The Commonwealth of Massachusetts

DEPARTMENT OF PUBLIC UTILITIES

April 11, 1986

D.P.U. 84-246

Joint petition of New England Hydro-Transmission Electric Company, Inc. and New England Power Company for a determination that proposed electric transmission lines in the Towns of Tyngsborough, Dunstable, Groton, Ayer, Shirley, Lancaster, Sterling, West Boylston, Boylston, Shrewsbury, Grafton, Millbury, Sutton, Upton, Milford, Medway, and the City of Leominster and the alteration of existing transmission lines in the Towns of Ayer, Shirley, Lancaster, Sterling, West Boylston, Boylston, Shrewsbury and Millbury are necessary and would serve the public convenience and be consistent with the public interest.

D.P.U. 84-247

Joint petition of New England Hydro-Transmission Electric Company, Inc. and New England Power Company for exemption of electric transmission lines from zoning by-laws of the Towns of Tyngsborough, Dunstable, Groton, Shirley, Lancaster, Sterling, West Boylston, Boylston, Shrewsbury, Grafton, Millbury, Sutton, Upton, Milford, and Medway and the zoning ordinance of the City of Leominister.

D.P.U. 84-248

Joint petition of New England Hydro-Transmission Electric Company, Inc. and New England Power Company for exemption of electric converter terminal from zoning by-laws of the Towns of Ayer and Groton.

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FOR: NEW ENGLAND POWER COMPANY
NEW ENGLAND HYDRO-TRANSMISSION ELECTRIC COMPANY
Petitioners

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I. INTRODUCTION

On November 30, 1984, New England Hydro-Transmission Electric Company, Inc. ("NEH") and New England Power Company ("NEP"; jointly, "Petitioners") filed three joint petitions with the Department of Public Utilities ("Department") seeking approval of the Petitioners' construction proposal for implementation of Phase II of the New England/Hydro-Quebec project to provide a 690 megawatt ("MW") interconnection between Quebec and New England. The Petitioners are both wholly-owned subsidiaries of New England Electric System ("NEES"), which is a voluntary association created under Massachusetts law and a registered holding company under the Public Utility Holding Company Act of 1935. NEES' other subsidiaries, affiliates of the Petitioners, are Massachusetts Electric Company; New England Power Service Company ("NEPSCo"), which provides engineering, technical and other services for NEES companies; Granite State Electric Company in Rhode Island; and New England Energy, Inc. The Commission designated Celia E. Strickler, Esq., as hearing officer in the case.

In D.P.U. 84-246, the Petitioners seek: a determination under G.L. c. 164, sec. 72, that the proposed new transmission lines and the alteration, relocation, and reconstruction of existing transmission lines are necessary, would serve the public convenience, and would be consistent with the public interest and accordingly, grant the Petitioner the authority to construct, alter, relocate, reconstruct, and use the proposed

new and the altered, relocated, and reconstructed existing transmission lines.

In D.P.U. 84-247, the Department is asked to determine, under G.L. c. 40A, sec. 3, that new transmission line facilities and the alteration, relocation, and reconstruction of existing transmission line facilities on certain lands in the Towns of Tyngsborough, Dunstable, Groton, Shirley, Lancaster, Sterling, West Boylston, Boylston, Shrewsbury, Grafton, Millbury, Sutton, Upton, Milford, Medway and the City of Leominster are reasonably necessary for the convenience and welfare of the public, and to exempt the proposed new and the altered, relocated, and reconstructed existing transmission line facilities from the operation of the zoning requirements of the municipalities in which the proposed new and the altered, relocated, and reconstructed existing transmission lines would be located.

In D.P.U. 84-248, the Department is also asked to determine, under G.L. c. 40A, sec. 3, that the present situation of a parcel of land owned or to be owned by the Petitioners, located on the easterly side of Westford Road in Ayer, Massachusetts, and the easterly side of Sandy Pond Road in Groton, Massachusetts, and the electric converter terminal facilities to be located and maintained thereon by NEH are reasonably necessary for the convenience and welfare of the public, and to exempt the same from the operation of the zoning by-laws of the Towns of Groton and Ayer.

Also on November 30, 1984, the Petitioners filed with the Energy Facilities Siting Council ("EFSC" or "Council") an Amendment to Supplement 2C to Long-Range Forecast 2 for the Ten-Year Period 1984-1993 of New England Hydro-Transmission Electric Company, Inc., Massachusetts Electric Company, New England Power Company, and Yankee Atomic Electric Company (Amendment to Supplement 2C).

This was docketed by the EFSC as E.F.S.C. 84-24A. In that docket, the Petitioners sought the Council's approval to construct new transmission facilities and to relocate and reconstruct certain existing transmission facilities to bring Canadian hydro-electric power into Massachusetts. The Petitioners asked the Council to determine that the proposed transmission facilities are needed to provide a necessary power supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

They also sought the Council's approval to construct the proposed converter terminal facilities and are asking the Council to determine that the converter terminal is an ancillary facility needed to provide a necessary power supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

Pursuant to an order of notice issued by the Department, fourteen days of public hearings conducted jointly by the Department and the Council, were held on the Petitioners' filings between February 5, 1985, and October 1, 1985. The

first three hearings were held in the evening in the Towns of Groton, West Boylston, and Milford, respectively.[1/] The remaining hearings were held in Boston.

During the course of these proceedings, two petitions for intervention were granted. However, both of these parties withdrew from the proceedings before the hearings concluded.

The Petitioners presented ten witnesses in support of these petitions. Robert O. Bigelow, Vice President of NEP, President of NEH, and Vice President of NEES, described the need for the Phase II project, its benefits, and its costs. Robert H. Snow, Manager of the Planning and Computer Applications Department of NEPSCo, described the system power engineering studies which were conducted in order to determine the facilities necessary to implement the Phase II project. Leo P. Sicuranza, Environmental Project Manager for Charles T. Main, Inc., assessed the environmental impact associated with the Phase II project. Frank S. Smith, Principal Engineer in the High Voltage Direct Current ("HVDC") Projects Engineering Department of NEPSCo, described the Phase II transmission facilities, their costs and routes, the need for exemption from local zoning requirements, and the Petitioners' construction methods and practices. Rufin Van Bossuyt, System Arborist for NEPSCo, described right-of-way

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1/ The Executive Office of Environmental Affairs also participated in the first three public hearings, as part of its review of the proposed project under the Massachusetts Environmental Policy Act (G.L. c. 30, secs. 61 and 62-62H).

maintenance practices. David L. Holt, Manager of HVDC Projects Engineering for NEPSCo, described the Phase II converter terminal, its cost and the need for exemptions from local zoning requirements.

Four witnesses addressed the electrical effects associated with the Phase II facilities: Dr. Gary B. Johnson, Manager, Electric Research Programs at General Electric Company's High Voltage Transmission Research Facility, described and quantified the electrical phenomena associated with the Phase II facilities; Dr. Edwin L. Carstensen, Professor of Electrical Engineering and of Radiation Biology and Biophysics at the University of Rochester, evaluated the biological significance of the alternating current ("AC") electrical environment; Dr. Jonathan M. Charry, Senior Research Scientist in the Laboratory of Neuropharmacology and Environmental Toxicology at the Institute for Basic Research, evaluated the biological and behavioral significance of the direct current ("DC") electrical environment; and Robert S. Banks, consultant for Robert S. Banks and Associates in the field of environmental health, evaluated, from a public health perspective, the operating experience of existing DC transmission lines.

