

**STATE OF VERMONT
PUBLIC UTILITY COMMISSION**

Petition of Vermont Transco LLC and Vermont)
Electric Power Company, Inc. (collectively,)
“VELCO”), for a certificate of public good,) Case No. 19-____-PET
pursuant to 30 V.S.A. § 248, authorizing the)
construction of the New Haven Operations)
Facility in New Haven, Vermont)

**PREFILED TESTIMONY OF
DANIEL L. NELSON
ON BEHALF OF VELCO**

November 15, 2019

Mr. Nelson’s testimony explains the need for a Secondary Data Center as part of the Project pursuant to 30 V.S.A. § 248(b)(2), and the benefits of the Secondary Data Center on system stability and reliability pursuant to 30 V.S.A. § 248(b)(3).

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EXHIBITS

Exhibit Petitioner DLN-1 Resume of Daniel Nelson

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1 **1. Introduction**

2 Q1. Please state your name, occupation, and business address.

3 A1. My name is Daniel Nelson. I am employed by Vermont Electric Power Company, Inc.
4 (“VELCO”). I serve as the Director of Technology for VELCO and have oversight for
5 all technology related functions within VELCO’s headquarters at 366 Pinnacle Ridge
6 Road, Rutland, Vermont 05701, which I refer to as the Pinnacle Ridge Campus.

7 Q2. Please describe your educational background, qualifications and work experience.

8 A2. My resume is attached as **Exhibit Petitioner DLN-1**. I have an associate’s degree in
9 electrical engineering technology. At VELCO, I am responsible for coordinating the day-
10 to-day operations of VELCO’s Technology personnel, which includes oversight and
11 administration of the existing Primary Data Center (as described further below) at
12 VELCO’s Pinnacle Ridge Campus. I am also responsible for the development,
13 construction, and overall management of VELCO’s Statewide Radio System, which
14 provides communication services to Vermont’s utilities during normal business
15 operations and emergency response.

1 Q3. Have you testified previously before the Public Utility Commission?

2 A3. Yes, I previously submitted prefiled testimony in multiple dockets associated VELCO's
3 Statewide Radio System, including Docket 7608.

4 Q4. What is the purpose of your testimony?

5 A4. My testimony describes the importance and overall function of data in VELCO's
6 operations of Vermont's electric transmission system and the need for a new Secondary
7 Data Center as part of the proposed New Haven Operations Center at 760 Main Street,
8 New Haven, Vermont (the "Project"), as described as one of the interior elements of the
9 "Main Building" in the prefiled testimony of Peter W. Lind. I also describe why the
10 Secondary Data Center will enhance system stability and reliability for purposes of 30
11 V.S.A. §248(b)(3).

12 **2. Functions and Importance of Transmission Data**

13 Q5. Please describe VELCO's current Primary Data Center.

14 A5. VELCO's Primary Data Center is located at the Pinnacle Ridge Campus in a building that
15 meets current standards for critical operational systems for an electric transmission
16 company. Due to the importance of the data housed within, the building is equipped with
17 physical security equipment, and is controlled both by physical and cyber access controls.
18 The building also has redundant and diverse supporting infrastructure, including backup-
19 power and server cooling systems.

1 Q6. Please explain why a transmission operator collects data, and please describe the nature
2 of the data.

3 A6. Given the variables that affect the day-to-day operations of the Vermont transmission
4 grid, it is imperative to collect data from remote substations for real-time monitoring of
5 power-system conditions to ensure system reliability and stability. Using this data,
6 system operators can make adjustments in real-time to ensure the reliability and
7 performance of the power grid. This data is also archived for analysis by engineers for
8 performance assessment and system planning to ensure the continued safe and reliable
9 operation of the power grid. In addition to real-time management of the power system,
10 VELCO collects data on the assets that support the real-time systems. This includes
11 information such as transformer performance, equipment temperatures, frequency of
12 operations, and other asset-management data associated with the efficient and long term
13 operation of the facilities.

14 Q7. What obligations, if any, does VELCO have to keep this data secure?

15 A7. Among the risks managed in the operation of the transmission system, cyber security
16 ranks among the highest. VELCO conforms to cyber security and critical infrastructure
17 protection (“CIP”) requirements as mandated by the Federal Energy Regulatory
18 Commission (“FERC”). VELCO also adheres to the ISO-NE Information Policy, which
19 is designed to preserve sensitive market-based information. VELCO’s security protocols
20 are subject to periodic audits, including audits by consultants, and regulatory audits by
21 the North American Electric Reliability Corporation (“NERC”) and the Northeast Power

1 Coordinating Council (“NPCC”). Managing the access, control, and overall security of
2 information and data is paramount in the safe and reliable operation of the transmission
3 system.

4 Q8. Please describe VELCO’s current system for data storage outside of the Primary Data
5 Center, including its current level of reliability and adequacy.

