Exhibit VGS-AG-125

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

TESTIMONY OF ERIC SORENSON
ON BEHALF OF THE
VERMONT AGENCY OF NATURAL RESOURCES

Summary of Testimony

Mr. Sorenson is the Community Ecologist with the Vermont Fish and Wildlife Department (VFWD) of the Vermont Agency of Natural Resources (VANR). The purpose of his testimony is to provide the Department's review of the potential effects of the Vermont Gas Systems, Inc. (VTGas) project on significant natural communities.

Q1. Please state your name, place of employment, and your current position.

A1. My name is Eric Sorenson. I am the Community Ecologist with the Vermont Fish and Wildlife Department (VFWD) of the Vermont Agency of Natural Resources (VANR). I have been in this position since 1996.

Q2. Please describe your educational background and any relevant experience.

A2. I have a B.S. degree from the University of Michigan in Natural Resources and Wildlife Ecology. I have an M.S. degree from the University of Maine in Botany and Plant Ecology. Prior to my current position I worked from 1989 until 1996 as a wetland ecologist with Vermont Department of Environmental Conservation implementing the Vermont Wetland Rules. I also worked as a wetland consultant in Massachusetts for two years and as an ecologist in Maine for one year. I have included a copy of my resume with my testimony (Exhibit ANR-ES-1).

Q3. Have you previously provided testimony to the Public Service Board?

A3. Yes, I provided written testimony on behalf of VFWD regarding Docket 7373, the VELCO Southern Loop project. I also provided written and oral testimony regarding Docket 7508 Georgia Mountain Community Wind, LLC and Docket 7628 Kingdom Community Wind in Lowell.

Q4. Please describe a few examples of the types of issues related to evaluating impacts to significant natural communities that you have participated in during your time with the Department.

A4. In my position as ecologist with the Department, I am responsible for the identification and classification of Vermont's upland and wetland natural communities. I am the co-author of a book on Vermont's natural communities. The majority of my work is to inventory, map, and evaluate significant natural communities across Vermont and to work with landowners on appropriate management and conservation. Both working with the Fish and Wildlife Department and in my previous position with the Department of Environmental Conservation, I have been responsible for evaluating the significance of wetland and upland natural communities associated with the regulatory process, including the Vermont Wetland Rules "conditional use determination" (CUD) (former review process for wetlands), wetland reclassification, Act 250, Section 248, and 401 Water Quality Certification. I have developed the Agency of Natural Resources position and testified before District Environmental Commissions, the Environmental Board, the Natural Resources Board (former Water Resources Board), in civil court settings, and have provided testimony to the Public Service Board. Typically, the goal of my work in the regulatory arena is to identify significant natural communities and to work with applicants to avoid and/or minimize adverse effects on these natural areas.

Q5. What is the purpose of your testimony in this proceeding?

A5. The purpose of my testimony is to provide the Department's review of the potential effects of the Vermont Gas Systems, Inc. (VTGas) project on significant natural communities. State-significant natural communities are addressed as Rare and Irreplaceable Natural Areas (RINA) under Act 248 Criterion 8 and relating to the overall project effect on the natural environment under 30 V.S.A.§ 248 (b)(5).

In addition, the purpose of my testimony is to identify opportunities to avoid or minimize negative impacts to state-significant natural communities.

Q6. Describe the concept of natural communities and how they are ranked by VFWD.

A6. 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. Whereas 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. In Vermont we have developed a

classification of more than 80 natural community types[1]. Each natural community type is ranked according to its relative rarity in Vermont. 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:

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

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

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;

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;

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

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. Almost all examples of rare natural community types are considered state-significant, whereas only the very best examples of common (S5)

[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.

community types are considered state-significant. For uncommon (S3) and widespread (S4) types, those examples that are excellent to good are considered state-significant. Examples of state-significant natural communities are tracked by the VFWD in the database maintained by the Natural Heritage Inventory. This database currently includes information on approximately 2,100 examples of state-significant natural communities in Vermont.

Q7. Are there state significant natural communities that you and the Vermont Fish and Wildlife Department recommends should be considered Rare and Irreplaceable Natural Areas?

A7. Yes. I recommend that the following state-significant natural communities be considered RINA (RINA) by the Public Service Board. I will explain the basis for my recommendation for each natural community later in my testimony.

