

STATE OF VERMONT
PUBLIC SERVICE BOARD

Docket No. 4905

Petition of Vermont Electric)
Power Company, Inc., for a)
Certificate of Public Good,)
pursuant to 30 V.S.A. §248,)
for Authority to Construct a)
Back-to-Back Direct-Current)
Converter Terminal in)
Highgate, Vermont, and an)
Associated Transmission)
Facility in Franklin and)
Highgate, Vermont)

Hearings at
Highgate, Vermont
June 20, 1984
July 16-17, 1984
St. Albans, Vermont
June 28, 1984
Montpelier, Vermont
July 12, 1984
Burlington, Vermont
June 4, 1984
July 18-19, 1984

AND

General Order No. 45 Notice)
with respect to the)
following: Contract to)
Construct a Back-to-Back)
High-Voltage Direct-Current)
Converter Terminal; Highgate)
Transmission Interconnection)
Preliminary Support)
Agreement; Agreement for)
Joint Ownership,)
Construction and Operation)
of the Highgate Transmission)
Interconnection; Highgate)
Transmission Agreement;)
Highgate Construction)
Agreement; Highgate)
Operating and Management)
Agreement; Allocation)
Contract for Hydro-Quebec)
Firm Power; Power Purchase)
Agreement for Hydro-Quebec)
Firm Power; Transmission)
Service Agreement for)
Project Number Three; Firm)
Power Contract)

Order Entered: 8/10/84

PRESENT: V. Louise McCarren, Chairman
William E. Markcrow, Board Member

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for Highgate Board of Selectmen and
Planning Commission

Howard Gates
Gilbert Downing
for Franklin Board of Selectmen and
Planning Commission

Mathew Rubin
John Warshow
for Vermont Independent Power Producers
Association

George Hamilton
for Vermont Public Interest Research
Group

INTRODUCTION

This docket involves three proceedings: (1) an application filed by Vermont Electric Power Company, Inc. (VELCO) on May 16, 1984, to undertake certain site-preparation work for a 200 megawatt (MW) back-to-back direct-current converter terminal station to be located in Highgate, Vermont; (2) an application filed by VELCO also on May 16, 1984, to construct and operate a 200 megawatt back-to-back direct-current converter terminal station in Highgate,

Vermont, and a transmission line from Highgate through Franklin, Vermont, including acquisition of a 250-foot right-of-way, 150 feet of which will be used for the transmission facility (project facilities); and (3) General Order No. 45 proceedings, which the Board consolidated with the foregoing two petitions, on ten contracts filed with the Board providing for the ownership, construction and operation of the foregoing project facilities and the purchase by the State of Vermont and resale to Vermont's electric utilities of electrical energy and capacity that will be transmitted over the project facilities. The contracts for the purchase and resale of power, together with the project facilities and the contracts for the financing, construction and use of the project facilities, are hereinafter referred to as the "project".

The project as proposed on May 16, 1984, is to construct a transmission line and converter facility to transmit power supplied from Hydro-Quebec pursuant to the Firm Power Contract executed between the State of Vermont and Hydro-Quebec. VELCO proposes to construct and operate the project facilities for a consortium of Vermont electric utility companies that will jointly finance and own these facilities pursuant to an Agreement for Joint Ownership, Construction and Operation of the Highgate Transmission Interconnection (Joint Ownership Agreement). Any rights that VELCO may acquire as a result of any orders or certificates

issued by the Board in this docket will be transferred to those Vermont electric utilities that become joint owners pursuant to the Joint Ownership Agreement.

A prehearing conference was held on June 4, 1984, in Burlington, Vermont. The Board granted party status to the Vermont Department of Public Service (DPS), VELCO, the Vermont Department of Agriculture (DOA), the Vermont Agency of Environmental Conservation (AEC), Town of Highgate Board of Selectmen, Highgate Planning Commission, Town of Franklin Selectmen, Franklin Planning Commission, Vermont Public Power Supply Authority (VPPSA). The Vermont Independent Power Producers Association (VIPPA) was granted limited intervention on the issues of need for the project, alternatives to the project and the economics of the project. On July 12, 1984, over the objections of VELCO and VPPSA, the Vermont Public Interest Research Group (VPIRG) was allowed to intervene.

On June 4, 1984, the Board also ruled on four motions by VIPPA. Motion to Recuse was denied. Motions to Cure Defective Filing and to Deny Interim Certificate were denied without prejudice. Motion to Appoint Attorney General to represent the public was taken under advisement and later denied in an order issued on July 9, 1984.

On June 8, 1984, VIPPA filed a Supplemental Motion to Recuse and requested that the motion, if denied, be certified for interlocutory appeal. By order dated June 19,

1984, the Board denied both motions. The Board entered a prehearing conference order establishing a discovery schedule.

On June 20, 1984, the Board took a view of the converter-terminal site and the project corridor and held a public hearing in Highgate, Vermont. The purpose of this hearing was to obtain the views of non-party members of the public, and to understand the concerns of the public, particularly those living in communities affected by the project.

On June 28, 1984, the Board took a second view in order to assess the effect of the project on certain archaeological excavations, and held a technical hearing in St. Albans, Vermont. At the hearing, the Board heard argument on VIPPA's renewed Motion to Dismiss Interim Certification. The Board took evidence on VELCO's proposal to undertake site-preparation work for the converter terminal. By a Board order entered July 9, 1984, VIPPA's motions were denied and VELCO was granted a Certificate of Public Good limited to site preparation only. On July 12, VIPPA appealed this decision to the Vermont Supreme Court.

On July 12, 1984, the Board held a hearing at which a number of procedural matters were considered, including a Petition to Intervene, filed on July 5, by VPIRG, mentioned above, and several discovery issues.

The Board denied VIPPA's Motion to Compel the deposition of Gerald R. Tarrant, counsel to the Department.

The Board ruled that the information sought by VIPPA -- pertaining to an alleged conflict of interest between the DPS' role as the State of Vermont's negotiating agent for the purchase of power from Hydro-Quebec, and Mr. Tarrant's role as the Director of Public Advocacy -- is irrelevant to this docket. The Board concluded that the Legislature has enacted legislation by which the Department is designated to be both the State's negotiating agent for procurement of electric energy and the public advocate in Section 248 proceedings.

The Board further denied VIPPA's Motion to Compel discovery of written information provided to the Governor by the Commissioner of the Department on the ground of executive privilege, and also denied its Motion to Compel certain written information -- notes, contract drafts, and other documents -- in the Commissioner's files pertaining to negotiations with Hydro-Quebec on the ground that such information is irrelevant in Section 248 proceedings, where the issue is whether the negotiated price is economic.

On July 13, 1984, VELCO filed drafts of the Joint Ownership Agreement, the Highgate Construction Agreement, the Highgate Operating and Management Agreement, and the Highgate Transmission Agreement, and on July 16, 1984, the DPS filed with the Board copies of the Firm Power Contract, Interconnection Agreement, and Hydro-Quebec Firm Power Allocation Contract. Both VELCO and the Department represented that the contracts were in substantially final

form, and that they will continue to file new drafts, including final contracts, as they become available.

On July 16 and 17, 1984, the Board held technical hearings in Highgate, Vermont, and took a third view, of the LaRoche, Parent and Barnum properties. On July 18 and 19, 1984, the Board held further technical hearings on the project in Burlington, Vermont.

