

**STATE OF VERMONT
PUBLIC UTILITY COMMISSION**

Case No. _____

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 upgrades to VELCO’s existing Florence Substation, located in Pittsford, Vermont

**PREFILED TESTIMONY OF DAN POULIN
ON BEHALF OF VERMONT ELECTRIC POWER COMPANY, INC.**

This testimony and associated exhibits have been filed ePUC other than the identified confidential document

September 3, 2021

Dan Poulin’s testimony introduces the other witnesses offering testimony in support of the so-called “Florence Project,” provides an overview of the proposed Project’s scope, cost and schedule, and explains how the Project addresses a subset of the § 248 criteria.

TABLE OF CONTENTS

1.	Introduction.....	1
2.	Testimony Overview.....	2
3.	Criteria on Public Outreach [Docket No. 7081]	24
4.	Orderly Development [30 V.S.A. § 248(b)(1)].....	27
5.	Need for Present and Future Demand for Service [30 V.S.A. § 248(b)(2)]	29
6.	System Stability and Reliability [30 V.S.A. § 248(b)(3)].....	31
7.	Economic Benefit to the State [30 V.S.A. § 248(b)(4)].....	32
8.	Public Health and Safety [30 V.S.A. § 248(b)(5)].....	32
9.	Transportation Systems/Traffic [10 V.S.A. § 6086(a)(5)].....	32
10.	Educational & Municipal Service [10 V.S.A. § 6086(a)(6)&(7)]	33
11.	Development Affecting Public Investments [10 V.S.A. § 6086(a)(9)(K)].....	34
12.	Compliance with Integrated Resource Plan [30 V.S.A. § 248(b)(6)]	34
13.	Compliance with Vermont Electric Energy Plan [30 V.S.A. § 248(b)(7)].....	35
14.	Impact on Vermont Utilities and Customers [30 V.S.A. §248(b)(10)]	36
15.	Conclusion	36

EXHIBITS

Exhibit Petitioner DP-1	Résumé of Dan Poulin
Exhibit Petitioner DP-2	VELCO Condition Assessment (Filed Under Seal as Critical Energy Infrastructure Information and Other Confidential)
Exhibit Petitioner DP-3	Florence Vegetation Clearing Plan
Exhibit Petitioner DP-4	Rock Removal Specification
Exhibit Petitioner DP-5	Project Cost Estimate Summary
Exhibit Petitioner DP-6	45 Day Package
Exhibit Petitioner DP-7	Town and Regional Plan Excerpts
Exhibit Petitioner DP-8	May 28, 2020 VSPC Meeting Minutes

PREFILED TESTIMONY OF DANIEL POULIN
ON BEHALF OF VERMONT ELECTRIC POWER COMPANY, INC.

1 **1. Introduction**

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

3 A1. My name is Daniel Poulin. I am employed by Vermont Electric Power Company,
4 Inc. (“VELCO”) as a Project Manager. My business address is 366 Pinnacle Ridge
5 Road, Rutland, Vermont 05701.

6

7 Q2. Please describe your education and employment background.

8 A2. I received my Bachelor of Science degree in Electrical Engineering from
9 Northeastern University in 1989 and my Masters of Business Administration
10 degree from the University of Oregon in 1999. I have been employed by VELCO
11 since 2007. During my career, I have worked for a number of electric utility
12 companies where I have held both engineering and management positions. I am a
13 registered Professional Engineer in the state of Vermont. Specific information
14 regarding my work experience is detailed in my resume, attached as Exhibit
15 Petitioner DP-1.

16

17 Q3. Have you previously provided testimony before the Vermont Public Utility
18 Commission (“PUC”)?

19 A3. Yes, I provided testimony in Docket No. 8205, the Georgia 115/34.5kV 3
20 Interconnection Project; Docket No. 8385, the Newport Project; Docket No. 8605,

1 the Connecticut River Valley Project; and Docket No. 8685, Case No. 18-1102-
2 PET, authorizing the installation of equipment at the Coolidge Substation to allow
3 for interconnection of the Coolidge Solar Project, and Case No. 20-3506, the
4 Irasburg Project.

5

6 **2. Testimony Overview**

7 Q4. What is the purpose of your testimony?

8 A4. My testimony supports the Petition by VELCO for a Certificate of Public Good
9 (“CPG”) pursuant to 30 V.S.A. § 248 with respect to upgrading VELCO’s existing
10 substation located at 8040 Whipple Hollow Road, Pittsford, Vermont (the
11 “Project”). VELCO refers to the substation as the “Florence” substation because
12 the substation is in Florence, which is an unincorporated community in the Town
13 of Pittsford. My testimony: (1) introduces the other witnesses offering testimony
14 in support of the Project; (2) provides an overview of the proposed Project and the
15 proposed schedule for Project completion and timing of needed CPG approvals; (3)
16 provides a summary cost estimate and the expected cost treatment; and (4) explains
17 how the proposed Project addresses a subset of the criteria under Section 248.

18

19 Q5. Please identify each of the witnesses other than yourself that will submit testimony,
20 as well as the scope of their testimony.

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

23

1	<u>Witness</u>	<u>Subject</u>
2	Ed McGann	Discusses the engineering and design details for the substation and associated transmission line work and addresses public health and safety and air pollution (noise)
3		
4		
5		
6		
7	Jake Reed	Provides an assessment on the environmental and historic sites criteria for the Project and VELCO's waste disposal methods
8		
9		
10		
11	Mike Buscher	Discusses the Project's compliance with the aesthetic criterion
12		
13		
14		
15	Q6. Please describe the existing VELCO Florence substation, and noteworthy historical events.	
16		
17	A6. VELCO's Florence substation is connected to the VELCO 115 kV electric transmission network in Rutland County, Vermont, and connects to Green Mountain Power's (GMP's) 46 kV system in the Florence area. The VELCO Florence substation was originally built in 1978 to serve the OMYA Plant, which is located to the east of the substation, and has had various modifications and improvements over the nearly forty-three years of service. The substation is configured as a 115/46 kV radial substation with three radial taps and one capacitor bank position, and includes the following major equipment: one 115/46 kV, 30/40/50 MVA power transformer manufactured by GE in 1971; four (4) 46 kV, oil circuit breakers; one 46 kV vacuum circuit breaker; and one 46 kV 5.4 MVAR capacitor bank with .4mH current limiting reactors. Today, the Florence substation's 46 kV lines provide service to the OMYA facility, Proctor and Leicester through GMP's distribution system.	
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		

