**STATE OF VERMONT**
**PUBLIC SERVICE BOARD**

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| Petition of Vermont Electric Power Company, Inc. ("VELCO") for a Certificate of Public Good authorizing VELCO to construct the so-called Northwest Vermont Reliability Project | ) ) ) ) | Docket No. _____ |

# DIRECT TESTIMONY OF THOMAS DUNN

## ON BEHALF OF VERMONT ELECTRIC POWER COMPANY, INC.

Mr. Dunn is the VELCO Project Manager for the Northwest Vermont Reliability Project. His testimony (1) introduces the other witnesses providing testimony on behalf of VELCO in these proceedings, (2) provides an overview of the Northwest Vermont reliability transmission problem and VELCO's proposed Northwest Vermont Reliability Project ("NRP" or "Project"), (3) sets forth the expected costs and benefits, (4) summarizes the alternatives that VELCO evaluated and (5) describes the public outreach that VELCO has conducted.

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**VERMONT ELECTRIC POWER COMPANY, INC.**

## 1. Introduction

Q1. Please state your name, business address and qualifications.

A1. My name is Thomas Dunn. My business address is Vermont Electric Power Company, Inc. ("VELCO"), 366 Pinnacle Ridge Road, Rutland, Vermont 05701. I am employed by VELCO as Manager of New England Power Pool ("NEPOOL") relations. My resume is attached to my prefiled testimony as VELCO Exhibit TD-1.

Q2. What is your is your role in the Northwest Vermont Reliability Project?

A2. I am the Project Manager for the VELCO Northwest Vermont Reliability Project ("NRP" or "Project"), which is the subject of this proceeding. All of the various pieces of work that demonstrate the need for and value of this Project, have been managed under my direction.

Q3. What is the purpose of your testimony in this proceeding?

A3. My testimony provides an overview of the NRP, explains why the NRP is needed for Vermont reliability, describes the alternatives VELCO evaluated, summarizes the benefits associated with the Project, provides the total estimated Project cost and provides information on the public outreach campaign VELCO has undertaken.

Q4. Have you previously testified in regulatory proceedings before the Vermont Public Service Board ("PSB" or "Board")?

A4. Yes. I have previously testified in several Board proceedings on behalf of the Department of Public Service ("DPS" or "Department"). I also recently testified before the Board on behalf of VELCO's proposal to install a portable transformer at VELCO's Queen City substation in South Burlington.

## 2. Overview of Testimony

Q5. Please identify each of the VELCO witnesses and the scope of their testimony in this proceeding.

A5. In support of this petition, VELCO submits prefiled testimony and exhibits sponsored by the following witnesses:

| Witness | Subject |
|---|---|
| Thomas Dunn (VELCO NRP NEPOOL Project Manager) | Provides a Project overview, introduces other VELCO witnesses, summarizes estimated Project costs, treatment, Project schedule and timing of needed CPG approvals. |
| Gary Parker (VELCO VP Engineering) | Provides an overview of the VELCO system resources and operations, discusses recent system problems and VELCO's responses, and describes the challenges posed by recent system failures and VELCO's response to those events. |
| Richard Hinners, Cleveland Richards, Dean LaForest, and Hantz Presume, (VELCO Planning) | Describes the analytical studies performed by VELCO System Planning Department to examine the transmission network's performance, and to determine the need for and timing of system reinforcements. |
| Marc D. Montalvo (LaCapra Associates) | Presents and briefly summarizes La Capra Associates' report entitled "Alternatives to VELCO's Northwest Vermont Reliability Project" |

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| Marc D. Montalvo & Scott Mallory (VELCO NEPOOL Market Ops.) | Describes the results of Alternatives Resource Study performed by La Capra Associates. This testimony describes the effects of Standard Market Design on congestion in Vermont. |
| John D. Plunkett, Chris Neme, and Phillip Monsenthal (Optimal Energy, Inc.) | Describes the results of Optimal Energy's analysis of the energy efficiency potential within Northwest Vermont. |
| David J. Boers, P.E. (Burns & McDonnell Engineering Company) | Provides Project design detail. |
| Ryan Johnson (VELCO Mgr. Transmission Engineering) | Discusses the anticipated design, procurement and construction schedule for the Project. |
| Thomas Dunn and Alexandra Rowe (VELCO Environmental Engineer) | Describes the Project's potential impact upon orderly development of the region. |
| Peter Valberg, Ph.D. (Gradient Corporation) | Testimony address electro-magnetic fields. |
| Terrence J. Boyle (T.J. Boyle & Associates) | Provides an aesthetics analysis of the Project upgrades. |
| Art Gilman (William D. Countryman, Environmental Assessment and Planning) | Describes the Project's impact upon air and water purity, water resources, the natural environment, wildlife habitat, and primary agricultural soils. |
| Douglas Frink (Archaeology Consulting Team, Inc.) | Describes the Project's potential impact upon historic sites. |

## 3. Overview of the Existing Northwest Vermont Transmission System

Q6. Please describe the existing Vermont transmission system that serves northwest Vermont.

