

**STATE OF VERMONT
PUBLIC SERVICE BOARD**

Joint Petition of Vermont Transco, LLC,)
Vermont Electric Power Company, Inc.)
("VELCO"), City of Burlington Electric)
Department ("BED") and Green Mountain)
Power Corporation for a certificate of public)
good, pursuant to 30 V.S.A. Section 248,)
authorizing the construction of the so-called)
East Avenue Loop Project in Williston, South)
Burlington, Colchester, Winooski and)
Burlington, Vermont, which consists of: (1))
the replacement of 4.8 miles of an existing)
single 115 kV line between VELCO's Essex)
Substation and its East Avenue Substation)
with two new 115 kV lines within the same)
corridor; (2) expansion of the East Avenue)
Substation; (3) installation of a new 1.5-mile)
34.5 kV line from the East Avenue Substation)
to BED's McNeil Substation; (4) construction)
of a new substation at the McNeil Generating)
Station; (5) installation of new and relocated)
equipment from BED's Lake Street)
Substation to the McNeil Substation; and (6))
removal of several circuits connected to)
BED's Lake Street Substation)

Docket No. 7314

**PREFILED REBUTTAL TESTIMONY OF
JEFFREY DISORDA
ON BEHALF OF
PETITIONERS**

November 26, 2007

Summary: The purpose of Mr. Disorda's testimony is to respond to comments and recommendations concerning VELCO's transmission vegetation management practices for the East Avenue Loop Project ("Project").

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EXHIBITS

Exhibit PET REB.9.1	VELCO Transmission Vegetation Management Plan
Exhibit PET REB.9.2	Study of the Impacts of Vegetation Management Techniques on Wetlands for Utility Rights-of Way in the Commonwealth of Massachusetts (June 1989)
Exhibit PET REB.9.3	W.C. Bramble and W.R. Byrnes, <u>Thirty Years of Research on Development of Plant Cover on an Electric Transmission Right-of-Way</u> , Journal of Arboriculture 9(3), March 1983
Exhibit PET REB.9.4	W.C. Bramble and W.R. Byrnes, <u>Integrated Vegetation Management of an Electric Utility Right-of-Way Ecosystem</u> , Down to Earth, Vol 51, No. 2 (1996)
Exhibit PET REB.9.5	R.H. Yahner, R.J. Hutnik, and S.A. Licinsky, <u>Bird Populations Associated with an Electric Transmission Right-of-Way</u> , Journal of Arboriculture 28(3), May 2002
Exhibit PET REB.9.6	Utility Vegetation Management and Bulk Electric Reliability Report from the Federal Energy Regulatory Commission (September 7, 2004)
Exhibit PET REB.9.7	Order on Violation Risk Factors, Docket No. RR07-12-00 (FERC, June 26, 2007)
Exhibit PET REB.9.8	ISO New England Operating Procedure No. 3, Appendix C

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PETITIONERS**

- 1 **1. Introduction**
- 2 Q1. Please state your name.
- 3 A1. My name is Jeffrey Disorda.
- 4

1 Q2. Have you previously filed testimony in this proceeding?

2 A2. Yes. I submitted direct prefiled testimony on behalf of the Petitioners in this
3 docket.

4

5 **2. Overview**

6 Q3. What is the purpose of your rebuttal testimony?

7 A3. My rebuttal testimony responds to testimony submitted by other parties that
8 comment on and make recommendations regarding VELCO's transmission
9 vegetation management practices for the Project corridor. I also introduce
10 VELCO's new Transmission Vegetation Management Plan ("TVMP"), Exhibit
11 PET REB.9.1, which became effective June 1, 2007.

12

13 **3. Continued Vegetation Management Practices Associated with the**
14 **Project Corridor**

15 Q4. Will any additional clearing of the existing Project corridor be required as a result
16 of the Project?

17 A4. Basically, no. The only time the Project will involve clearing will be (i) for areas
18 where VELCO proposes to swap its existing right-of-way ("ROW") for new
19 ROW on the same property (please see Sheets 1 and 2 of Exhibit PET 8.1.1), and
20 (ii) for a very small portion of the area of Centennial Woods between Structures
21 N/S 58 and the East Avenue Substation (please see Sheet 7 of Exhibit PET 8.1.1).
22 None of these areas have been identified by Pioneer Environmental Associates or

1 Vermont Agency of Natural Resources (“ANR”) as areas of environmental
2 sensitivity. There will also be some minor clearing in connection with certain
3 construction access routes, including St. Michaels Alt. #2 (see Exhibit PET
4 REB.7.4), Gorge Road #2 (see Exhibit PET REB.7.5), and SD Ireland Alt. #2 (see
5 Exhibit PET REB.7.6).

