indicator as to whether to go forward with the remaining site selection criteria, which take into account operational and environmental criteria. However, although EEC identified avoidance of the Acushnet Cedar Swamp State Reservation as a threshold criterion, EEC failed to define "avoidance," and, in particular, it did not set out what type or size of buffer between the area of active site development and

the Acushnet Cedar Swamp State Reservation would constitute "avoidance" of the Acushnet Cedar Swamp State Reservation. We are particularly concerned about the development of this threshold criterion in light of the issues related to runoff to the Acushnet Cedar Swamp State Reservation. See Section III.E.4.b, below for a full discussion of the issues related to impacts on the Acushnet Cedar Swamp State Reservation.

Finally, EEC stated that it assigned weights to the site selection criteria and that environmental criteria were weighted more heavily than other criteria. However, EEC did not provide a numeric value or range of values for the weights. As in previous cases, the Siting Council has noted its concerns regarding the absence of specific weights in a company's site selection criteria. West Lynn, EFSC 90-102 at 79; MASSPOWER, 20 DOMSC at 378-379; 1990 Berkshire Decision, 20 DOMSC at 161-162. In requiring the assignment of weights or values, the Siting Council does not suggest that such weights and values can or should operate as a substitute for judgment. Instead, the Siting Council recognizes that judgment inherently requires the assignment of some weights or values to specific criteria. Such assignment of weights is necessary for a company to consistently apply its criteria. In fact, it is our review of these weights and values which allows us to determine whether such judgment is sound and practical.

Here, although the Siting Council has some significant concerns regarding the lack of weights and values, the Siting Council also notes that EEC has surpassed other applicants in its development of criteria for selecting a steam host and a site. Accordingly, the Siting Council finds that EEC has developed an acceptable set of criteria for identifying and evaluating both potential steam hosts and potential facility sites.

2. Application of Siting Criteria

EEC stated that the search for a steam host focussed on southeastern Massachusetts at an early stage in the process

(Tr. 11, p. 16). EEC asserted that the advantages of southeastern Massachusetts included the anticipation of continued economic growth in the area and the need for additional power (id., p. 5). EEC added that environmental impacts of the project in southeastern Massachusetts would be minimal due to the meteorological conditions and terrain associated with the area (id., p. 11; Exh. HO-E-3).[121] EEC explained that the flat terrain in the area is more conducive to limiting ground level air quality impacts (Tr. 11, p. 18). In addition, EEC stated that it concentrated its search for a steam host on entities that utilize a significant amount of thermal power such as chemical plants and food processing facilities (id., pp. 6-7).

EEC stated that it applied its detailed steam host evaluation criteria to four identified steam hosts in southeastern Massachusetts: Polaroid, Acushnet, ICI America, and Ocean Spray (Exh. HO-E-3).[122] EEC claimed that Polaroid met all ten of the steam host evaluation criteria (Exh. HO-E-4, sup.). By comparison, EEC explained that Acushnet met six criteria, that ICI America met four criteria, and that Ocean Spray met six criteria (id.).[123] EEC asserted that they

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121/ For example, EEC stated that the predominant wind directions in the New Bedford area would serve to transport the plume from the proposed facility away from the relatively high terrain located to the west of the proposed facility, minimizing air quality impacts (Exh. HO-E-100).

122/ Polaroid and Acushnet both are located in the GNB Industrial Park, ICI America is located in Dighton, and Ocean Spray is located in Middleborough (Exh. HO-E-3).

123/ However, EEC stated that its fourth steam host criterion -- available land zoned for industrial use -- and its eighth steam host criterion -- an available site large enough to accommodate buffers -- were never applied to Ocean Spray, as negotiations were severed by Ocean Spray prior to EEC obtaining the needed information (Tr. 11, pp. 29-30). The Ocean Spray option was eliminated as a result of an Ocean Spray decision to pursue a project with another cogeneration developer prior to a full evaluation of Ocean Spray as a steam host by EEC (id.).

selected Polaroid because the firm best met the steam host criteria (id.).

Based on the foregoing, the Siting Council finds that EEC appropriately applied its criteria in eliminating alternative steam hosts and choosing the Polaroid Corporation as the steam host.

With respect to the selection of an appropriate site for the facility in the vicinity of the steam host, EEC indicated that the proposed site is 282 acres, which is part of a 385 acre Polaroid-owned industrial zoned parcel of land directly adjacent to the existing Polaroid facility (Exh. HO-1A, pp. 1-2).[124]

EEC stated that it applied its ten site selection criteria to seven identified sites (Exh. HO-5, sup.). The seven identified sites, all of which are located within a 1.5-mile radius of Polaroid, are: (1) a site owned by Talleyrand Chemical located within the GNB Industrial Park, comprising 79 acres ("Talleyrand Alternative"); (2) a site owned by Vulgaris, located south of Polaroid, comprising approximately 25 acres ("Vulgaris Alternative"); (3) a site located in the northwest quadrant of land of the 385 acre Polaroid parcel ("Northwest Alternative"); (4) a site located in the southwest quadrant of land of the 385 acre Polaroid parcel ("Southwest Alternative"); (5) a site located in the northeast quadrant of land of the 385 acre Polaroid parcel ("Northeast Alternative"); (6) a site located in the southeast quadrant of land of the 385 acre Polaroid parcel ("Southeast Alternative"); and (7) a site owned by Polaroid, south of their

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124/ The Siting Council notes that there is only one proposed site, the 282 acre Polaroid site, carved out of the larger 385 acre parcel owned by Polaroid. The proposed facilities would be concentrated in the Northwest quadrant of the 385 acre Polaroid parcel. The Company, in setting forth its site selection criteria in Exh. HO-E-5, sup., divided up the entire 385 acre Polaroid parcel into four distinct quadrants. EEC stated that it evaluated each quadrant on its own merits.

facilities, comprising less than 25 acres ("Far East Alternative") (Exhs. HO-E-6, sup., HO-E-7, sup.).[125]

EEC reported that, prior to identifying the above sites, it reviewed other siting alternatives of at least 50 acres, both inside and outside of the GNB Industrial Park (Exh. HO-E-5, sup.). EEC further stated that they contacted the Greater New Bedford Industrial Park Foundation to discuss the availability of sites in the GNB Industrial Park (Exh. HO-1A, p. 124).

In regard to EEC's application of its criteria for the identification and evaluation of specific sites in the vicinity of Polaroid, the process was bifurcated by the decision of EEC to divide up the 385 acre Polaroid parcel into four sites. Prior to EEC's inclusion of seven sites as identified options, EEC had designated three sites -- the Talleyrand Alternative, the Vulgaris Alternative and the 282 acre proposed site (Exh. HO-E-2a, pp. 3-5 to 3-7). EEC, however, did not explain the reasoning behind identifying four additional alternatives within the 385 acre Polaroid parcel, and subjecting each alternative separately to the site selection criteria.[126]

The Siting Council notes that the four sites (Northwest, Northeast, Southwest and Southeast Alternatives), are actually siting variations within the one larger site and should not be construed as different sites.[127] While the Northwest

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125/ Of the seven sites, four are located within the 385 acre Polaroid parcel -- the Southeast Alternative, Southwest Alternative, Northeast Alternative, and Northwest Alternative. The preferred site chosen by EEC for the proposed facility is the Northwest Alternative.

126/ EEC stated that the Northwest Alternative, the portion of the 282 acre proposed site designated as the location of the proposed facility, met all of the criteria, and that the Northeast, Southeast, and Southwest Alternatives did not meet all designated criteria (Exh. HO-7, sup.). The Siting Council notes that buffers and roadways will be located in portions of these last three alternatives (id.).

127/ The Company's witness, James Croyle, acknowledged that the actual division of the sites was somewhat arbitrary (Tr. 11, p. 38).

Alternative is identified as the preferred site, a combination of this alternative with various configurations of the three other alternatives comprise the total 282 acre proposed site. Therefore, evaluating the four sites equally, according to EEC's identified criteria, is inappropriate given that the criteria are designed for comparing mutually exclusive sites. In a previous decision, the Siting Council found that an analysis of sites contained within a larger site does not represent a legitimate site comparison, but instead constitutes design optimization. Altresco-Pittsfield, 17 DOMSC at 393 (1988). Here it would have been appropriate for EEC to first apply its site selection criteria to the 282 acre proposed site and the mutually exclusive site alternatives, i.e., Talleyrand, Vulgaris, and Far East. If as a result of this comparison the 282 acre proposed site was deemed to be preferable, then as a second step it would have been appropriate for EEC to apply the relevant site selection criteria to the four smaller sites. This second step constitutes design optimization.

NO-COAL and Robert Ladino asserted that the chosen site failed to meet some of the Company's selection criteria and that the site selection process was too limited in scope (NO-COAL/Ladino Reply Brief, p. 8).

Based on the foregoing, the Siting Council finds that EEC appropriately applied its criteria in eliminating alternative facility sites and choosing the Northwest Alternative. However, EEC confused the issue by combining the site selection and design optimization stages of their process. Nonetheless, this flaw does not negate the fact that EEC has (1) presented a site selection process with significant strengths, and (2) selected a site which is superior to available alternatives.

Accordingly, the Siting Council finds that EEC has established that it has appropriately applied a reasonable set of criteria for identifying and evaluating alternatives in a manner that ensures it has not overlooked or eliminated any clearly superior sites.

3. Geographic Diversity

EEC asserted that the selection of the preferred site for the proposed facilities is consistent with the MASSPOWER test, and, therefore, EEC is not required to identify an alternative site for the proposed facility. (EEC Initial Brief, p. 103, citing, MASSPOWER, 20 DOMSC at 78). EEC stated that it has established that (1) Polaroid has executed a steam sales agreement with EEC that is sufficient for the proposed project to qualify for QF status, and (2) Polaroid has executed a site lease agreement with EEC to allow the facility to be fully located within Polaroid's property boundaries (EEC Initial Brief, p. 103).

DEM recommended that an alternative site for the proposed facility be found due to the unique and irreplaceable ecological characteristics of the site, and the demonstrated threat from industrial development in and around the bordering wetlands. (Exh. DEM-1, p. 7). The Attorney General concurred with the DEM recommendation (AG Initial Brief, p. 66). However, the Attorney General and DEM have not argued that EEC fails to meet the MASSPOWER test or that the MASSPOWER test should not be applied in this case. Thus, consistent with the standard set forth in MASSPOWER, the Siting Council does not require EEC to provide an alternative site with some measure of geographic diversity.

4. Conclusions on the Site Selection Process

The Siting Council has found that: (1) EEC has developed an acceptable set of criteria for identifying and evaluating alternatives; (2) EEC has appropriately applied a reasonable set of criteria for identifying and evaluating alternatives in a manner that ensures it has not overlooked or eliminated any clearly superior sites; and (3) EEC is not required to provide an alternative site with some measure of geographic diversity.

Accordingly, the Siting Council finds that EEC has considered a reasonable range of practical facility siting alternatives.

D. Cost Analysis of the Proposed Facilities

Although EEC is not required to provide a noticed alternative to its proposed site (see Section III.C, above), the Siting Council, nevertheless, must determine whether the proposed facilities are consistent with ensuring a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. Therefore, the Siting Council evaluates the proposed facilities to determine whether the cost estimates associated with construction are (1) realistic for a facility of the size and the design of the proposed project, and (2) minimized consistent with the mitigation of environmental impacts.

EEC estimated that the installation costs of the proposed facilities, which include project development as well as construction costs, would total approximately $593 million (Exh. HO-PV-17). EEC indicated that its estimate includes costs of construction, spare parts, transmission line upgrades, development expenses, interest during construction, startup activities, financing, land, miscellaneous fees, and other contingencies (id.).

EEC noted that its cost estimate, amounting to $1,976 per kilowatt, is approximately 18 percent lower than the generic cost level identified for the comparable CFB technology in the Electric Power Research Institute's ("EPRI") 1986 Technical Assessment Guide ("TAG") (Exh. HO-1A, p. 95, Table 5.1). EEC stated that the TAG cost level reflects cost assumptions for a period during which EPRI considered the CFB technology to be in a pilot stage of development (id.). EEC stated that EPRI's cost estimation methods for technologies in pilot stages of development typically include significantly higher contingency cost factors compared to those assumed for mature technologies (id.).

EEC argued that the proposed site offers locational advantages that allow EEC to minimize costs related to use of the CFB technology (EEC Initial Brief, p. 66). EEC stated that the proposed site is located adjacent to Conrail facilities and

that, because Conrail's system extends into coal producing areas of northern Appalachia, direct delivery of coal from producers can be achieved by a single rail carrier (Tr. 9, pp. 6-8). In addition, EEC stated that the proposed site is adjacent to the steam host's plant and to a Com/Electric 115 kV transmission line (Exh. HO-1A, p. 126).

EEC argued that it has placed a premium on minimizing the environmental impacts of the proposed facility, and that its cost estimate reflects the costs of environmental mitigation (EEC Initial Brief, p. 105). EEC stated that its proposed use of air-cooled condensors and recycled wastewater, for example, results in water requirements that are less than one-tenth the typical water requirements for a 300 MW coal-fired cogeneration facility with a wet cooling system (Exh. HO-1A, p. 117).

The Company stated that it considered both environmental and cost considerations, as well as technological reliability, in selecting its proposed air pollutant control strategies (see Section III.E.2.a, below). In determining its proposed emissions of SO_2 and carbon-dioxide ("CO_2"), for example, the Company discussed possible strategies for further reducing or offsetting such emissions (Tr. 9, pp. 8-25, 30-31, 77-80; Exh. NC-RR-1).[128]

With respect to SO_2, the Company asserted that use of

128/ Although EEC expects to achieve its proposed NOx emission level (0.18 lb/MMBtu) within three years of start up through optimization of combustion, the Company indicated it also addressed an alternative control strategy -- injection of ammonia or urea -- for achieving its proposed emission level for this pollutant (Exh. HO-RR-37). The Company stated that injection of ammonia or urea could be implemented, with an additional installation cost of $8.1 million and an additional operating and maintenance cost of $1.2 million per year (Exh. HO-RR-37). While EEC did not reject injection of urea or ammonia from a cost standpoint, the Company indicated that this control strategy currently is not technologically reliable and, therefore, is proposed only as a possible backup approach should combustion optimization not prove effective after three years of operations (Tr. 11, p. 1).

medium sulfur coal, together with pollution control equipment that removes 91 percent of the SO_2, is appropriate for the technology and design of the proposed facility (Tr. 4, pp. 12-15, Tr. 10, p. 81, Tr. 11, p. 51). The Company indicated that it expects to obtain 1.8 percent sulfur coal from the northern Appalachian region served by Conrail, where a large amount of uncommitted coal is available (Tr. 9, p. 6). The Company stated that the price of 1.8 percent sulfur coal from northern Appalachia would be $48 to $50 per ton, delivered to the proposed site (id.).

Although EEC discussed alternative fuel strategies involving coal with lower sulfur content, the Company did not specify the minimum sulfur content coal that would be reasonable to use in the CFB boiler (Tr. 10, p. 82). The Company asserted that coal with a sulfur content of 0.75 to 1.2 percent would be available for use in the proposed facility, but that its use would increase the cost of fuel by eight to ten dollars per ton, including transportation, and thereby would have a negative economic impact on the project (Tr. 9, pp. 8-10, 24-26).[129] The Company further stated that use of 1.5 percent sulfur coal would increase the cost of fuel by six to seven dollars per ton due to (1) a higher mine price of one to two dollars per ton, and (2) higher transportation costs of five dollars per ton (Tr. 9, pp. 21-22).[130]

With respect to CO_2, the Company indicated that it would participate in the Massachusetts Releaf Program, which

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129/ The Company stated that transportation costs for lower sulfur coal would be higher due to mine locations that would require the use of two rail carriers (Tr. 9, p. 8). The Company further stated that it would be difficult to obtain a long-term contract for low sulfur coal because new air quality legislation likely will increase demand for low sulfur coal (id.).

130/ The Company provided its estimate of the price of 1.5 percent sulfur coal based on cost information for another project (Tr. 9, pp. 19-22).

encourages planting of trees to offset possible effects of CO_2 emissions on global climate (see Section III.E.2.b, below). Although the Company calculated the extent of tree planting that would be necessary to offset all of the proposed facility's CO_2 emissions, the Company failed to present any specific tree planting plans or other mitigation plans with their related costs.

With respect to noise, the Company indicated that it determined the proposed noise emissions based on meeting applicable state and federal guidelines for acceptable noise at the nearest existing residence (Exhs. HO-RR-6, pp.3-4, HO-2A, p. 5-105, HO-E-54; Tr. 1, pp. 30-31) (see Section III.E.3, below). The Company identified an alternative noise control strategy that would meet the same noise guidelines at the facility property line as well as at all existing residences, with an additional installation cost of $15 million (Exh. HO-RR-37). However, the Company argued that the proposed noise emissions represent the optimum balance between cost and noise impacts (EEC Initial Brief, p. 137).

EEC has shown that, as a result of more widespread implementation of CFB technology, the expected costs of installing a CFB facility are less than the costs assumed in recent years. Given the reduction in expected costs, and assuming the Company's proposals and related cost estimates for environmental mitigation, the project costs are competitive. In addition, EEC has shown that the location of its proposed site provides ready access to the existing steam user, electric transmission system, and rail facilities for fuel supply. Finally, EEC has shown that its proposed facility would minimize costs consistent with minimizing most of its identified environmental impacts.

However, EEC has provided only limited information on the costs of alternative control strategies for minimization of air quality impacts related to SO_2 and CO_2 emissions, and for minimization of noise impacts -- information that the Siting Council must review in order to ensure consistency with its

standard that needed energy facilities be built at the least cost with a minimum impact on the environment. While the Company provided some information on the relative costs of lower sulfur coal and the costs of an alternative noise control strategy, the record contains insufficient information for the Siting Council to determine whether the Company appropriately evaluated the tradeoffs between additional costs for alternative SO_2, CO_2, and noise control strategies and reductions in associated environmental impacts. Specifically, in support of its proposal, the Company failed to present a comprehensive analysis of the costs associated with incorporating different control options (including its proposed control options) relative to SO_2, CO_2, and noise impacts. More importantly, the Company provided no basis to assess the relationship between possible additional costs for alternative control strategies and (1) the financiability of the proposed project, and (2) the marketability of the power from the proposed project.

Accordingly, while the Siting Council finds that EEC has established that the cost estimates associated with the proposed facilities are realistic for a facility of the size and design of the proposed project, we can make no finding as to whether EEC has established that the cost estimates of the proposed facility have been minimized consistent with the mitigation of environmental impacts. Should the Company submit the information regarding control technologies for SO_2, CO_2, and noise, specified in the conditions set forth in Section III.E.2.a.iii, below, the Siting Council will be able to determine whether the cost estimates associated with the proposed facilities are minimized consistent with the mitigation of environmental impacts.

E. Environmental Analysis of the Proposed Facilities

1. Standard of Review

Although EEC has established that there are no practical alternatives to its proposed site (see Section III.C., above), the Siting Council nonetheless must determine whether

construction and operation of the proposed facility at the proposed site is consistent with ensuring a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. During the course of the proceeding, the Company and the Attorney General commented on the Siting Council's minimum environmental impact standard and each proposed specific applications of this standard in facility reviews.

a. Arguments of the Parties

EEC suggested that the Siting Council establish and apply separate standards of review for those environmental impacts that are subject to other governmental agencies' regulation and for those impacts that are not subject to such regulation (EEC Initial Brief, pp. 106-107). For environmental impacts that are subject to regulation by other agencies, EEC recommended that the Siting Council find that the environmental impacts are "per se" acceptable if all applicable federal and state environmental standards are met (id., p. 107). Where environmental impacts of a facility are not subject to other agencies' regulations, the Company recommended that the Siting Council find that the environmental impacts are acceptable as long as the weight of the evidence shows that the facility will result in no adverse impact to public health and welfare (id.).

EEC stated that its recommended standard of review is consistent with standards set forth in previous Siting Council facility reviews, as well as with standards for approval of facility proposals set forth in G.L. c. 164, sec. 69J. The Company stated that, in order to find that proposed facilities are consistent with ensuring a necessary energy supply for the Commonwealth with a minimum impact on the environment, the Siting Council must determine that the environmental impacts of the facilities would be adequately minimized and, thus, would be acceptable (id., p. 106). The Company further stated that, pursuant to G.L. c. 164, sec. 69J, the Siting Council may approve a facility proposal if plans for a new facility are

consistent with current health, environmental protection and resource use and development policies as adopted by the Commonwealth (id.).

Therefore, EEC asserted that its proposed standard of review would enable the Siting Council to determine whether the environmental impacts of a proposed facility are acceptable by evaluating whether a proposed facility (1) has a minimum impact on the environment, and (2) is consistent with state policies (id., pp. 106-107).

EEC also recommended an alternative standard for evaluating environmental impacts which are subject to other agencies' regulation (id., p. 107). The Company recommended that the Siting Council find that, if the other agencies' regulatory standards are met, the proponent has made a prima facie case that the environmental impacts of the facility are acceptable (id.). The Company indicated that under this standard, the burden of proof would be shifted to intervenors to establish that the project would have an adverse impact on public health and welfare (id.).

The Attorney General argued that the Siting Council can approve a facility only if it determines that it has a minimum impact on the environment (AG Initial Brief, p. 49). The Attorney General further argued that the analysis that determines whether a project has a minimum impact on the environment should be an objective overall assessment of the effects of the proposed facility on the environment, and not simply an examination of a proposed facility's technology, or compliance with particular federal, state or local standards (id.). The Attorney General also argued that, although the nature of the proposed technology and applicable regulatory standards should be important considerations in a minimum impacts review, the Siting Council also should analyze the environmental effects of a proposed project in terms of the objective risks it poses to human health, wildlife and plantlife (id.).

