

COMMONWEALTH OF MASSACHUSETTS

Energy Facilities Siting Board

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In the Matter of the Petition of Commonwealth )

Electric Company for Approval to Construct a )

New, Underground 115 kV Transmission Line in ) EFSB 96-6

New Bedford, Massachusetts and )

Acushnet, Massachusetts )

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FINAL DECISION

Robert P. Rasmussen

Hearing Officer

September 16, 1997

On the Decision:

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Petitioner

## TABLE OF CONTENTS

### I.INTRODUCTION

A.Summary of the Proposed Project

B.Procedural History

C.Jurisdiction

D.Scope of Review

### II. ANALYSIS OF THE PROPOSED PROJECT

A.Need Analysis

1.Standard of Review

2.Description of the Existing System

3.Reliability of Supply

a.Reliability Criteria

b.Load Forecast

i.Description

ii. Analysis

c. Contingency Analysis

d. Accelerated Conservation and Load Management

e. Conclusions on Reliability of Supply

B. Comparison of the Proposed Project and Alternative Approaches

1. Standard of Review

2. Project Approaches

3. Ability to Meet the Identified Need

a. Proposed Project

b. Reconductoring Alternative

c. Alternative Transmission Facilities

d. Distribution and Substation Alternatives

e. Generation Alternative

f. Distributed Generation

g. Conditions on Ability to Meet Identified Need

4. Reliability

a. Transmission Alternatives

b. Generation Alternative

5. Environmental Impacts

a. Facility Construction Impacts

b. Permanent Land Use Impacts

c. Magnetic Field Levels

d. Conclusions on Environmental Impacts

6. Cost

7. Conclusions: Weighing Need, Cost, Environmental Impacts and Reliability

### III. ANALYSIS OF THE PROPOSED AND ALTERNATIVE FACILITIES

A. Description of the Proposed Facilities and Alternative Facilities

1. Proposed Facilities

2. Alternative Facilities

B. Site Selection Process

1. Standard of Review

2. Development of Siting Criteria

a. Description

b. Analysis

3. Application of Siting Criteria

a. Description

b. Analysis

4. Geographic Diversity

5. Conclusions on the Site Selection Process

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

1. Standard of Review

2. Analysis of the Proposed Facilities Along the Primary Route

a. Environmental Impacts of the Proposed Facilities Along the Primary Route

i. River Crossing Impacts

ii. Impacts Outside the River Crossing

iii.Magnetic Field Levels

iv.Conclusions on Environmental Impacts

b. Cost of the Proposed Facilities Along the Primary Route

.....Page 74

c. Reliability of the Proposed Facilities Along the Primary Route

.....Page 75

d.Conclusions

3. Analysis of the Proposed Facilities Along the Alternative Route Segment  
Combinations and Comparison

a. Environmental Impacts of the Proposed Facilities Along the Alternative Routes and  
Comparison

i. River Crossing. .... Page 76

(a)Westerly Alternatives

(b)Acushnet Alternative

ii.Impacts Outside the River Crossing

(a)Westerly Alternative

(b)Acushnet Alternative

iii.Magnetic Field Levels

(a)Westerly Alternative

(b)Acushnet Alternatives

iv.Conclusions on Environmental Impacts

b. Cost of the Proposed Facilities Along the Alternative Routes and Comparison

c. Reliability of the Proposed Facilities Along the Alternative Route Segment  
Combinations and Comparison

i.Description

ii. Analysis

d. Conclusions

#### IV. DECISION

#### FIGURES:

FIGURE 1: PRIMARY AND ALTERNATIVE ROUTES

FIGURE 2: NOTICED ROUTE SEGMENTS

The Energy Facilities Siting Board hereby APPROVES the petition of Commonwealth Electric Company for approval to construct a new underground 115 kilovolt electric transmission line, using Commonwealth's proposed route in the City of New Bedford and the Town of Acushnet, Massachusetts.

#### I. INTRODUCTION

##### A. Summary of the Proposed Project

Commonwealth Electric Company ("Commonwealth" or "Company") is an investor-owned electric utility engaged in the generation, distribution and retail sale of electricity in forty communities in southeastern Massachusetts, including the City of New Bedford and the Town of Acushnet (Commonwealth Brief at 1). Commonwealth is a wholly-owned subsidiary of Commonwealth Energy System (id.).

Commonwealth has proposed to construct a new 115 kilovolt ("kV") underground transmission line, approximately 3.3 miles in length, that would extend from Commonwealth's Acushnet substation, located in Acushnet, Massachusetts, to its Pine

Street substation, located in New Bedford, Massachusetts (Exh. C-1, at exhibit I-1). For its primary route, Commonwealth has proposed a transmission line that would exit the Acushnet substation, proceed westerly toward the Acushnet River, cross the Acushnet River into New Bedford, proceed to the intersection of Belleville Road and Belleville Avenue, and then follow city streets to the south and to the immediate west of the river, until reaching the Pine Street substation (*id.*) (see Figure 1). Commonwealth also identified a number of other route alternatives and route segments that could be employed in combination between the Acushnet substation and the Pine Street substation, as well as several points of interconnection between Commonwealth's primary route and the various noticed alternatives. A total of 20 specific route segments were identified in Commonwealth's petition (*id.* at V-5 to V-11, exhibit I-2) (see Figure 2).

In addition to the proposed 115 kV transmission line, Commonwealth has indicated that, depending upon the results of final engineering analyses, it may also install shunt reactors, circuit breakers, a 115 kV bus extension and related structures, relaying and control equipment and switches at either the Acushnet substation or the Pine Street substation (Exh. HO-A-11) ("proposed project").

## B. Procedural History

Commonwealth filed its petition for approval of the proposed project with the Energy Facilities Siting Board ("Siting Board") on October 31, 1996. The petition was docketed as EFSB 96-6. On January 8, 1997, the Siting Board conducted a public hearing on the petition in the City of New Bedford. In accordance with the direction of the Hearing Officer, Commonwealth provided notice of the public hearing and adjudication. No petitions to intervene or to participate as an interested person were submitted to the Siting Board.

The Siting Board conducted an adjudicatory hearing on April 14, 1997. Commonwealth presented 6 witnesses: Harold W. Eklund, senior principal engineer of Commonwealth, who testified regarding the need for the project, the project alternative analysis and Commonwealth's route selection process; Keith L. Jones, a design engineer in Commonwealth's Transmission and Distribution Planning Group, who testified regarding the need for the project and the evaluation of project alternatives in terms of reliability and cost; Sara A. Brumbaugh, senior engineer-forecasting for Commonwealth, who testified regarding Commonwealth's long-range forecast and the continuing need for the project; Scott G. Hutchins, senior engineer and formerly Commonwealth's group leader of Demand Planning and Evaluation, who testified regarding Commonwealth's analysis of targeted demand-side management ("DSM") strategies that might be employed to address or defer the identified need for a new energy facility in the Pine Street Substation load center; Dennis M. Perry, an engineer in Commonwealth's System Engineering Department, who testified regarding the project alternative analysis, the route selection process and the cost comparison analysis of the various route segment alternatives analyzed by Commonwealth; and W. Stephen Collings, principal environmental engineer



in Commonwealth's Environmental Programs Group, who testified regarding environmental aspects of Commonwealth's project alternative analysis and route selection process.

The Hearing Officer entered 81 exhibits into the record, consisting of Commonwealth's responses to information and record requests. Commonwealth entered eight exhibits into the record. Commonwealth filed its brief on May 12, 1997.

### C. Jurisdiction

Commonwealth's Petition is filed in accordance with G.L. c. 164, § 69H, which requires the Siting Board "to implement the energy policies ... to provide a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost," and pursuant to G.L. c. 164, § 69J, which requires electric companies to obtain Siting Board approval for construction of proposed "facilities" at a proposed site before a construction permit may be issued by another state agency.

Two definitions of "facility," both set forth in G.L. c. 164, § 69G, are relevant in determining which components of Commonwealth's proposed project are subject to Siting Board review and approval in this proceeding. Siting Board jurisdiction over Commonwealth's proposed transmission line is governed by the second definition of "facility" set forth in G.L. c. 164, § 69G. That section states, in part, that a facility is:

(2) any new electric transmission line having a design rating of sixty-nine kilovolts or more and which is one mile or more in length except reconductoring or rebuilding of existing transmission lines at the same voltage.

The Company's proposal to construct a new 3.3 mile, 115 kV electric transmission line falls squarely within this definition. Accordingly, the Siting Board finds that the proposed transmission line is a jurisdictional facility within the meaning of G.L. c. 164, § 69G(2).

With respect to the shunt reactors, circuit breakers, 115 kV bus extension, relaying and control equipment and switches that may become components of the project, the third definition of facility set forth in G.L. c. 164, § 69G is the pertinent provision. This definition provides that a "facility" includes:

(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.

The Siting Board has interpreted the term "ancillary structure" in its prior decisions, and has stated that such a structure is a "facility" within the meaning of G.L. c. 164, § 69G if (1) structure is subordinate or supplementary to a jurisdictional facility, and (2) the structure provides no benefit outside of its relationship to the jurisdictional facility. See *New England Power Company, EFSB 95-2*, at 5 (1996) ("1996 NEPCo Decision"); *New*

England Power Company, 4 DOMSB 109, 117 (1995) (“1995 NEPCo Decision”); Commonwealth Electric Company, 17DOMSC 249, 263 (1988) (“1988 ComElec Decision”). The reactors, circuit breakers, bus extension, relaying and control equipment and switches that may be installed at either the Acushnet Substation or the Pine Street Substation would be supplementary to the proposed transmission line, and would not provide a benefit outside of their relationship to it. Accordingly, the Siting Board finds that these project components constitute jurisdictional facilities within the meaning of G.L. c. 164, § 69G(3).

#### D. Scope of Review

In accordance with G.L. c. 164, § 69H, before approving an application to construct facilities, the Siting Board requires applicants to justify facility proposals in three phases. First, the Siting Board requires the applicant to show that additional energy resources are needed (see Section II.A, below). Next, the Siting Board requires the applicant to establish that its project is superior to alternative approaches in terms of cost, environmental impact, reliability, and ability to address the previously identified need (see Section II.B, below). Finally, the Siting Board requires the applicant to show that its site selection process has not overlooked or eliminated clearly superior sites, and that the proposed site for the facility is superior to a noticed alternative site in terms of cost, environmental impact, and reliability of supply (see Sections III.B and III.C, below). When a facility proposal is submitted to the Siting Board, the petitioner is required to present: (1) its preferred facility site or route; and (2) at least one alternative facility site or route. These sites and routes often are described as the “noticed” alternatives because these are the only sites and routes described in the notice of adjudication published at the commencement of the Siting Board’s review. In reaching a decision in a facility case, the Siting Board can approve a petitioner’s preferred site or route, approve an alternative site or route, or reject all sites and routes. The Siting Board, however, may not approve any site, route, or portion of a route which was not included in the notice of adjudication published for purposes of the proceeding.

