STATE OF VERMONT
PUBLIC UTILITY COMMISSION

Investigation pursuant to 30 V.S.A. §§ 30 and 209 regarding the alleged failure of Vermont Gas Systems, Inc. to comply with the certificate of public good in Docket 7970 by burying the pipeline at less than required depth in New Haven, Vermont	)	Case No. 17-3550-INV
Notice of Probable Violations of Vermont Gas Systems, Inc. for certain aspects of the construction of the Addison natural gas pipeline	)	Case No. 18-0395-PET

PREFILED DIRECT TESTIMONY OF BRIAN CONNAUGHTON ON BEHALF OF VERMONT ELECTRIC POWER COMPANY, INC. AND VERMONT TRANSCO LLC

July 23, 2021

Summary of Testimony

In response to the Commission's order of April 30, 2021, Mr. Connaughton's testimony addresses why the Addison Natural Gas Pipeline ("ANGP") as buried in the VELCO right-of-way (the "VELCO ROW") in the Clay Plains swamp in New Haven, meets the HS-20+15% loading standard, after taking into the opinions of VELCO's technical consultant, Kevin Bodenhamer of TRC. He also testifies concerning whether the ANGP limits VELCO's future use of the VELCO ROW for additional electric transmission lines.

Q1. Please state your name and occupation.

A1. My name is Brian Connaughton. I am employed by Vermont Electric Power Company, Inc. and Vermont Transco LLC (together, "VELCO") as the Director of Transmission Services.

Q2. Please describe your educational and business background.

A2. I hold a Bachelor's Degree in Natural Resource Studies from the University of Massachusetts, Amherst as well as a Master's Degree in Business Administration from the College of Saint Joseph, Rutland, Vermont. I have worked at VELCO for approximately fifteen years in several roles including Environmental Team Lead, Transmission Services Manager, and the Director of Transmission Services. Prior to my employment at VELCO, I worked at several environmental consulting firms. During this time, my roles included performing environmental assessments, environmental quality investigations, resource inventories and regulatory permitting to support the development of energy infrastructure projects in New England. A copy of my resume is provided as *Exhibit VELCO-BC-1*.

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

A3. Yes, I have sponsored testimony to the Commission as part of the Southern Loop Project (Docket 7373) as well as part of the Saint Albans X61 Transformer Replacement Project (Docket 8085).

Q4. What is the purpose of your testimony?

A4. In the Commission's Order of April 30, 2021 in this proceeding, it stated the following:

> A key finding in the Liability Order is that the burial depth that Vermont Gas achieved in the VELCO right-of-way in New Haven has the potential to limit VELCO's future use of its right-of-way for additional transmission lines. VELCO only recently sought party status in this case and therefore did not participate in the

> evidentiary hearing. However, in its recent filing VELCO has now opined that the hearing officer's proposed findings on the burial-depth issue, and thus whether the applicable loading standard has been met, are incorrect. We believe that there would be value in hearing testimony from VELCO in this proceeding on why it believes the loading standard has been met.
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> We believe it will be judicially efficient for VELCO to provide testimony as to whether the pipeline as buried in the swamp would, or would not, limit its future use of its right-of-way for additional transmission lines. If VELCO relies on the previously filed study to support its conclusions, then it must account for the flawed assumptions in the study identified by the hearing officer.

In response to the Commission's order, VELCO requested TRC to perform a technical review of relevant information concerning whether the loading standard has been met, accounting for three specified "assumptions" in the May 25, 2016 engineering study prepared for Vermont Gas Systems, Inc. ("VGS") by Mott MacDonald (the "2016 MM Study"). VELCO asked TRC to consider the three assumptions in the 2016 MM Study that the Commission focused on in its order: (1) the diameter of the pipeline (12 inches versus 15 inches); (2) the method of burial (trenching versus horizontal directional drilling); and (3) the density of the soil surrounding the pipeline. The testimony of Kevin Bodenhamer of TRC addresses the above issues.