At the technical hearings, all parties waived the presence of less than two Board members and agreed to hearings outside of Franklin County.

The granting of a Certificate of Public Good is governed by 30 V.S.A. §248 which states as follows:

(b) Before the public service board issues a certificate of public good, it shall find that the construction:

(1) will not unduly interfere with the orderly development of the region with due consideration having been given to the recommendations of the municipal and regional planning commissions and the municipal legislative bodies;

(2) is required to meet the need for present and future demand for service;

(3) will not adversely affect system stability and reliability and economic factors;

(4) will not have an undue adverse effect on esthetics, historic sites, air and water purity, the natural environment and the public health and safety;

(5) plans have been submitted to the municipal and regional planning commissions in accordance with this section; and

(6) is in compliance with the final plan approved by the department under section 202 of this title, or that there exists good cause to permit the proposed action.

FINDINGS OF FACT AND CONCLUSIONS

Based on the evidence presented at the hearings and the briefs of the parties, the Board makes the following findings of fact and conclusions:

- I. ORDERLY DEVELOPMENT OF THE REGION, AESTHETICS, HISTORIC SITES, NATURAL ENVIRONMENT, AIR PURITY, WATER PURITY, AGRICULTURAL LANDS, PUBLIC HEALTH AND SAFETY, SUBMISSION OF PLANS TO MUNICIPAL AND REGIONAL PLANNING COMMISSIONS; COMPLIANCE WITH: ELECTRIC POWER IN VERMONT:
TWENTY-YEAR PLAN

1. The Findings of the Board's Order dated July 9, 1984, are incorporated by reference.

2. The proposed transmission line is to be located on a 250-foot right-of-way, 150 feet of which will be cleared for this project. The remaining 100 feet of right-of-way would be sufficient to accommodate expansion of the transmission system at any future time, should there be a need for it. Zuckernick pf. at 19; tr. 7/17/84, Vol. I at 83.

3. Four potential routes for the proposed transmission corridor were considered. One route is the "VELCO" route and the three alternate routings are the "Beaulieu" and "Beaulieu Alternative" routes and the "Rainville" route. Tr. 7/17/84, Vol. I at 17, 18.

4. Subsequent to the issuance of a Certificate of Public Good in this proceeding, but prior to the beginning of construction, VELCO intends to submit the final right-of-way design and structure location plans, including clearing and

selective clearing areas, to the Board for approval. Tr. 7/17/84, Vol. I at 27-30. Boyle pf. at 6.

5. From south to north the "VELCO" route exits the north side of the proposed terminal site, crosses Vermont Route 78 and then proceeds northeast for approximately 3.5 miles crossing both Town Highways 7 and 20. The right-of-way in this section was acquired in 1967 by Central Vermont Public Service Corporation (CVPS). The VELCO corridor turns sharply east just north of the Rock River crossing, then crosses Tarte Road, Gore Road, and then turns Northeast again. Town Highway 13 and State Route 235 are crossed before the proposed corridor reaches the United States - Canadian Border at Station 620, east of Morse's Line. This route is approximately 7.5 miles in length. DPS Exh. 6; tr. 7/17/84, Vol. I at 18-31.

6. After a view by the Board and consultation with Mr. and Mrs. LaRoche and Mr. and Mrs. Parent, the originally proposed VELCO route was modified slightly as it crosses the LaRoche and Parent property. The proposed modification follows a more westerly routing avoiding open farmland and an active sugarbush area. This route also reduces the adverse visual effect on the property. The proposed modification crosses a small section of cedar swamp and a section of inactive sugarbush. It will add 300 feet and two angle structures to the proposed line, at an estimated additional cost of \$50,000. The "LaRoche modification" is reasonable and

will not unduly adversely effect wetlands or agricultural lands. Tr. 7/17/84, Vol. I at 30, 31, 69-71; tr. 7/16/84, Vol. II at 91-93.

7. The "Beaulieu" and "Beaulieu Alternative" routes discussed at the hearing follow the proposed VELCO route from the proposed terminal site to the point north of the Rock River where the VELCO route turns to the east. These routes continue north toward the United States-Canadian border at Station 622A. The Beaulieu Alternative route would cross the border at Station 622A. The Beaulieu route as depicted on DPS Exh. 6 in yellow, turns east approximately 1700 feet south of border Station 622A and follows an easterly route to intersect the United States-Canadian border approximately 1600 feet to the west of Station 620. The Beaulieu Alternative route is approximately 5.3 miles in length and the Beaulieu route is approximately 8 miles in length. DPS Exh. 6; tr. 7/17/84, Vol. I at 18-31.

8. The "Rainville" route, so-called, follows the other two routes from the proposed terminal site, across Route 78, to the Lamoille Valley Railroad crossing, approximately 600 feet north of Route 78. The Rainville route turns east, following either the railroad right-of-way or the existing 46 KV transmission line right-of-way owned by Citizens Utilities Company (Citizens). At a point approximately 4 miles to the east, the Rainville route turns sharply to the north, following a slightly zigzag routing to the United States -

Canadian Border at a point approximately one mile to the east of Station 620. This route is approximately 9.75 miles in length. DPS Exh. 6; tr. 7/17/84, Vol. I at 18-31.

9. VELCO met with the Franklin/Grand Isle Regional Planning Commission and the selectmen and planning commission of the Towns of Highgate and Franklin to discuss proposed project alternatives and to consider their comments on the proposed project. Klunder pf. at 27-28.

10. The Franklin-Grand Isle Regional Planning Commission submitted a letter to the Board supporting the proposed project. VELCO Exh. 26.

11. The nearest historic site identified on the Vermont or National Historical Registers is a barn located approximately one-quarter mile from the proposed corridor. The proposed project will not affect this site nor any other historic site located in the Towns of Highgate and Franklin. Klunder pf. at 21.

12. In early 1984, VELCO began consultations with the Vermont Division for Historic Preservation in order to determine whether the proposed converter terminal site or proposed corridor contained archaeological properties which are entitled to protection under law. The proposed terminal site area was determined to have a high probability of containing archaeological sites, and VELCO subsequently hired an archaeologist, Dr. Peter Thomas, to survey the area. Gilbertson pf. at 2-4; tr. 6/28/84 at 176-179.

13. Doctor Thomas completed his study of the terminal site on July 13, 1984, which was successful in recovering and preserving valuable archaeological information in a manner satisfactory to the Vermont Division for Historic Preservation, including findings of indian campsites and evidence of tool manufacture and repair. Tr. 7/17/84, Vol. I at 4-11.

14. Doctor Thomas plans to conduct an archaeological review of the final approved transmission line corridor, which has only a few small areas with the potential for containing information of archaeological value, which can be avoided by a minor relocation of transmission poles. Tr. 7/17/84, Vol. I at 11-12.

15. The proposed project will have no undue adverse effect on historic sites.

16. The major portion (approximately 95 percent) of the proposed VELCO corridor crosses agricultural land and so-called "wet woods" (a type of wetland characterized by tree species such as white cedar and various plants useful to wildlife). Tr. 7/16/84, Vol. II at 88-89, 92.

17. Palustrine forested wetlands are characterized by "sweet" soils which have a high ph, unusual subflora species, including orchids, and are rich in diversity of species of non-game birds and mammals. By 1956, 40 million acres of the original estimated 127 million acres of wetlands in the United States had been drained. They are the major

environmentally sensitive areas in the entire project. Tr. 7/16/84, Vol. II at 89.

