STATE OF VERMONT
PUBLIC UTILITY COMMISSION

Case No. 23-_____

Petition of Vermont Transco LLC and Vermont Electric Power Company, Inc. (collectively, "VELCO"), for a Certificate of Public Good pursuant to 30 V.S.A. § 248 authorizing construction of the "Franklin County Line Upgrade Project" consisting of upgrades to VELCO's existing K42 transmission line in Georgia, St. Albans, Swanton, and Highgate, Vermont	

PREFILED TESTIMONY OF SCOTT S. MALLORY ON BEHALF OF VERMONT ELECTRIC POWER COMPANY, INC. AND VERMONT TRANSCO LLC

October 26, 2023

Scott S. Mallory's testimony introduces the other witnesses offering testimony in support of the so-called "Franklin County Line Upgrade Project," provides an overview of the proposed Project, estimated cost and construction schedule, and explains how the Project addresses a subset of the § 248 criteria.

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PREFILED TESTIMONY OF SCOTT S. MALLORY
ON BEHALF OF VERMONT ELECTRIC POWER COMPANY, INC.
AND VT TRANSCO LLC

Introduction

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

A1. My name is Scott Mallory. I am employed by Vermont Electric Power Company, Inc. (together with VT Transco LLC referred to as "VELCO") as a Senior Project Manager. My business address is 366 Pinnacle Ridge Road, Rutland, Vermont 05701.

Q2. Please describe your education and employment background.

A2. I received a Bachelor of Science degree in Finance from the University of Vermont School of Business. I have been employed by VELCO since 1997 and have been a Project Manager since 2007. Prior to 1997, I was employed by the Washington Electric Cooperative for seven years. My educational and employment background are set forth in more detail in my résumé, which is attached as **Exhibit Petitioner-SSM-1** (Résumé of Scott Mallory).

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

A3. Yes, I have provided testimony on the behalf of VELCO for upgrades to the Sandbar Substation (Case No. 20-0444-PET), the East Avenue and Queen City Substation Improvement Project (Case No. 18-0529-PET), PV20 Cable Replacement Project (Docket 8604), K35 Line Project (Docket 7900), Jay Substation Project (Docket 7708), Lyndonville Substation Project (Docket 7562), Gorge Area Reinforcement Project (Docket 7460), Taft Corners

substation upgrade (Docket 7453), East Avenue Loop Project (Docket 7314), Northwest Vermont Reliability Project (Docket 6860), and in other dockets on behalf of Washington Electric Cooperative, Inc.

Q4. What is the purpose of your testimony?

A4. My testimony supports the Petition filed by VELCO requesting a Certificate of Public Good ("CPG") pursuant to 30 V.S.A. § 248 for the "Franklin County Line Upgrade Project," which consists of upgrading VELCO's existing K42 transmission line located in the Towns of Georgia, St. Albans, Swanton, and Highgate, Vermont (the "Project"). My testimony begins with an executive summary and an introduction of the other VELCO witnesses that address specific Section 248 criteria. This is followed by an overview and description of the Project, the anticipated schedule, costs, and detail about regional funding. Thereafter, I address several specific Section 248 criteria.

Q5. Please provide an executive summary of your testimony, including how the Project benefits the State of Vermont and why the Commission should approve it.

A5. This Project is designed to address necessary upgrades to the K42 transmission line between Georgia and Highgate, Vermont and is slated to be an ISO-NE-approved project eligible for regionalized cost recovery. This means that Vermont customers will contribute approximately 4% of the Project costs. At the same time, the Project achieves multiple benefits on both a regional and local level. In addition to addressing the deficient asset condition of aging pole structures along the existing K42 transmission line, the Project will also reduce line losses, resulting in power savings for Vermont distribution utilities, and reduce future transmission

constraints in the Sheffield Highgate Export Interface ("SHEI") area. This will not only save Vermonter's money, but it will also open the door for more equitable access to renewable generation for customers in the SHEI region and enable more renewable development in Northern Vermont.[1]

Section I of my testimony provides an overview of the Project, which involves the construction of a replacement transmission line adjacent to the aging K42 Line. I explain the current deficiencies with the existing line and how the Project is planned to allow the K42 Line to be upgraded without taking the existing line out of service, which will reduce significant risk of customer outages during construction, avoid lost revenue for Vermont utilities, and mitigate potential financial impacts. I describe how the line is configured to maximize use of the right-of-way (ROW), creating additional value for Vermont customers by creating space within the existing VELCO ROW to accommodate a potential future line, giving VELCO an opportunity to create value and lower costs for Vermont. I also discuss how the addition of a second conductor on the rebuilt K42 Line will reduce line losses while also increasing the amount of energy that can be exported from the export-constrained SHEI area. I discuss the construction schedule and explain why we are seeking a CPG on or before the end of August 2024 so that we can commence construction in September 2024.

Thereafter, I discuss Project costs, how we developed those forecasted costs and why we expect that the Project will be approved for regional cost recovery. Because the K42 Line is a Pool Transmission Facility ("PTF"), 100% of the cost to replace that line to address asset

[1] Together, the design and sizing of the line address longer-term challenges with electrification by enhancing capacity for transmission of renewable resources needed for electrification goals both regionally and locally and will increase opportunity for new supply-side resources in the remote SHEI region.

condition needs will be shared among transmission owners of New England on a load ratio basis. Vermont's share is approximately 4% of that cost. Additionally, I explain that ISO-NE has considered potential costs and benefits of upgrading the K42 Line with a second conductor and issued a preliminary letter supporting regional cost recovery for that portion of the Project as well. Accordingly, we expect the entire region to benefit from this Project and share in the costs, which means that Vermont customers will experience significant economic and system-wide benefits from the Project while bearing about 4% of the cost.

Section II of my testimony discusses the extensive public outreach and transmission planning that has led to this proposed Project. VELCO has engaged with the Vermont System Planning Committee, discussed appropriate transmission planning principles, engaged in meetings with local select boards and planning commissions, and engaged with individual landowners. The public outreach process is ongoing, and I discuss the feedback we have received and how we are addressing questions about a variety of issues.