II. PURPOSE AND NECESSITY

A. Introduction

In March, 1983, member utilities of the New England Power Pool ("NEPOOL") entered into a formal agreement with Hydro-Quebec, the provincial utility of Quebec, Canada, to purchase 33 terawatt hours ("TWH"), or 33 million megawatthours ("MWH"), of hydro-electric energy within an eleven-year period beginning in 1986. To provide a means for delivering this energy, the construction of the Phase I facilities was proposed. These facilities include a $\pm$450 kilovolt ("KV") DC transmission line between Des Canton substation in Sherbrooke, Quebec, and a site adjacent to the Comerford hydro-electric generating station in Monroe, New Hampshire. That line was designed in anticipation of a possible second agreement with Hydro-Quebec and will be capable of transmitting in excess of 2,000 MW of power. The Phase I facilities also include a terminal in Monroe, New Hampshire, to convert DC power to AC power. The converter terminal was designed with a capacity of 690 MW, which will fully use the capability of the existing AC transmission system in northern New England to accept and transmit additional power (Exh. RHS, p. 6). The Phase I facilities are currently expected to be placed in service on July 1, 1986 (Exh. RHS, p. 5).

The Phase II facilities consist of three principal elements. The first element is the extension of the Phase I $\pm$450 KV DC transmission line along existing transmission line

rights-of-way between Monroe, New Hampshire, and Groton, Massachusetts. The second element is the construction of an 1,800 MW DC/AC converter terminal at the terminus of the Phase II DC transmission line on a site straddling the town line between Groton and Ayer, Massachusetts. The third element is the construction of two new 345 KV AC transmission lines along existing rights-of-way in Massachusetts. These new AC transmission lines are intended by the Petitioners to reinforce, or strengthen, the existing AC transmission system so that it would be able to accept the additional power. As proposed by the Petitioners, the first new 345 KV AC line would be constructed between the existing Sandy Pond 345 KV AC substation in Ayer, Massachusetts, and the existing Millbury No. 3 345 KV AC substation in Millbury, Massachusetts. In order to make room for this new line on the existing right-of-way, the Petitioners would alter, relocate, and reconstruct certain existing AC transmission lines and line segments. The second new 345 KV AC transmission line would be constructed between the Millbury No. 3 substation and the existing West Medway 345 KV AC substation in Medway, Massachusetts.

Mr. Bigelow provided testimony regarding the need for the New England Hydro-Quebec Phase II project, its costs and the benefits it would provide to utility customers in Massachusetts and the rest of New England (Exhs. ROB, ROB-1 through ROB-4). Mr. Bigelow explained the provisions of the contract for Phase II. Under the terms of the Firm Energy Contract (Exh.

EFSC-4(2)), Hydro-Quebec agrees to deliver, and New England agrees to pay for, 7 TWH or 7 billion KWH of energy per year for ten years, beginning no earlier than September 1, 1990 (Exh. ROB, p. 5). In conjunction with the guaranteed delivery of 7 TWH of energy per year to New England, the contract provides for some rescheduling of energy deliveries if Hydro-Quebec cannot deliver or New England cannot receive the energy as scheduled (Exh. ROB, pp. 5-6; Exh. ROB-1, p. 3; Exh. EFSC-4(2)). The parties also are committed to build, at their own expense, the necessary facilities within their service territories to permit the delivery of the energy (id.).

The pricing provisions of the Firm Energy Contract provide, in effect, that: (1) during each of the first five years of the agreement, the New England participants will pay Hydro-Quebec 80 percent of the average New England cost per MWH generated by fossil-fueled units in the previous year (the annual weighted NEPOOL fossil fuel energy cost); and (2) for the second five years, the 80 percent figure would increase to 95 percent. The average annual cost per MWH from fossil-fueled generators reflects the average cost of energy generated from coal, oil and natural gas (id.).

In his testimony, Mr. Bigelow discussed the results of the sensitivity analyses which have been conducted with respect to both project benefits and costs (Exh. ROB, p. 16). He stated that the analyses indicate that the Phase II project will provide positive and significant cumulative net benefits over a

carefully evaluated range of economic assumptions (Exh. ROB, pp. 16-17; Exh. ROB-1, pp. 77-79).

B. Power Engineering Studies

Mr. Snow described the system power engineering studies which were conducted in connection with the New England/Hydro-Quebec Phase II project. These studies identified the facilities needed to economically and reliably increase the nominal transmission capability of the interconnection between Hydro-Quebec and New England from the approximately 690 MW of Phase I to the approximately 2,000 MW of Phase II (Exh. RHS).

As designed, the Phase I DC transmission line would be capable of transmitting 2,000 MW of power (Exh. RHS, p. 5). However, because the capacity of the Phase I converter terminal is only 690 MW, Mr. Snow stated that a new terminal would be needed in connection with Phase II to convert additional quantities of DC power to AC power (Exh. RHS, p. 6).

Mr. Snow explained that a total of six potential sites for the Phase II converter terminal were identified -- two in New Hampshire and four in Massachusetts (Exh. RHS, p. 17; Exh. RHS-4). The Comerford, New Hampshire site is adjacent to the Phase I converter terminal in the Town of Monroe. The other potential site in New Hampshire is in the Town of Londonderry. The potential sites in Massachusetts are in the Towns of Ludlow, Millbury, and Tewksbury, and at a site on the town line between Groton and Ayer known as Sandy Pond.

Mr. Snow explained that, with respect to the Comerford site, three alternative transmission scenarios were identified for study (Exh. RHS, p. 18). He explained further that, with respect to the Londonderry site, two alternative switching configurations were identified for study. He referred to these plans as the "looped plan" and the "nonlooped plan" (Exh. RHS, pp. 18-19). Thus, in total, nine different transmission plans were studied.

These plans were identified by a group of planning engineers in New England (Tr. X, p. 37), and, according to Mr. Snow, provide a sound basis for comparing alternative locations for the Phase II converter terminal (Exh. RHS, p. 19). He stated that the Millbury, Tewksbury, and Sandy Pond locations are sites adjacent to existing 345 KV AC substations and near southeastern New England's load centers (Tr. IX, p. 16). The Ludlow site affords an opportunity to evaluate a site in western New England near Connecticut load centers (id.). The Comerford site affords an opportunity to evaluate the possibility of using high-voltage AC transmission lines to deliver the Phase II energy to southern New England load centers instead of extending the Phase I DC transmission line (Tr. IX, p. 17). Lastly, according to the witness, the Londonderry site, which would require both a new DC transmission line and two new AC transmission lines, provides an opportunity to evaluate a compromise between DC and AC expansion (id.).

Mr. Snow described in detail the manner in which the nine different plans were evaluated (Exh. RHS, pp. 20-49). This evaluation was divided into two stages. Initially, the nine plans were screened on a preliminary basis to determine whether any of them was so costly that it could be eliminated from further analysis (Exh. RHS, p. 22). In the second stage of the analysis, the remaining plans were subjected to further evaluation to determine which plan represented the least overall cost (Exh. RHS, p. 24).

