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 mainlines in Addison County, together with three new gate stations in Williston, New Haven, and Middlebury, Vermont	)	Docket No.

PREFILED TESTIMONY OF
JOHN HEINTZ
ON BEHALF OF
VERMONT GAS SYSTEMS, INC.

December 20, 2012

Mr. Heintz is the Project Manager for the Addison Natural Gas Project. His testimony describes the Project design, construction and schedule, and provides an estimate of the Project costs. Mr. Heintz also describes construction-related impacts with respect to noise, water supply, waste disposal and transportation.

TABLE OF CONTENTS

EXHIBITS

Exhibit Petitioner JH-10	Typical Sectionalizing Valve Site
Exhibit Petitioner JH-11	Project Cost Estimate
Exhibit Petitioner JH-12	Permitting and Construction Schedule
Exhibit Petitioner JH-13	Construction Process Diagram
Exhibit Petitioner JH-14	Impact Minimization/Avoidance, Pipeline Reroutes and Alignment Shifts
Exhibit Petitioner JH-15	Impact Minimization/Avoidance, Through Horizontal Directional Drill (HDD)
Exhibit Petitioner JH-16	Impact Minimization/Avoidance, Through Right-of-Way Narrowing

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1. Introduction

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

A1. My name is John Heintz. I am the President of International Engineering and Development Corporation and have been retained by Clough Harbour & Associates ("CHA") to serve as Project Manager of the Vermont Gas Systems, Inc. ("Vermont Gas" or "VGS" or the "Company") Addison Natural Gas Project ("Project" or "ANGP"). My business address is 2812 Shipping Ave, Miami, FL 33133.

Q2. Please describe your education and professional experience.

A2. A copy of my resume is included as Exhibit Petitioner JH-1. I have over twenty-five years of experience working in the oil and gas industry, including serving as

project manager in connection with the design, siting and construction of numerous natural gas transmission projects. The details of my experience are set forth in my resume.

Q3. What is the purpose of your testimony?

A3. My testimony and exhibits provide a detailed description of the Project layout and engineering design, including the refinements and modifications undertaken to the preliminary conceptual route alignment identified by VGS (the "Preliminary Alignment") in the course of the engineering design, resource assessments and right-of-way ("ROW") work to improve the layout and mitigate resource and landowner impacts where feasible. The result of these revisions is referred to here and in other witnesses' testimony as the "Final Alignment" and it is the Final Alignment Project Plans that are being submitted for approval in this Section 248 proceeding.

My testimony also describes the equipment specifications and the pipeline construction process that will be involved in building the Project. I also address ROW acquisition, material procurement, and Project noise and transportation impacts. Finally, I provide the Project cost estimate and schedule.

2. Project Description

Q4. Please describe the Project.

A4. The Project includes the following principal components:

(1) Approximately 43 miles of new 12-inch transmission pipeline, extending from a new tie-in to be located at Vermont Gas's existing 10-inch mainline north of Severance Road in Colchester ("Colchester Tie-In"), Vermont, to the intersection of U.S. Route 7 and Exchange Street in Middlebury, Vermont (the "Transmission Mainline");

(2) Approximately 5 miles of new six-inch distribution mainlines ("Distribution Mainlines") that will extend distribution service to Vergennes (4 miles) and Middlebury (1 mile); and

(3) Three new pressure regulation stations ("Stations" or "Gate Stations"), one located near Route 2 in Williston to reinforce the existing distribution system, one on Plank Road in New Haven, and the third just south of the intersection of U.S. Route 7 and Exchange Street in Middlebury.

The Transmission Mainline is approximately 43 miles in length from the point of interconnection in Colchester to the terminus at the new Exchange Street Gate Station in Middlebury. The line will pass through the towns of Colchester, Essex, Williston, St. George, Hinesburg, Monkton, New Haven and Middlebury.

The Distribution Mainline to Vergennes will extend from a new Plank Road Gate Station in New Haven, running along Plank Road approximately 4 miles through the towns of New Haven, Ferrisburgh and Waltham, to the intersection of Route 7 in Waltham, just east of Vergennes. The Middlebury Distribution Mainline will extend from the new Exchange Street Gate Station in Middlebury to the Middlebury industrial park on Exchange Street.

2.1 Transmission Mainline from Colchester to Middlebury

Q5. Please describe the Transmission Mainline.

A5. A one page map with the Project layout is included as Exhibit Petitioner JH-2. Detailed engineering plan sheets of the Transmission Mainline with design details are included as Exhibit Petitioner JH-3.

At the point of interconnection with the existing VGS transmission system in Colchester, the Colchester Tie-In will be configured with an approximately 30-foot by 70-foot fenced-in yard to enclose the valve and an area for utilizing a pipeline in-line cleaning or inspection tool or "PIG" launcher. A PIG is a tool used in the industry to clean the pipe or to inspect the integrity of the pipeline walls for things such as defects or corrosion. It moves down the pipeline by the force of the natural gas pressure in the pipeline. The fence will be a galvanized chain-link metal fence approximately 6 feet in height with three strands of barbed

wire extending another foot. The fenced area will have a pervious crushed stone surface underlain by a geogrid to infiltrate rainwater and snowmelt. An access road, approximately 1,000 feet long, consisting of 470 feet of existing gravel driveway and 530 feet of new stabilized pervious surface extending from Severance Road to the Colchester Tie-In. Exhibit Petitioner JH-4 is a site plan for the Colchester Tie-In.