Close Additionally, in the case of an electric company which is required by G.L. c. 164, § 69I to file a long-range forecast with the Department of Public Utilities (“Department”), the applicant must show that the facility is consistent with the electric company’s most recently approved long-range forecast. G.L. c. 164, § 69J. Commonwealth is an electric company required to make such a filing and to make such a showing. Department’s most recent review of a long-range-forecast for Commonwealth was in D.P.U. 95-95, in which, consistent with 220 C.M.R. §§ 10.00 et seq., the Department accepted the Company’s forecast pursuant to a comprehensive Settlement Agreement. Cambridge Electric Light Company/Commonwealth Electric Company, D.P.U. 95-95 (Letter Order, December 15, 1995 at 2, 3).

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## II. ANALYSIS OF THE PROPOSED PROJECT

### A. Need Analysis

#### 1. Standard of Review

In accordance with G.L. c. 164, § 69H, the Siting Board is charged with the responsibility for implementing energy policies to provide a 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 Board evaluates whether there is a need for additional energy resources

In this discussion, the term “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”).

Close to meet reliability, economic efficiency, or environmental objectives. The Siting Board must find that additional energy resources are needed as a prerequisite to approving proposed energy facilities.

#### 2. Description of the Existing System

Commonwealth indicated that the Pine Street substation is currently served by two underground 115 kV transmission cables originating at the Acushnet substation (Exh. C-2, at 3). These cables are 250 kcmil pipe-type transmission cables separated along their entire length by approximately 18 inches; Commonwealth refers to these cables as the #112 and #114 cables, and each is approximately four miles in length (Exh. C-1, at II-3). The cables exit the Acushnet substation running westerly and cross beneath the Acushnet River. The cables then proceed westerly on Belleville Road beneath City of New Bedford streets to the intersection of Ashley Boulevard, and then generally southerly continuing beneath the city streets including significant sections of Ashley Boulevard and County Street, and then generally easterly along Russell Street to the Pine Street substation (id.). Each of these cables has a rating of 60 megavolt amperes (“MVA”), providing a total of 120 MVA of capacity at the Pine Street substation (id.). The #112 cable is high-pressure, nitrogen-filled, while the #114 cable is high-pressure, oil-filled. The cables are 48 and 46

years old, respectively (id.).

The Acushnet substation is served by two overhead 115 kV lines with nominal ratings of 386 MVA and 227 MVA, resulting in a normal supply capacity of 613 MVA and a firm capacity of 227 MVA (id. at II-3; Exhs. HO-N-1; HO-N-3). At the Acushnet substation, there are two bulk 115/13.2 kV transformers, each having a top nameplate rating of 62.5 MVA, providing a total of 125 MVA of capacity. The firm capacity of the Acushnet substation is therefore sufficient to serve the combined 1997 peak load of approximately 108.6 MW which consists of 73 MW at the Pine Street substation and 35.6 MW at the Acushnet substation (Exh. C-1, and II-3). The Acushnet substation serves twelve main 13.2 kV distribution feeder circuits, ten of which proceed beneath the Acushnet River to serve the north end of New Bedford. Of these ten circuits, five feeder circuits provide tie capability with the Pine Street substation, and can be used to transfer about 12.5 MW of load between these two substations (id.).

At the Pine Street substation there are three bulk 115/13.2 kV transformers, each having a 60 MVA top nameplate rating. The Pine Street substation serves thirty main underground 13.2 kV distribution feeder circuits. Five of these 13.2 kV circuits provide tie capability with the five Acushnet substation the circuits previously mentioned.

Commonwealth also stated that the two overhead 115 kV line systems that serve the Acushnet substation area from the east, split to help form a multiple source of transmission supply that essentially surrounds the City of New Bedford on three sides. Commonwealth indicated that this design has provided the Company with the ability to transfer load to adjacent substations in the event of contingencies involving certain elements of the New Bedford district's bulk system.

Commonwealth indicated that it had maintained its existing limited capability to serve the Pine Street substation load area by "switching" certain of Commonwealth's 13.2 kV distribution circuits, so that a portion of the Pine Street load center could be served by other, adjacent bulk substations (id. at II-4 to II-6; Exh. C-2, at 4). Commonwealth indicated that it has installed automated, remote-control switching on certain distribution "tie" circuits to decrease the amount of time necessary to effect switching between the Pine Street substation and the adjacent Acushnet substation, as well as between Commonwealth's Cross Road and Fisher Road substations, both of which are located in the Town of Dartmouth (Exh. C-1, at I-3, II-6).

Commonwealth stated that it had been able to defer the need for the proposed transmission line by automating the switching of its 13.2 kV tie circuits. Commonwealth asserted that this ability to transfer load, together with ongoing C&LN programs, enabled Commonwealth to defer the need for the proposed transmission line (Exhs. C-1, at I-3 - I-4; C-2, at 4, 9; C-3, at 7-8; Tr. at 23).

Close Commonwealth's seven tie circuits permit the transfer of approximately 20.1 megawatts of the forecasted 1997 summer peak load from the Pine Street substation (id. at II-6).

### 3. Reliability of Supply

Commonwealth asserted that the proposed facility is needed in order to provide a reliable supply of electricity to the Pine Street substation load area (id. at III-1 to III-2; Exh. C-2, at 5; Tr. at 47). In support of this assertion, Commonwealth identified its concerns with the existing 115 kV transmission system that serves its Pine Street substation which result in reduced system reliability. Commonwealth stated that the present demand at the Pine Street substation exceeds the capability of existing equipment in the event of a reasonably foreseeable, single contingency outage (Exh. C-1, at III-1). Commonwealth indicated that one of its primary measures of system reliability is its ability to respond to such an outage, i.e., where a single transmission element, bulk substation transformer, or autotransformer serving load in a particular area is forced out of service (id. at exhibit III-A).

Commonwealth's reliability criteria further specify that system voltages, line loadings and equipment loadings shall be within normal limits for predisturbance conditions and within applicable "emergency" limits for a single contingency outage (Exh. C-1, at exhibit III-A).

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Commonwealth indicated that in the event of a single contingency outage during peak conditions, the cable remaining in service would be exposed to potentially serious thermal overload until the 13.2 kV tie circuits linking Pine Street to surrounding substations could be transferred or switched to adjacent substations (id. at 1-2; Exh. C-3, at 6). Commonwealth further explained that, due to the age of the existing underground cables serving the Pine Street substation load center, the Company typically would shed the Pine Street substation load in response to a single contingency outage during peak conditions so as to avoid a thermal overload and potential damage to the second or remaining cable. Commonwealth stated that at present, in the event of a single contingency involving one of the 115 kV lines serving the Pine Street substation, existing 13.2 kV distribution tie lines would be switched by the system operator and field crews so that a portion of the Pine Street load could be served by adjacent substations. The Company estimated that such switching would require two to four hours, during which time the Pine Street substation load center would be without service (Exhs. C-1, at III-4; C-3, at 6).

In this section, the Siting Board first examines the reasonableness of Commonwealth's system reliability criteria. The Siting Board then evaluates: (1) whether Commonwealth uses reviewable and appropriate methods for assessing system reliability based on load flow analyses; (2) whether existing and projected loads under certain contingencies exceed Commonwealth's reliability criteria, thereby requiring additional energy resources; and (3) whether acceleration of C&LM programs could eliminate the need for

such additional energy resources.

a. Reliability Criteria

Commonwealth described several service reliability and system design criteria applicable to the existing transmission facilities that serve the Pine Street substation load center. In defining its reliability criteria, Commonwealth provided an excerpt of its Reliability Criteria for the Design of Transmission Lines and Bulk Power Substations (Exh. C-1, at exhibit III-A). First, Commonwealth's reliability standard requires that its transmission system be designed with sufficient capacity to serve area loads under certain reasonably foreseeable outage conditions, including the forced outage of certain transmission circuits, transformers, or generators (*id.*; Exh. C-3, at 5). Commonwealth indicated that its design standard requires that its contingency studies assume power flow conditions that "reasonably" stress the system and that voltages, line loadings and equipment loadings should be within normal limits for "pre-disturbance" conditions, and within applicable emergency limits for the system conditions that exist following the established contingency (Exh. C-1, at exhibit III-A).

Commonwealth indicated that its reliability criteria had been developed in accordance with New England Power Pool and Northeast Power Coordinating Council reliability criteria to ensure that the reliability and efficiency of Commonwealth's bulk transmission facilities remain within acceptable guidelines (*id.* at III-1; Exh. C-3, at 4-5).

The Siting Board has consistently found that if the loss of any single major component of a supply system would cause significant customer outages, unacceptable voltage levels, or thermal overload on system components, then there is justification for additional energy resources to maintain system reliability. Norwood Municipal Light Department, EFSB 96-2, at 11 (1997) ("Norwood Decision"); 1996 NEPCo Decision, EFSB 95-2, at 10; Holyoke Gas & Electric Department, 3 DOMSC 1, 7 (1978). Consequently, the Siting Board finds that Commonwealth's reliability criteria regarding firm service in the event of a single contingency outage is reasonable.

In addition to the Company's single contingency criterion, Commonwealth introduced two additional factors for consideration in its assessment of need for new facilities, and discussed their relationship to overall system reliability. First, Commonwealth suggested that it is appropriate to consider the addition of new energy resources if emergency plans developed to address a reasonably conceivable double contingency would require extensive or substantial efforts, or necessitate undue or extended customer outages (Exh. C-1, at I-3, n.2, III-4). Second, Commonwealth suggested that the need for new energy facilities could be further established if such new facilities would support or enhance the ability of the Company to address future planned construction (*id.* at III-2).

With respect to Commonwealth's criteria regarding the potential for a double contingency involving both the #112 and #114 underground cables, the Siting Board has

noted that concern about such a loss is warranted if the need for a two line supply is clear, e.g., if the two lines provide needed firm capability or if the combined capacity of the lines is needed to meet peak load under normal operations. 1995 NEPCo Decision, 4 DOMSB at 124. The Siting Board has also found that it may be appropriate to consider this factor in conjunction with other reliability criteria that relate to the need for two lines. Id. Commonwealth's reliability criteria do not explicitly require that its bulk supply system maintain firm supply in the event of a double contingency outage, but do analyze its ability to restore service in the event of a reasonably conceivable double contingency outage. The Siting Board therefore finds that Commonwealth's analysis of a double contingency in this case is reasonable, but is not required based on its reliability criteria. Therefore, Commonwealth's double contingency criterion will not be explicitly considered in the Siting Board's determination of need for new energy facilities.