A6. VELCO owns and operates most of the Vermont high voltage transmission network (115kV and above), including the lines that serve northwest Vermont. The system facilities (lines and substations) are shown on VELCO Exhibit TD-2. The VELCO line numbering designations reflected on the system map and sometimes referred to in the testimony of the VELCO witnesses in these proceedings, are listed on VELCO Exhibit Planning-5.

In 1957, VELCO built Vermont's first 115 kV transmission line, a 115 kV submarine cable tie between VELCO's Sand Bar substation (Milton, Vermont) and New York Power Authority's ("NYPA") Plattsburgh, New York substation ("PV-20"). Three additional major transmission ties were added between 1958 and 1985. Today, the following four 115 kV lines serve northwest Vermont:

- The 115 kV "PV-20" line connecting the NYPA Plattsburgh, New York substation with VELCO's Sand Bar substation. Constructed in 1957, the PV-20 typically carries flows from New York into Vermont. The line includes sections of submarine transmission cable, pipe-type underground transmission cable, overhead transmission line, and a Phase Angle Regulator ("PAR") located at NYPA's Plattsburgh substation;

- The 115 kV "K-26" line originating at the Granite substation in Williamstown, Vermont. Constructed in 1958, this line was reinforced in 1971 by the construction of the F-206 line. The 230 kV "F-206" line carries flows from a substation in Comerford, New Hampshire to the Granite substation;

- The 115 kV "K-30/K-63" line connecting West Rutland to New Haven. Constructed in 1969, this line, which brings power from southern New England along the 345 kV "340" and "350" lines connecting southern Vermont to Coolidge, then from Coolidge to West Rutland;

- The 115 kV "K-21" line connecting northwest Vermont with Hydro Quebec. Constructed in 1985, this line brings power into northwest Vermont from Quebec by means of a back-to-back HVDC Converter at Highgate, Vermont.

**4. Summary of the Project**

Q7. What the is the Northwest Vermont Reliability Project ("NRP")?

A7. The NRP is a coordinated series of improvements to the VELCO transmission system designed to provide reliable transmission service to the state of Vermont and to the systems with which it interconnects. As is detailed in the testimony of Mr. Boers, the principal features of the NRP are a new 345 kV line from West Rutland to New Haven; a new 115 kV line from New Haven to Queen City (both lines will use existing right-of-way for almost their entire lengths); reconductoring of the 115 kV Granite to Barre line; new phase angle regulator ("PAR") devices at VELCO's Sand Bar, Blissville and Granite substations; and new capacitor banks, breakers and other substation upgrades at VELCO's West Rutland, Queen City, Essex, Williston, Hartford and Granite substations and at Green Mountain Power Corporation's ("GMP") Vergennes, North Ferrisburgh, Charlotte and Shelburne substations.

Q8. Why is NRP needed?

A8. The NRP is needed to address serious reliability problems facing Vermont. As demonstrated in the studies performed by VELCO System Planning and discussed further in the panel testimony of Mr. Hinners, Mr. Richards, Mr. Presume and Mr. La Forest ("Panel Testimony"), the existing system does not comply with VELCO's design, operating and reliability standards. These studies demonstrate that due to growing summer loads, limited transmission capacity and relatively small amounts of generation in northwest Vermont, the Vermont transmission system is becoming increasingly susceptible to widespread outages (*i.e.*, blackouts). For example, if the Highgate Converter were to suffer a long-term outage,

Vermont could face voltage collapse with the loss of any of the other three remaining 115 kV lines supplying northwest Vermont. Such an outage, if it were to occur during peak summer conditions, could result in a blackout for over half of Vermont's load (encompassing all of northwest Vermont) and possibly cascade to neighboring systems.