1

2 Q7. Please describe the primary deficiencies of the existing Florence substation and
3 proposed solutions.

4 A7. VELCO developed an evaluation tool that it used to conduct a condition assessment
5 of the substation. VELCO is providing the Substation Condition Assessment
6 (Assessment), under seal as Confidential, as Confidential Exhibit Petitioner DP-2.
7 The Assessment identified the need to replace some of the equipment due primarily
8 to condition, but design standards and operating practices were also taken into
9 consideration. VELCO identified deficiencies in equipment such as the protection
10 and controls system, 115 kV circuit switcher, 46 kV breakers, switches, capacitor
11 bank, and control building.

12

13 Based on this Assessment, VELCO considered addressing the condition-related
14 concerns identified in the Assessment by performing specific equipment
15 refurbishments, replacements, and upgrades to the existing substation in its current,
16 radial bus configuration. While further analyzing this potential solution, VELCO
17 learned that GMP would require VELCO to install a temporary substation for the
18 duration of construction in the vicinity of the existing substation to provide service
19 to GMP customers while performing the identified improvements. This temporary
20 substation would cost approximately \$1 million and would require temporarily
21 filling in an identified Class II wetland. Avoiding the temporary impact to the
22 wetland would cost significantly more than the estimated \$1 million.

23

1 Alternatively, VELCO considered constructing a new substation adjacent to the
2 existing substation and then after commissioning the new substation, it would
3 transfer the load to the new substation and remove the existing substation. The
4 alternative obviates the need for the temporary substation and therefore allows
5 VELCO to use monies it would have used for a temporary component (temporary
6 substation), on a long-term substation ring-configuration. In addition, it avoids the
7 need to fill in the wetland area to construct the temporary substation.

8
9 Specifically, a new substation in a ring bus configuration rather than the existing
10 radial bus configuration improves the substation's reliability and maintainability.
11 In a ring bus configuration, the circuit breakers are connected to form a ring and
12 the circuits feeding each 46 kV transmission circuit are connected between the
13 breakers. In a radial bus configuration, each 46 kV circuit is fed from a single
14 circuit breaker. A ring bus provides improved reliability and maintainability over
15 a radial bus, as any of the circuit breakers can be opened and isolated for planned
16 maintenance without interruption of service. Ed McGann further explains the
17 reliability benefits of the ring bus configuration in more detail in his testimony.
18 VELCO concluded that this alternative was the preferred option given that many
19 substation components, including the below grade infrastructure that has
20 considerable settling were in need of replacement, the costs spent on a temporary
21 substation would not result in improved reliability or maintainability of the
22 substation, and the estimated cost of this alternative costs approximately only 10%
23 more than utilizing a temporary substation and replacing the deficient components

1 in kind. Therefore, to correct the identified deficiencies, VELCO is proposing the
2 Project which involves constructing a new substation to the north and adjacent to
3 the existing substation. VELCO proposes to design the new substation in a ring
4 bus configuration as opposed to the existing radial bus configuration.

5
6 The Assessment thus focuses on the condition-related issues that VELCO
7 contemplated it would resolve through upgrades to the existing substation rather
8 than by building a new substation.

9
10 Below, I describe the major elements of the Assessment and recommendations. Mr.
11 McGann's testimony and exhibits include further engineering and design details of
12 the proposed substation upgrades.

13
14 *Long Range Planning and Future Considerations (Assessment pg. 10)*

15 VELCO assessed the long-term need for the substation as well as its system
16 configuration and geographical location and concluded that there is no reliability-
17 based need for system upgrades at the Florence Substation, with the exception of
18 condition-based issues that could jeopardize reliability. Therefore, VELCO is not
19 proposing to change any components in order to upgrade the ratings, with the
20 exception of the capacitor bank, which at GMP's request, VELCO would increase
21 from a 5.4 MVAR bank to a 10 MVAR bank. In his testimony, Ed McGann
22 provides an explanation of this change. Although the Assessment did not identify
23 a need to improve the substation's reliability, due to the reasons previously stated

1 regarding the reliability and maintainability benefits of a 46 kV ring bus
2 configuration, the Project will improve the substation's reliability.

3

4 *Protection and Control (P&C) System (Assessment pg. 10-11)*

5 The Assessment noted the existing electromechanical relays are from the original
6 substation installation and are considered obsolete by the manufacturer. VELCO's
7 practice is to replace electromechanical relays with microprocessor-based relays
8 whenever practical. The existing P&C lacks both redundancy and separation, and
9 also lacks 115 kV and 46 kV breaker and circuit switcher failure protection.

10

11 To address the deficiencies, VELCO is proposing to replace the entire P&C system
12 with a new system that has redundant and separate protection lineups, breaker
13 failure relaying, 46 kV bus differential protection and digital fault recording. The
14 Assessment report recommends eliminating the existing B11 bypass disconnect and
15 installing a B11/B12 line tie switch to allow VELCO to remove the B11 breaker
16 from service for maintenance without disrupting service to the B11 line customers.

17 The line tie switch allows the B11 bypass to occur without degrading the 46 kV bus
18 protection which is symptomatic of the legacy breaker bypass schemes. VELCO
19 recommends that it remove the B10 and B12 breaker bypasses for the same reasons.

20 The proposed Project negates the need to install the B11/B12 tie switch, because
21 the ring bus configuration will allow VELCO to bypass any 46 kV breaker without
22 disruption of service to the area customers and compromising the 46 kV bus
23 protection.

1 VELCO will properly dispose of the existing P&C systems in accordance with
2 VELCO's disposal practices as further discussed in Jake Reed's prefiled testimony
3 under the waste disposal criterion.