Sections III through XI of my testimony address several specific Section 248 criteria. I explain why the Commission should approve the Project because it does not interfere with the orderly development of the region, and provide a more extensive explanation of why the Project as designed is needed to meet present and future demand. This includes a discussion of the asset condition needs of the existing K42 Line, but also the extensive value associated with how we have designed the project to minimize outages during construction, saving Vermont customers money while mitigating potential financial risks. I discuss the cost benefits analyses we have performed in connection with alternatives and describe both the regional and Vermont-specific benefits of reducing line losses and congestion in the SHEI area. These benefits are also discussed under Section 248(b)(4) as there is a clear economic benefit to the State.

Finally, I address several other specific Section 248 criteria, including Section 248(b)(5) regarding public health and safety, education and municipal services, and aesthetics, as well as impact on public investment, and finally, Section 248(b)(10) regarding impact on Vermont Distribution utilities and their customers. Overall, VELCO is pleased to propose this valuable regional transmission Project and looks forward to continuing to discuss the many advantages and economic benefits it brings to the State of Vermont.

Q6. Please identify each of the other VELCO witnesses that will submit testimony, as well as the scope of their testimony.

A6. In support of this Petition, VELCO submits the prefiled testimony with exhibits sponsored by the following witnesses:

Witness	Subject
William McNamara	Describes the existing K42 line and proposed line upgrade.
Andrew McMillan	Provides an assessment of the Project's potential impacts on above-ground and below-ground historic sites, as well as presents the Natural Resource Assessment Report prepared by VHB and marked Exhibit Petitioner AM-2.
Hantz Présumé	Explains the benefits of the second conductor to the system provided by the Project. Also addresses the Project's conformance with the State of Vermont's twenty-year Electric Energy Plan, as well as its impact on system stability and reliability and the criteria in Section 248(b)(6).
Jeffrey Disorda	Describes: 1) mowing/removal of vegetation within the ROW needed for construction and the expected regrowth afterwards; 2) the danger tree removal outside of the ROW that is needed for the Project, and 3) VELCO's general practice of vegetation management within and outside of the ROW to be done in the future.

Section I: Project Overview

Q7. Please describe the existing VELCO K42 transmission line located in the towns of Georgia, St. Albans, Swanton, and Highgate, Vermont.

A7. The K42 transmission line connects the Georgia and Highgate substations within northwest Vermont.[2] This 16.7 mile 115 kV line supports important electric flow southward to the greater Chittenden County area allowing for up to 225 MW of power from Quebec to reach Vermont, and for generation in northern Vermont to reach central Vermont. It also supports important electric flow northward to northern Vermont load between Highgate and Newport. Further details regarding the line's physical features are provided in the prefiled testimony of William F. McNamara.

Q8. What are the primary deficiencies of the VELCO K42 transmission line located in the towns of Georgia, St. Albans, Swanton, and Highgate, Vermont?

A8. The primary deficiencies of the K42 transmission line concern asset condition and retirement age. About 70% of the structures need to be replaced at this time. VELCO's practice is to replace wooden structures that are approximately 60 years old or older as they may not last until the next inspection in eight years. Based on the last inspection, about 25% of the wooden structures on the line are currently in a deficient condition with defects such as holes, rot, checks/splitting, bowing, and/or poor strength measurements per Osmose inspections. Additionally, another 42% of the structures are of retirement age and need to be replaced prior to the next inspection. **Exhibit Petitioner SSM-2** (Table of Pole Condition and Age).

[2] This line also has other lines off of it connecting the Highgate converter and the St. Albans tap line, which are not impacted or part of the Project.

Q9. Please describe the proposed upgrade to the K42 transmission line located in the towns of Georgia, St. Albans, Swanton, and Highgate, Vermont.

A9. The Project involves a rebuild of the current transmission line in a single pole vertical design to fit within the existing 150-foot ROW boundaries, which will minimize impacts to landowners outside of the ROW. The current line includes a two-pole per structure design that utilizes a substantial portion of the ROW. The rebuild will involve the construction of a predominately single-pole line that will be built adjacent to the east of the existing line. The existing line will remain in service during construction and then be removed after construction and energization of the new line.

The three phases of conductors on the existing line are in a horizontal configuration. This configuration will be changed to a vertical configuration on the new structures, which will be predominantly a single pole rebuild constructed with steel structures, instead of wood, for less maintenance and a lower replacement frequency. The vertical configuration will require an increase in height to maintain safe electrical clearances. On average the new structures will be approximately 28 feet taller above grade. The increase in height has been minimized by placing the three phases in a delta configuration (e.g., two phases are side by side, instead of all three stacked vertically). This overall design enables us to construct the new line while leaving the existing line in service, the importance of which I discuss in more detail below. It also allows us to construct the new line within the existing ROW because a two-pole design could not be installed in the existing ROW while keeping the existing line energized during construction. More details on the proposed project line design can be found within the testimony and exhibits of William McNamara.

The Project also involves the addition of a second conductor in a bundled configuration (i.e., two conductors per each of the three phase wires). As discussed in more detail below and in the Prefiled Testimony of Hantz Présumé, this configuration will reduce electrical losses on this line by approximately 50 percent. We also estimate that the second conductor will alleviate future transmission constraints associated with the SHEI by allowing for an increase in the export limitation by an estimated 20 MW[3].

Q10. Will the Project require a service outage and/or temporary construction?

A10. The Project will require limited outages of the K42 Line to connect the replacement line. These outages do not directly cause or require customer outages, however, given the importance of the K42 Line to local and regional reliability, the outages will create the risk of customer outages. As I discuss in more depth below, these risks are mitigated by the line design, methods of construction, and monitoring of weather and system conditions to schedule connection work.

Temporary modifications will need to be made to some of the existing structures (e.g., temporary poles, insulators, guy wires, and shifting of conductors westward) to construct immediately adjacent to the existing energized line. These modifications will be removed along with the existing line structures.

[3] Green Mountain Power's upgrades to its B20 and B22 lines were planned to alleviate the majority of current congestion within the SHEI that caused generation in that area to be curtailed. This Project is expected to provide SHEI limit improvements in addition to the B20 and B22 line upgrades.