Upon reviewing Commonwealth's contention that requirements relating to future system expansion should be considered as a determinant in showing need for additional energy facilities, the Siting Board agrees that future expansion plans may be an appropriate reliability consideration in weighing alternatives for meeting the identified need. However, as Commonwealth has stated that it has no near term plans to reconnector either of the existing #112 and #114 lines, this factor will not be considered as a determinant in showing need for new energy facilities. Commonwealth indicated that for planning study purposes, it has identified years 2016 and 2017 as the likely date for reconnectoring operations involving these lines (Exh.HO-A-5).

Close Instead, the Siting Board will consider the extent to which the proposed project would facilitate future construction or upgrades of related system components as part of its review of the reliability of alternative approaches to meeting the identified need (see Section II.B.4, below).

Accordingly, the Siting Board finds that Commonwealth's single contingency reliability criterion is reasonable for purposes of determining need in this review. The Siting Board also finds that Commonwealth's double contingency and future construction criteria are reasonable in this case for purposes of comparing the reliability of the proposed project to alternative approaches.

## b. Load Forecast

### i. Description

In connection with its analysis of the need for the proposed facility, Commonwealth presented its most recent load forecast for the Pine Street substation load center (Exh. C-1, App. A).

Commonwealth indicated that the Pine Street substation load center forecast was constructed using a “top down” approach, based on Commonwealth’s most recent long-range forecast, which was reviewed and accepted by the Department in D.P.U. 95-95 (Exh. C-4, at 4). Commonwealth noted that this forecast reflected Commonwealth’s total coincident peak load, i.e., the coincidence of peak load in each of Commonwealth’s three districts: Cape Cod; New Bedford; and Plymouth (id. at 5). Commonwealth then developed specific projections of each district’s peak load, non-coincident with Commonwealth’s total or system peak. These non-coincident peaks (“NCP”) reflect the maximum demand that is expected to be placed on each district within the summer season (id.). Commonwealth explained that its allocation of its system-wide forecast to its three districts included analysis of the weather responsiveness of each district, and each district’s sensitivity to economic conditions and seasonal load patterns (Exh. C-1, App. A, at 4). Commonwealth then developed allocated load forecasts for each substation within a district based upon the expected timing of that particular district’s NCP. The Company stated that these forecasts are developed annually for 41 substations in each of Commonwealth’s three districts (id., App. A, at 1).

Commonwealth indicated that it developed its Pine Street substation forecast in the context of its annual review using a six-step econometric modelling process. First, Commonwealth ascertained the continuing validity of its D.P.U. 95-95 forecast, by weather-normalizing the actual 1995 summer peak and observing that it was nearly identical to the forecasted 1995 summer peak (id., at App. A at 2-3, 6-8; Exh. C-4, at 5). Second, Commonwealth weather-normalized the actual individual district NCP loads using techniques similar to those applied to Commonwealth’s system forecast (Exh. C-4, at 5; Exh. C-1, App. A at 8). Through this process, Commonwealth established the particular patterns that, in isolation or in combination, drove Commonwealth’s total load (Exh. C-4, at 7-8). Third, in order to account for forecast diversity between the weather-normalized system and district peak loads, normal peaking conditions were identified for each district, thus enabling the coincident peak forecast for the Commonwealth system as a whole to be transformed into the individual district NCP’s (id. at 8-9; Exh. C-1, at App. A at 12-15). Fourth, loads for each substation in each district were modelled statistically, based on the pertinent district load, and on factors such as temperature, humidity, the day of the week, and the level of economic activity in the area as reflected, for example, by the level of manufacturing employment (Exh. C-4, at 10; C-1, App. A at 15-16). Fifth, Commonwealth identified and reflected expected step loads, or incremental load increases of 0.5 MW or more, based upon an analysis of district-specific information. In the case of the Pine Street load center, two expected step loads were identified and introduced into the model: 1.5 MW in year 1996 corresponding to the New Bedford wastewater treatment plant; and 0.66 MW in year 1997 corresponding to additional load for the wastewater treatment plant.

Close Step loads were then reduced by a factor of 0.6 to reflect the possibility that such loads might not completely materialize (Exhs. C-1, App. A at 17; C-4, at 11). Sixth, an “extreme weather” case was formulated in order to further test the reliability of Commonwealth’s transmission system under “reasonably expected extreme weather.”



Commonwealth indicated that its extreme weather case assumed a one-in-five year probability of extreme conditions, based upon examination of the previous twenty-two years of available weather data (Exhs. C-1, App. A at 17-18; C-4, at 6, 11-12).

Commonwealth stated that its forecasted weather-normalized peak load at the Pine Street substation is expected to grow from 66 MW in 1995 to 75 MW in the year 2015, reflecting a compound annual growth rate (“CAGR”) of 0.6% (Exh. C-4, at 13). In the extreme weather case, Pine Street substation load is expected to grow from 72 MW in 1995 to 81 MW in 2015, a CAGR of 0.6% (id. at 15).

## ii. Analysis

In support of its petition, Commonwealth has submitted a detailed substation level forecast which was derived from its system-wide forecast submitted in D.P.U. 95-95 and accepted by the Department pursuant to an approved settlement agreement. Commonwealth validated its D.P.U. 95-95 forecast with actual data, and Commonwealth’s analysis demonstrated that the D.P.U. 95-95 forecast continues to be appropriate for planning purposes. In addition, Commonwealth analyzed its district and substation forecast to ascertain the consistency of these disaggregated forecasts with the system-wide forecast prepared and submitted in D.P.U. 95-95.

In forecasting load for the Pine Street substation, Commonwealth prepared a New Bedford district forecast and then derived the Pine Street substation forecast from the district forecast. In presenting its New Bedford district forecast, the Company adequately explained its derivation of historic trends in order to prorate its system-wide forecast into separate district forecasts. Commonwealth also has provided reasonable explanations of its estimation of load growth at the substation level, based upon both Commonwealth’s forecasts of system and district load, as well as historical measurements of increasing substation load.

In previous transmission line reviews, the Siting Board has stated that, in facility reviews where a company projects load growth for a portion of its service territory, the Siting Board will require such company to use quantitative techniques, where sufficient data is available, or other systematic techniques, and to document all pertinent assumptions to support the allocation of system-wide growth to service areas and to individual substations within the service areas. 1995 NEPCo Decision, 4 DOMSB at 127; New England Power Company, 21 DOMSC 325, 344 (1991)(“1991 NEPCo Decision”).

Here, the Siting Board finds that Commonwealth has relied on quantitative techniques with adjustments for forecasting load at the district level, and has provided a reasonable explanation for its estimation of load at the substation level, based on the district forecast. Accordingly, for purposes of this review, the Siting Board finds that Commonwealth’s substation forecast is reasonable and acceptable.

## c. Contingency Analysis

In this section, the Siting Board considers whether there is a need for additional energy resources based upon Commonwealth's reliability criteria.

Commonwealth stated that electrical facilities currently serving the Pine Street substation could not be operated at or above emergency capacity ratings in the event of a single contingency outage during peak periods (Exh. C-1, at III-4, exhibit III-B). In support of its assertion, Commonwealth provided the normal and emergency ratings of the existing #112 and #114 underground cables that serve the Pine Street substation load, which it indicated were based on manufacturers specifications and recommendations based on the manufactures' industry experience, and on the age of these facilities (id. at II-3, n.1). Commonwealth argued that any period of exposure of the existing #112 and #114 linesto load levels exceeding emergency ratings would not be prudent given the age of thesecables and the prospect that subjecting either of these cables to overload conditionscould lead to serious, permanent damage (Exh. C-1, at III-4 and III-8).

Close Commonwealth stated that the established emergency rating for each of these cables is 60 MVA (id. at II-3; Tr. at 31). The Company thus established a load threshold of 60 MW, above which, Pine Street substation load would be at risk under a single contingency.

Commonwealth next provided lad flow analyses showing power flows and voltage conditions on the facilities that currently serve the Pine Street substation (Exh. C-1, at exhibit III-B).

Commonwealth employed the Power System Simulator for Engineering ("PSS/E") model, an industry standard program to produce load flow analyses (Exh. C-3, at 5).

Commonwealth explained that the PSS/E model used computerized mathematical models of Commonwealth's power system in order to quantify voltages and powerflows under normal, peak, and contingency conditions (Exh. C-1, at III-3). Commonwealth applied the model to forecasted extreme weather peak load to analyzethe adequacy of its system under normal and contingency conditions (id.).

Close Commonwealth's load flow analyses, based on a forecasted year 2000 summer peak load under extreme weather conditions of 74.5 MVA, indicated that in the event of a loss of one of the existing #112 or #114 underground cables that now run between the Acushnet substation and the Pine Street substation, the remaining line would be subject to a 25 percent overload prior to the switching of maximum transferrable load to other adjacent substations (id. at III-4). Commonwealth stated that this condition constitutes a violation of the Company's single contingency reliability criterion (id. at III-4 and exhibit III-A). Additionally, Commonwealth indicated that by 2015 under extreme weather, a comparably timed contingency would result in an overload of the remaining cable by approximately 37 percent above that cable's 60 MVA emergency rating (id. at III-4).

Commonwealth stated that in order to restore reliability to the system under a single contingency outage of either the #112 or #114 line, it currently has to shift load to several

13.2 kV distribution level circuits which provide tie capability between the Pine Street substation and adjacent substations within Commonwealth's New Bedford district (id. at III-8) (see Section II.A.2, above). The Company argued that its reliance on distribution based capacity transfer capability is problematic for several reasons: (1) the transfer of load requires time for the Company's Supervisory control and Data Acquisition ("SCADA") operators and line crews to complete; (2) physical interconnection of adjacent substations provides no guarantee that the requisite capacity will be available for load transfer purposes; and (3) transfer capacity will diminish as native load increases at those adjacent substations having distribution level interconnection with the Pine Street substation (id. at III-4).

Taking these considerations into account, Commonwealth explained that while 13.2 kV distribution level switching theoretically gives Commonwealth the ability to maintain loading on a single remaining line to within its rated capacity, the Pine Street substation load must be shed during the time that such switching is being pursued in order to avoid thermal overload of the remaining cable. Commonwealth stated that this necessary interruption of Pine Street substation service is in violation of the Company's single contingency reliability criterion (Exh. C-3, at 6).

Commonwealth also explained that its ability to transfer Pine Street substation load to other substations in the event of a single contingency involving one of the existing lines was becoming further constrained by load growth within the district as a whole, and that the number of hours and amount of load being placed at risk in the event of a single contingency would therefore increase during the period examined in the Company's load forecast (Exh. C-1, at III-4).