- Pine-Oak-Heath Sandplain Forest in Colchester and Essex
- Wet Clayplain Forest at the LaPlatte River in Hinesburg
- Wet Clayplain Forest at Lewis Creek in Hinesburg
- Wet Clayplain Forest south of Rotax Road in Monkton (if confirmed)
- Red/Silver Maple-Green Ash Swamp at the Monkton-New Haven town line
- Wet Clayplain Forest at Little Otter Creek in New Haven.

The determination that a particular example of a natural community is state-significant is made by the Department of Fish and Wildlife Department based on established

Department guidelines. A RINA, in contrast, is a creation of Act 250 and is a determination made by the regulator, the District Commission, or the Public Service Board, under 10 V.S.A. § 6086(a)(8).

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. The Vermont Fish and Wildlife Department makes recommendations to the Public Service Board based on the following steps:

- the feature must be shown to be natural; where natural conditions predominate over human influences,
- the feature must be 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
- the feature must be shown to be irreplaceable in the foreseeable future.

Q8. Have you reviewed the Petitioner's prefiled testimony and exhibits?

A8. Yes I have. In particular I have reviewed: The "Section 248 Natural Resources Report" prepared by Vanasse Hangen Brustlin, Inc. (VHB) and dated December 17, 2012 and revised February 26, 2012, the "Rare Species and Rare Natural Communities" report by Gilman and Briggs dated December 13, 2012 and a separate report revised February 26,

2013; the "Natural Resources Series" maps for the project by VHB dated December 13, 2012 and revised May 2, 2013; the "Erosion Prevention and Sediment Control Plan" sheets and maps prepared by VHB and dated January 28, 2013 and revised May 2, 2013; the "Vegetation Management Plan – Transmission Main" prepared by VHB dated May 3, 2013; and the maps and summary tables of the proposed Horizontal Directional Drills prepared by VHB and dated April 10 and 12, 2013.

Q9. Have you conducted site visits to evaluate the potential impacts of the VT Gas pipeline on natural communities and the environment?

A9. Yes, I conducted site visits with Art Gilman, staff from VHB, and staff from the Agency of Natural Resources on October 25 and November 9, 2012 and on May 15, 2013. My site visits focused on visiting most of the state-significant natural communities where impacts are proposed by the VT Gas project.

Q10. Are there other tools that you have used to assess the potential environmental impacts from the project and to identify and evaluate potentially significant natural communities?

A10. Yes, I have used and viewed data layers in ArcMAP (ESRI Geographic Information Systems software) that are generally available from the Vermont Center for Geographic Information (http://vcgi.vermont.gov/) or the Agency of Natural Resources. These

include existing records of state-significant natural communities and rare species (VT Fish and Wildlife Department, Natural Heritage Inventory), soils maps by the Natural Resources Conservation Service, wetland maps, habitat blocks as mapped by VT Fish and Wildlife Department, and aerial photographs from various dates that show land cover and land use.

Q11. Please provide an overview of the potential ecological effects of the proposed VT Gas pipeline on natural communities.

A11. 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. 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. 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.

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.

Q12. Explain how you will present your assessment of natural communities and potential impacts to these natural communities in your testimony.

A12. For each important natural community along the VT Gas pipeline alignment I will describe the natural community and its location, provide a summary of its importance and whether it qualifies as a RINA, describe what the proposed and potential impacts are to the natural community, and recommend what steps could be taken to avoid or further minimize impacts. I will begin at the northern portion of the VT Gas project in Colchester and progress south to New Haven.

Q13. What is the northern-most natural community along the VT Gas pipeline that you have concerns about?

A13. There is a Pine-Oak-Heath Sandplain Forest located along the VTGas alignment from approximately Mile Post (MP) 0.85 to MP 1.95. The Pine-Oak-Heath Sandplain Forest is not continuous along this one mile section of mostly forest, but is instead interspersed with deep stream and wetland valleys. The VELCO powerline also crosses this area oriented north-south.

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. 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.

Approximately 75 acres of Pine-Oak-Heath Sandplain Forest occur along this one-mile section of the VTGas alignment. Vermont Fish and Wildlife Department considers this to be a state-significant example of this rare natural community type and recommends that it be considered a RINA in the Act 248 review process. Although there are some areas of the Pine-Oak-Heath Sandplain Forest that are young forest and somewhat disturbed (especially adjacent to the Gauthier operation and the borrow pit for the Circumferential Highway), 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*). One of the most intact sections of Pine-Oak-Heath Sandplain Forest along the VTGas alignment is located from MP 1.36 to MP 1.46 – an area where horizontal directional drilling (HDD) is proposed. 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.