Q11. Is vegetation clearing required for the Project?

A11. Yes. Vegetation clearing needs for the Project are discussed in the Prefiled Testimony of Jeff Disorda.

Q12. Will laydown areas be needed for the project?

A12. Yes, VELCO will expects it will use two or possibly three laydown or staging areas for this Project for temporary storage. First, is an area immediately outside of its substation in Georgia, Vermont. Second, is an area across Route 78 from VELCO's Highgate substation. Specific to the laydown area across Route 78 from the Highgate substation, VELCO proposes to change this from currently a temporary into a permanent entrance and laydown area for use within the current Project and any ongoing maintenance needs.[4] VELCO expects it may utilize a third laydown area for the Project. VELCO is working now to identify that area and will plan to update its testimony on this topic within the next few weeks.

Q13. Will the Project require any blasting?

A13. The Project is not expected to require blasting to create pole holes. However, if blasting becomes necessary, VELCO will follow its rock removal specification as well as the Vermont Department of Environmental Conservation (DEC) best management practices (BMPs) for blasting. Please see **Exhibit Petitioner SSM-3** (Rock Removal Specification). This rock removal specification is more detailed than the blasting plan that VELCO has submitted as an exhibit in past projects. VELCO will provide this rock removal specification to contractors and

[4] In PUC Case No. 22-4338-PET, VELCO planned and the Commission approved a temporary entrance, and a stone and fabric area that was to be removed after the Highgate substation work was completed.

include the Agency of Natural Resources' (ANR) BMPs. If and when the ANR updates its BMPs, VELCO will update its rock removal specification.

Q14. Please describe the approach for developing the Project's cost estimate.

A14. The first step was to identify the resources required to plan, design, and construct the Project. VELCO developed the cost estimate utilizing seven categories to establish the total cost for each Project element. The seven resource categories are as follows 1) Materials, 2) Labor, 3) Specialized Equipment, 4) Indirects, 5) Escalation, 6) Capital Interest, and 7) Contingency.

Q15. Please summarize the process used to develop the direct and indirect costs.

A15. VELCO developed the Direct Costs (i.e., Material, Labor, and Specialized Equipment) using cost data from projects VELCO recently completed or which are in progress. Specifically, VELCO used cost data associated with recent VELCO substation and line projects to develop the material, labor, and specialized equipment costs. VELCO utilized vendor cost data for portions of the Project scope for which VELCO did not have recent actual cost data from its prior projects.

VELCO estimated labor and equipment costs using preliminary detailed designs. The detailed line items for each Project element were estimated into sub-categories following the Federal Energy Regulatory Commission ("FERC") system of accounts. Developing the cost estimates by FERC account enhances VELCO's ability to track costs in a manner consistent with the reporting format of actual costs as required by FERC. Also, escalation costs can be more

accurately calculated by applying the Handy-Whitman cost index to the estimated costs by FERC account.

The Project team also developed the estimated costs for Indirects, Escalation, Capital Interest and Contingency.

VELCO estimated the Indirect Costs based on the resources required to support the Project completion by resource category. Resource categories included in the Indirect estimated costs include: Engineering and Design; Operations; Planning; Communications; Environmental Engineering; Archeological Studies; Field Surveys; Impact Mitigation; Aesthetic Impact; Legal Expenses; Regulatory Permitting and Filings; Administrative Overhead; Mobilization and Demobilization; Project Management; Construction Supervision; and Project Administration.

The Indirect estimated Project costs support services are based on the number of people/hours (Level of Effort) required to support the particular function, as well as outsourced consulting services for each resource category (e.g. archaeology studies, engineering, and surveying).

VELCO Project Controls developed escalation costs by using an anticipated 2023-2027 spending plan and projected Handy-Whitman cost index and consumer price index.

VELCO applied Capital Interest (interest cost during construction) and also followed the Project spending plan as applied to the escalation cost calculation. The Capital Interest rate is typically based on the company's credit rating and is subject to change based on the financial market conditions.

Finally, the Project cost estimate also accounts for a contingency of twenty percent (20%) due to the preliminary detailed designs and the uncertainty and risk associated with the current level of Project definition.

Q16. What risk elements did VELCO consider when developing the cost estimate and how were the risks addressed in the cost estimate?

A16. Risk elements considered are the Project duration, level of certainty regarding ground condition for below-grade work, required aesthetic and environmental mitigation measures, volatility regarding escalation rates, temporary configurations necessary to support construction and potential resource constraints at the anticipated time of construction. Per standard project management practices widely recognized by organizations such as the Project Management Institute, VELCO applied a contingency to the estimate to account for these risks.

VELCO applied a contingency of twenty percent (20%) to the total estimated cost based on the current level of Project definition.

Q17. What is the total cost estimate for the Project?

A17. The total cost of the Project is estimated at $84,644,559 with contingency. **Exhibit Petitioner-SSM-4** details the cost estimate and schedule.

Q18. What portion of the Project is expected to be eligible for Pool Transmission Facilities ("PTF") regionalized cost recovery?

A18. As the existing K42 Line is a PTF asset and the majority of the Project is a replacement of that asset, VELCO expects the new line to be considered PTF with 100% of its costs to be funded via the transmission tariff of ISO-NE, with those costs paid by the transmission owners of New England on a load ratio basis. Vermont's share of the New England load is approximately four percent (4%).

As the proposed second conductor is an upgrade of the existing PTF asset, VELCO consulted with ISO-NE and the Planning Advisory Committee on the applicability of PTF treatment for that portion. After consideration of the added cost versus the benefit of reduced line losses, ISO-NE issued a preliminary letter of support for regional cost recovery (PTF treatment); See **Exhibit Petitioner SSM-5** (ISO-NE letter of preliminary cost support). Given VELCO's relationship with ISO-NE and history of not receiving PTF cost recovery for less than requested, a rare letter of preliminary support, and our plan to submit the cost recovery application early to work through any questions, we expect the ISO-NE to formally approve regional cost recovery for the full Project including the second conductor prior to when we would expect a CPG to be issued in this case.