6
7 Several witnesses have commented upon or referred to “additional clearing”
8 associated with this Project. Clearing of the Project corridor is a planned
9 maintenance activity that will occur to conform to VELCO’s Transmission
10 Vegetation Management Plan (“TVMP”), not this Project. As I explained in my
11 April 16, 2007 prefiled testimony in this proceeding (Q10 & A10), the last
12 vegetation management cycle for the Project corridor occurred in 2004. The next
13 regularly scheduled management cycle is in 2008, and will occur regardless of
14 anything that happens with respect to the Project. Moreover, the Project does not
15 involve any widening of the 150 foot corridor. VELCO manages this corridor to
16 its full 150 foot cleared width; however, some tree encroachments have occurred
17 at the edge of the corridor over time, and these will be addressed (removed)
18 during the next regular clearing cycle in order to meet the required vegetation-
19 conductor clearances in the TVMP, which has been developed to comply with
20 newer and stricter vegetation management policies and practices established by
21 NERC and ISO-New England (“ISO-NE”). I discuss the North American Electric
22 Reliability Corporation (“NERC”) and ISO-NE standards in Q 9& A 9, below.

1

2 Q5. Robert Popp, the Botanist for the Vermont Fish and Wildlife Department
3 (“Department”) of ANR, has stated in Q 13 & A 13 of his October 5, 2007
4 prefiled testimony in this matter, that any additional clearing in the floodplain
5 forests at Winooski Island or the Gorge Island will permanently alter a portion of
6 the natural community that is present. Do you have comments on this testimony?

7 A5. Yes. VELCO representatives met with ANR staff and counsel on November 8,
8 2007, to discuss the issues identified in the ANR testimony submitted in this
9 docket. As a result of that meeting, Mr. Popp now understands that the Project
10 will not involve any clearing of forested wetlands. The rebuttal testimony of Mr.
11 Nelson and Mr. Prasch discusses in more detail understandings reached regarding
12 the issues raised by ANR witnesses.

13

14 Q6. Mr. Popp’s testimony also recommends restricting application of herbicides
15 within 50 meters of any rare plant or state significant natural community. Please
16 address this recommendation.

17 A6. Herbicide use is an integral part of our TVMP. Each year, VELCO receives a
18 Permit to Conduct Rights of Way Herbicide Treatment from the Agency of
19 Agriculture. At our recent meeting with the ANR on November 8, 2007, the
20 parties agreed that the issue of herbicides would be addressed outside of the scope
21 of this docket, since the current Project does not involve any expansion of the

1 existing utility corridor, nor will herbicides need to be used to complete any
2 portion of the Project's construction.

3
4 **4. Muddy Brook Park**

5 Q7. Mr. Eisman, a consultant for the Winooski Valley Park District ("WVPD"), has
6 recommended in his report (Exhibit EAL-CE-2), that VELCO not perform any
7 cutting or other work on WVPD lands in the City of South Burlington between
8 May 1 to September 15 to the extent possible, in order to avoid the nesting period
9 of certain bird species. Do you have any comments on this recommendation?

10 A7. VELCO has agreed to limit *mechanical clearing* techniques such as mowing
11 during the months of May and June to avoid nesting birds. Both manual clearing
12 and herbicide applications are completed in a manner that would have little
13 impact to wildlife due to the selectivity of clearing the incompatible species and
14 the short duration of completing selective clearing of incompatible species with
15 those methods. This is consistent with VELCO's TVMP and vegetation
16 management practices. Compatible species are allowed to remain to the greatest
17 extent possible which allows vegetation to remain for nesting birds and other
18 wildlife. Limitations on vegetation management from May 1st to September 15th
19 would not allow for some vegetation management techniques to occur during the
20 active growing season, which would in turn limit some of their effectiveness.
21 Moreover, ANR has not proposed or adopted WVPD's recommendation. Many
22 studies have been conducted that show vegetation management techniques have

1 little impact on bird populations and in fact improve habitat for many species of
2 birds and other wildlife. See Exhibits PET REB.9.2 through REB.9.5. Finally, as
3 I discuss above, the Project corridor is a well-established corridor that has been
4 cleared regularly since its inception, decades ago.