18. Wetlands are useful for the removal of toxic substances, particularly nitrates. This phenomenon is very important in agricultural communities where nitrates are used in fertilizers which leach into the ground and create the potential for water contamination. They help neutralize the effects of acid rain. Wetlands also help prevent flooding by acting like a sponge and serve as areas of ground water recharge. The VELCO route will affect wetlands the least of the four alternatives. Tr. 7/16/84, Vol. II at 100-105.

19. Due to the large number of wetlands in the Highgate-Franklin area, the crossing of some wetlands by any proposed corridor in this area would be unavoidable. Tr. 7/16/84, Vol. II at 92, 99, 105.

20. The Rainville route, by virtue of the fact that it is approximately 2.25 miles longer than the proposed VELCO route, takes a total of more agricultural land and wetland and was rejected by Dr. William Countryman, VELCO's environmental consultant. Tr. 7/16/84, Vol. II at 90-91, 107.

21. The proposed VELCO route minimizes the adverse effects on agricultural land and wetland because most of the structures have been placed at the interface between agricultural land and wetland. Tr. 7/16/84, Vol. II at 92, 104-106.

22. No federally listed rare and endangered species of plants and animals were identified on the proposed VELCO corridor or the Beaulieu, Beaulieu Alternative or Rainville routes. Countryman pf. at 4; tr. 7/16/84, Vol. II at 94, 96-98.

23. Three species of orchids, on the Vermont Endangered Species List, were identified on the proposed VELCO corridor and would likely be found on the two Beaulieu routes and the Rainville route. These species are either common plants in the type of wetlands encountered in the subject area or native to other areas of the world. By careful placement of the routing and structures, these species can be adequately protected. Countryman pf. at 4; tr. 7/16/84, Vol. II at 94-98.

24. Provided that accepted standard construction and soil erosion control methods are employed and access road locations properly planned, there will be no adverse effect on water purity from the construction of the line. Countryman pf. at 5.

25. The proposed VELCO corridor crosses open fields that will require little, if any, regular maintenance. Approximately 50 acres of the proposed corridor will require the use of selective-management techniques for maintenance purposes. Such techniques are those previously reviewed in detail and accepted by the Board in In re: Petition of

Vermont Electric Power Company Inc., Docket Nos. 4622/4724.

Zuckernick pf. at 12.

26. Electric fields within the proposed terminal yard will be comparable to a conventional 115 KV AC substation. The converters are designed for relatively low voltage (56 KV) and high current (3600A). Due to the use of a relatively low DC voltage, there will be no corona and therefore, no ion generation. In addition, the converter valves are to be contained within an electrically screened building. Harrison pf. at 8; tr. 6/28/84 at 132-34.

27. The proposed converter terminal will be designed to minimize any potential for radio and television interference and will not have an adverse effect on radio and television reception in the area. Harrison pf. at 6; tr. 6/28/84 at 136-37.

28. The proposed converter terminal will contain AC harmonic filters to prevent harmonic currents, generated by the converter valves, from flowing into the AC lines exiting the proposed converter terminal. Such harmonic currents potentially could cause electrical interference in telephone circuits. As a result of the filter installation, the proposed facility will have no effect on neighboring telephone systems. Harrison pf. at 7; tr. 6/28/84 at 134-35.

29. Audible noise levels from the proposed converter terminal will be minimized to reduce any potential adverse effect on the nearest road or residences (located to

the north) by placing the proposed terminal about 500 feet away from this area and by the use of a screen of trees. The noise level is estimated to be within the range of 40 to 46 decibels ambient (dba), which compares with the typical noise level in a "living room, suburban area." Harrison pf. at 8.

30. The proposed project will have no undue adverse effect on air and water purity or on the natural environment.

31. The proposed transmission line corridor is located within areas of Highgate and Franklin which have been designated to have low development potential. The town land use plans and zoning ordinances identify these areas either as low-density development or unsuitable for development. Klunder pf. at 28-29; tr. 7/17/84, Vol. I at 30-31.

32. The east-west portion of the Rainville route, approximately 4.1 miles in length between the proposed terminal site and the point at which the corridor turns sharply northward, encounters several potential problems, including visual exposure, interference with the orderly development of Highgate Center, the potential acquisition of houses, and the potential inability to accommodate a second transmission line in the future. Tr. 7/17/84, Vol. I at 19, 20; Boyle Sup. pf. at 2.

33. The Beaulieu route and its various alternates to reach Border Station 620 in particular, have a greater adverse effect on agricultural land than the proposed VELCO route. Tr. 7/17/84, Vol. I at 21-26.

34. The proposed VELCO corridor, including the LaRoche modification, will not unduly interfere with the orderly development of the region.

35. Hydro-Quebec conducted a transmission corridor routing study for its portion of the proposed 120 KV transmission line between the Bedford Substation and the United States - Canadian border. Tr. 7/17/84, Vol. II at 4.

36. The Hydro-Quebec corridor study included the evaluation of environmental factors, agricultural lands, residential areas, wildlife areas and woodlands. Tr. 7/17/84, Vol. II at 5-7.

37. Before construction of the Hydro-Quebec transmission line may begin, three provincial permits and one federal permit are required. The three provincial permits are from the Commission for Agricultural Protection, the Ministry of Environment and the Government of Quebec. The required federal permit must be obtained from the National Energy Board of Canada. Tr. 7/17/84, Vol. II at 8, 13.

38. The Quebec provincial permitting process takes approximately four months, followed by the Canadian federal permitting process which takes four to six months for a total time of eight to ten months. Tr. 7/17/84, Vol. II at 23-25.

39. Hydro-Quebec received the permit from the Commission for Agricultural Protection for the easterly route depicted in VELCO Exhibit 23 which intersects the border at Station 620, on July 13, 1984, and expected receipt of the

other two Quebec provincial permits within a few days after the July 17th hearing. Tr. 7/17/84, Vol. II at 13, 19.

40. Receipt of the National Energy Board of Canada permit is expected by October 1984. Tr. 7/17/84, Vol. II at 19, 24.

41. Hydro-Quebec must receive all necessary permits by January 1, 1985, in order to complete the transmission line construction by September 1985. Tr. 7/17/84, Vol. II at 23, 26.

42. There is insufficient time for Hydro-Quebec to modify its route, obtain all provincial and federal permits, and complete construction of the line by September 1985. Tr. 7/17/84, Vol. II at 23-26.

43. Hydro-Quebec was aware at the time it was reviewing alternative corridors that the preferable Vermont route would intersect the United States - Canadian border at Border Station 622A. However, Hydro-Quebec determined that it could not obtain a permit from the Commission for Agricultural Protection for a route to cross the border at that location. A review of the land use maps shows that any alternative would cross highly protected agricultural lands. Tr. 7/17/84, Vol. II at 7-10, 31-33; VELCO Exh. 23.

44. The permit from the Commission for Agricultural Protection is a necessary prerequisite for other Quebec provincial permits and its reviewability is severely restricted. Tr. 7/17/84, Vol. II at 8, 29.

45. The proposed converter terminal site is screened by existing vegetation except from the north. VELCO proposes to add plant materials on the north side to mitigate visual exposure. A mature pine forest on the southern side of the proposed site conceals large areas south of the Missisquoi River and, in addition, provides a backdrop for views from the north. Klunder pf. at 22.