The Attorney General maintained that there are two

principal problems with the standard for environmental review set forth by the Company (AG Reply Brief, pp. 11-13). The Attorney General argued that in simply applying existing governmental standards, the Siting Council (1) in many instances would be subscribing to lower standards or simple pronouncements of environmental protection or policy, and (2) would be eliminating its statutory responsibility to conduct an independent review of the environmental impacts of a proposed facility (id., pp. 12-13). The Attorney General asserted that federal and state standards simply do not rise to the level of environmental protection that is contemplated by the Siting Council's "minimum impact" standard and, in some cases, actually allow for pollution to occur (id., p. 12).

b. Analysis and Conclusion

The Siting Council agrees with the Attorney General that an overall assessment of the effects of a facility on the environment, rather than a mere analysis of a facility's compliance with standards of other governmental agencies, is consistent with the statutory mandate of the Siting Council to ensure a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. Federal and state regulations generally establish quantitative or other specific requirements as thresholds of acceptability for particular environmental impacts. Compliance with these thresholds clearly does not establish that a proposed facility's environmental impacts have been minimized.

However, we note that the Siting Council's mandate does not require that the Siting Council develop and apply a separate and more stringent level of environmental control for energy facilities relative to the requirements of other environmental permitting agencies. Rather, the mandate requires that the Siting Council ensure that all energy facilities achieve the appropriate balance between minimizing environmental impacts and minimizing cost, consistent with meeting reliability objectives for energy supply. Thus, the levels of environmental control

that the Siting Council requires cannot be set forth in advance in terms of quantitative or other specific criteria, but instead, must depend on the particular environmental, cost and reliability trade-offs that arise in respective facility proposals.

The Siting Council's balancing function occurs on two levels. First, the Siting Council must balance a range of facility-level environmental impacts to determine whether the facility's environmental impacts at a particular site, as a whole, are acceptable. We note that a federal, state or local permitting program that reviews a particular facility proposal addresses only the specific environmental impacts within that program's jurisdiction, often without taking into consideration information regarding other environmental impacts. Such an impact-specific review does not recognize the trade-offs between minimization of differing and sometimes opposing environmental impacts, where minimization of one specific impact may trigger an increase in a second environmental impact. For example, a generating facility's stack height relates to air quality as well as visual impacts. A higher stack height may minimize air quality impacts but at the same time increase visual impacts. Likewise, use of specialized equipment that would reduce water requirements could increase noise impacts. G.L. c. 164, sec. 69J, clearly requires the Siting Council to determine whether a facility proposal achieves the appropriate balance among all environmental impacts.

Second, permitting reviews by other agencies often do not take into account trade-offs between minimizing environmental impacts and minimizing costs. In addition, the balance between minimizing environmental impacts and meeting reliability objectives for energy supply may not be considered explicitly by other environmental agencies at the federal, state and local level.

An overall assessment of all impacts of a facility allows the Siting Council to determine whether an appropriate balance is achieved among conflicting environmental concerns as well as

between environmental impacts, cost and reliability.[131] A facility proposal which achieves this balance is one which meets the Siting Council's statutory standard to minimize environmental impacts. Any other interpretation of the minimization of environmental impacts clearly would violate the spirit, if not the plain meaning of G.L. c. 164, sec. 69G.

This interpretation is underscored by the Siting Council's statutory authority under G.L. c. 164, sec. 69K, to override decisions of state and local permitting agencies if the Siting Council finds that requirements of such agencies would not be consistent with ensuring a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. The override authority allows the Siting Council great discretion in balancing the need for, and reliability of, energy resources with cost and environmental impact and confirms our position that the Siting Council's review should extend beyond the limited review of individual permitting agencies.

We cannot accept EEC's arguments that our environmental review consist merely of a checklist of existing regulatory standards of other agencies. Merely accepting or rejecting a project based on a checklist of other agencies' standards would ignore the real interactive effects among environmental impacts as well as the interrelationship between environmental impacts, cost and reliability, and thus, would not be consistent with the

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131/ The Siting Council notes that a company's Best Available Control Technology ("BACT") analysis may be considered by the Siting Council in determining whether the facility achieves an appropriate balance (1) among various environmental impacts, and (2) among environmental impacts, costs and reliability. However, the Siting Council emphasizes that by incorporating the BACT analysis into our review, the Siting Council does not make determinations whether specific control technologies are BACT and, therefore, does not substitute its judgment for that of the Massachusetts Department of Environmental Protection ("MDEP").

Siting Council's ability to achieve its statutory mandate.[132]

In addition, we cannot accept EEC's suggestion for a standard of review for environmental impacts that are not subject to regulation by other agencies. To find that environmental impacts are acceptable as long as the weight of the evidence shows that the proposed project will have no adverse impact on public health and welfare, would inhibit the Siting Council from finding that the environmental impacts of a proposed facility have been minimized.

Finally, while agreeing with the Attorney General that our environmental review should be an overall assessment of the effects of the project on the environment, we reject the Attorney General's argument that the Siting Council is authorized to approve a proposed facility based only on a determination that it has a minimum impact on the environment. Instead, as we have noted above, a facility which minimizes environmental impacts is one which achieves an appropriate balance (1) among various environmental impacts, and (2) among environmental impacts, costs and reliability.

2. Air Quality

EEC asserted that operation of the proposed facility would comply with all federal and state air quality standards and, as such, would have acceptable impacts on air quality (Exh. HO-1A, p. 154; EEC Initial Brief, p. 108).

EEC stated that the proposed facility would be subject to the following federal air quality rules and regulations:

132/ The Siting Council also rejects EEC's alternate standard that in some instances the burden of proof be shifted to the intervenors to establish that a proposed facility would have an adverse impact on the public health and welfare. It is clearly the burden of the applicant to establish that a proposed facility would have a minimum impact on the environment.

(1) National Ambient Air Quality Standards ("NAAQS");[133]
(2) Prevention of Significant Deterioration Program ("PSD"); and
(3) New Source Performance Standards ("NSPS") (Exh. HO-1A, p. 137).[134, 135] In addition, the Company stated that the proposed facility would be subject to MDEP air pollution control regulations and guidelines (id.).[136]

133/ The Company stated that NAAQS are ambient ceilings for specific pollutants based upon the identifiable effects the pollutants may have on public health and welfare (Exh. HO-2B, p. F.1-2). The Company further stated that NAAQS, established by the United States Environmental Protection Agency ("EPA"), have been adopted by the MDEP (id., p. F.1-3).

134/ The Company indicated that the PSD regulations were established in order to prevent significant degradation of air quality in areas where air quality currently is better than the ambient standards (Exh. HO-2A, p. 5-16). The Company indicated that the components of a PSD permit application include: (1) an evaluation of alternative control devices and techniques demonstrating that BACT would be applied to the facility; (2) an analysis of existing ambient air quality in the vicinity of the facility; (3) a modeling analysis demonstrating that emissions from the facility, in conjunction with other nearby sources, would not cause a violation of the NAAQS or PSD increments; and (4) an assessment of the facility's impact on soils and vegetation (Exh. AG-28, p. 3-8). The Company stated that the MDEP administers the federal PSD requirements and manages the review process under the NSPS program (Exh. HO-1A, p. 139).

135/ EEC stated that the proposed facility would be exempt from certain provisions of the Clean Air Act Amendments of 1990 (Exh. HO-RR-38). The Company stated that the proposed facility would be exempt from (1) the SO_2 allowance trading provisions because it had signed PPAs prior to November 14, 1990, and (2) the air toxics provisions because it is an electric generating facility (id.). In addition, the Company stated that the ozone nonattainment provisions are not currently in effect (id.).

136/ The Company stated that a permit to construct would be required from the MDEP (Exh. HO-2A, pp. 5-17, 5-18). The Company further stated that the proposed facility would be subject to: (1) MDEP regulations that limit emissions of particulates, SO_2, and NOx; (2) a MDEP guideline that limits the one-hour ambient nitrogen oxide concentration; and (3) the MDEP air toxics program which limits ambient concentrations of compounds not covered by the NAAQS (id., Exh. HO-E-111).

The federal and state air quality rules and regulations apply to the quantity of pollutants that will be emitted and to the impact of such emissions on the ambient air quality (Exh. HO-2A, p. 5-15). In its air quality analysis, the Company first identified the emissions that would result from the operation of the proposed facility, then predicted the impact of the facility emissions on ambient air quality (Exh. AG-28, sections 4-7).

In the following sections the Siting Council reviews EEC's estimates of emissions from its proposed facility as well as the impacts of those emissions on air quality. In addition, the Siting Council evaluates the impact of the proposed facility's emissions on vegetation and soils and considers the issue of whether a health risk assessment should have been performed in order to assess the potential health risks from the proposed facility.

a. Identification and Control of Air Emissions

EEC stated that the pollutants that would be emitted in the greatest amounts by the proposed facility will be SO_2, NOx and carbon monoxide ("CO") (Exh. HO-2A, p. 5-20). The Company stated that, in addition, the proposed facility would emit particulate matter ("particulates" or "PM"),[137] VOCs, and small amounts of lead and other pollutants (id.).

EEC indicated that pollutant emissions from coal-fired facilities depend primarily on: (1) the quality and quantity of

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137/ The Company indicated that originally NAAQS covered total suspended particles ("TSP") but this standard was subsequently replaced by one for particles smaller than ten micrometers ("PM_{10}") (Exh. HO-2B, p. F.1-3). The Company indicated that PM_{10} remain in the lungs longer than larger particles and, thus, pose a greater health risk than larger particles (id.). For permitting purposes, the Company conservatively assumed that all particulates emitted from the facility would be PM_{10} (Exh. HO-2A, p. 5-21).

coal that is burned;[138] (2) the type of boiler; (3) the method of operation; and (4) the use of pollution control equipment (id., p. 5-20). The Siting Council reviews EEC's estimates of emissions from the facility as proposed below.

i. Criteria Pollutants

EEC indicated that emissions from the proposed facility include the following criteria pollutants:[139] (1) SO_2; (2) NOx (3) CO; (4) PM; (5) VOC; and (6) lead (id., pp. 5-21, 5-23, 5-24). EEC estimated the emission rate[140] for each of the criteria pollutants, in pounds per million British thermal units of heat input ("lb/MMBtu") based on facility design, facility operation, fuel quality, consultation with vendors, experience with, and surveys of, existing facilities, and literature review (id., Exh. EEC-15; Tr. 10, pp. 5-8, Tr. 4, p. 24). EEC asserted that emission of criteria pollutants would be minimized by the design and operation of the proposed facility (Exh. HO-2A, pp. 5-21, 5-23, 5-24). In addition, the Company asserted that the level of control proposed for each criteria pollutant represents BACT for each pollutant (Exh. AG-28, section 5).[141]

138/ The Company indicated that the amount of sulfur and the amount of nitrogen contained in coal are the characteristics which most affect emissions (Exh. AG-60). The Company further indicated that other characteristics of coal -- e.g., its heat value, ash content and moisture content -- would be important to the design of the boiler (Tr. 10, p. 75).

139/ EEC indicated that criteria pollutants are those for which the EPA has set NAAQS (Exh. HO-2A, p. 5-21).

140/ The Company stated that maximum hourly emission rates were based on operation at 105 percent of boiler capacity and that annual emission estimates were based on 92 percent plant availability at 100 percent boiler capacity, which corresponds to an annual coal firing rate of 1,102,703 tons of coal (Exhs. HO-E-38, HO-E-97).

141/ The Company stated that, as part of its PSD application, the Company is required to demonstrate that the proposed facility's air pollutant emissions for all pollutants (footnote continued)

EEC indicated that criteria pollutant emission rates are interdependent such that adjustment of controls for one pollutant may increase the emission rate of another (Exh. HO-12B, pp. F.2-4, F.2-6, F.2-7). The Company explained that adjustment of operating conditions in order to reduce NOx emissions could have an adverse effect on emissions of SO_2, CO and VOCs (id.).

The Company stated that original decisions regarding emission rates, i.e., the decision that the SO_2 emission rate would be 0.25 lb/MMBtu rather than 0.5 lb/MMBtu or 0.12 lb/MMBtu, were made by EEC based on air quality standards, emission rates from other plants, and permit levels set by other agencies (Tr. 10, p. 105, Tr. 11, pp. 47-48). The Company further stated that these decisions were then discussed with the Generating Company and reviewed by BPC to ensure that such rates would be achievable (Tr. 10, p. 105, Tr. 11, p. 48).

EEC maintained that its assumptions regarding annual emission rates were conservative in that they were based on 92 percent plant availability, whereas actual plant availability is expected to be closer to 85 percent (Tr. 4, pp. 80, 118). Finally, the EEC stated that it would obtain guarantees for pollutant emission rates from the boiler vendor at the time of boiler selection (Tr. 10, pp. 91-92).[142]

(footnote continued) regulated by the PSD program would be controlled by BACT (Exh. HO-2A, p. 5-16). The Company defined BACT as the emission level that MDEP determines to be achievable for each regulated pollutant emitted from the facility through the application of control techniques (Exh. AG-28, p. 3-9). The Company indicated that BACT requirements are intended to ensure that a proposed facility's control systems represent the latest control technology, while taking into account energy, environmental and economic impacts and other costs (id.).

142/ EEC asserted that its emission estimates are actually emission guarantees in that the MDEP would not allow the facility to begin commercial operation unless all measured emissions, as indicated during facility start-up testing, were at or below the levels set forth in the Draft Environmental Impact Statement and air permit application (Exh. HO-E-12A, p. 3-69). The Company stated that, in addition, the facility (footnote continued)

(A) SO_2 Emissions

EEC stated that SO_2 emissions would result from the combustion of sulfur in the coal (Exh. HO-2A, p. 5-21). The Company stated that the quantity of sulfur in the coal directly determines the uncontrolled emission rate for SO_2 (id., p. 5-20, Exh. HO-E-99).[143] EEC stated that SO_2 emissions would be minimized by injection of limestone into the fluidized bed (Exh. HO-2A, pp. 5-21, 5-23).[144]

EEC predicted that an emission rate of 0.25 lb/MMBtu[145] would be achieved by injection of limestone into the combustion chamber and use of medium sulfur coal with a maximum sulfur content of 1.8 percent (Exh. AG-28, pp. 5-50 through 5-54). EEC stated that at this emission rate, approximately 91 percent of the potential SO_2 emissions would be removed (id., p. 5-51).[146]

(footnote continued) would be required to install continuous emission monitors for key pollutants, most likely SO_2, NOx, CO and opacity, which is a surrogate for PM (id.).

143/ The Company's witness, Mr. Smith, testified that the Company's RFP for coal supply specifies coal sulfur content ranging from 1.72 to 1.76 percent (Tr. 9, p. 83). He noted that the quality of the coal ultimately would be monitored by both the coal supplier and the Company (id., pp. 90-91).

144/ The Company stated that the injection of crushed limestone into the combustor for desulfurization is a fundamental characteristic of the CFB technology (Exh. AG-28, p. 5-38). The Company stated that, when heated, the calcium in the limestone would react with the SO_2 to form gypsum, a stable solid byproduct that would be removed as particulate matter by the fabric filter baghouse (id., Exh. HO-2A, p. 2-42).

145/ EEC stated that an SO_2 emission rate of 0.25 lb/MMBtu would comply with NSPS and MDEP SO_2 emission limits (Exhs. HO-2A, Table 5.4-2, HO-2B, Table F.1-6).

146/ EEC stated that sulfur removal depends on the physical characteristics of the coal and limestone, the ratio of calcium to sulfur and operational variables such as bed temperature (Exh. AG-28, p. 5-50). The Company further stated that, although it anticipates 91 percent sulfur removal, the actual percentage removal and calcium to sulfur ratio that would correspond to an emission rate of 0.25 lb/MMBtu cannot be (footnote continued)

As a possible means to further decrease SO_2 emissions to 0.08 lb/MMBtu, the Company evaluated downstream flue gas desulfurization (id., pp. 5-39 through 5-50). EEC concluded that this technology (1) would not be cost effective, and (2) would result in negative environmental impacts related to water supply requirements (id.).

EEC maintained that control measures to achieve an SO_2 rate of 0.25 lb/MMBtu: (1) would be cost effective; (2) would have no negative environmental impacts; and (3) would be consistent with the approved levels of control for other CFB units using low to medium sulfur coal (id., pp. 5-39, 5-52).

Although EEC indicated that the SO_2 emission rate could be lowered through the use of lower sulfur coal, EEC stated that it did not consider using low sulfur coal in the proposed facility (Tr. 4, p. 82, Tr. 11, p. 47).[147]

(B) NOx Emissions

The Company stated that NOx would form during fuel combustion by oxidation of nitrogen in the coal and nitrogen in the combustion air (Exh. HO-2A, p. 5-23). The Company stated that NOx formation would be inhibited by the relatively low combustion temperature of the CFB boiler (id.).

(footnote continued) determined until boiler testing is conducted with the specific coal and limestone that will be utilized (id., p. 5-51).

In addition, EEC noted that approximately 90 percent sulfur removal is the practical limit that can be achieved with medium sulfur coal (id., p. 5-38). The Company further noted that increasing the amount of limestone would have only a minor impact on SO_2 emissions (id.).

147/ The Company's witness, Mr. King, stated that CFB technology lends itself to use of higher-sulfur coal than other coal-firing technologies in that SO_2 is captured before it is emitted from the stack without the use of add-on control technologies (Tr. 10, pp. 81-82, Tr. 4, p. 12). He further stated that lower sulfur coals generally would be used with pulverized coal boilers (Tr. 10, p. 81).

EEC predicted that NOx emissions of 0.30 lb/MMBtu[148] would be achieved by staged combustion within the CFB boilers (Exh. AG-28, p. 5-9).[149] As a possible method of further decreasing NOx emissions, the Company evaluated (1) post-combustion injection of ammonia or urea,[150] and (2) combustion optimization (id., p. 5-21).[151]

EEC concluded that, due to the lack of long-term operating and maintenance data for ammonia and urea injection on large coal fired CFB boilers, it did not consider either technology to be a fully proven NOx control technique (id., pp. 5-26, 5-29).[152]

However, EEC also concluded that advanced combustion optimization potentially could reduce NOx emission levels while avoiding the increased operating and capital costs of add-on technology (id., p. 5-37; Tr. 4, pp. 95-96).

Therefore, the Company proposed an emission rate of 0.30 lb/MMBtu for the first three years of operation with a

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148/ EEC stated that a NOx emission rate of 0.30 lb/MMBtu would comply with NSPS and MDEP NOx emission limits (Exhs. HO-2A, Table 5.4-2, HO-2B, Table F.1-6).

149/ EEC indicated that staged combustion refers to the introduction of the combustion air into separate sections of the boiler (Exh. AG-28, p. 5-9).

150/ The Company explained that ammonia and urea injection are post-combustion control technologies that reduce NOx emissions by chemical reaction (Exh. AG-28, pp. 5-21, 5-27).

151/ EEC explained that combustion optimization refers to burning of carbon in the coal as completely as possible (Tr. 4, p. 95, Tr. 10, p. 76). The Company stated that operating factors that can be adjusted in order to optimize the combustion process include the quantity and location of air that is injected into the boiler (Tr. 10, pp. 103-104).

152/ EEC maintained that, although urea injection currently is used in smaller CFB plants, it has not been commercially proven on plants of the size of the proposed facility (Tr. 4, p. 101).

subsequent reduction in the emission rate (Exh. AG-28, p. 5-37). EEC stated that it would attempt to optimize the combustion process during the first three years of facility operation in order to achieve a lower emission rate (id.). Specifically, EEC stated that a reduction of 0.12 lb/MMBtu in NOx emissions, from 0.30 lb/MMBtu to 0.18 lb/MMBtu, would be achievable as a result of combustion optimization (Tr. 10, p. 98).[153] In the event that such a lower emission rate could not be achieved with combustion optimization, EEC stated that it would install post-combustion injection of ammonia or urea (Exh. AG-28, p. 5-37).[154] EEC stated that it would install either of these control technologies provided that (1) data from similarly sized CFB boiler units utilizing these controls clearly demonstrate that reduced NOx rates are consistently achievable, and (2) the data from similarly sized plants clearly demonstrate that use of these control technologies does not result in high levels of ammonia emissions or increases in the emissions of other pollutants above allowable levels (id.).

The Company indicated that three- to five-years of operating data from CFB boilers sized from 80 MW to 100 MW would be reasonable in order to evaluate the effectiveness of post-combustion injection of ammonia or urea (Tr. 6, pp. 28-29). The Company noted that at present there are no CFB facilities of the size of the proposed facility operating with ammonia or urea

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153/ Although the Company's BACT analysis indicates that combustion optimization potentially would reduce NOx emissions to 0.18 lb/MMBtu, the BACT analysis does not specify an emission rate that the Company proposes to achieve (Exh. AG-28, pp. 5-29, 5-37). In addition, two of the Company's witnesses stated that a specific lower emission rate was not proposed (Tr. 6, p. 26, Tr. 10, pp. 97-98). However, in its initial brief, the Company stated that it proposes a BACT emission rate of 0.18 lb/MMBtu for NOx after three years of operation (EEC Initial Brief, pp. 117-118).

154/ Mr. King stated that if required by permit conditions, ammonia or urea injection can be incorporated into facility design prior to construction in order to minimize capital cost expenditures at later time (Tr. 10, p. 106).

injection (id., p. 29). However, the Company noted that ammonia or urea injection is included in the design of two proposed CFB facilities of comparable size to the proposed facility (Exhs. AG-32, AG-30, pp. 1-7, AG-151).[155]

(C) VOC Emissions

EEC stated that VOC emissions result from incomplete combustion of fuel and would be minimized by maintenance of proper combustion conditions in the boiler including thorough mixing of fuel and air (Exh. HO-2A, p. 5-24). EEC also stated that its proposed facility would emit no more than 0.007 lb/MMBtu of VOCs (id.).