The Independent System Operator of New England ("ISO-NE"), the organization charged by the Federal Energy Regulatory Commission ("FERC") with ensuring the reliability of the New England regional transmission system, has indicated that the,

> "*Northwest Vermont area faces serious reliability problems due to weak interconnections with the bulk transmission system and a lack of generating resources and distributed resources in the region.*"[1]

These conclusions were recently reinforced by the April 11, 2003 failure of the phase angle regulator ("PAR") in the Plattsburgh substation. This failure has weakened an already stressed transmission system and exacerbated concerns about the potential economic impacts of congestion. VELCO has evaluated several transmission and non-transmission alternatives to the NRP and is convinced that the NRP is the most robust and the only option whose implementation can be counted on for solving Vermont's reliability problems. The NRP corrects system deficiencies that exist at load levels far below today's peak demand and provides for reliable service up to a statewide load of 1,200 MW.

Q9. Has VELCO taken any action to address the recent Plattsburgh PAR failure?

A9. Yes. The new Sand Bar PAR is one of the elements of the NRP. Before the most recent Plattsburgh PAR failure, VELCO planned on replacing this PAR as part of the NRP §248 proceeding because, with load growth, planning studies demonstrated that the Plattsburgh PAR would not have enough capacity to control flows on the PV-20 tie, one of the four

[1]ISO New England Board approved RTEP02 (Regional Transmission Expansion Plan), section 1.4.4, page 14.

critical 115 kV lines serving northwest Vermont. With the most recent failure (the third failure in three years), VELCO believes that it is necessary to replace the PAR now. VELCO has made a separate §248 filing for a new Sand Bar PAR with construction planned in the 2003 to 2004 period.

Q10. What is the cost of the NRP?

A10. The cost of the NRP is estimated to be $128 million (includes cost of Sand Bar upgrades). On April 4, 2003 the New England Power Pool ("NEPOOL") Participants Committee approved VELCO's application to have most of the NRP designated as Pool Transmission Facilities ("PTF"), and therefore eligible for regionalized cost support under the Restated NEPOOL Agreement and NEPOOL Open Access Tariff. Section 8 below provides additional detail on the NRP's cost and cost allocation. The effect of this designation is that for the entire Project, Vermonters will pay approximately $11.7 million.

Q11. What is the schedule for the NRP?

A11. We propose to begin construction as soon as possible after receiving the required permits and authorizations. VELCO proposes to start work on the Blissville, Hartford, Essex, Williston substation upgrades, and possibly some of the Granite substation upgrades, in 2004. The Granite to Barre reconductoring, the new 115 kV and 345 kV lines, and the associated substation upgrades will be constructed in the 2005 to 2007 time frame.

## 5. Project Description

Q12. Please describe the proposed NRP upgrades.

A12. The NRP involves three (3) transmission line upgrades (a new West Rutland to New Haven 345 kV line, a new New Haven to Queen City (South Burlington) 115 kV line, and the reconductoring of the existing Granite (Williamstown) to Barre 115 kV line), together with

equipment additions and upgrades at nine (9) existing VELCO substations and at four (4) GMP substations. The locations of the Project upgrades are shown on the "System Map of NRP Upgrades" VELCO Exhibit TD-3. Details on the routing and resource information for the 345 kV West Rutland to New Haven line are shown on VELCO Exhibit TD-4. VELCO Exhibit TD-5 provides this information for the 115 kV New Haven to Queen City line and VELCO Exhibit TD-19 for the Granite to Barre 115 kV line reconductoring. VELCO Exhibit TD-6 is a table providing detail on each of the NRP substation upgrades. VELCO Exhibits TD 7-18 are orthophotos showing details on the expansions at each of the substations as well as suggested screening. The NRP upgrades are designed to permit the system to reliably serve loads up to a 1,200 MW statewide load level.

A detailed discussion of proposed design of these Project elements is included in Mr. Boer's testimony. The prefiled testimony of VELCO's System Planning panel witnesses explains why these particular upgrades were identified and the functions they serve to meet the identified reliability need.

Q13. Please describe the proposed West Rutland to New Haven 345 kV line.

A13. VELCO is proposing to construct approximately 35.5 miles of new 345 kV transmission line adjacent to the existing 115 kV line from the West Rutland substation to the New Haven substation (*See* VELCO Exhibits TD-3 & 4). From West Rutland to Middlebury, the new line will be constructed on the west side of the existing 115 kV line. From Middlebury to New Haven, the new line will be constructed on the east side of the existing 115 kV line. Like the existing line, the new line will be built using "H-frame" structures. These structures will be comprised of two wooden poles approximately 79 feet in height above ground with a horizontal wooden crossarm connecting the two poles near the top. (*See* Exhibit DB-8 for cross-section drawings of the corridor on the West Rutland to New Haven line showing the typical structures for both the "existing" 115 kV line and "proposed" 345 kV line).

