STATE OF VERMONT
PUBLIC SERVICE BOARD

Petition of Vermont Gas Systems, Inc., requesting a Certificate of Public Good pursuant to 30 V.S.A. § 248, authorizing the construction of the **"Addison Natural Gas Project"** consisting of approximately 43 miles of new natural gas transmission pipeline in Chittenden and Addison Counties, approximately 5 miles of new distribution mainline in Addison County, together with three new gate stations in Williston, New Haven, and Middlebury, Vermont	)	Docket No. 7970

VERMONT AGENCY OF NATURAL RESOURCES
PROPOSED FINDINGS OF FACT CONCLUSIONS OF LAW AND ORDER

The Vermont Agency of Natural Resources, by and through its attorney, Judith L. Dillon, files the following proposed Findings of Fact and Conclusions of Law.

I. INTRODUCTION

Vermont Gas Systems, Inc., has petitioned the Vermont Public Service Board for a Certificate of Public Good to construct and operate the approximately 43 miles of new natural gas transmission pipeline in Chittenden and Addison counties, and to install approximately five miles of distribution mainline in Addison County, together with three new gate stations in Williston, New Haven, and Middlebury, Vermont. This Proposal for Findings of Fact, Conclusions of Law and Order sets forth the findings and recommendations of the Vermont Agency of Natural Resources (Agency or ANR) with respect to criteria relating to natural resources in accordance with 30 V.S.A. § 248(b)(5).

Findings

BACKGROUND

1. On December 20, 2012, VGS filed with the Vermont Public Service Board ("Board") a petition for a Certificate of Public Good ("CPG"), along with supporting testimony and exhibits, for expansion of VGS's existing natural gas pipeline system into Addison County, Vermont (the "Project"). VGS-ANR-Joint 1

2. VGS updated its Project plans and analyses in filings made on February 28, 2013 and June 28, 2013. VGS-ANR-Joint 1

3. ANR has filed direct and rebuttal testimony in Docket 7970, through its witnesses and has opined that the Project, without sufficient avoidance, minimization, or mitigation, could result in an undue adverse impact to the natural environment because of its impacts to significant wetlands, wetland functions, state significant natural areas, rare and irreplaceable natural areas, and rare and threatened and endangered plants. VGS-ANR-Joint 1

4. VGS has worked with ANR to refine and improve the Project in an effort to avoid and minimize potential natural resource impacts of the Project. VGS-ANR-Joint 1

5. VGS and ANR agree that with the implementation of the conditions outlined and required in the September 13, 2013, Memorandum of Agreement Between Vermont Gas Systems, Inc., and the Vermont Agency of Natural Resources, VGS-ANR-Joint 1, the Project will not result in an undue adverse impact to the natural environment. VGS-ANR-Joint 1

6. VGS and ANR request that the Board adopt the terms and conditions of the Agreement, VGS-ANR-1, in any order and CPG issued for the Project. VGS-ANR-Joint 1

7. In addition to its CPG application, VGS has applied to the Vermont Agency of Natural Resources to obtain the following permits for the Project: Vermont Wetlands Permit; Vermont Individual Construction Stormwater Permit; Vermont Stream Alteration Permit; Vermont 401 Water Quality Certification ("Collateral Permits").

30 V.S.A. § 248(b) (5) – Air and Water Purity, the Natural environment, and the Public Health and Safety

Air and Water Pollution

[10 V.S.A. §6086 (a) (1) and 248 (b) (8)]

Green House Gas emissions

8. In its initial filing, Vermont Gas presented testimony asserting that the project would result in a reduction of greenhouse gas emissions. EMS-1.

9. EMS-1 provides one possible analysis of the relative change in greenhouse gas emissions from fuel combustion that can be expected when a certain number of customers switch from fuel oil and propane to natural gas as a result of the availability of natural gas via the pipeline extension proposed by Vermont Gas Systems. Merrell Direct at 4, line14-19.
10. The analysis does not account for GHG releases at various other stages along the entire life-cycle, including the extraction and production of the fuel, the fugitive (i.e., uncaptured or uncontrolled discharges to the air) natural gas leakage from transmission and distribution pipes and other system components such as gate valves, residential/commercial distribution hookups, etc., or natural gas releases from scheduled maintenance and new construction activities ,or from natural gas releases from unscheduled events (e.g. historical estimate of accidental releases, relief valve releases due to overpressure events, etc.). Merrell Direct page 5, lines 1-10.
11. The analysis in EMS-1 assumes that customers in the Vergennes and Middlebury service areas would continue to use fuel oil and propane from 2016 through 2034 in the absence of an opportunity to make a fuel-switch to natural gas. Merrell, Direct at 4, lines 12-22.
12. Some number of these customers would likely convert to other energy sources (e.g., heat pumps, renewable fuels, etc.) that could have lower greenhouse gas emissions than fuel oil, propane, and natural gas. This would reduce the greenhouse gas benefits estimate provided in EMS-1. Merrell, Direct at 4, lines 12-22.
13. Other factors that would influence the outcome of the analysis include: differences in the actual vs. expected number of customers converting to natural gas from fuel oil or propane in the project area, future improvements to building thermal envelopes (e.g.,

weatherization projects, etc.), energy technology advances, and efficiency improvements that would reduce fuel consumption. Merrell, Direct at 4, lines 12-22.

14. The only way to determine actual greenhouse gas emissions reductions with accuracy would be to conduct a comprehensive "life-cycle analysis" of the project. Merrell Direct at 6, lines 17-18.
15. Vermont Gas supplemented its submission regarding the greenhouse gas emissions from the project through the testimony of Joel Bluestein and the report conducted by ICF International. Bluestein rebuttal, p. 4, lines 1-8.

16. The ICF analysis examines the fuel life-cycle GHG emissions associated with all stages from extraction through distribution of natural gas to Vermont Gas customers. Merrell rebuttal, p.1, lines 18- p.2, lines 2.

17. The analysis also provides an estimate of life-cycle GHG emissions from heating oil, and 7% biofuel delivered to Vermont customers, as well as on a "delivered heat energy basis" which considers heating unit / boiler efficiency. Merrell rebuttal, p. 2, lines 2-4.
18. A comparison of these life-cycle GHG emissions estimates from natural gas vs. heating oil vs. 7% biofuel suggests that natural gas has the lowest life-cycle GHG emissions of the fuels compared. Merrell rebuttal, p. 2, lines 4-8.