EEC asserted that it was confident that the proposed facility would achieve the projected 0.007 lb/MMBtu emission rate for VOCs based on (1) a survey of VOC emissions from four existing and pilot plants, and (2) a statement from a boiler vendor who indicated a willingness to guarantee a VOC emission rate of 0.005 lb/MMBtu (Exhs. EEC-15, EEC-16; Tr. 10, pp. 5, 45). EEC stated that VOC emissions, unlike SO_2 emissions, are not determined from a direct calculation, but instead are dependent on combustion characteristics including the length of time that fuel has to combust in the boiler and the temperature and oxygen levels within the boiler (Tr. 10, pp. 23-25, 96). The Company further stated that VOC emissions are not dependent on the size of a facility, nor are VOC emissions easier to control in smaller facilities (id.). The Company noted that (1) VOCs are controlled by good combustion characteristics in the boiler, and (2) that there are no control devices that can be installed to further reduce VOC emission rates (Tr. 6, p. 25, Tr. 10, pp. 56-57).

155/ EEC indicated that ammonia or urea injection has been proposed for (1) a proposed 150 MW CFB facility in Taunton, Massachusetts and (2) the Halfmoon Cogeneration Project, a proposed 210 MW CFB facility in the Town of Halfmoon, Saratoga County, New York (Exhs. AG-32, AG-30, pp. 1-7, AG-151).

The Attorney General raised questions regarding the validity of the Company's proposed emission rate of 0.007 lb/MMBtu for VOCs, a rate which corresponds to 97 tons per year ("tpy") of VOCs (AG Initial Brief, p. 63; Tr. 12, pp. 105-112). The Attorney General stated that the Company did not account adequately for its derivation of the VOC emission rate, but instead supported this rate by (1) a letter from a vendor stating that it would guarantee this project at a VOC emission rate of 0.005 lb/MMBtu, and (2) data from other CFB plants which have VOC emission rates lower than 0.007 lb/MMBtu (AG Initial Brief, p. 63).

The Attorney General's witness, Dr. Mohr, questioned the Company's reliance on VOC emission data from other facilities (Tr. 12, pp. 108-112). He stated that the data was limited and irrelevant to the proposed facility due to the smaller size of the other CFB facilities (id.). Dr. Mohr noted that it is difficult to derive VOC emission rates for larger facilities from the rates for smaller facilities because a very small change in combustion efficiency can have a significant effect on VOCs, which result from very small imperfections in mixing in the combustion chamber (Tr. 12, pp. 108-112). The Attorney General further argued that the VOC emission rate is critical because a slightly higher rate, i.e., 0.0072 lb/MMBtu, would trigger additional regulatory requirements (id.).[156]

NO-COAL argued that VOCs are precursors to ozone and that the Company's estimated emission rate of VOCs is close to the threshold defining a "major source" (NO-COAL Initial Brief, p. 38). NO-COAL stated that the new federal Clean Air Act may require VOC emissions to be reduced to 50 tpy or to be offset by the purchase of credits by the Company (id., p. 39).

156/ The Company indicated that if VOC emissions were greater than 100 tpy, the proposed facility would be subject to a nonattainment review for VOCs under federal regulations, and, thus, would be required to attain emission offsets for VOCs, i.e., emission reductions from other sources. (Tr. 3, pp. 5-6).

(D) CO, Particulate, and Lead Emissions

EEC stated that CO emissions result from incomplete combustion of fuel and would be minimized by maintenance of proper combustion conditions in the boiler including thorough mixing of fuel and air (Exh. HO-2A, pp. 5-23, 5-24). EEC stated that the proposed facility would emit 0.15 lb/MMBtu of CO (id.).

The Company stated that particulate emissions would result primarily from ash, unburned carbon, limestone reaction products and unreacted limestone (id., p. 5-21). EEC stated that particulate emissions would be limited by use of a fabric filter baghouse (id.).[157] The Company indicated that the proposed facility would emit 0.02 lb/MMBtu of particulates (id.).[158]

Finally, EEC stated that lead emissions would result from the lead content of the coal (id., p. 5-24). EEC stated that lead would adsorb to particulate surfaces and that lead emissions would thus be minimized by the fabric filter baghouse (id.). The Company stated that the proposed facility would emit 0.0019 pounds of lead per hour (id.).

157/ The Company stated that flue gas would be exhausted from each boiler through a fabric bag which would retain particulate matter on its outer surface (Exh. HO-2A, p. 2-11). The Company stated that, upon reaching a preset thickness of particulate build-up, a cleaning cycle would be initiated (id.).

In addition, EEC explained that, although the amount of limestone injected into the boiler to control SO_2 emissions affects the formation of particulates, the design and operation of the baghouse would prevent an increase in particulate formation from causing an increase in particulate emissions (Tr. 4, pp. 8-9, 69-70, 88-89). EEC stated that, therefore, even if it was necessary to adjust anticipated limestone usage in order to achieve the proposed SO_2 emission rate, particulate emissions would not increase (id.).

158/ The Company indicated that a PM emission rate of 0.02 lb/MMBtu would comply with NSPS emission limits (Exhs. HO-2A, Table 5.4-2, HO-2B, Table F.1-6)

ii. Other Pollutants

In addition to criteria pollutants, EEC stated that the project would emit non-criteria pollutants that are regulated under the PSD program, trace pollutants that are regulated under the MDEP air toxics program and CO_2 (Exhs. HO-2A, pp. 5-24, 5-27 through 5-29, HO-E-29).

In regard to non-criteria pollutants that are regulated under the PSD program, EEC stated that the proposed facility would emit small amounts of: (1) sulfuric acid mist; (2) fluorides; (3) mercury; and (4) beryllium. Further, the Company stated that the proposed facility would emit negligible amounts of: (1) asbestos; (2) vinyl chloride; (3) hydrogen sulfide; (4) total reduced sulfur; and (5) reduced sulfur compounds (Exh. HO-2A, pp. 5-24, 5-27). In regard to trace pollutants that are regulated under the MDEP air toxics program, the Company stated that the proposed facility would emit: antimony, arsenic, barium, cadmium, chromium, copper, manganese, nickel, selenium, thallium, vanadium, zinc, benzene, formaldehyde, hydrogen chloride and polycyclic aromatic hydrocarbons ("PAH") (id., pp. 5-28, 5-29, Exh. EEC-28).

EEC estimated the emissions from the proposed facility of non-criteria pollutants and trace pollutants based on a review of available literature on emissions from fluidized bed combustion systems using comparable coal (Exh. HO-2A, pp. 5-24, 5-27 through 5-29).[159] EEC stated that most of the non-criteria pollutants and trace pollutants would adhere to particulate surfaces and, therefore, would be controlled by the fabric filter baghouse (Exhs. AG-28, p. B-11, HO-1A, p. 144).

With regard to CO_2 emissions, the Company stated that the formation of CO_2 is dependent on the carbon content of the coal and heating of the limestone (Tr. 10, pp. 123-124). The Company indicated that the proposed facility would emit

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159/ EEC stated that potential coal suppliers would be required to provide information regarding the trace element content of their coal which would then be reviewed by project engineers (Tr. 9, pp. 94-95).

approximately 720,000 pounds per hour of CO_2 at 100 percent load (Exh. HO-E-29). The Company further indicated that there are no post-combustion technologies that would minimize CO_2 emissions (Exh. HO-E-109).

iii. Analysis

The record indicates that EEC projected air pollutant emission rates based on both the specific features of the proposed facility and data for similar equipment and facilities. The Company based its air emission rates on the type of coal that will be utilized in the proposed facility, the design and operation characteristics of the proposed facility, information from equipment vendors, the Company's experience with existing facilities, and air permit data regarding existing facilities.

In addition, the Siting Council notes that EEC projected relatively high annual emission rates since such projections were based on a higher than expected plant availability. The Siting Council also notes that the Company will receive guarantees for its projected emission rates from boiler vendors at the time it selects a boiler.

With regard to the Company's projected VOC emission rate, the Siting Council finds that the Company's reliance on vendor information and data regarding existing facilities is reasonable. In making this finding, we recognize that (1) VOC emissions cannot be calculated directly from fuel and equipment, and (2) use of vendor information and data regarding existing facilities is consistent with the Company's method of projecting emission rates.

In sum, the Siting Council finds that EEC's analyses for determining air pollutant emission rates for the proposed facility are reasonable, adequate, and based on conservative assumptions. In addition, the Siting Council notes that these rates will be supported by vendor guarantees. Accordingly, the Siting Council finds that the Company's methodology for estimation of air pollutant emission rates is acceptable.

b. Impacts of Emissions on Air Quality

After determining the emission rates for all pollutants, EEC analyzed the impact of the proposed facility on the ambient air quality of the surrounding area (Exh. AG-28, Sections 6,7). EEC used a mathematical dispersion model in order to estimate the air quality impacts of facility emissions and then added facility impacts to background concentrations in order to determine the air quality impact of the proposed facility (id., Exh. HO-1A, p. 152).[160] The Company indicated that MDEP has determined that the Company's modeling methods are appropriate for determining the potential ambient impacts of the proposed facility (Exh. AG-RR-30; Tr. 6, p. 5). Based on the results of its analyses, EEC argued that air quality inputs from its proposed facility are acceptable (EEC Initial Brief, pp. 107-108).

i. Description

EEC asserted that the results of its air quality impact analysis demonstrate that the operation of the proposed facility would be in compliance with all federal and state air quality standards (Exh. AG-28, p. 7-1).

With regard to compliance with the PSD regulations, EEC stated that PSD review was required for PM, SO_2, NOx, CO,

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160/ EEC stated that it utilized the EPA's Industrial Source Complex short-term ("ISCST") mathematical dispersion model (1) to simulate the transport and dilution of the facility emissions, and (2) to calculate expected ground level concentrations at specified receptors (Exhs. HO-2A, p. 5-34, AG-28, p. 6-6). EEC noted that the calculation of ground level concentrations was based on the height, rate, velocity and temperature of the pollutant emissions, and the effect of meteorological factors and topographical influences on the dispersion of such emissions (Exh. HO-2A, p. 5-34).

beryllium, mercury and flouride emissions (Exh. HO-2A, pp. 5-32, 5-33).[161,162] The Company asserted that its analysis demonstrated that the expected increases in the ambient air concentrations for PM, SO_2, and NOx emissions would consume one-fifth or less of allowable PSD increments, i.e., the increases in ambient concentration levels that cannot be exceeded for each pollutant (id., p. 5-55; Tr. 1, pp. 191, 194). EEC noted that PSD increments have been established only for SO_2, PM and NOx (Exh. HO-2B, p. F.1-12). See Table 6.

With regard to compliance with the NAAQS, EEC stated that its NAAQS compliance analysis indicated that the impact of the facility for each criteria pollutant would be well below the NAAQS (Exh. HO-2A, p. 5-57).[163] See Table 7.

161/ EEC stated that the PSD review requirements are triggered on a pollutant-specific basis for criteria pollutants if (1) the regional ambient air quality either meets the NAAQS or is unclassified with regard to the NAAQS, and (2) the emission rate is above a de minimis threshold rate (Exh. HO-2B, pp. F.1-5, F.1-6). The Company also stated that PSD review requirements are triggered for other PSD regulated pollutants -- those that are not criteria pollutants -- if the emission rate is above a de minimis threshold rate (id.).

With regard to the proposed facility, the Company stated that the New Bedford region is designated as meeting the NAAQS for NOx, SO_2, and CO and is unclassified for PM (id., pp. F.1-5, F.1-6). The Company also stated that emission rates of NOx, SO_2, CO, PM, fluorides, mercury and beryllium will exceed the de minimis thresholds (id.). Thus, PSD review was required for PM, SO_2, NOx, CO, beryllium, mercury and fluoride emissions.

162/ EEC indicated that the the entire state of Massachusetts does not meet the NAAQS for ozone and, as such, the proposed facility was not subject to PSD review for VOCs which are precursors to ozone formation (Exh. HO-2A, p. 5-17). The Company stated, however, that a nonattainment review, which would require emission offsets for VOCs, would have been triggered by VOC emissions in excess of 100 tpy (id.; Tr. 3, p. 5).

163/ EEC stated that modeling of other major background sources located in southeastern Massachusetts was required for the PSD and NAAQS compliance analysis for (footnote continued)

With regard to compliance with MDEP guidelines, EEC stated that its analysis demonstrated (1) compliance with the MDEP air toxics ambient guidelines such that all trace pollutant concentrations would be well below respective 24-hour and annual limits,[164] and (2) compliance with the one-hour NOx concentration limit (Exhs. EEC-28, HO-2A, pp. 5-53, 5-57).[165] See Table 8.

Finally, with regard to CO_2 emissions, EEC asserted that estimated CO_2 emissions from the proposed facility would have an insignificant impact on global CO_2 concentrations because facility emissions would contribute less than one percent to the total United States emissions from coal-fired facilities (Exh. HO-E-12A, p. 3-39). However, the Company stated that it would participate voluntarily in the Massachusetts Releaf Program which is designed to encourage planting of trees and seedlings to counter any effects of CO_2 emissions related to global climate changes (Exh. HO-E-109). EEC did not specify the extent of its participation in the Massachusetts Releaf Program nor did it provide any information regarding the cost of participation. EEC noted that about 1.1 million acres of trees would need to be planted in order to

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(footnote continued) three-hour and 24-hour SO_2 concentrations (Exh. HO-2A, pp. 5-53, 5-55). The Company stated that this requirement was triggered by the three-hour and 24-hour SO_2 concentrations which exceeded significant impact levels ("SILs") (id.). The Company noted that SILs are concentration thresholds established to determine the appropriate level of air quality analysis and generally are set at levels which are less than one-twentieth of the ambient air standards (Exhs. HO-2B, p. F.1-14, HO-E-27).

164/ EEC stated that, as part of the air toxics program, the MDEP has derived 24-hour threshold effects exposure limits ("TELs") and allowable ambient limits ("AALs") for compounds not covered by the NAAQS (Exhs. HO-2A, p. 5-53, HO-E-111). The Company noted that AALs are health-based values derived to protect the public health (Exh. HO-E-111).

165/ The Company stated that a source interaction analysis was required to estimate total one-hour NOx concentrations since the proposed facility impact would exceed the SILs that MDEP recognizes for one-hour NOx concentrations (Exh. HO-2A, p. 5-57).

compensate for the total estimated CO_2 emissions from the proposed facility (Exh. NC-RR-1).[166]

In summarizing the impact of the proposed facility on air quality, EEC stated that the impact would be (1) less than two percent of the ambient standard and less than 10 percent of the existing background air quality level for each criteria pollutant, and (2) less than 30 percent of the annual allowable concentration limit for each non-criteria pollutant and each trace pollutant, and in most cases, less than one percent of the annual allowable limit for each such compound (Exhs. AG-28, p. 7-1, HO-E-12A, p. 3-25). Thus, EEC concluded that the operation of the proposed facility would result in an unmeasurable increase over current air pollution levels (Exh. AG-28, p. 7-1).[167] The Company added that the operation of the facility would not preclude the siting of other major sources in the area (Exh. HO-2A, pp. 5-53, 5-55).

ii. Arguments of the Parties

During the course of the proceeding, the Attorney General raised concerns regarding the impact of the SO_2 and NOx emissions from the proposed project and recommended that the Siting Council require the Company to adopt additional mitigation measures (AG Initial Brief, pp. 52-62). The Attorney General maintained that, even though facility emissions would

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166/ The Company's estimate assumes that approximately 150 trees can be planted on an acre of land (Exh. NC-RR-1).

167/ EEC stated that maximum facility impacts for the one- and three-hour averaging periods generally would occur along low hills which are located about one kilometer to the northwest of the proposed facility, while those for longer averaging periods would likely occur along the hills to the southwest of the proposed facility, beyond the Acushnet Cedar Swamp State Reservation (Exh. HO-2A, p. 5-45). EEC added that the maximum facility impacts in the residential areas to the east of the proposed facility would be 40 to 60 percent of overall maximum facility impacts, thereby causing no threat to public health in these potentially sensitive areas (id.).

satisfy federal and state air quality standards, the proposed facility would not meet the Siting Council's statutory minimum-environmental-impact standard because the Company has not taken all reasonable steps to minimize SO_2 and NOx emissions (id.).

Specifically, the Attorney General argued that the impacts of SO_2 emissions were not acceptable because the Company did not investigate the use of lower sulfur coal as a means of reducing SO_2 emissions (id., pp. 54-55). The Attorney General stated that the record demonstrates that (1) SO_2 emissions from a number of coal-fired plants in the United States, on the same scale as the proposed facility, have SO_2 emission rates lower than those proposed by EEC, and (2) there are Massachusetts energy facilities currently using coal with a lower sulfur content than the coal EEC proposes to use (id., p. 54). The Attorney General further stated that use of lower sulfur coal would also reduce the amount of solid waste produced by the proposed facility (id., p. 57).

With regard to NOx emissions, the Attorney General contended that the Company's decision to rely solely on the CFB boiler technology for NOx control fails to minimize NOx emissions (id., p. 58). The Attorney General stated that the record demonstrates that injection of urea or ammonia, both of which have been used or proposed for coal-fired plants as a means of reducing NOx emissions, should be included in the design of the proposed facility. The Attorney General argued that without one of these additional control technologies, the facility's NOx emissions will not be consistent with the Siting Council's statutory minimum-environmental-impact standard (id.).

Finally, the Attorney General asserted that VOC emissions should be limited to 0.005 lb/MMBtu (id., p. 64). The Attorney General argued that the Siting Council should hold the Company to this emissions level as it is the only VOC emission rate substantiated in the record (id.).

NO-COAL argued that the quantity of emissions from the proposed facility is significant in light of existing conditions

and air quality regulations (NO-COAL Initial Brief, pp. 30-37). NO-COAL states that the predicted emissions of CO_2, SO_2, and NOx are significant in light of (1) global warming; (2) state mandated decreases in acid rain and ozone; and (3) the federal Clean Air Act (id., pp. 30-32, 36). NO-COAL further contended that particulate emissions, which will contain a number of pollutants, will affect a number of residential areas (id., pp. 39-40).

iii. Analysis

In this proceeding the four pollutants that raised particular concern regarding the impact on air quality were VOC, NOx, SO_2, and CO_2. The Siting Council discusses the impact of these pollutants below. Based upon the record in this case, the Siting Council finds that the other pollutants from the proposed plant would not add significantly to the existing air pollutant concentrations and are adequately minimized.

First, in regard to VOC emissions, the Siting Council does not accept the Attorney General's position that the VOC emission rate should be limited to 0.005 lb/MMBtu. We agree that controlling VOCs is critical, but the record simply does not support setting a limit at the level proposed by the Attorney General. However, because there is an interrelationship between VOC emissions and emissions of other substances, a inordinately low VOC limit might tend to cause emission levels of other pollutants to be elevated to unacceptable levels. In light of this, the Siting Council expects the Company to minimize the emission of VOCs to the greatest extent possible, without significantly degrading the facility's ability to control other pollutants. Further, the Siting Council notes that a VOC level in the 0.005 lb/MMBtu to 0.007 lb/MMBtu range would result in acceptable impacts. Therefore, the Siting Council ORDERS EEC to minimize the VOCs emitted from the proposed facility, consistent with the above levels, and to provide the Siting Council with documentation of the VOC emission rate guaranteed by the vendor ultimately

selected by EEC. Accordingly, the Siting Council finds that, upon compliance with the above ORDER, emissions of VOCs will be adequately minimized.

Second, with regard to NOx emissions, the Siting Council endorses, as a minimum requirement, the Company's decision to utilize combustion optimization during the first three years of facility operation as a means of reducing NOx emissions. However, the Siting Council has serious concerns about the Company's commitment to the use of ammonia or urea injection if combustion optimization fails to reduce NOx emissions significantly. The Company indicated that it would install ammonia or urea injection if three to five years of data from similarly-sized CFB facilities using these control technologies demonstrate that reduced NOx rates are achievable and emissions of other pollutants are not affected. However, the Company also has stated that that there are no similarly-sized CFB facilities currently using ammonia or urea injection. Thus, we are concerned that the performance data specified and required by the Company may not be available within three years of facility operation.

The record indicates that smaller-sized CFB facilities currently are using ammonia or urea injection as control technologies and that two proposals to construct similarly-sized CFB plants have included these technologies in their facility design. Moreover, the record indicates that the Company's decision not to pursue these control technologies was not based on cost considerations, and that the costs associated with either control technology are acceptable (see Section III.D., above).

Therefore, the Siting Council ORDERS the Company to utilize ammonia or urea injection in order to reduce NOx emissions after three years of facility operation, if combustion optimization does not achieve expected reductions of NOx emissions from 0.30 lb/MMBtu to 0.18 lb/MMBtu or lower. Accordingly, the Siting Council finds that NOx will be adequately minimized with the Company's compliance with the above ORDER.

Third, with regard to SO_2 emissions, the Siting Council shares the concern of the Attorney General that the Company has not demonstrated that SO_2 emissions have been adequately minimized in accordance with our least-cost, least-environmental-impact standard. The Company provided little information regarding its decision to utilize 1.8 percent sulfur coal, merely stating that 1.8 percent sulfur coal is the appropriate fuel for the CFB technology and that an emission rate of 0.25 lb/MMBtu can be achieved with this type of coal. The record does not indicate that the Company considered the use of coal with a sulfur content lower than 1.8 percent, even though the use of coal with a lower sulfur content clearly would result in reduced SO_2 emissions.

In addition, although there is some information in the record regarding the cost for different types of lower sulfur coal, these estimates were never documented or verified. Similarly, the Company's assertion that the cost of rail transportation for lower sulfur coal would be significantly higher than the cost of rail transportation for 1.8 percent coal was never documented or verified. Finally, the Company failed to provide an analysis of the impact of the cost of lower sulfur coal on the financiability of the proposed project or the marketability of the power for the proposed facility (see Section III.D, above).

In our opinion, the sulfur content of the coal to be burned is critical because it is directly related to SO_2 emissions. It is troubling that the Company did not explore fully the use of lower sulfur coal. As stated in Section E.1(b), above, a facility which minimizes environmental impacts is one which achieves an appropriate balance (1) among various environmental impacts, and (2) among environmental impacts, cost and reliability. Without a thorough analysis of the costs and emission rates for different types of lower sulfur coal, the Siting Council cannot assess whether the environmental impact of SO_2 emissions from the proposed facility is adequately minimized.

