STATE OF VERMONT
PUBLIC UTILITY COMMISSION

Case No. 25-_____

Petition of Vermont Transco LLC and Vermont Electric Power Company, Inc. ("VELCO") for a Certificate of Public Good, pursuant to 30 V.S.A. § 248, for approval to install an Advanced Power Flow Controller at the VELCO Sandbar Station in Milton, Vermont	

PREFILED TESTIMONY OF WITNESS
HANTZ A. PRÉSUMÉ
ON BEHALF OF VELCO

June 30, 2025

Mr. Présumé discusses the need for the Project. He also explains how the Project improves system stability and reliability, conforms with the State of Vermont's Electric Energy Plan, and aligns with principles for resource selection.

PREFILED TESTIMONY OF HANTZ A. PRÉSUMÉ

Q1. Please state your name, current employer, business address, and position.

A1. My name is Hantz A. Présumé. I am currently employed by Vermont Electric Power Company Inc. and Vermont Transco LLC (collectively referred to as "VELCO" or the "Petitioner") with a business address of 366 Pinnacle Ridge Road, Rutland, VT 05701. I am an electrical engineer employed as a director of system planning at VELCO. I have special training and experience in the area of transmission system planning including the modeling and simulation of electric power systems.

Q2. Please describe your education and employment background.

A2. My résumé is included with this filing as **Exhibit Petitioner HAP-1**.

Q3. Have you previously provided testimony before the Vermont Public Utility Commission ("the Commission")?

A3. Yes. I have provided testimony on behalf of VELCO in: Docket No. 6860 for the Northwest Vermont Reliability Project; Docket No. 7314 for the East Avenue Loop Project; Docket No. 7751 for the Ascutney Substation Project; Docket 8604 for the PV20 Cable Replacement Project; Docket No. 8605 for the Connecticut River Valley Project; Docket No. 8847 for the Vermont Green Line Transmission Project; and Case No. 23-3734-PET for the K42 Transmission Line Upgrade.

Q4. What is the purpose of your testimony?

A4. My testimony addresses certain aspects of VELCO's proposal for approval to install an Advanced Power Flow Controller at the VELCO Sandbar Station in Milton, Vermont (the "Project"). Specifically, I discuss how the Project meets several Section 248 criteria: need, improving system stability and reliability, aligning with principles for resource selection, and conforming with the State of Vermont's Electric Energy Plan.

Q5. Please provide an overview of the proposed Project.

A5. As further detailed in the Prefiled Testimony of John Fiske and Edward McGann, the Project involves the installation of an Advanced Power Flow Controller, named a SmartValve, at the VELCO Sandbar Station. The SmartValve will operate in series with the existing Sandbar phase shifting transformer (PST) to regulate the power flow on the Plattsburgh to Sandbar 115 kV line, named PV20. The controls of the SmartValve and the PST will be coordinated so that the SmartValve operates first and maintains the PV20 flow within a tighter flow band. The coordinated and combined operation of these two flow control devices will improve our ability to respond to flow variations caused by New York wind generation volatility, intra-day changes in imports and exports over the nearby Highgate HVDC converter transfers across the New York – New England boundary and other operations patterns.

Q6. Why is this Project needed at this time from a system planning perspective?

A6. This Project is needed to maintain reliability of power in the region by extending the life of the existing Sandbar PST. The primary objective of this Project is to reduce the

likelihood that the existing Sandbar PST will fail by significantly reducing the number of tap changes, which likely contributed to the PST failure in 2021. The number of tap changes at Sandbar is approximately six times more than the Blissville PST, and much higher than other PSTs in New England. To change the PV20 line flow, the PST adjusts its taps to change the bus angle difference between the two sides of the transformer. A tap change can be forced by the system operator who enters a new desired flow setting. The PST also adjusts its taps to return the flow to within acceptable range in response to a sudden flow change caused by an outage or to a gradual flow change as the flow drifts away from the desired flow setting due to load and generation pattern changes throughout the day.

The SmartValve improves system reliability by reducing wear on the PST, which in turn reduces the likelihood of another PST failure. The controls of the SmartValve and the PST will be coordinated so that the SmartValve operates first and maintains the PV20 flow within a tighter flow band. As more renewable and intermittent generation is added in New York and Vermont, we anticipate that flows will vary more frequently on the PV20 line. A power electronics device such as the SmartValve is better suited to manage frequently changing power flows than the PST's mechanical tap changers.