19. The methodology presented by Mr. Bluestein takes into account most of the upstream life-cycle GHG emissions associated with natural gas and fuel oil. Merrell rebuttal, p. 2, lines 7-8.
20. The ICF analysis was not exhaustively comprehensive in that it did not provide comparable life-cycle emissions analysis for propane, the other major fuel in the region identified by Vermont Gas in exhibit EMS-1. Merrell rebuttal, p. 2, lines 9-11.
21. The GHG emissions results are also reported as single values. A number of the assumptions (for both fuel oil and natural gas) underlying the analysis were derived from datasets with fairly wide variability and uncertainty. It would have been more informative, and more reflective of the data variability, if the analysis showed an expected range of results. Merrell rebuttal, p. 2, lines 14-15.
22. The assumptions used to determine upstream emissions from natural gas rely upon published assumptions about upstream life-cycle methane emission rates rather than actual site-specific data from the components of the natural gas supply chain that Vermont Gas will be using. Merrell Rebuttal testimony page 3, lines 1-4.
23. If any of the specific sources providing Vermont Gas with natural gas have high fugitive emissions, then the life-cycle GHG benefits of the Vermont Gas project could be reduced.
24. Given the variability of fugitive emissions from different natural gas operations, it is important to continue to collect more project-relevant data to better understand the actual life-cycle GHG emissions characteristics. Merrell Rebuttal at 3, lines 16-21.

Greenhouse Gas Emissions Reporting

25. The Vermont Agency of Natural Resources (ANR) and Vermont Gas Systems (VGS) agree that VGS will provide the following information annually to the ANR:

    a. The amount of natural gas purchased at each market point for the prior twelve months.

    b. The estimated greenhouse gas emissions as reported by Vermont Gas to the Environmental Protection Agency through the greenhouse gas reporting system known as "e-GGRT."

    c. The unaccounted for gas as reported to the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration.

    d. VGS will provide updates on the GHG reporting requirements for the natural gas industry and shall report to ANR annually on changes in those requirements. When new or updated GHG emissions data associated with VGS' suppliers' of natural gas production becomes available to VGS or publically available, VG shall provide it to ANR along with other information described in a, b, and c above.

    VGS-ANR-Joint 1 at §6.

Outstanding Resource Waters
[10 V.S.A. §1424a(d) & 30 V.S.A. § 248(b)(8)]

26. There are no waters in the Project vicinity that have been designated as outstanding resource waters. Nelson Supplemental Testimony 2/28/13, page 13, lines 18-20.

27. The Project will not result in an undue adverse impact to outstanding resource waters.

Nelson Supplemental Testimony, 2/28/13, at page 13, lines 19-20.

Waste Disposal and Soil Erosion

10 V.S.A. § 6086(a)(1)(B), (a)(4)

28. The project will require a construction stormwater discharge permit (NPDES) for the discharge of stormwater runoff from construction activities. Calvi Direct, p. 3, lines 8-9.

29. On December 20, 2012, VGS applied for an Individual Construction Stormwater Discharge Permit. Calvi Direct, p. 3, lines 12-13.

30. VGS provided revised application materials on May 3, 2013. Nelson Supplemental & Rebuttal Testimony, p. 13, lines 13-15.

31. ANR has requested and VGS has provided additional information about the Project and the proposed Erosion Prevention and Sediment Control Plan for the project. Calvi Rebuttal, p. 2, lines 10-21.

32. The blasting BMPS, Attachment 2 to VGS-ANR-Joint 1, will be included as a condition of the construction stormwater permit. VGS-ANR-Joint 1, §8.

33. The stormwater permit application is under review by the Agency.

34. If the Agency issues a Permit for the Project and VGS adheres to the terms and conditions of the Permit, and the approved EPSC Plans, the project will not cause or contribute to a violation of the Vermont Water Quality standards. Calvi Rebuttal, p. 4, lines 16-19.

Discussion

VGS has applied for a NPDES Individual Construction Stormwater Discharge Permit. The Individual Discharge Permit for the Project will require an Erosion Prevention and Sediment

Control Plan and include additional oversight requirements and safeguards to protect water quality. The Board should include a requirement in the CPG for the Project that the Petitioner obtain a NPDES Individual Stormwater Discharge Permit prior to construction of the Project.

Streams

10 V.S.A. § 6086 (a)(1)(E)

35. The project will be located in the vicinity of streams. 2-28-13 Nelson Supplemental Testimony, p. 21, l. 15.

36. The Project will cross 17 unique streams or rivers at 22 discrete locations that have been mapped by the ANR/DEC with watershed sizes greater than one (1) square mile which are subject to review and comment by DEC personnel. 2-28-13 Nelson Supplemental Testimony, p. 23, lines 5-9.

37. In addition, there are 26 stream channel reaches of less than 1 square mile of drainage area crossed by the Project. Riparian buffer zones have been determined, based on ANR Buffer Guidance. 2-28-13 Nelson Supplemental Testimony, p.23, lines 8-12.

38. Within perennial stream riparian buffers, the project will implement special vegetation management practices. 2-28-13 Nelson Supplemental Testimony, p. 24, line 18- 22; VGS-ANR-Joint 1, Attachment 1 (Vegetation Management Plan).

39. VGS must obtain and has applied for a stream alteration permit from ANR/DEC. VGS-ANR-Joint 1.

Discussion

The project will cross streams and must obtain a stream alteration permit. The Board should include a requirement in a CPG for the Project that the Petitioner must obtain a Stream Alteration Permit prior to construction of the Project.

Wetlands

[10 V.S.A. § 6086(a)(1)(G)]

40. The Project must comply with the Vermont Wetland Rules ("VWR"). The VWR regulates significant wetlands (Class I and Class II wetlands) and their buffers.
41. There are at least 51 Class II wetlands or wetland complexes along the proposed route. Class II wetlands are those wetlands deemed "significant" under the Vermont Wetland Rules. Quackenbush direct, p. 3, lines 4-9.
42. There are also Class III wetlands along the route. Class III wetlands are not considered "significant" under the Vermont Wetland Rules. Quackenbush direct, p. 3, lines 7-9.
43. A wetland impact is any alteration to the wetlands vegetation, soil, or hydrology. Quackenbush rebuttal, page 4, lines 4-3.