Therefore, based on the record in this proceeding at this time, the Siting Council finds that the Company has failed to establish that SO_2 emissions have been adequately minimized. However, the Siting Council recognizes that a comprehensive analysis of the availability, environmental impact and economic impact of lower sulfur coals may allow the Company to demonstrate that, with the use of 1.8 percent sulfur coal, SO_2 emissions will be adequately minimized. Should the Company provide a comprehensive analysis of the availability, environmental impacts, and economic impacts of the use of coal with a range of sulfur contents lower than 1.8 percent, the Siting Council will determine, within 120 days of the receipt of this information, whether the Company has established that the SO_2 emissions, as currently proposed, have been adequately minimized, or whether SO_2 emissions must be further minimized in order to meet the Siting Council's standard.[168]

This comprehensive analysis should contain a description of fuel acquisition strategies for a range of lower sulfur coals. The analysis for each such strategy should include: (a) the location of mines and reserves; (b) mine prices; and (c) transportation availability and costs. The analysis also should include emission rates for coal with different sulfur content as well as a consideration of the possibility of mixing 1.8 percent sulfur coal with lower sulfur coal. Further, the Company should provide financial analyses regarding the impact of the cost of different coals on the financiability of the project and the ability of the Company to market the power from the project. Finally, a summary of the information required above should be provided in a matrix format.

Fourth, with regard to CO_2 emissions, the record

168/ This condition does not preclude the Company from proposing to use a lower sulfur coal when it files its comprehensive analysis with the Siting Council. In fact, if the analyses performed by the Company indicate that a lower sulfur fuel would achieve an appropriate balance between minimizing SO_2 emissions and minimizing costs, it would be incumbent upon EEC to modify its proposal accordingly.

indicates that emissions from the proposed facility would be significant and that there are no control technologies that can be incorporated into facility design to minimize CO_2 emissions. Although the record indicates that the Company will participate voluntarily in the Massachusetts Releaf Program, the record does not indicate the extent of the Company's participation in this program or the costs involved.

In light of the lack of information on the record regarding the amount of CO_2 emissions that will be offset by EEC's participation in the Massachusetts Releaf Program and the associated costs, the Siting Council finds that the Company has failed to establish that CO_2 emissions have been adequately minimized. However, the Siting Council recognizes that a comprehensive analysis of the economic and environmental impacts of attaining a range of CO_2 offsets -- through participation in the Massachusetts Releaf Program or through other methods -- may allow the Company to demonstrate that, with its plan for attaining CO_2 offsets, CO_2 emissions will be adequately minimized. Should the Company provide a comprehensive analysis of the environmental and economic impacts of attaining a range of CO_2 emission offsets, the Siting Council will determine, within 120 days of the receipt of this information, whether the Company has established that the facility's CO_2 emissions have been adequately minimized or whether CO_2 emissions should be further minimized in order to meet the Siting Council's standard.

The comprehensive analysis provided by the Company should include the CO_2 emission offsets that would be achieved under its plan for participation in the Massachusetts Releaf Program and the associated costs. EEC also should analyze a range of CO_2 emission offsets that could be attained through participation in the Massachusetts Releaf Program or by other methods. The cost of attaining different levels of CO_2 emission offsets also should be provided.[169] The information

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169/ In requiring EEC to provide a comprehensive analysis supporting a plan for attaining CO_2 emission offsets, the Siting Council recognizes that it has never required (footnote continued)

provided by EEC further should include financial analyses regarding the impact of the cost of attaining different levels of CO_2 emission offsets on the financiability of the project and the ability of the Company to market the power from the facility. Finally, a summary of the information should be provided in matrix format.

In summary, the Siting Council, above, has made the following findings and orders concerning the impact of air emissions from the proposed facility:

(1) The Siting Council finds that pollutants from the proposed plant other that VOCs, NOx, SO_2 and CO_2 would not add significantly to the existing air pollutant concentrations and are adequately minimized.

(2) The Siting Council ORDERS EEC to minimize the VOCs emitted from its facility, consistent with expected emission levels of 0.005 lb/MMBtu to 0.007 lb/MMBtu, and to provide the Siting Council with documentation of the VOC emission rate guaranteed by the vendor ultimately selected by EEC. Based on the Company's compliance with the above ORDER, the Siting Council finds that emissions of VOCs would be adequately minimized.

(3) The Siting Council ORDERS the Company to utilize ammonia or urea injection in order to reduce NOx emissions after three years of facility operation, if combustion optimization does not achieve the expected reduction of NOx emissions from 0.30 lb/MMBtu to 0.18 lb/MMBtu or lower. Based on the Company's compliance with the above ORDER, the Siting Council finds that NOx emissions would be adequately minimized.

(4) The Siting Council finds that if (a) the Company provides a comprehensive analysis of the availability, environmental impact and economic impact of lower sulfur coal, and (b) the Siting Council determines, after review, that the use of 1.8 percent sulfur coal or a lower sulfur coal is

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(footnote continued) gas-fired facilities to implement measures offsetting CO_2 emissions. However, the level of CO_2 emissions from the proposed facility is two to three times the level of a comparable combined-cycle gas-firing facility.

consistent with the minimization of SO_2 emissions, then the proposed facility's SO_2 emissions, would be adequately minimized.

(5) The Siting Council finds that if (a) the Company provides its plan for attaining CO_2 emission offsets through participation in the Massachusetts Releaf Program or other methods and a comprehensive analysis of the economic and environmental impacts of attaining a range of CO_2 emission offsets, and (b) the Siting Council determines, after review, that the Company's plan for attaining CO_2 emission offsets or a different CO_2 emission offset plan is consistent with the minimization of CO_2 emissions, then CO_2 emissions would be adequately minimized.

c. Impact on Vegetation and Soils

In addressing the impact of air emissions from the proposed facility on vegetation and soils, EEC analyzed (1) the impact of emissions on plant species and soils located in the vicinity of the proposed facility, and (2) deposition of particulates in the Acushnet Cedar Swamp State Reservation (Exh. HO-2B, Sections F.5, F.6).

With regard to the impact of emissions on plant species, the Company compiled a list of 43 tree and shrub species[170] located in the vicinity of the proposed facility site and noted the level of sensitivity[171] of thirteen species to SO_2 and the level of sensitivity of four species to NOx (id., Table F.6-1). The Company stated that the SO_2 sensitivity of Atlantic White Cedar,[172] was not included in its list of tree

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170/ EEC noted that its listing did not include all Acushnet Cedar Swamp State Reservation species (Tr. 2, p. 72).

171/ The Company noted that species sensitivities are characterized as resistant, intermediate and sensitive (Exh. HO-2B, Table F.6-1).

172/ DEM indicated that approximately half of the swampland portion of the Acushnet Cedar Swamp State Reservation is dominated by dense stands of Atlantic White Cedar (Exh. DEM-1, p. 6).

and shrub species. EEC however, submitted an additional report which indicated that the white cedar, as opposed to the Atlantic White Cedar, was resistant to SO_2 (Exh. DEM-RR-2, Table B.2; Tr. 2, pp. 71-72).

The Company then compared the total concentration of SO_2, NOx, PM, CO, hydrogen fluorides, and lead resulting from background concentrations and facility emissions to plant damage thresholds and secondary NAAQS (Exh. HO-2B, Table F.6-2).[173] The Company concluded that predicted concentrations of these pollutants would be well below levels which have been shown to cause injury to vegetation (id., Section F.6).[174]

In addition, EEC stated that the threshold level for vegetative stress likely would be lower for combined pollutants (id., pp. F.6-10, F.6-11). Thus, the Company compared the combined predicted concentration of NOx and SO_2 to threshold levels that have caused injury to crop species and concluded that the combined predicted concentration also would be well below such threshold levels (id.).

In sum, the Company concluded that even the species most sensitive to air pollutants would not be affected by the emissions from the proposed facility (Tr. 2, pp. 12-13). The Company, therefore, determined that the Atlantic White Cedar,

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173/ EEC indicated that it determined plant damage thresholds for SO_2, NOx, CO, and hydrogen fluorides based on a literature review (Exh. HO-2B, p. F.6-4). The Company further indicated that secondary NAAQS are a separate class of ambient air quality standards that define levels of air quality necessary to protect soils, vegetation, wildlife and other aspects of public welfare (id., p. F.1-3).

174/ EEC indicated that, under certain meteorological conditions, the maximum ground level SO_2 impact for a one-hour averaging period would occur in the southern part of the Acushnet Cedar Swamp State Reservation (Exh. HO-12B, p. 3-48, Figure 3.5.3-24a; Tr. 3, pp. 121, 127). However, the Company indicated that SO_2 from the proposed facility would constitute approximately 10 percent of total SO_2 deposition (Tr. 3, p. 127).

which would be reasonably tolerant to air pollution, would not be affected by emissions from the proposed facility (id.).

With regard to emission impacts on soils in the vicinity of the proposed facility, EEC indicated that concentrations of pollutants would be well below secondary NAAQS and, therefore, facility emissions would not have a significant impact on area soils (Exh. HO-2B, pp. F.6-12, F.6-13).

Finally, the Company analyzed the impact of the deposition of particulates within the Acushnet Cedar Swamp State Reservation (id., pp. F.5-1, F.5-2, F.6-13).[175] The Company stated that total particulate deposition within the Acushnet Cedar Swamp State Reservation would be approximately three ounces per acre per year and that trace metal deposition would be approximately .01 ounce per acre per year (Tr. 3, pp. 127-128). The Company further stated that the resulting soil concentrations of pollutants would be less than naturally-occuring pollutant concentrations (id., p. 128).

DEM argued that, due to the close proximity of the Acushnet Cedar Swamp State Reservation to the proposed facility stack, it is probable that the air pollution plume would cause changes to the water quality, water chemistry, and wetland soils within the Acushnet Cedar Swamp State Reservation (DEM Brief, p. 2). In addition, DEM argued that air pollutants will directly impact Acushnet Cedar Swamp State Reservation vegetation (id.). DEM stated that, although there is no research data regarding the sensitivity of the Atlantic White Cedar to air pollutants, a number of Acushnet Cedar Swamp State Reservation vegetation species have been classified as sensitive

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175/ EEC indicated that deposition rates were based on the ambient air concentrations and deposition velocity (Tr. 3, p. 112).

to SO_2 or intermediately sensitive to SO_2 (id.; Exh. DEM-RR-2).[176] DEM stated that each plant and animal species present in the swamp is of equal importance in the ecosystem (DEM Brief, p. 2).

NO-COAL argued that the Acushnet Cedar Swamp State Reservation is within the significant impact area for SO_2 emissions (NO-COAL Initial Brief, pp. 36-37).

The Siting Council finds that EEC has established that the concentrations of air pollutants, which result from background concentrations and the emissions from the proposed facility, would not have a negative impact on even the most sensitive vegetative species in the vicinity of the proposed facility, including the Acushnet Cedar Swamp State Reservation. Further, the record provides no evidence that deposition of pollutants within the Acushnet Swamp will have a negative impact on the soils within the Acushnet Swamp.[177]

Based on the foregoing, the Siting Council finds that the operation of the proposed facility would have an acceptable impact on vegetation and soils.

d. Health Risk Assessment

The Attorney General argued that a health risk assessment should be performed for the proposed facility in order to assess the potential health risks associated with the facility, in

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176/ DEM stated that although the Company provided documentation to establish that the white cedar is resistant to increased SO_2 and ozone concentrations, it does not consider the white cedar to be analogous to the Atlantic White Cedar (Exh. DEM-RR-2; Tr. 12, pp. 68-69). DEM stated that the white cedar does not develop well in extremely wet conditions, that its range is more northerly and inland than that of Atlantic White Cedar, and that the two species do not respond to hydrologic and climatic conditions in the same way (Tr. 12, pp. 68-69).

177/ Run-off related impacts of the proposed facility on the Acushnet Cedar Swamp State Reservation are addressed in Section III.E.4.b, below.

particular, those risks associated with emissions of trace pollutants eventually deposited in media other than air (AG Initial Brief, p. 50).[178] The Attorney General stated that the direct human exposure to pollutants, (i.e., inhalation of compounds and ingestion of soil at predicted concentrations), as well as uptake into plants that eventually become part of the human food chain, should be evaluated in order to assess conclusively the potential health risks associated with the operation of the proposed facility (Tr. 12, pp. 48, 52, 55-59; Exh. AG-139, pp. 10-11).

The Attorney General further stated that, even though air emission rates and deposition rates from the proposed facility are low in comparison to other facilities where health risk assessments indicated emissions would not constitute significant risks to public health, a site-specific health risk assessment should be performed for this facility in order to account for local land use conditions (Tr. 12, pp. 57-59).

The Company responded that a health risk assessment regarding the emission of trace pollutants from the proposed facility should not be required because there is no evidence in the record to suggest that such emissions would pose a risk to public health (EEC Initial Brief, pp. 126-129). The Company stated that: (1) results of its air modeling analysis have more than adequately addressed potential impacts to air quality; (2) trace pollutants will be emitted in minute amounts; and (3) results of health risk assessments for a number of other facilities demonstrate that emissions from the proposed facility

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178/ The Attorney General's witness, Dr. Beck, defined a health risk assessment as the "characterization of the potential adverse health effects of human exposure to environmental hazard" (Exh. AG-139, p. 5). Dr. Beck noted that the components of a health risk assessment are: (1) hazard identification; (2) dose response assessment (an estimate of the amount of a chemical that is associated with different types and different levels of exposure); (3) exposure assessment; and (4) risk characterization (id., pp. 6-9).

would not constitute a significant risk to public health (id.).[179]

Finally, the Company stated that there are procedural reasons for the Siting Council to deny the Attorney General's request for a health risk assessment (id., p. 111). The Company further stated that if a health risk assessment were necessary in order for the Siting Council to determine whether the environmental impacts of the proposed facility would be acceptable, such a study should have been requested by the Siting Council during the course of the proceeding (id.).

The Siting Council notes that it addresses in all facility reviews the impact of a proposed facility on the surrounding population. It is clearly the responsibility of a proponent to address the question of the health effects of the emissions from a facility. Thus, the Siting Council rejects EEC's position that the Company does not have to make an affirmative showing regarding the health effects of the emissions from the proposed facility.

In this case, the Siting Council notes that the Company provided information indicating that the amount of toxic pollutants that will be emitted is minute and well below MDEP guidelines for AALs which were derived to protect the public health (see Section III.E.2.b.i, above). Further, the record in this case includes the results of health risk assessments for other facilities, including assessments that are reasonably current and one assessment that reflects a comparably sized proposed CFB facility, which support the view that the emissions

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179/ The Company noted that health risk assessments for two proposed CFB facilities, similar to the proposed facility, concluded that the increased cancer risk to the public was less than one in one million (Exhs. EEC-27, HO-SC-AG-11A; Tr. 12, pp. 46-47; EEC Initial Brief, p. 127). The Company further noted that a health risk assessment for a resource recovery facility in California, where emissions of arsenic, zinc and PAHs were higher than those of the proposed facility, concluded that the higher concentrations of arsenic, zinc and PAHs posed an acceptable risk to the public (Tr. 12, pp. 44-46; EEC Initial Brief, pp. 128-129).

from this proposed facility would not pose significant health threats. Therefore, based on this record, the Siting Council finds that a health risk assessment is not required for the proposed facility.[180]

e. Conclusions on Air Quality

The Siting Council has found that the Company's methodology for estimation of air pollutant emission rates is acceptable.

In addition, regarding the impact of air emissions from the proposed facility:

(1) The Siting Council has found that pollutants from the proposed plant other that VOCs, NOx, SO_2 and CO_2 would not add significantly to the existing air pollutant concentrations and are adequately minimized.

(2) The Siting Council has ORDERED EEC to minimize the VOCs emitted from the proposed facility consistent with expected emission levels of 0.005 lb/MMBtu to 0.007 lb/MMBtu, and to provide the Siting Council with documentation of the VOC emission rate guaranteed by the vendor ultimately selected by EEC. Based on the Company's compliance with the above order, the Siting Council has found that emissions of VOCs would be adequately minimized.

(3) The Siting Council has ORDERED the Company to utilize ammonia or urea injection in order to reduce NOx emissions after three years of facility operation, if combustion optimization does not achieve the expected reduction of NOx emissions from 0.30 lb/MMBtu to 0.18 lb/MMBtu or lower. Based on the Company's compliance with the above order, the Siting Council has found that NOx emissions will be adequately minimized.

180/ Even though a health risk assessment has not been required here, the Siting Council recognizes that in some cases a health risk assessment might be the best means of ascertaining a facility's impact on the public health. Therefore, the Siting Council, in future cases, may require the submission of a comprehensive health risk assessment.

(4) The Siting Council has found that if (a) the Company provides a comprehensive analysis of the availability, environmental impact and economic impact of lower sulfur coal, and (b) the Siting Council determines, after review, that the use of 1.8 percent sulfur coal or a lower sulfur coal achieves the appropriate balance based on our standard, then the proposed facility's SO_2 emissions will be adequately minimized.

(5) The Siting Council has found that if (a) the Company provides its plan for attaining CO_2 emission offsets through participation in the Massachusetts Releaf Program or other methods and a comprehensive analysis of the economic and environmental impacts of attaining a range of CO_2 emission offsets, and (b) the Siting Council determines, after review, that the Company's plan for attaining CO_2 emission offsets or a different CO_2 emission offset plan achieves the appropriate balance based on our standards, then CO_2 emissions will be adequately minimized.

Further, the Siting Council has found that the operation of the proposed facility would have an acceptable impact on vegetation and soils.

Finally, the Siting Council has found that a health risk assessment is not required for the proposed facility.

3. Noise Impacts

EEC asserted that operation of the proposed facility would meet all applicable governmental noise criteria and would not significantly impact the surrounding community (Exh. HO-2A, p. 5-105). The Company stated that MDEP guidelines limit noise increases above background levels to ten decibels at the nearest inhabited building and at the property line (Tr. 1, p. 31).[181]

181/ EEC stated that the railroad entity responsible for the delivery of coal and limestone and removal of ash would be subject to EPA noise regulations that limit the amount of noise associated with certain main line and rail yard activities, including locomotive operations, rail cars, and coupling operations (Tr. 1, p. 170).

The Company conducted an analysis of the noise impact of the proposed facility in which the Company: (1) predicted the operational noise levels associated with facility equipment; (2) predicted the resulting noise levels at residential and property line receptors; and (3) evaluated the impact of the predicted noise levels at the receptors (Exh. HO-2A, pp. 5-91 through 5-105).

EEC derived estimates of operational noise levels of facility equipment[182] from (1) the measured noise levels provided by vendors for specific equipment,[183] and (2) calculations based on average measurements of engineering parameters of comparable equipment (Tr. 1, pp. 41-43, 79-81). EEC explained that because newer equipment likely would have lower noise levels than older equipment, its use of average measurements of engineering parameters of comparable equipment led to conservatively high estimates of operational noise (id., pp. 79-81, 166). EEC noted that noise mitigation features, incorporated into the design of the facility, were reflected in its prediction of noise emissions (id., p. 168).

The Company stated that an additional significant source of facility noise would be locomotive operations during coal delivery (id., pp. 166-167). EEC stated that it derived noise emission characteristics of the locomotive from a study of railroad operations (Exh. HO-1A, p. 167).

In order to predict the noise levels resulting from facility operation, EEC first measured existing baseline noise at residential and property line receptors (Exh. HO-2A, pp. 4-103 through 4-114). Existing baseline noise was measured

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182/ EEC indicated that the principle sources of noise emissions from the facility would be: fluidizing air blower; rail car unloader; primary air fans; induced draft fans; secondary air fans; air cooled condenser; coal crusher; main transformer; and limestone crusher (Exh. HO-2A, Table 5.5-6).

183/ The Company indicated that it determined the noise level of the air-cooled condenser by scaling up representative vendor data for another smaller project (Tr. 1, pp. 41-42; Exh. AG-4; EEC Initial Brief, p. 134).

at the residence closest to the facility,[184] located within a low density residential area at a distance of 4,200 feet to the north of the facility stack, and at the northern, eastern and western property lines of the proposed facility (Exh. HO-2A, p. 4-107, Table 5.5-8).[185]

EEC stated that it measured existing baseline noise at each receptor on four weekdays during the months of August and September 1989 (Exh. HO-E-90).[186] Three to five measurements

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184/ EEC indicated that baseline noise measurements actually were not taken at the residence closest to the facility due to concerns of access, privacy and disturbance to residents (Tr. 1, pp. 112-113; Exh. HO-E-54). Instead, the Company stated that it monitored baseline noise at an alternate site within an undeveloped area to the south of the closest residence, where the Company asserted background noise would be comparable or lower (Exhs. HO-E-54, HO-RR-4; Tr. 1, pp. 113-122). However, the Company made little attempt to conduct noise surveys to verify that the background noise at the two sites would be comparable (Tr. 1, p. 118).

185/ EEC indicated that the northern property line receptor is located 1,900 feet from the facility stack, the eastern property line receptor is located 3,200 feet from the facility stack, and the western property line receptor is located 600 feet from the facility stack (Exh. HO-2A, Table 5.5-8).

186/ EEC asserted that it was not necessary to conduct additional seasonal and weekend monitoring in that winter weekend ambient noise levels would not vary significantly from measured levels (Exhs. HO-1A, p. 168, HO-E-56, HO-E-57; Tr. 1, pp. 129-132, 137-138). With regard to seasonal variations, EEC stated that although a number of noise-related factors change with the seasons, cold weather factors that would increase noise in winter, such as decreased foliage, would be offset by lower facility noise emissions resulting from reduced operation of the air cooled condenser (Exhs. HO-1A, p. 168, HO-E-57; Tr. 1, pp. 137-138).