Both stages of the evaluation of alternative converter terminal sites and transmission plans involved, according to Mr. Snow, extensive use of computer modeling (Tr. IX, p. 25; Exh. RHS, pp. 20-21, 27-28, 39-40). Although the second stage of the analysis was somewhat more detailed than the first, the method was essentially the same. At each stage, alternative transmission plans were compared on the basis of an economic analysis which considered three factors: (1) the estimated cost of the new DC facilities (i.e., the new converter terminal and DC transmission line); (2) the estimated cost of AC transmission facilities needed to maintain the reliability and stability of the AC transmission system while the Phase II energy is being imported; and (3) the estimated value of overall transmission system energy losses (Exh. RHS, pp. 22, 24).

During the first stage of the evaluation, a computer program known as the Contingency Analysis Procedure ("CAP") was used to model the performance of the New England AC transmission system

(Exh. RHS, p. 20). Mr. Snow stated that the output of the CAP program indicated where thermal overloads on system elements are likely to occur for various contingencies, such as the loss of a transmission line (Exh. RHS, pp. 20-21; Tr. IX, pp. 81-82). This information was used to estimate the AC transmission system reinforcements that would be needed in connection with each plan (Exh. RHS, p. 21; Tr. IX, pp. 81-82). Once the required new AC facilities had been identified, study estimates were developed for each plan (Exh. RHS, p. 21). These cost estimates, together with estimates of energy loss costs, were used to rank and compare the alternative plans (Exh. RHS, p. 22; Exh. RHS-5).

Mr. Snow testified that, based on these cost estimates, all three plans using the Comerford converter terminal site were dropped from further consideration (Exh. RHS, pp. 22-23). These were dropped because the least costly of them was estimated to cost $91 million more than the least costly of the other transmission plans (Exh. RHS-5). Mr. Snow also testified that the Ludlow site was dropped from further consideration at this point in the evaluation based on an analysis of comparative capital costs (Exh. RHS, p. 23). The Londonderry "looped plan" was also dropped from further consideration at this point in the evaluation because it had no demonstrated special advantage over the "nonlooped plan" which would justify its additional cost (Exh. RHS, p. 24).

Four transmission plans remained for further evaluation after the first stage of the analysis. These plans were based

on locating the Phase II converter terminal at Sandy Pond, Tewksbury, Millbury, and Londonderry (nonlooped) (id.). Mr. Snow described the further studies which were conducted with respect to these plans (id.). These studies included additional tests using the CAP program, numerous load flow studies, and numerous transient stability studies (id.). The studies were conducted for two different import levels at the new converter terminal: first, assuming 1,310 MW of import at the new converter terminal and 690 MW of import at the Phase I converter terminal; then, assuming 2,000 MW of import at the new converter terminal and 0 MW of import at the Phase I converter terminal (Exh. RHS, pp. 25, 29, 40-41).

Mr. Snow stated that the criteria set forth in the document "Reliability Standards for the New England Power Pool" (Exh. RHS-7) were used as a basis for determining the AC transmission system reinforcements which would be needed in connection with each plan (Exh. RHS, pp. 28-29). These standards provide, in part, that all equipment must operate within normal capacity limits when there is no disturbance and must operate within acceptable emergency limits following any reasonably expected contingency (id.). They also require that the transmission system be designed so that the loss of critical elements of the system will not adversely affect the stability of the New England bulk power supply system (Exh. RHS, p. 29).

On the basis of the NEPOOL reliability standards, a number of AC transmission system reinforcements were identified as

necessary to eliminate thermal overloads and maintain system stability for each potential converter terminal site (Exh. RHS, p. 41; Exh. RHS-29). Mr. Snow described the most significant load flow studies and transient stability studies for each potential converter terminal location (Exh. RHS, pp. 31-41; Exhs. RHS-9 through RHS-28).[2/]

At the 1,310 MW level of import, the need for a second 345 KV AC transmission line between Millbury and West Medway was identified for each of the potential converter terminal sites (Exh. RHS-29). Without the addition of this transmission line, according to the witness, under certain system conditions, the existing 345 KV AC transmission line between Millbury and West Medway would be loaded above its normal capability with all lines in service and above its short-time emergency capability following a single contingency (i.e., the outage of Pilgrim station) (Exh. RHS, pp. 31-32, 33-34, 35-36, 38). Mr. Snow stated that both of these conditions are unacceptable under NEPOOL reliability criteria (Exh. RHS-7).

For the Sandy Pond, Tewksbury, and Londonderry potential sites, the need for a second 345 KV AC transmission line between Sandy Pond and Millbury was also identified at the 1,310 MW import level (Exh. RHS-29). The witness contends that the construction of this line would prevent loading on the existing

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2/ Detailed back-up information with respect to the load flow studies and transient stability studies which were conducted for each potential converter terminal site is contained in the document entitled "Evaluation of the Hydro-Quebec Phase II HVDC Terminal Location" (Exh. EFSC-40).

345 KV AC transmission line between Sandy Pond and Millbury from exceeding its short-time emergency capability under a reasonably expected contingency condition (i.e., loss of the 345 KV AC transmission line between Vernon, Vermont, and Northfield, Massachusetts) (Exh. RHS, pp. 33, 35, 37-38). In addition, he stated that the results of transient stability tests indicated that, for several critical short circuits, construction of a second 345 KV AC transmission line between Sandy Pond and Millbury would maintain system stability (Exh. RHS, pp. 40-41).

Although a second 345 KV AC transmission line between Sandy Pond and Millbury would, according to Mr. Snow, not be necessary if a 1,310 MW converter terminal were constructed at Millbury, he stated that the use of the Millbury site would mean that the DC transmission line would have to be constructed along the existing right-of-way between Sandy Pond and Millbury (Exh. RHS, p. 48).

After the new facilities needed at the 1,310 MW import level had been identified, each potential converter terminal site was studied to determine whether any additional facilities would be needed at the 2,000 MW import level. For the Sandy Pond and Tewksbury converter terminal sites, no additional transmission lines were identified as necessary at the 2,000 MW import level (Exh. RHS-29). For the Londonderry site, additional reinforcement of the connection between Londonderry and north-central Massachusetts was indicated at the 2,000 MW import level (id.). In addition, at the 2,000 MW import level, a

second 345 KV AC transmission line between Sandy Pond and Millbury would be needed if the converter terminal were located at Millbury (id.).

Mr. Snow also described the detailed estimates of energy loss costs which were developed during the second stage of the analysis of alternative converter terminal locations (Exh. RHS, pp. 42-45; Exh. EFSC-106; Exh. EFSC-107). This loss cost analysis considered losses on both the DC transmission line and the overall AC transmission system (Exh. RHS, p. 42).

With respect to the size of the proposed converter terminal, Mr. Snow explained that there were two factors supporting the selection of 1,800 MW. First, an economic analysis which considered both converter terminal construction costs and the cost of transmission line energy losses demonstrated that 1,800 MW was the optimum converter terminal size (Exh. RHS, pp. 45-46). This analysis, which considered a number of converter terminal sizes, revealed that the additional costs associated with increasing the converter terminal size from 1,310 MW to 1,800 MW were more than compensated for by a reduction in AC transmission system energy loss costs (Tr. X, pp. 19-20). This analysis also revealed that a larger converter terminal would not be justified because the additional reductions in AC transmission system loss costs would not compensate for the cost of the extra facilities (Exh. RHS, p. 46). Second, Mr. Snow explained that 1,800 MW was the appropriate size for the Phase II converter terminal because it would allow New England to

import 2,000 MW of power from Quebec even on those occasions when certain AC transmission facilities in northern New England are out of service (Exh. RHS, pp. 46-47; Tr. IX, pp. 76-80). He stated that this additional flexibility is valuable because, unlike those of the Phase I contract, the terms of the Phase II agreement provide for economic penalties, under certain circumstances, when the New England utilities cannot accept the agreed-upon quantity of energy imports (Exh. RHS, pp. 46-47).