Q19. What is the Project schedule and planned construction hours?

A19. We propose to begin Project construction as soon as possible upon receiving the required permits and approvals. Currently, the estimated construction schedule is from September 2024 into the fall of 2026. This assumes receipt of a CPG on or before the end of August 2024. A failure to adhere to this schedule could have adverse impacts on Project execution and overall Project cost. Construction would take place between the hours of 7:00 A.M. and 7:00 P.M. Monday through Friday, and between 8:00 A.M. and 5:00 P.M. on Saturdays. No construction will take place on Sundays, federal holidays, and state holidays with the exception of Bennington Battle Day in August. VELCO requests, however, that these restrictions do not apply to construction activities that VELCO must perform during any required transmission outages that may be needed to maintain system reliability or when work involves crossing the Interstate highway within lower traffic periods. VELCO also respectfully requests

that it be allowed to perform construction activities on Bennington Battle Day given (i) the short summer construction season, and (ii) that the holiday is not widely granted as a paid day off for the workers on this Project. This would improve construction efficiency when our typical Vermont contractors do not recognize this as a holiday and therefore may attempt to shift their workers to another job site to avoid forced use of vacation or unpaid days off.

VELCO also requests permission to commence construction without having first obtained transportation permits. VELCO seeks exemption from the standard condition that requires acquisition of all state and federal permits prior to the start of construction. VELCO needs permits from the Agency of Transportation (AOT) for Interstate 89 access and aerial crossing and highway curb cuts, and a permit from the New England Central Railroad for the railroad crossing. These permits are not typically pursued until approximately 1-2 months prior to their need in the construction schedule.

Section II: Public Outreach [Docket No. 7081]

Q20. Has the Project development been consistent with the public outreach and transmission planning process contemplated in Docket No. 7081 Memorandum of Understanding ("MOU")?

A20. Yes. VELCO has discussed the Project with the Vermont System Planning Committee ("VSPC") and performed non-transmission alternative screening analysis as contemplated in the MOU. The results of that screening were also discussed at VSPC meetings. Because the need for this Project is driven by required asset maintenance, it was determined that non-transmission alternative analysis was not applicable and the Project cannot be avoided by the use of a non-transmission alternative. See **Exhibit Petitioner SSM-6** (VSPC Review of NTA Screening).

Q21. Please describe VELCO's public outreach efforts related to this Project.

A21. VELCO began its outreach with ISO-NE and its Planning Advisory Committee on need, scope of the project, benefits of the second conductor, and cost in July of 2021.

Introductions to the Project and field planning work were mailed out to impacted landowners starting in the spring of 2022, as well as information posted to our website and emailed out to interested individuals in a Project newsletter. Mailings and postings have continued since then when new information is available.

Meetings to discuss the Project with town select boards and planning commissions began in June of 2022 and continued through June of 2023. Project updates have also been made to the Vermont System Planning Committee during this time. VELCO also met with the Franklin County Industrial Development Corporation to explain the Project.

Meetings with individual landowners, to clarify rights to remove danger trees outside of the ROW and to clarify specific access routes outside of the ROW commenced in the fall of 2022 and continue through 2023. To obtain explicit rights to remove danger trees outside of the ROW, VELCO has been amending its easements as needed.

As part of minimizing our impact to farmed fields that share our ROW and access roads, VELCO updated its compensation rates and explained these net profit per acre values to the Franklin County Farm Bureau. With these rates we will offer fair compensation for lost profits to landowners directly impacted by our planned two years of construction.

To further share information and collect feedback, VELCO hosted public meetings in each of the four towns in November of 2022 and again in June of 2023. The 45-day pre-CPG advance notice with a Project description was sent out on June 16, 2023 to the town select boards and planning commissions, regional planning commission, the Department of Public Service, the

Agency of Natural Resources, and the Vermont Agency of Agriculture, Food & Markets. **Exhibit Petitioner SSM-7** (45-day Advance Notice Package).

Q22. How did VELCO address the comments and input that were received from the public outreach efforts?

A22. During the many meetings and through phone calls and emails VELCO responded to questions from the public, explaining its practices and helping landowners understand specific design issues or proposed access routes. VELCO posted a written question and answer document to its website covering common questions from landowners about the Project and potential impacts. Also, to address common questions about the aesthetics and how close the Project is to an individual's residence, VELCO created and posted to its website a computer model of the existing and proposed structures with a guided viewer and an address specific non-guided viewer. VELCO will continue to update materials to its Project on its website through the life of the Project.

VELCO received and answered questions from the town select boards, planning commissions, and regional planning commission about issues such as: the added 20 MW of expected generation availability in the SHEI area, aesthetics, the option of placing the line underground, self-weathering steel poles, herbicide use, notifications to landowners, ROW encroachments, danger tree markings, whether the project considers future system needs, and if an additional line could be built in the corridor to help achieve Vermont's climate and energy mandates.

Section III: Orderly Development [30 V.S.A. § 248(b)(1)]

Q23. Will the Project unduly interfere with the orderly development of the region giving due consideration to recommendations from municipal and regional planning commissions and municipal legislative bodies, and land conservation measures included in the municipal plan?

A23. No. I have reviewed: the Town of Georgia's 2017 Comprehensive Municipal Plan, the 2020 Town Plan of the Town of St. Albans, the 2023 Swanton Town and Village Municipal Plan, and the Highgate Town Plan 2023-2031. The Project is consistent with these plans as they do not have any policies regarding land use or energy that would specifically pertain to or contradict the Project. The Highgate Town Plan does highlight that SHEI is causing generation to be curtailed and that this barrier will need to be addressed for Highgate to meet its energy goals; the Project helps to address this issue.

I also reviewed the Northwest Regional Plan 2023-2031 from the Northwest Regional Planning Commission and found the Project consistent with that plan, i.e., no policies that contradict the Project. There is a policy[5] to support efforts to upgrade infrastructure, including energy, to make it available and dependable. There is also a policy[6] to support efforts to maintain and upgrade transmission infrastructure with a reference of needing to improve the limited transmission capacity in the SHEI area to meet the regional renewable generation goals.