4

5 115 kV Circuit Switcher (Assessment pg. 12)

6 Circuit switchers can be used as part of a transformer differential scheme that will
7 isolate a transformer for various fault conditions. The circuit switcher is a technical
8 solution for transformer protection and isolation, but does have drawbacks and
9 limitations. As an example, depending on the manufacturer and style, circuit
10 switchers installed on elevated structures are inherently more difficult to maintain,
11 and also do not have integral current transformers that can provide overlapping
12 zones of protection. When provided the opportunity in capital project upgrades,
13 VELCO will utilize a circuit breaker instead of a circuit switcher. A circuit breaker
14 is located closer to the ground, has internal bushing current transformers, and
15 includes other miscellaneous features not found on a circuit switcher. Together,
16 these circuit breaker features make it technically superior and make it easier to
17 maintain than a circuit switcher.

18

19 The existing Florence substation has no 115 kV breakers. The interruption rating
20 of the existing 115 kV circuit switcher is not high enough for the projected available
21 fault current and is therefore classified as over-dutied and needs to be replaced.

22 VELCO recommends that it replace the 115 kV circuit switcher with a new SF6
23 circuit breaker that accommodates the current transformers necessary to move the

1 Florence substation's 115 kV line protection to the transformer's high side.
2 VELCO will remove the existing circuit switcher from the site and properly
3 dispose of it in accordance with VELCO's disposal practices as further discussed
4 in Jake Reed's prefiled testimony under the waste disposal criterion.

5

6 *115/46 kV Power Transformer (Assessment pg. 13*

7 The existing 115/46 kV, 33.6/44/56 MVA power transformer was manufactured in
8 1971 and was installed at the Florence substation as part of the original substation
9 build. Recent tests conducted on the transformer show no abnormal conditions.
10 However, the time required to relocate the existing transformer from its current
11 location to the proposed location in the new substation exceeds the duration that
12 GMP will allow VELCO to take the substation out of service. Therefore, VELCO
13 is proposing to relocate an existing 115/46 kV, 33.6/44/56 MVA transformer in its
14 inventory and install it in the new substation. This will avoid the additional expense
15 of installing a temporary transformer during the transition or having multiple
16 substation outages to swap transformers around. VELCO will install the new
17 transformer on a new concrete foundation with a secondary passive oil containment
18 system and equipped with a dissolved gas analysis (DGA) monitoring system.
19 After the existing transformer has been removed, VELCO will reassess its
20 condition and health and either utilize it as a spare or retire it.

21

1 46 kV Capacitor Bank and Associated Equipment (Assessment pg. 13)

2 A typical capacitor bank is comprised of capacitor cans that are connected to a
3 metal framework, thus creating a bank of cans. Transient limiting inductors (TLI)
4 and voltage transformers are utilized in the operation of the capacitor bank. The
5 existing C8 capacitor bank is inadequate as installed because it is not able to be
6 adequately tuned and causes harmonic issues on the system. As such, VELCO
7 removed it from service several years ago and it has not been used since.

8
9 VELCO proposes to replace the existing 5.4 MVAR capacitor bank with a 10
10 MVAR bank. Ed McGann describes the basis for this change in his testimony.

11
12 115 kV and 46 kV Instrument Voltage Transformers (Assessment pg. 12-13)

13 VELCO recommends that it install a new set of 115 kV voltage transformers to
14 support the new 115 kV P&C system. With the existing radial bus arrangement,
15 VELCO recommends that it relocate the existing 46 kV line voltage transformers
16 from the breaker stands to their own dedicated stands. VELCO proposes to install
17 four new sets of 46 kV instrument voltage transformers to support the new P&C
18 system associated with the ring bus design.

19
20 The existing voltage transformers will be disposed of in accordance with VELCO's
21 disposal practices as further discussed in Jake Reed's prefiled testimony under the
22 waste disposal criterion.

23

1

2 DC Station Service (Assessment pg. 14)

3 VELCO's standard direct current (DC) station service at a substation is comprised
4 of two 125 volt DC battery banks, two battery chargers and DC transfer switches.
5 The DC station service is an integral part of the P&C system, as it provides power
6 to the protective relays. The DC station service is also used to provide DC power
7 to other equipment such as security systems and communication systems, and is
8 sized specifically to support the DC load at a substation.

9

10 The present DC station service is only a single battery bank, with one charger, and
11 is not configured to support redundant protection systems or use of VELCO's
12 mobile battery bank. The charger and the bank were replaced in 2012. VELCO
13 proposes to install a DC station service that follows VELCO's standard design
14 requirements. The proposed replacement of the P&C panels and other substation
15 equipment will require a DC load study to be conducted during the engineering
16 phase of the Project. The existing battery bank and charger will be properly
17 disposed of in accordance with VELCO's disposal methods as further discussed in
18 Jake Reed's prefiled testimony under the waste disposal criterion.

19

20 AC Station Service (Assessment pg. 14)

21 VELCO's standard alternating current (AC) station service at a substation is
22 comprised of two or more redundant 120/240 volt AC sources, and the sources
23 could be a combination of AC station service transformers and generators. The AC

1 station service is used to provide AC power to equipment such as battery chargers,
2 lights, control building heat, pumps and fans.

3
4 VELCO proposes to replace the existing substation service transformers, secondary
5 fused disconnects, meters, control cable, etc. with this Project. The existing
6 substation has a single substation service source with provisions for a 6.5 kV
7 portable generator hookup. Larger battery systems require a larger generator to pick
8 up the substation battery chargers during a station service outage. VELCO proposes
9 to install a fully sized generator with automatic transfer scheme as the substation
10 standby emergency energy source.

11

12 *Control Building Structure (Assessment pg. 11)*

13 The existing 20' x 28' steel control building is from the original 1978 build. The
14 Assessment revealed that the control building's physical size will not adequately
15 house the proposed upgrades necessary for the new P&C equipment,
16 telecommunication equipment and batteries, and still retain necessary maintenance
17 work space clearance on the equipment.

18

19 VELCO proposes to construct a new building of approximately 32' x 54' to
20 adequately house the proposed P&C equipment, DC station service, AC station
21 service, telecommunication equipment, security systems, and other ancillary
22 systems. Disposal of the existing control building will be done in accordance with

1 VELCO's disposal practices as further discussed in Jake Reed's prefiled testimony
2 under the waste disposal criterion.