46. The proposed transmission line will utilize wood H-frame structures, which are compatible with the Vermont landscape. The wood H-frame structures are visually most acceptable in an area characterized by intermixed open and forest lands. Klunder pf. at 26; tr. 7/17/84, Vol. I at 35.

47. The landscape in which the corridor is located is relatively flat, yet has sufficient vertical grading to minimize long range views of the line and will provide a backdrop for the line, limiting visual exposure of the proposed line to either short or medium range (less than 2 miles). Klunder pf. at 23-27.

48. The major exposure of the proposed line will be at the four road crossings. Careful structure placement to take advantage of available screening and rocky ridge backdrops will mitigate adverse visual effects. Klunder pf. at 23-27; Boyle pf. at 5-7; tr. 7/17/84, Vol. I at 35.

49. The Gagne property, located to the north of the Route 78 crossing of the proposed corridor has on or near it an existing VELCO 115 KV substation and an existing 46 KV

transmission line, owned and operated by Citizens. The proposed transmission line must cross over the Citizens 46 KV line and the resulting structures and their height will adversely affect the aesthetics of the property. This visual intrusion can be minimized by careful structure location and could be reduced further by a relocation of a section of the Citizens 46 KV line. Tr. 7/17/84 at 35-36, 57-60.

50. The proposed project will not have an undue adverse effect on aesthetics.

51. The proposed VELCO route will cross approximately 4.2 miles of land currently in agricultural use. A total of approximately five miles of the corridor is located on soils classified as good or high potential for agriculture. Of the approximately 60 acres of prime agricultural land that will be within the corridor, 33 acres are used for haying, 4 acres for grazing, 13 acres for field crops, and 10 acres of forest. VELCO Exh. 24; Klunder pf. at 15-16.

52. Careful structure location will result in only two or possibly three structures placed on active agricultural land not adjacent to an interface location, such as a ravine, hedgerow, or fenceline. The remainder of all agricultural land can be utilized in its existing manner without any effect on the operation of the farms. Tr. 7/17/84, Vol. I at 34, 35, 277, 228.

53. The proposed VELCO corridor and tentative structure locations are acceptable to the Vermont Department of Agriculture and represent a minimal taking of agricultural lands. Tr. 7/17/84, Vol. I at 279.

54. Construction of the proposed transmission line should be undertaken between the fall harvest season and the spring planting season (October through April) to minimize disruption of agricultural activities. Jester pf. at 4-5.

55. The Beaulieu route, resulting in a border crossing at Station 620 is less acceptable to the Department of Agriculture than the proposed VELCO route. The Beaulieu Alternative route crossing the border at Station 622A would be more acceptable than the proposed VELCO route, from an agricultural land standpoint. Tr. 7/17/84, Vol. I at 279-281.

56. The Department of Agriculture would require additional study of the Rainville route to assess its potential effect on agricultural land before forming a position on that route. Tr. 7/17/84, Vol. I at 284-285.

57. The results of independent load flow analyses and stability studies commissioned by VELCO and the Public Service Department show that the proposed project will not adversely affect system stability. Zuckernick pf. at 13; Merritt pf. at 5; tr. 7/16/84, Vol. I at 98, 99.

58. The proposed project is equivalent to adding a 150 megawatt (eventually to become 200 MW) "generator" to the existing transmission system without removing any existing

power sources. The addition of a new generator to a system without dropping another source of power improves system reliability. Zuckernick pf. at 13; tr. 7/16/84, Vol. I.

59. The proposed converter terminal allows the asynchronous systems of Hydro-Quebec and VELCO to be interconnected without adverse effects on the reliability of the systems. With a direct interconnection of alternating current systems, the generators in each system must operate in synchronism with each other. Any generation or load changes in one system would cause power flows back and forth over the interconnection which could cause overloads and trip-out of that interconnection. The proposed direct-current interconnection overcomes these problems as it acts like a "clutch" so that the systems are not synchronously tied together. Zuckernick pf. at 14-15.

60. VELCO load flow studies indicate that reinforcement of the existing 115 KV transmission system from Highgate to Essex and from Essex south to Middlebury is required. This reinforcement is proposed to be done by reconductoring existing 115 KV lines with larger wire. The amount of proposed reconductoring has been minimized by utilizing the "fast runback" feature of the proposed converter terminal. Zuckernick pf. at 15-16.

61. VELCO and the DPS commissioned load flow studies which show that the VELCO transmission system will perform reliably with the proposed project in service and

under various contingency conditions. Zuckernick pf. at 15; Merritt pf. at 3-5.

62. The proposed project will not adversely affect system stability or reliability.

63. There is no evidence known to the Petitioner that converter stations, including those operating at high DC voltage levels, present any health risk. The proposed converter station, operating at relatively low levels of AC and DC voltage, should be even less likely to pose any health risks. Harrison pf. at 9.

64. From the standpoint of audible noise, the proposed converter terminal will have no undue adverse effect on public health and safety. Harrison pf. at 8.

65. Under Public Service Board Rule No. 3.500, all construction must be in accordance with the standards set forth in the National Electrical Safety code.

66. Construction of the proposed converter terminal and transmission line and the right of way maintenance within the corridor, done in accordance with the methods approved in Docket No. 4622, will have no undue adverse effect on public health and safety. Harrison pf. at 9; Zuckernick pf. at 12.

67. The proposed project will not have an undue adverse effect on the public health and safety, water and air purity.

68. Electric utilities involved with the proposed project have filed energy conservation plans with the DPS, as

required by Electric Power in Vermont: Twenty Year Plan (the Plan). The Department is in the process of reviewing these conservation plans, some of which have already been approved. The Plan also recognizes that additional power supplies must be acquired, over and above the conservation objective. Tr. 7/18/84, Vol. I at 66-67.

69. The DPS, through Richard H. Saudek, Commissioner of the Department of Public Service, determined that the project is consistent with the plan.

70. Operation of the proposed converter terminal is sensitive to the electrical impedance of the transmission line connected to it. As the impedance increases (due to increasing the length of the transmission line), the operation of the terminal becomes more limited, possibly requiring some derating. Tr. 7/16/84, Vol. I at 56; tr. 7/18/84, Vol. II at 78-80.

71. The impedance specification for which ASEA has designed the converter terminal is for that of a 15.1 mile length of 115 KV single conductor transmission line. The Canadian portion of this line was to be 8 miles and the VELCO portion 7.1 miles. Tr. 7/18/84, Vol. II at 84; tr. 7/16/84, Vol. I at 55-56.

72. Due to environmental constraints, the Canadian portion of the line has resulted in a longer route, increasing the length of that portion from 8 to 11 miles. Tr. 7/16/84, Vol. I at 56.

73. By double conductoring the Vermont portion, the transmission line, even though 18 miles in actual length, will have the same level of impedance that would exist on a 16.5 mile line built to the original specifications. Impedance will be further reduced when Hydro-Quebec rebuilds the Canadian section of the line. Tr. 7/18/84, Vol. II at 80.

74. ASEA has conducted simulation studies based upon a line length of 18.1 miles constructed to the original specifications. The studies showed the terminal to operate satisfactorily. Tr. 7/18/84, Vol. II at 86.

75. Based upon computer simulation analyses, the likelihood that the proposed converter terminal will operate at a rated 200 megawatts, with no derating, is 90 percent or better. Tr. 7/18/84, Vol. II at 78.