The Siting Board finds that Commonwealth used reviewable and appropriate methods for assessing the reliability of supply based on actual load measurements and load flow analyses. The Siting Board accepts the Company's analysis which indicates that 60 MW is the threshold of risk that applies to its existing facilities. The record indicates that in 1995, weather-normalized peak load at the Pine Street substation exceeded firm capacity by 6 MW, and that by 2015, peak load would exceed firm capacity by 15 MW. Under extreme weather assumptions, Pine Street substation load in 1995 exceeded firm capacity at the Pine Street substation by 12 MW, and would grow to exceed firm capacity by 21 MW in 2015. The Siting Board therefore finds that (1) Commonwealth's measurements and load flow analyses demonstrate that under a single contingency at both current and forecasted peak load conditions, transmission facilities supplying the Pine Street substation would be loaded above emergency capabilities in contravention of Commonwealth's reliability criteria, and (2) the ability of the current system to address a single contingency by effecting automated and manual switching of 13.2 kV distribution level circuits is not sufficient to maintain system reliability consistent with Commonwealth's stated reliability criteria. Consequently, the Siting Board finds that the current configuration of supply to the Pine Street substation does not meet Commonwealth's reliability criteria in the event of the single contingency loss of either the #112 or the #114 transmission cable.

Accordingly, the Siting Board finds that there is a need for additional energy resources based on Commonwealth's reliability criteria.

#### d. Accelerated Conservation and Load Management

G.L. c. 164, § 69J requires a petitioner to include a description of actions planned to be taken to meet future needs and requirements, including the possibility of reducing requirements through load management. Commonwealth asserted that, given the amount of load reduction necessary, accelerated C&LM

Load management is a measure or action designed to modify the time pattern of customer electricity requirements, for the purpose of improving the efficiency of an electric company's operating system. 220 C.M.R. § 10.02. For example, a utility may reach an agreement with a manufacturer that uses electricity whereby that manufacturer will curtail its use during peak times when the utility's system, as a whole, is facing increased demand for electricity for cooling or heating purposes. During non-peak times the manufacturer may then resume its use of electricity. The utility providing electricity has, therefore, managed its load, thereby decreasing its need for additional peak capacity. Conservation, on the other hand, is a technology, measure, or action designed to decrease the kilowatt or kilowatt hour requirements of a particular electric end-use, thereby reducing the overall need for electricity (*id.*). Both conservation and load management are DSM measures.

Close efforts within the Pine Street substation load center would not address the identified need for additional energy resources (Exhs. C-1, at IV-14 to IV-15; C-5, at 9; Tr. at 174-175). The Company stated that it had been able to defer the construction of the proposed transmission line, in part, due to the implementation of its "Green Saver" programs and other DSM initiatives within the New Bedford load area. Commonwealth argued that such activities, in conjunction with the installation of additional distribution switching equipment, secured benefits for its customers, but that such actions could no longer be prudently implemented to further defer the construction of a new energy resource (Exh. C-2, at 9).

In support of its assertion, the Company provided a study, performed in conjunction with its consultant, XENERGY, Inc., of opportunities to address or defer the need for additional energy resources to serve the Pine Street substation area. The study considered whether a combination of targeted strategies including DSM, energy efficiency and load management, distributed generation ("DG"), and interruptible rates would be capable of supplying approximately 14 MW of load reduction in the area served by the Pine Street substation (Exh. C-1, App. B at 1).

Commonwealth indicated that this figure was based upon forecasts of 1998 peak requirements at the Pine Street substation, which are expected to reach 73.6 MW under extreme weather, or approximately 14 MW over the 60 MW emergency threshold identified in Section II.A.3.c., above (Exh. C-1, App. A at 65, App. B at 15).

Close As a result of this study, Commonwealth concluded that even extraordinary levels of achievement in these areas could only defer, and not avoid, the need for a new energy resource to serve the Pine Street substation load area as Pine Street substation load is projected to reach 67.9 MW under base weather, and 73.6 MW under extreme weather, by 1998 (id. at III-6, n.4, App. A at 62, 65).

In performing its study, the Company conducted an analysis of Company data relating to technical potential, baseline energy and demand, and end-use measure impacts (id. at III-6). Commonwealth's staff also analyzed the particular characteristics of customers and customer classes within the Pine Street substation load center to determine whether any area-specific adjustments were required with respect to forecasting data and assumptions. The Company stated that Commonwealth's staff performed field investigations which served to further refine the Company's characterization of the Pine Street substation load area (id.). Commonwealth then developed particular demand and load characteristics for the Pine Street substation load center, disaggregated by customer class (id.). Customer class requirements were then analyzed and particular usage patterns for each class were developed (id.).

Next, Commonwealth examined a load duration curve for the Pine Street substation to determine the actual requirements DSM applications in terms of both time and duration of use. Commonwealth then applied mathematical models commonly in use within the industry to assess potential DSM, and to rank DSM technologies by market segment (id.; see also Exh. C-1, App. B at 15). This resulted in the determination of the load center's technical potential by end-use in terms of energy and demand during the periods of peak load (id. at III-6, App. B at 16). The study identified 17.1 MW of Pine Street substation load that would be technically amenable to accelerated DSM initiatives. Commonwealth asserted that the level of technical potential identified by the study would be overstated to the extent that the analysis did not account for customers that have already participated in one or more of Commonwealth's established DSM programs, or customers who have already expressed a reluctance to accept interruptible service (id. at III-6 to III-7). The Company indicated that 14 percent of the Pine Street substation load center's customer base has participated in ongoing Commonwealth DSM program (Exh. C-1, at III-6).

Close With respect to applications for DG, the Company stated that the study assumed two potential applications for a total of 4 MW of DG (fuel cells), but projected a cost of \$500 to \$4000 per kilowatt for such resources, leading the Company to conclude that DG would be uneconomical, and that it should therefore be rejected (id. at IV-15, and App. B at 4, 26). The Company also expressed concerns as to the reliability of this emerging technology as further grounds for the rejection of DG (id.).

Commonwealth next determined "economic potential" and "market or achievable potential," the level of DSM considered to be available and economically feasible in the

Pine Street substation load area (Exh. C-5, at 7). The Company stated that, even using extremely optimistic assumptions, Commonwealth's assumptions included, for example, that all residential refrigerators within the City of New Bedford would be replaced with energy efficient refrigerators within a three year period (Tr. at 185-186).

Close only 10.3 MW of DSM could be achieved by 1998 (Exh. C-1, at III-7). Commonwealth's load forecast for the Pine Street substation indicates that under the base weather case, 1998 peak load (adjusted for DSM) would be 67.9 MW and that extreme weather 1998 peak load would be 73.6 MW (Exh. C-1, App. A, at 62-65, App. B at 15). The Company identified a need threshold of 60 MW in relation to the Pine Street substation load area (see Section II.A.3.c, above). Consequently, based on its study and analysis, Commonwealth concluded that the application of accelerated and targeted DSM resources would not be sufficient to enable Commonwealth to avoid the need for a new energy facility (Exh. C-5, at 7).

Commonwealth has undertaken an extensive and comprehensive effort to determine the ability of a targeted load reduction program, including distributed generation, to meet the identified need by 1998. The Siting Board notes that Commonwealth would have to rely on the successful implementation of a highly aggressive targeted load reduction program in order to meet the identified need by 1998 under the base weather case. The Siting Board recognized that achievement of 10.3 MW of load reduction would represent a reduction by approximately one-seventh of total load at the Pine Street substation, and agrees with Commonwealth's assessment that meeting this goal by 1998 likely is unrealistic given the aggressive assumptions included in the Company's study, and the short time period available for implementation of such initiatives. Moreover, the record indicates that the Company would be unable to meet the identified need under extreme weather, even if the entire 10.3 MW of load reduction were to be achieved by 1998. In sum, the Company has reasonably demonstrated the likely inability of the Pine Street load area to achieve the magnitude of load reduction necessary to offset the present potential for thermal overload of existing transmission facilities.

Accordingly, the Siting Board finds that acceleration of C&LM programs, even when combined with other load reduction techniques, would not meet the identified need for additional energy resources based on Commonwealth's reliability criteria.

#### e. Conclusions on Reliability of Supply

The Siting Board has found that: Commonwealth's single contingency reliability criterion is reasonable for purposes of determining need in this review, and further that Commonwealth's double contingency and future construction criteria are reasonable in this case for purposes of comparing the reliability of the proposed project to alternative project approaches; Commonwealth has relied on quantitative techniques with adjustments for forecasting load at the district level, and has provided a reasonable explanation for its estimation of load at the substation level, based on the district forecast;

and for purposes of this review, Commonwealth's substation forecast is reasonable and acceptable. In addition, the Siting Board has found that Commonwealth used reviewable and appropriate methods for assessing the reliability of supply based on actual load measurements and load flow analyses. The Siting Board has also found that: Commonwealth's measurements and load flow analyses demonstrate that under a single contingency at both current and forecasted peak load conditions, transmission facilities supplying the Pine Street substation would be loaded above emergency capabilities in contravention of Commonwealth's reliability criteria; the ability of the current system to address a single contingency by effecting automated and manual switching of 13.2 kV distribution level circuits is not sufficient to maintain system reliability consistent with Commonwealth's stated reliability criteria; and consequently the current configuration of supply to the Pine Street substation does not meet Commonwealth's reliability criteria in the event of the single contingency loss of either the #112 or the #114 transmission cable. Accordingly, the Siting Board has found that there is a need for additional energy resources based on Commonwealth's reliability criteria. Finally, the Siting Board has found that acceleration of C&LM programs, even when combined with other load reduction techniques, would not meet the identified need for additional energy resources based on Commonwealth's reliability criteria.

Based on the foregoing, the Siting Board finds that Commonwealth has demonstrated that the existing supply system is inadequate to serve the Pine Street substation load center. Accordingly, the Siting Board finds that additional energy resources are need for reliability purposes in the area served by the Pine Street substation.

## B. Comparison of the Proposed Project and Alternative Approaches

### 1. Standard of Review

G.L. c. 164, § 69H requires the Siting Board to evaluate proposed projects in terms of their consistency with providing a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. In addition, G.L. c. 164, § 69J requires a project proponent to present "alternatives to planned action" which may include: (a) other methods of generating, manufacturing, or storing; (b) other sources of electrical power or natural gas; and (c) no additional electric power or natural gas. G.L. c. 164, § 69J also requires a petitioner to provide a description of "other sitelocations." The Siting Board reviews Commonwealth's proposed route, as well as other routing alternatives, in Section III.B, below.

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In implementing its statutory mandate, the Siting Board requires a petitioner to show that, on balance, its proposed project is superior to alternative approaches in terms of cost, environmental impact, and ability to meet the previously identified need. Norwood Decision, EFSB 96-2, at 20; 1996 NEPCo Decision, EFSB 95-2 at 18; Boston Edison Company, 13 DOMSC 63, 67-68, 73-74 (1985).