3

4 Existing Substation Fence (Assessment pg. 15)

5 VELCO substations must be enclosed by a chain link fence that meets the National
6 Electric Safety Code (NESC) and is at least seven feet in height. VELCO's
7 standard substation fence has a chain link fabric of eight feet in height with one foot
8 of barbed wire. When provided the opportunity, such as a larger capital project,
9 VELCO will replace or improve non-standard fence with a fence that meets present
10 design standards.

11

12 The existing substation fence is seven-feet high. The fence fabric is six feet in
13 height and has one inch of barbed wire. The existing substation fence encompasses
14 the control building, however, the building is located within 10 feet of the fence,
15 which does not meet VELCO's present design standard.

16

17 VELCO proposes to install a new fence to accommodate the new substation. The
18 substation fence will enclose an approximate 39,500 square foot area to the north
19 of the existing substation fence. For comparison, the existing substation fence
20 encloses an area of 24,900 square feet. In addition, VELCO will install a fence at
21 the top of the hillside created by the ledge removal for safety purposes.

22

1 VELCO will remove the existing fence from the site and properly dispose of it in
2 accordance with VELCO's disposal methods as further discussed in Jake Reed's
3 prefiled testimony under the waste disposal criterion.

4

5 *Oil Containment (Assessment pg. 15-16)*

6 The existing 115/46 kV transformer does not have a passive secondary oil
7 containment system, and relies on the gravel substation surface and berm to prevent
8 spread of an oil spill. VELCO proposes to install a new passive secondary oil
9 containment system for the proposed new transformer. Please see the prefiled
10 testimony of Ed McGann and Jake Reed for more information on the secondary oil
11 containment.

12

13 *46 kV Vacuum circuit breakers (Assessment pg.3)*

14 VELCO proposes to install four 46 kV vacuum circuit breakers to replace the
15 existing four 46 kV oil circuit breakers. Vacuum breakers are considered more
16 environmentally friendly than breakers that contain oil or SF6, and when provided
17 the opportunity, such as a larger capital project, VELCO will replace 46 kV oil
18 circuit breakers with vacuum circuit breakers.

19

20 *New Pole Structures*

21 VELCO proposes to install two, three pole structures to connect the existing 115
22 kV transmission line to the new substation. The structures are needed because the
23 transmission line support structures in the proposed substation are further away

1 from the existing transmission line than the transmission line support structures in
2 the existing substation.

3

4 46 kV Line Construction

5 VELCO will be contracting GMP to support some of the Florence Project
6 construction activities. GMP will perform the 46 kV line work to replace the three
7 existing 46 kV line structures and will provide temporary station service power to
8 the site while the VELCO Florence substation is out of service. GMP will be
9 supporting other aspects of construction that require interface with the GMP 46 kV
10 P&C systems and temporary workarounds.

11

12 Q8. In summary, please describe the Project's major substation components.

13 A8. To address the noted deficiencies at the Florence substation, VELCO proposes to
14 install/perform the following major components:

15 • Construct a new 115/46 kV ring bus substation with all new components adjacent
16 to the existing substation, including installing:

17 ○ A new 115/46 kV, 33.6/44.8/56 MVA transformer.

18 ○ Four (4) 46 kV vacuum circuit breakers.

19 ○ One (1) 115 kV, SF6 circuit breaker.

20 ○ Ten (10) MVAR capacitor bank, and associated reactor/resister filter bank
21 components, and SF6 Breaker.

22 ○ A P&C system.

- 1 ○ A control building that can accommodate the new P&C system, redundant
- 2 AC and DC station services, communication equipment, and security
- 3 systems.
- 4 ○ One (1) set of 115 kV, and four (4) sets of 46 kV instrument voltage
- 5 transformers in support of the new P&C system.
- 6 ○ Passive secondary oil containment system for the new 115/46 kV
- 7 transformer.
- 8 ○ A new fence to accommodate the new substation. The substation fence will
- 9 enclose an approximate 39,500 square foot area to the north of the existing
- 10 substation fence. For comparison, the existing substation fence encloses an
- 11 area of 24,900 square feet. In addition, VELCO will install a fence at the
- 12 top of the hillside for safety purposes.
- 13 ○ Two (2), three pole structures to connect the existing 115 kV transmission
- 14 line to the new substation.
- 15 • Perform tree clearing to accommodate new substation and pole structures.
- 16 • Remove existing substation, including all above and below grade components and
- 17 restore the area to fit in with the surrounding property.

18

19 Mr. McGann's testimony includes exhibits detailing further engineering and design
20 details of the substation upgrades.

21

1 Q9. Please describe the proposed vegetation clearing plan for the Project.

2 A9. VELCO will need to remove approximately one acre of vegetation to construct the
3 Project. Please see Exhibit Petitioner DP-3 (Florence Vegetation Clearing Plan).

4

5 Q10. Will the Project require any blasting?

6 A10. Yes, VELCO will need to perform blasting to remove approximately 20,000 cubic
7 yards of ledge where VELCO will construct the new substation. VELCO will
8 follow its rock removal specification, as well as the Vermont Department of
9 Environmental Conservation (DEC) best management practices (BMPs) for
10 blasting. Please see Exhibit Petitioner DP-4 Rock Removal Specification. VELCO
11 has used a similar specification to support its electric transmission line work, and
12 has taken this opportunity to apply it to substation projects. This rock removal
13 specification is more detailed than the blasting plan that VELCO has submitted as
14 an exhibit in past substation projects. VELCO will provide this rock removal
15 specification to contractors and includes the Agency of Natural Resources' (ANR)
16 BMPs. If and when the ANR updates its BMPs, VELCO will update its rock
17 removal specification. After the necessary ledge has been blasted, VELCO's
18 contractor will process the rock on site, utilizing a diesel powered, portable rock
19 crusher. The rock will be processed as it is removed and therefore will not be
20 continual, but may take a period of 4 to 8 weeks. During the process, the contractor
21 will manage dust by spraying water on the conveyer and jaws of the crusher as
22 necessary. The temporary sound generated from the crusher that VELCO would

1 use during construction is consistent with sound generated by nearby industrial
2 operations, such as a permanent rock crushing operation and the OMYA facility.