5
6 **5. Vegetation Management Standards and Reliability**

7 Q8. In your response A4 above, you mention that the new TVMP addresses
8 vegetation-conductor clearances. Why is this a concern?

9 A8. Because failure to maintain proper clearances presents a serious risk to the safety
10 and reliability of the Vermont and interconnected regional and national electric
11 grid. VELCO is responsible for maintaining the integrity and reliability of over
12 688 miles of high voltage (115 kV and above) electric transmission lines, which
13 includes managing vegetation on nearly 12,000 acres of ROW extending
14 throughout the State of Vermont and portions of the State of New Hampshire. As
15 the Transmission Operator (“TO”) of the Vermont high voltage electric
16 transmission network, and TO of a portion of the interconnected regional and
17 national transmission electric grid, VELCO must manage vegetation in its ROWs
18 to prevent contact between its transmission lines and vegetation. Contact between
19 vegetation and conductors can result in sustained transmission system outages and
20 could directly contribute to power system instability, separations, or a cascading
21 sequence of failures.

22

1 Q9. Are there examples of system outages that have been attributed to conductor-
2 vegetation contact?

3 A9. There are numerous examples. One of the most recent and dramatic examples
4 was the August 14, 2003 blackout that impacted large portions of the northeast
5 and midwest United States and Ontario, Canada. The blackout lasted up to two
6 days in some areas of the United States, and even longer in some areas of Ontario.
7 It affected an area with over 50 million people and 61,800 megawatts of electric
8 load. See Exhibit PET REB.9.6, Utility Vegetation Management and Bulk
9 Electric Reliability Report from the Federal Energy Regulatory Commission
10 (September 7, 2004) (“FERC Report”), at 4. On April 5, 2004, a joint U.S-
11 Canada Power System Outage Task Force issued a Final Blackout Report¹ (the
12 “Blackout Report”) stating that one of the four primary causes of the blackout was
13 inadequate vegetation management. Specifically, during the hour before the
14 cascading blackout occurred, three FirstEnergy Corporation 345 kV transmission
15 lines failed as a result of contact between the lines and overgrown vegetation that
16 encroached into the clearance zones for the lines. The Blackout Report also
17 compared the August 2003 blackout with seven previous major outages and
18 concluded that conductor contact with trees was a common factor among the
19 outages.

20

¹ U.S.-Canada Power System Outage Task Force, Final Report on the August 14th
Blackout in the United States and Canada: Causes and Recommendations (April 2004).

1 Largely as a result of these findings, the Federal Energy Regulatory Commission
2 (“FERC”) directed all designated TOs to submit reports regarding their vegetation
3 management practices, and the FERC staff worked with the National Association
4 of Regulatory Utility Commissioners’ (“NARUC”) ad-hoc Committee on Critical
5 Infrastructure to analyze the reports and look for significant patterns and potential
6 problems in the vegetation management practices of the electric industry. The
7 FERC issued the FERC Report to Congress on September 7, 2004, summarizing
8 its findings and recommendations. See Exhibit PET.REB.9.6. The FERC Report
9 summarized ten principal recommendations:

- 10 1) Congress should enact mandatory and enforceable reliability standards;
- 11 2) Effective transmission vegetation management requires clear, unambiguous,
12 enforceable standards that adequately describe actions necessary by each
13 responsible party.
- 14 3) It is important that state and federal regulators continue to coordinate so that
15 jurisdictional considerations do not impede effective vegetation management.
- 16 4) Federal and state regulators should allow reasonable recovery for the costs of
17 vegetation management expenses.
- 18 5) With respect to permitting on federally managed public lands, the FERC
19 should work with the Council on Environmental Quality and land
20 management agencies to better coordinate the requirements.
- 21 6) Federal, state and local land managers should develop “rush” procedures and
22 emergency exemptions to allow utilities to correct “danger” trees that threaten
23 transmission lines, from both on and off documented rights-of-way.
- 24 7) Five-year vegetation management cycles should be shortened and the FERC
25 and states should look at the cost-effectiveness of more aggressive vegetation
26 management practices.
- 27 8) Transmission owners should fully exercise easement rights for vegetation
28 management and better anticipate the permitting process for scheduled
29 vegetation management.
- 30 9) Variances in vegetation management practices may be resolved by NERC or
31 by a stakeholder process.
- 32 10) State regulators and the utility industry should work through NARUC, the
33 National Conference of State Legislators, and other organizations to help state

1 and local officials better understand and address transmission vegetation
2 management.
3

4 *Id.* at 3-4.

5

6 Q10. What did the FERC Report state regarding recommendation No. 8, that utilities
7 should fully exercise their easement rights?

8 A10. The FERC Report stated that:

9 “In general, if a utility has a wider right-of-way, well documented easement
10 rights, and exercises those rights fully, it will be more successful in avoiding
11 vegetation-line contact than a utility that maintains narrower rights-of-way. A
12 narrow right-of-way increases the risk of contact with vegetation that is outside of
13 the right-of-way and adjacent to the transmission line. Expert Commentary
14 included in the CNUC Final Vegetation Report stated, “[m]ost tree/power line
15 contacts occur when trees fall onto lines from outside the rights-of-way. Utilities
16 are slow to act to address this issue due to the perception of increased costs and
17 the pressure from landowners etc. to leave the trees standing.”

18

19 *Id.* at 8.

20

21 Q11. Did the FERC Report address clearances between conductors and vegetation?

22 A11. Yes. The FERC Report concluded that the maintenance of sufficient vertical

23 clearances between conductors and vegetation is “essential” because direct

24 physical contact is not necessary for a line outage to occur. An electric arc can

25 occur between a part of a tree and a conductor without sufficient clearance.

26 *Id.* at 10. The FERC Report also identified a number of recommended good

27 utility vegetation management practices, including establishment of a wire zone –

28 border zone, which the FERC stated is both effective and environmentally

1 friendly in ensuring reliability. This method involves creating a low-growing
2 vegetation environment directly under transmission lines, which physically
3 prevents dangerous vegetation from encroaching into energized transmission
4 facilities. As I discuss below, this is the approach VELCO employs in its TVMP.

5
6 Q12. Have reliability standards governing transmission vegetation management been
7 developed?

8 A12. Yes, both federal and regional standards have been developed. On August 8,
9 2005, Congress passed the Energy Policy Act of 2005 (“EPAAct 2005”), which
10 requires FERC to certify an Electric Reliability Organization (“ERO”) to develop
11 mandatory and enforceable Reliability Standards, subject to FERC review and
12 approval.

13
14 On February 3, 2006, FERC certified the NERC Corporation (“NERC”) as the
15 Electric Reliability Organization, and in April and August of 2006, NERC
16 submitted 107 proposed Reliability Standards, including a Vegetation
17 Management Reliability Standard -- FAC-003-1 -- for FERC approval. FERC,
18 Mandatory Reliability Standards for the Bulk-Power System, 117 FERC ¶61,084,
19 ¶380 (Oct. 20, 2006) (Docket No. RM06-16-000).

20
21 On March 16, 2007, FERC adopted the NERC Transmission Vegetation
22 Management Reliability Standard, FAC-003-1 (Exhibit PET 11.2), subject to the

1 requirement that NERC subject the standard to its development process to extend
2 the applicability of the standard to lower voltage facilities that have an impact on
3 reliability. FERC Order No. 693, at 201.

4
5 Q13. Please describe the NERC standard.

6 A13. The stated purpose of the NERC Transmission Vegetation Management
7 Reliability Standard is:

8 “To improve the reliability of the electric transmission systems by
9 preventing outages from vegetation located on transmission rights-
10 of-way (ROW) and minimizing outages from vegetation located
11 adjacent to ROW, maintaining clearances between transmission
12 lines and vegetation on and along transmission ROW, and
13 reporting vegetation-related outages of the transmission systems to
14 the respective Regional Reliability Organizations (RRO) and the
15 North American Electric Reliability Council (NERC).”