Q14. Please describe the proposed New Haven to Queen City 115 kV line.

A14. VELCO is proposing to construct approximately 27.1 miles of new 115 kV transmission line to replace an existing subtransmission line from the New Haven substation to the Queen City substation (*See* VELCO Exhibits TD-3 & 5). The existing subtransmission line is comprised of a 46 kV line from New Haven to Vergennes, and a 34.5 kV line from Vergennes to Queen City. The first 1.2 miles of the 6.5 mile long 46 kV line is owned by Central Vermont Public Service Corporation ("CVPS"). The remainder of the 46 kV line and all of the 34.5 kV line is owned by GMP. The existing line is constructed on single wooden poles. The new 115 kV line will also be built using single wooden pole structures. Most of these structures will be approximately 61 feet in height above ground. On poles where distribution lines are attached to the existing transmission line, the distribution lines will be transferred to the new transmission poles. Poles with distribution lines attached will be approximately 70 feet in height above ground. (*See* Exhibit DB-24 for cross-section drawings of the corridor on the New Haven to Queen City line showing the typical structures for both the "existing" 34.5/46 kV line and "proposed" 115 kV line)

Q15. Please describe the Granite to Barre 115 kV line reconductoring.

A15. VELCO is proposing to replace the existing 795 Aluminum Covered Steel Reinforced ("ACSR") conductor with new 1272 ACSR conductor between its Granite and Barre substations. This line is approximately 5.6 miles in length. The existing H-frame, two pole wooden structures will be retrofitted with cross bracing to support the larger wire.

**6. <u>Scope and Impact of New Facilities</u>**

Q16 Will these upgrades require VELCO to build new substations in Vermont?

A16. No. All upgrades are proposed to occur at existing substation locations. However, as noted in Exhibits TD- 6 through 18 and in the more detailed Project descriptions included in Mr.

Boers' testimony, most of the substation improvements will require expansion of existing substation sites.

Q17. How did VELCO choose the routes for the 115 kV and 345 kV lines?

A17. The intention of the NRP is to create a 5th transmission path into northwest Vermont. In designing the Project, VELCO sought to use existing corridors wherever possible. In fact, with the exception of two short segments that will be rerouted to mitigate aesthetic impacts, the transmission lines in the NRP use existing transmission corridors. In the case of the 115 kV New Haven to Queen City line, most of the existing corridor is located next to an active rail line. The 345 kV line will be located in an existing corridor next to an existing 115 kV line. Another important consideration in the route selection process is aesthetics. The use of existing corridors allows VELCO to minimize the aesthetic impact of the NRP. VELCO is proposing two new sections of right-of-way ("R/W") on the New Haven to Queen City line to mitigate aesthetic impacts. Additional detail on the line segments can be found below and in Mr. Boers' testimony.

Q18. Will the 345 kV line upgrade require VELCO to widen it existing transmission corridor?

A18. Yes. VELCO is proposing to construct the new West Rutland to New Haven 345 kV line in the existing transmission corridor adjacent to the existing 115 kV line. To build the new 345 kV line, the existing 150 foot corridor will need to be widened by approximately 100 feet. This will increase the total width cleared in the right–of-way ("R/W") to 250 feet.

Q19. Will VELCO need to acquire additional easements for the 345 kV line?

A19. Yes. For all but 1.3 miles of the 35.5 mile length, the VELCO R/W is between 250 and 350 feet in width. In a 1.3 mile section along Halpin Road in north Middlebury and New Haven VELCO has 150 foot easements. To build the new 345 kV line in this section, VELCO will

need to acquire additional easements for an additional 100 feet on the east side of the existing corridor.

Q20. Will the 115 kV line upgrade require VELCO to build new transmission corridors?

A20. Yes. The proposed New Haven to Queen City line will replace GMP's 34.5 & 46 kV line. VELCO intends to follow this existing corridor for approximately 22.7 of the 27.1 mile length. VELCO is proposing two sections of new transmission corridor which I believe are an improvement over the existing corridor.

Referring to VELCO Exhibit TD-5 (115 kV Line Corridor Orthophotos, pp. 4 & 5), the first new segment begins on the north side of the Otter Creek in Vergennes. The existing 34.5 kV line follows Comfort Hill Road north into Ferrisburgh where the road name changes to Botsford Road. VELCO is proposing a new, approximately 2.8 mile corridor for the 115 kV line, beginning at the intersection of Comfort Hill and High Street in Vergennes. The new corridor heads in a northeasterly direction through woodlands and across a pasture until it reaches the railroad tracks owned by the State of Vermont and operated by Vermont Railway. From there the line will head in a northerly direction mostly along the west side of the railroad tracks until the new corridor rejoins with the existing corridor to north of Little Chicago Road. Once the 115 kV line is in service, the existing 34.5 kV line along Comfort Hill and Bostford Road will be removed.