76. At a reduced operating level of 150 megawatts, the level at which the line will operate for at least a year, and an equivalent line impedance of a 16.5 mile line, it is very unlikely that any derating of the converter terminal would be necessary. If modifications are necessary for operation at 200 MW, they can be made during the first year of operations. Tr. 7/18/84, Vol. II at 86-88.

DISCUSSION

The choice of a route for a transmission corridor is, at best, a difficult decision because it involves the taking of private land and, no matter how skillfully placed, a transmission line will have some negative effect on the environment. 30 V.S.A. §248 requires that the route chosen not unduly interfere with the orderly development of the region, and that it not have an undue adverse effect on aesthetics, historic sites, air and water purity, the natural environment or public health and safety. The proposed plans must be submitted to the municipal and regional planning commissions and municipal legislative bodies, and we must consider their recommendations. Lastly, any corridor must comply with the provisions of Executive Order 52 with respect to agricultural land.

Whether the proposed corridor meets the criteria of aesthetics, orderly development of the region, historic sites, air and water purity and health and safety was fully considered but not seriously contested in this proceeding. The primary issue was the taking of and adverse effect on wetlands and agricultural lands. Wetlands and agricultural lands are both very important to the health and economic wellbeing of Vermont but represent inconsistent if not conflicting uses of land. Wetlands are vital to our natural environment not only for the habitat that they provide to non-game species of animals and to exotic flora but because of

their very beneficial effect on water detoxification. The United States government has recognized the importance of wetlands and will give great attention to the effect the proposed corridor has on wetlands in determining whether to grant a Presidential Permit necessary for the importation of power from Hydro-Quebec.

Agricultural land has great economic value to Vermont not only because of its productivity but because it preserves the rural nature of the state. Agricultural lands are given special protection pursuant to Executive Order 52 and the PSB's "Guidelines for Implementation of Executive Order No. 52," adopted January 12, 1981. We have carefully reviewed this project with respect to the type of agricultural land that will be affected, and to the effects it will have on the economics of the farms involved, particularly with respect to the placement of structures. We conclude that the VELCO proposed corridor and proposed structure placement represent the optimum choices under available alternatives.

At the initial prehearing conferences the Board encouraged local residents affected by the proposals to offer their recommendations and, most importantly, alternatives to the VELCO proposed route. Three alternatives were proposed, the Beaulieu route, the Beaulieu Alternative route and the Rainville route. The Beaulieu route is depicted in yellow on DPS Exhibit 6 and described in finding 7, above. The Beaulieu alternative would extend the corridor directly north to the

Canadian border approximately 2 miles west of the border crossing proposed by Hydro-Quebec at Station 620. Therefore, in addition to the VELCO route the Board had before it three alternatives.

Two major considerations other than agricultural land and wetlands are the ability or feasibility of Hydro-Quebec to meet VELCO at an agreed border crossing and the length of the line. Both the Beaulieu alternative and the Rainville routes would require that Hydro-Quebec change its border crossing, in the case of the Beaulieu alternative about 2 miles to the west and, for the Rainville alternative about 1 mile to the east. At the request of the Board, Mr. Giles Martel, an engineer, and Ms. Stella Leney, a lawyer from Hydro-Quebec, testified with respect to the process by which Hydro-Quebec selected its route for Quebec provincial approval and the degree of flexibility that Hydro-Quebec has in moving its corridor to meet either of these alternative Vermont routes.

The flexibility of Hydro-Quebec is particularly important with respect to the Beaulieu alternative because the Beaulieu alternative is the preferable route, being both shorter and affecting less agricultural land and wetland. We are convinced after review of the testimony that it would be unlikely that Canadian approvals could be obtained for a corridor compatible with the Beaulieu alternative. A direct corridor south from Bedford, Quebec, to the Canadian border to

meet the Beaulieu alternative would impinge on prime Canadian agricultural land. Even if approval could be obtained, it is unrealistic to expect that it would be in time to allow completion of the Hydro-Quebec portion before Vermont Yankee is out of production. For these reasons we conclude that the Beaulieu and Beaulieu alternative routes are less preferable than the VELCO route.

The converter Station was engineered under contract with ASEA to perform with an impedance value associated with a 15.5 mile line, from Bedford, Quebec to the converter station. The Canadian route added three miles to the original estimate placing a premium on a shorter line on the Vermont side. Though impedance values vary with the type of construction, phase spacing, and conductor size, it is generally a linear function of length. This factor places a premium on shortness.

The Rainville route is approximately two miles longer than either the VELCO or Beaulieu routes, thus causing concern for proper operation of the converter terminal which as just noted, is very sensitive to the length of the transmission line. Moreover, even though the first five and one half miles south of the United States-Canadian border are nearly ideal, the remaining four miles encounter several severe problems'. These include aesthetic problems, potential land use problems, and insufficient room for possible future corridor expansion.

The VELCO corridor will cross the Gagne property and must be placed above existing 46 KV lines of Citizens, further detracting from landscape. This problem would be ameliorated if the 46 KV line were relocated. However, Citizens is not a party to this proceeding and we cannot order this change. We urge VELCO to work with Citizens to effect this change and propose it to this Board.

30 V.S.A. §202 requires that the DPS, through the Director for Regulated Utility Planning, formulate a twenty-year electric plan for Vermont and that utilities seeking to construct transmission facilities, such as the one proposed in this proceeding, submit the proposal to the DPS for a determination that the facilities are consistent with the plan. The statute contemplates that the DPS shall be the agency that initially determines whether a proposal is consistent with the plan. The Board has a separate duty under 30 V.S.A. §248(b)(6) to find either that the proposal is consistent with the plan or, if the DPS has concluded that it is not, to find good cause for the certification in the absence of that conformity. In this proceeding both the Commissioner of Public Service, Richard H. Saudek, and Mr. Carlton W. Bartels, Director for Regulated Utility Planning, testified that the proposal before the Board is consistent with the twenty-year plan.

Both VIPPA and VPIRG raise the issue of whether this proposal is in fact consistent with the plan because the

utilities which are the proponents had not demonstrated to the DPS, nor to the Board, that they had undertaken all cost effective conservation as an alternative to this new facility. With respect to the role of conservation in the twenty-year plan and the requirement that the utilities seek economically efficient means of conservation, the twenty-year plan states as follows:

"By September 1, 1983, each utility shall submit its proposed conservation plan to the Department of Public Service. The Department will review each utility's conservation plan and determine its consistency with this plan. After December 1, 1983, the existence of an approved conservation plan will be considered necessary for compliance with this plan. Utilities proposing actions after April 1, 1983, but before December 1, 1983 which require the Department to make a determination pursuant to 30 V.S.A., Section 202 will be expected to demonstrate that the proposed action is a superior choice when compared to available conservation alternatives."

When cross-examined concerning compliance by the utilities with this section, both the Commissioner and Mr. Bartels testified that the conservation plans filed by the utilities which had been reviewed by the DPS and found to be satisfactory first steps to a complete conservation program. Each of the retail distribution utilities in this proceeding testified that they had not specifically considered

conservation as an alternative to this facility as a means of assuring an adequate supply of power for Vermont.

For this proceeding we will accept the Commissioner's statement that the utilities have complied with the twenty-year plan with respect to the requirement that they have approved conservation plans. However, the proof provided within this proceeding just rises to the level of acceptability and the Board hereby puts the utilities and the DPS on notice that for future proceedings the Board expects a fully developed presentation on the available conservation alternatives and a firm plan for the pursual of those alternatives. We also urge the DPS to take a more active role in these proceedings and general rate proceedings to advance proposals for economically efficient conservation measures that can be undertaken by the utilities. It is the Board's observation that conservation measures promoted by the utilities and the DPS can hold the potential to reduce the need for new generation on a cost effective basis.