44. The project will require a Vermont Individual wetland permit for impacts to Class II wetlands (significant wetlands), and a Federal Department of the Army Section 404 Permit 404 Army corps of Engineers Permit for impacts to Class III wetlands. Quackenbush Direct Testimony page 4; Nelson 2-28-13 Supplemental Prefiled Testimony, p. 25, lines 12-13.
45. VGS has filed a wetland permit application and 401 Water Quality Certification Application with the Vermont Agency of Natural Resources. Quackenbush direct p. 4, line 10-12.
46. The wetland and 401 applications were originally filed with ANR/DEC in December 2012, were re-filed on May 3, 2013, reflecting the alignment revisions made on 2/28/13

and 4/30/13. Nelson Supplemental & Rebuttal Testimony of Jeffrey Nelson, p. 13, lines 13-14.

47. On July 11, 2013, VGS submitted revisions to its revised wetland application and Section 401 Water Quality Certification application. The revisions reflect changes to the May 3, 2013, submittals including: results from further wetland investigation areas; project design changes resulting in 11,200 linear feet of shifts in the alignment; changes in width of the construction corridor (narrowed to reduce wetland impacts); changes from HDD to trenching at two locations. Quackenbush rebuttal, p. 2, lines 11-16.
48. VGS has filed a Department of the Army Section 404 Permit application. Nelson 2-28-13 Supplemental Prefiled Testimony, p. 25, lines 12-16.
49. Under the July 2013, revisions to the Vermont Individual Wetland application, the project will result in 84, 055 square feet of temporary wetland impacts, and146,220 square feet of permanent wetland impacts. Quackenbush rebuttal, page 4, lines, 16-18.
50. Under the July 2013, revisions to the Vermont Individual Wetland application, the project will result in 109, 803 square feet of temporary buffer impacts and 161,093 square feet of permanent buffer impacts. Quackenbush rebuttal, page 4, lines, 16-18.
51. As a result of the agreement reached between ANR and Vermont Gas, VG-ANR-Joint 1, the wetland impacts have been reduced.

<u>Wetland construction and operational practices</u>

52. Where bedrock is encountered during construction of the Project within Class Two wetlands, buffers or vernal pools, VGS will install a bentonite plug at the base of the trench, through the blasted segment of the wetland.

53. With respect to wetland breeding bird habitat, three wetlands of potential concern have been identified. These features are:

    a. Wetland 2012-CM-193: Construction activities will occur within the wetland buffer which is currently an agricultural field, however no Project construction activities will occur within the wetland.

    b. Monkton Swamp: Project construction will occur through HDD, and will avoid bird habitat impacts;

    c. Wetland 2012-CM160/161: VGS agrees to either clear brush or install matting prior to March 1 or conduct a detailed springtime bird survey prior to construction. Should the survey determine the presence of the species of concern, VGS will not commence construction until after July 15.

VGS-ANR-Joint 1, § 4.

Discussion

The Project will result in temporary and permanent impacts to wetlands and their buffers. The Petitioner will need to obtain a Vermont state wetlands permit along with a Federal Section 404 permit and a Section 401 water quality certification for the Project. The Stipulation entered into by the Petitioner and ANR (VGS--ANR-Joint 1) requires limited construction and vegetation management treatment methods through the red/silver maple green ash swamp. The Agreement also requires conservation of a suitable mitigation parcel to offset the impacts to this wetland. The stipulation also requires the use of horizontal directional drilling under the cedar swamp in Monkton. In order to avoid undue adverse impacts to wetlands, if the Board were to issue a Certificate of Public Good it should include as a condition that Petitioner comply with the terms and conditions of the ANR-Vermont Gas MOU, VGS-ANR Joint 1, and that it obtain state

and federal wetlands permits and a Section 401 water quality certification prior to construction of the Project.

Significant Natural Communities/ Rare and Irreplaceable Natural Areas (RINA)
248(b)(5); 10 V.S.A. § 6086(a)(8)

54. With the proposed construction methods, mitigation, and vegetation management outlined and required in the VGS-ANR- Memorandum of Agreement, the project will not result in an undue adverse impact on the state significant natural communities and rare and irreplaceable natural areas along the project.

55. Eric Sorenson, Community Ecologist with the Natural Heritage Inventory of Vermont Fish and Wildlife Department (VFWD) of the Vermont Agency of Natural Resources (VANR) testified on the project's impacts to state significant natural communities and rare and irreplaceable natural areas. Mr. Sorenson is responsible for the identification and classification of Vermont's upland and wetland natural communities. Mr. Sorenson is the co-author of a book on Vermont's natural communities. Sorenson Direct p. 1-2.

56. Natural communities are interacting assemblages of plants and animals, their physical environment, and the natural processes that affect the organisms and the environment. These assemblages of plants, animals, and other organisms found in natural communities repeat wherever certain environmental conditions (such as soil, hydrology, and climate) are found. Sorenson direct p. 3, lines 13-17.

57. A natural community refers to an actual occurrence on the ground; a natural community type is a composite description summarizing the characteristics of all known examples of

that type. The concept of a natural community type is very useful in classifying the complex patterns in the landscape. Sorenson direct p. 3, lines 17-20.

58. Vermont has developed a classification of more than 80 natural community types[1]. Each natural community type is ranked according to its relative rarity in Vermont. Sorenson direct p. 4, lines 1-2.

59. The following State Rarity Rank system is used by the VFWD, and is based on the known number of occurrences of a natural community type, the total area occupied by the type, and the quality or condition of most occurrences:

    i. **S1**: very rare in the state, generally with fewer than five high quality occurrences;

    ii. **S2**: rare in the state, occurring at a small number of sites or occupying a small total area in the state;

    iii. **S3**: high quality examples are uncommon in the state, but not rare; the community is restricted in distribution for reasons of climate, geology, soils, or other physical factors, or many examples have been severely altered;

    iv. **S4**: widespread in the state, but the number of high quality examples is low or the total acreage occupied by the community type is relatively small;

[1] Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont. E.H. Thompson and E.R. Sorenson. 2000 and 2005. Published by The Nature Conservancy and Vermont Department of Fish and Wildlife, distributed by University Press of New England.

v. **S5**: common and widespread in the state, with high quality examples more common.

Sorenson direct p. 4, lines 2-15.