In addition, the Siting Board requires a petitioner to consider reliability of supply as part of its showing that the proposed project is superior to alternative project approaches. Norwood Decision, EFSB 96-2, at 21; 1996 NEPCo Decision, EFSB 95-2, at 19; Massachusetts Electric Company, 18 DOMSC 383, 404-405 (1989).

## 2. Project Approaches

In its initial filing, Commonwealth identified sixteen potential approaches to meeting the identified need: (i) the proposed project – the construction of a new, underground, 115 kV transmission line between the Acushnet substation and the Pine Street substation, routed generally through the streets of the City of New Bedford (Exh. C-1, at exhibit I-1); (ii) an alternative involving the reconductoring of the existing #112 and #114 lines serving the Pine Street substation (“project alternative 2”); (iii) nine project alternatives involving the construction of additional transmission facilities that would provide another source of supply to the Pine Street substation from Commonwealth’s bulk power system (project alternatives 3 through 11); (iv) three project alternatives involving the construction of additional distribution and substation facilities (project alternatives 12, 13, and 14); (v) a project alternative involving the repowering or resiting of Commonwealth’s Canon Street generating station, which is located adjacent to the Pine Street substation (“project alternative 15” or “generation alternative”); and (vi) an alternative involving a combination of DSM and DG resources (id. at exhibit IV-B, and App. B). Commonwealth maintained that it was necessary to identify and evaluate a comprehensive list of project alternatives so as to ensure “that no practical economic alternative to serve the identified need was omitted” (id. at IV-1). The Siting Board’s examination of project approaches will include an analysis of the proposed project and each of the identified alternative project approaches.

G.L. c. 164, §69J requires Commonwealth to consider the alternative of “no additional electrical power.” Commonwealth indicated that project alternative 2 was akin to a no-build alternative, but stated that this alternative would seriously compromise system reliability during the reconductoring period (Exhs. C-1, at IV-3 to IV-4; C-3, at 5 to 6). The Siting Board considers project alternative 2 in Section II.B.3.b, below.

Close

## 3. Ability to Meet the Identified Need

In its analysis of the ability of each of the sixteen project approaches to meet the identified need, the Siting Board evaluates whether each approach would provide a reliable supply to the Pine Street substation load center consistent with the Company’s reliability criteria relating to unplanted single contingencies.



#### a. Proposed Project

Commonwealth asserted that the proposed facilities would fully address the identified need (id. at IV-3). In support thereof, Commonwealth provided load flow analyses showing equipment loadings under a contingency involving a loss of the existing #112 transmission line (id. at exhibit III-B).

The Siting Board notes that, from an operational standpoint, the effects on the system of a single contingency involving the #114 line would be essentially identical to those resulting under the single contingency involving the #112 line that is represented in Commonwealth's load flow analysis. This is the case because both existing cables perform the same function and have identical ratings.

Close Commonwealth's load flow analyses demonstrate that, with the addition of the proposed facilities, Commonwealth's existing system components would be loaded well within emergency summer capabilities under the identified single contingency (id.).

The record demonstrates that the proposed facilities would provide a reliable supply to the Pine Street substation load center in the event of a loss of either the #112 or #114 underground cables. Accordingly, the Siting Board finds that the proposed project would meet the identified need.

#### b. Reconductoring Alternative

Commonwealth asserted that project alternative 2, which involves reconductoring of the existing #112 and #114 lines, would not meet the identified need (id. at IV-4 to IV-11). The Company provided load flow analyses which demonstrated that project alternative 2 would, once complete, be sufficient to address the identified need (id. at exhibits IV-C, and IV-D). However, Commonwealth explained that, due to the substantial period of time required for the removal of the existing cable and subsequent reconductoring, system reliability would be substantially degraded during the construction period such that Commonwealth would be unable to satisfy its reliability standards given present load levels at the Pine Street substation (id. at IV-3 to IV-4; Exh. HO-A-3). Commonwealth stated that the construction of project alternative 2 would likely require two or more years to complete (Exh. HO-A-3). Therefore, Commonwealth indicated that it had rejected this alternative as being unable to meet the identified resource need consistent with its reliability standards (id.).

The Siting Board previously has found that Commonwealth has established that need exists under both current and forecasted load conditions (see Section II.A.3.c, above). While project alternative 2, once constructed, would meet the identified need, the process of constructing this alternative would further degrade already unacceptable reliability during a lengthy construction period. Accordingly, the Siting Board finds that the

reconductoring alternative, project alternative 2, would not meet the identified need.

### c. Alternative Transmission Facilities

Commonwealth asserted that nine new transmission line project alternatives, project alternatives 3 through 11, would meet the identified need (id. at IV-4 to IV-11).

In order to assess these alternatives, Commonwealth developed specific design criteria which considered the likely configuration and equipment requirements of each alternative, and presented schematic representations of each alternative (id. at IV-1, IV-4 to IV-11, exhibit IV-A). Commonwealth developed load flow analyses for each alternative showing equipment loadings under both normal conditions (id. at exhibit IV-C), and the single contingency loss of the #112 line (id. at exhibit IV-D). Commonwealth stated that load flow and equipment loadings would be maintained to within rated limits for each of the transmission alternatives (id. at IV-15, and exhibit IV-D).

The record demonstrates that project alternatives 3 through 11 would provide a reliable supply to the Pine Street substation load center under normal system conditions, and in the event of a single contingency loss of either of the existing underground transmission cables. Accordingly, the Siting Board finds that the transmission level project alternatives, project alternatives 3 through 11, would meet the identified need.

### d. Distribution and Substation Alternatives

Commonwealth stated that it analyzed three options for addressing the identified need by enhancing its distribution level “tie” capacity between the Pine Street substation and either the Acushnet substation or a new substation (project alternatives 12 through 14) (Exhs. C-1, at IV-11 to IV-14; C-3, at 7). Commonwealth indicated that, in concept, these alternatives would enable Commonwealth to switch an additional increment of load from the Pine Street substation in the event of a single contingency outage of either the #112 or #114 line (id.).

Project alternative 12 would involve the construction of six 13.2 kV express distribution feeders between the Acushnet and Pine Street substations (id. at IV-11). Commonwealth stated that these improvements would add about 60 MVA of capacity to the Pine Street substation load center (id. at IV-12). However, the Company noted that during normal operating conditions, these express feeders would be out-of-service, and that a complex series of switching operations would be required in order to provide support to the Pine Street substation in the event of a contingency (id.).

Commonwealth stated that the express tie circuits would normally be switched open in order to prevent loop flow that would leave the remaining 115 kV line subject to thermal overload in the event of a single contingency (Exh. HO-A-6).

Close The Company's load flow analyses indicated that in order to maintain operation of existing system elements within acceptable thermal ratings, this distribution level switching would need to be accompanied by the electrical disconnection, or islanding, of two of the Pine Street substation load busses from the remaining

115 kV line in order to prevent loop flow (Exh. HO-A-6).

Commonwealth indicated that loop flow would result once tie circuits between Pine Street substation and Acushnet substation are switched in, forming a closed loop, i.e., a closed electrical path with the 115 kV bulk supply system (Exh. HO-A-6).

Close Commonwealth explained that this alternative would actually increase the number and extent of switching operations that Commonwealth would have to accomplish in the event of a single contingency and therefore would exacerbate the Company's existing violation of its reliability standard (Exh. C-1, at IV-12).

Project alternatives 13 and 14 would involve tapping Commonwealth's existing #109 115 kV line at a point between the Cross Road and Fisher Road substations located in the Town of Dartmouth. A new overhead (alternative 13) or underground (alternative 14) 115 kV line would run from the tap point to feed a new substation to be located at the intersection of Hawthorne Street and Slocum Road in Dartmouth ("Hawthorne Street substation"). The new substation would feed the Pine Street substation by means of six new 13.2 kV underground feeder circuits (id. at IV-13). The Company provided load flow analyses which demonstrate that, in the event of a single contingency involving the #112 or #114 cable, load on the remaining cable would be 54.2 MW, or 90 percent of its 60 MVA rating (id. at existing IV-D). The Company stated that project alternatives 13 and 14 would perform identically with respect to load flow and reliability (id. at IV-12 to IV-14).

The Company stated that in order to maintain the ability of project alternatives 13 and 14 to support the Pine Street substation over the longer term, additional 13.2 kV express distribution feeders would be required, as would the addition of a new transformer bank at the Hawthorne Street substation (id. at IV-13). Commonwealth also noted that from an operational standpoint, project alternatives 13 and 14 would require the completion of switching operations before the Pine Street substation load could be effectively supported following a single contingency (id.). The Company stated that, as with alternative 12, Pine Street substation load would be interrupted until such time as switching could be completed, thus contravening Commonwealth's reliability standard (id.).

The record demonstrates that project alternative 12 would require that Commonwealth rely on distribution level switching to address capacity constraints at the Pine Street substation in the event of a single contingency. The record also demonstrates that service outages to the Pine Street substation load area would result, thus placing the Company in contravention of its system reliability criteria.

In its treatment of need for the proposed project under Section II.A.3.c, the Siting Board has found that the Company's ability to address a single contingency by means of automated and manual switching of 13.2 kV distribution level circuits is not sufficient to maintain system reliability consistent with Commonwealth's reliability criteria. To the extent that reliability concerns associated with distribution level switching operations required under certain project alternatives are similar to, or in some instances more pronounced than, those options currently available to the Company, the Siting Board notes that those project alternatives would not meet the identified need.

Close Accordingly, the Siting Board finds that the distribution level project alternative, project alternative 12, would not meet the identified need.

Similarly, project alternatives 13 and 14 would require outages pending the completion of switching of distribution level components in the event of a single contingency, thus subjecting the Pine Street substation load area to interruption of service during the period required to complete such switching. Accordingly, the Siting Board finds that the distribution level project alternatives, project alternatives 13 and 14, would not meet the identified need.

#### e. Generation Alternative

Project alternative 15 considered additional power generation as an alternative to meet the identified need. Commonwealth provided a load flow analysis assuming a 135 MW combined cycle facility located at its Cannon Street station, which demonstrated that equipment loadings would be maintained to well within acceptable levels both under normal conditions, and in the event of a single contingency involving the #112 cable (Exh. C-1, at exhibit IV-D).

The record demonstrates that the repowering or resiting of a generation facility at Cannon Street station would address the identified need in a manner consistent with Commonwealth's reliability criteria. Accordingly, the Siting Board finds that the repowering or resiting of a generation facility at the Cannon Street station, project alternative 15, would meet the identified need.