My testimony takes into account the technical opinions of TRC, and addresses why the Addison Natural Gas Pipeline ("ANGP"), as buried in the VELCO right-of-way (the "VELCO ROW") in the Clay Plains swamp in New Haven (the "CP ROW"), meets the HS-20+15% loading standard. For that reason and others, I testify that the ANGP does not limit VELCO's future use of the VELCO ROW for additional electric transmission lines.

Q5. First by way of background, please briefly describe the purpose and general terms of the Memorandum of Agreement between VGS and VELCO dated June 13, 2013 (the "MOA"), previously identified as Exhibit 16 to Exhibit VGS-JSH-2 in this proceeding.

A5. The purpose of the June 2013 MOA was to document the agreement between VGS and VELCO pertaining to the co-location and crossing of the proposed ANGP within the VELCO rights-of-way (ROWs), including easements and lands owned in fee, associated with the VELCO transmission lines designated as the K21/K22/K24/K27/K43/K63/K64 and 370 lines. The MOA includes provisions associated with employee, contractor and community safety considerations, the co-location license(s), the development of an Operating Agreement, VGS design adjustments to allow for a possible future use of the ROW for additional electric transmission line(s), VELCO's review of VGS's project plans, loading requirements, project coordination and oversight items, as well as terms pertaining to insurance and the treatment of information. The MOA was previously filed with the Commission as *Exhibit VELCO-PWL-2* in Docket 7970 and *Exhibit 16 to Exhibit VGS-JSH-2* in this proceeding.

Q6. Paragraph 5 of the MOA states, "VGS will design the Project in VELCO's ROW and access roads into VELCO's ROW to meet an HS-20+15% standard which VGS plans to meet by using Class 3 pipe interred at a depth of 4 feet." Please explain why this provision was developed and incorporated into the MOA.

A6. Upon receiving the request from VGS to co-locate a natural gas pipeline within the transmission line corridors identified in A5 above, VELCO developed a Technical

Memorandum dated October 1, 2012 for the purpose of outlining the design, construction, and operation criteria that VELCO would require VGS to follow during the siting, layout, installation, and operation of the ANGP. The memorandum is being filed with my testimony as ***Exhibit VELCO-BC-2***.

The requirements in the Technical Memorandum addressed, among other things, AC protection, transmission structure grounding, counterpoise, cathodic protection, transmission structure and foundation integrity and clearances, blasting, workspace and access roads for construction, and public and worker safety. A provision of the Technical Memorandum specifically applied to a loading integrity of HS-20, was later revised to include an adjustment of +15%, such that the buried ANGP would not preclude VELCO's safe movement of heavy construction equipment over the pipeline without additional precautions. This provision, as well as other items referred to in A5 above, were incorporated into the June 13, 2013 MOA to memorialize VELCO's requirements. The MOA was filed in Docket 7970 to ensure that it would be enforceable by the Commission should it issue a certificate of public good ("CPG") for the ANGP.

Q7. Did VELCO enter into any other agreements with VGS concerning VGS's work in the VELCO ROW?

A7. Yes, as per the MOA, VELCO and VGS entered into the VELCO/VGS Construction, Operation and Maintenance Agreement on July 24, 2015 (the "CO&M Agreement"). This agreement governs project construction and maintenance, including relocation and replacement activities taking place in or activity likely to impact the VELCO ROW or facilities. Provisions of this agreement include access notification requirements, safety

considerations, the HS 20+15% loading requirements, as well as project construction and maintenance items. The CO&M Agreement effective as of July 24, 2015, is attached hereto as *Exhibit VELCO-BC-3*.