60. The Agency considers S1 and S2 natural community types to be rare in Vermont. The Agency considers those natural community occurrences that meet a combination of Rarity Rank (for the type) and quality (Element Occurrence Rank) to be state-significant natural communities. Sorenson direct p. 4, lines 16-19.

61. Almost all examples of rare natural community types are considered state-significant, whereas only the very best examples of common (S5) community types are considered state-significant. For uncommon (S3) and widespread (S4) types, those examples that are excellent to good are considered state-significant. Sorenson direct p. 5, line 19- p. 6, line 2.

62. The Project will pass through or in the vicinity of the following seven (7) state significant natural communities:

i. a Pine Oak Heath Sandplain Forest in Colchester and Essex which occurs in four patches (MP 0.87-0.96; MP 1.06-1.29; MP 1.37-1.47; and MP 1.62-1.96)[2];

[2] All Mile Post ("MP") references herein are approximate, and refer to distances as shown on EPSC plan set dated 6/28/13.

ii. a Wet Clayplain Forest adjacent to the LaPlatte River in Hinesburg (MP 19.20 to MP 19.27);

iii. a Wet Clayplain Forest south of Lewis Creek in Hinesburg (MP 22.4 to MP 22.5) that cannot currently be verified due to absence of landowner permission;

iv. a potential Wet Clayplain Forest south of Rotax Road in Monkton (MP 24.7);

v. a Red Maple-Black Ash Seepage Swamp/Northern White Cedar Swamp and large open wetland complex in Monkton (MP 27.08 to MP 27.72)(the "Monkton" or "Mt. Florona Swamp");

vi. a Red/Silver Maple Green Ash Swamp at the Monkton-New Haven town line (MP 31.05 to 31.6); and

vii. a Wet Clayplain Forest and Northern White Cedar Swamp at Little Otter Creek in New Haven (MP 32.15 to MP 32.38).

63. The determination that a particular example of a natural community is state significant is made by the Department of Fish and Wildlife based on established Department guidelines. Sorenson direct p. 5, line 21- p. 6, line 3.

64. A rare and irreplaceable natural area determination is made by the District Commission for Act 250 determinations, or the Public Service Board, under 10 V.S.A. § 248. ANR offers recommendations on RINA determinations. Sorenson direct p. 5, line 21- p. 6, line 3.

65. Natural communities have been the most common feature identified as RINA in Act 248 and Act 250 proceedings. Other features that could be considered RINA include rare geologic features, rare aquatic habitats, and rare physical landscapes. Sorenson direct p. 6, lines 5-7.

66. The Vermont Fish and Wildlife Department makes recommendations to the Public Service Board on when a natural community should be considered rare and irreplaceable based on the following factors:

    a. the feature is natural; where natural conditions predominate over human influences,
    b. the feature is demonstrated to be rare in the state or landscape (for natural communities this means a rare natural community type or an exceptional example of a more common natural community type), and
    c. the feature is shown to be irreplaceable in the foreseeable future.

    Sorenson direct p. 5, lines 7-15.

67. The potential adverse ecological effects on natural communities and the environment associated with the installation and corridor maintenance of the VT Gas pipeline can be summarized into two categories or scales. At the largest scale, installation of the pipeline and maintenance of a permanently open (no forest canopy) corridor in areas that currently

are forested will result in new habitat fragmentation. Habitat fragmentation (breaking contiguous habitat into smaller and smaller pieces by development) is considered one of Vermont's most significant threats to biological diversity, along with habitat loss, climate change, and invasive species. Sorenson direct, p. 8, lines 10-17.

68. Co-locating the pipeline along existing powerline corridors or roads reduces the extent of landscape-scale habitat fragmentation but can still result in fragmentation or alteration of specific natural communities or other habitats adjacent to the powerline or road. Sorenson direct, p. 8, lines 17-20.
69. At the natural community scale, potential impacts include alteration of wetland hydrology, permanent removal of forest canopy, and introduction of non-native, invasive plant species. Utility corridors are generally known as vectors for the spread of invasive species, as there is typically soil disturbance during construction, followed by long term vegetation management to exclude overstory trees using equipment that moves along the corridor and spreads seeds. Sorenson direct p. 8, line 20- p. 21, line 3.
70. Pipeline construction that results in landscape scale habitat fragmentation is considered an adverse effect on the natural environment. Pipeline construction that results in alteration of a state-significant natural community may also be considered an adverse effect on the natural environment but also may be an adverse effect on a RINA. Sorenson direct p. 9, lines 5-8.
71. The project impacts the following state significant natural communities that should be considered RINA (RINA) by the Public Service Board.

a. Pine-Oak-Heath Sandplain Forest in Colchester and Essex

b. Wet Clayplain Forest at the LaPlatte River in Hinesburg

c. Wet Clayplain Forest at Lewis Creek in Hinesburg

d. Wet Clayplain Forest south of Rotax Road in Monkton (if confirmed)

e. Red/Silver Maple-Green Ash Swamp at the Monkton-New Haven town line

f. Wet Clayplain Forest at Little Otter Creek in New Haven.

Sorenson direct p. 5, lines 12-20.

Pine Oak Heath Sandplain Forest

72. The VTGas alignment passes through approximately 91 acres of Pine-Oak-Heath Sandplain Forest from approximately Mile Post (MP) 0.87 to MP 1.96. Sorenson Rebuttal at 4; VGS-ANR Joint 1.

73. This natural community occurs in four patches (Patch A: MP 0.87-0.96; Patch B: MP 1.06-1.29; Patch C: MP 1.37-1.47; and Patch D: MP 1.62-1.96). VGS-ANR Joint 1, at 2.1.

74. Pine-Oak-Heath Sandplain Forest is one of Vermont's rarest natural community types – ranked very rare (S1) by Vermont Fish and Wildlife Department. The deep, deltaic sands on which this community occurs were deposited after the last glaciation when the earlier Lake Champlain and the Champlain Sea were much larger than at present. Sorenson Direct at 11.

75. These deep sands occupy a large area near the mouth of the Winooski River and other large Lake Champlain rivers. Most of these sandy Adams-Windsor soils have been

developed over the past 200 years, and only a few, relatively small patches of intact Pine-Oak-Heath Sandplain Forest remain. Sorenson Direct at 11.

