

STATE OF VERMONT
PUBLIC SERVICE BOARD

Docket No. 4905-A

Petition of the Joint Owners of the Highgate)
Interconnection to amend the Certificate of)
Public Good, granted to VELCO for the con-)
struction of a 200 megawatt back-to-back)
direct-current converter terminal in Highgate,)
Vermont, to authorize an operating level of up)
to 225 megawatts)

Order Entered: 1/25/95

I. INTRODUCTION

On October 24, 1994, the eight electric utilities that jointly own the Highgate Interconnection (Joint Owners) filed a petition, under 30 V.S.A. Section 248, seeking amendment of the Certificate of Public Good (CPG) issued to Vermont Electric Power Company, Inc. (VELCO) in Docket No. 4905,¹ which authorized construction and operation of a 200-megawatt back-to-back direct-current converter terminal in Highgate, Vermont, and an associated transmission line in Franklin and Highgate, Vermont. Specifically, the Joint Owners seek authority to operate the Highgate Interconnection (Interconnection) at levels of up to 225 megawatts.

The petition was filed pursuant to 30 V.S.A. Section 248(j). By filing under Subsection 248(j), the Joint Owners assert that the amendment they seek does not raise any significant issue with respect to the substantive criteria of Section 248 and therefore may be approved without hearing. The petitioners have served proposed findings and an order (along with a prospective Amended CPG) on the parties specified in 30 V.S.A. Section 248(a)(4)(c).

Notice of the filing was sent on December 6, 1994, to all parties specified in 30 V.S.A. Section 248 and all other interested persons. The notice stated that any party wishing to submit comments as to whether the petition raises a significant issue with respect to the substantive criteria

1. VELCO transferred its CPG to a consortium of joint owners, pursuant to Condition #7 of the CPG. See Assignment Agreement, dated 4/18/85.

of 30 V.S.A. Section 248 must file their comments with the Board on or before January 6, 1995.

On January 5, 1995, the Department of Public Service (DPS) filed a letter with the Board indicating that the requested certificate could be issued without a hearing and stipulating to a proposal for decision submitted by the Joint Owners. No parties indicated any opposition to the Joint Owner's petition, and no one requested that the Board hold a hearing on the request.

Notice of the filing, with a request for comments on or before January 6, 1995, was published in the St. Albans Messenger on December 8 and 15, 1994. No comments were received.

The Board has reviewed the petition and accompanying documents and agrees that, pursuant to 30 V.S.A. Section 248(j), an Amended CPG should be issued without the notice and hearings otherwise required by 30 V.S.A. Section 248.

II. FINDINGS OF FACT

Based upon the petition and accompanying documents, the Board hereby makes the following findings in this matter.

A. Background

1. In Docket No. 4905, the Board issued to VELCO a Certificate of Public Good under 30 V.S.A. § 248 authorizing construction and operation 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." Docket No. 4905, Order of 8/10/84 at 50-51.

2. In Docket No. 5330, the Board found that, "[w]ithout further study and approval by the Board, the Highgate Converter should not be operated continuously at its overload rating of 225 MW." Docket No. 5330, Order of 10/12/90 at 158.

3. On behalf of the Joint Owners, VELCO performed additional studies on the Interconnection's reliability. The results have been filed in this docket and have led to issuance of an amended Presidential Permit for the Interconnection by the U.S. Department of Energy, authorizing the Joint Owners to operate the Interconnection at levels of up to 225 megawatts. Beard pf. at

3, 6.

4. Operation of the Interconnection at levels of up to 225 megawatts requires no physical change to the Interconnection's facilities, including its converter terminal; therefore, the Board's previous findings in Docket No. 4905 with respect to 30 V.S.A. Sections 248(b)(1), (b)(5) and (b)(8) will not change. Parker pf. at 6; see Beard pf.

5. The Interconnection is not a waste-to-energy facility, so 30 V.S.A. Section 248(b)(9) is not applicable.

B. 30 V.S.A. Section 248(b)(2):
The Need for Present and Future Demand

6. None of the Joint Owners propose to make any new, long-term purchases of power or energy from Hydro-Quebec. Evans-Mongeon pf. at 8; Page pf. at 11; see Ryan pf.

7. Instead, Central Vermont Public Service Corporation (Central Vermont) and Green Mountain Power Corporation (Green Mountain) propose to use the additional import capacity to transmit energy purchased under an existing firm purchase contract with Hydro-Quebec -- the Firm Power and Energy Contract approved by the Board in Docket No. 5330 -- energy that would otherwise be transmitted over Phases I and II of the Quebec-New England HVDC Interconnection. Page pf. at 4; Evans-Mongeon pf. at 3; Docket No. 5330, Orders of 10/12/90 and 1/7/91.