With regard to weekday and weekend noise levels, the Company stated that background noise sources including insects, aircraft, traffic and continuous process industries such as the Polaroid facility, would not vary (Exh. HO-E-56; Tr. 1, pp. 130-132). However, the Company stated that it did not survey these industries contributing to background noise to determine whether, in fact, weekend operation is comparable to weekday operation (Tr. 1, pp. 130-132, 134). Mr. Croyle, however, did testify that Polaroid does not always operate on the weekend (Tr. 9, p. 104, Tr. 11, pp. 56-57).

were taken during daytime and nighttime hours at each receptor (Exh. HO-2A, Table 4.5-4).

EEC then incorporated the noise sources[187] into a point source propagation model which calculated increases in noise levels for nighttime and daytime hours, with and without coal delivery, at the various receptors (Exhs. HO-1A, p. 164, HO-2A, Tables 5.5-8, 5.5-9). The Company's preliminary analysis indicated that noise levels at the closest residence would increase: (1) by eight decibels during the nighttime;[188] (2) by six decibels during the daytime, without consideration of coal delivery; and (3) by eight or nine decibels during the daytime, with coal delivery, dependent upon location of the locomotive (Exh. HO-2A, Tables 5.5-8, 5.5-9).[189]

In addition, EEC's preliminary analysis indicated significant increases at the western and northern property lines (id.). The Company indicated that noise levels would increase by 25 decibels during the nighttime and by 24 decibels during the daytime at the western property line, and by nine decibels during the nighttime and by nine to seventeen decibels during the daytime at the northern property line (id.).

EEC stated that it subsequently updated its daytime noise analysis to reflect: (1) a revision in the plant layout which moved the facility to the north and west within the site;

187/ EEC indicated that facility noise was estimated based on maximum operating conditions for the proposed plant (Tr. 1, p. 92). The Company asserted that if the facility were to operate at 105 percent of maximum operating conditions, the resulting increase in noise emissions over maximum operating conditions would be less than one decibel (id.; Exh. HO-E-93).

188/ EEC indicated that coal delivery would take place only during daytime hours (Exh. AG-6; Tr. 1, p. 69).

189/ In addition, the Company measured ambient baseline noise at three other residential receptors located from 5,200 feet to 6,400 feet from the facility stack (Exh. HO-2A, Tables 5.5-8, 5.5-9). The Company estimated that the maximum increase at these residential receptors would be five decibels at night (id.).

(2) additional noise mitigation measures incorporated into facility design; and (3) noise propagation factors such as directivity effects (Exh. HO-RR-7). The revised noise analysis, for daytime hours, without consideration of locomotive noise, indicated that noise levels would increase by seven decibels at the closest residence and by 27 decibels at the western property line (id.).

EEC then evaluated the impact of the initially projected noise level increases at the closest residence (EEC Initial Brief, pp. 130-131). The Company stated that a nine decibel increase would be a doubling of loudness and would be noticeable outdoors but imperceptible indoors (Exh. HO-E-54). The Company further stated that, although an increase of nine decibels would be noticeable, such an increase would not annoy or adversely affect residents in that absolute noise levels still would remain below those levels found by the EPA to cause undue interference with activity or annoyance (EEC Initial Brief, p. 131; Exh. HO-RR-6, pp. 3-4; Tr. 1, pp. 158-159).[190]

EEC maintained that its noise analysis was based on a number of conservative assumptions and that resulting noise impacts, therefore, were overstated at the closest residence (Tr. 1, pp. 116, 118, 166, 177-178). EEC stated that the ambient noise is likely to be higher at the closest residence than at the monitored site and that actual facility noise levels are likely to be less than estimated levels (id., pp. 116, 118, 166, 177). In addition, the Company indicated that the actual tree buffer between the facility and closest residence is significantly greater than the tree buffer assumed in its noise

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190/ EEC stated that the increase of nine decibels would increase the estimated outdoor noise level at the closest residence from 35 to 44 decibels, which corresponds to indoor noise levels of 18 to 33 decibels (Exh. HO-2A, Table 5.5-a). EEC stated that resulting noise levels would remain within the EPA guidelines for residential areas, which, when expressed in comparable terms to the Company's noise estimates, are 49 decibels outdoors and 39 decibels indoors (Exh. HO-RR-6, p. 3; Tr. 1, pp. 161-163; EEC Initial Brief, p. 131).

analysis, which would lead to additional noise attenuation of approximately three to four decibels (Tr. 1, p. 178).

With regard to projected increases in noise levels above ten decibels at the property line, EEC asserted that MDEP guidelines would not apply due to the lack of public access to those areas (Tr. 1, pp. 30-31).[191] EEC stated that although additional noise mitigation could be incorporated into the design of the facility, the proposed noise measures represent the optimal balance between cost and noise impacts (id., pp. 88-90, 167-170; Exh. HO-RR-37; EEC Initial Brief, p. 137;).[192]

EEC argued that, based on current information published by the EPA, noise from the proposed facility would not have a negative effect on wildlife (EEC Initial Brief, p. 149). The Company's noise analysis indicated that the maximum noise level with the proposed facility would be 69 decibels at the western property line, which abuts an upland section of the Acushnet Cedar Swamp State Reservation (Exhs. HO-RR-7, HO-2A, Figure 4.5-8). The Company asserted that none of the wildlife species in the Acushnet Cedar Swamp State Reservation would be vulnerable to changes in noise level resulting from the proposed facility (Exhs. EEC-1, p. 2, HO-12A, p. 3-34).

The Attorney General argued that EEC's noise analysis failed to establish that the noise effects of the proposed plant would not pose a risk to sensitive receptors in the area (AG Initial Brief, p. 74). The Attorney General further argued that the noise analysis performed by the Company was inadequate because it (1) failed to utilize actual vendor data, and

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191/ The Company indicated that the Acushnet Cedar Swamp State Reservation is due west of the proposed facility site and that existing industry and undeveloped land lies to the north and northwest of the proposed facility site (Exhs. HO-2A, Figure 4.5-8, HO-E-11, HO-RR-36).

192/ The Company indicated that the cost of reducing the noise level from the proposed facility to ten decibels at the northern and western property lines would be approximately $15,000,000 (Exh. HO-RR-37).

(2) failed to analyze the entire receptor area, including the GNB Industrial Park (id.). He stated that the engineering data used for noise emission calculations was not project-specific and therefore could only bear a tangential relationship to the proposed operation of the plant (id., p. 75). He further stated that the Company's noise witness admitted it was better to utilize vendor-specific data (id., pp. 75-76).

Finally, the Attorney General argued that noise from the proposed facility would disrupt the behavioral habits of wildlife in the vicinity of the proposed facility (id., p. 78).

In past decisions, the Siting Council has reviewed estimated noise impacts of proposed facilities for general consistency with applicable governmental requirements, including the MDEP's ten decibel guideline. West Lynn, EFSC 90-102 at 97; MASSPOWER, 20 DOMSC at 85; Altresco-Pittsfield, 17 DOMSC at 48. In addition, the Siting Council has considered the significance of expected noise increases, which, although below ten decibels, may adversely affect existing residences or other sensitive receptors such as schools. Altresco-Pittsfield, 17 DOMSC at 48; NEA, 16 DOMSC at 402-403.

Here, the Siting Council has serious concerns regarding two areas of the Company's noise impact analysis: first, its estimate of background noise; and second, its analysis of the noise impacts from the proposed facility.

With regard to the estimate of background noise, the Siting Council finds that EEC generally did not utilize a comprehensive set of data and did not document its assumptions. Measurements of background noise were taken only during weekdays and only during one season. Further, the Company did not provide any documentation supporting its assumptions that background noise would not vary from weekday to weekend or from season to season. In fact, the Company's assumption that industries in the vicinity of the proposed facility are continuous process industries is inconsistent with the Company's own testimony that Polaroid does not operate on weekends. In

addition, while the Siting Council can accept that access problems may have made it difficult for EEC to measure background noise at the residence closest to the proposed facility, we are concerned that EEC failed to verify that the measurements of background noise taken at a proxy location are comparable to measurements at the closest residence.

With regard to the Company's analysis of noise impacts from the proposed facility, the Siting Council recognizes that a number of the assumptions used by EEC in its analysis were conservative, leading to an overstatement of predicted noise impacts. First, equipment noise emissions may be overstated because the Company utilized the midpoint of engineering data to predict equipment noise while actual equipment would be state-of-the-art.[193] Second, with regard to the closest residence, the Siting Council notes that the actual tree buffer between that residence and the facility would attenuate noise from the proposed facility to a greater degree than the tree buffer assumed in the Company's analysis.

Nonetheless, the Siting Council is concerned with the noise impacts of the proposed facility both at the nearest residence and the northern property line. Based on the Company's updated analysis, the expected daytime noise at the closest residence would increase by seven decibels without coal delivery. The Company's updated analysis, however, did not indicate the expected noise increase at the closest residence with locomotive noise associated with coal delivery. Without this critical information, the Siting Council cannot determine whether the noise would increase by ten decibels at the closest residence during coal delivery. A noise increase of this magnitude would be noticeable and possibly troublesome to residents.

Further, with regard to the northern property line, the Company predicted a daytime noise increase of nine to 17

193/ The Siting Council notes that the Company's use of engineering parameters to estimate noise characteristics of specific equipment was reasonable in that actual equipment for the facility has not yet been selected.

decibels. Although the Company asserts that the MDEP guideline of ten decibels would not be applicable at the property line due to the lack of public access, the Siting Council is concerned with a noise increase of this magnitude in the vicinity of existing industries and nearby undeveloped areas.

The Siting Council notes that there are methods of further reducing noise impacts. In fact, the Company provided one estimate for the costs of additional mitigation necessary to limit the noise increase to ten decibels at the property line (see Section III.D, above).

Accordingly, based on the record in this proceeding at this time, the Siting Council finds that the Company has failed to establish that noise levels have been adequately minimized. However, the Siting Council recognizes that the filing of (1) a revised analysis of the noise impacts of the proposed facility at the closest residence, and (2) a description of the various strategies the Company would use to further minimize noise impacts of the facility at the northern property line, could demonstrate that the presently proposed noise levels have been adequately minimized. Should the Company provide (1) a revised analysis of the noise impacts of the proposed facility at the closest residence, and (2) a description of the various strategies the Company would use to further minimize noise impacts of the facility at the northern property line, the Siting Council will determine, within 120 days of the receipt of this information, whether the Company has established that the noise levels of the proposed facility, as currently proposed, have been adequately minimized or whether noise levels must be further minimized in order to meet the Siting Council's standard.[194]

194/ This condition does not preclude the Company from proposing additional noise mitigation measures when it files its analyses with the Siting Council. In fact, if the analyses performed by the Company indicate that greater noise mitigation would achieve an appropriate balance between minimizing noise impacts and minimizing costs, it would be incumbent upon EEC to modify its proposal accordingly.

The analysis of the noise impacts at the closest residence should include the expected noise increase with locomotive noise during coal delivery. The description of strategies to further minimize noise impacts of the facility should include (1) various strategies to limit the noise increase at the northern property line, including a strategy to limit the noise increase at the northern property line to ten decibels; (2) resulting noise impacts, with locomotive noise, at the northern property line and the closest residence for each mitigation strategy; and (3) the cost of each mitigation strategy. Further, the Company should provide economic analyses regarding the impact of the cost of each mitigation strategy on the financiability of the proposed project and the ability of the Company to market the power from the proposed project. Finally, a summary of the information required above should be provided in matrix format.

4. Water Resources

EEC indicated that approximately one-third of the 282 acre site consists of forested wetlands and that an unnamed stream flows from north to south within the site (Exhs. HO-2A, p. 4-25, HO-E-12B, Appendix E, p. 3). In addition, EEC indicated that the Acushnet Cedar Swamp State Reservation, a federally designated National Landmark, abuts the southern and western boundaries of the site (Exhs. HO-2A, p. 4-11, HO-E-12A, p. 3-7, DEM-1, p. 6). The Company indicated that the Acushnet Cedar Swamp State Reservation includes (1) a wetland which abuts the southern boundary of the site ("Acushnet Swamp"), and (2) upland areas which abut the western boundary of the site (Exh. EEC-2, p. 3; Tr. 2, p. 33). EEC further indicated that the on-site wetlands drain into the Acushnet Swamp and, therefore, are connected hydrologically to the Acushnet Swamp (Exhs. HO-2A, p. 4-25, HO-E-12B, Appendix E, p. 4).

In this section, the Siting Council evaluates the construction and operation of the proposed facility with respect to (1) alteration of the on-site wetlands, and (2) indirect impacts on the on-site wetlands and the Acushnet Swamp.

a. Alteration of On-Site Wetlands

The Company asserted that the facility has been designed to minimize the permanent alteration of on-site wetlands (Exhs. HO-1A, p. 134, EEC-2, p. 2). The Company stated that avoidance of wetlands was a primary concern in determining the placement of the facility within the site (Tr. 2, pp. 22-23). EEC stated that all building activity would be concentrated on a 53 acre site in the northwestern corner of the parcel, in a predominantly non-wetland area (Exhs. HO-2A, p. 5-3, HO-E-12B, Appendix 3, p. 2). The Company stated that within the 53 acres, impervious building and parking areas would total nine acres and that no portion of the nine acres would be located in a resource area subject to protection under the Massachusetts Wetlands Protection Act ("MWPA") (Exh. EEC-2, p. 2).[195]

EEC stated that approximately one acre of wetlands would be filled to provide access to the proposed facility (Exh. HO-E-120; Tr. 2, pp. 35-36). Specifically, EEC stated that 0.9 acres of wetlands would be filled in order to construct the site access road and rail transportation spur along the northern border of the site and that approximately 1,000 square feet of wetlands would be filled for construction of the railyard to the east of the facility (Exh. HO-E-120).[196]

The Company indicated that the site access road, which would extend from an existing industrial park roadway, would

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195/ EEC stated that an isolated area of approximately one acre within the nine acres of building and parking areas accumulates water seasonally (Exh. HO-3A; Tr.2, pp. 110-115). The Company stated that this area is not a resource area under the MWPA, but likely would be classified as a wetland by the United States Army Corps of Engineers and be subject to that agency's "Section 404 nationwide permit" (Tr. 2, pp. 110-115).

196/ EEC stated that its original delineation of the wetland boundaries differed from the delineation of the New Bedford Conservation Commission ("NBCC"), but that it had later accepted the NBCC's delineation (Tr. 2, p. 21). The Company added that acceptance of NBCC's delineation did not affect the amount of wetlands that would be filled (id., p. 102).

traverse a wetland as it crosses the electric transmission line right-of-way ("ROW"), and then turn to the west to enter the site (Exh. HO-E-12B, site plan). EEC also indicated that the rail transportation spur would traverse the same wetland as well as the unnamed stream along the eastern edge of that wetland area (id.). The Company stated that no alternative road or rail access routes exist to the upland portions of the site, but that wetland impacts would be minimized by design and alignment of the site access road and rail transportation spur (Exhs. HO-E-68, HO-E-70, HO-2A, pp. 5-3, 5-4). EEC stated that the road and rail wetland crossing would be located in an area that previously has been disturbed by construction of the electric transmission line ROW and GNB Industrial Park roadway (Exh. EEC-2, p. 2; Tr. 2, pp. 36-37). EEC further indicated that the rail transportation spur and site access road would be constructed adjacent to each other on a common earth berm across the wetland and that the rail transportation spur would be constructed on a trestle bridge in order to cross the unnamed stream (Exhs. HO-E-12A, p. 1.2, HO-E-70, HO-E-83).[197]

EEC noted that additional measures incorporated into the project design to minimize wetland alteration will include: (1) elimination of a previously proposed access roadway to the Polaroid facility; (2) alignment of the rail transportation spur to the south of an isolated wetland that is located to the east of the facility site; and (3) location of the steam and condensate return pipes adjacent to the rail ROW (Exhs. HO-E-51, HO-E-52, HO-E-83, EEC-5, p. 2).

EEC stated that any reduction in the flood protection and hydrologic support functions of the altered wetlands would be

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197/ The Company stated that, since it filed its original petition, design changes and modification of the layout of the facility have reduced wetland alteration by more than 50 percent (Exh. EEC-2, p. 2). The Company explained that use of the trestle bridge and relocation of the facility and rail spur to the west have reduced wetland filling by approximately one acre (id.).

negligible due to (1) the small area that would be filled, and (2) the presence of significant downgradient wetlands that would act to buffer any off-site hydrologic impacts (Exh. HO-2A, p. 5-7). However, in order to mitigate the loss of wetland functions and to comply with the "no-net-loss" of wetlands policy of the state, EEC stated that it would replicate wetlands on the site (Tr. 2, pp. 58-59).[198] EEC noted that although plans for replication have not been finalized (1) the area of wetland replication will be greater than the area of wetland alteration, and (2) replication locations will be determined in conjunction with the NBCC and the MDEP (Exhs. HO-12A, pp. 1-21, 3-3, AG-RR-5, AG-24; Tr. 2, pp. 58-69, Tr. 6, pp. 136-138).

DEM argued that the filling of approximately two acres of state and federally recognized wetlands is a repudiation of the state's no-net-loss policy (DEM Brief, p. 1). Additionally, DEM argued that the Company did not submit evidence of other instances where forested wetlands, which are comparable to the on-site wetlands that would be filled, have been successfully replicated (id.).

CNB argued that construction of the proposed facility would require filling of portions of state and federally regulated wetlands, which are primarily forested wetlands (CNB Initial Brief, p. 2). In addition, CNB argued that although the Company proposes to replicate wetlands on site, information provided by the Company does not present clear evidence of any examples of successful replication of forested wetlands (id.). CNB further argued that the replicated wetlands may not fulfill the same functions as the existing wetlands (id.).

198/ The Company stated that it would replicate wetlands on the site even though it expects that wetlands replication would not be required (Tr. 2, pp. 58-59). EEC stated that the limited project provision of the MWPA, which is triggered when there is no alternative access to a site, would apply to the proposed project, and that MWPA, thus, would not require wetlands replication (id., p. 104, Tr. 6, pp. 121-123).

The Siting Council notes that the Company has attempted to minimize the alteration of the on-site wetlands by avoiding construction within wetlands wherever possible. EEC located the 53 acre portion of the 282 acre site within a primarily upland area, and designed the layout of facility components within the 53 acre preferred site to avoid construction within wetlands protected under the MWPA. Where alteration of wetlands could not be avoided, i.e., the rail and road access to the site, the Company designed such access so as to minimize wetland impacts.

In addition, the Siting Council notes that the Company indicated its intention to replicate forested wetlands on-site, on a greater than one-to-one basis, in order to mitigate the loss of wetland functions. However, the Company has not finalized its plans for the replication of wetlands.

Although the Company has minimized the amount of wetlands that would be permanently altered, the Siting Council notes that successful replication of wetlands is integral to the mitigation of the loss of important wetland functions, such as flood protection. Here, replication of wetlands can be monitored by the NBCC to ensure that such replication is successful in fulfilling important wetland functions. Therefore, the Siting Council ORDERS the Company to replicate wetlands on-site, in an amount greater than the amount of wetlands that will be altered. Final plans for the location and amount of replication as well as a plan for monitoring replication, should be developed in conjunction with the NBCC.

Accordingly, based on the foregoing, the Siting Council finds that with EEC's compliance with our ORDER to replicate wetlands, the alteration of on-site wetlands that would result from construction of the proposed facility will be acceptable.

b. Indirect Impacts to On-Site Wetlands and Acushnet Swamp

i. Arguments of The Parties

EEC asserted that construction and operation of the proposed facility would not adversely impact the on-site

wetlands or the Acushnet Swamp (Exh. EEC-2, pp. 2-4).[199]

EEC stated that potential indirect environmental impacts to the on-site wetlands and Acushnet Swamp could result from project-related changes in surface water run-off and ground water flows to the on-site wetlands and Acushnet Swamp (id., pp. 3-4). However, the Company asserted that the proposed project has been designed to maintain the pre-development hydrologic characteristics of the facility site, including drainage volumes, flowrates, and water quality during construction and operation of the proposed facility (id., Exh. HO-E-12B, Appendix E).

With regard to site drainage volumes and flowrates, the Company stated that its stormwater management plan ("stormwater plan") would control potential increases in site drainage runoff resulting from newly added impervious surfaces (Exhs. HO-E-12B, Appendix E, pp. 9, 10, EEC-2, pp. 3-4, EEC-5, p. 3). EEC stated that there would be no direct stormwater runoff from the site into wetland areas, but rather, runoff would be directed toward stormwater management basins which would "maintain peak runoff"[200] from the site (Exh. EEC-5, p. 3; Tr. 2, pp. 80-81). EEC stated that, in addition, percolation ditches would receive the outflow from the stormwater management basins in order to distribute flow to the wetlands uniformly (id.). The Company further stated that the proposed project would not withdraw any groundwater from the site, eliminating an

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199/ EEC stated that no development would occur within the boundaries of the Acushnet Swamp (Exh. EEC-2, p. 2). The Company, however, indicated that there would be no tree buffer for approximately 900 feet between the proposed facility site and an upland area of the Acushnet Cedar Swamp State Reservation (Tr. 2, pp. 78-80) (see Section III.E.7, below.). In addition, EEC indicated that with the revised layout of the proposed facility, the tree clearing line in the vicinity of the coal storage enclosure and rail spur extending to the south of the coal storage enclosure would be, in places, within ten feet or less of the on-site wetlands (Exh. HO-E-12B, attachments "Site Plan," and "Finish Grading Plan").

200/ The Company explained that maintenance of peak runoff would be equivalent to maintenance of existing conditions during a design storm (Exh. EEC-5, p. 3).

additional potential impact on the hydrology of the Acushnet Swamp (Exh. EEC-2, p. 4).

EEC indicated that, even with its stormwater plan, project development would cause minor changes in runoff from the site (Exhs. HO-E-119, EEC-46). The Company calculated that the average annual runoff to the Acushnet Swamp would increase by 0.09 cubic feet per second as a result of project development (id.).[201] However, EEC maintained that, due to the large surface area of the Acushnet Swamp, this incremental flow would have a negligible effect on the water level of the Acushnet Swamp (id.).