3

4 Q11. Please describe the approach for developing the Project's cost estimate.

5 A11. The first step was to identify the resources required to plan, design, and construct
6 the Project. VELCO developed the cost estimate utilizing seven categories to
7 establish the total cost for each Project element. The seven resource categories are
8 as follows:

- 9 • Material
- 10 • Labor
- 11 • Equipment
- 12 • Indirects
- 13 • Escalation
- 14 • Capital Interest
- 15 • Contingency

16

17 Q12. Please summarize the process used to develop the direct and indirect costs.

18 A12. VELCO developed the Direct Costs using cost data from projects VELCO recently
19 completed or which are in progress. Specifically, VELCO used cost data associated
20 with recent VELCO substation and line projects to develop the material, labor and
21 equipment costs. VELCO utilized vendor cost data for portions of the Project scope
22 for which VELCO did not have recent actual cost data from its prior projects.

23

24 VELCO estimated labor and equipment costs using preliminary detailed designs.
25 The detailed line items for each Project element were estimated into sub-categories
26 following the Federal Energy Regulatory Commission ("FERC") system of

1 accounts. Developing the cost estimates by FERC accounts enhances VELCO's
2 ability to track costs in a manner consistent with the reporting format of actual costs
3 as required by FERC. Also, escalation costs can be more accurately calculated by
4 applying the Handy-Whitman cost index to the estimated costs by FERC account.

5

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

8

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

17

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

22

1 VELCO Project Controls developed escalation costs by using an anticipated 2019-
2 2021 spending plan and projected Handy-Whitman cost index and consumer price
3 index (CPI).

4

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

9

10 Finally, the Project cost estimate also accounts for a contingency of twenty percent
11 (20%) due to the preliminary detailed designs and the uncertainty and risk
12 associated with the Project level of definition.

13

14 Q13. What is the total cost estimate for the VELCO Components based on the various
15 cost elements and resource categories described?

16 A13. The total cost of the Project is estimated at \$17,681,390. The total cost estimate is
17 comprised of \$9,022,522 of Direct Costs (encompassing Material, Labor and
18 Equipment), \$4,993,368 of Indirect Costs, \$388,388 in Escalation, \$489,405 in
19 Capital Interest, and \$2,787,707 in Contingency. Please refer to Exhibit Petitioner
20 DP-5 for a cost summary by resource category and Project elements. VELCO will
21 utilize one of its existing spare transformers for this Project, and therefore the cost
22 of the transformer has already been capitalized and will not be charged to this

1 Project. Once the existing transformer is removed, its condition and health will be
2 re-assessed and either utilized for a spare or retired.

3

4 Q14. What is the design basis for the substation's Direct cost estimate?

5 A14. The Direct cost estimate is based on the General Arrangement Plans and the One-
6 Line Diagram as presented in Mr. McGann's testimony and exhibits.

7

8 Q15. What risk elements did VELCO consider when developing the cost estimate and
9 how were the risks addressed in the cost estimate?

10 A15. Risk elements considered are the Project duration, level of certainty regarding
11 ground condition for below grade work, required aesthetic and environmental
12 mitigation measures, volatility regarding escalation rates, temporary configurations
13 necessary to support construction and potential resource constraints at the
14 anticipated time of construction. Per standard project management practices widely
15 recognized by organizations such as the Project Management Institute, VELCO
16 applied contingency to the estimate to account for these risks.

17

18 As described in my testimony, VELCO applied a contingency of 20% to the total
19 estimated cost based on the current level of Project definition.

20

21 Q16. Are any portions of the Project upgrades expected to be eligible for Pool
22 Transmission Facilities ("PTF") regionalized cost recovery?

1 A16. Yes. See Exhibit Petitioner DP-5. The 115 kV gang operated switch and monopole
2 receive PTF treatment. VELCO does not expect other Project components to be
3 eligible for PTF cost recovery such as: the 115 kV system, including the
4 transformer and the 46 kV transformer low side disconnect switch and source
5 voltage transformer that are Common Vermont Facility assets; the two 46 kV
6 supply breakers (H8412 and H8411) and the capacitor bank, reactor, and associated
7 breaker (C8) that are GMP Specific Facility assets; the two breakers (H1012 and
8 H1011) and associated line voltage transformers and switches supporting GMP's
9 46 kV system that are GMP Exclusive Facility assets; and the one station service
10 disconnect that is a Shared Facility asset. Please see Confidential Exhibit Petitioner
11 DP-2, page 9 for a diagram that shows the various facility assets of the proposed
12 substation.

13

14 Q17. What is the Project schedule?

15 A17. We propose to begin Project construction as soon as possible after receiving the
16 required permits and approvals. The area of land to be cleared as part of the clearing
17 plan (Exhibit Petitioner DP-3) is located in the summer range of the Indiana bat
18 (*Myotis sodalists*), which is listed as endangered under 10 V.S.A. Chapter 123 by
19 federal authority. To avoid injuring or killing Indiana Bats, the Vermont
20 Department of Fish and Wildlife (VDFW) has requested that we not clear trees
21 greater than five inches in diameter at breast height between April 1 and October
22 31 unless VELCO performs further studies or implements mitigation measures as
23 further described in Jacob Reed's prefiled testimony. Therefore, VELCO is hoping

1 to receive a CPG by March 1, 2022 to be able to remove any affected trees prior to
2 the April 1, 2022 start of the seasonal clearing restriction period. If we do not
3 receive a CPG prior to this date, the studies positively identify bats on the site, and
4 mitigation measures are deemed ineffective to protect potential roosting bats,
5 VELCO will be forced to delay the start of construction by a year which will have
6 adverse impacts on Project execution and overall Project cost. Assuming receipt
7 of a CPG by March 1, 2022, the target date for completion of the Project is June
8 2023.

9
10 Construction would take place between the hours of 7:00 A.M. and 7:00 P.M.
11 Monday through Friday, and between 8:00 A.M. and 5:00 P.M. on Saturdays. No
12 construction will take place on Sundays, or state or federal holidays, although
13 VELCO seeks to conduct activities on Bennington Battle Day given the short
14 summer construction season, and the holiday is not widely granted as a paid day
15 off for many of the workers likely to be working on the Project. VELCO requests,
16 however, that these restrictions do not apply to: 1) construction activities that
17 VELCO must perform during any required outages that may be needed to maintain
18 system reliability and 2) work that VELCO must perform related to filling the
19 power transformer with oil.