8. The increased operating capability may also be useful for short-term purchases of energy from Hydro-Quebec under the Joint Owners' existing Interconnection Agreement when Hydro-Quebec's price is less than the Joint Owners would pay to other utilities for comparable purchases. Ryan pf. at 3; Evans-Mongeon pf. at 2; Page pf. at 4, 8.

9. The Joint Owners estimate the cost of increasing the Interconnection's operating capability to be \$70,000, most of which represents a "sunk" cost already incurred for technical studies and permitting. Evans-Mongeon pf. at 7; Page pf. at 9.

10. Transfers of firm purchases from Phase I and Phase II or short-term purchases of energy will produce benefits from existing purchase contracts

that exceed the costs associated with operating the Interconnection at levels of up to 225 megawatts. Findings 30-40, *infra*.

11. Spending the same amount of money (\$70,000) on demand-side management programs and measures for Vermont's transmission system would not produce the same economic benefits. Evans-Mongeon pf. at 8; Page pf. at 11; Ryan pf. at 6.

12. Because the Joint Owners propose to use any increase in operating capacity to transmit energy purchased under an existing firm contract or make short-term purchases under their existing Interconnection Agreement, operation of the Interconnection at levels up to 225 megawatts to transmit these purchases is required to meet the present and future demand for service, and investing the same amount of money on demand-side management programs or measures to improve the efficiency of Vermont's transmission system would not produce the same economic benefits. Findings 6-11, *supra*.

C. 30 V.S.A. Section 248(b)(3):
Effect on System Stability and Reliability

13. VELCO prepared a study that analyzed the reliability of operating the Interconnection at levels of up to 225 megawatts. Beard pf. at 2.

14. Based on this study and subsequent analysis, VELCO concluded that the Interconnection could operate reliably with imports at levels of up to 225 megawatts if VELCO:

- a. revised the precontingency dispatch of VELCO's switched capacitors, to prevent post-contingency reactive deficiency;
- b. instituted a new Interconnection runback to 150 megawatts for loss of the Sandbar-Essex 115-kilovolt line and added a control function to the Sandbar Overload Mitigation System that will activate the system by sensing overload of the Sandbar-Essex line following loss of the Georgia-IBM-Essex 115-kilovolt line; and
- c. with the New England Power Pool (NEPOOL), adopted new operating rules to limit Highgate imports to 200 megawatts under certain conditions.

Exh. CB-1; Beard pf. at 3-4.

15. NEPOOL and the Northeast Power Coordinating Council have approved operation of the Interconnection at levels of up to 225 megawatts, conditioned on implementation of the measures recommended as a result of VELCO's analysis. Beard pf. at 6-7.

16. VELCO has implemented the post-contingency dispatch procedure, the new 150-megawatt runback scheme and the Overload Mitigation System. Id. at 6-7.

17. NEPOOL and VELCO have agreed on the new operating rules limiting imports to 200 megawatts under conditions when operation at a higher level could adversely affect reliability. Id. at 7.

18. With these protective measures, the Interconnection can operate reliably at flows of up to 225 megawatts. Id. at 5-6, 8. 19. VELCO undertook stability studies with the Interconnection's output adjusted to 225 megawatts; these studies show that there will be no adverse affect on system stability due to the increased operating level. Id. at 9.

20. The converter terminal has a continuous overload capacity of 225 megawatts, and the construction contractor, ASEA Brown Boveri (ABB) specified that the converter could be operated at this level with ambient temperatures below 30 degrees Celsius (86 degrees Fahrenheit). Parker pf. at 2-3.

21. ABB confirmed the operating capability in 1988 and by a recent letter. Id. at 3; exhs. GP-3, GP-5.

22. ABB did recommend filter-switching above the 200-megawatt level which has been implemented by modifying the converter's "reactive power controller software" to allow the operator to switch on the filter manually. Parker pf. at 3.

23. The converter's control systems automatically ramp down the Interconnection's import level from 225 megawatts as temperatures increase above 30 degrees Celsius. Id. at 4.

24. On April 6, 1987, VELCO and Hydro-Quebec performed a two-hour test with the Interconnection operating at an import level of 225 megawatts and observed no adverse voltage or equipment temperatures. Id. at 4.