16
17 Exhibit PET 11.2, NERC Standard FAC-003-1 at ¶ A.3. The standard establishes
18 two primary reliability requirements. Requirement R1 requires a transmission
19 owner to develop a transmission vegetation management program, and
20 Requirement R2 requires a transmission owner to implement the program and to
21 document its implementation. Each program must be designed for the
22 geographical area and specific design configurations of the transmission owner’s
23 system. FERC Order No. 693, at 198. The NERC Standard requires a
24 transmission owner to define a schedule for and the type (aerial or ground) of
25 ROW vegetation inspections. In addition, it requires a transmission owner to
26 determine and document the minimum allowable clearance between energized

1 conductors and vegetation before the next trimming. *Id.* The minimum clearance
2 distances must be “sufficient to prevent outages due to vegetation management
3 practices under all applicable conditions.” FERC, Mandatory Reliability
4 Standards for the Bulk-Power System, 117 FERC ¶61,084, ¶380 (Oct. 20, 2006)
5 (Docket No. RM06-16-000).

6
7 Q14. Does the NERC Transmission Vegetation Management Reliability Standard apply
8 to the Project transmission lines?

9 A14. The NERC standard as it currently reads, applies to all transmission lines operated
10 at 200 kV and above and to any lower voltage lines designated by the Regional
11 Reliability Organization (“NPCC”), as critical to the reliability of the electric
12 system in the region. Exhibit PET 11.2, NERC Transmission Vegetation
13 Management Standard FAC-003-1 at ¶ A.4.3. The Project lines will be built and
14 operated at 115 kV. However, I would note that the 200 kV threshold adopted by
15 NERC in FAC-003-1, is a topic of continuing discussion. In its recent Order No.
16 293, FERC instructed NERC to revise the standard through NERC’s Reliability
17 Standards development process, “with the expectation that the applicability of this
18 Reliability Standard will expand to include additional facilities that impact
19 reliability that currently are not covered by this Reliability Standard.” FERC
20 Order No. 293, at 202.

21

1 Just recently, FERC affirmed NERC's assignment of a "high" Violation Risk
2 Factor to Requirements R1 and R2 of the NERC Vegetation Management
3 Reliability Standard (development of a vegetation management program and
4 implementation of the program). NERC has defined three levels of Violation
5 Risk Factors that it will assign to its Reliability Standards: (1) high risk
6 requirement; (2) medium risk requirement; and (3) lower risk requirement. The
7 Violation Risk Factors are used by NERC and Regional Entities in determining
8 financial penalties for violating the Reliability Standards. FERC, Order on
9 Violation Risk Factors, Docket Nos. RR07-12-00, at 4 (June 26, 2007) (Exhibit
10 PET.REB.9.7). In approving NERC's assignment of a "high" Violation Risk
11 Factor to the vegetation management standards, FERC stated that the assignment
12 is appropriate because "vegetation management presents a serious risk of
13 sustained transmission outage and could directly cause or contribute to Bulk-
14 Power System instability, separation, or a cascading sequence of failures. Both
15 planning and implementation are critical to vegetation management." *Id.* at 4.
16 The assignment of a "high" Violation Risk Factor to a violation of the NERC
17 Vegetation Management Reliability Standard confirms that FERC expects
18 transmission owners to take vegetation management programs very seriously, and
19 that any violation could result in serious penalties.

20

21 Q15. Are there any regional transmission vegetation management standards that apply
22 to the Project corridor?

1 A15. Yes. ISO-NE Operating Procedure (OP) 3, Appendix C - ISO New England
2 Right-of-Way Vegetation Management Standard (February 1, 2005) (Exhibit
3 PET.REB.9.8) (the “OP3 Standard”). The stated objective of this standard is to
4 “achieve and maintain a high degree of reliability for the New England
5 Transmission System.” *Id.* at 1. The OP3 Standard applies to transmission
6 voltages of 69 kV and above, and therefore will apply to the East Avenue Loop’s
7 Essex to East Avenue ROW. ISO-NE’s Vegetation Management Standards Task
8 Force is currently in the process of revising this standard. I am a member of this
9 Task Force. Based upon discussions to date, I would anticipate the new ISO-NE
10 OP3 Standard to look very much like the NERC standard, although the ISO-NE
11 Standard will apply to all Pool Transmission Facility (“PTF”) portions of the New
12 England transmission network.

