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

Affidavit and Certification of John St. Hilaire

I, John St. Hilaire, being duly sworn, hereby depose and state as follows:

1. I am employed by Vermont Gas Systems, Inc. ("VGS") as Vice President of Operations and I have held that position since 2015. I have been employed by VGS for 26 years in positions of increasing authority including Manager Gas Supply/Control and Director, Operations Services, Gas Supply and Gas control. I have an Associate in Science Degree in Mechanical Engineering Technology from Vermont Technical College (1989), a B.S. in Business Management from Champlain College (1999), an M.S. in Administration from St. Michaels College (2005) and a B.S. in Accounting from Champlain College (2010). I have personal knowledge of the information submitted in this affidavit, except where noted to be on information and belief.

2. The Addison Natural Gas Project ("ANGP" or "Project") route commences at the pre-existing transmission line at Severance Road in Colchester and extends to Route 7 in Middlebury traversing through portions of the towns of Essex, Williston, St. George, Hinesburg, Monkton and New Haven. The Public Utility Commission approved the Certificate of Public Good for the Project on December 23, 2013. *Petition of Vermont Gas Systems, Inc., for a certificate of public, pursuant to 30 V.S.A. § 248, authorizing the construction of the "Addison*

Natural Gas Pipeline," Docket 7970 (Vt. Pub. Util. Comm., Dec. 23, 2013) Final Order (hereafter "2013 Final Order").

Depth of Cover Survey Information for Project

3. I am personally familiar with the 2013 Final Order in Docket 7970 (Vt. Pub. Util. Comm., Dec. 23, 2013), the plans and evidence submitted in Docket 7970, and the permits and other agreements that contain requirements for the construction of the Project (collectively all referred to as "Project Documents").

4. VGS engaged the engineering firm of Clough, Harbour & Associates ("CHA") to provide survey services, including staking out right-of-way and the pipeline centerline, and taking top of pipe readings at the time of installation and depth of cover readings after final grade was achieved by the pipeline contractor. VGS also engaged CHA to provide as-built drawings, which CHA has not yet completed.

5. Based on the depth of cover information from CHA and that gathered by VGS employed surveyors, more than 95% of the ANGP pipeline was installed to a depth of at least 4 feet.

6. The entire ANGP pipeline was installed at least 36 inches underground at every one of the more than 4500 welds along its 41 mile length.

7. Based on the CHA survey data and that gathered by VGS employed surveyors, VGS has prepared a Depth Table that provides information about the depth of cover at each of over 4,500 locations. The Depth Table is attached here as **Exhibit 1.**

8. VGS' survey engineers confirmed installed depth of cover at approximately 4500 welds and inflection points along the length of the pipeline (approximately 4050 through survey

measurement of welds and 450 from Horizontal Directional Drilling ("HDD") reports and pipe locators).

9. The several portions of ANGP within an HDD or other drilled section were not measured at every weld. With respect to the HDDs, compliance is described in the notes section of the Depth Table, which specifically references the drill profile and describes our method for determining the shallowest depth of cover. For the road bores not involving HDD, compliance is described in the notes section of the Depth Table, which specifically references the depth identified using the pipe locator.

10. The Commission's summary of the Project's construction made this finding expressly related to depth of cover:

> e. Pipe lengths will be welded together, inspected, laid in the trench and warning tape will be laid over the line, and then the trench will be backfilled. The pipe will be covered by at least 36 inches of soil. The pipeline will have four feet of cover in agricultural areas and within the VELCO ROW, generally five feet of cover at road crossings, and seven feet of cover at open cut streams.

2013 Final Order at 40, Finding 62(e).

11. The PUC ordered VGS to comply with the terms of all state and federal agency permits and all separate landowner and other agreements, some of which contained specific depth of cover requirements. 2013 Final Order, at 11.

12. These specific permits and agreements include the Department of Environmental Conservation stream alteration permit and water quality permit, VTrans ROW permits, railroad licenses, Army Corp of Engineer permits, the VELCO MOA, and landowner agreements. VGS entered into agreements with more than 30 landowners along the route that specified depth of cover requirements. These requirements were at 3 or 4 feet, except one (Hurlburt) that required 5 feet; none set forth any deeper standard.

13. As outlined in VGS' August 4 filing, there is no requirement in the 2013 Final Order regarding depth of cover for "residential areas."