The second new segment begins just north of the Shelburne substation (*See* VELCO Exhibit TD-5, pp. 10-12). The existing 34.5 kV line follows the Ticonderoga Haul Road and passes through the Nature Conservancy area until reaching Bay Road in Shelburne, where it generally parallels the road until reaching the Vermont Railways railroad tracks. At this location, VELCO is proposing a new, approximately 1.6 mile corridor that crosses the McCabe Brook north of the Shelburne substation and heads in an easterly direction along the edge of an open field and behind the vacant Blodgett factory until reaching the Vermont

Railways railroad tracks. The proposed corridor will follow the west side of the railroad tracks north until it rejoins the existing corridor at Bay Road in Shelburne.

Q21. Will VELCO need to acquire easements for the 115 kV line?

A21. Yes. To build the new 115 kV line, VELCO plans to acquire 100 foot easements to replace the existing GMP and CVPS easements.

Q22. Will the Granite to Barre line reconductoring require new corridors or widening of existing corridors?

A22. No.

Q23. Will VELCO need to acquire additional land for any of the Project substation expansions?

A23. Yes. Based upon the Project plans, we will need additional land for substation upgrades at New Haven, North Ferrisburgh, and Shelburne. This is noted in VELCO Exhibit TD-60.

## 7. Project Benefits

Q24. What benefits will be realized from the NRP?

A24. As described in the Critical Load Study attached to the Planning Panel's testimony (VELCO Exhibit Planning-6), the existing system has deficiencies beginning at the 700 to 800 MW load level (summer peak load levels last experienced in the 1980s; the 2002 summer peak load was 1,023 MW). The NRP will make Vermont's transmission system reliable up to 1,200 MW.

The improved reliability of Vermont's grid reduces Vermont's exposure to a widespread outage. Presently, Vermont is exposed to voltage collapse if there is a long-term outage of the Highgate Converter combined with the loss of any of the other three remaining 115 kV lines supplying northwest Vermont. Such an outage, if it were to occur during peak

summer conditions, could result in a blackout for over half of Vermont's load (encompassing all of northwest Vermont) and possibly cascade to neighboring systems. Reducing Vermont's exposure to such widespread outages is a major benefit to Vermont. Widespread blackouts present serious risks to public health and safety. In addition, they would have large economic impacts on the business community through lost production. I have met with representatives from the business community who have expressed their deep concerns about the reliability of the grid and its importance in supporting a healthy business climate in Vermont. Several of these companies and organizations have provided VELCO with letters of support for the NRP as the best way to address Vermont's current reliability needs. These letters are included in my testimony as VELCO Exhibit TD-20.

The NRP also reduces Vermont's exposure to the cost of congestion on the grid. Under current market rules, these costs will be paid by Vermont. As detailed in Mr. Montalvo's alternative resource analysis (VELCO Exhibit MDM-2), Vermont is exposed to additional costs due to the need to run local, more expensive generation required to support the transmission system. Absent the construction of new transmission or new power plants in Northwest Vermont, Vermont is expected to see an increase in congestion costs as our load grows. Mr. Montalvo, in his joint testimony with Mr. Mallory (*See* VELCO Exhibit MM-2), projects that these costs could exceed $17 million per year in 2008, and total over $164 million during the 2005 to 2011 period (nominal dollars). With the NRP, these congestion costs are expected to be slightly less than $49 million during the same (2005-2011) period.

The expected reduction in congestion costs highlights the fact that the NRP provides Vermont with increased access to the wholesale electric market. This means that Vermont will have more options to choose from in the wholesale market (e.g., renewable generation located outside of northwest Vermont or new, efficient gas plants). Without the NRP, there will be periods, during times of higher demand, when Vermont will need to run local

generation out-of-economics to support the grid, perhaps displacing less costly generation located outside the constrained area.

In addition to addressing serious reliability problems, the NRP provides Vermont with the option to align new power supply commitments with power supply needs. Today, Vermont has a major reliability need, but it does not have a corresponding power supply need. This disparity affects the ability to use generation as a solution to the reliability need because the amount of the generation needed to solve the reliability problem today exceeds Vermont's current power supply needs.