[5] Page 27 of Northwest Regional Plan 2023-2031, Economic Development section, Goal 4, Policy b.

[6] Page 43 of Northwest Regional Plan 2023-2031, Energy section, Goal 7, Policy d.

Q24. Has VELCO received any substantive comments from the municipal or regional commissions related to the criteria of 30 V.S.A. § 248(b)? And if so, how has VELCO addressed them?

A24. VELCO received substantive comments from the towns of Georgia, St. Albans, and Swanton, which have provided letters of support for the Project. See **Exhibit Petitioner SSM-8** (Town Letters of Support). We have not received any negative feedback from the municipal or regional commissions after submittal of the 45-day advance notice.

Section IV: Need for Present and Future Demand for Service [30 V.S.A. § 248(b)(2)]

Q25. Is the Project required to meet the need for present and future demand for service which 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?

A25. Yes. The Project is needed to replace existing deficient transmission line assets that support significant northern and southern flow of electricity within Vermont and New England, accordingly, this line could not be replaced with energy efficiency, conservation, or load management measures.

This Project is designed to meet the need for present and future demand in several ways, which I detail below. *First*, the replacement of the existing line is driven by the need to improve the deficient condition of VELCO's existing 16.7-mile transmission line. *Second*, construction of the replacement line while leaving the existing line in service during construction reduces overall

outage risk and provides significant value to both regional and Vermont electric customers. *Third*, replacement of the existing line with a single-pole configuration adds value over alternatives like replacing the two-pole structure itself, including mitigation of lost Renewable Energy Credits, allowance for additional ROW space for future use, and expanding the capacity of fiber optics service that can be utilized by VELCO, Vermont electric utilities, Vermont Communication Union Districts, and others. *Finally*, the addition of a second conductor as part of this Project reduces line losses resulting in added economic benefits and creates additional export space within the SHEI area. Each of these benefits are discussed in more detail below.

Q26. Why is the Project needed to address the current asset condition of the existing transmission line?

A26. As discussed above this Project is needed to replace deficient structures along the existing line and maintain the line. Rebuilding the entire line at this time makes sense given that approximately 70% of the structures need replacement and the rebuild will minimize the risk of a first contingency event creating widespread outages in northern Vermont.

Q27. Please explain why construction of the replacement line while leaving the existing line in service during construction reduces overall outage risk.

A27. The proposed Project is designed to allow for construction of the replacement line without taking the existing line out of service because the K42 is a vitally important part of the transmission infrastructure system in Northern Vermont. The K42 Line is one of only two high voltage transmission lines that supplies a large area of Vermont spanning from St. Johnsbury to St. Albans. If the K42 Line is taken out of service, it creates a single contingency supply

situation that involves a level of risk that is higher than generally acceptable system design and operation. Under a single contingency supply situation, a fault on the only remaining supply line would result in lost customer load with no restorative solutions except repair of the fault condition.

This kind of event could impact approximately 53,000 customers of Vermont Electric Cooperative, Green Mountain Power ("GMP"), and Swanton Electric covering the northern Vermont area between St. Johnsbury and St. Albans. VELCO also estimates the potential duration of one of these worst case events as up to 12 hours (i.e., a 10-hour work day plus 2 hours for coordination among VELCO and the affected distribution utilities to restore load to their connected systems).[7]

Consistent with VELCO's practice to minimize the risks of construction outages that could cause customer outages (e.g., utilizing temporary mobile transformers, by-pass lines, live line work when safe to perform, and postponement of work during poor weather), this Project is designed to mitigate the potential for a significant single contingency event like the one described above. By installing the replacement line adjacent to the existing line, we can leave the existing line in place and minimize the frequency of K42 construction related outages compared to replacing the structures in-kind and in-place.

In particular, the existing K42 Line has 35 complicated structures that have many guy wires and high-tension angles that would each require a day long construction outage to replace safely, if they were to be replaced in-kind and in the same place. The proposed rebuild Project

[7] A small amount of load might be able to be restored sooner by running the Swanton peaking generators depending on system and load restoration conditions at the time but the majority of the 109 MW would remain unserved.

would significantly reduce the number of day-long construction outages from 35 days to approximately ten days, to tie in the new conductors and replace structures adjacent to the tie-in locations. Since the majority of the structures need to be replaced in any event, this design allows for a replacement line with substantially less risk.

Q28. Has VELCO evaluated whether the single-pole rebuild results in substantially more value for both regional and Vermont customers?

A28. Yes. VELCO, ISO-NE and the Planning Advisory Committee reviewed the reliability importance of the existing line and support the proposed rebuild as it will minimize: outages, load shedding/low voltage risk, and disruption to regional maintenance during construction. They also considered the value, created by the single pole rebuild, of the space for a future line if needed by the region.

As discussed above, we expect 100% of the replacement project as designed to receive regional funding, and mitigation of risk to regional stability and reliability is an important part of that evaluation. Additionally, while Vermont customers will only bear 4% of the overall Project costs, it is expected that the Project design will provide significant value for Vermont customers. In particular, we conducted a cost benefit analysis that compared the value of the Project as designed with a project that involved replacement of the structures in-kind and in the same place as existing structures.[8] Setting aside the significant economic value of the Project, which is

[8] Daymark Energy Advisors (Daymark) reviewed these costs and benefits for consistency and reasonableness among the calculations and with industry best practices for analysis. Daymark reviewed and agreed with the methodologies, assumptions, data sources, and results that the benefits outweigh the costs for a new line versus in-kind replacement, and for adding a second conductor to the new line. **Exhibit Petitioner SSM-9** (Daymark Memo).

discussed in more depth elsewhere, mitigation of a single contingency fault event as discussed above more than outweighs the additional cost of constructing the Project as designed rather than in kind and in the same place.