As the final step in the second stage of analyzing of alternative converter terminal locations, the four lower-cost plans were compared on the basis of total facilities cost and energy loss costs (Exh. RHS, p. 31). This comparison, according to Mr. Snow, revealed that Sandy Pond was the most economic alternative (Exh. RHS, p. 49). The comparison also revealed that the Tewksbury location, although slightly higher in cost, was comparable to the Sandy Pond location (id.). In addition, the witness stated that this comparison established that either Sandy Pond or Tewksbury was a clear economic choice over Millbury or Londonderry (Exh. RHS, p. 48).

Between the Sandy Pond and Tewksbury locations, Mr. Snow testified that, from a power planning perspective, the Sandy Pond location is preferable in that it provides a more balanced dependence on the two major north/south transmission corridors in eastern Massachusetts (Exh. RHS, p. 49). Specifically, use of the Tewksbury site would add the DC transmission line to a right-of-way currently occupied by two important 230 KV AC

transmission lines and where an important 345 KV AC transmission line is planned; whereas use of the Sandy Pond site would add the DC transmission line to a right-of-way currently occupied by only one 345 KV AC transmission line (Exh. EFSC-139).

The studies described in the direct testimony of Mr. Snow (Exh. RHS) are based on the configuration of the electrical system expected by the Petitioners to be in place in 1990 (Tr. IX, p. 27). With the exception of some preliminary analyses, which assumed both Seabrook units would be in service in 1990, these studies were conducted assuming that only Seabrook Unit 1 would be in service (Tr. IX, pp. 42-43, 114). Even if Seabrook Unit 1 is not in service, the Petitioners contend that the two proposed 345 KV AC transmission lines would still be needed (Tr. IX, pp. 116-117; Tr. X, p. 39), and that the same capacity constraints would be likely to appear on the AC transmission system without Seabrook Unit 1 (id.). The Petitioners submitted preliminary load flow studies in support of this conclusion (Exh. EFSC-172; Exh. EFSC-129).

According to Mr. Snow, the studies establish that the proposed plan, which includes extension of the Phase I DC transmission line to Groton, construction of a 1,800 MW converter terminal at Sandy Pond, and construction of the two proposed AC transmission system reinforcements, is the least-cost option for expanding the capacity of the New England/Hydro-Quebec interconnection from the approximately 690 MW of Phase I to the approximately 2,000 MW of Phase II. Mr.

Snow's conclusion is that the 345 KV AC transmission lines proposed to be constructed between Sandy Pond and Millbury and between Millbury and West Medway would be necessary to maintain the reliability and stability of the New England bulk power supply system when the Phase II energy is being transmitted.

III. PROPOSED FACILITIES

A. Transmission Lines

Mr. Smith described the routes, design details and estimated costs of the proposed transmission facilities and supported the petition for exemption of the proposed transmission facilities and associated rights-of-way from local zoning regulations (Exh. FSS).

1. ±450 KV DC Line (New Hampshire/Massachusetts Boundary Line to Groton)

Mr. Smith testified that the first proposed transmission line, to be constructed by NEH and operated at ±450 KV DC, would cross into Massachusetts at a point on the Hudson, New Hampshire/Tyngsborough, Massachusetts boundary line, and would extend in a generally southwesterly, southerly, and southeasterly direction, a total distance of approximately 12.2 miles, through portions of the Towns of Tyngsborough, Dunstable and Groton, to its connection with NEH's proposed 1,800 MW converter terminal located in the Towns of Groton and Ayer. The proposed DC line would be built on an existing NEP right-of-way parallel and adjacent to the east side of an existing 345 KV AC line (Exh. FFS, p. 6). Detailed maps of the route of the proposed line and the rights-of-way involved were introduced as exhibits to Mr. Smith's testimony (Exh. FSS-1, Figures A-1, A-2; Exh. FSS-2, Sheets 1-13).

Mr. Smith estimated that the total cost to Petitioner NEH for the materials, labor and equipment required for the construction of the proposed ±450 KV DC line would be $22,607,000 (Exh. FSS, pp. 12-14; Exh. FSS-5; Exh. EFSC-75).

2. 345 KV AC Line (Ayer to Millbury)

The second proposed line, to be constructed, operated and maintained by Petitioner NEP, is a single-circuit 345 KV AC line which would begin at a connection with NEP's Sandy Pond substation in the Town of Ayer and would extend in a generally westerly, southwesterly, southerly, southwesterly, southeasterly and southerly direction, a total distance of approximately 36.0 miles, through portions of the Towns of Ayer, Shirley, Lancaster, Sterling, West Boylston, Boylston, Shrewsbury, Grafton and Millbury to its connection with NEP's Millbury No. 3 substation in the Town of Millbury. The proposed line would be constructed on an existing NEP right-of-way between an existing 345 KV AC line and four existing 115 KV AC lines. Two of the existing 115 KV AC lines run from Sandy Pond Substation to NEP's Pratt's Junction substation in the Town of Sterling, and the other two existing 115 KV AC lines run between Pratt's Junction substation and NEP's Millbury No. 2 substation in the Town of Millbury (Exh. FSS, pp. 17-19; Exh. FSS-1, Figures A-2 through A-9, A-15 through A-21; Exh. FSS-2, Sheets 13, 15-51).

Mr. Smith explained that, in order to make room on the existing Ayer to Millbury right-of-way for the proposed 345 KV AC line, NEP would remove the four existing 115 KV AC steel-tower lines and rebuild them as two double-circuit single steel-pole lines. Two segments of existing single-circuit 69 KV AC steel-tower line located in the Town of West Boylston would also have to be altered to accommodate the proposed 345 KV AC line on the existing right-of-way (Exh. FSS, pp. 19-20).

Mr. Smith estimated that the total cost to Petitioner NEP for the materials, labor and equipment required for the construction of the proposed Ayer to Millbury 345 KV AC line would be $40,468,000 (Exh. FSS, pp. 26-27; Exh. FSS-10; Exh. EFSC-75).

3. Relocation of Existing 115 KV AC Lines (Ayer to Millbury

The proposed relocation of the first set of 115 KV AC lines would begin at NEP's Sandy Pond substation in the Town of Ayer and would extend in a generally westerly and southwesterly direction, a total distance of approximately 14.9 miles, through portions of the Towns of Ayer, Shirley, and Lancaster, the City of Leominster and the Town of Sterling to their reconnection with the existing 115 KV AC lines at NEP's Pratt's Junction substation in Sterling. The second set of relocated 115 KV AC lines would begin at Pratt's Junction substation and would extend in a generally southerly, southwesterly, southeasterly and southerly direction for a total distance of approximately 20.8 miles through portions of the Towns of Sterling, West Boylston, Boylston, Shrewsbury, Grafton, and Millbury to their reconnection with the existing 115 KV AC lines at NEP's Millbury No. 2 substation in Millbury (Exh. FSS, pp. 30-31; Exh. FSS-1, Figures A-2 through A-9; Exh. FSS-2, Sheets 13, 15-51).