14. The attached Depth Table lists the type of regulation, permit or agreement that requires the deepest installed cover applicable to every measured location, and what that requirement is, except where that standard is tied to "as built" depths, which are described in the notes section. Notes in the Depth Table provide detail where needed on permit changes or amendments, and on other information specific to a particular measured location. For example, the depth required by VTrans per its permit varied by location. There are five locations in the VTrans right-of-way that VTrans has preliminarily indicated are acceptable at the installed depth, but which are subject to final inspection by VTrans once it has the "as-built" drawings from VGS. There are also individual location notations for a spot where a landowner put in a drainage swale over the pipeline between the time of installation and final measurement (and we have agreed that VGS will come onsite to restore this spot).

15. Also based upon these survey data and measurements, VGS has prepared maps for each town through which the ANGP passes. These maps illustrate the surveyed depths of cover over the pipeline, along with showing the depth of cover that VGS' contractors used to guide the pipeline construction. The maps are attached to this affidavit as **Exhibits 2 through 15**.

16. I am personally familiar with and knowledgeable about the information in Exhibits 1 through 15 because I worked closely with CHA and VGS personnel to compile the measurement data into Exhibit 1 and to prepare the maps attached as Exhibits 2 through 15.

17. The attached Depth Table and maps show that based on survey data, the pipeline's installed depth of cover complies with applicable regulations, permits and agreements, with the exception of the 18 locations in the Clay Plains Swamp.

18. On behalf of VGS, I certify that, other than the 18 welds in the Clay Plains Swamp, based on the information compiled by the CHA and VGS survey teams as shown in the Depth Table attached here as Exhibit 1, the pipeline's installed depth complies with the Project's permits, agreements, and the 2013 Final Order.

ANGP Project Background

19. VGS engaged Over & Under and later Michels Corporation ("Michels") for the Project to perform pipeline construction and related activities including clearing/grading, ditching, stringing (transporting and placing pipe along the right-of-way), bending, welding, coating, lowering-in, backfill, testing, clean up, and restoration.

20. Vermont Gas contracted with Michels to undertake mainline construction in 2015 and 2016, including approximately 30 miles of the ANGP in 2016. As the contractor, Michels was responsible for construction means and methods.

21. As noted above, VGS engaged the engineering firm of CHA to provide survey services, including staking out right-of-way and the pipeline centerline, taking top of pipe readings at the time of installation and depth of cover readings after final grade was achieved by the pipeline contractor, and providing as-built services.

22. VGS engaged Hatch Mott McDonald ("HMM") in 2016 to provide construction inspection services including providing inspection of the construction management and all construction, welding, and coating inspectors. Previously, McDaniel Technical Services, Inc.

provided inspection services in 2015, and AK Environmental, LLC, provided construction inspection services in 2014.

23. VGS engaged PWC to provide construction management services.

24. In addition, VGS had a management team of VGS employees, who, together with PWC personnel, oversaw construction of the Project, providing, among other things, engineering support and project management services.

25. Throughout the construction of this pipeline, VGS worked with the Department of Public Service ("Department"), through both its gas engineer G.C. Morris and John MacCauley, its outside expert hired to help with field oversight for Project.

26. VGS had weekly meetings during the construction with the Department to address any concerns that arose, and the Department's representatives were on-site frequently during installation. VGS continues to have weekly meetings with the Department to review and close out remaining details on the Project.

27. The Project, which consists of 41 miles of pipeline, is connected by over 4,500 welds and buried beneath the ground either through open trenching or Horizontal Directional Drilling ("HDD").

28. As constructed, the pipeline passes through a portion of New Haven that is identified in the ANR MOU as the Red/Silver Maple Green Ash Swamp. This area is also called the Clay Plains Swamp and will be referred to as such in this Affidavit.

29. The pipeline contractors and CHA knew the required depth of cover for a particular area based on the documents provided to them by VGS at the time of construction, including the 2013 Final Order, and related materials submitted to the PUC in Docket 7970, the collateral permits related to the ANGP, and construction level plans.

30. Michels began construction work for the season on approximately May 23, 2016 and completed construction activities on December 12, 2016. During construction, Michels met with VGS personnel frequently, including weekly construction management meetings to discuss the current status of pipeline construction and plans for upcoming work.