25. On July 20, 1994, VELCO and Hydro-Quebec conducted a test at 225 megawatts that was terminated after 35 minutes because voltage dropped two

kilovolts due to a disturbance on Hydro-Quebec's 765-kilovolt system. Drees pf. at 5.

26. The Hydro-Quebec system is not synchronized to VELCO's system; on that system, imports of up to 225 megawatts could reduce voltage levels below normal operating levels, requiring that imports be reduced. Parker pf. at 5-6.

27. For quality-of-service reasons, Hydro-Quebec maintains voltage of 123 kilovolts even though the line's rating is 120 kilovolts, which also affects the operating level for imports. Drees pf. at 6.

28. Because VELCO's system is not synchronized to Hydro-Quebec's, this is an operating concern that could affect the hours during the year when imports at the 225-megawatt level can occur but would not have any effect on the reliability or stability of the VELCO system. Parker pf. at 5-6.

29. Operating the Interconnection at levels of up to 225 megawatts will not have an adverse effect on system stability or reliability. Findings 13-28, *supra*.

D. 30 V.S.A. Section 248(b)(4):
Economic Benefit to the State

30. In addition to \$70,000 in direct (mostly technical and permitting) costs required to increase the Interconnection's operating capability, importing 225 megawatts per hour increases VELCO-system losses by 1.6 megawatts over losses at the 200-megawatt import level. Drees pf. at 5.

31. Importing 212 megawatts per hour increases losses by approximately .75 megawatt. *Id.* at 8.

32. Central Vermont and Green Mountain each analyzed the benefit of switching firm purchases from Phases I and II of the Quebec-New England HVDC Interconnection to the capacity made available by the proposed increased operating level, analyses that compared the increased savings under the Phase II Firm Power Energy Contract with their share of the increased cost of losses and the \$70,000 in direct expenses required to increase the operating level. See Page pf. at 5-10; Evans-Mongeon pf. at 6-7.

33. In addition to analyzing the savings if the full 25 megawatts of incremental capacity is available to Vermont utilities throughout the year,

Central Vermont analyzed the savings if only 12 megawatts of capacity is available because of operating restrictions on the Hydro-Quebec system, which, based on information provided by Hydro-Quebec, is a conservative year-round average import capacity. Page pf. at 7; see Drees pf. at 6-7.

34. In preparing its analysis, Central Vermont assumed that the increased operating level would be available on December 1, 1994, and analyzed the increased Phase II Firm Energy Contract savings between now and June 30, 1996, the remaining period of time under the contract when Hydro-Quebec must sell energy to NEPOOL at a price that is 80% of the average weighted fossil-fuel cost in New England. Page pf. at 4-5.

35. At a year-round average import level of 225 megawatts, Central Vermont estimates that Vermont would save (net of direct costs and losses) \$388,360 between December 1, 1994 and June 30, 1996. Id. at 10.

36. At a year-round average import level of 212 megawatts, Central Vermont estimates that Vermont would save \$191,406 (net of direct costs and losses) between December 1, 1994 and June 30, 1996. Id.

37. At the 225-megawatt level, Green Mountain estimates it would save \$75,000 (net of direct costs and losses in the first year) if it transferred the delivery of firm purchases from the Quebec-New England HVDC Interconnection to the Highgate Interconnection. Evans-Mongeon pf. at 7.

38. As an alternative to selling their share of the Interconnection's increased capacity to Joint Owners that participate in the Firm Energy Contract, Joint Owners not participating in the contract might use the added capacity to increase short-term purchases of energy under the existing Interconnection Agreement. Ryan pf. at 3; Page pf. at 8-9.

39. Hydro-Quebec has made short-term sales in recent years at favorable rates and continues to do so. Ryan pf. at 3.

40. Vermont Public Power Supply Authority is a Joint Owner that represents a number of utilities that have entitlements to capacity in the Interconnection; it estimates that these utilities could purchase energy at a net savings of \$3,925 during the initial year and \$8,229 after it has recovered the direct costs of increasing the Interconnection's operating

level, if they were able to make short-term purchases from Hydro-Quebec at the same terms that were available in late 1993. Ryan pf. at 5.

41. Increasing the Interconnection's operating level to 225 megawatts will produce economic benefits to the State of Vermont and its residents. Findings 30-40, *supra*.