One of the reasons we selected the SmartValve technology is because of the ancillary but important benefits that it provides in supporting renewable generation. We have observed that the ISO-NE and New York Independent System Operator (NYISO) control center operators direct the VELCO operators to frequently change the desired flow, possibly in response to load/generation patterns and reliability concerns on either side of the NY-NE border. Sometimes, these instructions change within just a few minutes, and this leads to frequent PST

tap changes. We anticipate that the frequency of the tap changes will increase as more wind generation is installed in northeast New York. By installing the SmartValve in series with the PST and by coordinating their controls, we will not only reduce the likelihood of a future PST failure, we also increase the flow control range, which should help power flow regulation as more renewable intermittent generation is installed. In effect, the SmartValve facilitates renewable generation production growth.

The SmartValve also improves system resilience. In the event the PST fails, the SmartValve will retain flow control capability, which reduces the recovery time and allows the system operators to maintain the line closed for continued system support. The SmartValve uses a modular design consisting of four modules per phase (twelve total), and each module contains ten inverters. The SmartValve can continue to operate after the failure of several inverters or entire modules. The flow control capability can be fully retained depending on the extent of SmartValve failures. The modular design also facilitates the relocation of the SmartValve to other lines in the event a system redesign.

The SmartValve is a type of Grid Enhancing Technology (GET). The Department of Energy (DOE), utilities, researchers and other interested stakeholders support using GETs to increase the capacity, operability, and other aspects of the grid. One example of the benefits is congestion reduction. The Project may be partially funded by a DOE grant awarded on October 1, 2024, to the Electric Power Research Institute (EPRI) and VELCO, which would fund approximately $13,000,000 of VELCO's Project costs. EPRI is also participating in this Project to transfer knowledge to the industry. VELCO will continue to share our experience with EPRI,

the DOE and the industry, based on our engineering and study of the SmartValve, during project implementation, and after several years of operating experience.

Q7. Please discuss VELCO's coordination with ISO-NE on this Project.

A7. Pursuant to Section I.3.9 of the ISO-NE Tariff, Review of Market Participant's Proposed Plans, VELCO is required to complete system impact studies to document that the Project will not have a significant adverse impact on the reliability or operating characteristics of VELCO's transmission facilities, the transmission facilities of another Transmission Owner or the system of any other Market Participant. VELCO has been collaborating with Smart Wires (the SmartValve vendor), and ISO-NE to produce adequate models and finalize the system impact study scopes. These studies have started, and they should be completed in a matter of weeks.

Because the SmartValve is a new technology for ISO-NE, VELCO collaborated with Smart Wires to explain the technology, including its capabilities and limitations. We arranged several meetings with ISO-NE to get input and answer questions from ISO-NE Operations, EMS, and Planning departments. We worked with ISO-NE during several months to select the stressed boundary conditions that need to be tested. ISO-NE arranged a meeting with NYISO and New York Power Authority (NYPA) to make sure that the studies address New York's concerns. Following the completion of the system impact studies, VELCO will file the proposed plan application seeking ISO-NE approval.

Q8. Is the Project required to meet the need for present and future demand for service that could not otherwise be provided in a more cost-effective manner through energy conservation programs and measures and energy-efficiency and load management measures, including those developed pursuant to the provisions of subsection 209(d), section 218c, and subsection 218(b) of V.S.A. Title 30?

A8. Yes. As noted above, the Project is intended to address an asset condition concern with the existing PST, which is necessary to maintain reliability of power in the region. Operating the SmartValve in series with the PST and coordinating their controls will ensure adequate flow control under present and future system conditions. Non-transmission alternatives are not practical solutions to the asset condition concerns.

Q9. Will the Project adversely affect system stability and reliability (30 V.S.A. § 248(b)(3))?

A9. No. This Project will improve system stability and reliability. ISO-NE is currently completing a comprehensive review of system impacts, which has involved detailed studies performed under ISO-NE supervision. We anticipate that ISO-NE will make a final determination within the next few months, and VELCO will update the Commission regarding the ISO-NE review.

Our studies indicate that the SmartValve will improve system stability and reliability by more precisely regulating power flow. The SmartValve affects power flow by injecting a voltage that is at 90 degrees in relation to the line current, meaning that if the current is horizontal (0 degree angle), the voltage would be vertical. The ratio of the voltage to the current

results in an effective reactance in ohms or pu (percent of 132.25 ohms) that can be inductive with a positive voltage injection (+90 degrees) or capacitive with a negative voltage injection (-90 degrees).