20
21 VELCO also requests permission to commence construction without having first
22 obtained the required Wastewater System and Potable Water Supply Permit and the
23 Division of Fire Safety Permit. VELCO seeks exemption from the standard

1 condition that requires acquisition of all state and federal permits prior to the start
2 of construction. Although VELCO anticipates the receipt of the Wastewater
3 System and Potable Water Supply Permit and Division of Fire Safety Permit prior
4 to the start of construction, the acquisition of these two permits may not occur prior
5 to when VELCO is prepared to begin site preparation and construction activities
6 that are not subject to these two permits. Specifically, VELCO would like to begin
7 the following activities upon receipt of a final order and CPG: equipment
8 demolition, vegetation clearing, site grading, reroute of fiber-optic cable and
9 installation of temporary equipment.

10

11 **3. Criteria on Public Outreach [Docket No. 7081]**

12 Q18. Has the Project development conformed to the transmission planning requirements
13 approved in the Memorandum of Understanding (MOU) of Docket No. 7081?

14 A18. Yes.

15

16 Q19. Please describe VELCO's public outreach efforts related to this Project.

17 A19. VELCO designed the public outreach efforts to meet the requirements of the MOU
18 from Docket No. 7081. VELCO specifically reached out to the local community
19 in Florence. Once the Project's need and site details were further refined, VELCO
20 issued a 45-day advance notice describing the Project to the abutting landowners,
21 the Town of Pittsford Select Board, the Town of Pittsford Planning Commission,
22 the Rutland Regional Planning Commission, Department of Public Service,
23 Agency of Natural Resources (ANR), and Vermont Division of Historic

1 Preservation. VELCO Project staff met with the Town of Pittsford Select Board,
2 Town of Pittsford Planning Commission and the Rutland Regional Planning
3 Commission regarding the Project. There were no comments or concerns raised in
4 these meetings that VELCO had not already planned to address as part of the
5 Project's construction. VELCO invited all stakeholders to a virtual public meeting
6 to provide interaction for questions and feedback. The public meeting was
7 scheduled for the convenience of interested persons and no members of the public
8 attended. The public has been offered other means of communicating with VELCO
9 including phone and email transmittals. I personally met with landowners of the
10 three properties closest to the Project to review the Project with them and get their
11 feedback. Some landowners raised concerns that VELCO has addressed as
12 discussed below. No landowner opposed the Project. The VELCO website also
13 provides constant availability for those with internet access to Project information
14 and provides a means of submitting requests for information via an on-line contact
15 form. Please see Exhibit Petitioner DP-6 (45-day Package).

16

17 Q20. How did VELCO address the comments and input that were received from the
18 public outreach efforts?

19 A20. ANR submitted comments to VELCO noting that the Project will require a wetland
20 permit. VELCO agrees and will submit a wetland permit application and is
21 working with the ANR wetlands program. ANR also noted that the Project is in
22 the summer range of the Indiana bat and identified the associated construction
23 restrictions and guidelines. I have discussed VELCO's commitment to remove

1 trees outside the restrictive period to avoid bat impacts, and Jacob Reed’s testimony
2 further addresses the endangered bat in his testimony. ANR also requested that
3 VELCO perform a plant survey and to include the results in the Section 248
4 submission. VELCO has performed a plant survey and did not find any Rare,
5 Threatened or Endangered (RTE) plant species. Witness Jacob Reed explains the
6 results of the survey in more detail in his testimony. ANR also requested that
7 VELCO’s filing include an affirmative representation that VELCO will install
8 secondary containment for the new transformer that meets ANR’s standard. The
9 prefiled testimony of Ed McGann and Jacob Reed also includes this affirmative
10 statement.

11
12 One of the landowners that I spoke with expressed concerns regarding their well
13 and the impact any blasting might have on it. Their well is located approximately
14 1,200 feet from our proposed blasting site. I explained that VELCO would be
15 following our established specification for rock removal (attached as Exhibit
16 Petitioner DP-4) and accordingly, at their request would perform an inspection
17 along with documentation of their property prior to any blasting and that the
18 contractor performing the blasting would be liable for all damage to property
19 caused by the blasting operations. The landowners made that request, and VELCO
20 will perform the inspection prior to any blasting.

21
22 Another landowner pointed out the tight turning radius of VELCO’s driveway into
23 the Project site and was concerned that large trucks entering the site might damage

1 his lawn trying to navigate the turn. I agreed with his assessment and assured him
2 that VELCO will address this issue by widening VELCO's existing driveway
3 entrance as part of the Project and/or repair any damage done to his property. The
4 landowner was satisfied with that response. During the various public meetings,
5 VELCO answered specific questions regarding the Project and received no negative
6 comments or concerns regarding the Project.

7
8 **4. Orderly Development [30 V.S.A. § 248(b)(1)]**

9 Q21. Will the Project unduly interfere with the orderly development of the region?

10 A21. No. The Project will have a favorable impact on the orderly development of the
11 region in that it will improve the reliability of the region's existing electrical supply
12 while not adversely impacting the environment or aesthetics. The proposed Project
13 is consistent with the 2018 Town of Pittsford Town Plan ("Town Plan"). The Town
14 Plan contains no language addressing the construction or operation of substations
15 or the construction of transmission lines for reliability purposes. The Town Plan
16 describes the area where the Florence Substation is located as primarily industrial:

17 Industrial

18 Land in the Florence vicinity has traditionally been agricultural and
19 industrial and offers potential for further industrial expansion. A rail
20 spur serves the area, there is direct truck access from Route 7, high
21 voltage power service is provided and municipal water is available.
22 While municipal services do not presently exist in Florence for
23 wastewater treatment, consideration has been given to developing a
24 sewer treatment facility. The current industrial area is composed
25 primarily of land owned by OMYA and the railroad. Other sites
26 adjacent to OMYA lands and along access to the OMYA lands are

1 also considered to have potential for industrial uses but may require
2 substantial resources to make them useable for industrial purposes.

3
4 Exhibit Petitioner DP-7 (Town Plan at 17). The Town Plan Land Use map
5 identifies the Project area as “Industrial.” The Project complies with the Town
6 Plan.