The Process for Determining Depth of Cover Along the Pipeline

31. During the construction process for the ANGP, depth of cover verification involved the following four step process for open cut installations:

a. Sections of the pipeline were prepared for installation and "cribbed" or placed in a "staging trench" to protect it while the trench was prepared. Pipelines are typically staged on wood cribbing along a trench line until they are ready to be lowered into the final trench. In wet swamp conditions, where the soil does not support the pipeline on wood cribbing, the pipe is put in a shallow "staging trench" until the contractor is ready to move forward with installing the pipe by digging along each side to remove muddy soil and slowly lower the pipe. To do this, the contractor digs a small trench, not much larger than the pipe, to stage the pipe until the trenching and installation can occur. Once the pipeline contractor has completed welding, coating, x-ray, trenching, and lowered the pipe into the trench, CHA was called in to take an electronic measurement of "elevation" at the top of each weld. The elevation measurement records an X, Y, Z coordinate. This gave a longitudinal and latitudinal measurement for each weld.

b. The pipeline contractor then backfilled and restored the site including replacing topsoil and contouring to return the site as close to its original condition as practicable. Once this step was complete, CHA returned to the location and took a second elevation recording at the top of cover and a new X, Y, Z coordinate. Collecting the data took several weeks.

c. CHA then compiled its survey data and compared the initial top of weld elevations with the post installation top of cover elevation measurements to calculate depth of the pipe.

d. After performing its data compilation, CHA then provided VGS with a list of welds where the expected depth of cover may not have been achieved. VGS then did further surveys at locations provided by CHA to again measure depth of cover.

32. In general, if a calculation confirmed a weld was not at required depth of cover, VGS worked with Michels to remediate the depth of cover at these locations.

33. After remediation, CHA or VGS personnel performed additional survey work to confirm that the required depth of cover had been met through the remediation efforts.

The Installation of the Pipeline in the Clay Plains Swamp

34. The VELCO MOA provides: "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." VELCO MOA, at 3, attached here as **Exhibit 16**.

35. Consistent with VGS' plan to meet the VELCO loading standard as set forth in the VELCO MOA, the construction specifications provided to Michels called for a 4-foot depth of cover in this area.

36. I am informed that the pipe was staged in the Clay Plains Swamp in early September and installed on September 15, 16, 19 and 20, 2016. It took four days to install approximately 2,500 feet of pipeline due to the wet conditions. Based on the pace of work in other locations, I would have expected it to take around two days to install this amount of pipe.

37. There is very limited public access in the area of the Clay Plains Swamp where the pipe was installed. There is no road or trail meant for a vehicle. For practical purposes, the only expected loading in this area would be by VELCO to access its own facilities, though the loading standard would protect the pipeline from public uses as well.

38. I oversaw the completion of the Root Cause Analysis of the Clay Plains depth of cover matter requested by the Commission, which is attached here as **Exhibit 17**. I believe the following facts in Paragraphs 39-62 reflected in that Root Cause analysis to be true based upon the work done to create it.

39. Given the wet soil conditions in this location, Michels began its work by constructing a mat road to access and install the pipeline, using 8 foot wooden mats. In the Clay Plains Swamp area, the ROW and work space was narrow, compared to other areas of the ANGP. Michels used a staging trench as the field team prepared for actual trenching and pipe lowering at a later date.

40. On September 15, Michels began the process of excavating to lower the pipe and was unable to achieve depth within the planned working hours.

41. On September 16, Michels continued efforts to lower the pipe, using wider wooden mats placed along the wall of the dug trench along with multiple excavators to help hold wet soil and aid in lowering the pipe. The work proceeded slowly, extending into the following work week on September 19 and 20. Michels reported progress, but told VGS representatives that great care had to be taken to protect equipment and workers using the wooden mats for stability. Michels reported that at one point, a piece of equipment exiting the site slipped off its mat and became stuck temporarily in mud.

42. VGS personnel directed its inspection contractor, HMM, to inform Michels to continue using its best efforts to get the pipe buried to the planned depth of four feet.

43. On September 19, VGS informed VELCO of the challenges Michels was experiencing installing the pipeline within the Clay Plains Swamp ROW. Concerned that Michels may not achieve the planned 4-foot depth specified, VGS discussed with VELCO whether its loading standards could be achieved with a shallower burial at this location. On September 20, VGS shared with VELCO an engineering analysis performed in May 2016 that showed VELCO's loading standard would be met with depths at 3 feet. See September 20 email from John St. Hilaire to Peter Lind at VELCO, with Mr. Lind's response, attached hereto at

Exhibit 18 (the attachment to this email is the May 25 Mott McDonald engineering analysis of the loading standard VGS provided to VELCO). VGS also informed VELCO that its contractor would continue to work to reach a 4-foot depth and complete installation in this area.