This asymmetry will change in the future. As detailed in the Planning Panel's testimony, the NRP corrects existing system deficiencies at load levels as low as 700 MW. It provides for reliability to a statewide load of approximately 1,200 MW. Based on the Public Service Department's load forecast, adjusted for savings from continuation of the existing energy efficiency programs, this load level is projected in 2011. Shortly after 2011,Vermont will need to replace approximately two-thirds of its power supply needs. At approximately the same time, it may have an additional reliability need to address. Locally sited generation could play a significant role in meeting both needs. I believe that the feasibility of constructing power plants in northwest Vermont will be greater if Vermont's utilities participate as either owners or holders of power supply contracts. This may best done when Vermont's power supply needs coincide with Vermont's transmission system needs. The NRP allows Vermont to defer decisions to build sizable amounts of new generation until a time when there will be both a reliability and power supply need. The NRP improves the reliability of the grid while providing Vermont with time to consider its power supply options.

**8. <u>Cost Allocation and Project Cost</u>**

Q25. How are the cost of transmission upgrades allocated in NEPOOL?

A25. Schedule 12 of the NEPOOL Open Access Transmission Tariff ("OATT") and Section 15 of the Restated NEPOOL Agreement ("RNA") specify how the cost of transmission upgrades will be allocated in New England. The method of cost recovery is a function of a project's classification. Upgrades can be classified in many ways including reliability, economic, generator interconnect and Northeast Massachusetts ("NEMA") upgrades. The NEPOOL OATT defines a Reliability Upgrade as:

> *"Those additions and upgrades not required by the interconnection of a generator that are nonetheless necessary to ensure the continued reliability of the NEPOOL system, taking into account load growth and known resource changes, and include those upgrades necessary to provide acceptable stability response, short circuit capability and system voltage levels, and those facilities required to provide adequate thermal capability and local voltage levels that cannot otherwise be achieved with reasonable assumptions for certain amounts of generation being unavailable (due to maintenance or forced outages) for purposes of long-term planning studies. Good Utility Practice, applicable reliability principles, guidelines, criteria, rules, procedures and standards of NERC and NPCC and any of their successors, applicable publically available local reliability criteria, and the NEPOOL System Rules, as they may be amended from time to time, will be used to define the system facilities required to maintain reliability in evaluating proposed Reliability Upgrades."*

Under Schedule 12 of the NEPOOL OATT, the cost of Reliability Upgrades is paid by NEPOOL Participants.

Q26. Is the NRP a Reliability Upgrade?

A26. Yes. The NRP is classified as a Reliability Upgrade in ISO-NE's RTEP02, Section 4 & Attachment 13.11.

Q27. Are all of the Project costs subject to New England-wide cost sharing?

A27. No. The RNA provides a definition that details which costs will be paid by all Participants in New England. In general, only the cost of Pool Transmission Facilities ("PTF") are paid by all Participants. Under section 15.1 of the RNA, the definition of PTF is:

> *"Pool Transmission Facilities ("PTF"), which are transmission facilities owned by Participants rated 69 kV or above required to allow energy from significant power sources to move freely on the New England transmission network."*

In the NRP, the cost of the 115 kV and 345 kV transmission lines and related substations will all be PTF costs and, the costs of those facilities will be allocated to all load in New England. The cost of facilities that are intended to serve local load is borne by the local customers (i.e., Vermont consumers). These are often referred to as Non-Pool Transmission Facilities ("Non-PTF") costs. The costs of 115/12.5 kV stepdown transformers and related equipment at Vergennes, North Ferrisburgh, Charlotte and Shelburne are examples of Non-PTF in the NRP.

Q28. What is the estimated expected cost of the NRP?

A28. The estimated total cost of the Project is $128 million. Please see VELCO Exhibit TD-21 for a breakdown of the NRP costs.

Q29. What is the breakdown between PTF and Non-PTF for the NRP?

A29. Of the total $128 million cost of the NRP, approximately $121.2 million is PTF. Vermont will pay approximately 4.09% of this amount, or about $5 million. In addition, Vermont will pay all the Non-PTF costs which are estimated to be $6.7 million. For the entire Project, Vermont will pay approximately $11.7 million which represents the sum of Vermont-supported PTF plus the cost of the Non-PTF.

Q30. What is the process by which NEPOOL reviewed the NRP and classified the majority of its components as PTF?