7
8 VELCO also examined the Rutland Regional Planning Commission’s (RPC) 2018
9 Regional Plan (adopted June 19, 2018) (“RPC Plan”). The RPC Plan does not
10 provide land conservation measures regarding the Project parcel where VELCO
11 seeks to install the upgrades.

12
13 The RPC Plan contains generally applicable design standards for electric
14 transmission facilities:

- 15 Electrical Transmission Facilities:
- 16 Electrical transmission facilities in excess of 30 kV and related
17 substations shall be designed, constructed, and operated such that:
- 18 1. Existing rights-of-way shall be used by new facilities. The need
19 or [sic] a new facility beyond these corridors shall be based on the
20 PUC review of system need, reliability, and economic benefit
 - 21 2. Any transmission line, substation or other structure is located
22 away from special flood hazard areas and wetlands.
 - 23 3. Any upgrade to 3-Phase requires a permit. From the Public
24 Service Board.
 - 25 4. When electrical transmission lines are less than 50 feet from
26 residences, they shall be re-routed or buried.
 - 27 5. Whenever possible, transmission lines will be reconducted
28 instead of widening existing right of way and adding another set of
29 poles and wires.
 - 30

1 Exhibit Petitioner DP-7 (RPC Energy Plan at 27-29). The Project gives due
2 consideration to these design goals as the Petitioner proposes to locate the Project
3 adjacent to its existing substation, and the Project is in a remote and industrial
4 area. As further discussed in Jacob Reed's prefiled testimony, there is one
5 wetland comprised of two sections next to the Project area. VELCO has designed
6 the Project to minimize impacts to the wetland and its regulated 50-foot buffer,
7 however, impacts are necessary to accommodate the new substation yard, fence,
8 site grading, access road, and two new transmission pole structures. VELCO will
9 apply for and obtain all applicable wetland permits prior to construction. This
10 wetland is also associated with a floodplain that is next to the existing substation
11 fence. As Jacob Reed's testimony further explains, VELCO evaluated several
12 Project alternatives and went through several design iterations to minimize
13 floodplain impacts, however, some unavoidable impacts are still required to
14 facilitate Project construction. VELCO will obtain the necessary floodplain
15 permit. The associated transmission lines will remain within existing rights-of-
16 way. As the Project is contained within a confined area and does not cross town
17 boundaries, it does not have a regional impact. Exhibit Petitioner DP-7 (RPC Plan
18 at 8). Because the RPC Plan did not contain any applicable land conservation
19 measures, the Project is consistent with the RPC Plan.

20
21 **5. Need for Present and Future Demand for Service [30 V.S.A. § 248(b)(2)]**

22 Q22. Is the Project required to meet the need for present and future demand for service
23 which could not otherwise be provided in a more cost-effective manner through

1 energy conservation programs and measures and energy efficiency and load
2 management?

3 A22. Yes. The VELCO Florence substation's condition as discussed above is the main
4 driver of the need for the proposed Project. Energy efficiency and load
5 management actions could not resolve these problems.

6
7 VELCO presented the proposed Project to the Vermont System Planning
8 Committee (VSPC) Geotargeting Subcommittee. The Geotargeting Subcommittee
9 concluded that the Project screened out of the VSPC's test for Non-Transmission
10 Alternative (NTA) analysis. Thus, VELCO did not perform an NTA analysis.
11 Please see Exhibit Petitioner DP-8 May 28, 2020 VSPC Meeting Minutes. VELCO
12 presented the Project and NTA screening form at the meeting, which does not
13 require specific project design details and cost information.

14

15 Q23. Could the same benefits be achieved by transmission alternatives?

16 A23. No. Because the need for the Project is based on the condition of an existing
17 substation, VELCO did not perform a Transmission Alternatives (TA) analysis.

18

19 Q24. Has VELCO considered and assessed whether the proposed Project represents the
20 least-cost alternative to resolving the deficiencies discussed above?

21 A24. Yes, the Assessment demonstrated that VELCO needs to address condition-related
22 concerns at the existing substation. VELCO considered the alternative discussed
23 above and contemplated in the Assessment – upgrading the existing substation in

1 place and use of a temporary transformer. The Assessment is attached as
2 Confidential Exhibit Petitioner DP-2. An analysis of the alternative demonstrated
3 that building a new substation configured in a ring bus arrangement adjacent to the
4 existing substation – the proposed Project – is the most efficient and cost-effective
5 way to address the condition-related concerns while at the same time improving the
6 reliability and maintainability of the substation. This new substation would be built
7 while the existing substation is still providing service to GMP customers and would
8 thus avoid the expense of building a temporary substation as required for the
9 alternative. Furthermore, VELCO followed the MOU with the Department of
10 Public Service (DPS) under Docket No. 8385, which included the preliminary
11 review of project alternatives and estimated costs with DPS staff.

12
13 **6. System Stability and Reliability [30 V.S.A. § 248(b)(3)]**

14 Q25. What impact will this upgrade have on system stability and reliability?

15 A25. The Project will have no adverse impact on the stability and reliability of
16 VELCO's transmission system. In fact, the Project will improve system safety
17 and reliability by replacing equipment of less than adequate condition. In
18 addition, a ring bus provides improved reliability and maintainability over a radial
19 bus, as any of the circuit breakers can be opened and isolated for maintenance
20 without interruption of service. In addition, in the event of a fault, the breakers on
21 both sides of the faulted circuit trip, and thereby isolate the fault, while the other
22 circuits remain in service.

23

1 **7. Economic Benefit to the State [30 V.S.A. § 248(b)(4)]**

2 Q26. Will the Project result in an economic benefit to the State?

3 A26. Yes. The Project will create economic and safety benefits to the citizens of
4 Vermont. The Project will increase property tax revenues based on the capital
5 investment required for the upgrades. Additionally, there will be some local
6 economic benefits associated with engaging local businesses and contractors during
7 the Project's construction phase.

8
9 **8. Public Health and Safety [30 V.S.A. § 248(b)(5)]**

10 Q27. Will the Project have any adverse effects on the health, safety, or welfare of the
11 public or adjoining landowners?