In particular, the cost of a widespread outage in northern Vermont as discussed above would be expected to exceed $83 million.[9] At the same time, the incremental cost of the Project as designed compared to an in-kind and in the same place design is $27,282,495, with Vermont's share of 4% equal to about $1,091,300. Given this substantial difference (i.e., Vermont paying approximately $1 million to avoid a potential $83 million Vermont impact), VELCO believes the additional single pole rebuild cost is reasonable to mitigate risks and costs of widespread customer outages as it reduces the number of construction line outages from 35 to approximately ten days. Thus, the design eliminates approximately 25 days that pose the risk of a single contingency event and the associated cost of such an event as discussed above. See **Exhibit Petitioner SSM-10** (Benefit cost evaluation).

Q29. Please explain how the Project design provides additional value relating to renewable energy, ROW space, and fiber optic capacity.

A29. The single pole rebuild also provides other benefits of (1) additional space in the ROW for future transmission capacity, (2) avoiding lost energy and Renewable Energy Credit

[9] VELCO estimated the value of lost load (VOLL) based on cost data from the Interruption Cost Estimate (ICE) Calculator developed by the U.S. Department of Energy's Lawrence Berkeley National Laboratory at $63.65 per unserved kWh, and multiplied this by the typical load of 109.192 MW within the St. Johnsbury to St. Albans transmission service area, and multiplied by 12 hours for the worst case duration of a load shedding event. This calculation equals $83,404,456. This valuation of outage costs is conservative in that it is based on surveyed residential, commercial, and industrial end user costs and does not include any valuation of the risks from the public secondary uses of electricity (e.g., potential impacts to human life from failed traffic lights, medical equipment, or delayed surgeries due to an extended power outage).

revenues for the Vermont distribution utilities during construction, and (3) additional fiber optic cable capacity. VELCO conservatively values the additional ROW space and the avoided lost energy and Renewable Energy Credit revenues at approximately $3 million. Once the single pole line has been built and the existing line removed there will be space remaining on the western side of the new line that could be used for a second single pole line. VELCO can see benefits for a second line in this Georgia to Highgate corridor. Pursuant to good utility practice to create value for Vermont, VELCO is actively seeking to creatively and responsibly utilize this asset to increase reliability/resiliency, deliver clean energy, unlock greater instate generation potential, and lower Vermont utility costs.[10] Should the opportunity present itself, this available ROW space would be valuable compared to the costs to acquire a new ROW. VELCO has valued the cost to acquire and clear vegetation for a 75-foot wide easement along a 16.7-mile corridor at $2,710,356. This estimate conservatively excludes the cost of potential takings/relocations of homes/buildings that might be in the way of procuring easements on new property (i.e., that which is unencumbered by utility easements and may have buildings on it) and only includes condemnation costs from its experience in expanding an existing easement.[11]

Additionally, by keeping the existing transmission line energized during most of the construction period of the proposed single pole rebuild, the Vermont distribution utilities will

[10] If a developer was to use this space, there would likely be other value to Vermont in terms of "hosting payments" of some kind and likely grid upgrades. The New England Clean Power Link (NECPL) for example, if constructed, is set to make payments to VELCO that will have the effect of lowering the pressure on Vermont utility costs and will drive the need for other Vermont grid upgrades that would be paid for by NECPL's developers.

[11] Given the opposition that recent regional transmission projects have faced (i.e., Eversource's Northern Pass and Central Maine Power's New England Clean Energy Connect), we expect the value of an established and available ROW to be much greater, as a comparable new ROW would almost certainly take much more time to secure and result in significant regulatory costs. Additionally, this space – which would allow for potential future transmission upgrades – may be needed to support the expected increases in load as Vermont and other New England states work towards meeting their respective renewable energy goals.

have less generation curtailed, that would otherwise provide revenues. During construction outages of the K42 line, Kingdom Community Wind and Sheffield wind generators would be curtailed from production, creating revenue losses. As the single pole rebuild will reduce the number of construction outage days by 25, the proposed project will avoid lost revenue for the distribution utilities owning or having contracted output for these generators. VELCO has valued the avoided lost energy and Renewable Energy Credit market revenues at $339,359 and $231,750, respectively, for the proposed project.

Finally, the new single pole line rebuild would replace a fiber optic line allowing for its capacity to be significantly increased with a more modern cable design. This extra capacity will be used by VELCO and available for Vermont distribution utilities, Vermont Communication Union Districts, and other commercial users with resultant revenue reducing transmission rates to Vermont distribution utilities. Installing new fiber optic cable would also improve fiber optic network reliability for existing VELCO and commercial users given that older cable generally gets brittle and unreliable over time.

The new single pole line rebuild also allows for a second conductor to be added to the structures to provide significant line loss savings and added future export capacity for the SHEI. The existing line configuration would not be able to accommodate a second conductor.

Q30. Please explain why the inclusion of a second conductor as part of the Project design results in added economic benefits and alleviates future congestion in the SHEI.

A30. As discussed above, the second conductor would be an upgrade to what is otherwise an asset condition project, however, we expect to gain support for the incremental cost of the conductor on a region-wide basis. Accordingly, we expect the incremental present value

cost of $7,555,994 associated with this aspect of the Project to be regionally funded, with Vermont's share about $277,062. The second conductor on this line would reduce electrical losses by approximately 50 percent (50%) and alleviate future transmission constraints in Northern Vermont by increasing the export capacity of the SHEI by about 20 MW. The reduction in line losses benefits the region by reducing the amount of energy and carbon dioxide emissions that would be generated and benefits Vermont by increasing revenues for generation and power purchased at nodes within the SHEI area.

As discussed in more detail in the Prefiled Testimony of Hantz Présumé, the SHEI is an electrical area within northern Vermont monitored by ISO-NE to avoid excessive generation from overloading transmission lines. Within this area there are times, predominately with high generation and energy flows, when there is insufficient load to absorb the generation and imports, and insufficient transmission capacity to export the extra power outside of this area. To protect the transmission system, ISO-NE at times requires generators within this area to curtail their output due to this lack of capacity to export the power. This curtailment causes revenue losses for those generators and their contractual customers and depresses the energy market prices in this export constrained area.