The VTGas alignment as proposed would result in installation of pipeline by trenching and burying through approximately 3,100 linear feet of Pine-Oak-Heath Sandplain Forest. Along these sections of pipeline installation the width of the cleared forest corridor varies, but is typically depicted as 75 feet wide on the May 2, 2013 Erosion Prevention and Sediment Control Plan (EPSC) with "additional temporary work space" (ATWS) shown for sections at the ends of proposed HDD. Most of this trenched and buried pipeline is shown as "Construction Type 1B" on the EPSC plans, which is defined as "75' construction space and does not depict additional temp. workspace." This uncertainty of actual clearing limits is not described elsewhere in the application that I have read. The total area of Pine-Oak-Heath Sandplain Forest altered or lost for

temporary or permanent impacts are also not provided in the application materials I have read.

As mentioned above, one of the best sections of Pine-Oak-Heath Sandplain Forest located from MP 1.36 to MP 1.46 will not be subjected to surface or vegetation alteration associated with pipeline installation, as horizontal directional drilling (HDD) is proposed under this sandplain forest and the Indian Brook valley. There is also HDD proposed under a portion of the sandplain forest in the vicinity of MP 0.9. However, even when HDD is proposed to avoid direct impacts to the Pine-Oak-Heath Sandplain Forest, there would be permanent surface vegetation clearing and management in the forest for a width of 50 feet to allow for aerial flight survey of the pipeline. This surface vegetation management is described in the Vegetation Management Plan and includes a 20 foot wide herbaceous corridor centered on the pipeline and an additional 15 feet of "feathered" woody vegetation on each side. The result is a permanent clearing through the sandplain forest in order to allow for aerial flight surveys. Another reason provided by VTGas for needing surface vegetation management over this and other sections of HDD is to avoid deep-rooting trees from interfering with the pipeline. However, given the great depth of the HDD under the sandplain forest it is very unlikely that there will be any tree roots present. In the event of a leak or damage to the pipe in the HDD sections under the sandplain forest it is unclear how they would be repaired, but based on conversations with VTGas staff the pipeline would be excavated from the surface to make the repair. Given the expected depth of the HDD pipeline under the ground

surface, this would require extensive clearing and excavation of the Pine-Oak-Heath Sandplain Forest.

The net result of the proposed pipeline trenching and burial is that a significant portion of the Pine-Oak-Heath Sandplain Forest will be adversely impacted by the proposed VTGas pipeline installation, both by permanent and temporary alterations of soils and vegetation. The impacts represent landscape-scale habitat fragmentation and natural community scale fragmentation and alteration. As proposed, this represents an undue adverse effect on the natural environment and on a RINA.

The VTGas pipeline alignment in this area is mostly within the Vermont Agency of Transportation right-of-way for the proposed Route 289 (Circumferential Highway). The highway project is not permitted to proceed at this time and is therefore not a fragmenting feature. As discussed above, this Pine-Oak-Heath Sandplain Forest is within an approximately 900 acre block of forest and wetland that is currently unfragmented by roads or other development, with the only significant fragmentation within this block from the existing VELCO powerline and managed right-of-way. The construction of the VTGas pipeline through the Pine-Oak-Heath Sandplain Forest and forest block along the Route 289 property would result in significant additional fragmentation of this remaining patch of rare natural community and the habitat block. The extent of additional fragmentation would be much less if the VTGas pipeline could be located along the existing VELCO right-of-way.

The following steps could be taken to avoid or further reduce impacts to the Pine-Oak-Heath Sandplain Forest from this Project.

- The VTGas pipeline could be constructed roadside along Mill Pond Road, Severance Road, Kellogg Road, and Susie Wilson Road and would completely avoid the impacts to the rare Pine-Oak-Heath Sandplain Forest and the HDD crossings of Indian Brook and other stream and wetland valleys. Locating the VTGas pipeline along the unconstructed and unpermitted Route 289 right-of-way does not represent the least damaging environmental alternative.
- Use horizontal directional drilling (HDD) to avoid additional areas of Pine-Oak-Heath Sandplain Forest, especially in sections near MP 0.86, from MP 1.1 to MP 1.28, from MP 1.62 to MP 1.66. I understand that it is not possible to use HDD under all of the Pine-Oak-Heath Sandplain Forest, but additional protection could be obtained by more HDD.
- Establish "additional temporary work space" (ATWS) in locations that are already disturbed, not in existing Pine-Oak-Heath Sandplain Forest. An example of where this is currently proposed is in the borrow-pit created with the construction of the Circumferential Highway adjacent to MP 1.65 to 1.85. Similarly, making better use of the already disturbed area in the VELCO right-of-way could reduce ATWS in Pine-Oak-Heath Sandplain Forest.
- Revise the Vegetation Management Plan for any VTGas pipeline using HDD under Pine-Oak-Heath Sandplain Forest to eliminate permanent clearing of the

forest. In these areas where the pipeline is deep below the soil surface establish only a walking path over the pipeline and maintain the current forest cover.