76. The majority of the natural community is in good condition, with natural processes predominating, and with typical species composition, including Red Oak (*Quercus rubra*), Black Oak (*Quercus velutina*), White Pine (*Pinus strobus*), Pitch Pine (*Pinus rigida*), Red Maple (*Acer rubrum*), Sheep Laurel (*Kalmia angustifolia*), Black Huckleberry (*Gaylussacia baccata*), and Bracken Fern (*Pteridium aquilinum*). Sorenson direct p. 10, line 22- page 1, line 4.
77. ANR considers the Pine Oak Heath Sandplain Forest in Colchester and Essex to be a state-significant example of this rare natural community type and recommends that it be considered a rare and irreplaceable natural area in the Act 248 review process. Sorenson Direct, p. 11, l.20-P. 12, line 1.
78. Vermont Gas agrees that this community is appropriate to be considered a rare and irreplaceable natural area. Nelson Rebuttal at 20, lines 15-17.
79. Another factor contributing to the importance of this Pine-Oak-Heath Sandplain Forest is that it occurs within a large block of forest and wetland (900 acres) that is currently unfragmented by roads and development. The only significant fragmentation within this block is from the existing managed right-of-way for the VELCO power line. Sorenson direct p. 11, lines 7-11.
80. Absent avoidance or further minimization and mitigation, the May/June 2013 alignment would result in temporary and permanent impacts to the natural community, RINA, and natural environment and will result in landscape scale and natural community scale

fragmentation, permanent alteration of natural vegetation composition and structure, and soil disturbance likely leading to an increase in non-native invasive species. These impacts would be adverse and undue. Sorenson rebuttal, p. 6, lines 1-10.

81. Mr. Sorenson testified that this impact could be avoided by an alternative route or horizontal directional drilling under the sandplain forest and a revised vegetation management plan that retained the natural vegetation along the surface of the natural area during operation. Sorenson rebuttal, p. 6, lines 14-p. 15, lines 1-12; Sorenson direct p. 14, lines 2-p. 15, l. 1-13.

82. Vermont Gas has entered into an agreement with the Vermont Agency of Natural Resources to avoid, minimize, and mitigate for the impacts to the Pine Oak Heath Sandplain Forest.

83. To avoid and minimize impacts to the Pine Oak Heath Sand Plain Forest, VT Gas will construct the pipeline segment from approximately MP 0.85 to MP 1.65 using Horizontal Direct Drilling ("HDD") in two segments, divided or split at approximately MP 1.3, on State of Vermont Parcel (LLN 3.0), just west of the existing VELCO corridor (see VGS Erosion Prevention Sediment Control "EPSC" Sheets 2-4[3]). VGS-ANR Joint 1, at 2.1.

84. The final design of the HDD will be that the HDD segment shall extend beneath sandplain patches A, B, and C, with impacts to patch B. VGS-ANR Joint 1, at 2.1

[3] Except as otherwise noted herein, all EPSC plan sheet references apply to June 28, 2013 plan set.

85. The area of sandplain forest where there will be impact from the drilling will be limited to the west side of the VELCO right-of-way within patch B for HDD setups. This area of forest impacts for drill rig setup areas will be less than one acre (current best estimate 0.75 acres). HDD construction site activities will require tree clearing, stumping, minor site grading, and temporary stabilization. VGS-ANR Joint 1, at 2.1

86. To minimize and help mitigate for these impacts to patch B, a sandplain forest revegetation and restoration plan for this 0.75 to 1.0 acre area will be developed by VGS for ANR review and approval. The goal of this plan will be to commence re-vegetation using native tree, shrub, and herb species and to monitor and control invasive plant species. VGS-ANR Joint 1, at 2.1

87. To mitigate for the impacts to this rare and irreplaceable natural community, prior to construction in the Pine Oak Heath Sandplain Forest, VGS will obtain for the benefit of the Vermont Agency of Natural Resources, a permanent conservation easement to protect wetland and sandplain resources, or will acquire in fee and convey to the Agency of Natural Resources, on a parcel identified as LLN 3.02 on EPSC sheet 003. VGS-ANR Joint 1, at 2.1

88. This mitigation parcel, which is approximately 62.7 acres in size, contains approximately 15.8 acres of sandplain forest, as well as streams and significant riparian wetlands. If VGS is not able to obtain this conservation easement, or fee

acquisition, it will acquire another permanent conservation easement sufficient to provide conservation of a sandplain community that provides similar functions as the parcel LLN 3.02 at a 10:1 ratio, which is approved by ANR. The substitute parcel must be acquired prior to construction or disturbance in the Pine Oak Heath Sandplain forest. VGS-ANR Joint 1, at 2.1

89. In areas where the HDD is less than fifteen feet deep, and for a distance of no more than 100 feet from the ends of the HDD segments, VGS reserves the ability to conduct selective tree removal of trees that may pose a risk to pipeline integrity. VGS-ANR Joint 1, at 2.1.

90. In the event that VGS determines that repairs to the pipeline are necessary within the sandplain and can be completed with soil disturbance impacts of less than 1,000 square feet and vegetation clearing impacts without soil disturbance or removal of stumps of less than 10,000 square feet, including any temporary or permanent access roads, VGS may repair the pipeline. VGS-ANR Joint 1, at 2.1.

91. Prior to conducting the repairs, VGS will confer with ANR to select the least disruptive method to conduct the repair which may include re-vegetation management. Otherwise, VGS agrees to abandon the pipeline in place if the pipeline becomes inoperable. Revegetation, restoration, and invasive species monitoring and control plans will be developed by VGS and provided to ANR for review and approval for any such disturbance.

92. During the operational phase of the Project, VGS will maintain a staked walking path along this section of the pipeline, using blazed trees, signage, and VGS standard pipeline markers, as outlined in the Vegetation Management Plan, Attachment 1.
93. VGS will implement and adhere to the vegetation practices for the Pine Oak Heath Sandplain Forest, outlined in the Vegetation Management Plan, Attachment 1 toVGS-ANR-Joint 1.
94. The construction and operation of the VGS pipeline through the use of horizontal directional drilling under most of the Pine Oak Heath Sandplain forest, the limited construction practices and vegetation management, and the mitigation parcel outlined and required under the Memorandum of Agreement, will result in the impacts to this RINA being adverse, but no longer undue. Live testimony of Eric Sorenson.