Recent transmission upgrades of the B20 and B22 lines by Green Mountain Power are expected to relieve current export constraints. This Project provides additional SHEI capacity over and above the capacity added by GMP's recent upgrades because the second conductor will further increase the capacity of the line and allow for more generation to be exported out of the SHEI. This will allow for more generation to be sited and dispatched in this area rather than facing future export constraints like those experienced in Vermont over the last several years. Thus, to the extent more generation is added to the SHEI area in the future, generator

curtailments and their resulting lost revenue will be less likely so long as that additional generation is within the new SHEI export limits.

Q31. What additional value does the second conductor provide regarding line loss savings and transmission congestion relief in the SHEI?

A31. We have assessed the value of the second conductor compared to the added costs from multiple angles, and these benefits justify both the regional cost allocation as well as Vermont's much smaller share.

First, we estimated the present value of reduced PTF line losses (a benefit) on a societal basis of $15,496,828, which significantly outweighs the additional cost of $7,554,994 associated with adding the second conductor. The line loss savings are expected to result in less energy and capacity being purchased and less carbon dioxide being emitted from marginal generation within New England. These savings are derived from valuing the avoided energy, capacity, and carbon dioxide costs estimated over a ten-year period. We also view this as a conservative estimate because these line loss savings may exist longer than ten years, though transmission topology and flows are also likely to vary past ten years. The difference in line and system impedances was used to determine a number of MWhs of savings per year which was then multiplied by forecasted rates for energy and capacity, and by a carbon dioxide (CO_2) cost used by the Vermont Climate Council. Exhibit Petitioner SSM-10 (Cost benefit evaluation).

Second, the estimated present value of line loss savings for Vermont customers is $4,593,980 over ten years for Vermont distribution utilities which significantly outweighs the expected Vermont portion of the incremental cost of about $277,062. See Exhibit Petitioner SSM-10 (Cost benefit evaluation). For the Vermont distribution utilities, the line loss savings are

expected to manifest in changes to the locational marginal prices within the New England energy market due to changing the line impedance and therefore marginal pricing for losses and congestion. Specifically, energy prices that are paid to certain generators and purchased power contracts are expected to increase the revenues paid to the Vermont distribution utilities. VELCO hired Daymark Energy Advisors to perform production cost modeling and forecast the expected increase in energy prices in the Highgate/SHEI area multiplied by the amount of generation and purchased power contracts that would be priced at these area nodes. The present value of these saving was considered over ten years to synchronize with expiration of the maximum amount of the Hydro-Québec purchased power contract, conservatively assuming that this contract is not renewed and that the savings would thus not continue. See Exhibit Petitioner SSM-10 (Cost benefit evaluation).

The second conductor also benefits the Vermont and New England transmission grid by increasing system strength and reactive margin, as well as alleviating future transmission congestion in the SHEI area allowing more generation to be available for the entire grid. See Hantz Présumé testimony for additional details.

Q32. Did VELCO review these costs and benefits with the Vermont distribution utilities?

A32. Yes, VELCO discussed the Project in general as well as the valuation of potential benefits and costs with the Vermont distribution utilities. There were one on one and group discussions that culminated in updates to the VELCO Operating Committee, which includes VELCO and Vermont distribution utilities.

Q33. Has VELCO considered and assessed whether the proposed Project represents the least-cost alternative to resolving the deficiencies discussed above?

A33. Yes. There is no transmission alternative to the existing line that is needed to support northern and southern electric flows between Georgia and Highgate Vermont. VELCO assessed replacing the structures in-kind and in-place but found that had unacceptable reliability risks, given greater construction outages, than the proposed single pole rebuild.

VELCO also considered rebuilding the K42 line with different types and configurations of conductors to evaluate the least-cost solution to reducing line losses. Out of the evaluated alternative conductors (i.e., a single 1351 kcmil ACSS, a single 2515 kcmil ACSR, and a double 1272 kcmil ACSR) the double 1272 kcmil ACSR conductor provided optimal improvement to line losses and system strength for the added cost.

Q34. Can the introduction of demand side management ("DSM") or distributed generation ("DG") alleviate the need for the Project?

A34. No. As the need for the Project is to replace deficient transmission line assets, DSM or DG cannot provide a direct replacement for this transmission path.

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

Q35. Will the Project result in an economic benefit to the State?

A35. Yes. The Project will create economic and safety benefits to the citizens of Vermont as it restores electric reliability to the deficient asset condition of the K42 line while also reducing line losses, which will provide future value to the Vermont distribution utilities. Additionally, the Project is expected to create future value for Vermont customers by enhancing

future transmission capacity in the ROW and lowering costs for Vermont customers through associated revenues. Moreover, by adding another 20MW of capacity to the SHEI export limitation, the Project will create more opportunity for economic development and renewable energy development in the SHEI area. The Project will also increase property tax revenues based on the capital investment required for the new facilities. Additionally, there will be some local economic benefits associated with engaging local businesses and contractors during the construction phase of the Project.

Section VI: Air Pollution (Noise), Public Health and Safety [30 V.S.A. § 248(b)(5)]

Q36. Has VELCO evaluated the Project's sound impacts?

A36. No. There are no sound producing devices proposed as part of this line rebuild Project.

Q37. Will the Project have any adverse effects on the health, safety, or welfare of the public or adjoining landowners?

A37. No. VELCO will design and construct the Project in accordance with National Electric Safety Code requirements. VELCO will adhere to prudent utility construction practices throughout the construction phase to not endanger the public or adjoining landowners.

Q38. Did VELCO evaluate the electric and magnetic field impacts from the Project?

A38. Yes. VELCO modeled the electric and magnetic field (EMF) levels for the Project and hired Dr. Christopher Long at Gradient, Inc. as an expert in the field of EMF to review the proposed changes to the K42 Line and with respect to EMFs, their effect on public safety. With the rebuilt line having a vertical/delta configuration there is a mitigating effect on the EMF levels.

In summary of this review, Dr. Long concluded that "All of the modeled electric and magnetic field values fall well below the health-based guidelines of the International Commission on Non-Ionizing Radiation Protection (ICNIRP) for public exposure to EMF, namely, 4.2 kV/m and 2,000 mG (ICNIRP, 2010). Overall, there is thus no expectation of adverse health effects due to the EMF changes caused by the K42 Line Rebuild and Reconductoring Project." Dr. Long's complete report is attached as **Exhibit Petitioner SSM-11** (EMF Analysis Memo).