6 A8. Currently, VELCO operates a secondary data center within the West Rutland 345kV
7 substation control building. By “secondary,” I mean a system that is active simultaneous
8 with the primary system, and where either system can assume full operations at any given
9 moment. This is more than simply data storage—rather, it is a fully operational,
10 integrated computer system that has the capability to operate independently. The use of
11 the West Rutland substation control building as a secondary data center began in
12 approximately 1996. Since then, substantial technology upgrades and substation
13 improvements have been made, thereby necessitating an increased number of servers and
14 storage to be located within the high voltage control building. The secondary facility’s
15 computer equipment has outgrown the building, which was not initially designed as a
16 data center. As a result, the space, power, and cooling systems are operating at full
17 capacity, creating significant challenges to the continued operation of the secondary data
18 center, particularly as VELCO faces ever increasing cyber security and digitalization-
19 transformation challenges.

1 Q9. Under what circumstances, if any, would VELCO potentially lose access to both the
2 Primary Data Center and the current backup facility?

3 A9. The scenarios in which VELCO would lose access to the primary and secondary data
4 centers include a coordinated effort targeted at the disruption of VELCO's control
5 systems in Rutland, or a severe storm or similar disaster that would cause the
6 simultaneous failure of two or more systems in the same general area of Rutland.
7 Although these events have a low likelihood of occurrence, the degree of impact—in this
8 case, the loss of VELCO's data—would be severe as it would impact the ability to
9 operate the transmission system.

10 **3. Need for Secondary Data Center at New Haven Operations Facility**

11 Q10. Please explain why a new Secondary Data Center is proposed for the New Haven
12 Operations Facility.

13 A10. Based on the criticality of data in the operation of the transmission system, the siting
14 requirements for the Secondary Data Center aligned with that of the Backup Control
15 Center. The collocation of the facilities also allowed for efficiencies to be gained in the
16 design. As an example, the data center is proposed to be sited within the basement of the
17 Main Building, providing the prudent utilization of space and allowing the data servers to
18 be supported by the redundant systems also needed for the Backup Control Center. The
19 decision to collocate facilities was determined as part of the peer consultation described
20 in Mr. Haas's testimony, and the alternatives review described in Mr. Lind's testimony.

1 Q11. Describe the circumstances under which the Secondary Data Center would become a
2 primary data center for VELCO's operations.

3 A11. As discussed above, the Secondary Data Center is both an active part of and an alternate
4 to the Primary Data Center, and is designed to operate as an integral part of the overall
5 computing infrastructure, as the operation of the power grid requires continuous
6 monitoring and control. Critical infrastructure that operates the power grid can be active
7 simultaneously at the primary or secondary data centers. As an example, a failure of
8 hardware or software at the Primary Data Center will result in the resumption of those
9 services at the Secondary Data Center.

10 Q12. Did VELCO consider alternatives to the Secondary Data Center to ensure data protection
11 based on locations physically separate from the operations center?

12 A12. While determining the optimal configuration to serve secondary data-center functions,
13 alternatives were evaluated that considered the use of existing facilities that were farther
14 away from the Primary Data Center but also close enough to be efficient for the
15 management and maintenance of the computer equipment located at the Pinnacle Ridge
16 Campus. Considering the routine management, compliance requirements, security needs,
17 and operational efficiencies of the systems, VELCO determined that the continued
18 colocation of the Backup Control Center with the Secondary Data Center offered optimal
19 efficiencies. Please see the alternatives review encapsulated in **Exhibit Petitioner PWL-**
20 **6** and referenced in Mr. Lind's testimony for more information. The NERC definition of

1 “control center” recognizes that data centers are often a key element of the operations
2 center.

3 Q13. Explain whether data cloud storage could obviate the need for a data facility?

4 A13. Although cloud storage and computing may be suitable for many business needs, it is not
5 suitable for a real-time power grid control system. The reliability and security of cloud
6 solutions do not meet VELCO’s operational requirements and, importantly, could
7 therefore jeopardize reliable operation of the power grid.

8 Q14. Has VELCO included expansion space into the design of the Secondary Data Center?

9 A14. Yes. VELCO plans to take advantage of a future expansion area within the basement of
10 the Main Building for temporary staging of IT projects, such as new servers or computer
11 equipment that can be pre-staged in a given area prior to replacing outdated equipment.
12 This empty space in the basement was driven by the first floor spatial requirements for
13 the BCC and associated facilities. Given the rate of change in technology and the
14 integration of more complex electronic systems into utility operation, this expansion area
15 would be utilized to support future needs of VELCO and other Vermont utilities. This
16 future expansion area also provides opportunities for public and quasi-public institutions
17 with congruent missions and appropriate security protocols (e.g., State of Vermont,
18 University of Vermont, first responders) to collocate equipment and/or servers, but will
19 require further collaboration and planning to define the operational protocols.

1 Q15. What benefits, if any, will the Secondary Data Center have on system stability and
2 reliability?

3 A15. Construction of the Secondary Data Center is vital to ensuring system stability and
4 reliability of VELCO's transmission assets, which in turn ensures the stable and reliable
5 operation of Vermont's distribution system. The Secondary Data Center improves the
6 reliability of VELCO's existing integrated computer system today, while ensuring that in
7 the event of a catastrophe the critical data is protected and useful to VELCO's operations.

8 **4. Conclusion**

9 Q16. Does this conclude your testimony?

10 A16. Yes.

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