#### f. Distributed Generation

Commonwealth provided an analysis of the ability of DG to meet the identified need by including DG as one element of a comprehensive strategy of load reduction that would combine DSM, energy efficiency and load management, DG and interruptible rates (see Section II.A.3.d, above). Commonwealth stated that it identified several waterfront and industrial locations in the New Bedford area that potentially would be suitable for the siting of DG resources (Exh. C-1, at IV-15). The Company stated that its load reduction alternative assumed the siting of four MW of DG (fuel cells) within the Pine Street

substation load center (id.).

The Company identified two concerns as to the viability of DG as part of a strategy for meeting the identified need. First, Commonwealth stated that based on its analysis, DG resources would cost \$500 to \$4000 kilowatt, and as such would not be competitive with its proposed transmission project (id. at n.3). Second, the Company stated concerns as to the reliability of emerging fuel cell technology (id.). The Company indicated that it did recognize the potential for securing environmental benefits with the use of DG, and stated that it would continue to monitor developments in DG technology as an option for addressing future transmission and distribution needs (id.).

In Section II.A.3.d above, the Siting Board has reviewed the Company's study of a targeted load reduction strategy, and has found that acceleration of C&LM programs, even when combined with other load reduction techniques, would not meet the identified need. The Siting Board notes that the study assumed a range of load reduction initiatives, an integral component of which was four MW of DG resources. Based on the Siting Board's finding that such a strategy would not meet the identified need, the Siting Board finds that four MW of DG resources alone would not be sufficient to meet the identified need. Accordingly, the Siting Board finds that distributed generation would not meet the identified need.

#### g. Conditions on Ability to Meet Identified Need

The Siting Board has found that Commonwealth has demonstrated that the proposed project, the construction of a new 115 kV transmission line between the Acushnet substation and the Pine Street substation, would satisfy Commonwealth's reliability criteria and would meet the identified need. In addition, the Siting Board has found that: (1) the reconductoring alternative, project alternative 2, would not meet the identified need; (2) the transmission level project alternatives, project alternatives 3 through 11, would meet the identified need; (3) the distribution level project alternatives, project alternatives 12, 13, and 14, would not meet the identified need; (4) the repowering or resisting a generation facility at the Cannon Street station, project alternative 15, would meet the identified need; and (5) distributed generation would not meet the identified need.

Accordingly, the Siting Board next evaluates the reliability, environmental impacts and cost of the proposed project and those alternatives to the proposed project that have been found to meet the identified resource need.

#### 4. Reliability

In this section, the Siting Board compares the proposed project with project alternatives 3 through 11 with respect to providing a reliable supply of electricity to the Pine Street substation. In so doing, the Siting Board addresses the two reliability criteria identified in Section II.A.3.a, above, namely the double-contingency and future construction criteria, and any other reliability arguments raised by the Company for specific project

alternatives.

a. Transmission Alternatives

Commonwealth argued that the proposed project would be more reliable than the transmission level project alternatives (Brief at 27). In support of its statement, Commonwealth identified a series of reliability issues for which the proposed project would provide reliability advantages as compared to the transmission level project alternatives. Specifically, the Company argued that: (1) the double source of bulk 115 kV supply to the Acushnet substation rendered the proposed project more reliable than those project alternatives that would tie into the existing bulk system at a points with only a single source of supply; (2) the proposed project would consist of a simple electrical connection between the Acushnet substation and the Pine Street substation and require no series reactive compensation or phase angle regulating equipment; (3) the proposed project would involve no construction of overhead lines and only a short submarine section; and (4) the proposed project generally follows a shorter and more direct route than many of the project alternatives (Exh. C-1, at IV-15 to IV-18).

In response to an information request, Commonwealth stated that there were no areas within its New Bedford district that would gain reliability benefits from construction of one of the identified project alternatives (Exh. HO-A-1).

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With respect to Commonwealth's argument regarding the double source of 115 kV supply, the company explained that the Acushnet substation is supplied by two separate sources, each of which is able to satisfy the requirements of both the Acushnet substation and the Pine Street substation. The Company noted that alternative transmission configurations generally were inferior to the proposed facilities in this regard (*id.* at IV-15 to IV-16; Exh. C-3, at 10; Tr. at 14-15, 27-28, 39-41, 70-72). However, Commonwealth also recognized that project alternatives 3 through 10 would provide a source of 115 kV supply to the Pine Street substation independent of the Acushnet substation, an advantage which would partially offset the advantage of a two source supply for the proposed project. (Exh. C-1, at IV-4 to IV-11, IV-15).

With respect to the reliability of the identified project configurations and the associated system components, Commonwealth indicated that project alternatives 3, 4, 6, and 9 would require the application of load compensating equipment such as series reactive components, and that project alternatives 5, 7 and 10 would require mechanical equipment such as phase angle regulators in order to improve the balance of power flows between the new facilities and the existing cables (*id.* at IV-4). Commonwealth stated that, at a minimum, such equipment represents a complicating factor. The Company also asserted that there is little operational experience with phase angle regulating equipment in New England, and that such mechanical components have a higher probability of failure than do simple electrical connections (*id.* at IV-7; Exh. HO-A-7; Tr. at 39-41).

Commonwealth stated that project alternatives 4 through 10 each would involve some measure of overhead construction, and argued that those alternatives would be less reliable than the proposed project in that they would be subject to greater risk of outages resulting from storm damage or lightning strikes. In support of its assertion, Commonwealth provided data on unplanned transmission system outages occurring during the most recent ten year period in the New Bedford district. The data indicate that several recent transmission system incidents resulting in customer outages in the New Bedford district were attributed to lightning or tree damage (Exh. HO-N-4).

With respect to the overall length, Commonwealth stated that the proposed facility would be approximately 3.3 miles, all underground, with a 0.25 mile river crossing (Exh. C-1, at IV-2). Project alternatives 4 through 10 are significantly longer than the proposed project. Commonwealth noted that alternative 3, although shorter than the proposed project, would involve a nearly 1.0 mile submarine crossing of the Acushnet River (*id.* at IV-4). The Company asserted that project alternative 11, which follows the same route as the proposed project, possesses neither advantages nor disadvantages as compared to the proposed project with respect to overall length.

Finally, Commonwealth indicated that it expected that project alternatives 3 through 11 would enhance Commonwealth's ability to respond to a double contingency (*id.* at IV-4; Brief at 24). With respect to the future construction criterion, Commonwealth stated that project alternatives 3, 4, and 5 would provide benefits in terms of the future planned reconductoring of the existing #112 and #114 lines, and implied that the remaining transmission level alternatives would provide similar benefits to the extent that they, like the proposed project, introduced a third source of 115 kV supply to the Pine Street substation which would facilitate such construction (Exh. C0-1, at IV-4 to IV-11).

The record demonstrates that the proposed project provides reliability benefits above those offered by the other transmission level project approaches with respect to: (i) the relative simplicity of the proposed project's design and electrical functioning; (ii) the proposed project's lack of reliance on either overhead construction or long submarine sections; and (iii) the comparatively short overall length and directness of the proposed route.

The record is unclear as to whether the reliability advantage of a double source of bulk supply exceeds the reliability advantage provided by a source of transmission to the Pine Street substation that is independent of the Acushnet substation. Therefore, the Siting Board is unable to adequately compare the proposed project to the transmission level project alternatives with respect to this particular aspect of reliability.

Finally, the Siting Board finds no evidence to suggest that project alternatives 3 through 11 would differ significantly from the proposed project in providing benefits with respect to Commonwealth's double-contingency and future construction criteria.

Accordingly, the Siting Board finds that the proposed project would be preferable to project alternatives 3 through 11 with respect to reliability.

## b. Generation Alternative

Commonwealth asserted that the repowering or resistering of the Cannon Street station would provide generally acceptable loadflow and performance under normal plant conditions, but would also maintain the Company's reliance on its two existing cables (Exh. C-1, at IV-16). Commonwealth explained that any such generating station would be subject to planned and unscheduled outages for maintenance and repair, during which time a single contingency involving the #112 or #114 lines would place Commonwealth in contravention of its reliability criteria (id. at IV-14). In addition, Commonwealth argued that the permitting and construction associated with the generation alternative could not be completed on a timely basis (id. at IV-14). Commonwealth therefore asserted that the proposed project was superior to the repowering or resistering of generating facilities at the Cannon Street station with respect to reliability (id.).

With respect to Commonwealth's future construction criterion, the Company indicated that, in the absence of an extended planned or forced outage, the generation alternative would facilitate the reconductoring of Commonwealth's existing #112 and #114 lines (id.). The Company did not discuss the reliability of the generation alternative in the event of the double-contingency loss of the existing lines.

The Siting Board notes that generating facilities, by their nature, are subject to planned and forced outages of considerably greater frequency and duration than the unplanned outages to which an underground transmission line is subject. During such outages, the Company would be reliant on its existing 115 kV cables to serve the Pine Street substation load, and would experience the same reliability concerns that led the Company initially to propose this project. While Commonwealth likely could schedule any future construction around the timing of its planned outages, it cannot similarly schedule double contingencies. Therefore, the Siting Board finds that the proposed project would be slightly preferable to project alternative 15 with respect to Commonwealth's future construction criteria, and preferable with respect to the Company's double-contingency criteria.

Accordingly, the Siting Board finds that the proposed project would be preferable to project alternative 15 with respect to reliability.

## 5. Environmental Impacts

In this section, the Siting Board compares the proposed project to those project alternatives that were found to meet the identified need with respect to the environmental impacts resulting from: (1) facility construction; (2) permanent land use; and (3) magnetic field levels.



#### a. Facility Construction Impacts

Commonwealth stated that it analyzed the facility construction impacts of the proposed project and the various project alternatives that would meet the identified need (Exhs. HO-RR-4; C-1, at IV-17). Commonwealth asserted that facility construction impacts of the proposed project would be significantly less than those of the project alternatives (Exh. HO-RR-4, at 6; Brief at 32). In support of its statement, Commonwealth provided a comparative analysis which was developed by its Environmental Programs Department (Exh. HO-RR-4).

Commonwealth explained that, because the various project alternatives would involve differing types of construction activity and would result in construction related impacts on various types of land resources, it developed a general set of preferences for specified comparative factors. For example, Commonwealth explained that, to the extent possible, construction of roughly linear facilities within established right-of-ways ("ROW's") was preferable to construction to pristine areas (Exhs. C-7, at 4; HO-RR-4, at 1). The Company also assumed that shorter, more direct route alternatives would be preferable as a means to reduce the total amount of construction activity associated with the proposed project as well as with each of the identified project alternatives.