Mr. Smith estimated that the total cost to Petitioner NEP for the materials, labor and equipment required for the relocation of the 115 KV AC lines would be $16,939,000 for the relocation of the two 115 KV AC lines between Ayer and Sterling,

and $24,778,000 for the relocation of the two 115 KV AC lines between Sterling and Millbury (Exh. FSS, pp. 36-37; Exh. FSS-15; Exh. FSS-16; Exh. EFSC-75).

4. 69 KV AC Line Segment Relocations (West Boylston)

Mr. Smith testified that the proposed relocated 69 KV AC line segments are both located in the Town of West Boylston. The first relocated line segment would begin at a point on the existing right-of-way approximately 0.1 mile northeasterly of the Wachusett Reservoir crossing and would extend in a generally southwesterly and southeasterly direction, a total distance of approximately 1.3 miles, to its connection with NEP's Wachusett substation. The second relocated line segment would begin at Wachusett substation and extend in a generally southeasterly direction, a total distance of approximately 0.9 mile to a point on the existing right-of-way where it would reconnect with the existing 69 KV AC line (Exh. FSS, pp. 39-41; Exh. FSS-1, Figure A-7; Exh. FSS-2, Sheets 37-40).

Mr. Smith estimated that the total cost to Petitioner NEP for the materials, labor and equipment required for the relocation of the 69 KV AC line segments would be $800,000 (Exh. FSs, p. 44; Exh. FSS-19; Exh. EFSC-75).

5. 345 KV AC Line (Millbury to Medway)

The third proposed line to be constructed, operated and maintained by Petitioner NEP, is a single-circuit 345 KV AC line which would begin at a connection with NEP's Millbury No. 3 substation in the Town of Millbury and would extend in a

generally easterly and southeasterly direction along existing NEP right-of-way, a total distance of approximately 16.1 miles, through portions of the Towns of Millbury, Sutton, Grafton, Upton, Milford and Medway, to its connection with BECo's West Medway substation in the Town of Medway. The proposed Millbury to Medway 345 KV AC line would be constructed parallel and adjacent to the south side of an existing 345 KV AC line and two existing 115 KV AC lines (Exh. FSS, pp. 46-48; Exh. FSS-1, Figures A-9 through A-12; Exh. FSS-2, Sheets 51-68).

Mr. Smith estimated that the total cost to Petitioner NEP for the materials, labor and equipment necessary for the construction of the proposed Millbury to Medway 345 KV AC line would be $17,710,000 (Exh. FSS, p. 53; Exh. FSS-23; Exh. EFSC-75).

6. Underground Construction

Mr. Smith testified on the cost of alternatively constructing the proposed new transmission lines underground. Mr. Smith estimated that the cost of constructing the Massachusetts portion of the $\pm$450 KV DC line underground would be $44.6 million, as compared to the estimated overhead cost of $22.6 million (Tr. V, pp. 62-64). As another example, Mr. Smith estimated that the cost of constructing the proposed Millbury to Medway 345 KV AC line underground would be $83.5 million as compared with $17.7 million if the line were built overhead (Tr. V, pp. 64-65; Exh. EFSC-68). Mr. Smith testified further that the underground alternative would have higher line losses and

higher operation and maintenance costs and would be less reliable than the proposed overhead lines (Tr. V, p. 65; Exh. EFSC-69).

7. Safety

The Petitioners stated that the three proposed new transmission lines and the proposed transmission line and transmission line segment relocations would all be constructed and maintained in compliance with the Department's Code for the Installation and Maintenance of Electric Transmission Lines 220 C.M.R. 125.00 and the National Electrical Safety Code (Exh. FSS, p. 14). They also state that street crossing rights for the proposed lines, relocated lines and relocated line segments have been obtained, where necessary, from the communities along the route of the proposed facilities (Exh. FSS, pp. 14-15, 27, 37, 38, 45, 53-54).

8. Zoning

In support of the petition in D.P.U. 84-247 seeking exemption from local zoning requirements under the provisions of G.L. c. 40A, sec. 3, Mr. Smith testified that the Petitioners have been advised by counsel that zoning exemptions will be necessary under the provisions of that statute in the Towns of Tyngsborough, Dunstable, Groton, Shirley, Lancaster, Sterling, West Boylston, Boylston, Shrewsbury, Grafton, Millbury, Sutton, Upton, Milford and Medway for the lawful construction and operation of major portions of the proposed transmission lines, and that zoning exemptions will be necessary in the Towns of

Shirley, Lancaster, Sterling, West Boylston, Boylston, Shrewsbury, Grafton, and Millbury and the City of Leominster for the lawful alteration, relocation, reconstruction and operation of major portions of the proposed relocations of existing transmission lines and transmission line segments (Exh. FSS, pp. 55-58).

Mr. Smith testified that it will be in the public interest for the proposed and relocated transmission facilities to be constructed, maintained and operated by the Petitioners. The locations of the rights-of-way ("lands") for which the Petitioners are seeking exemptions and the distances, exclusive of public ways, within the various zoning districts in the respective communities are set forth in detail in the petition in D.P.U. 84-247 and the zoning maps attached thereto as Exhibits A through P, inclusive (see also Appendix I). Substantially the same information is shown in greater detail on Exhibits FSS-2 and FSS-22.

B. Converter Terminal

Mr. Holt provided detailed testimony which described the physical site location, engineering and design characteristics and estimated cost of the proposed Sandy Pond converter terminal, as well as the need for exempting the proposed converter terminal and site from the zoning by-laws of the Towns of Ayer and Groton (Exh. DLH).

Mr. Holt testified that the purpose of the proposed converter terminal is to convert DC electrical power to AC

electrical power (and vice versa), thereby allowing the proposed ±450 KV DC transmission line to be connected to New England's AC electrical power system at NEP's Sandy Pond substation in Ayer, Massachusetts. Two 345 kV AC connector lines would connect the proposed converter terminal to the Sandy Pond Substation (Exh. DLH, pp. 4, 8-9).

1. Sandy Pond Terminal Site and Major Components

Mr. Holt testified that a site of approximately 42 acres is required for the development of the proposed Sandy Pond converter terminal (Exh. DLH-3). Within this site, there would be located a square-shaped converter terminal yard measuring approximately 1,000 feet on each side and a connecting corridor between the converter terminal yard and NEP's Sandy Pond substation. The connecting corridor would provide an access route for the two proposed 345 KV AC connector lines (Exh. DLH, p. 9; Exh. DLH-4).

He stated that the converter terminal yard would be graded on a 2 percent slope and would be surfaced with crushed stone. A seven-foot- high chain link fence topped by three strands of barbed wire, sloped outward, would enclose the yard. Access to the converter terminal site would be by means of a driveway approximately 1,000 feet in length, which would be constructed off of Nemco Way in the Town of Ayer. A 30-foot-wide vehicle gate, which would be padlocked, would control access to the converter terminal yard (Exh. DLH, pp. 9-10; Exh. DLH-4).

According to Mr. Holt, landscaping for the proposed converter terminal yard would consist of finish grading and seeding of exposed slopes, where appropriate. The yard would be located near a sandpit area which is not presently visible from either public roads or private residences. A buffer strip averaging 500 feet in width would be maintained around the proposed converter terminal site in all directions where future residential development is likely to occur and should eliminate concerns over potential visual impact (Tr. V, pp. 82-85; Exh. DLH-3).