12 A27. No. VELCO will design and construct the Project in accordance with National
13 Electric Safety Code requirements. The Company will adhere to prudent utility
14 construction practices throughout the construction phase, and the Project will not
15 endanger the public or adjoining landowners. VELCO will operate and maintain
16 the substation equipment installed as part of this Project in the same safe manner
17 that the Company operates and maintains all of its facilities.

18
19 **9. Transportation Systems/Traffic [10 V.S.A. § 6086(a)(5)]**

20 Q28. Please describe the Project's potential impacts with respect to use of public roads.

21 A28. The Project poses no long-term traffic impacts in the Town of Pittsford. VELCO
22 anticipates only minor, short duration traffic impacts, if any, due to deliveries of
23 equipment and material to the substation site during the construction period

1 (expected to be from March 2022 to December 2022). Such deliveries will use
2 existing roads with vehicles that are commonly used on public roads. During
3 delivery of any large equipment, VELCO will employ the services of traffic control
4 personnel to manage traffic flow. VELCO will obtain all required highway permits
5 associated with the work and deliveries.

6

7 Q29. Will the Project affect railway transportation?

8 A29. No. VELCO does not anticipate that the Project will impact railway transportation.

9

10 Q30. Where will VELCO store equipment during construction?

11 A30. VELCO will use the existing substation parcel and VELCO right-of-way easements
12 to stage any material needed during construction. These staging areas are within the
13 Project area that VELCO studied for impacts to environmental criteria.

14

15 **10. Educational & Municipal Service [10 V.S.A. § 6086(a)(6)&(7)]**

16 Q31. What impact will the Project have on educational and municipal services?

17 A31. The Project will not have any impact on educational or municipal services. With
18 respect to educational services, the Project will not add any new students to the
19 affected municipality. Thus, the Project will not place an unreasonable burden on
20 the ability of a municipality to provide educational services because the Project will
21 not require or affect educational services.

22

1 With respect to municipal services, the Project does not require any fire or police
2 services beyond those typically required of other businesses, and what is currently
3 required for the Florence substation. Jacob Reed's prefiled testimony discusses
4 VELCO's plans regarding limited disposal of sanitary waste.

5
6

7 **11. Development Affecting Public Investments [10 V.S.A. § 6086(a)(9)(K)]**

8 Q32. What impact will the Project have on public investment in a public resource?

9 A32. The Project will not unnecessarily or unreasonably endanger any public or quasi-
10 public investment in any facility, service, or lands, or materially jeopardize or
11 interfere with the function, efficiency, or safety of, or the public's use or enjoyment
12 of or access to any facility, service, or lands.

13

14 **12. Compliance with Integrated Resource Plan [30 V.S.A. § 248(b)(6)]**

15 Q33. Is the Project consistent with VELCO's least cost Integrated Resource Plan?

16 A33. VELCO does not have an integrated resource plan. As a transmission-only
17 company, VELCO periodically produces transmission studies. Specifically,
18 VELCO issued a 2021 Vermont Long-Range Transmission Plan. The 2021 Plan
19 explains that:

20 The transmission plan requirements are not meant to include those
21 asset condition or routine projects that are undertaken to maintain
22 existing infrastructure in acceptable working condition. Some-times
23 these activities require significant projects, such as the
24 refurbishment of substation equipment and the replacement of a
25 relatively large number of transmission structures to replace aging
26 equipment or maintain acceptable ground clearances. Although the

1 plan requirements do not apply to these types of projects, VELCO
2 is listing these projects for the sake of information. These projects
3 are needed to maintain the existing system, not to address system
4 issues resulting from load growth, and VELCO routinely shares
5 plans for many of these projects with the VSPC as part of its non-
6 transmission alternatives (NTA) project screening process. The
7 formal NTA screening tool employed in this process “screens out”
8 projects that are deemed “impracticable” for non-transmission
9 alternatives because they are specifically focused on resolving asset
10 condition concerns.

11

12

13 2021 VELCO Plan, at page 10. Section 4.4.1 of the 2021 plan acknowledges that
14 VELCO has assessed the Florence substation and “it has been determined that
15 refurbishments are necessary.”

16

17 **13. Compliance with Vermont Electric Energy Plan [30 V.S.A. § 248(b)(7)]**

18 Q34. Is the Project consistent with the 2016 Comprehensive Energy Plan?

19 A34. Yes. Vermont’s Twenty-Year Electric Plan (“the Plan”) adopted by the
20 Department of Public Service in January 2016 (Section 1.3) as part of the Vermont
21 Comprehensive Energy Plan contains several basic objectives related to
22 transmission investment that must be satisfied in serving the public interest. The
23 Plan seeks to ensure reliability of the transmission system. The Plan also strives
24 for the protection of public safety, preservation of the environment, and least cost
25 planning. Similarly, the Plan recognizes statutory goals in which Vermont meets
26 its energy service needs in a manner that is adequate, reliable, secure, and
27 sustainable and that assures affordability. The Project strikes the proper balance
28 between each of these objectives. Specifically, VELCO has proposed a Project that
29 restores and maintains system reliability and safety. Moreover, VELCO’s proposal

1 to perform the Florence Project in an area that already hosts other electric
2 infrastructure limits the environmental impact. In addition, the proposed Project
3 avoids the substantial cost to install a temporary substation that would not provide
4 long-term system benefits as compared with the ring-bus configuration that
5 VELCO proposes to install in the new substation. VELCO has asked the
6 Department for a determination under 30 V.S.A. § 202(f) that the Project is
7 consistent with the 20-Year Plan.

8
9 **14. Impact on Vermont Utilities and Customers [30 V.S.A. §248(b)(10)]**

10 Q35. Can existing or planned transmission facilities serve the Project without creating an
11 undue adverse effect on Vermont utilities, customers, or existing transmission
12 facilities?

13 A35. Yes. Existing transmission facilities can serve the Project without creating an
14 undue adverse effect on Vermont utilities and customers. The proposed Project is
15 designed to enhance the existing utility system and to improve service to customers.
16 VELCO has, and will continue to coordinate the work with GMP to minimize
17 impacts during construction and ensure worker safety.

18
19 **15. Conclusion**

20 Q36. Does this conclude your testimony at this time?

21 A36. Yes, it does.