With regard to the quality of the water reaching the on-site wetlands and Acushnet Swamp, the Company asserted that its erosion and sedimentation plan, stormwater plan, and facility design would prevent potential pollutants from becoming waterborne during construction and operation of the facility (Exhs. HO-E-12B, Appendix E, pp. 8-10, 13, EEC-5, p. 3, AG-25). EEC stated that its erosion and sedimentation plan would prevent site erosion and resultant sedimentation of wetlands areas, during construction of the proposed facility (Exh. HO-E-12B, Appendix E, pp. 8, 13).[202]

The Company explained that pollutants that could potentially become waterborne during the operation of the proposed facility include oil and grease from roadway and parking areas, as well as coal, limestone and ash particulate (Exh. AG-25). However, the Company indicated that stormwater management basins would settle out sediments in the water and trap potential contaminants, including oil and grease (Exhs. HO-E-12B, Appendix E, p. 10, AG-25).

201/ EEC indicated that it accounted for the effect of a decrease in evapotranspiration due to tree clearing in its calculation of increased water flow to the Acushnet Swamp (Tr. 4, pp. 157-159).

202/ The Company indicated that the erosion and sedimentation plan consists of: (1) silt fences and straw bale diversion dikes to intercept sediment; (2) a system of swales, drainage ditches, culverts and grading to sedimentation basins to prevent siltation to wetland areas; and (3) construction management techniques (Exh. HO-E-12B, Appendix E, pp. 8, 17).

EEC indicated that additional mitigation features incorporated into the design of the proposed facility include (1) enclosure of all material transfer, storage and handling facilities, and (2) accident prevention measures (Exhs. AG-25, AG-26).[203] In addition, EEC indicated that: (1) operation of the proposed facility would require limited vehicular activity; (2) no herbicides would be used within the facility site or access areas; and (3) construction equipment would be located outside of wetland areas (Exhs. AG-25, DEM-RR-3; Tr. 2, p. 30).

The Company stated that the design of the stormwater plan is state-of-the-art for stormwater and sedimentation control and that EEC was confident that the plan would be effective (Exhs. E-123, AG-47; Tr. 2, pp. 48-49, Tr. 4, pp. 145-147). EEC initially stated that it did not plan to monitor the actual operation of the stormwater plan (Tr. 2, pp. 48-49, Tr. 4, pp. 145-147, Tr. 6, p. 145). However, during the course of the proceeding, the Company agreed to monitor the operation of its stormwater plan (Exh. AG-RR-6).[204]

In order to determine whether the proposed stormwater control structures are effective in trapping and containing potential waterborne contaminants from reaching on-site wetlands and the Acushnet Swamp, EEC stated that it would: (1) test

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203/ The Company stated that accident prevention measures include: (1) location of oil storage tanks within containment dikes with liners; (2) pits to collect transformer area oil leaks; and (3) enclosed storage and handling of materials (Exh. AG-26).

204/ The Company stated that, although it would be possible to monitor water levels and water quality within the Acushnet Swamp, such data would be ineffective in measuring the performance of the stormwater plan (Exh. AG-RR-6). The Company stated that due to the location of the Acushnet Swamp within an extensive watershed encompassing other land uses besides the proposed facility, it would be difficult to trace the actual source of contaminants (id.). The Company also stated that due to the size of the watershed (3,800 acres) in relation to the size of the developed site (53 acres), it would be difficult to distinguish normal hydrologic changes from those that would be associated with the facility (id.).

samples of water and sediment in three stormwater management basins shortly after construction of the facility is complete to establish a background data set;[205] (2) test water and sediment samples annually; and (3) compare annual test samples with the background data set and a list of potential compounds that could be released from the site (id.).

In order to determine whether the stormwater plan would adequately control and attenuate runoff flows from the site, EEC stated that it would measure flow rates in the stormwater management basins (id.). The Company stated that flow rates would be measured continuously during several representative storm events and would be compared with the discharge rates predicted by the model used to design the system (id.).

EEC further asserted that the operation of the proposed project would not have a harmful effect on the Atlantic White Cedar, the dominant tree species within the Acushnet Swamp (Tr. 2, pp. 11-13; Exh. DEM-1, p. 6). The Company stated that operation of the proposed project would not result in a measurable change in the water level of the Acushnet Swamp or particulate deposition within the Acushnet Swamp (Tr. 2, pp. 11-12; Exh. HO-2B, p. F-6-13). EEC further stated that a literature review indicated that the Atlantic White Cedar would be fairly tolerant of any water level changes (Tr. 2, pp. 11-12).

Finally, EEC asserted that although two rare species, the Heartleaf Twayblade, an orchid, and the Mystic Valley Amphipod,

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205/ The Company stated that it would test for compounds that would be associated with runoff resulting from impervious areas such as parking areas and roadways (Exh. AG-RR-6). In addition, the Company stated that it would test for compounds that could be associated with the storage and handling of coal, limestone, ash, and fuel oil, and with vehicular and rail traffic on the site (id.).

a crustacean,[206] are found within the Acushnet Swamp, the proposed facility would not have an adverse impact on either species (EEC Initial Brief, p. 148; Exh. HO-E-17).

In addition, EEC noted that the habitat of the Mystic Valley Amphipod also includes the unnamed stream on the site (Exhs. HO-2A, p. 4-39, EEC-2, p. 5). However, the Company asserted that the proposed facility would not impact Mystic Valley Amphipods in the unnamed stream because (1) a dense forested wetland buffer of approximately 450 feet would be maintained between the unnamed stream and the nearest structure, and (2) the stormwater plan would prevent potential contaminants from reaching the unnamed stream (EEC Initial Brief, p. 146; Exhs. HO-4, EEC-2, p. 5).

The Attorney General argued that the construction and operation of the proposed facility would result in serious impacts to the wetlands on the proposed site (AG Initial Brief, p. 65). The Attorney General stated that the Company failed to properly delineate the wetlands and failed to analyze completely the effects of construction and operation of the proposed facility on the wetlands (id.). The Attorney General further argued that the Mystic Valley Amphipod likely would be affected by changes in hydrology and chemical balance (id.). In addition, the Attorney General questioned the qualifications of the Company's wetlands witness (id.).

The Attorney General argued that the construction and operation of the proposed facility would result in serious impacts to the Acushnet Swamp vegetation and wildlife due to changes in hydrology, chemical balance and noise pollution (AG Initial Brief, pp. 65-67, 72-73).

The Attorney General argued that the continued existence of the Acushnet Swamp depends on a delicate balance of water

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206/ The Company indicated that the Massachusetts Natural Heritage Program has identified the Heartleaf Twayblade as an "endangered species" and the Mystic Valley Amphipod as a "special concern species" (Exh. HO-E-17).

which could be disturbed by industrial development of the proposed site (id., p. 66). The Attorney General further argued that the site provides an upland buffer for the wetland system and plays a key part in the hydrology of the Acushnet Swamp (id.).

The Attorney General agreed with DEM that the expected wetlands impacts are too great for the facility to be sited in the proposed location (id., p. 67). In addition, the Attorney General stated that information provided by DEM strongly demonstrates that minimal changes in the water level or chemical balance of the water in the Acushnet Swamp could cause mortality in the seedlings of the Atlantic White Cedar (id.). The Attorney General further argued that chemical changes due to pollutants released from the proposed facility could affect the Mystic Valley Amphipod (id.). Finally, the Attorney General stated that the Siting Council should reject the Company's analysis and not approve the siting of the proposed facility within close proximity to the Acushnet Swamp (id., p. 73).

DEM asserted that the Acushnet Swamp is one of the finest Atlantic White Cedar swamps remaining in Massachusetts (Exh. DEM-1, p. 6). DEM raised a number of objections to the proposed facility due to its potential impact on the Acushnet Swamp ecosystem (DEM Brief, pp. 1-2). DEM stated that the site of the proposed facility is integral to the hydrology of the Acushnet Swamp due to: (1) the extension of the Acushnet Swamp wetland system, beyond its northern border, into the proposed site; (2) the interspersion of wetlands and uplands along the northern border of the Acushnet Swamp that form a complex boundary between the wetland system and uplands; and (3) the physical upland buffer that the proposed site provides to the Acushnet Swamp (Exh. DEM-1, p. 7).

DEM argued that there is the probability that construction and operation of the proposed facility would result in changes to the Acushnet Swamp's water quality and quantity (DEM Brief, p. 1). DEM stated that, even if the stormwater plan functions effectively, development of the site will cause an

increase in surface and groundwater discharge from the site (id., p. 2). DEM also stated that the success of the stormwater plan is unproven (id., p. 1).

Additionally, DEM questioned the Company's analysis of increased water runoff to the Acushnet Swamp (id., p. 2; Exh. EEC-3). DEM stated that, in EEC's calculation of increased runoff to the Acushnet Swamp, EEC failed to account for the loss of flood storage capacity which would result from the EEC proposal to fill approximately two acres of on-site wetlands (DEM Brief, p. 2). DEM further stated that the Company should have considered the effects of increased runoff to the Acushnet Swamp from single storm events rather than averaging the runoff over the course of one year (Exh. EEC-3).[207]

DEM argued that additional runoff from the proposed site could have a potential impact on the species composition of the Acushnet Swamp (id.). DEM stated that establishment of Atlantic White Cedar seedlings can occur only within a narrow range of water conditions (id., HO-RR-53).[208]

In regard to the operation of the stormwater plan, DEM stated that water quality and quantity should be monitored at the outlet of the stormwater management basins (1) on a regular basis during construction and operation of the proposed facility, and (2) after heavy storm events (Exh. HO-RR-52). In addition, DEM suggested that: (1) preconstruction baseline data should be obtained for all seasons and after heavy storms for

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207/ DEM explained that the Company calculated the average yearly increase in runoff to the Acushnet Swamp to be 0.09 cubic feet per second but that the actual increase during the highest rainfall one could expect in a 10-year period (4.8 inches in 24 hours) would be 3.19 cubic feet per second (Exh. EEC-3).

208/ Although DEM could not quantify the effect of increased runoff on the Acushnet Swamp, DEM conceded that any such increase in water level would amount to less than one inch (Tr. 12, p. 93). However, DEM added that it is possible that a water level increase of less than one inch could affect the establishment of Atlantic White Cedar seedlings (id., p. 94).

the unnamed stream within the site; (2) DEM should receive annual reports regarding results of monitoring; and (3) a bond should be set aside for improving the stormwater management system if it does not function effectively (id.).

In sum, DEM stated that changes in water quality and quantity, together with changes in parameters of noise (see Section III.E.3, above) and air quality (see Section III.E.2, above), will stress organisms in the Acushnet Swamp, and that these stressed organisms will become more susceptible to disease and other environmental pathogens (id.). In light of the Commonwealth's obligation of stewardship for the Acushnet Swamp, DEM argued that the proposed site is unsuitable for the EEC facility because of the potential negative impacts that development of this site would have on the Acushnet Swamp (id.).

NO-COAL argued that the presence of the proposed facility abutting the Acushnet Swamp is a cause for deep concern (NO-COAL Initial Brief, p. 41).

ii. Discussion and Analysis

The Siting Council notes that the Company's facility design and construction plans include a number of significant measures which would minimize adverse impacts to on-site wetlands and the Acushnet Swamp. In particular, EEC's stormwater plan and the Company's plans to enclose all material transport, storage and handling facilities would minimize adverse impacts to the on-site wetlands and Acushnet Swamp. In addition, by concentrating the development of facility components within a 53 acre, largely upland, portion of the 282 acre site, EEC's plan allows for a substantial on-site area that would be left in its natural state, in effect preserving considerable buffer areas for the Acushnet Swamp.

The Siting Council notes that revision of the layout of the proposed facility has minimized impacts to on-site wetlands (see section III.E.4.a, above). However, the Siting Council further notes that with the revised layout, the tree clearing line in the vicinity of the coal storage enclosure and rail spur extending to the south of the coal storage enclosure would be,

in places, within ten feet or less of the on-site wetlands.

With respect to facility design, the Company has included a comprehensive stormwater management program that will control the quality and quantity of water that enters the Acushnet Swamp from the facility site during both construction and operation of the proposed facility. In addition, the Company will monitor the operation of the stormwater plan in order to ensure that it operates as planned. The Siting Council recognizes that, nonetheless, there will be a slight increase in the quantity of water reaching the Acushnet Swamp, even with the stormwater plan in effect. However, because the surface area of the Acushnet Swamp is sufficiently large, these slight increases will not result in an adverse impact on the Acushnet Swamp.[209]

In order to ensure the integrity of the Acushnet Swamp, such that (1) waterborne contaminants from the site do not reach the Acushnet Swamp, and (2) the quantity of water flowing from the site to the Acushnet Swamp does not increase substantially, the Siting Council finds that the quality and quantity of the water flow from the site to the Acushnet Swamp should be monitored. Accordingly, the Siting Council ORDERS the Company (1) to develop a comprehensive stormwater monitoring plan, in consultation with DEM and NBCC, and (2) to submit this monitoring plan to the Siting Council.

The stormwater monitoring plan should encompass: (1) the monitoring of the water and sediment quality in stormwater management basins; (2) the monitoring of peak and non-peak water discharge rates from the stormwater basins; and (3) the monitoring of the water quality of the unnamed stream within the site. In addition, annual reports regarding the results of this plan should be submitted to DEM and NBCC.

The portion of the plan addressing the monitoring of

209/ The Siting Council notes the concern of DEM that the Company did not account for the loss of flood storage capacity of all wetlands in its calculation of water output from the site. However, the Siting Council further notes that this concern is addressed by the proposed stormwater plan and by the proposed replication of a larger area of MWPA wetlands than would be altered (see Section III.E.4.a, above.)

water and sediment quality in stormwater management basins should include provisions for analyzing water and sediment samples from a number of stormwater management basins (1) after several representative storm events, during construction and during the first year of operation of the proposed facility, and (2) on at least an annual basis thereafter. The Company also should provide a list of potential compounds that could be released from the site during construction and operation of the proposed facility and should compare the results of its water and sediment analysis with such list.

The portion of the plan addressing the monitoring of peak and non-peak water discharge rates from the stormwater basins should include provisions for measuring the discharge rates from each stormwater basin (1) continuously during several representative storm events during construction and the first year of operation of the proposed facility, and (2) on at least an annual basis thereafter. The Company should also compare measured discharge rates with predicted discharge rates.

The portion of the plan addressing the monitoring of the water quality of the unnamed stream should include the analysis of a sample of stream water (1) prior to the construction of the proposed facility, and (2) on at least an annual basis during construction and operation of the proposed facility.

In addition, the Siting Council ORDERS the Company to maintain at least 30 feet of existing vegetation, during construction and operation of the proposed facility, between the on-site wetlands and (1) the coal storage enclosure, and (2) the rail spur extending to the south of the coal storage enclosure.

Finally, although the Company has taken steps in its site development plan to preserve substantial undisturbed wetland areas and replicate disturbed wetlands, the Siting Council expects the Company to continue to cooperate with DEM and other interested persons to maximize conservation of lands that serve as buffer areas in the vicinity of the Acushnet Swamp.

Based on the Company's compliance with the above ORDERS, the Siting Council finds that the construction and operation of the proposed facility will have an acceptable impact on the

on-site wetlands and the Acushnet Swamp.

5. Visual Impacts

The Company asserted that the visual impacts of the proposed facility would be minimal (EEC Initial Brief, p. 158). The Company stated that due to the physical separation between the proposed facility and off-site, non-industrial, visual receptor locations, the proposed facility buildings simply would appear as one additional point within the broad panoramic vista (Exh. HO-2A, p. 5-112). The Company stated that, therefore, the proposed facility would not have any of the massing or shielding effects that would occur if it were constructed in close proximity to visual receptors (id.).

The Company indicated that the primary visual elements of the proposed facility would be (1) the boiler building, which would be approximately 150 feet above site grade, and (2) the facility stack which would be approximately 380 feet above site grade (id.).

EEC stated that the boiler building height was determined by the height of the boilers and that maximum boiler height was based on a review of data for other projects and consultation with vendors (Tr. 10, p. 65).

EEC asserted that the facility stack was designed to minimize air quality impacts (EEC Initial Brief, p. 156). The Company stated that the stack height was determined on the basis of Good Engineering Practices ("GEP")[210] in order to minimize the potential for high ground-level concentrations of pollutants

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210/ EEC indicated that the GEP stack height was dependent on the height of the boiler building (Tr. 10, p. 65). The Company calculated the GEP stack height by multiplying the anticipated 150-foot height of the boiler building by a factor of 2.5 (Tr. 6, p. 12).

The Company stated that if actual equipment dimensions were less than anticipated dimensions, leading to an appreciable decrease in GEP stack height, further air quality modeling likely would be required by the MDEP (id. p. 11, Tr. 10, p. 65). The Company noted that EPA regulations prohibit applicants from taking credit in the computer modeling analysis for stack heights that exceed GEP height (Exh. HO-2A, p. 5-18).

due to aerodynamic downwash (Exh. HO-E-30).[211]

The Company stated that, in addition, a building height variance would be required for the boiler building from the New Bedford Zoning Board of Appeals (Exhs. HO-B-10, p. 3, HO-2A, p. 5-107) (see Section III.E.7, below).

EEC indicated that the Federal Aviation Administration ("FAA") has granted an approval of a stack height of 380 feet (Exh. HO-RR-10).[212] EEC stated that the facility stack would consist of three flues within one concrete chimney tapering from 32 feet in diameter at its base to 24 feet in diameter at its top (Exh. HO-E-82). The Company stated that obstruction markings, consisting of high intensity white obstruction lights, would be placed approximately half way up the chimney and near the top (id.). In addition, the Company stated that catwalks would be installed on the stack in order to service the obstruction lights and emission monitoring equipment (id.).

EEC stated that construction materials and exterior coloring of the stack would minimize visibility from off-site locations (Exh. HO-2A, p. 5-112). The Company stated that the chimney would be the color of concrete and would blend with the background (Tr. 6, p. 160, Tr. 10, p. 69; Exh. HO-E-79). The Company further indicated that the catwalks, which could be painted any color, would not be discernable (Tr. 6, pp. 160-161). The Company also stated that the white obstruction lights, which would be oriented toward aircraft, would have a minimal effect on area residences (Exh. HO-E-115). However, the Company noted that it would perform additional

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211/ The Company stated that it conducted additional air quality modeling analyses at stack heights of 240 feet and 300 feet (Tr. 6, pp. 13-14). The Company stated that these analyses demonstrated that air quality impacts would be significantly greater with a lower stack height (Exh. HO-RR-11).

212/ The Company noted that FAA regulations require that the height of any structure near an airport not interfere with air traffic flight paths during landing, takeoff and circling (Exh. HO-E-12A, p. 3-20). The Company further noted that FAA approval of stack height is based on an FAA determination that the stack height is safe (id., p. 3-21).

analyses to evaluate and confirm that the effects of the obstruction lights would be minimal (id.).

EEC stated that no lands within the vicinity of the proposed facility were identified as being unique or significant visual resources in the Massachusetts Landscape Inventory listings prepared by the MDEP (Exh. HO-2A, p. 5-112). The Company further stated that visual impacts of the facility generally would be restricted to views extending above the topography and tree line established on the forested portions of the site and adjacent undeveloped areas (id., pp. 5-111, 1-112).

The Company assessed the visual impacts at designated visual receptor sites[213] by (1) superimposing the visible sections of the stack and boiler building on photographs taken from each receptor, and (2) developing line-of-site drawings from each receptor (id., pp. 5-121, Exh. HO-E-79). The Company stated that the photographs demonstrate that the stack would be barely perceptible from most vantage points (Tr. 6, pp. 161-163).[214] In addition, EEC stated that the line-of-site drawings demonstrate that topography and trees generally would prevent clear visual access to the stack (Exh. HO-2A, p. 5-121). The Company also noted that, due to the substantial number of conifers within the tree cover, there would be little seasonal variation in the visibility of the proposed facility (Exh. HO-E-80).

Finally, the Company stated that the plume from the

213/ The Company chose the closest residential areas to the north, south, east and west of the site as visual receptor locations (Exh. HO-E-78). Additional receptor locations were analyzed in response to a request of the Siting Council (Exh. HO-E-79).

214/ The photographs indicated that the proposed facility would be clearly visible from (1) a residence located adjacent to a cranberry bog to the northeast of the facility, and (2) Turners Pond, within the southwestern portion of the Acushnet Swamp (Exh. HO-E-79, photographs 3A, 5A).

facility would not be visible (Exh. HO-2A, p. 5-121).[215]

The Siting Council notes that the proposed facility would be sited in an industrial park and would be separated by wooded buffer zones from residential and other developed areas. The Siting Council also notes that even with a stack height of 380 feet, topography and substantial tree cover in the surrounding area will screen the proposed facility from residences and other visual receptors, limiting its visibility. In addition, the record demonstrates that the the Company has designed the stack to minimize visual impacts, including the use of a color that would blend into the background.[216]

The Siting Council further notes that obstruction lighting will be required on the facility stack. Due to the orientation of the obstruction lighting toward aircraft and the distance of the stack from residential areas, the obstruction lighting should not affect residential areas closest to the facility. However, EEC plans to ensure that the obstruction lights would not affect residences by performing additional analyses to evaluate the effects of the obstruction lighting. The Siting Council expects EEC to ensure that the obstruction lighting does not have an impact on the residential areas in the vicinity of the proposed facility.

Accordingly, based on the foregoing, the Siting Council finds that the proposed facility will have acceptable visual impacts.

215/ The Company explained that Federal and State regulations limit the opacity (degree of opaqueness) of the plume to 20 percent and that the plume of the proposed facility would vary primarily between zero and ten percent (Exh. HO-E-12A, p. 3-64).

216/ The Siting Council recognizes that any deviation from the proposed dimensions or color may result in a negative effect on the surrounding receptors. In the case of changes to the stack or to any other aspect of the proposed facility, other than minor variations, the Company is required to submit that information to the Siting Council so that the Siting Council may decide whether to inquire further into that issue.