VELCO has also executed licenses to co-locate the ANGP within the VELCO ROW associated with the transmission lines identified in A5 above, for each municipality that the ANGP crosses. The licenses set forth the general terms and conditions for the right to co-locate, operate, and maintain the gas pipeline within designated portions of VELCO's ROWs, provide access rights to certain areas within the VELCO ROWs in areas where VGS installed the ANGP adjacent to but outside of the VELCO ROWs, and provide maintenance and access rights in designated areas of the VELCO ROWs. The licenses also include specific sections of the June 13, 2013 MOA, for reference, including Section 3 (VELCO Build-out); Section 5 (Loading); Section 6 (Line Clearances During Construction); Section 9 (Project Construction Review and Oversight); and Section 10 (VGS Personnel and Agents).

Q8. Is the as-installed burial depth of the ANGP in VELCO's ROW sufficient to meet the HS-20+15% loading standard in the VELCO ROW? Why or why not?

A8. As documented in the Technical Memorandum, the MOA, the CO&M Agreement, and the co-location licenses, VELCO required VGS to install the ANGP at a HS-20+15% loading rating so that the presence of the pipe would not preclude VELCO's movement of heavy construction equipment over the pipe. It is VELCO's understanding, based upon the information referenced in A9 below, that this loading standard has been achieved

irrespective of the fact that the pipeline was buried at depths less than 4 feet below the ground surface in a number of locations.

Q9. In reaching this conclusion, did VELCO rely on the May 25, 2016 engineering study by Mott MacDonald, LLC (the "2016 MM Study"), previously filed in this proceeding as Exhibit 18 to Exhibit VGS-JSH-2 at 3? Please explain.

A9. In September 2016, VGS informed VELCO of construction issues that limited the ability to achieve a burial depth of 4 feet in the CP ROW. Due to this issue, VGS requested that VELCO allow for the installation to be at a depth of less than four feet at eighteen (18) locations.

In response, VELCO requested that an engineering analysis be performed to confirm that the HS-20+15% loading factor would be met with the diminished burial depth. VGS referenced the 2016 MM Study, which was relied upon as the basis for reaching the conclusion that the less-than 4' burial of the gas pipeline would still meet the HS-20+15% loading factor agreed upon in the MOA and CO&M agreements. In addition to the 2016 MM Study, VELCO also requested VGS: (1) document the specific areas where the pipe was not installed at a depth of 4', (2) install yellow location markers over the pipeline in the affected VELCO ROW (K43), and (3) to inspect the pipeline location on an annual basis for two years to ensure that 3' of minimum cover is maintained which has occurred. VELCO understands that the addition of replacement material would be performed as part of VGS's routine inspection and maintenance program, if needed.

In addition to the 2016 MM Study, VGS provided VELCO with a memorandum from Mott MacDonald dated June 15, 2021 which included additional information pertaining to

the 2016 MM Study (the "2021 MM Memorandum"). The 2021 MM Memorandum confirmed the fundamental conclusion of the 2016 MM Study, i.e., that the HS-20+15% loading factor was met in the VELCO ROW, and which was relied upon by VELCO. See *Exhibit VELCO-BC-4*.

Q10. The Commission requested that if VELCO did rely on the 2016 MM Study, that it account for three assumptions in the 2016 MM Study as you noted above. First, the Commission stated that the 2016 MM Study included a diameter of the ANGP (12.75 inches) which did not consider the cement coating of the pipeline which increased the total diameter to approximately 15 inches. Does the fact that MM did not account for the cement coating on the pipe's overall diameter for purposes of its loading analysis affect or alter VELCO's conclusion that the ANGP met the HS-20+15% loading standard? Please explain.

A10. As described in more detail in Mr. Bodenhamer's testimony, the purpose of the cement coating is not to provide significant structural value, but rather is to add weight to the pipe. Based upon this information from Mr. Bodenhamer's review, the omission of the cement coating on the pipe's overall diameter does not affect VELCO's conclusion that the HS-20+15% loading standard has been met.