- Reduce the width of clearing for construction in all areas of Pine-Oak-Heath Sandplain Forest. Currently the EPSC propose using Construction Type 1B or 1C in most areas which include 75 feet of clearing. These could be reduced to 50 feet wide clearing using Construction Types 2A, 2B, or 2C.
- If some or all of the above steps cannot be taken to avoid or minimize impacts to Pine-Oak-Heath Sandplain Forest, mitigation by means of permanently conserving other areas of Pine-Oak-Heath Sandplain Forest should be implemented to offset these impacts. This could be in the form of fee acquisition or purchase of conservation easements for the remaining 75 acres of Pine-Oak-Heath Sandplain Forest in this block of forest that is not already owned by the Vermont Agency of Transportation.

Q14. What is the next natural community to the south that you have concerns about?

A14. There is a Wet Clayplain Forest located on the north side of the LaPlatte River and on both sides of the proposed VTGas alignment in the vicinity of MP 19.2 to 19.3 in Hinesburg. This is a rare (S2), wetland natural community type associated with wet clay soils of the Champlain Valley. The natural community type is rare because most wet and mesic clay-soil forests have been cleared for agricultural use over the past 200 years.

The location of this Wet Clayplain Forest is accurately shown on the project site plans although it is incorrectly labeled as Valley Clayplain Forest, which is an older name and concept for all clayplain forest types of the Champlain Valley combined. Vermont Fish and Wildlife Department considers this Wet Clayplain Forest to be a RINA.

VTGas proposes to install the pipeline by trenching using Construction Types 2A and W (EPSC sheet 39) through the edge of the Wet Clayplain Forest. These Construction Type specifications reduce the right-of-way to 25 feet on each side of the pipeline and use wetland matting. To further reduce impacts to the Wet Clayplain Forest I recommend that Construction Type 2D be used instead of 2A. This would reduce the width of Wet Clayplain Forest clearing to only 10 feet, an acceptable adverse impact in this area.

Q15. What is the next natural community to the south that you have concerns about?

A15. There is a Wet Clayplain Forest located on the south side of Lewis Creek and the west side of the proposed VTGas alignment in the vicinity of MP 22.9 in Hinesburg.

This Wet Clayplain Forest is identified on the VTGas Natural Resource Series maps but is not identified on the corresponding EPSC Sheet 47. This Wet Clayplain Forest record is based on a report and mapping in the Vermont Fish and Wildlife Department database, but has not been visited by Fish and Wildlife Department staff. Gilman and Briggs in their report describe that the area is not Wet Clayplain Forest. To date, I have not been

able to visit this site as VTGas has not obtained landowner approval. Until I can visit the site I will maintain that it is a Wet Clayplain Forest as described in the Vermont Fish and Wildlife Department database and therefore likely qualifies as a RINA, based on this being a rare natural community type and that it is a naturally forested landscape adjacent to Lewis Creek.

Horizontal directional drilling (HDD) is proposed under Lewis Creek and all of the location of the mapped Wet Clayplain Forest, so no direct effects on the rare natural community are proposed. It is not specified in the application materials I have read whether there will be surface vegetation management in the Wet Clayplain forest over the HDD for long-term survey of the pipeline. Unless shown to not be a Wet Clayplain Forest, I recommend that there should be no surface vegetation management in this rare natural community to avoid undue adverse impacts.

Q16. What is the next natural community to the south that you have concerns about?

A16. There is a large Red Maple-Black Ash Seepage Swamp (an S4 natural community type) mapped by Natural Heritage Inventory of Vermont Fish and Wildlife Department south of Rotax Road and on the west side of the proposed VTGas alignment in the vicinity of MP 24.7. A potential Wet Clayplain Forest has been mapped on the margin of the large swamp along the VTGas alignment by Gilman and Briggs. Due to a lack of landowner permission, detailed mapping and identification of natural communities and wetlands

have not occurred at this location. I need to visit this site to evaluate the natural community present. If Wet Clayplain Forest is present, Vermont Fish and Wildlife Department would consider this a RINA and recommends that Construction Type 2A, 2B, or 2C be used (50 foot temporary workspace) instead of the proposed Construction Type 1E, which calls for 75 foot temporary workspace. In addition, it appears that all impacts to the forested wetland complex could be avoided by moving the VTGas alignment as little as 200 feet to the east, beginning at Rotax Road and extending south to the point where it rejoins the VELCO right-of-way (approximately at VELCO pole #190).