II. NEED

77. In its analysis, the DPS assumed annual growth rates for Vermont's energy and load equal to 1.5% and 1.4% respectively. These were based on the Department's conservation case as presented in Electric Power in Vermont: Twenty Year Plan. Tr. 7/19/84 at 79-80; Twenty-Year Plan at 10; tr. 7/9/84 at 74-80.

78. For the five year period ending 1983, GMP experienced average annual growth rates of 4.1% for energy and 3.6% for peak demand. Tompkins pf. at 2.

79. CVPS utilized annual growth projections of 2.1% for peak and 2.4% for energy in their analysis of the Highgate project. McLeod pf. at 8.

80. VPPSA assumed annual growth rates for energy of 2.6% and for peak load of 2.4% in their analysis of Highgate. Tr. 7/12/84 at 218.

81. The New York Power Authority (NYPA) plans to begin reducing the amount of Niagara and St. Lawrence power sold to Vermont beginning in 1986. Vermont will experience reductions of approximately 10% per year until 1995 when it will receive 4 MW from NYPA. Vermont's current allotment of NYPA power is 150 MW. McLeod pf. at 2-3; Saudek pf. at 2; tr. 6/28/84 at 37-38; tr. 7/16/84, Vol. I at 81; tr. 7/17/84, Vol. II at 38.

82. Beginning September 9, 1985, and continuing for at least 36 weeks thereafter, the Vermont Yankee nuclear power station at Vernon will be shut down for scheduled and unscheduled outage. McLeod pf. at 4; tr. 6/28/84 at 38.

83. There is no transmission contract presently in place for transmission of Ontario Hydro after 1985; the State of Vermont's contract for 52 MW of capacity expires in 1987; the option to expand Ontario Hydro to up to 252 MW has expired; recent negotiations with New York utilities indicate

that New York is requesting a high transmission charge for future transmission of 52 MW of Ontario Hydro. Tr. 7/16/84, Vol. I at 48, 68-69, 88; tr. 7/17/84, Vol. II at 94-97; tr. 7/18/84, Vol. I at 94.

84. The potential loss of Seabrook Unit II, the cancellation of the proposed Sears Island coal plant and the fact that no large plants are presently scheduled after Millstone and Seabrook will result in NEPOOL's having no excess capacity available to meet Vermont's needs after the 1990 period. McLeod pf. at 10.

85. GMP will be capacity deficient commencing with the 1986/87 power year. They will be 30 MW deficient by 1990 and more than 90 MW deficient by 1994. Tompkins pf. at 3.

86. CVPS faces a "major upheaval" in its power supply situation starting in the summer of 1985. Unless additional sources can be found or other contractual arrangements can be made, CVPS will face a capacity deficiency through the 1997/1998 power year. McLeod pf. at 2-5.

87. VPPSA's membership as a whole is significantly capacity deficient starting in November, 1985. Gross pf. at 7.

88. CVPS's reliance on Canadian energy will range from a low of 9.2% to a high of 29.1% between 1985 and 1986. Its dependence on Canadian capacity will range from approximately 4.2% to 32.17% during the same period. These

projections assume that firm capacity will not be utilized from the NEPOOL HVDC tie until 1991.

89. GMP's maximum dependence on Canadian energy ranges from 18.3% in 1985 to 47.1% in 1994. Its maximum dependency on Canadian capacity ranges from 25% to 38.4% during the same period.

90. VPPSA estimated that their individual member reliance on Canadian energy will range from 7% to 45% between 1985 and 1999. VPPSA Exh. 3.

The DPS, CVPS, GMP and VPPSA have all presented different estimates for the annual growth of energy and load. Regardless of which estimate is picked, it is apparent that the State will experience significant load and energy growth over the next 10 years.

In addition to demand growth, the state will experience substantial reductions in the amount of power it currently receives. The NYPA currently projects 10% annual reductions in the power it exports to Vermont starting in 1986. High transmission charges for Ontario Hydro power transmitted across New York may result in its loss to Vermont utilities as an economic source. Finally, the potential loss of one or both Seabrook units along with Sears Island will further reduce the capacity available to Vermont.

The combination of load growth and the loss of several capacity sources has led some of the Vermont utilities

to predict capacity deficiencies in the near future. GMP predicts that it will be deficient in the 1986/87 power year, while VPPSA projects deficiencies starting in November, 1985. Finally CVPS anticipates a capacity deficiency throughout their planning horizon, if additional economic sources are not developed before the end of the summer of 1985.

Based on the information presented above, the Board recognizes Vermont's need for additional capacity, and the potential for Hydro-Quebec to fill this need.

III. ECONOMICS

91. The cost of the project facilities is approximately \$26 million including development costs, the converter terminal (\$19.4 million), construction of the 345 KV line from the converter to the Canadian border (\$4.6 million), and a \$2 million contingency. Tr. 7/16/84, Vol. I at 29-30, 104-105, 107, 128.

92. In addition to construction of project facilities, reconductoring is necessary on the VELCO 115 KV system between Highgate and Middlebury in the summer of 1984. These improvements are needed to reduce losses caused by import of the initial 150 and ultimately 200 MW of power. The reconductoring is estimated to cost \$5.5 million. Id. at 29, 103-104, 107, 128-129.

93. In addition to reconductoring, improvements at VELCO's Georgia substation are required at a cost of \$1.4 million. Id. at 29, 104, 107, 128.

94. The New England Electric System (NEES) is projected to incur \$2.5 million of improvements to its transmission facilities because of the load at Highgate. These improvements will include primary reconductoring the Wilder-Ascutney line and improvements at Tewksbury station. Id. at 29, 40, 107-108, 144.

95. In addition to the \$35.7 million for project capital costs, it is appropriate to include AFUDC, operating and management (O&M), administrative and general (A&G), Hydro-Quebec capacity charges and losses as project costs.

96. In this worst case analysis, four percent of the total cost of reconductoring, Georgia substation improvements and AFUDC is a reasonable assumption to use for combined O&M and A&G costs. The resulting estimate of O&M and A&G costs for these items is \$329,300. Tr. 7/18/84, Vol. I at 6, 64.

97. \$280,800 based on one percent of the converter investment plus AFUDC, is a reasonable assumption for O&M and A&G costs for the converter station. Tr. 7/18/84, Vol. II at 70.

98. The total cost for O&M and A&G is \$610,100 per year. Adjusting for inflation and levelizing on a 10%

interest rate results in a ten year levelized cost of \$5.13/KW-year.

99. VELCO's engineer, Teshmont Consultants, Inc., estimates losses to be approximately one and one-quarter percent for the terminal and less than one percent for the 345 KV-specification line operated at 120 KV between the United States-Canadian border and the terminal. It is appropriate to use two percent total losses between the United States-Canadian border and the VELCO side of the terminal for this analysis. Tr. 6/28/84 at 138; tr. 7/16/84, Vol. I at 34, 133.

100. In addition to the losses from the Canadian border to the VELCO side of the terminal, 2.5% losses on the VELCO transmission system and 3.5% losses for suballotees may be experienced. Tr. 7/16/84, Vol. I at 172; tr. 7/17/84, Vol. I at 217.