Wet Clayplain Forests

95. Wet Clayplain Forest is a rare (S2) natural community type in Vermont that is limited to the clay soils of the Champlain Valley and has been drastically reduced in area as a result of conversion to agricultural uses over the past 200 years. Sorenson rebuttal, p. 7, lines 18-20.

Wet Clayplain Forest located on the north side of the LaPlatte River in Hinesburg

96. The Wet Clayplain Forest located on the north side of the LaPlatte River in Hinesburg, is small, but natural, as it is primarily under the influence of natural disturbance processes. Sorenson rebuttal, p. 7, lines 20-21.

97. The species composition and hydrology of this and the other Wet Clayplain Forests along the VT Gas project alignment are consistent with examples of this natural community type supported by natural processes, not human disturbance. Sorenson rebuttal, p. 8, lines 2-3.

98. Wet Clayplain Forests have developed on the wettest clay soils that were deposited in the Champlain Sea about 12,000 to 13,500 years ago. The natural community has developed as species migrated individually into the region after the retreat of the glaciers. Sorenson rebuttal, p. 8, lines 5-7.

99. Soil organic matter, soil horizons, soil drainage characteristics, and the specific composition of species making up each Wet Clayplain Forest have developed over thousands of years and are determined by site-specific characteristics. Sorenson rebuttal, p. 8, lines 8-10.

100. Wet Clayplain Forests and other rare natural communities cannot be replaced once they are destroyed. There is no evidence that functioning and ecologically intact Wet Clayplain Forests can be recreated once they are lost. Sorenson rebuttal, p. 8, lines 11-15.

101. The rarity of this natural community type is due primarily to past conversion of clay-soil wetlands to agricultural land. Functioning natural communities are typically the result of hundreds or thousands of years of soil profile development, natural disturbance regimes creating micro-topography, woody debris and vegetation decaying and creating rich soil structure and habitat for fungi and invertebrates, and, especially in wetlands, a hydrologic regime to which all the species present are adapted. Sorenson rebuttal, p. 9, lines 9-10, 17-p. 10, line 1.

102. Based on these factors, ANR recommends that this Wet Clayplain Forest and other examples of this natural community along the VT Gas project alignment be designated as RINAs by the PSB. Sorenson rebuttal, p. 8, lines 15-17.

103. In its June 2013 alignment, VT Gas proposed to install the pipeline through the edge of the Wet Clayplain Forest along the existing VELCO corridor by trenching using Construction Types 2D and W (EPSC sheet 39). This construction type results in the pipeline installation 10 feet from the edge of the VELCO maintained right-of-way and an additional 10 feet of forest clearing to be used to stockpile topsoil during construction and then allowed to regenerate as part of the "feathered" long-term vegetation management. Sorenson rebuttal, p. 10, lines 7-12.

104. ANR recommended that impacts to the Wet Clayplain Forest could be minimized over the long term by allowing the disturbed 10 foot wide band of cleared forest to regenerate without "feathered" vegetation management. Sorenson rebuttal, p. 10, lines 12-20.

105. VGS has agreed to modify its vegetation management of the pipeline through this community. During the operational phase of the Project, VGS will only conduct vegetation management within the existing maintained VELCO right of way. (VMT Type B3 as described in the Vegetation Management Plan (see Attachment 1)). VGS reserves the ability to conduct selective removal of trees that may pose a risk to pipeline integrity. VGS-ANR-Joint 1, §2.2c.

Wet Clayplain Forest south of Lewis Creek in Hinesburg

106. The Wet Clayplain Forest located on the south side of Lewis Creek in Hinesburg (vicinity of MP 22.9) is the next significant natural community along the VT Gas project alignment to the south.

107. Based on previous documentation in the Department's Natural Heritage database this is a rare Wet Clayplain Forest that qualifies as a RINA based on its natural condition, rarity of this community type, and irreplaceability of complex forested wetlands. Sorenson rebuttal page 11, lines 6-13.

108. With respect to the potential Wet Clayplain Forest south of Lewis Creek in Hinesburg, VGS will construct the Project in this area in accordance with the Project plans submitted in this docket by VGS on June 28, 2013, which will be revised to show no construction phase vegetation removal between MP 22.85 and 23.00. VGS-ANR-Joint-1, at 2.3

109. During the operational phase of the Project, VGS will only conduct vegetation management within the existing maintained VELCO right of way (as described in the Vegetation Management Plan (see Attachment 1)). VGS reserves the ability to

conduct selective removal of trees that may pose a risk to pipeline integrity. VGS-ANR-Joint-1, at 2.3

Wet Clayplain Forest south of Rotax Road in Monkton

110. With respect to the Wet Clayplain Forest south of Rotax Road in Monkton, VGS will field verify the extent of this feature prior to the start of construction. VGS-ANR-Joint-1, at 2.4

111. If the permanent VGS easement is fully outside of this feature, no change to the alignment as depicted on the construction EPSC plan dated June 28, 2013 will be required. If the currently proposed permanent VGS easement overlaps with the feature, VGS will relocate the easement to avoid the feature. VGS-ANR-Joint-1, at 2.4

Mt. Florona Swamp

112. The Northern White Cedar Swamp and Cattail Marsh within the Mt. Florona (Monkton Swamp) wetland complex in Monkton (MP 27.1 to 27.6), VTGas will employ horizontal directional drilling under the swamp. VGS-ANR-Joint-1, at 2.5

113. With respect to the Mt. Florona Swamp, VGS will construct in this area in accordance with the Project plans submitted in this docket by VGS on June 28, 2013. VGS-ANR-Joint-1, at 2.5

114. If any portion of HDD section of the Pipe under the swamp becomes inoperable, VGS will abandon in place. VGS-ANR-Joint-1, at 2.5

115. For the portion of the alignment adjacent to the Northern White Cedar swamp (MP 27.08 to 27.27), for operational phase, VGS will only conduct vegetation management within the existing maintained VELCO right of way, with the exception of the selective removal of trees the roots of which may pose a risk to pipeline

integrity (VMT Type B3, as described in the Vegetation Management Plan (see Attachment 1)). VGS-ANR-Joint-1, at 2.5

116. For the portion of the alignment installed using HDD under the Mt. Florona Swamp wetland complex, VGS will not conduct ongoing vegetation management (VMT Type C as described in the Vegetation Management Plan (see Attachment 1)). VGS-ANR-Joint-1, at 2.5

Red/Silver Maple-Green Ash Swamp

117. There is a Red/Silver Maple-Green Ash Swamp along the proposed VTGas alignment from MP 31.1 to MP 31.55. This swamp has primarily mineral (clay and silt) soils and appears to occupy a shallow basin that accumulates enough water in the spring to result in one to two feet of flooding in the lower portions of the swamp. Other than the VELCO powerline crossing of the wetland, the Red/Silver Maple-Green Ash Swamp is natural, with clay soils, seasonal flooding, and other forms of natural disturbance (such as wind) responsible for maintaining the natural community. Sorenson direct, p. 21, line19-p. 22. Lines 25.