Mr. Holt stated that the converter terminal would be built in accordance with the latest standards established by the American National Standards Institute and by the Institute of Electrical and Electronic Engineers (Exh. DLH, pp. 13-14).

Mr. Holt also testified that a sound level survey, was made of the area surrounding the proposed Sandy Pond converter terminal site (Exh. DLH, p. 10, DLH-5). The average ambient sound pressure level which presently exists at the nearest residences, located along Westford Road in the Town of Ayer, is 42 dB based on the A-weighted scale of a sound level meter. The nearest residence is located approximately 1,600 feet away, behind a hill and beyond dense woods. According to the survey and Mr. Holt's testimony, the worst-case projected sound pressure level at the nearest residence from power equipment to be operated at the converter terminal would be 25 dB on the A-weighted scale of a sound level meter. Mr. Holt claimed that,

since existing ambient sound levels at the nearest residence exceed the projected levels of sound from equipment to be operated at this converter terminal by a considerable margin, the installation of the terminal facility should not be objectionable. He stated that the proposed converter terminal equipment would produce less than a decibel increase over ambient sound levels at the nearest residences along Westford Road (Exh. DLH, pp. 10-11; Exh. DLH-5, pp. 1-4; Exh. EFSC-221).

Mr. Holt estimated that the total cost to Petitioner NEH for the materials, labor and equipment required for the construction of the proposed Sandy Pond converter terminal would be $252,000,000 (Exh. DLH, p. 12; Exh. DLH-6).

2. Zoning

The use of the approximately 42-acre site in Ayer and Groton for converter terminal facilities as proposed is not permitted by the zoning by-laws of the Towns of Groton and Ayer (Exh. FSS-23, 3/17, 4/17). In support of the petition in D.P.U. 84-248 seeking exemption from local zoning requirements under the provisions of G.L. c. 40A, sec. 3, Mr. Holt testified that the Petitioners have been advised by counsel that exemptions will be necessary from the requirements of the zoning by-laws of the Towns of Groton and Ayer before NEH can lawfully build and operate the proposed converter terminal. Mr. Holt further testified that it will be in the public interest for the proposed converter terminal to be constructed and operated (Exh. DLH, pp. 14-15). The location of the terminal site for which

the Petitioners are seeking exemptions is shown in detail on Exhibit DLH-3, which is also Exhibit A to the petition in D.P.U. 84-248.

IV. OTHER AGENCY ACTION

In its decision of December 10, 1985, the EFSC unanimously approved the Petitioners' amendment to the long-range forecast, subject to the condition that the Petitioners monitor several environmental conditions. Specifically, the Council found:

> that the record is substantially accurate and complete and has provided the Siting Council with adequate grounds on which to base its determinations;
>
> that New England and Massachusetts need low-cost sources of energy that reduce the region's reliance upon oil;
>
> that New England and Massachusetts will need to add economic sources of supply for reliability purposes during the next decade;
>
> that the Petitioners developed reasonable and reliable estimates of the economic, environmental and reliability impacts of the Project under different assumptions regarding uncertain events in the future;
>
> that the Phase 2 Project will provide New England and Massachusetts with needed energy and capacity at a substantial savings over alternatives;
>
> that additional transmission facilities are needed to implement the Project and fully realize its potential economic, environmental, and reliability benefits;
>
> that in determining what facilities are needed, the Petitioners identified and evaluated a reasonable range of practical alternatives;
>
> that the Petitioners developed reliable cost estimates for the proposed facilities;
>
> that the proposed facilities are superior to alternatives in terms of cost and environmental impacts; and
>
> that the Petitioners' plans for expansion and construction of the proposed facilities are consistent with the current health, environmental protection and resource use and development policies of the Commonwealth (EFSC Decision, pp. 124-125).

On October 30, 1985, the Petitioners filed their Final Environmental Impact Report ("FEIR") with the Secretary of the Executive Office of Environmental Affairs ("EOEA"). On December 19, 1985, the EOEA issued its certificate on the FEIR, stating that it "adequately and properly complies with the Massachusetts Environmental Policy Act (G.L., c. 30, s. 62-62H) and with its implementing regulations (301 CMR 10.00)."

V. FINDINGS

The Petitioners have presented evidence that under an agreement with Hydro-Quebec, they are planning to transmit large quantities of electricity from Canada into New England. In these dockets we reach no conclusions concerning the propriety of the contracts between Massachusetts utilities and Hydro Quebec since those contracts have not been presented for our review. Our analysis, rather, is prevised on the existence of such contracts. Accordingly, our conclusions herein are conditional upon the execution and subsequent effect of such contracts.

The evidence in these dockets establishes that the existing transmission system must be reinforced, or strengthened, to enable it to accept the additional power anticipated to be received from Hydro-Quebec. The record in this case shows that the Petitioners have considered several alternative plans for such reinforcement, and chosen a reasonable plan which has been found by the EFSC to be "superior to alternatives in terms of cost and environmental impacts."

The record also shows that the proposed converter terminal is needed to convert DC electrical power to AC electrical power so that it can be carried along the reinforced transmission lines. Furthermore, the evidence establishes that the proposed projects will have a minimum impact on the environment.

Therefore, based upon our review of the Petitioners' proposals and the discussion above, the Department finds,

pursuant to G.L. c. 164, sec. 72, that the proposed new transmission lines and the alteration, relocation and reconstruction of existing transmission lines are necessary for the purposes for which they are to be constructed, altered, relocated and reconstructed, and that they will serve the public convenience and be consistent with the public interest.

In addition, the Department finds, under the provisions of G.L. c. 40A, sec. 3, that the present situation of certain lands in the Towns of Tyngsborough, Dunstable, Groton, Shirley, Lancaster, Sterling, West Boylston, Boylston, Shrewsbury, Grafton, Millbury, Sutton, Upton, Milford, and Medway and the City of Leominster, and the transmission lines and structures to be constructed, altered, relocated, reconstructed and maintained thereon by the Petitioners, are reasonably necessary for the convenience and welfare of the public and that said lands and transmission facilities should be exempted from the operation of the zoning by-laws of said towns and the zoning ordinance of said city.

Finally, the Department finds, under the provisions of G.L. c. 40A, sec. 3, that the present situation of a parcel of land owned or to be owned by the Petitioners, located on the easterly side of Westford Road in Ayer, Massachusetts, and the easterly side of Sandy Pond Road in Groton, Massachusetts, and the electric converter terminal facilities to be located and maintained thereon by Petitioner NEH, are reasonably necessary for the convenience and welfare of the public, and that said

land and converter terminal facilities should be exempted from the operation of the zoning by-laws of the Towns of Ayer and Groton.