13
14 Q16. Has the VELCO TVMP been developed to meet the requirements of the NERC
15 and ISO-NE transmission vegetation management standards?

16 A16. Yes. However, I expect that the VELCO TVMP will be revised from time to time
17 as both the NERC and ISO-NE standards continue to evolve.

18

19 **6. VELCO Transmission Vegetation Management Plan**

20 Q17. Please describe VELCO’s Transmission Vegetation Management Plan or TVMP.

21 A17. VELCO’s TVMP, Exhibit PET REB.9.1, describes VELCO’s Transmission
22 Vegetation Management Program. The goal of VELCO’s TVMP is to prevent

1 physical contact between transmission lines and nearby vegetation that could
2 cause a transmission line to fail. In accordance with the NERC and ISO-NE
3 standards, VELCO's TVMP includes minimum clearances and an approach to
4 vegetation management intended to preserve those clearances.

5
6 VELCO utilizes a system of vegetation management that manages plant
7 communities in which compatible and incompatible vegetation are identified,
8 action thresholds are considered, control methods are evaluated, and selected
9 control(s) are implemented. Choice of control methods is based on safety,
10 environmental impact, effectiveness, site characteristics, security, and economics.

11 This system of vegetation management is called Integrated Vegetation
12 Management, a concept recommended in the ANSI Standard, Exhibit PET 11.3.

13
14 VELCO has established a four-year vegetation management cycle as an action
15 threshold. This vegetation management cycle has been time tested since 1980,
16 and is based upon engineering design of the lines, the growth rate potential of the
17 vegetation, and required minimum vegetation to conductor clearances.

18 The primary clearance factor is the design of the line. For 115 kV line corridors,
19 such as those involved with the Project, conductor-to-vegetation clearance
20 requirement at time of clearing and maintenance, is 8 feet, with a maximum safe
21 tree height of 12 feet. Vegetation that generally may mature to greater than 12
22 feet in height is considered incompatible and removed from the corridor. The 12

1 foot maximum vegetation height limitation is established based upon growth
2 rates, and the fact that once exceeded, vegetation will encroach into the
3 conductor-vegetation clearance zone before the next clearing cycle, thus posing a
4 risk of vegetation to conductor contact.

5
6 Q18. Please explain how the wire zone – border zone approach to vegetation
7 management is applied.

8 A18. The wire zone is the area under the conductors and extends to fifteen (15) feet
9 beyond the outside conductor. The objective of the four-year cycle is to reduce
10 the number of stems per acre of the tall-growing, incompatible tree species in the
11 ROW. Once this is accomplished, the program performs basically to control tree
12 seeds germinating throughout the four-year vegetation management cycle. All
13 tall-growing, incompatible species are eliminated in both the wire zone and the
14 border zone. These incompatible species are identified in the TVMP. The TVMP
15 also identifies lower growing, compatible trees and shrubs that may be allowed to
16 remain in the corridor. The TVMP breaks down compatible tree species into
17 these categories: compatible species allowed within the wire zone, and
18 compatible species allowed within the border zone. The type of compatible
19 vegetation permitted within the border zone includes vegetation that does not
20 normally mature to greater than 12 feet tall, but could exceed 12 feet in height.
21 Any trees that grow taller than 12 feet within the border zone are removed on the
22 next cycle. Vegetation allowed within the wire zone does not mature to greater

1 than 12 feet. Over time, the plant community (trees, shrubs, forbs, ferns and
2 grasses) retained within the ROWs stabilizes into a very low-maintenance
3 condition of compatible species. This low-growing plant community in the ROW
4 has been found to promote and sustain wildlife habitat within those ROWs.

5

6 **7. Conclusion**

7 Q19. Does this conclude your testimony at this time?

8 A19. Yes, it does.