118. This is an uncommon (S3) natural community type, for which high quality examples such as this one are rare. Red/Silver Maple-Green Ash Swamp are known to occur only in the Champlain Valley of Vermont. High quality examples of this community type are rare. The primary physical environmental feature that results in the development of this wetland natural community is its unusual flooding regime – a long

duration flooding that may extend into June on typical years with occasional flooding at other times of the year. Sorenson rebuttal, p. 15, lines 19-p.16, line 1.

119. Silver maple and green ash are both especially tolerant of flooding and are most commonly associated with floodplain forests along rivers and large lakes. Sorenson rebuttal, p. 16, lines 2-3.

120. There are only 28 examples of Red/Silver Maple-Green Ash Swamp in Vermont (as indicated in the Vermont Fish and Wildlife Department Natural Heritage database), including the subject swamp on the Monkton-New Haven town line. Sorenson rebuttal, p. 16, lines 3-5.

121. Of these 28 swamps, 20 are directly associated with flooding of Lake Champlain or Otter Creek. Only nine of the swamps occur in a much more unusual setting – relatively shallow basins in relatively flat landscapes where the topography and surface runoff conditions result in a flooding regime in the basins that is very similar to that found adjacent to Lake Champlain and Otter Creek. Sorenson rebuttal, p. 16, lines 5-10.

122. As one of only nine examples of this basin type of Red/Silver Maple-Green Ash Swamp, ANR recommends the swamp on the Monkton-New Haven town line to be a rare natural area. Sorenson rebuttal, p. 16, lines 10-12.

123. Vermont Gas has agreed to minimize the clearing limits of construction for the Project and will modify the vegetation management during the operational phase and mitigate for the impacts to the swamp.

124. VGS will construct the pipeline using trenching with no clearing/disturbance or work outside existing maintained VELCO ROW within this segment (MP 31.05 to 31.6), to be depicted in modification of construction type 2DW detail. VGS-ANR-Joint-1, at 2.6

125. VGS to coordinate with VELCO regarding additional potential construction travel lane within the VELCO corridor. VGS-ANR-Joint-1, at 2.6

126. During the operational phase of the Project, VGS will limit vegetation management over the pipeline in this specific segment to annual mowing 5 feet wide, plus additional mowing as needed, but not more frequent than once every three years, to maintain herbaceous ground cover and prevent woody vegetation growth (VMT B4). VGS-ANR-Joint-1, at 2.6

127. Prior to the construction in the Red/Silver Maple Green Ash Swamp, VGS will obtain for the benefit of the Vermont Agency of Natural Resources a conservation easement or fee acquisition of property that conserves portions of the Red/Silver Maple-Green Ash Swamp and its upland buffer. The parcel on the eastern side of the swamp and bordering Parks Hurlburt Road (approximately 11 acres) provides these functions. VGS-ANR-Joint-1, at 2.6

128. If VGS is not able to obtain a conservation easement or fee acquisition of this recommended parcel, it will acquire another conservation easement or fee acquisition with similar Red/Silver Maple-Green Ash Swamp attributes, or other features acceptable and approved by ANR, prior to construction in the Red/Silver Maple Green Ash Swamp. VGS-ANR-Joint-1, at 2.6

129. During the operational phase of the Project, VGS will only conduct vegetation management within the existing maintained VELCO corridor. (VMT Type B4 as described in the Vegetation Management Plan (see Attachment 1)). VGS reserves the ability to conduct selective removal of trees that may pose a risk to pipeline integrity. VGS-ANR-Joint-1, at 2.6

130. The revised construction methods, vegetation management, and mitigation, will render the impacts to this community adverse, but not undue. Sorenson live testimony, 9/18/13.

<u>The Wet Clayplain Forest and small Northern White Cedar Swamp just north of Little Otter Creek in New Haven (MP 32.15 to MP 32.3)</u>

131. There is a Wet Clayplain Forest (S2) and small Northern White Cedar Swamp (S3) along the proposed VTGas alignment from MP 32.15 to MP 32.3, just north of Little Otter Creek in New Haven. Sorenson direct, p.22, lines 10-12.

132. Portions of this Wet Clayplain Forest are young but are dominated by species characteristic of this natural community type, including Green Ash (*Fraxinus pennsylvanica*), Bur Oak (*Quercus macrocarpa*), and Sensitive Fern (*Onoclea sensibilis*). Succession in the Wet Clayplain Forest is directed by natural processes, including disturbance by wind and flooding. ANR/F&W recommends that this rare natural community be considered a RINA. Sorenson direct, p. 22, lines 10-19

133. VGS will construct the pipeline segment from approximately MP 32.15 to MP 32.43 using Horizontal Direct Drilling ("HDD"). VGS-ANR-Joint-1, at §2.7.

134. During the operational phase of the Project, VGS will only conduct vegetation management within the existing maintained VELCO corridor (as described in the Vegetation Management Plan (see Attachment 1)). VGS-ANR-Joint-1, at §2.7.

135. In the event that VGS determines that repairs to the pipeline are necessary within this segment and can be completed with soil disturbance impacts of less than 1,000 square feet and minimizes temporary impacts to the wetland by matting, VGS may repair the pipeline. Otherwise, VGS agrees to abandon in place if the pipeline becomes inoperable. Re-vegetation, restoration, and invasive species monitoring and control plans will be developed by VGS and provided to ANR for review and approval for any such disturbance. VGS-ANR-Joint-1, at §2.7.