A30. Section 18.4 of the RNA requires that any Participant seeking to add to or modify transmission facilities obtain approval from the ISO-NE. The purpose of this review is determine whether a project will have an adverse effect upon the reliability or operating characteristics of the New England transmission system. The 18.4 review process for the NRP began 2001 with reviews by the Stability Task Force and the Transmission Task Force, two technical subcommittees of NEPOOL's Reliability Committee. In 2002, both subcommittees determined that the NRP would not have an adverse impact on other parts of the New England network. Based on the recommendation of the subcommittees, in January of 2003, the Reliability Committee made a similar determination.

In February of 2003, the Reliability Committee voted to approve the major components of the NRP as PTF investment, but added the proviso stating that cost recovery would be "based on the Regional Tariff in effect at the time the facilities enter service." In April of this year the Participants Committee approved the major components of the NRP as PTF, without this proviso.

## 9. Alternatives Evaluated

Q31. Did VELCO evaluate any alternative solutions to the Northwest Vermont transmission reliability problem?

A31. Yes. VELCO evaluated several transmission alternatives, as well as various supply and demand side alternatives.

Q32. How did VELCO evaluate transmission alternatives?

A32. To evaluate transmission alternatives to the NRP, VELCO Planning studied several different configurations. These included upgrading the PV-20 to 230 kV, making the Highgate Converter redundant and various other options for upgrading other transmission lines. As described in the Transmission Alternatives report attached to the Planning Panel's testimony

(VELCO Exhibit Planning-8), the NRP is the best transmission option for reliably serving Vermont's load up to a statewide load of 1,200 MW.

Q33. Please summarize how VELCO evaluated other supply and demand side alternatives to the NRP?

A33. VELCO retained La Capra & Associates ("La Capra") of Boston, Massachusetts to compare the NRP to various supply and demand side alternatives. The results of this analysis are contained in Mr. Montalvo's report, VELCO Exhibit MDM-2. La Capra first identified the amount of resources needed in northwest Vermont. The data used for this phase of the analysis included the load forecast for northwest Vermont (DPS 8-5-02 DSM-adjusted Vermont load forecast) and the capability of the transmission lines and generators supplying northwest Vermont. Once the need was determined, La Capra evaluated options for meeting this need. On the supply side, various generation technologies, including utility-scale generation, distributed generation, and renewable technologies, were screened to identify the most viable options.

Q34. How were demand side resources evaluated?

A34. VELCO retained Optimal Energy, Inc. ("Optimal") of Bristol, Vermont to determine how much peak demand in northwest Vermont could be reduced by increased investments in energy efficiency programs and what it would cost to implement such programs. Additionally, Optimal provided an estimate of the expected savings over the next ten years from the continuation of Efficiency Vermont's ("EVT") programs funded at current levels. This estimate of expected savings was used to adjust the DPS 8-5-02 forecast.

Q35. How did La Capra compare the NRP to the supply and demand side options?

A35. La Capra used Optimal's results, along with the supply side resource evaluation, to construct five alternate resource configurations ("ARCs"). Each ARC is, from a reliability

perspective, comparable to the NRP. Each ARC included estimated future savings from the continuation of EVT's existing programs. ARCs 1-4 are comprised primarily of generation of various sizes. ARC 5 utilizes generation and a portion of the DSM savings identified by Optimal. As noted in Mr. Montalvo's testimony, many of the NRP elements cannot effectively be replaced by non-transmission alternatives. NRP elements that provide voltage control, ensure system stability or direct flows are not good candidates for replacement by non-transmission alternatives due to either cost or operational characteristics. Thus many of the NRP elements are included in each ARC. Mr. Montalvo identifies the elements that are included in each ARC and those elements that can be displaced or deferred by non-transmission alternatives.

Q36. How did La Capra compare the ARCs and the NRP?

A36. La Capra evaluated each ARC and the NRP using (1) the option's carrying cost, (2) the net variable costs to serve Vermont's load, and (3) net societal costs. La Capra evaluated the options under base case conditions (i.e., expected load growth and market prices). ARCs 1, 4, and 5 and the NRP were also evaluated under several additional scenarios (e.g., high/low load growth, high fuel prices and low market prices) to determine the performance of the options under varying conditions.

Q37. What are the results of this comparison?

A37. From a societal cost perspective, the NRP is cheaper than the four generation alternatives and slightly more expensive than ARC 5. ARC 5 is slightly less costly than the NRP due primarily to the value of the avoided generation and avoided distribution and subtransmission upgrades.

Q38. If ARC 5 is the least cost option why is VELCO asking for a permit for the NRP?