Q11. The second assumption in the 2016 MM Study that was called out by the Commission was the method of installation—open trench vs. horizontal direction drill. Does MM's assumption concerning the installation method for purposes of its loading analysis affect or alter VELCO's conclusion that the ANGP met the HS-20+15% loading standard? Please explain.

A11. As described in more detail in Mr. Bodenhamer's testimony, open trench construction is a normal method of pipeline construction in wet areas and the calculations used by MM are utilized for all soil conditions. Based upon this information from Mr. Bodenhamer's review, the installation method does not affect VELCO's conclusion that the HS-20+15% loading standard has been met.

Q12. The third assumption in the 2016 MM Study that was called out by the Commission was that the density of the soil surrounding the pipeline was a mix of swamp water and mud, rather than compacted soil. Does MM's soil density assumption affect or alter VELCO's conclusion that the ANGP met the HS-20+15% loading standard? Please explain.

A12. As described in more detail in Mr. Bodenhamer's testimony, the soil density assumptions did not affect the accuracy of MM's conclusions. Based upon this information from Mr. Bodenhamer's review, MM's soil density assumption does not affect VELCO's conclusion that the HS-20+15% loading standard has been met.

Q13. Based upon the 2016 MM Study, 2021 MM Memorandum, and TRC testimony, what is VELCO's conclusion as to whether the ANGP satisfies the HS-20+15% loading standard as required in the CO&M Agreement and MOA?

A13. Based on the information provided by VGS, specifically, the 2016 MM Study and the 2021 MM Memorandum as well as the recent review by Mr. Bodenhamer of TRC, VELCO believes that the HS-20+15% loading requirement for the ANGP has been met by VGS.

Q14. What are the current uses by VELCO of the transmission line ROWs identified in A5 above, and what are the potential future uses of the K43 Line ROW in the locations where the pipeline was installed at depths less than four feet below the ground surface?

A14. The K21/K22/K24/K27/K43 and K64 ROWs contain 115kV transmission lines. The K21/K22/K24/K27 and K43 lines also have fiber optic cables affixed to the structures. The K63 and 370 ROW is used to accommodate both an 115kV and 345kV transmission line and fiber optic cable, running parallel to each other. The locations where the ANGP is buried at depths less than 4 feet are along VELCO's K43 ROW, which includes a 115kV transmission line. A potential future use of the K43 ROW, as contemplated in the MOA and the project design process, is an additional 345kV line located to the east of the existing K43 line in a potential ROW expansion area.

Q15. As the Commission inquired, does the ANGP, as buried in the Clay Plains swamp, limit VELCO's future use of the VELCO ROW?

A15. No. The Project does not limit VELCO's future use of the ROWs. With specificity to the K43 ROW where the pipeline was installed at depths less than 4 feet, the pipeline was installed along the *western* edge of the ROW, in order to preserve VELCO's ability to build, if necessary, additional infrastructure on the *opposite, eastern* side of the ROW. Future expansion in this area is further protected by VGS's obligation to provide for any necessary additional cathodic protection for the pipeline, AC mitigation, and grounding that could be necessary for potential future 345kV buildout, should that buildout occur. See Exhibit 16 to Exhibit VGS-JSH-2 Paragraph 3 of the MOA.

Q16. Please discuss the safety considerations that VELCO considered for the ANGP to be located in the VELCO ROW, as reflected in the CO&M Agreement.

A16. The CO&M Agreement contains several provisions to ensure the safety of workers and the general public for sections of the ANGP that are co-located within a VELCO ROW. Specifically, the CO&M agreement requires the performance of safety trainings, compliance with Electrical Safety Code, Occupational Safety and Health Administration (OSHA), and VELCO safety requirements, as well as measures to ensure the maintenance and use of proper grounding, AC mitigation, and cathodic protection systems. In addition, the CO&M Agreement requires that VGS maintains the HS-20+15% standard for the ANGP from the date of installation.

Q17. Does that conclude your testimony at this time?

A17. Yes, it does.