Rare, Threatened, and Endangered Species and Vegetation Management

136. There are no confirmed T or E plant species along the project corridor. A threatened plant species (Harsh Sunflower) has been previously identified within the VELCO corridor in the area of MP 26.2. Currently, neither Party has access to the property where this plant may occur. However, a follow up survey would be performed by VGS at an appropriate time when the plant would be recognizable, prior to construction in that area. VGS-ANR-Joint-1, §11.

137. If the plant is present in the Project corridor to be impacted during construction, VGS will re-align the pipe if feasible to avoid the plant species. If the species cannot be avoided, VGS will obtain a Takings permit prior to construction. VGS-ANR-Joint-1, § 11.

138. There are 19 locations along the Project corridor that contain rare plant species. Of these, at all but 8 locations impacts are avoided or less than 20% of the population is impacted. VGS-ANR-Joint-1, § 12.

139. VGS plans to install temporary construction matting at locations depicted on the EPSC plan sheets during Project construction to minimize impacts to wetlands and other resources. VGS-ANR-Joint-1, § 12.

140. With respect to rare plant occurrences, VGS agrees that mat placement for greater than 6 days during the growing season could result in plant mortality. VGS further agrees that an area of impact of 20% or greater is a reasonable threshold for the imposition of follow up monitoring and mitigation. The specific monitoring and mitigation protocols are presented in the amended Vegetation Management Plan (VMP). VGS-ANR-Joint-1, § 12.

141. Notwithstanding the above, VGS agrees to use reasonable best efforts to minimize the duration of matting in areas of known rare plant occurrences during the growing season. For example, where matting is used for the temporary stockpiling of soil from trenching operations, it is the intent of VGS to remove matting immediately after backfill operations and to maintain the matting in place for no longer than 28 days where feasible. VGS-ANR-Joint-1, § 13.

142. VGS agrees to modify project plans for Access Road "H" (depicted on EPSC sheets ANGP-T-G-007B and ANGP-EPSC-014), to avoid impacts to rare plant 2012-RTE-CT-030. The access road will be relocated so no disturbance of the plant population will occur, and the area will be fenced off to prevent unintended vehicular

access during construction. Amended EPSC Sheets will be prepared prior to construction. VGS-ANR-Joint-1, § 14.

143. VGS agrees to modify project plans at MP 18.95 to 19.05 to place matting over the rare plant populations CT-081 and CT-082 during construction. Amended EPSC Sheet ANGP-EPSC-039 will be prepared prior to construction. VGS-ANR-Joint-1, § 15.

144. In areas where the Project is not co-located with the VELCO right of way, VGS agrees to re-delineate and re-map previously identified RTE species in its corridor at a frequency no greater than every eight years, to begin no later than 2020. VGS-ANR-Joint-1, § 16.

145. In areas where the Project is co-located with the VELCO right of way, VGS agrees to re-delineate and re-map previously identified RTE species in its corridor at a frequency no greater than every eight years, to begin no later than 2020. This requirement is not intended to create new obligations for VELCO or to require that VELCO take any action beyond existing obligations and agreements. VGS-ANR-Joint-1, § 17.

146. In consultation with ANR, VGS has modified its Vegetation Management Plan, (VPM), attachment 1 to VGS-ANR-Joint-1.

Natural Resources HDD Segments

147. The following additional HDD segments are subject to F The following additional HDD segments are subject to additional operational restrictions as noted below:

a. Approximate MP 6.8 to MP 6.88: Winooski River crossing
b. Approximate MP 19.48 to MP 19.49: LaPlatte River crossing
c. Approximate MP 22.83 to MP 22.88: Lewis Creek crossing
d. Approximate MP 39.32 to MP 39.37: New Haven River crossing

148. For these segments, VGS agrees to the following limitations:

a. For the Winooski River crossing[4], for the operational phase of the Project, VGS will perform no surface vegetation management.

b. VGS will perform surface vegetation management within the riparian buffer (50 feet) of the LaPlatte River, the New Haven River and Lewis Creek crossings, using Vegetation Management Type B5 as set forth in the Vegetation Management Plan (See Attachment 1). VGS reserves the ability for the selective removal of trees the roots of which may pose a risk to pipeline integrity.

c. In the event that VGS determines that repairs to the pipeline are necessary within the portions of this segment outside the water body and can be completed with soil disturbance impacts of less than 1,000 square feet and

[4] The Winooski River crossing is defined as the segment from the northern edge of the 100 foot riparian buffer to the southern end of the HDD segment.

vegetation clearing impacts without soil disturbance or removal of stumps of less than 3,000 square feet, including any access roads, VGS may repair the pipeline. Otherwise, VGS agrees to abandon in place if the pipeline becomes inoperable. Revegetation, restoration, and invasive species monitoring and control plans will be developed by VGS and provided to ANR for review and approval for any such disturbance. A stream alteration permit may be required for activities in or near the water body.

Invasive Species

149. VGS will conduct an invasive species baseline survey during spring 2014, prior to commencing clearing for construction. This will include plants on the noxious weed quarantine list and certain watch list plants as listed in the VMP. VGS-ANR-Joint-1, §9.

150. VGS will conduct ongoing monitoring and management of invasive plants in accordance with Section 4.0 of the revised Vegetation Management Plan attached as Attachment 1 to the MOU. VGS-ANR-Joint-1, §9.

Discussion

Based on the testimony and evidence presented in this matter and the findings above, if Petitioner implements and adheres to the terms and conditions of the VGS-ANR-MOA, the project will not result in an undue adverse impact to rare plants, rare and irreplaceable natural communities, and the natural environment. To ensure the project does not result in an undue adverse impact to the natural environment, any Certificate of Public Good for this Project should

include as a condition that Petitioner comply with the terms and conditions of the VGS-ANR-MOA, VGS-ANR Joint 1.

CONCLUSION AND RECOMMENDED CONDITIONS

With the mitigation measures and terms and conditions outlined in VGS-ANR-Joint-1, and the other recommendations of ANR, the Project will not result in an undue adverse impact to the natural environment. In addition, the Board should impose as a condition of any CPG issued for this project, that Petitioner shall obtain all necessary state and federal permits before commencement of construction or ground clearing, including Vermont Stream Alteration Permit, Vermont Wetland Permit, 401 Water quality Certification, NPDES Stormwater Permit, Army corps of Engineers, 404 Permit.

Respectfully submitted this 11th day of October 2013.

State of Vermont
Agency of Natural Resources

BY: _____

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