Commonwealth indicated that it performed field work to further define the construction impacts of the various project alternatives (Exh. HO-RR-4, at 2; Tr. at 58). Commonwealth explained that a project team, the Environmental Programs Group, visited proposed sites for the various project alternatives, consulted with Commonwealth's engineers to ascertain construction requirements, and elicited comment from relevant public officials in order to identify permitting issues and any exogenously identified preferences (Exhs. C-1, at 1-5; C-2, 6-8).

Commonwealth asserted that project alternative 3, consisting of a 115 kV transmission line running from Commonwealth's Arsene Street substation to Fairhaven, would require a mile-long directional drill to cross the Acushnet River and therefore would involve significantly greater impacts than the proposed project relating to the handling and disposal of drilling slurry and mud generated during the drilling process. Commonwealth indicated that installation of the cable on the river bottom would not be permitted in this location as the lower portion of the Acushnet River is navigable water that is within the "Designed Port Area" as delineated by the Massachusetts Department of Environmental Protection ("MDEP") and the Division of Coastal Zone Management (Exh. HO-A-8). A cable lying on the bottom in this vicinity would be subject to damage from anchors, and would impede future dredging operations (id.).

Close Such construction would also require a larger operations staging area in the vicinity of the Acushnet River and associated wetlands, due both to the length of the bore and more elaborate requirements associated with installation of the project's electrical components (Exh. HO-RR-4).

Commonwealth also indicated that construction of project alternative 3 would require the clearing of a new ROW and the excavation of pole foundations in an area that may contain hazardous waste (*id.* at 2; Exh. C-1, at IV-4 to IV-5; Tr. at 69-73).

Commonwealth explained that such activities potentially would involve special handling and disposal requirements for contaminated soils as well as worker safety and exposure issues (Exh. HO-RR-4, at 3). In sum, Commonwealth concluded that the construction impact of project alternative 3 would be significantly greater than that of the proposed project (*id.*).

The record demonstrates that the extent of facility construction required for project alternative 3 would be greater than that required for the proposed project. Accordingly, the Siting Board finds that the proposed project would be preferable to project alternative 3 with respect to facility construction impacts.

Commonwealth asserted that construction of project alternatives 4 and 5 would involve significant operations adjacent to a railroad ROW, in addition to temporary impacts associated with underground construction comparable to those anticipated for the proposed project (Exh. C-1, at IV-5 to IV-7). Commonwealth stated that construction of these project alternatives also would necessitate the clearing of a 5.0-mile section of new easement through areas including a number of wetlands and a stream (Exh. C-1, at IV-6). Commonwealth asserted that construction activities conducted in the vicinity of active railroads, or within wetlands, would be more complex, and progress more slowly, and that such construction therefore would result in greater facility construction impacts (Exh. HO-RR-4, at 3). Commonwealth further argued that the greater length of project alternatives 4 and 5 – 4.2 miles of underground construction and 5.0 miles of overhead construction – would involve a more significant total construction impact than the proposed project (*id.* at 3-4; Exh. C-1, at IV-5).

The record demonstrates that the extent of facility construction for project alternatives 4 and 5 would be greater than that required for the proposed project. Accordingly, the Siting Board finds that the proposed project would be preferable to project alternatives 4 and 5 with respect to facility construction impacts.

The Company indicated that project alternatives 6, 7, 9 and 10, would follow a common route for significant portions of their length, and include an approximately 4.0-mile segment of underground cable, as well as overhead segments of various lengths. In the case of alternatives 6 and 7, the overhead portion would be 4.3 miles long, and in the case of alternatives 9 and 10, the overhead portion would be 9.3 miles long (Exhs. C-1, at IV-8 to IV-10). All four of these project alternatives also would involve the construction of a new overhead-underground transition station at the intersection of Allen Street and Tucker Road in the Town of Dartmouth (*id.*). Commonwealth asserted that each of these project alternatives would involve more significant environmental impacts than the proposed project (*id.* at IV-7 to IV-9, IV-10 to IV-11; Exh. HO-RR-4, at 4-5).

Commonwealth explained that facility construction would require the permanent clearing of wetland vegetation along portions of a new overhead right-of-way, as well as clearing

and sideline trimming of vegetation along an existing ROW (Exh. HO-RR-4, at 4-5). Commonwealth explained that project alternative 9 would involve sideline trimming and possible clearing of vegetation along an 8.0-mile section of existing transmission line that would require reconductoring under this project alternative (Exh. HO-RR-4, at 4). The existing #109 line runs generally southerly from Commonwealth's High Hill switching station to its Cross Road substation, containing southerly to a point between the Cross Road and Fisher Road substations in the Town of Dartmouth where the new line would tap the #109 line (id.).

Close Commonwealth also asserted that, while the underground portion of these project alternatives would involve short-term construction impacts generally comparable to those anticipated for the proposed project, the length of these facility alternatives would be greater than that for the proposed project and, therefore, would affect a larger total area (id.).

The record demonstrates that the extent of facility construction for project alternatives 6, 7, 9 and 10 would be greater than that required for the proposed project, and would impact additional wetlands. Accordingly, the Siting Board finds that the proposed project would be preferable to project alternatives 6, 7, 9 and 10 with respect to facility construction impacts.

Project alternative 8 consists of a new underground cable that would follow the primary route between the Pine Street substation and the Acushnet substation, but would extend beyond the Acushnet substation and proceed overhead, parallel to the Company's existing #112 and #114 transmission lines' right-of way, to tap the #112 line at Commonwealth's Industrial Park Tap, for a total length of 6.2 miles (id.; Exh. C-1, at IV-9). Commonwealth explained that project alternative 8 would require extensive construction activity in wetland areas between the Acushnet substation and the Industrial Park Tap (Exh. HO-RR-4, at 4). Commonwealth also asserted that the construction impacts of project alternative 8 would be significantly greater than the proposed project, due primarily to the greater length of the facility (id.).

The record demonstrates that the extent of facility construction required for project alternative 8 would be greater than that required for the proposed project, and would impact additional wetlands. Accordingly, the Siting Board finds that the proposed project would be preferable to project alternative 8 with respect to facility construction impacts.

The Company stated that project alternative 11, consisting of two new 115 kV cables along the Company's primary route for its proposed project, would involve marginally greater facility construction impacts than would the proposed project (id. at 5). Commonwealth asserted that construction of two lines would involve greater impacts in terms of street construction as well as at the river crossing (id.).

The record demonstrates that the extent of facility construction required for project alternative 11 would be slightly greater than that required for the proposed project.

Accordingly, the Siting Board finds that the proposed project would be preferable to project alternative 11 with respect to facility construction impacts.

Finally, Commonwealth asserted that project alternative 15, the generation alternative, would involve major air quality and siting issues that would affect land-use policies in the City of New Bedford (Exhs. C-1, at IV-14; HO-RR-4). Commonwealth explained that it believed that the construction impacts associated with project alternative 15 would be dramatically greater than those projected for Commonwealth's proposed project and that, as such, the generation alternative represented the least advantageous alternative with respect to environmental impacts (*id.* at 6; Exh. C-1, at IV-14).

The Siting Board acknowledges that the impacts of facility construction with respect to project alternative 15 would be considerably greater than for the proposed project. Accordingly, the Siting Board finds that the proposed project would be preferable to project alternative 15 with respect to facility construction impacts.

Thus, the Siting Board has found, above, that the proposed project would be preferable to project alternatives 3 through 11 and 15 with respect to construction impacts.

#### b. Permanent Land Use Impacts

Commonwealth asserted that the proposed project would involve "essentially no long-term impacts" (Exh. HO-RR-4, at 2; see also Exh. C-1, at IV-17). In support of this assertion, Commonwealth explained that the proposed use of roadway construction would mean that "the new cable would be installed in existing utility corridors with no change in terms of viability or land-use considerations" (Exh. HO-RR-4, at 2).

Commonwealth also provided a comparison of the proposed project to project alternatives with respect to permanent land use impacts (Exh. HO-RR-4). It assumed that the use of underground construction, particularly in the vicinity of existing utility facilities, tends to involve the least long-term environmental impact (Exh. C-7, at 4). Commonwealth also stated that the construction of permanent facilities that could affect the character or land use of a particular area following construction was disfavored (*id.* at 5). For example, construction of visible structures, such as overhead poles and supports or transition stations, particularly in proximity to residential areas, were met with reservation by the Company, as were requirements to place these or other structures within wetlands or pristine areas (Exh. HO-RR-4, at 1-2).

Commonwealth explained that it considered alternatives 3, 4, 5, 6, 7, 9 and 10 to be inferior to the proposed project with respect to land use impacts because they each would require the establishment of new, permanent ROWs and, in some instances, would require the construction of permanent ancillary facilities such as transition stations and overhead structures (*id.* at 3-6; Exhs. C-1, at IV-17; C-7, at 4). Commonwealth considered project alternative 8 to be inferior to the proposed project because, while it

would use an existing ROW, overhead construction would be required for a portion of the project's length and the project would result in significant land use impacts in wetland areas between the Acushnet substation and the Industrial Park tap (Exh. HO-RR-4, at 4). Commonwealth asserted that project alternative 11, which would involve the construction of two new 115 kV lines along the primary route for the proposed project, would involve permanent land use impacts comparable to those of the proposed project (id. at 5). Finally, Commonwealth noted that project alternative 15, the generation alternative, would involve significant, permanent land use impacts at a site that, according to the Company, has been targeted as a central parcel for redevelopment within the City of New Bedford (Exh. C-1, at IV-14).

The Siting Board has previously found that "in many cases, the use of an existing [ROW] as the site of new lines is the most appropriate way to achieve the proper statutory balance [among need, environmental impacts and cost]" and that the environmental impact of such use is "prima facie minimal." See 1996 NEPCo Decision, EFSB 95-2, at 30; 1988 ComElec Decision, 17 DOMSC 249 at 327; Boston Edison Company, 3 DOMSC 44, 53,-54, 61 (1978). Because the proposed project would be located primarily beneath existing roadbeds and within an existing ROW, the Siting Board expects that incremental permanent land use impacts would be minimal. 1996 NEPCo Decision, EFSB 95-2 at 30. The record demonstrates that the long-term environmental impacts associated with project alternatives 3 through 10 would involve the permanent clearing of new ROWs and/or the construction of ancillary structures such as towers and transition stations, and therefore would involve greater permanent land use impacts than the proposed project. With respect to the generation alternative, the Siting Board agrees that the permanent land use impacts associated with the repowering or resiting of generation facilities in New Bedford would be significantly greater than those associated with the proposed project.

Accordingly, the Siting Board finds that the proposed project would be comparable to project alternative 11 and preferable to project alternatives 3 through 10 and project alternative 15 with respect to permanent land use impacts.

#### c. Magnetic Field Levels

The Siting Board focuses on magnetic field levels rather than electric field levels because perceived health impacts generally relate to magnetic field levels. see 1996 NEPCo Decision, EFSB 95-2 at 26, n.22; 1995 NEPCo Decision, 4 DOMSB at 32, n.51.