Q17. What is the next natural community to the south that you have concerns about?

A17. State-significant Northern White Cedar Swamp and Cattail Marsh occur within the Mt. Florona (Monkton Swamp) wetland complex in Monkton along the VTGas alignment from approximately MP 27.1 to 27.6. Mt. Florona Swamp is a highly significant wetland complex, based on its large size, the presence of these natural communities, and the high quality wildlife habitat it provides. It is very important to avoid and/or minimize adverse environmental impacts to this wetland.

The current VTGas proposal is to use horizontal directional drilling (HDD) under the main portion of the Mt. Florona Swamp (primarily Cattail Marsh and other open wetland types at this location) with staging (Additional Temporary Work Space) for this HDD on

both sides of the wetland complex. The following steps are recommended to avoid and/or minimize impacts to this important wetland complex:

- Instead of crossing the Mt. Florona Swamp with HDD, follow the VELCO right-of-way to approximately pole #218, then directly south behind the residences to Monkton Road, then west along Monkton Road to rejoin the VELCO right-of-way at pole #228. This would avoid the Monkton Swamp HDD crossing and would reduce temporary swamp impacts associated with the HDD, which include the creation of a large alternate temporary workspace (ATWS) described below.
- To date, VTGas has not provided information on the depth of organic soil (peat) in the wetland complex where HDD is proposed. If HDD is used, it is critical to know organic soil depths and the type of underlying substrate in order to design the HDD to avoid impacts to the wetland – the HDD must be located completely in underlying substrate (likely clays or bedrock), not in the peat soils.
- On the eastern side of the proposed Mt. Florona Swamp HDD the EPSC sheet 56 shows a 105' by 1,524' alternate temporary work space (ATWS) – this is 3.7 acres. Portions of this ATWS are in the Northern White Cedar Swamp and other wetlands. The Department recommends that VGS explore ways to reduce this ATWS in size to minimize natural community and wetland impacts. The Department recommends that VGS explore whether the ATWS for this long HDD could be located primarily on the eastern side of Mt. Florona Swamp where there are open fields with no wetlands delineated to date.

- In the Vegetation Management Plan, it states that "Vermont Gas has designated a section of Monkton Swamp (approximately 300 feet +/-) as no management zone. There would be no management activities within this section of the corridor." If HDD is used under the swamp, there should be no surface vegetation management across the entire wetland crossing, which is close to 1,800 feet. It is unclear what the 300 feet of "no management zone" refers to and it is not specified on site plans as it should be in order to be effectively implemented.
- If HDD is used to cross Mt. Florona Swamp and in the event that there is a leak in the buried pipeline, there are no specifics provided in the application that I have read on how the pipeline would be repaired or replaced. I have heard varying responses to this scenario from VTGas staff. As excavation in the swamp would have serious negative impacts (and may not be feasible due to great peat depth) it is critical that it be specified that a fault in this 1,800 foot section of HDD would be addressed by replacing the pipeline with a new pipeline, not excavation to repair the pipeline.

Q18. What is the next natural community to the south that you have concerns about?

A18. 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. This is an uncommon (S3) natural community type, for which high quality examples such as this one are rare. I recommend that this Red/Silver Maple-Green Ash Swamp be considered a RINA.

The VTGas proposal is to install the pipeline by trenching through this large wetland using Construction Types 2D (50 feet corridor with only 10 feet of forest clearing adjacent to the VELCO right-of-way) and W (wetland mats). Construction Types 2D and W result in the least impact to forested wetlands along the VELCO right-of-way of the construction types listed by VTGas on the EPSC plans. However the proposed open trenching in the wetland and clearing of the swamp forest edge could be completely avoided by locating the VTGas alignment adjacent to Parks Hurlburt Road (Monkton) and North Street (New Haven) as was originally proposed in the December 2012 VTGas pipeline alignment. This alignment along North Street is also referenced in the December 13, 2012 Gilman and Briggs report as a way of avoiding impacts to this natural community. This section of road directly east of the Red/Silver Maple-Green Ash Swamp does not have any residences along it. Vermont Gas has identified the presence of residences as the reason for moving the alignment away from roads in other locations in Monkton. Although there is a large and significant example of the uncommon (S3) Mesic Maple-Ash-Hickory-Oak Forest adjacent to Parks Hurlburt Road, the impacts to this upland natural community from a 25 foot wide pipeline construction right-of-way