44. Following the protocol for the pipeline installed though open trenching, during initial installation VGS' survey contractor CHA took a measurement at the top of the pipe at each weld in the Clay Plains Swamp, so that final interred depth could be determined after fill, contouring and clean-up. Actual depth of cover cannot be determined until after these steps occur and cover is placed on the pipe.

45. On September 20, Michels completed installation in this section of the VELCO ROW and discontinued trenching activities.

46. On September 21, VELCO told VGS that it agreed that its loading standard could be met at a shallower depth than 4 feet, so long as other protective measures were put in place, such as additional markers, and the companies memorialized in writing any modified methods employed. See Exhibit 18.

47. After the installation, Michels spent approximately 8 days on clean-up and final grade in the Clay Plains Swamp. Based on the pace of work in other locations, I would have expected it to take about 3 days for these activities in typical open field conditions.

48. Due to the wet, muddy soil, CHA was unable to reenter the Clay Plains Swamp until November 4 and 6 to take final grade depth of cover measurements.

49. On November 9, 2016, CHA reported to VGS that, for the 2016 season, 290 welds may not have been installed to depth, including 18 in Clay Plains Swamp. All other measurements in the Clay Plains Swamp met the 4-foot specification.

50. On November 11, 2016, VGS informed Michels of the depth deficiencies for the 2016 season identified by the surveyor, and Michels worked to remediate these locations.

51. By December 12, 2016, Michels had remediated the depth of cover issues except the 18 locations in the Clay Plains Swamp. The remediation work typically involves adding more cover and further contouring the soil surface.

52. Michels informed VGS during this remediation work that the Clay Plains Swamp locations could not be successfully remediated through adding cover and further contouring due to the environmentally-sensitive area. As well, Michels communicated to VGS that it lacked confidence that a second attempt at burying the pipe would be any more successful in terms of getting the pipe to four feet throughout the Clay Plains Swamp.

53. Given the challenges faced by VGS' contractors when installing the pipeline within the Clay Plains Swamp, VGS believes that any attempts to rebury the pipeline at these locations would cause greater environmental harm than leaving the pipeline where it is.

54. The 18 locations in the Clay Plains Swamp had an installed depth of between 3.0 and 3.8. At these depths, the VELCO MOA loading standard is still met according to the engineering analysis VGS obtained.

55. The 18 locations in the Clay Plains Swamp were installed at a safe depth because they are at least as deep as the federal depth requirement adopted by the PUC, and meet the VELCO loading standard. VGS also implemented additional protective measures requested by VELCO, as described below.

56. Given the practical challenges of working in the Swamp and the environmental concerns, VGS management determined that it would pursue leaving the pipeline interred at

installed depth at those locations since VELCO loading standards were achieved at those depths, and would seek party and regulatory approval for that plan.

57. During remediation work in mid-November, 2016, VGS informed VELCO that certain locations within the Clay Plains Swamp did not meet 4-foot planned installation depth according to survey measurements.

58. On December 1, 2016, I updated the Department's gas engineer regarding its depth of cover survey results and remediation, including the locations in the Clay Plains Swamp.

59. During the week of December 28, I discussed the "leave in place" option with the Department's public advocacy staff.

60. On January 3, 2017, I spoke in detail with the Department engineer regarding the 18 locations in the Clay Plains Swamp, the work involved in installing the pipeline, and the decision to pursue leaving the pipeline as is with Department support if VELCO agreed.

61. From January through April 25, 2017, VGS worked with VELCO to determine whether VELCO, consistent with its initial September review of the issue, would agree to leave the pipe as installed given satisfaction of the loading standard. On April 25, 2017, VELCO provided its letter of approval to VGS to leave the pipe in place with additional conditions. See VELCO April 25, 2017 Letter, attached here **Exhibit 19** (also provided with VGS' June 2 NSC request).

62. This letter and the engineering analysis performed in May 2016 that showed VELCO's loading standard would be met with depths at 3 feet was provided to the Department on April 26, 2017 for review by the Department gas engineer and Dave Berger, the Department independent engineering consultant.