Close

Commonwealth stated that it expected that only minor increases to ambient magnetic field levels would result from construction and operation of the proposed project, and that such increases would not constitute a significant environmental impact (Exh. HO-E-19). In support of its statement, Commonwealth provided a report produced by its consultant,

Enertech Consultants of Santa Clara, Inc. (“Enertech”), entitled “Calculated EMF Levels of 115 kV Cables and Existing Levels Along Two Proposed Alternative Routes” (“Enertech report”) (id. Att.). In the Enertech report, calculations estimating magnetic field levels for the proposed project were compared to existing magnetic field levels as measured along Commonwealth’s primary route, and along a noticed alternative route which is the route followed by the existing #112 and #114 cables (Exh. C-1, at IV-2) (see Section III.C.2.a.iii, below).

In comparing the magnetic field impacts of the proposed project to those associated with the various project approaches identified by Commonwealth, the Company first explained that all transmission level alternatives would involve relative low impacts that would be consistent with magnetic field levels that have been found to be acceptable in previous decisions of the Siting Board (Exh. HO-RR-4, at 1). 1995 NEPCo Decision, 4 DOMSB at 152; Massachusetts Electric Company/New England Power Company, 13 DOMSC 119, 228-242 (1985) (“1985 MECo/NEPCo Decision”).

In lieu of presenting EMF measurement data for each of its project alternatives, Commonwealth presented a set of criteria relating to magnetic field impacts, which it used to compare the various project alternatives. Commonwealth asserted that underground construction, particularly within established ROWs, such as streets, and along shorter routes likely would result in lower magnetic field impacts (Exh. HO-RR-4, at 1). Commonwealth also stated that project alternatives that could be routed through primarily industrial areas should be considered preferable with respect to magnetic field impacts (id.).

Based on these criteria, Commonwealth argued that the proposed project was preferable to other project alternatives in terms of magnetic field levels (Exh. HO-RR-4, at 2). Commonwealth explained that the proposed project would involve underground construction along a short and relatively direct route. Commonwealth asserted that project alternatives 3 through 10 would either: (1) involve longer route segments including construction beneath city streets traversing greater numbers of residential areas within New Bedford, and that such alternatives would involve the siting of facilities in proximity to greater numbers of sensitive receptors such as schools and churches; or (2) include overhead lines, leading to more significant increases in magnetic field levels in those areas (id. at 5-6; C-1 at Section 5.C) (see Section II.B.5.b, above). The Company asserted that magnetic field impacts from project alternative 11 likely would be marginally inferior to the proposed project depending upon the disposition of the Company’s existing cables (Exh. HO-RR-4, at 5).

The Company noted that, under project alternative 11, its existing 115 kV lines could either be abandoned, or relegated to 13.2 kV distribution service.

Close

With respect to ambient magnetic field levels along the primary route, Commonwealth stated that assuming peak load, existing average magnetic fields along the primary route

would be 5.2 mG (Exh. HO-E-19). The Company stated that, with the proposed facility, average magnetic field along the primary route under peak load would be between 5.22 mG and 7.35 mG (id.). The Company noted that existing magnetic fields along the primary route likely would be dominated by distribution circuits that serve the industrial and commercial loads in this area (Tr. at 119-120). With respect to the residential portions of the primary route, Commonwealth stated that magnetic field levels tend to be dominated by appliances and other electrical equipment already in use in homes and buildings along the route (Tr. at 119; Brief at 34).

The record demonstrates that under the proposed project, magnetic field levels within the ROW for the construction of the proposed transmission facilities would be at low levels, comparable to ambient conditions existing within the relevant New Bedford streets. While Commonwealth did not provide magnetic field management data relative to each of the alternatives to the proposed project, the Company's use of magnetic field criteria to compare project alternatives with respect to magnetic field levels demonstrates that the effect of magnetic fields would be somewhat greater along other project alternatives due to alternative configurations and the greater length of several alternatives to the proposed project. Accordingly, the Siting Board finds that the proposed project would be preferable to project alternatives 3 through 11 with respect to magnetic field impacts.

The Company has not provided criteria and data on magnetic fields that is suitable for an assessment of the performance of the generation alternative in terms of magnetic field impacts. Therefore, the Siting Board makes no finding on the preferability of the proposed project relative to the generation alternative, project alternative 15, with respect to magnetic field impacts. Below, the Siting Board balances overall environmental impacts for the generation alternative with those for the proposed project.

#### d. Conclusions on Environmental Impacts

In Section II.B.5.a, b, and c, above the Siting Board has found that the proposed project would be preferable to project alternatives 3 through 11 and 15 with respect to facility construction impacts, comparable to project alternative 11 and preferable to project alternatives 3 through 10 and project alternative 15 with respect to permanent land use impacts, and preferable to project alternatives 3 through 11 with respect to magnetic field impacts. The Siting Board made no finding with respect to the magnetic field impacts of project alternative 15; however the Siting Board concludes that, on balance, the construction and long term impacts of siting a generating facility would significantly outweigh the impacts of the proposed project, and therefore finds that the proposed project would be preferable to project alternative 15 with respect to environmental impacts.

Accordingly, the Siting Board finds that the proposed project would be preferable to project alternatives 3 through 11 and 15 with respect to environmental impacts.











































passes through a National Register district and that four structures along the route are identified as National Register properties (id. at exhibit V-K, App. C at 11). Commonwealth stated that construction of the proposed facilities would have no impact on these structures (id.).

With respect to impacts on agricultural or recreational land, the Company stated that no agricultural lands would be impacted and that a small park located adjacent to segment 7 at Earle Street would be temporarily impacted by construction activity (id. at V-8, exhibit V-B).

With respect to impacts on archaeological resources, Commonwealth indicated that construction along the primary route may impact the Lawson Cultural Site, which is located on the east bank of the Acushnet River in the Town of Acushnet (id. at V-10, App. C). Commonwealth explained that the Lawson Cultural Site has been identified as a potential location of prehistoric resources; however, it argued that extensive disturbance to this area from prior construction and river dredging activities “make it unlikely that any materials recovered from such area would be in good physical condition or appropriate context” (id.). Commonwealth’s archaeological consultant supported this conclusion (id. App. C at 10).

Commonwealth stated that the construction of the proposed facilities along the primary route would result in limited and temporary impacts to existing natural resources, primarily trees (id. at V-15, exhibit V-B, and App. D; Exh. C-7, at 7-8). Commonwealth indicated that it conducted a comprehensive inventory of the various trees located along each of the identified route segments.

Commonwealth retained the BSC Group, Inc. of Worcester and Norwell, Massachusetts to perform a wetlands inventory and a tree enumeration and identification (Exh. C-1, at V-15, exhibit V-I, App. D).

Close The primary route includes two roadbed segments with existing trees (Exh. C-1, at V-13, exhibit V-C). Commonwealth stated that it did not expect construction of the proposed transmission line to significantly affect any trees along city streets, since construction would be completely within existing roadways and, therefore, would be unlikely to encounter significant numbers of tree roots (id. at V-15; Exhs. C-7, at 8; HO-E-21). The Company explained that the majority of city streets previously have been disturbed in the course of installation of other utility facilities including telephone, gas, and electric facilities, as well as sewer and street drain systems, thereby reducing the likelihood of encountering tree roots in the course of constructing the proposed facility (Exh. HO-E-21). The Company indicated that should street-side trees be encountered in the course of construction, Commonwealth would consult with the Tree Warden of the City of New Bedford in order to mitigate the impacts of construction activity (id.). The Company stated that mitigation of impacts to trees, if necessary, would include hand excavating around root structures, treatment of damaged roots, and fertilizing and watering following construction (id.).





















The record indicates that the impacts of facility construction along the westerly alternative with respect to natural resources would be temporary, and that, with the appropriate mitigation measures, impacts, impacts to trees and scenic areas along the westerly alternative would be minimized. The Siting Board therefore finds that the primary route would be slightly preferable to the westerly alternative with respect to impacts to natural resources.

The Company stated that traffic impacts would be significant for the westerly alternative since the westerly alternative runs along roads in commercial and residential portions of New Bedford where traffic flow is moderate to heavy (id.). The Company also noted that significant portions of segments 5 and 8 are used as bus routes by schools and other public carriers (id.; Exh. HO-E-16(atts. 1, 2, 3, 4)). Commonwealth stated that it would use the same measures developed to address traffic and safety impacts along the westerly alternative as were proposed for the primary route (see Section III.C.2.a.ii, above).

The record indicates that, as compared to the primary route, the westerly alternative would traverse areas where the impacts of facility construction would be greater with respect to traffic flow. The record demonstrates that, with the appropriate mitigation measures, traffic impacts along the westerly alternative would be minimized, but that such impacts would be greater along the westerly alternative than along the primary route. The Siting Board therefore finds that the primary route would be preferable to the westerly alternative with respect to traffic impacts.

Commonwealth stated that the impacts of construction noise and dust along the westerly alternative would be comparable to those along the primary route, but noted that, due to differences in zoning between the two routes, a greater number of sensitive receptors such as churches, schools, and parks would be affected by these impacts along the westerly alternative (Exh. C-1, at V-5 to V-11). Commonwealth indicated that its proposed mitigation for construction noise and dust would be identical to that proposed for the primary route (Exh. HO-E-9) (see Section III.C.2.a.ii, above).

The record indicates that, with the appropriate mitigation measures, impacts from construction noise and dust along the westerly alternative would be minimized. The record demonstrates that because there are fewer sensitive receptors located along the primary route, the primary route would be preferable to the westerly route with respect to construction noise and dust impacts.

Based on the foregoing, the Siting Board finds that the primary route would be preferable to the westerly alternative with respect to land use impacts, traffic and safety impacts, and noise and dust impacts, and would be slightly preferable to the westerly alternative with respect to natural resource impacts.

Accordingly, the Siting Board finds that the primary route would be preferable to the westerly alternative with respect to land use, natural resources, traffic and safety, and construction noise and dust impacts along street portions of the primary route.



















Unanimously APPROVED by the Energy Facilities Siting Board at its meeting of September 16, 1997, by the members and designees present and voting. Voting for approval of the Tentative Decision as amended: Janet Gail Besser (Acting Chair, EFSB/DPU); John D. Patrone (Commissioner, DPU); Sonia Hamel (for Trudy Coxe, Secretary, Executive Office of Environmental Affairs); David L. O'Connor (for David A. Tibbetts, Director, Department of Economic Development); and Joseph Flaherty (Public Member).

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Janet Gail Besser

Acting Chair

Dated this 16th day of September, 1997.

[FIGURE 1]

[FIGURE 2]

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

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