A38. Referring to VELCO Exhibit MDM-2, Table 20 of Mr. Montalvo's testimony, ARC 5 is, when evaluated on a societal cost basis, only slightly less expensive than the NRP. It is worth noting that ARC 5, in order to provide the same level of reliability, must include approximately half of the NRP elements including the 115 kV New Haven to Queen City line. La Capra's analysis shows that if intensive DSM programs were implemented and achieved all of the expected savings, the impact of the intensive DSM programs on the need for NRP elements is relatively modest in that only the second phase of the Granite STATCOM would be deferred.

In addition to the very modest deferral impact, ARC 5 requires the largest capital investment of any of the options. ARC 5 requires an investment of $55 million for several NRP transmission elements, a $110 million investment for three 50 MW combustion turbines and associated fuel and transmission infrastructure upgrades, and an additional investment of approximately $270 million over tens years for the intensive energy efficiency program. The investments in energy efficiency and generation, under current NEPOOL rules, would be borne by Vermont.

Mr. Montalvo's analysis demonstrates that the DSM investment in ARC 5 does little to avoid the investments in the major components of the NRP. According to La Capra's analysis, the $270 million investment in energy efficiency only defers the need for the second phase of the Granite STATCOM (+/- 75 MVAR) by eight years, saving approximately $8 million in carrying costs. From a perspective of deferring transmission investment, the $270 million investment in an intensive energy efficiency program is relatively ineffective in that it only avoids $8 million dollars of transmission costs. Finally, as noted in Mr. Plunkett's testimony, the level of investment and sustained commitment have never been done. It is possible that the projected savings might not materialize fast enough to avoid deferring even the second phase of the Granite STATCOM.

**10. Public Outreach Effort**

Q39. Please provide information about VELCO's public outreach effort.

A39. In October of 2001, VELCO launched a public outreach effort to raise public awareness about the importance of transmission reliability and receive comments and suggestions about the NRP and the alternatives under consideration. Over the past 20 months, I have attended about 80 meetings with a wide variety of town officials, environmental and business groups and other interested parties.

Our goal in this effort was to provide information to the public about Vermont's reliability problem and possible solutions. We sought meetings with many different types of groups and individuals, including town officials in the communities affected by the Project, business groups and associations, environmental groups, regional planning commissions, various state agencies and other potential interested parties.

Q40. Did you do any other outreach besides setting up and attending meetings?

A40. Yes. We created a public information web site (nrpvt.com) where we have posted project reports, a map of the project area and news stories about the project. In addition we created a Project brochure. Some of this material has been distributed to area libraries, regional planning commissions and town offices.

Q41. What did you tell people when you met with them?

A41. We developed a 10-20 page slide presentation where the following information was presented:

1) Background information on VELCO

2) Description of reliability problem (i.e, increased energy use, finite capacity on the transmission system, no new generation);

3) Description of the alternatives under consideration to solve the "problem";

4) Some of the impacts of the alternatives;

5) Invite their comments and suggestions;

The message about the reliability problem has been the same throughout the entire process. Over the last two years, the description of the alternatives has changed as more detail about the viability of the alternatives has become known with the completion of the Alternatives Report.

Q42. Is VELCO going to continue the public outreach campaign now that the §248 filing has been made?

A42. Yes. It is our intention to continue to meet regularly with the public and town officials throughout the regulatory process and to maintain regular correspondence with the people on our mailing list. We believe that it is essential to continue to have an on-going conversation with the people along the corridor and other interested parties.

Q43. What did you hear from the public in the 80 meetings you have attended?

A43. Overall, people are concerned about the reliability problem and are very interested in the options for solving the reliability problem. People representing the business community were particularly concerned about the reliability of the grid and the cost of electricity. Some people were concerned about the impacts associated with transmission line construction and advocated support for the use of more renewable energy and energy efficiency as the appropriate solution. Others encouraged VELCO to secure NEPOOL support for the NRP. Some town officials were supportive of VELCO's plans to make substantial investments in their towns. Finally, there were comments that the reliability problem was the result of growth in Chittenden County and that the NRP impacted their community without providing offsetting benefits.

Q44. Has VELCO received letters supporting the NRP?

A44. Yes. Included in VELCO Exhibit TD-20 are ten letters of support from the following groups listed in alphabetical order:

Addison County Chamber of Commerce
Addison County Economic Development Corporation
Associated Industries of Vermont
East Mountain Development Corporation, LLC
Greater Burlington Industrial Corporation
IBM
Lake Champlain Regional Chamber of Commerce
Lamoille County Planning Commission
Renewable Energy Vermont
Vermont Association of Snow Travelers
Vermont Chamber of Commerce

Q45. Does this conclude your testimony?

A45. Yes.