VI. ORDER

Accordingly, after due notice, public hearing and consideration, it is

DETERMINED: That, subject to the conditions stated on page 33, the proposed transmission lines and converter terminal are necessary for the purposes stated by the Petitioners and will serve the public convenience and be consistent with the public interest; and it is

ORDERED: That the land and transmission lines as shown on the Petitioners' exhibits in D.P.U. 84-247, copies of which are on file with the Department, be exempted from the operation of the zoning by-laws of the Towns of Tyngsborough, Dunstable, Groton, Shirley, Lancaster, Sterling, West Boylston, Boylston, Shrewsbury, Grafton, Millbury, Sutton, Upton, Milford, and Medway, and the zoning ordinance of the City of Leominster, pursuant to the provisions of G.L. c. 40A, sec. 3, as amended, to the extent that they may be used for electric power transmission purposes as presented in testimony and exhibits to the Department; and it is

FURTHER ORDERED: That the land and converter terminal facilities as shown on the Petitioners' exhibits in D.P.U. 84-248, copies of which are on file with the Department, be exempted from the operation of the zoning by-laws of the Towns of Ayer and Groton pursuant to the provisions of G.L. c. 40A,

sec. 3, as amended, to the extent that they may be used for electric power transmission purposes as presented in testimony and exhibits to the Department.

By Order of the Department,

/s/ PAUL F. LEVY

Paul F. Levy, Chairman

A true copy
Attest;

Mary L. Cottrell
Secretary

APPENDIX I

± 450 KV DC LINE (NE/MA BOUNDARY LINE TO GROTON)

Tyngsborough	Miles
A. Total length of right-of-way	1.54
Public roads excluded	0.10
B. Total length of right-of-way to be exempted from zoning	1.44
C. Primary Districts	
1. Business	0.18
2. General Residence and Farming	0.26
3. Industrial	1.00
D. Overlay District	
1. Floodplain	
(a) Business	----
(b) General Residence and Farming	0.08
(c) Industrial	0.32

Dunstable	
A. Total length of right-of-way	4.89
Public roads excluded	0.05
B. Total length of right-of-way to be exempted from zoning	4.84
C. Primary Districts	
1. Single Residence and Farming	4.31
2. Camping District	0.53

Groton	
A. Total length of right-of-way	5.81
Public roads excluded	0.09
B. Total length of right-of-way to be exempted from zoning	5.72
C. Primary Districts	
1. R-A Residence - Agricultural District	4.35
2. "C" Conservancy District	0.94
3. Institutional properties	0.43
D. Overlay District	
1. Primary Water Resource District	
(a) R-A Residence - Agricultural District	0.75
(b) "C" Conservancy District	0.54
2. Secondary Water Resource District	
(a) R-A Residence - Agricultural District	1.98
(b) "C" Conservancy District	0.36

345 KV AC LINE; 115 KV AC RELOCATIONS; 69 KV AC RELOCATIONS (AYER TO MILLBURY)

Ayer	Miles
Total length of right-of-way	4.41
Shirley	
A. Total length of right-of-way	4.98
Public roads excluded	0.13
B. Total length of right-of-way to be exempted from zoning	4.85
C. Primary Districts	
1. A1 Single Residence	2.51
2. A2 Single Residence	0.97
3. A3 Single Residence/A2 Single Residence	0.59
4. A3 General Residence	0.21
5. General Business	0.57
D. Overlay District	
1. Floodplain - Proposed	----
Lancaster	
A. Total length of right-of-way	5.08
Public roads excluded	0.20
B. Total length of right-of-way to be exempted from zoning	4.88
C. Primary Districts	
1. R24 Residence	4.64
2. Light Industry	0.09
3. Highway Business	0.15
D. Overlay District	
1. Floodplain	
(a) R24 Residence	0.27
Sterling	
A. Total length of right-of-way	5.70
Public roads excluded	0.25
B. Total length of right-of-way to be exempted from zoning	5.45
C. Primary Districts	
1. Rural Residential & Farming	4.46
2. Light Industrial	0.79
3. Neighborhood Residential	0.20
D. Overlay District	
1. Floodplain	
(a) Rural Residential & Farming	0.28

continued

West Boylston	Miles
A. Total length of right-of-way	4.97
Public roads excluded	0.06
MDC properties excluded	1.43
B. Total length of right-of-way to be exempted from zoning	3.48
C. Primary Districts	
1. Single Residence	2.30
2. General Residence	0.80
3. Industrial	0.38
D. Overlay District	
1. Floodplain	
(a) MDC properties	0.52

Boylston	
A. Total length of right-of-way	1.64
Public roads excluded	0.02
B. Total length of right-of-way to be exempted from zoning	1.62
C. Primary Districts	
1. Industrial Park	0.77
2. Highway Business	0.70
3. Village Business/Industrial Park	0.08
4. Village Business/Residential	0.05
5. Residential/Highway Business	0.02

Shrewsbury	
A. Total length of right-of-way	5.29
Public roads excluded	0.29
B. Total length of right-of-way to be exempted from zoning	5.00
C. Primary Districts	
1. Limited Industrial	0.06
2. Rural A	0.41
3. Rural B	1.42
4. Residence A	0.53
5. Residence B1	0.90
6. Residence B2	0.51
7. Residence A/Residence B1	0.41
8. Commercial Business/Residence B2	0.10
9. Commercial Business	0.31
10. Commercial Business/Residence B1	0.10
11. Residence B2/Residence B1	0.06
12. Residence B2/MF-1 Garden Type	0.18
D. Overlay District	
1. Floodplain	
(a) Residence A/Residence B1	0.19
(b) Residence B2/MF-1 Garden Type	0.03
(c) Residence B2	0.18

continued

Grafton	Miles
A. Total length of right-of-way	0.81
Public roads excluded	0.01
B. Total length of right-of-way to be exempted from zoning	0.80
C. Primary Districts	
1. Industrial	0.42
2. Industrial/Business	0.38
D. Overlay District	
1. Floodplain	
(a) Industrial/Business	0.07

Millbury	
A. Total length of right-of-way	3.21
Public roads excluded	0.10
B. Total length of right-of-way to be exempted from zoning	2.95
C. Primary Districts	
1. Industrial A	1.02
2. Residential	0.37
3. Suburban	1.82

Leominster	
A. Total length of right-of-way - a small irregular-shaped portion of existing right-of-way containing approximately 2,500 sq. ft.	2,500 ± sq. ft.
B. Total area of right-of-way to be exempted from zoning	2,500 ± sq. ft.
C. Primary District	
1. Residence A	2,500 ± sq. ft.
D. Overlay District	
1. Water Supply Protection	
(a) Residence A	2,500 ± sq. ft.

345 KV AC LINE (MILLBURY TO MEDWAY)

Millbury	Miles
A. Total length of right-of-way	0.28
Public roads excluded	----
B. Total length of right-of-way to be exempted from zoning	0.28
C. Primary District	
1. Industrial	0.28

Sutton	Miles
A. Total length of right-of-way	0.64
Public roads excluded	----
B. Total length of right-of-way to be exempted from zoning	0.64
C. Primary District	
1. R-1 Residential - Rural	0.64

Grafton	
A. Total length of right-of-way	4.65
Public roads excluded	0.06
B. Total length of right-of-way to be exempted from zoning	4.59
C. Primary Districts	
1. Suburban	3.40
2. Residence A	0.84
3. Residence B	0.25
4. Business	0.10
D. Overlay District	
1. Floodplain	
(a) Suburban	0.51
(b) Residence A	0.36
(c) Residence B	0.21