adjacent to the road would be much less than the impacts from the proposed crossing of the Red/Silver Maple-Green Ash Swamp. This is because the Mesic Maple-Ash-Hickory-Oak Forest is an upland community for which hydrologic alteration is unlikely compared to in the swamp. For the Mesic Maple-Ash-Hickory-Oak Forest, construction could occur from the existing road surface instead of on mats in the wetland. The spread of invasive species is much less likely in this community as compared to the swamp.

Q19. What is the next natural community to the south that you have concerns about?

A19. 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. 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. I recommend that this rare natural community be considered a RINA.

The VTGas proposal is to install the pipeline by trenching through this wetland using Construction Types 2D (50 feet corridor with only 10 feet of forest clearing adjacent to the VELCO right-of-way) and W (wetland mats). The proposed open trenching in the wetland and clearing of the Wet Clayplain Forest edge could be completely avoided by

locating the VTGas alignment adjacent to North Street (New Haven) as was originally proposed. There is only one residence on the west side of North Street between this section and the section to the north that could be used to avoid crossing the Red/Silver Maple-Green Ash Swamp.

An additional concern with crossing this wetland using Construction Types 2D and W is that the Northern White Cedar Swamp portion of the wetland has deep organic soils and trenching though these soils is likely to result in significant adverse impacts to the cedar swamp. VTGas staff have stated that they will be able to trench through the organic soils but, to date, no survey information has been provided by VTGas or VHB on the depth of organic soils in this wetland. Based on my visit to the site and soil probing, I know the organic soils are greater than four feet deep.

If relocation of the VTGas pipeline to North Street is not possible, detailed plans of how pipeline installation through the Northern White Cedar Swamp should be provided. An additional alternative to minimize impacts to this wetland and Little Otter Creek would be to use HDD through this section. This alternative may be necessary to avoid undue adverse effects to the natural community if engineering details for trenching in the cedar swamp organic soils are not sufficient to minimize adverse effects.

Q20. Are there additional concerns that you have with the project and its impacts on natural communities over the long term?

A20. Yes. Two additional plans are needed to address long term and ongoing environmental concerns: a post construction restoration and re-vegetation plan and an invasive species monitoring and control plan. I will address each of these separately.

A post construction restoration and re-vegetation plan is needed to address all locations where the proposed pipeline will alter (temporary and permanent) soils and vegetation in state-significant natural communities. This plan should cover at least the following topics:

- How will soils that have been excavated or disturbed be returned to their original horizons in the soil profile?
- Plantings of native species characteristic of the natural community type impacted are appropriate for all areas where vegetation is removed for construction but will return for forest or natural vegetation after construction. Species to be planted and locations of plantings should be specified. Any alternative approaches to re-vegetation should be clearly specified.
- Periodic monitoring of the restoration areas for success should be conducted for at least five years post construction and reports should be provided to VT Fish and Wildlife Department and the PSB.

An invasive species monitoring and control plan is needed for all locations where the proposed pipeline will alter (temporary and permanent) soils and vegetation along the

pipeline, but with particular emphasis on state-significant natural communities, as well as wetlands, rare species populations, and stream/rivershores. The goal of this plan should be to prevent any new infestations of non-native invasive species (as identified on the Vermont Agency of Agriculture's Noxious Weed List) along the VTGas pipeline. The monitoring and control plan should be in effect for at least five years after the completion of construction. This plan should provide specifics the methods for surveying the pipeline for invasive species, how invasive species that are encountered will be controlled and disposed of, and the reporting process to the ANR and PSB.

Q21. Do you have concerns about temporary and permanent road access to the pipeline construction route?

A21. Yes. There are many temporary and permanent access roads shown on the EPSC plans (sheets 7 through 10 of the EPSC plans) but it is unclear whether inventory for natural communities, wetlands, and rare species have been conducted along all of these access roads. These roads are not all indicated in the Natural Resources Series Maps.. It is also unclear if these roads have been located so as to avoid or minimize impacts to natural communities and other features to the extent possible.

Q22. Does this conclude your testimony at this time?

A22. Yes it does.