Based on our study results, we have determined that the reactance needs to be limited between -0.1 pu capacitive and 0.6 pu inductive to prevent high voltage or low voltage, respectively. In addition, the SmartValve will only be allowed to actively control the line current when the flow is sufficiently higher than 20 MVA to prevent a hunting effect where the SmartValve continuously enters and exits the control and monitoring modes. As is currently done with the phase shifter, a flow target will be selected and the SmartValve will adjust its reactance to maintain that flow within a flow bandwidth. The flow target is a flow that prevents equipment overloads, and it is determined on a real-time basis by conducting contingency analysis in the control centers every five minutes. Currently, the phase shifter adjusts its angle to maintain the desired flow. The SmartValve controls and the phase shifter controls will be coordinated such that the SmartValve will act first and control the flow more precisely. This coordination approach will ensure that the SmartValve augments the control capability of the phase shifter instead of conflicting with the phase shifter. The same operational philosophy will be used to prevent overloads when selecting the desired flow with both the SmartValve and the phase shifter operating together in a coordinated manner.

From a short circuit perspective, the SmartValve does not inject current into the system, and it is designed to be bypassed or become a short under fault conditions. Therefore, the SmartValve should not exacerbate fault currents, notwithstanding the fact that the existing fault duty level is significantly lower than breaker interrupting ratings and withstand capabilities.

From a stability perspective, the SmartValve behaves like a passive device by maintaining a fixed reactance because the time delays for active power control are several minutes long, while dynamic responses occur during the event and tens of seconds after the event. Results have confirmed that the SmartValve should not affect system stability, interact with nearby control devices, nor itself be negatively impacted by system dynamics.

Finally, the SmartValve's control settings can be adjusted from the field or remotely from the control center. This allows VELCO to make future adjustments to refine the control settings after some operating experience. The off-line system impact studies and the ability to make post-energization control adjustments will ensure that the SmartValve will not have a significant adverse impact on system stability and reliability.

Q10. Is the Project consistent with VELCO's Integrated Resource Plan (30 V.S.A. § 248(b)(6))?

A10. VELCO does not have an integrated resource plan. As a transmission-only company, VELCO periodically performs transmission studies to determine whether reinforcements to the transmission system are necessary, and whether system constraints can be mitigated by non-transmission solutions. VELCO also produces a long-range transmission plan at least every three years. VELCO issued a 2024 Vermont Long-Range Transmission Plan. The 2024 Plan explains that the DOE and the industry support continued development and use of GETs, which are anticipated to improve the flexibility and the resilience of the system, help to avoid or minimize operational concerns, such as congestion and generation curtailment, and help defer or reduce the scale of transmission reinforcements. The Plan describes VELCO's

extensive experience with implementing and operating GETs, and that we are pursuing use of a SmartValve to supplement the Sandbar phase shifting transformer, which controls flows along the Plattsburgh-Sandbar 115 kV PV20 line.

Q11. Is this Project consistent with the 2022 Vermont Comprehensive Energy Plan which also serves as the Vermont Electric Plan (30 V.S.A. § 248(b)(7))?

A11. Yes. The Vermont Comprehensive Energy Plan ("CEP") articulates strategies that collectively can transform our energy future in a way that is affordable, reliable, environmentally sound, and equitable. The CEP recognizes that Vermont benefits from a strong regional transmission grid that includes ties to neighboring areas. Working collaboratively, the region can more effectively achieve greater reliability, access to renewable generation, and decreases in costs than if Vermont were to try reaching all these goals by itself.

The SmartValve project not only addresses an asset condition concern with the phase shifter, it improves flow control capability together with the phase shifter. In so doing, we should be able to facilitate a larger import of renewable energy from northeast New York to Vermont, which should increase renewable energy access to Vermont.

The SmartValve also improves reliability and resilience by reducing the likelihood of a phase shifter failure caused by excessive tap changes. If the phase shifter does fail, the SmartValve retains flow control capability, which allows the PV20 line to remain closed and improve system performance.

Q12. Does this conclude your testimony at this time?

A12. Yes.

DECLARATION OF HANTZ A. PRÉSUMÉ

I declare that the testimony and exhibits that I have sponsored are true and accurate to the best of my knowledge and belief and were prepared by me or under my direct supervision. I understand that if the above statement is false, I may be subject to sanctions by the Commission pursuant to 30 V.S.A. § 30.

June 30, 2025 *_/s/ Hantz A. Présumé_*
Date Hantz A. Présumé