Upton	
A. Total length of right-of-way	4.22
Public roads excluded	0.07
B. Total length of right-of-way to be exempted from zoning	4.15
C. Primary Districts	
1. Agricultural - Residential	2.44
2. Agricultural - Residential/Single Residential D	1.71
D. Overlay District	
1. Floodplain	
(a) Agricultural - Residential	0.21
(b) Agricultural - Residential/Single Residential D	0.03

continued

Milford

A.	Total length of right-of-way	4.53
	Public roads excluded	0.21
B.	Total length of right-of-way to be exempted from zoning	4.32
C.	Primary Districts	
	1. Single-Family Residential - RB	1.07
	2. Rural Residential - RC	1.47
	3. Rural Residential - RD	0.16
	4. Highway Industrial - IB	1.62
D.	Overlay District	Miles
	1. Floodplain	
	(a) Single-Family	0.01
	(b) Rural Residential - RC	0.28
	(c) Rural Residential - RD	0.04

Medway

A.	Total length of right-of-way	1.80
	Public roads excluded	0.03
B.	Total length of right-of-way to be exempted from zoning	1.77
C.	Primary Districts	
	1. Agricultural and Residential I	1.08
	2. Agricultural and Residential II	0.49
	3. Industrial IV	0.20
D.	Overlay District	
	1. Floodplain	
	(a) Agricultural and Residential I	0.24
	(b) Agricultural and Residential II	0.28

RECORD

The Commonwealth of Massachusetts

DEPARTMENT OF PUBLIC UTILITIES

June 23, 1986

D.P.U. 84-246-A

§ 72

Joint petition of New England Hydro-Transmission Electric Company, Inc. and New England Power Company for a determination that proposed electric transmission lines in the Towns of Tyngsborough, Dunstable, Groton, Ayer, Shirley, Lancaster, Sterling, West Boylston, Boylston, Shrewsbury, Grafton, Millbury, Sutton, Upton, Milford, Medway, and the City of Leominster and the alteration of existing transmission lines in the Towns of Ayer, Shirley, Lancaster, Sterling, West Boylston, Boylston, Shrewsbury, Grafton and Millbury are necessary and would serve the public convenience and be consistent with the public interest.

D.P.U. 84-247-A

c. 40A § 3

Joint petition of New England Hydro-Transmission Electric Company, Inc. and New England Power Company for exemption of electric transmission lines from zoning by-laws of the Towns of Tyngsborough, Dunstable, Groton, Shirley, Lancaster, Sterling, West Boylston, Boylston, Shrewsbury, Grafton, Millbury, Sutton, Upton, Milford, and Medway and the zoning ordinance of the City of Leominister.

D.P.U. 84-248-A

c. 40A § 3

Joint petition of New England Hydro-Transmission Electric Company, Inc. and New England Power Company for exemption of electric converter terminal from zoning by-laws of the Towns of Ayer and Groton.

APPEARANCES: Alan J. Rabinowitz, Esq.
Annette Seltzer Lewis, Esq.
Lawrence J. Reilly, Esq.
25 Research Drive
Westborough, Massachusetts 01581
FOR: NEW ENGLAND POWER COMPANY
NEW ENGLAND HYDRO-TRANSMISSION ELECTRIC COMPANY
Petitioners

On May 2, 1986, New England Hydro-Transmission Electric Company, Inc. ("NEH") and New England Power Company ("NEP"; jointly, "Petitioners") filed a Motion for Clarification of Findings Regarding Environmental Impact with the Department of Public Utilities ("Department"). In their motion, the Petitioners ask the Department to clarify its findings regarding the environmental impact of the New England/Hydro-Quebec Phase II transmission facilities which are the subject of D.P.U. 84-246, 84-247 and 84-248, pursuant to G.L. c. 30 sec. 61.

The Petitioners' witnesses testified that most of the environmental effects of the project would be related to construction activities, and therefore would be temporary (Exh. LPS, p. 11). In addition, they stated that the design of the proposed facilities includes measures which will reduce any potential environmental impacts (Exhs. LPS, pp. 17-19; FSS, pp. 58-65).

In its Order of April 11, 1986, the Department noted that the Petitioners' plan was "found by the Energy Facilities Siting Council ("EFSC") to be 'superior to alternatives in terms of cost and environmental impacts'" and that "the proposed projects will have a minimum impact on the environment." D.P.U. 84-246, 84-247, 84-248, p. 33. A fair reading of the Department's Order indicates that the environmental impact issue was addressed and considered by the Department. The omission of an explicit finding on the environmental impact issue was merely an oversight on the Department's part. Based on the Order's intent

I. INTRODUCTION

On November 30, 1984, New England Hydro-Transmission Electric Company, Inc. ("NEH") and New England Power Company ("NEP"; jointly, "Petitioners") filed three joint petitions with the Department of Public Utilities ("Department") seeking approval of the Petitioners' construction proposal for implementation of Phase II of the New England/Hydro-Quebec project to provide a 2000 megawatt ("MW") interconnection between Quebec and New England. The Petitioners are both wholly-owned subsidiaries of New England Electric System ("NEES"), which is a voluntary association created under Massachusetts law and a registered holding company under the Public Utility Holding Company Act of 1935. NEES' other subsidiaries, affiliates of the Petitioners, are Massachusetts Electric Company; New England Power Service Company ("NEPSCo"), which provides engineering, technical and other services for NEES companies; Granite State Electric Company in New Hampshire; Narragansett Electric Company in Rhode Island; and New England Energy, Inc. The Commission designated Celia E. Strickler, Esq., as hearing officer in the case.

In D.P.U. 84-246, the Petitioners seek: a determination under G.L. c. 164, sec. 72, that the proposed new transmission lines and the alteration, relocation, and reconstruction of existing transmission lines are necessary, would serve the public convenience, and would be consistent with the public interest and accordingly, grant the Petitioner the authority to construct, alter, relocate, reconstruct, and use the proposed

the Department finds it is appropriate to make the specific finding requested and to amend the Order to reflect this finding.

In addition, the Petitioners pointed out three apparent errors in the Department's April 11, 1986 Order. Specifically, they refer to the omission of the town of Grafton from the caption for D.P.U. 84-246, a reference on page 1 to a 690 megawatt ("MW"), rather than 2000 MW interconnection between Quebec and New England for Phase II, and the description, on page 1, of the Granite State Electric Company. These errors were inadvertent and had no substantive bearing on our decision.

Accordingly, after review and consideration, the cover sheet has been corrected and a corrected page 1 has been attached to this Order, and it is

ORDERED: That the Order dated April 11, 1986 be and hereby is amended to include the following finding:

FINDS: That the environmental impact of the project is as described by the EFSC in the Environmental Impact Report and in the Department's April 11, 1986 Order, and that all feasible measures have been taken to avoid or minimize said impact.

By Order of the Department,

/s/ PAUL F. LEVY

Paul F. Levy, Chairman

Commissioners participating in the decision of D.P.U. 84-246-A, D.P.U. 84-247-A, D.P.U. 84-248-A were: Levy, Chairman; McIntyre and Keegan

A true copy
Attest;

Mary L. Cottrell
Secretary

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

Such petition for appeal shall be filed with the Secretary of the Commission within twenty days after the date of service of the decision, order or ruling of the Commission, or within such further time as the Commission may allow upon request filed prior to the expiration of twenty days after the date of service of said decision, order or ruling. Within ten days after such petition has been filed, the appealing party shall enter the appeal in the Supreme Judicial Court sitting in Suffolk County by filing a copy thereof with the Clerk of said Court. (Sec. 5, Chapter 25, G.L. Ter. Ed., as most recently amended by Chapter 485 of the Acts of 1971).