Safety Measurement Implemented By VGS

63. VGS has implemented numerous "layers of protection," to maintain the integrity of the pipeline in addition to burying it at a certain depth. Together, these measures are all aimed at protecting the buried pipe and include: 1) placement of pipeline markers, 2) implementation of a damage prevention program, 3) use of the One-Call System – federal law requiring use of 811, 4) patrolling the pipeline, 5) performing leak surveys, 6) utilizing the company's public awareness programs, 7) odorization of the gas, 8) observation of excavations, and 9) requirements for soft excavation techniques in tolerance zones, meaning use of hand shoveling close to pipe.

64. The PUC's 2013 Final Order specifically requires ongoing monitoring and remediation:

> 273. VGS will also develop and implement a plan to monitor for and mitigate occurrence of unstable soil and ground movement and if observed conditions indicate the possible loss of cover, perform a depth of cover study, and replace cover as necessary to restore the depth of cover or apply alternative means to provide protection equivalent to the originally required depth of cover for both transmission and distribution pipes. Berger reb. pf. at 9.

65. VGS' ongoing Transmission Maintenance Plan fulfills this requirement.

66. As I described above, VGS also has kept the Department involved in its progress on the Project during construction and to date.

67. Department compliance personnel were present regularly on site during construction of the ANGP, for the purpose of monitoring pipeline safety compliance. In addition, the Department's gas engineer conducted weekly meetings with VGS project team members to review, discuss and assess pipeline construction safety and compliance. Those meetings still occur, as VGS closes out remaining items with the Department.

Project Opponents' Two Claims Regarding Depth Of Cover

68. The picture attached to the Project Opponent's June 23 filing, submitted by Lawrence Shelton, shows the pipeline during an interim point of construction, in a staging trench where it would be lowered and installed at a later date. Mr. Shelton has also sent this photo to PHMSA. PHMSA has not yet closed its review, but as VGS has noted, all locations along the pipeline were installed deeper than the 3-foot depth of cover required by federal regulations.

69. Based on its review of the photo and description of it being taken just south of the Hurlburt property, it appears the photo was taken in the VELCO ROW within Clay Plains Swamp.

70. I cannot say specifically which section of the Clay Plains Swamp pipeline is shown in Mr. Shelton's photo, but based on survey data, VGS has information that all of the pipeline in the Clay Plains Swamp was installed between 3 and 4 feet, not at 18 inches as suggested by Mr. Shelton's photo.

71. Project Opponents' comments also claim that G.C. Morris, the Department's gas engineer, informed Mr. Shelton that VGS made the pipeline deeper at this location by pushing a backhoe down directly on the pipe or the ground above it. I can say unequivocally that the method described was not utilized here (or elsewhere – it is not a method of pipe installation). It is possible that what was described was instead the common industry installation method described above for swampy areas that was in fact used in this location – to stage the pipe in a shallow trench and then dig through the muddy soil on each side next to the pipe, creating a deeper trench as the digging continues and thereby lowering the staged pipe as mud beneath it subsides into the void created by the trenching.

72. Regarding the photograph claiming to depict a crossing on the Sucker Brook in Williston covered by the DEC's Stream Alteration Permit, the Project Opponents reference a VELCO inspector field note on August 29, 2016 that the pipe is not to required depth at a stream in Williston. The note itself suggests additional work in the rock is needed to achieve depth.

73. The installation of this crossing was not completed on August 29. The contractors were able to install the pipe under the Sucker Brook to a depth in excess of 7 feet. See Attachment 1 (ANGP Stream Depth Table) to my August 4, 2017 Affidavit submitted in this matter.

Root Cause Analyses

74. Attached to this Affidavit are Root Cause Analyses for: a) the Clay Plains Swamp depth of cover matter; b) the 2016 Harsh Sunflower incident that was the subject of Docket 8791; c) and the induced voltage protections subject to a Notice of Potential Violation and settlement in Docket 8814, which are labeled **Exhibits 17, 20, and 21**, respectively

75. I oversaw the preparation of these documents for VGS and am familiar with their content, including the information regarding contractor work onsite which I believe to be true.

76. These Root Cause Analyses demonstrate that VGS' project management has been proactive and effective in addressing compliance issues that have arisen in this large and complex Project.

Dated at Burlington, Vermont this 11 day of August, 2017.

John St. Hilaire

Subscribed and sworn to before me this 11 day of August, 2017.

Notary Public
My commission expires: 2/10/19