Section VII: Transportation Systems/Traffic [10 V.S.A. § 6086(a)(5)]

Q39. Please describe the Project's potential impacts with respect to use of public roads.

A39. VELCO does not expect long-term traffic impacts from the Project. There will be minor short-term traffic impacts due to the pulling of conductor/cables across roadways and deliveries of Project equipment to the transmission line area during the construction period (expected to be from September 2024 through fall of 2026). Such deliveries will use existing roads with vehicles that are commonly used on public roads. During delivery of any large

equipment VELCO will employ the services of traffic control personnel to manage traffic flow and enable emergency response vehicles to get to and from where they need to go. VELCO will obtain all required highway crossing permits and provide advance notice of construction phases/activities to affected adjoining neighbors.

Q40. Will the Project affect railway, waterway, or air transportation?

A40. The Project will not impact waterway transportation. During the construction phase of stringing conductor/cables over the railway between structures 342 and 343, VELCO and its contractors will coordinate with the New England Central Railroad for safety during this crossing. With this coordination, VELCO does not expect any impact to railway transportation.

VELCO submitted height and location information of all its proposed replacement structures to the Federal Aviation Administration ("FAA") for airspace obstruction evaluation. The FAA responded with a determination of no hazard to air navigation and no need for visible markers or lighting for aviation safety. **Exhibit Petitioner SSM-12** (FAA Determination Sample Letter).

Q41. Will the Project require the construction of new access roads?

A41. Yes. The Project will require several new access roads to get to the ROW; Andy McMillan's testimony covers the environmental impacts of this work.

One existing access road in particular will require a modification with limited grading and vegetation removal to get to the St. Albans tap. **Exhibit Petitioner SSM-13** (Access Road to St. Albans Tap Design) is the site plan showing the required grading**.**

Section VIII: Educational & Municipal Service [10 V.S.A. § 6086(a)(6)&(7)]

Q42. What impact will the Project have on educational and municipal services?

A42. The Project is not anticipated to have any impact on educational or municipal services because it will not create the need for any additional educational or municipal services.

Section IX: Aesthetics [30 V.S.A. § 248(b)(5), 10 V.S.A. § 6086(a)(8)]

Q43. Will the Project adversely impact aesthetics?

A43. No. VELCO retained T.J. Boyle & Associates (Boyle) to review and assess the potential aesthetic impact associated with this Project and prepare a report of its findings, which is attached as **Exhibit Petitioner SSM-14** (Aesthetic Analysis Report). Boyle found that there would be limited instances where the additional height of the new proposed structures and vegetation removal would increase visibility. The Boyle report concludes that although the Project would result in overall adverse impacts to the aesthetics and scenic and natural beauty of the area, the level of adversity would be very low, and therefore, not unduly adverse. Boyle's conclusion is based on the following: 1) the Project would replace existing electrical transmission infrastructure; 2) the new proposed line would result in limited changes to the scale, form or overall visual appearance compared to the existing 115 kV transmission line; 3) visibility of Project components would be limited, screened by surrounding vegetation and other obstructions; 4) within views that would have visibility of Project upgrades, existing transmission infrastructure is already an established part of the visual landscape, and there would be very limited locations where upgrades would result in new visibility of transmission infrastructure; and 5) the proposed transmission infrastructure would be similar in color, size and form as existing transmission infrastructure within the same location.

As well, Boyle concluded that the Project would not violate a clear written community standard intended to preserve the aesthetics or scenic beauty of the area. Boyle also determined that the Project would not be shocking or offensive because it would not be the dominant or highly visible feature in the landscape, and Project upgrades would replace an existing, established transmission line.

The Project would also be mitigated by the following. The Project is located within an existing transmission corridor where transmission infrastructure is a well-established component of the visual landscape. The Project would replace an existing 115 kV transmission line with a proposed 115 kV transmission line. VELCO chose self-weathering steel structures that create a brown color, along with non-specular conductor and OPGW wire, which will mitigate visibility. VELCO has and continues to conduct an in-depth community outreach, which has influenced parts of the Project design. As well, landscape mitigation plantings are proposed to screen and soften limited views that would be created of Project upgrades. See Exhibit Petitioner SSM-14 Appendix B.

VELCO has and will continue to work with individual landowners regarding the need for certain vegetation removal for the Project, along with options for potential additional landscaping mitigation.

Section X: Development Affecting Public Investments [10 V.S.A. § 6086(a)(9)(K)]

Q44. What impact will the Project have on public investment in a public resource?

A44. None. The Project will not unnecessarily or unreasonably endanger any public or quasi-public investment in any facility, service, or lands, or materially jeopardize or interfere with the function, efficiency, or safety of, or the public's use or enjoyment of or access to any

facility, service, or lands. Within Highgate there is a canoe carry trail to get around the Highgate Falls dam that runs through the VELCO ROW between proposed structures 416 and 417. To ensure public safety during construction VELCO will provide trail blockage and closure notification to the Northern Forest Canoe Trail organization that maintains this trail during the temporary periods of active construction.

Section XI: Impact on Vermont Utilities and Customers [30 V.S.A. §248(b)(10)]

Q45. Can existing or planned transmission facilities serve the Project without creating an undue adverse effect on Vermont utilities, customers, or existing transmission facilities?

A45. Yes. Existing transmission facilities can serve the Project without creating an undue adverse effect on Vermont utilities and customers. The proposed Project is designed to enhance the existing utility system and to improve service to customers by replacing deficient and aged transmission equipment and saving power costs. VELCO will coordinate this work with the Vermont distribution utilities to minimize impacts during construction and to ensure worker safety.

Conclusion

Q46. Does this conclude your testimony at this time?

A46. Yes, it does.

DECLARATION OF SCOTT S. MALLORY

I declare that the above statements are true and accurate to the best of my knowledge and belief. I understand that if the above statements are false, I may be subject to sanctions by the Commission pursuant to 30 V.S.A. § 30.

October 26, 2023
Date

Scott S. Mallory