101. Weighting of the losses at 86% direct and 14% suballotees produces a loss of 4.9% for the Vermont composite system.

102. We find that an assumption of AFUDC of \$2,082,000 for the converter station/345 KV transmission facilities and \$1,332,000 for the reconductoring/Georgia substation improvements can be used in this analysis.

103. For this analysis the fixed costs, AFUDC, O&M, A&G, and Hydro-Quebec capacity charges were allocated to the on-peak hours during the contract period. This allocation is

a conservative approach since a portion of the capacity cost may be recovered through sales during the off-peak hours. Bartels revised pf. at 7, 15.

104. The energy price for the first five years, beginning September 1, 1985, will be a set schedule of 33 mills, 33 mills, 35 mills, 37 mills and 40 mills per KWH; the price for a second five years will be at 80% of NEPOOL's weighted average fossil fuel cost. In addition, for the second five year period only, Vermont will pay Hydro-Quebec an annual capacity payment equal to \$10 million 1990 dollars, adjusted annually for inflation. The capacity charge translates into \$66 per KW per year, or \$28.90/KW-year when adjusted for inflation and levelized. Bartels pf. at 3, 4; Saudek pf. at 7-8; DPS Exh. 8; McLeod pf. at 5-6; Gross pf. at 4.

105. Based on a DOE mid-range full price forecast for the energy cost of the last five years of the contract and the annual energy prices specified in the contract for the first five years, the 10 year levelized energy cost equals 46.59 \$/KWH.

106. The alternatives to the Highgate project are short-term oil fired purchases, New York State Electric and Gas's (NYSEG) Somerset coal plant, Ontario Hydro, New Brunswick's Point Lepreau nuclear station, and power provided over the NEPOOL HVDC tie. These alternatives are too expensive, or are unavailable due to transmission or timing

problems. McLeod pf. at 6-7; Tompkins pf. at 7-8; Bartels pf. at 10.

107. Utilization of Highgate project power in GMP's mix is less expensive than short-term oil fired purchase power entitlements. Tompkins pf. at 6-7.

108. NYSEG's request for expressions of interest in its Somerset coal plant has been withdrawn and is therefore not a viable option to the Highgate project. Tompkins pf. at 7.

109. The State's current contract for 52 MW of Ontario Hydro power expires in 1987 while the transmission contract with NYPA necessary to transmit this power expires in 1985. Vermont's option to expand the 52 MW contract to 252 MW has expired. There is uncertainty as to the availability and cost of transmission of Ontario power across New York state. Therefore, Ontario Hydro is not considered as an alternative to Hydro-Quebec. Tr. 7/16/84, Vol. I at 48, 68-69, 88; tr. 7/17/84, Vol. II at 94-97; tr. 7/18/84, Vol. I at 94.

110. Power from New Brunswick's Point Lepreau nuclear power station is not a viable alternative to Highgate due to transmission problems through adjoining states. Tompkins pf. at 7.

111. Firm power from the NEPOOL HVDC tie is not a reasonable alternative because it will not be available during the 1985/1986 power year. Bartels pf. at 10.

112. GMP's cumulative present value savings are estimated to be \$14.5 million for their share of the 150 MW case and \$16.7 million for their share of the 200 MW case for the ten-year contract. VELCO Exh. 15 at 3; Tompkins pf. at 6; tr. 7/16/84, Vol. I at 210.

113. Central Vermont Public Service Corporation's (CVPS) share of the savings from the project over a 15-year period were estimated to be \$43 million. McLeod pf. at 9; VELCO Exh. 19.

114. Vermont Public Power Supply Authority will experience \$11,027,100 in projected gross energy savings during the first five years of the Hydro-Quebec contract or \$7,694,900 in 1984 dollars. Gross pf. at 8.

The analysis that the Board will apply in evaluating this or any other proposed project is a three step test. The cost of the proposed project over its life will be computed and will be compared to the alternatives available to meet the established need of the utility. If the project compares favorably with the alternatives, all other factors affecting the economics of the project will be considered, including its relative business and financial risk, location, availability and other relevant factors. We have, therefore, computed a ten-year levelized cost for this project and have compared it to the alternatives available, including the alternative of purchases for small power producers pursuant to the rates set

in In re: Small Power Production Rates, 60 P.U.R. 4th, 148
(Vt. 1984).

A. Cost of the Project

As set out in the findings above, the cost of this project is:

- | | |
|---|-----------------|
| 1. The AC-DC-AC converter terminal
and 345 KV line north from Highgate,
Vermont, to the Canadian border | \$26.0 million |
| 2. VELCO reinforcements of the VELCO
system | \$ 5.5 million; |
| 3. VELCO improvements on the Georgia
substation | \$ 1.4 million; |
| 4. Reinforcement on the NEES | \$ 2.5 million; |
| 5. AFUDC for the converter and
transmission line | \$ 2.1 million; |
| 6. AFUDC for the VELCO system improvements | \$ 1.3 million; |
| Total project cost: | \$38.8 million. |

The annual carrying cost of this project at the above total cost is \$9.77 million based on a levelized carrying cost rate of 25.2%. This results in a ten-year levelized cost of \$65.13/KW-year. To the \$65.13/KW-year carrying cost is added \$5.13/KW-year and \$28.90/KW-year for O&M, A&G and Hydro-Quebec carrying charges respectively. The total fixed cost of \$99.16/KW-year must then be adjusted for capacity losses of 13.33% assuming the power is utilized only

during the peak periods. The resulting total capacity cost is \$114.41/KW-year or 27.44 mills/KWH on a ten-year levelized basis.

This capacity price computation contains some very conservative assumptions which cause this estimate of the total project costs to be at the high end of the most probable actual cost. Conservative assumptions include the method used for calculating AFUDC, inclusion of a \$2 million contingency, a \$2.5 million payment for NEES reinforcements, the allocation of all the capacity costs to the peak load period of the project, and, most importantly, the assumption that the transmission line, converter and associate facilities will have a ten-year life. The engineering life of the converter and transmission line is actually well in excess of the ten years with a probable life of thirty years or more. We want to stress that the total capacity costs of 27.44 mills/KWH are, in our opinion, overstated in this analysis.

Having established the capacity costs of the project, we next determine the associated energy costs. We have accepted the DPS's estimates of the ten-year energy costs for this project as set out in the findings above. These estimates include an assumption of DOE oil price estimates for the second five years of the contract. The energy price was levelized and adjusted for 4.9% energy losses estimated to occur on the Vermont composite system, resulting in a 48.99 mills/KWH price for energy. This produces a total ten-year

levelized price for Hydro-Quebec power through this project of 76.43 mills/KWH.

B. Comparison to Alternatives

The next step is to compare this proposed project to the alternatives available to meet the need of the utilities. The needs of the Vermont utilities in this instance not only include capacity deficiencies, but also include the short-run need to provide replacement power for the thirty-six week outage of Vermont Yankee anticipated to occur in 1985-86. We will first look at the non-small power production alternatives available. Darrow M. McLeod, Vice President of Engineering and Operations for CVPS, Mr. E. John Tompkins, Assistant Vice President of the Energy Planning Department of GMP, and Mr. Carlton W. Bartels, Director of Regulated Utility Planning for the DPS, reviewed the available alternatives including coal, nuclear from New Brunswick, system power from NEPOOL and Ontario power and each alternative was either not available on a timely basis, could not be delivered because of transmission limitations or was more expensive than this project. With the exception of the purchase of power under the PURPA rate, no party contested the unavailability of other sources and no contradictory evidence was presented. We conclude that compared to the alternatives available this project falls within an acceptable range.