6. Water Supply and Wastewater

a. Water Supply

The Company asserted that the facility design is consistent with the goals of the Commonwealth regarding the conservation of water resources (Exh. HO-E-12A, p. 1-22). The Company stated that the facility has been designed to minimize water usage requirements and to maximize the use of treated wastewater in order to meet those requirements (Exh. EEC-5, pp. 2-3).

The Company stated that the facility would use water primarily for equipment cooling, cooling tower make-up, boiler make-up, the demineralization system, clarifier blowdown, filter backwash, and also for condensate/feedwater (id., p. 4, Exh. HO-2A, p. 5-9). In order to reduce overall water requirements, the Company stated that the facility design incorporates (1) an air-cooled condenser, rather than a wet cooling system, and (2) the use of internally recycled wastewater (Exh. HO-E-12A, p. 1-22).[217]

The Company estimated that the operation of the proposed facility would require water input of 330,000 gpd, with peak requirements of 400,000 gpd (id., p. 1-21). The Company stated that this requirement would be met by use of treated wastewater from neighboring facilities and from the City of New Bedford (id.). The Company stated that the facility would utilize all of the wastewater from Polaroid's existing wastewater treatment facility, which is an average of 165,000 gpd with peak flows of up to 300,000 gpd (Exh. HO-E-86). The Company stated that, therefore, an average of 165,000 gpd from the City of New Bedford's municipal water system would be required for the balance of the proposed facility's water needs (Exh. EEC-5, p. 4).[218]

217/ The Company noted that approximately 65,000 gpd of wastewater would be recycled internally within the facility (Exh. HO-E-12A, p. 1-22).

218/ The Company stated that changes in the design of the facility since the original petition have reduced the average daily requirements for water from the municipal system from 235,000 gpd to 165,000 gpd (Exhs. HO-1A, p. 171, EEC-5, p. 2).

EEC asserted that the facility's net average water requirements from the municipal system would fall well within that system's available supply (Exh. HO-2A, p. 5-10).[219] However, the Company stated that it is attempting to increase its wastewater usage and thus decrease its reliance on municipal water by investigating the use of effluent streams from other neighboring facilities (Tr. 9, pp. 101-102, 105).[220] EEC added that Polaroid wastewater and City of New Bedford water would be stored on site for weekends and other short periods when Polaroid is not in operation and, therefore, not providing wastewater (id., p. 104).[221]

EEC indicated that the existing 16-inch water main in the vicinity of the proposed facility has sufficient capacity to supply facility requirements (id., pp. 5-10, 5-11; Exh. HO-E-60).[222] The Company noted that a water connection

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219/ EEC stated that the increase in municipal water usage in 1995 due to the operation of the proposed facility would be well within the City of New Bedford's overall anticipated increase in water usage for 1995 (Exh. HO-E-12A, p. 3-10). EEC further stated that the City of New Bedford's anticipated 1995 water withdrawal, as reported in the City's application to the MDEP Division of Water Supply, is well below the safe yield of the City's reservoir system (id.).

220/ The Company stated that it is currently negotiating with Acushnet to utilize its wastewater of approximately 5,000 gpd and also would investigate the use of the wastewater from a planned expansion to the Polaroid facility (Tr. 9, pp. 101-102).

221/ The Company stated that Polaroid shuts down for a two-week period each July and that water requirements from the municipal system would, therefore, increase to 330,000 gpd during this period (Exhs. HO-E-62, HO-E-86). However, the Company noted that, during this time, there would not be a net increase in the demand for municipal water because Polaroid would not be drawing any water from the municipal system (id.).

222/ The Company stated that, although it has not tested the capacity of the water main that would serve the site, the main originally was constructed to accommodate projected growth in the GNB Industrial Park and has sufficient pressure for the projected increase in water demand triggered by the proposed facility (Exhs. HO-2A, pp. 5-10, 5-11, HO-E-60).

permit would be required from the New Bedford Water Department (Exh. HO-E-61).

EEC indicated that wastewater from Polaroid would be treated at the Polaroid facility (Exh. EEC-5, p. 4). EEC further indicated that wastewater would be treated again at the proposed facility in order to remove suspended solids, metals, organics and total dissolved solids prior to its use (id.).[223]

The Siting Council notes that the conservation of water resources has been included in the design of the facility. The use of an air-cooled condenser and use of internally recycled wastewater within the facility have reduced the overall water requirements of the facility.

The Siting Council further notes that, in order to meet the overall water requirements of the facility, EEC has attempted to minimize its reliance on municipal water. EEC will utilize all of the wastewater from the Polaroid facility and is negotiating to utilize the wastewater from other facilities. Finally, the Siting Council notes that there is an adequate supply of municipal water for average daily use and for those times when Polaroid will not be operating.

Based on the foregoing, the Siting Council finds that the proposed facility would have an acceptable impact with respect to water supply.

b. Wastewater

The Company asserted that the proposed project would have a positive impact on the New Bedford sewerage system (EEC Initial Brief, p. 162). In support of its assertion, the Company stated that operation of the facility would reduce the amount of wastewater that is currently discharged into the New Bedford sewerage system (Exh. HO-E-12A, p. 1-22).

223/ The Company stated that the wastewater treatment system at the proposed facility consists of clarification, chemical precipitation, filtration and reverse osmosis (Exh. EEC-5, p. 4).

The Company stated that, at present, the Polaroid facility discharges 165,000 gpd of treated wastewater into the City's sewerage system and that this discharge would be fully recycled for use in the proposed facility (id.). The Company further stated that the operation of the proposed facility would generate 143,000 gpd[224] of treated wastewater, and, therefore, would result in an overall reduction of 22,000 gpd of discharge into the municipal sewerage system (id.).

The Company asserted that the wastewater from the proposed facility would be treated prior to discharge into the municipal sewerage system and would meet all applicable water quality standards of the City of New Bedford (id., pp. 1-22, 1-25). Finally, EEC noted that facility wastewater would be discharged into a discharge station with adequate capacity and that a sewer connection permit from the Division of Water Pollution Control of the MDEP would be required (id., p. 1-25, Exh. HO-RR-50).

The record indicates that the operation of the proposed facility would have a positive impact on the New Bedford sewer system in that the amount of wastewater discharged daily into the municipal system would be reduced. Based on the foregoing, the Siting Council finds that the proposed facility will have an acceptable impact with respect to wastewater discharge.

7. Land Use

EEC asserted that the proposed facility would be compatible with existing land uses (Exhs. HO-1A, p. 169, HO-2A, pp. 5-105, 5-106). EEC stated that the proposed site is surrounded on the north and east by the New Bedford Industrial Park and on the south and west by the Acushnet Cedar Swamp State Reservation (Exh. HO-2A, Figure 4.5-9). The Company indicated

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224/ The Company noted that changes in facility design since the Petition was originally filed have reduced the amount of facility wastewater by approximately 60,000 gpd (Exhs. HO-E-12A, p. 1-22, HO-E-86, attachment).

that although a buffer of undeveloped land will be maintained between the 53 acre portion of the proposed site, where all building activity would be concentrated, and the Acushnet Swamp on the south, there will be no tree buffer for approximately 900 feet, between this portion of the proposed site and upland areas of the Acushnet Cedar Swamp State Reservation on the west (id., Figure 5.5-10; Tr. 2, pp. 78-80,).

The Company stated that the proposed site is bordered by the Com/Electric transmission line ROW on the north and that land use to the north of the ROW consists of light industry and commercial offices (Exh. HO-2A, p. 5-106). In addition, EEC stated that the proposed site is bordered by 2,500 feet of undeveloped forested land owned by Polaroid on the east and that the Conrail track and the Polaroid complex lie to the east of this undeveloped land (id.).

EEC stated that the land area within one mile of the proposed site is occupied primarily by the developed portion of the GNB Industrial Park and forest (id., p. 4-115). The Company stated that the proposed site is located at least two-thirds of a mile from all non-industrial uses (id., p. 5-105). EEC stated that there are clusters of residential development approximately one mile to the north, 4,000 feet to the east, and and 4,000 feet to the northwest of the proposed site (id., pp. 4-108, 4-115, 4-116). The Company indicated that cranberry bogs lie approximately one mile to the north and one mile to the northwest of the proposed site (id., p. 4-116). The Company stated that public access to the Acushnet Cedar Swamp State Reservation for recreational purposes is prohibited (id.). The Company further stated that there are no schools or hospitals within one mile of the proposed site (id.).

EEC asserted that the proposed facility would be compatible with existing use within the GNB Industrial Park (Exh. HO-1A, p. 169). The Company indicated that the proposed facility would be located within an Industrial C zone and maintained that a generating facility would be an allowed use within this zone (id.).

EEC indicated that the proposed facility site would consist of a 282 acre portion of a 385 acre undeveloped parcel currently owned by Polaroid, and that approval of a definitive subdivision plan by the New Bedford Board of Survey would be required (id., p. 125, Exhs. HO-2A, p. 1-1, HO-B-10, p. 3). EEC indicated that a preliminary plan was rejected by the Board of Survey and that a definitive subdivision plan, which addressed the Board of Survey's concerns, subsequently was submitted (Exh. HO-RR-35; Tr. 11, pp. 43-44).[225]

In addition, the Company stated that a zoning variance from the New Bedford Zoning Board of Appeals would be required because the height of the boiler building exceeds restrictions that limit the height of primary buildings within Industrial C zones to 100 feet (Exhs. HO-B-10, p. 3, HO-2A, p. 5-107; Tr. 11, p. 45).

The Company further stated that a zoning variance would not be required for the height of the facility stack (Tr. 11, p. 45). The Company noted that stack height limitations have been enacted by CNB but EEC's facility stack would be exempt from such limitations because preliminary subdivision plans were filed with the New Bedford Board of Survey before the new height limitations were established (id.).

DEM raised an objection to the lack of a buffer between approximately 1,000 feet of the upland Acushnet Cedar Swamp State Reservation boundary and the proposed facility (DEM Brief, p. 1).

The Siting Council notes that the proposed facility would be compatible with existing commercial and industrial land use contiguous to the facility site and existing commercial and

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225/ The Company indicated that the rejection of its preliminary subdivision plan was based on a lack of information and need for clarification (Tr. 11, p. 44). The Company noted that additional information requested included information regarding water usage, wastewater discharge, water main plans, and effect of construction on aquifers (Exh. HO-RR-35, attached letter dated 4/6/90 from J.A. Davidson to Polaroid).

industrial use presently within the GNB Industrial Park. In addition, the Siting Council notes that EEC's plans allow for a significant buffer between the proposed facility and non-industrial, developed land.

However, the Siting Council shares the concern of DEM regarding the lack of a buffer between the upland portion of the Acushnet Cedar Swamp State Reservation and approximately 900 feet of the proposed facility site boundary in the vicinity of the parking area, oil storage tank and limestone storage building. The Siting Council recognizes that this lack of a buffer results from the modification of the layout of the facility in order to avoid construction within wetlands (see Section III.E.4.a, above). Nonetheless, the Siting Council ORDERS the Company to (1) maintain at least ten feet of existing vegetation, during construction and operation of the proposed facility on the western boundary of the proposed site, in the vicinity of the parking area, oil storage tank and limestone storage building, where the tree clearing line is proposed to extend along the Acushnet Cedar Swamp State Reservation boundary, and (2) maintain at least 100 feet of existing vegetation, during construction and operation of the proposed facility along all other portions of the western boundary and along the southern boundary of the proposed site.

Accordingly, based on the Company's compliance with the above ORDER, the Siting Council finds that the proposed facility would have an acceptable impact on existing land uses.

8. Solid Wastes

EEC indicated that solid wastes produced by the facility would consist of: (1) ash; (2) sludge; and (3) oily wastes (Exhs. HO-1A, p. 171, EEC-5, p. 4).

The Company stated that the operation of the facility would generate 282,000 tpy of ash due to the ash content of coal

and the use of limestone to control SO_2 emissions (Exhs. AG-RR-16, HO-1A, p. 118).[226] EEC stated that the ash would be stored in an enclosed structure, loaded to covered rail cars by telescoping tubing, and then transported from the site in covered rail cars (Exh. HO-2A, pp. 2-32, 5-121).

The Company stated that removal of ash would be negotiated with the coal supplier and would be included in the coal supply contract (Exh. HO-E-12A, p. 3-31; Tr. 9, pp. 99-100).[227] Although the Company maintained that ash would be back-hauled by the coal supplier to the place of coal origination, Mr. Smith testified that he does not expect the contract to specifically stipulate that the ash cannot be disposed of within Massachusetts (Exh. HO-2A, p. 5-121; Tr. 6, pp. 94-95, Tr. 9, pp. 99-100, 115-116). The Company noted that the coal supplier would obtain any required licenses or approvals to remove and transport ash (Exh. HO-E-116).

EEC indicated that operation of the proposed facility would generate approximately 480 to 1,000 pounds of sludge per day which would be stored on-site in a separate tank (Exh. EEC-5, p. 4). EEC indicated that, in addition, one 55-gallon drum of oily waste would accumulate every two months, which would be stored on-site in a separate tank, (id.).

The Company stated that off-site disposal arrangements for sludge and oily waste have not been determined (Tr. 11, pp. 52-53). However, EEC stated that for all off-site transport

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226/ EEC stated that ash generated by the facility would consist of fly ash which would be collected by the fabric filter baghouse and bottom ash which would be removed continuously from the boilers (Exh. HO-2A, pp. 2-31, 2-32; Tr. 4, p. 141). In addition, the Company stated that the fly ash and lighter particles of bottom ash would be pelletized and then combined with the heavier particles of bottom ash, in storage, until transported from the site (Tr. 4, p. 141).

227/ EEC indicated that there are some potentially beneficial uses of ash for land reclamation in strip-mined areas and for backfilling of played-out mines (Exh. HO-1A, p. 119; Tr. 6, pp. 94-96). EEC indicated that, in addition, ash can be utilized in the manufacture of construction materials such as wallboard or concrete blocks (Tr. 9, pp. 115-116).

of wastes from the proposed facility, EEC would contract only with companies licensed by the MDEP (Exh. HO-12B, p. 3-31).

The Attorney General argued that EEC has not evaluated (1) the environmental and public safety aspects of backfilling coal mines with the ash produced by the proposed facility, or (2) alternative uses for the ash (AG Initial Brief, p. 82). In addition, the Attorney General asserted that it is possible that some ash from the proposed facility may be deposited within Massachusetts, and, therefore, the Company should be required to evaluate the effects of depositing ash in Massachusetts (id.).

The Siting Council notes that the operation of the proposed facility would generate a significant amount of solid waste. With regard to ash, the Company intends to negotiate with its ultimate coal supplier to remove ash from the proposed facility. Although this ash has potentially beneficial uses, ultimate use of the ash will be determined by the coal supplier and simply is not in the purview of the Siting Council. However, it is within our mandate to ensure that ash will be removed in a safe and appropriate manner. Therefore, the Siting Council ORDERS the Company to submit either (1) a signed agreement for the removal of ash, which includes provisions to ensure safe and environmentally acceptable removal thereof, or (2) the signed coal supply contract, which includes specific provisions to ensure safe and environmentally acceptable removal of the ash.

With regard to sludge and oily waste, the Company intends to arrange for companies licensed by the MDEP to transport and dispose of sludge and oily wastes. The Siting Council notes that such arrangements have not yet been made. It is our view that contracts with these MDEP-licensed entities will ensure appropriate removal and disposal of this waste.

Accordingly, based on the Company's compliance with the above ORDER and the completion of arrangements with MDEP-licensed entities to dispose of sludge and oily wastes, the Siting Council finds that the solid waste impacts of the proposed facility would be acceptable.

9. Transportation

The Company asserted that the transportation aspects of the proposed facility would have no impact on the public health or welfare and therefore should be considered acceptable (EEC Initial Brief, p. 165). In this section we discuss the rail and vehicular transportation requirements of facility operation and their impacts on local traffic.

With regard to rail requirements, the Company indicated that, on average, five trains would travel to and from the facility each week to deliver coal and limestone and to remove ash (Exh. HO-2A, p. 5-65). The Company indicated that facility operation would require four weekly deliveries of coal and one weekly delivery of limestone (id.).[228] In addition, the Company stated that ash will be removed from the site in empty coal cars (Exh. HO-E-47). The Company further indicated that all rail lines along the route from the coal source to the proposed facility would be sufficient to accommodate coal transport (Exhs. HO-E-46, EEC-45).

The Company indicated that trains would access the proposed facility from the north and would traverse three at-grade road crossings near the site (Exh. HO-2A, pp. 5-65, 5-89, 5-90). The Company calculated that the maximum vehicular delay at each of the at-grade crossings would be 230 seconds (id., p. 5-89).[229] The Company indicated that train deliveries to the proposed facility would not be scheduled during morning and afternoon peak commuter hours (id., p. 5-65).

228/ The Company indicated that for coal delivery, trains would consist of three to four diesel engines and from 60 to 65 enclosed coal cars, and that for limestone delivery, trains would consist of approximately 40 cars (Exh. HO-2A, p. 5-65).

229/ The maximum at-grade crossing delay was calculated based on: (1) a maximum train length of 3,745 feet; (2) a maximum train speed of 15 miles per hour; and (3) a halt in traffic for 60 seconds prior to train arrival (Exh. HO-2A, p. 5-89).

Based on anticipated 1994 vehicular traffic, the Company estimated the number of vehicles that would be delayed when the trains traversed each of the three intersections (id., pp. 5-89, 5-90). The Company then compared the space required for vehicular queuing at each intersection with available space and concluded that space at each intersection would be adequate (id.). Thus, the Company concluded that resulting vehicular queuing would not disrupt traffic flow on either side of the at-grade rail crossings in the vicinity of the proposed facility (id.). The Company noted that seven businesses located to the west of the track would not have an alternate means of roadway access during train crossings of Barnett Boulevard, the road leading directly into the GNB Industrial Park (Exh. HO-E-114). The Company indicated that the rail spur line leading from the Conrail mainline into the proposed facility has been designed to minimize any train crossing delay (id.).[230]

With regard to vehicular traffic, the Company estimated that an average of 110 vehicles would enter and leave the proposed facility during morning and afternoon peak commuter hours each day (Exh. HO-2A, p. 5-66).[231] In addition, the Company predicted the 1994 demand on seven major roadway intersections in the vicinity of the New Bedford Industrial Park (id., pp. 5-79, 5-80). The Company then analyzed the effects of increased vehicular traffic due to the operation of the proposed facility on each intersection and concluded that facility operational vehicular traffic would not impact the traffic flow at any of these intersections (id.).

The Siting Council notes that increased vehicular traffic

230/ The Company noted that a spur track would be constructed south of Barnett Boulevard and that trains would immediately move onto this spur after crossing Barnett Boulevard (Tr. 6, pp. 157-158). The Company stated that any delay at the Barnett Boulevard crossing would be minimized by the construction of this spur track (id.).

231/ The Company estimated the number of vehicles based on 80 employee commuter vehicles, 10 trucks and 20 visitor vehicles per day (Exh. HO-2A, p. 66).

due to the operation of the proposed facility would not impact traffic at major intersections in the vicinity of the GNB Industrial Park and that rail traffic would not disrupt traffic flow at three at-grade road crossings close to the site. In addition, the Company has taken steps to minimize potential traffic impacts by (1) the scheduling of rail deliveries outside of morning and afternoon peak commuter hours, and (2) the design of the rail spur line.

Accordingly, based on the foregoing, the Siting Council finds that increased vehicular and rail traffic due to the operation of the proposed facility will have an acceptable impact on the traffic flow in the vicinity of the proposed facility.

10. Safety

The Attorney General argued that EEC has not addressed a number of safety issues in the design of the proposed facility (AG Initial Brief, pp. 79-82). The Attorney General stated that the Company has failed to establish a sufficient (1) spill prevention plan for its stormwater management system, and (2) hazardous material control plan for the interior of the proposed facility. In addition, the Attorney General stated that the Company has not taken into consideration the risk of explosion from build-up of coal dust and other combustible gases in its coal storage area (id., p. 79).

EEC stated that the Company has taken measures to avert spillages and leaks of hazardous materials, including: (1) enclosed material storage and handling facilities; (2) location of oil storage tanks in containment dikes with liners to capture seepage; and (3) location of all transfer areas and storage areas for the water treatment chemicals within containment dikes (Exh. HO-E-12A, pp. 3-8, 3-13).

In addition, the Company asserted that the design of the proposed facility includes sufficient measures to contain any accidental spills (id., p. 3-12, Exh. HO-12B, Appendix E, pp. 11, 25; Tr. 4, pp. 168-169, 185-186). The Company stated that the stormwater plan includes (1) measures to contain

pollutants such as ash, oil and grease that may become waterborne, and (2) manual control valves on stormwater management basins in order to control and isolate any spills (Exhs. HO-12A, p. 3-12, HO-12B, Appendix E, pp. 11, 25; Tr. 4, pp. 168-169). The Company further stated that any accidental spillage of water treatment chemicals would be contained within containment dikes and ultimately discharged into the wastewater treatment system (Exh. HO-2A, p. 3-13; Tr. 4, p. 185).[232] In addition, the Company stated that that on-site workers would be trained in hazardous material control as a precaution for leaks or spillage (Tr. 4, p. 181).[233]

While acknowledging that combustible gas, generated by coal dust, can build up in the coal storage area, EEC asserted that the coal storage area would be designed in accordance with the standards of the National Fire Protection Association, and, as such, would include protection against any potential sparks that could ignite combustible gases contained in the area (id., p. 189; Exh. HO-AG-56). The Company indicated that the coal storage area would be equipped with a roof ventilation system incorporating a fabric filter baghouse, and with appropriate fire detection and prevention systems (Tr. 4, pp. 188-190).

The Siting Council notes that the design of the proposed facility includes measures to avert spills of hazardous materials and to contain any such accidental spills. Further, proposed monitoring of the operation of the stormwater plan would ensure that pollutants are contained on site (see Section III.E.4.b.ii, above).