E. 30 V.S.A. Section 248(b)(6):
Consistency with Least-Cost Integrated Plan

42. Green Mountain's integrated-resource plan requires it to use its existing resources to the maximum possible benefit before obtaining other power-supply resources; increasing the operating capability of the Interconnection to allow Green Mountain to maximize the benefits from two existing contracts is consistent with that objective. Evans-Mongeon pf. at 8.

43. Central Vermont does not have an approved integrated-resource plan; upgrading the Interconnection's capability is consistent with the resource principles in Central Vermont's proposed plan, which strives to make the best possible use of its assets to reduce the total cost of power while maintaining Central Vermont's capacity obligations. Page pf. at 11-12.

44. Certain utilities represented by Vermont Public Power Supply Authority have approved integrated-resource plans; while these plans do not specifically address the increased operating capability proposed for the Interconnection, the project is consistent with the plans' emphasis on maximizing use of existing facilities and minimizing power costs. Ryan pf. at 7.

45. Increasing the Interconnection's capability is consistent with the resource-selection principles expressed in approved integrated-resource plans of the Joint Owners. Findings 42-44, *supra*.

F. 30 V.S.A. Section 248(b)(7):
Twenty-Year Plan

46. The Joint Owners propose to use the Interconnection's increased operating capability to transmit energy purchased under the Firm Power and Energy Contract approved in Docket No. 5330. Evans-Mongeon pf. at 4; Page pf. at 4.

47. The Board has previously found that purchase to be consistent with the 20-Year Electric Energy Plan. Docket No. 5330, Order of 10/12/90 at 156-57.

48. Although not yet adopted, the March 1994 Public Review Draft of the 20-Year Electric Energy Plan states that "[o]ptions to improve the capacity of the bulk transmission system utilizing existing corridors must be encouraged to the fullest extent possible. . . ." and "the upgrade of existing facilities [is] the preferred method for increasing transmission capacity." Page pf. at 12.

49. The Department of Public Service has issued a determination under 30 V.S.A. Section 202(f) that the project is consistent with the 20-Year Electric Energy Plan. DPS ltr. at 1 (Nov. 30, 1994); see Findings 46-48, *supra*.

G. 30 V.S.A. Section 248(b)(10):
Transmission Facilities

50. The Interconnection's increased operating capability requires no physical change to the Interconnection and will increase this existing facility's capacity by 25 megawatts, capacity that can be used to transmit energy from existing firm contracts or for short-term purchases under the existing Interconnection Agreement. Findings 4, 7-8, *supra*.

51. The Joint Owners estimate the cost of providing the increased operating capability to be \$70,000, most of which involved technical studies and permitting costs that have already been incurred. Finding 30, *supra*.

52. Such purchases of energy may therefore be served economically through existing transmission facilities without undue adverse effects on Vermont utilities or customers. Findings 50-51, *supra*.

53. The proposed project is of limited size and scope within the meaning of 30 V.S.A. Section 248(j). Findings 1-52, above.

54. Permitting the Interconnection to operate at levels of up to 225 megawatts will promote the general good of the State. Findings 1-52, *supra*.

III. CONCLUSIONS

Based upon all of the above evidence, we conclude that the proposal will be of limited size and scope; the petition does not raise a significant issue

with respect to the substantive criteria of 30 V.S.A. Section 248; and the public interest is satisfied by the procedures authorized by 30 V.S.A. Section 248(j).

IV. ORDER

IT IS HEREBY ORDERED, ADJUDGED AND DECREED by the Public Service Board of the State of Vermont that the increase in operating level of the back-to-back direct-current converter terminal in Highgate, Vermont, from 200 megawatts to 225 megawatts will promote the general good of the State of Vermont in accordance with 30 V.S.A. Section 248 and an amended Certificate of Public Good shall be issued in this matter.

DATED at Montpelier, Vermont, this 25th day of
January, 1995.

<u>s/Richard H. Cowart</u>	)	PUBLIC SERVICE
	)	
<u>s/Suzanne D. Rude</u>	)	BOARD
	)	
<u>s/Leonard U. Wilson</u>	)	OF VERMONT

OFFICE OF THE CLERK

FILED: January 25, 1995

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

NOTICE TO READERS: This decision is subject to revision of technical errors. Readers are requested to notify the Clerk of the Board of any technical errors, in order that any necessary corrections may be made.

Appeal of this decision to the Supreme Court of Vermont must be filed with the Clerk of the Board within thirty days. Appeal will not stay the effect of this order, absent further order by this Board or appropriate action by the Supreme Court of Vermont. Motions for reconsideration or stay, if any, must be filed with the Clerk of the Board within ten days of the date of this decision and order.