The next alternative available which this project must be compared is the ability to purchase from small power producers under the established PURPA rates in Docket No. 4804. These PURPA rates represent the avoided cost of the Vermont composite system. As the avoided costs they are the higher end of what a utility would have to pay for an alternative source. In addition, they also represent what the utility can pay for power to small power producers. We used the PURPA rates as a benchmark, not as the exclusive factor in evaluating the alternatives available.

The current PURPA rate on a ten-year levelized basis is 70.9 mills/KWH. This comparison shows that the Highgate project based on "worst case" scenario would exceed the avoided costs set by PURPA in Docket No. 4804 by 5.51 mills/KWH. Though the proposed project exceeds the State's composite avoided cost, that comparison is only one tool in the analysis and its usefulness is limited in this proceeding because these estimates are more than a year old and incorporate several assumptions which appear to be outdated, including 77.7 megawatts of New York Power Authority (NYPA) power available through the years 1999-2000, 30 megawatts from Sears Island, 33 megawatts from Seabrook II and 52 megawatts from Ontario Hydro. In addition, these estimates do not take into account the prolonged Vermont Yankee outage anticipated for 1985-86. The assumptions with respect to the cost of this project cast it in its worst light and even then it is within

the range of what would be acceptable. Approval of this project at an estimated price above the existing PURPA rate does not constitute a determination of the issues in the pending PURPA rate proceeding.

Having made the comparison to the alternatives available, including PURPA, and finding that the project does not fail that test, we must next look at other characteristics of the project that might make it more or less acceptable. It is important to stress that the Board will consider many factors other than the price of alternatives, including the relative riskiness of the proposed project, considering construction, financing, delivery and source, as well as other relevant issues.

There are two important factors which make this project clearly acceptable. The first is the right of the participants to cancel the second five more expensive years of the contract on or before April 30, 1986. Secondly, the contract between the State of Vermont and Hydro-Quebec not only requires that power be delivered at 100% capacity but requires that if the power is not delivered by Hydro-Quebec, Hydro-Quebec will pay for the replacement power. This makes this power an ideal source and substantially reduces the financial riskiness of non-delivery.

In VELCO's prefiled testimony both GMP and CVPS have presented economic analyses of their pro rata share of the Hydro-Quebec project. These analyses are based on comparisons

of the company's power supply costs with and without Hydro-Quebec power. While this does not precisely fit the analyses set forth above for new projects, it does provide the Board with additional assurances that this project is economic for Vermont. Both GMP and CVPS have projected substantial savings over the life of the project. GMP projects a cumulative present value savings of \$17.5 million, assuming 150 MW and \$16.7 million, assuming 200 MW importation. CVPS's estimates indicate \$43 million in total savings over fifteen years. The DPS's conservatively projected net present value savings of \$11 million to \$16 million over the ten-year contract period for Vermont as a whole and VPPSA's projected gross energy savings of \$7.7 million for the first five years of the contract show the project to be economic and to have a cash payback period substantially less than the initial five years of the contract.

We conclude that the project is economic for the utilities involved and for the State as a whole.

IV. GENERAL ORDER NO. 45 NOTICE

As noted in the introduction, VELCO, VPPSA and the DPS filed ten separate contracts relating to the project for our review. By the terms of General Order No. 45, electric utilities are required to give written notice at least ninety days in advance of the execution of various contracts, including contracts for the construction of or for the

purchase or sale of capacity in or energy from transmission facilities.

Strictly speaking, notice should have been furnished not only by VELCO, VPPSA and the DPS, but by all of the signatories to the contracts as well. The effectiveness of the contracts is dependent upon the procurement of necessary regulatory approvals, and so that there will be no question as to the technicalities of compliance, we will treat the notice as though it has been made by or on behalf of all signatories.

Having reviewed the contracts in the context of all of the evidence relating to the Highgate project, we conclude that no reason appears why they should be disapproved. We also reduce the period of notice from ninety days to the period from the date of filing of the contracts to the date of our oral announcement (August 3, 1984) of the granting of the certificate of public good.

We would make one further observation. Under Article XVI of the Transmission Agreement, any allottee of power purchased by Vermont under the Firm Power Contract with Hydro-Quebec may decline to take its share for the second five years of that contract. Such an election would constitute a material change in the effective terms of the Transmission Agreement with respect to any utility making the election. Absent extraordinary and presently unforeseeable circumstances, it will also require any such utility to secure other sources of firm power. We therefore hold that an

election not to take power for the second five years of the Firm Power Contract by any Vermont utility would constitute an event subject to the notice requirement of General Order No. 45.

The execution of the Firm Power Contract, following the conclusion of other agreements for energy to be transmitted over the HVDC line through northeastern Vermont, raises important questions regarding the degree of reliance that may prudently be placed upon foreign sources -- or upon any single source -- of supply. Some of these issues were briefly touched on in the course of the hearings: Mr. Zuckernick, for example, testified that, from the standpoint of engineering reliability criteria, Vermont should not depend on a single source for more than twenty-five to thirty per cent of its electric capacity requirements. Tr., 7/16/84, vol. I at 52-55, 91-93. That opinion was echoed by other witnesses. E.g., tr., 7/16/84, vol. I at 198; tr., 7/17/84, vol. I at 188-89.

In addition to reliability concerns, there are economic and political/governmental considerations of at least equal importance. Excessive dependency on a single political or economic entity could substantially diminish Vermont's flexibility in seeking the lowest cost sources of supply in the future. Such dependency could make it impossible to accept more favorable offers if they should become available. Or, the perceived security with a source which appears to have

large capacity reserves could weaken incentives to plan for alternatives as conditions change in the future.

We hasten to add that we do not believe Vermont's present arrangements for Canadian power (including the Highgate agreements) to be suspect with regard to any of the concerns just mentioned. We raise these issues only to express our conviction that it is essential that those responsible for planning for Vermont's future electric supply continue to give them serious attention with the aim of arriving at sound and coherent long-range policies by which to evaluate and pursue future Canadian offers should they become available.

While detailed consideration of these issues was not called forth by this case, it is not inconceivable that another project of similar magnitude would demand that kind of analysis. The time constraints under which we were asked to act in this case would have precluded such an inquiry except in the most superficial way. Let us be certain that the groundwork has been done when a case is presented in which such issues come to the forefront.

ORDER

IT IS HEREBY ORDERED, ADJUDGED AND DECREED by the Public Service Board of the State of Vermont that:

Construction by Vermont Electric Power Company Inc.
(on behalf of a consortium of Vermont utilities) of a 200

megawatt back-to-back converter-terminal located in Highgate, Vermont, and a 345 KV-specification transmission facility to be operated at 120 KV in the corridor filed with the Board as VELCO Exhibit 12, will, subject to the conditions set out in the Certificate of Public Good dated this day, promote the general good of the State.

Dated at Montpelier, Vermont, this 10th day of August, 1984.

s/ V. Louise McCarren)
)
s/ Rosalyn L. Hunneman)
)
s/ William E. Markcrow)

PUBLIC SERVICE
BOARD
OF VERMONT

OFFICE OF THE CLERK

FILED: August 10, 1984.

ATTEST: s/ Susan M. Hudson
Clerk of the Board