232/ The Company asserted that, under all circumstances, the wastewater from the proposed facility would meet the wastewater pretreatment standards of CNB (Exh. HO-12A, pp. 3-14, 3-15).

233/ The Company indicated that the local and regional highway facilities that would be utilized to transport the chemicals required for the operation of the proposed facility have been designed to accommodate industrially related traffic (Exh. HO-E-12A, p. 3-44). The Company added that, in the event of an accident, the emergency procedures of the MDEP and CNB would be followed (id.).

In addition, the Siting Council notes that all spills of hazardous materials would ultimately be discharged into the facility wastewater treatment system. Finally, the Siting Council notes that the coal storage area would be designed in accordance with the National Fire Protection Association.

Accordingly, based on the foregoing, the Siting Council finds that the Company has established that the proposed facility will incorporate adequate safety measures.

11. Conclusions on the Environmental Analysis

In its analysis of the environmental impacts of the proposed facility, the Siting Council has reviewed: (1) air quality impacts; (2) noise impacts; (3) impacts to water resources; (4) visual impacts; (5) water supply and wastewater; (6) land use impacts; (7) solid waste; (8) transportation; and (9) safety.

With regard to air quality, the Siting Council has found that the Company's methodology for estimating air pollutant emission rates is acceptable. In regard to the impact of air emissions from the proposed facility on air quality, the Siting Council has found that pollutants from the proposed plant other that VOCs, NOx, SO_2 and CO_2 would not add significantly to the existing air pollutant concentrations and are adequately minimized.

The Siting Council has ORDERED EEC to minimize the VOCs emitted from the proposed facility consistent with expected emission levels of 0.005 lb/MMBtu to 0.007 lb/MMBtu, and to provide the Siting Council with documentation of the VOC emission rate guaranteed by the vendor ultimately selected by EEC. Based on the Company's compliance with the above ORDER, the Siting Council has found that emissions of VOCs will be adequately minimized.

The Siting Council has also ORDERED the Company to utilize ammonia or urea injection in order to reduce NOx emissions after three years of facility operation, if combustion optimization does not achieve the expected reduction of NOx emissions from 0.30 lb/MMBtu to 0.18 lb/MMBtu or lower. Based

on the Company's compliance with the above ORDER, the Siting Council has found that NOx emissions will be adequately minimized.

With regard to SO_2, the Siting Council has found that if (a) the Company provides a comprehensive analysis of the availability, environmental impact and economic impact of lower sulfur coal, and (b) the Siting Council determines, after review, that the use of 1.8 percent sulfur coal or a lower sulfur coal achieves the appropriate balance based on our standard, then the proposed facility's SO_2 emissions will be adequately minimized.

With regard to CO_2, the Siting Council has found that if (a) the Company provides its plan for attaining CO_2 emission offsets through participation in the Massachusetts Releaf Program or other methods, and a comprehensive analysis of the economic and environmental impacts of attaining a range of CO_2 emission offsets, and (b) the Siting Council determines, after review, that the Company's plan for attaining CO_2 emission offsets or a different CO_2 emission offset plan achieves the appropriate balance based on our standard, then CO_2 emissions will be adequately minimized.

Finally, with respect to air quality, the Siting Council has found that the operation of the proposed facility will have an acceptable impact on vegetation and soils, and that a health risk assessment is not required for the proposed facility.

With regard to noise, the Siting Council has found that if (a) the Company provides a revised analysis of the noise impacts of the proposed facility at the closest residence, and a description of the various strategies the Company would use to further minimize noise impacts of the proposed facility at the northern property line, and (b) the Siting Council determines, after review, that the Company's plan for reducing noise impacts or a different plan for reducing noise impacts is consistent with the minimization of noise impacts, then noise impacts will be adequately minimized.

With regard to water resources, the Siting Council has ORDERED the Company to replicate wetlands on-site, in an amount greater than the amount of wetlands that will be altered. Based on the Company's compliance with the above ORDER, the Siting Council has found that the alteration of on-site wetlands that will result from construction of the proposed facility will be acceptable. The Siting Council has also ORDERED the Company to (1) develop a comprehensive stormwater monitoring plan, in consultation with DEM and the NBCC, and (2) submit this monitoring plan to the Siting Council. The Siting Council has further ORDERED the Company to maintain at least 30 feet of existing vegetation, during construction and operation of the proposed facility, between the on-site wetlands and (1) the coal storage enclosure, and (2) the rail spur extending to the south of the coal storage enclosure. Based on the Company's compliance with the above ORDERS, the Siting Council has found that the construction and operation of the proposed facility will have an acceptable impact on the on-site wetlands and the Acushnet Swamp.

In addition, the Siting Council has found that the proposed facility will have: (1) acceptable visual impacts; (2) an acceptable impact with respect to water supply, and (3) an acceptable impact with respect to wastewater discharge.

With regard to existing land uses, the Siting Council has ORDERED the Company to (1) maintain at least ten feet of existing vegetation, during construction and operation of the proposed facility on the western boundary of the proposed site, in the vicinity of the parking area, oil storage tank and limestone storage building, where the tree clearing line is proposed to extend along the Acushnet Cedar Swamp State Reservation boundary, and (2) maintain at least 100 feet of existing vegetation, during construction and operation of the proposed facility along all other portions of the western boundary and along the southern boundary of the proposed site. Based on the Company's compliance with the above ORDER, the Siting Council has found that the proposed facility would have an acceptable impact on existing land uses.

With regard to solid waste, the Siting Council has ORDERED the Company to submit either (1) a signed agreement for the removal of ash, which includes provisions to ensure safe and environmentally acceptable removal thereof, or (2) the signed coal supply contract, which includes specific provisions to ensure safe and environmentally acceptable removal of the ash. Based on the Company's compliance with the above ORDER and the completion of arrangements with MDEP-licensed entities to dispose of sludge and oily wastes, the Siting Council has found that the solid waste impacts of the proposed facility would be acceptable.

Finally, the Siting Council has found that (1) increased vehicular and rail traffic due to the operation of the proposed facility will have an acceptable impact on the traffic flow in the vicinity of the proposed facility, and (2) the proposed facility will incorporate adequate safety measures.

F. Conclusions on the Proposed Facility

The Siting Council has found that the Company has considered a reasonable range of practical facility siting alternatives.

In addition, with regard to cost, the Siting Council has found that the Company has established that the cost estimates associated with the proposed facility are realistic for a facilty of the size and design of the proposed project.

Further, with regard to all environmental impacts except (1) air quality impacts related to SO_2 and CO_2 emissions, and (2) noise impacts, the Siting Council has found that the Company has established that the environmental impacts of the proposed facility are adequately minimized, subject to compliance with the Orders contained herein.

However, the Siting Council has found that, based on the record in this proceeding at this time, the Company has failed to establish, with respect to air quality impacts, that SO_2 emissions and CO_2 emissions are adequately minimized, and further has failed to establish that noise impacts are

adequately minimized. Additionally, as a result of its specific findings concerning SO_2, CO_2 and noise impacts, the Siting Council has made no findings as to whether the Company has established that the cost estimates for the proposed facility are minimized consistent with the mitigation of environmental impacts.

In a number of previous reviews concerning proposed transmissions lines, the Siting Council has considered whether proposed or alternative facilities would best achieve the appropriate balance between minimizing cost and minimizing environmental impacts. Turners Falls, 18 DOMSC at 192-194; 1988 Braintree Decision, 18 DOMSC at 53; 1988 Com/Electric Decision, 17 DOMSC at 343; 1985 Hingham Decision, 14 DOMSC at 7. In each of those cases, the record contained sufficient information for the Siting Council to determine whether the proposed or alternative facility achieved the appropriate balance between minimizing cost and minimizing environmental impacts.

Here, however, we do not have an adequate record to determine whether the proposed facility achieves the appropriate balance between minimizing costs and minimizing environmental impacts. In particular, our concerns are focussed on the lack of adequate information relative to mitigation strategies for SO_2, CO_2 and noise impacts and the costs associated with those strategies. While the record contains general information on possible mitigation for CO_2, and on trade-offs between costs and environmental impacts associated with possible mitigation for SO_2 and noise, the importance and magnitude of these issues requires a precise and detailed record before a determination can be made as to whether the appropriate balance between cost and environmental impact would be achieved.

Thus, with respect to SO_2, CO_2 and noise, the Siting Council has specified the types of additional evidence on proposed and alternative mitigation strategies, including resultant impact levels and costs, that EEC will need to provide in order for the Siting Council to make the additional findings that would support a Decision and Order allowing EEC to construct its proposed facility.

IV. DECISION AND ORDER

The Siting Council finds that upon compliance with the six conditions[234] set forth in Sections II.C.4 and III.E.11, the construction of the proposed generating facility and ancillary facilities is consistent with providing a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

Further EEC must comply with the seven ORDERS[235] set forth in Section III.E.11.

Accordingly, the Siting Council hereby APPROVES the petition of EEC to construct a bulk generating facility and ancillary facilities subject to the conditions set forth in Sections II.C.4 and III.E.11.[236] Because issues addressed in this decision relative to the need for this facility are subject to change over time, construction of the proposed generating facility and ancillary facilities must be commenced within two years of the date of this CONDITIONAL APPROVAL.

Finally, the Siting Council has set forth two sets of conditions in this decision. The first set is related to the

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234/ The Siting Council notes that, upon receipt of the requested information and analyses from the Company, all parties in this proceeding will have a full opportunity to address these matters and supplement the record prior to the Siting Council staff's tentative decisions regarding compliance with these conditions.

235/ We note that the Siting Council must find that EEC has complied with all conditions before EEC can commence construction of the facility. The ORDERS must be fulfilled by EEC in the course of construction and operation of the facility.

236/ The Siting Council notes that the filing of the information required by the conditions is the Company's next step toward a final approval in this case. If the Company's compliance filings, including appropriate mitigation measures and/or design changes to the facility, fail to establish that environmental impacts will be adequately minimized, the Company's petition to construct will be rejected.

viability of the proposed project and is set forth in Section II.C.4. The second set is related to the environmental impacts of the proposed facility and is set forth in Section III.E.11. The Siting Council expects the Company to address these conditions by submitting two distinct compliance filings. One compliance filing should address the viability conditions; a separate compliance filing should address the environmental conditions.

Robert D. Shapiro

Robert D. Shapiro
Hearing Officer

Robert P. Rasmussen

Robert P. Rasmussen
Hearing Officer

Dated this 2nd day of August, 1991

APPROVED by a majority of the Energy Facilities Siting Council at its meeting of August 2, 1991 by the members and designees present and voting. Voting for approval of the Tentative Decision as amended: Gloria C. Larson, Secretary of Consumer Affairs and Business Regulation; Daniel S. Gregory, Secretary of Economic Affairs; Andrew Greene (for Susan F. Tierney, Secretary of Environmental Affairs); Paul W. Gromer (Commissioner of Energy Resources); Joseph Faherty (Public Labor Member); and Kenneth Astill (Public Engineering Member). Voting against approval of the Tentative Decision as amended: Mindy Lubber (Public Environmental Member).

Gloria C. Larson

Gloria C. Larson
Chairperson

Dated this 2nd day of August, 1991

TABLE 1
Eastern Energy Corporation

1990 DEMAND FORECASTS

Year	1990 CELT Forecast	Kuhn Forecast
1989	20,000*	20,000*
1990	19,989	20,640
1991	20,087	21,300
1992	20,674	21,982
1993	21,335	22,686
1994	22,039	23,411
1995	22,540	24,161
1996	22,970	24,934
1997	23,328	25,732
1998	23,732	26,555
1999	24,287	27,405
2000	24,912	28,282
2001	25,351	29,187
2002	25,754	30,121
2003	26,248	31,085
2004	26,806	32,079
2005	27,417	33,106

Notes:
* Actual 1990 Peak Load

Sources: Exhs. HO-RN-2, HO-RN-4, HO-RN-7, HO-RN-21

TABLE 2
Eastern Energy Corporation

1990 SUPPLY FORECASTS

Year	Base Case*	High Case**	Low Case***
1989+	24,294	24,294	24,294
1990	25,799	25,799	24,649
1991	27,403	27,417	26,253
1992	27,499	27,518	26,349
1993	27,190	27,224	26,040
1994	26,837	26,871	25,687
1995	26,735	26,965	25,585
1996	26,750	26,982	25,600
1997	26,750	27,084	25,600
1998	26,692	27,026	25,542
1999	26,685	27,033	25,535
2000	26,672	27,068	25,522
2001	25,386	27,282	24,236
2002	25,354	27,343	24,204
2003	25,285	27,383	24,135
2004	25,281	27,379	24,131
2005	25,219	27,410	24,069

Notes:
* Based on the 1990 CELT forecast.
** Assumes a higher success rate for planned additions and the extension of Hydro-Quebec Phase II beyond the year 2000.
*** Assumes the cancellation of the Seabrook generating unit.
\+ Actual 1989 Supply.

Source: Exh. HO-RN-9

TABLE 3
Eastern Energy Corporation

1989 NEED CASES:
NUMBER OF CASES WITH AT LEAST
300 MW OF CAPACITY NEEDED

Year	EEC Contingency Test Results
1991	7
1992	25
1993	14
1994	16
1995	2
Total	64

Source: Exh. HO-RN-11

TABLE 4
Eastern Energy Corporation

1990 NEED CASES:
NUMBER OF CASES WITH AT LEAST 300 MW OF CAPACITY NEEDED

Year	EEC Tests	EFSC Test 1[a]	EFSC Test 2[b]	EFSC Test 3[c]	EFSC Test 4[d]	NO-COAL Test 1[e]	NO-COAL Test 2[f]	TOTAL
1991	1	0	0	0	3	1	1	6
1992	6	2	1	0	17	1	6	33
1993	23	7	6	5	17	20	23	101
1994	19	5	3	26	27	13	19	112
1995	12	4	4	10	0	18	12	60
1996	3	0	4	12	0	8	3	30
1997	0	0	0	9	0	2	0	11
1998	0	0	0	2	0	1	0	3
Total	64	18	18	64	64	64	64	356

Notes:
a. 25% of planned but uncommitted non-utility generating projects come on line as scheduled.
b. 66% of planned but uncommitted non-utility generating projects come on line as scheduled.
c. C&LM at level which 1989 NEPOOL resource assessment estimates has a 10% chance of occurring.
d. C&LM at level which 1989 NEPOOL resource assessment estimates has a 90% chance of occurring.
e. 25% increase in C&LM over levels identified in 1990 CELT report.
f. 25% increase in non-utility generation over levels identified in 1990 CELT report.

Sources: Exhs. HO-RN-11, HO-RN-13, HO-RN-14, HO-52

TABLE 5
Eastern Energy Corporation

1991 NEED CASES:
NUMBER OF CASES WITH AT LEAST 300 MW OF CAPACITY NEEDED

Year	EEC Tests	EFSC Test 1[a]	EFSC Test 2[b]	EFSC Test 3[c]	EFSC Test 4[d]	NO-COAL Test 1[e]	NO-COAL Test 2[f]	TOTAL
1993	0	0	0	0	1	0	0	1
1994	3	0	0	0	13	0	2	18
1995	13	2	0	1	15	4	13	48
1996	14	3	3	7	3	10	14	54
1997	2	3	3	12	0	15	3	38
1998	0	1	3	12	3	3	0	22
1999	2	0	0	0	9	0	0	11
2000	7	1	0	0	18	0	9	35
2001	21	2	1	22	2	23	20	91
2002	0	6	8	0	0	0	1	15
2003	2	0	0	7	0	6	2	17
2004	0	0	0	2	0	3	0	5
2005	0	0	0	1	0	0	0	1
Total	64	18	18	64	64	64	64	356

Notes:
a. 25% of planned but uncommitted non-utility generating projects come on line as scheduled.
b. 66% of planned but uncommitted non-utility generating projects come on line as scheduled.
c. C&LM at level which 1989 NEPOOL resource assessment estimates has a 10% chance of occurring.
d. C&LM at level which 1989 NEPOOL resource assessment estimates has a 90% chance of occurring.
e. 25% increase in C&LM over levels identified in 1990 CELT report.
f. 25% increase in non-utility generation over levels identified in 1990 CELT report.

Sources: Exhs. HO-RN-11 (rev.), HO-RN-13 (rev.), HO-RN-14 (rev.), HO-52 (rev.)

TABLE 6
Eastern Energy Corporation

PSD INCREMENT CONSUMPTION ANALYSIS

Pollutant*	Averaging Period	Concentration (micrograms per cubic meter) Facility Impact**	Background Sources	Maximum Total+	PSD Increment	Percent of Increment
SO_2	3-Hour	29.0	26.5	55.5	512	11
	24-Hour	6.0	14.0	20.0	91	22
	Annual	0.34	++	0.34	20	2
PM	24-Hour	1.3	++	1.3	30	4
	Annual	0.065	++	0.065	17	<1
NOx	Annual	0.97	++	0.97	25	4

Notes:

* Allowable increases in concentrations (PSD increments) have been established for SO_2, PM and NOx.

** The facility impact includes the impact of the main stack and the limestone preparation heater. The short-term concentrations (3-hour and 24-hour) represent the second highest concentrations for all receptors over the five-year modeling period. The annual concentrations represent the highest concentrations for all receptors over the five-year modeling period.

\+ Maximum total refers to the sum of facility impact and background sources for 3-hour and 24-hour SO_2 concentrations.

++ Background sources were not modeled because facility impacts were less than the thresholds which would require background source modeling.

\# Less than one percent

Sources: Exhs. HO-2A, Table 5.4-10, HO-2B, pp. F.1-12, F.1-16

TABLE 7
Eastern Energy Corporation

NAAQS COMPLIANCE ANALYSIS

Concentration (micrograms per cubic meter)

Pollutant	Averaging Period	Facility Impact*	Background Sources	Monitored Background	Maximum Total**	NAAQS	Percent of NAAQS
SO_2	3-Hour	29.0	33.2	314	376.2	1,300	29
	24-Hour	5.2	32.6	139	176.8	365	48
	Annual	0.32	+	26	26.3	80	33
PM	24-Hour	1.3	+	55	56.3	150	38
	Annual	0.065	+	30	30.1	50	60
NOx	Annual	0.97	+	30	31.0	100	31
Pb	Quarterly	3.6×10^{-6}		+	0.08		0.08
1.5	5						
CO	1-Hour	113.8	+	12,000	126	40,000	<1
	8-Hour	22.1	+	5,000	25	10,000	<1

Notes:

* The facility impact includes the impact of the main stack and the limestone preparation heater. The short-term concentrations (3-hour and 24-hour) represent the second highest concentrations for all receptors over the five-year modeling period. The annual concentrations represent the highest concentrations for all receptors over the five year modeling period.

** Maximum total refers to the sum of facility impact, background sources and monitored background for 3-hour and 24-hour SO_2 concentrations, and to the sum of facility impact and monitored background for all other pollutants and averaging periods.

\+ Background sources were not modeled because facility impacts were less than the thresholds which would require background source modeling.

Sources: Exhs. HO-2A, Table 5.4-10, HO-2B, pp. F.1-12, F.1-16

TABLE 8
Eastern Energy Corporation

MDEP AIR TOXICS AMBIENT GUIDELINES COMPLIANCE ANALYSIS

Compound	Emission rate* (grams/second)	Maximum Concentration (micrograms per cubic meter) 24-Hour EEC	24-Hour TEL**	Annual EEC	Annual AAL***
Arsenic	0.0035 0.0031	0.00022	--	0.000010	--
Benzene	0.12 0.11	0.0068	1.74	0.00035	0.12
Beryllium	0.000056 0.000049	0.0000035	0.001	0.00000016	0.0004
Cadmium	0.000016 0.000014	0.00000096	0.003	0.000000045	0.001
Chromium (total)	0.0026 0.0022	0.00016	1.36	0.0000074	0.68
Chromium (+6)	0.00026 0.00022	0.000016	0.003	0.00000074	0.0001
Copper	0.00025 0.00022	0.000015	0.54	0.00000071	0.54
Flourides	1.26 1.10	0.078	6.80	0.0036	6.80
Formaldehyde	0.073 0.067	0.0045	0.33	0.00022	0.08
Hydrogen chloride	16.5 14.5	1.03	2.03	0.048	2.03
Hydrogen fluoride	1.26 1.10	0.078	0.68	0.0036	0.34

TABLE 8 (cont.)

Compound	Emission rate (grams/second)	Maximum Concentration (micrograms per cubic meter) 24-Hour EEC	24-Hour TEL	Annual EEC	Annual AAL
Lead	0.00024 0.00021	0.000015	0.14	0.00000069	0.07
Mercury	0.0066 0.0057	0.00041	--	0.000019	--
Nickel (metal)	0.00052 0.00046	0.000032	0.27	0.0000015	0.01
PAH	0.000093 0.000088	0.0000057	--	0.00000029	--
Selenium	0.00019 0.00017	0.000012	0.54	0.00000055	0.54
Sulfuric acid mist	0.059 0.052	0.0037	2.72	0.00017	2.72
Vanadium	0.0010 0.00090	0.000063	0.27	0.0000030	0.27
Zinc	0.0012 0.0011	0.000075	--	0.0000035	--

Notes:

* The first value is the short-term rate based on a 105 percent maximum continuous rating. The second value is the annual average based on a 100 percent maximum continuous rating and 92 percent annual facility availability.

** TEL refers to 24-hour "Threshold Effects Exposure Limits"

*** AAL refers to annual "Allowable Ambient Limits"

Sources: Exhs. EEC-28, HO-2A, p. 5-53

Appeal as to matters of law from any final decision, order or ruling of the Siting Council 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 Council modified or set aside in whole or in part.

Such petition for appeal shall be filed with the Siting Council within twenty days after the date of services of the decision, order or ruling of the Siting Council or within such further time as the Siting Council may allow upon request filed prior to the expiration of 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. (Sec. 5, Chapter 25, G.L. Ter. Ed., as most recently amended by Chapter 485 of the Acts of 1971).