To optimize the alignment of the Transmission Mainline corridor, Vermont Gas has attempted to co-locate the pipeline with or adjacent to other utility and road infrastructure where possible in order to minimize impacts. The northern segment of the Transmission Mainline, from Colchester to Williston near Interstate 89, will generally be located within the ROW of VT 289 (also referred to as the Circumferential Highway, "CCCH" or "CIRC"). This segment of the Project corridor is approximately 11 miles from the Colchester Tie-In, and extends though portions of the towns of Colchester, Essex and Williston, to a point east of Interstate 89 in Williston, near the intersection of Interstate 89 and U.S. Route 2.

Near the intersections of Interstate 89 and Route 2 in Williston, the Transmission Mainline will leave the CIRC corridor. Based on the Preliminary Alignment, the plan was to have the Transmission Mainline continue south, adjacent to an existing Vermont Electric Power Company, Inc. ("VELCO") electric transmission line corridor that extends between Williston and Middlebury, Vermont. As I

explain below, multiple re-alignments have occurred to the Preliminary Alignment design to avoid or mitigate impacts to sensitive environmental and cultural resources, such that approximately 18 miles of this southern segment of the Transmission Mainline will now run along public roads in the Final Alignment. This segment of the Transmission Mainline extends about 32 miles and crosses through portions of the towns of Williston, St. George, Hinesburg, Monkton, New Haven and Middlebury. The details for this approximately 32-mile southern segment of the Transmission Mainline are shown in the Transmission Mainline Alignment Sheets, Exhibit Petitioner JH-3.

A more detailed summary of the Transmission Mainline Final Alignment is as follows:

- The proposed pipeline connects to the existing VGS 10-inch transmission pipeline in Colchester and proceeds northerly for approximately 0.1 mile, Milepost ("MP") 0.0 to 0.1, within the existing pipeline ROW to the northerly edge of the un-built CCCH ROW. The alignment follows approximately parallel to the northerly ROW, avoiding present and future constructability issues for 2.0 miles (MP 0.1 to 2.1).
- The built section of the CCCH Highway begins at approximately MP 2.1. The alignment continues to follow the northerly ROW limit of the built section of the CCCH highway for approximately 4.1 miles (MP 2.1 to 6.2).

- The next approximately 1.1 miles (MP 6.2 to 7.3) of the alignment allows for a constructible crossing of the Winooski River, avoiding conflicts with Alder Brook and the possible future extension of the CCCH. The alignment continues southerly within the Redmond Road and Mountain View Road ROWs for approximately 1.8 miles (MP 7.3 to 9.1).
- The alignment re-enters the un-built CCCH ROW at MP 9.1 and continues southerly for approximately 1.8 miles (MP 9.1 to 10.9).
- The alignment parallels the northerly ROW of Interstate 89 and continues westerly for approximately 0.5 mile (MP 10.9 to 11.4).
- The alignment proceeds approximately 0.3 mile (MP 11.4 to 11.7) to allow for a constructible crossing of Interstate 89, avoiding conflicts with the VELCO Taft Corners substation and the densely-built Hurricane Lane. The alignment continues southerly parallel to the westerly VELCO ROW for approximately 1.4 miles (MP 11.7 to 13.1).
- The following approximately 0.8 mile (MP 13.1 to 13.9) of the alignment crosses the VELCO ROW and continues southerly on private land avoiding the VELCO Williston substation.
- The following approximately 0.3 mile (MP 13.9 to 14.2) of the alignment continues southerly parallel to the westerly VELCO ROW.
- The alignment crosses the VELCO ROW and continues southerly 1.0 mile (MP 14.2 to 15.2) on private land avoiding side hill slopes and the King George Estates Development.

- The alignment continues southerly generally parallel to the westerly VELCO ROW for approximately 0.7 mile (MP 15.2 to 15.9).
- The alignment crosses the VELCO ROW and continues southerly approximately 1.0 mile (MP 15.9 to 16.9) on private land and within the Route 2A ROW avoiding large rock formations until continuing across Route 116.
- The alignment continues southerly generally parallel to the westerly VELCO ROW for approximately 3.0 miles (MP 16.9 to 19.9) to Baldwin Road in Hinesburg.
- The alignment continues southerly within the westerly ROW limits of Charlotte, Baldwin and Davis Roads for approximately 4.2 miles (MP 19.9 to 24.1).
- The following approximately 0.2 mile (MP 24.1 to 24.3) of the alignment returns to the westerly side of the VELCO ROW.
- The alignment continues southerly generally parallel to the westerly VELCO ROW for approximately 1.6 miles (MP 24.3 to 25.9).
- The alignment crosses the VELCO ROW to Monkton Road and continues southerly approximately 3.4 miles (MP 25.9 to 29.3) parallel and adjacent to the easterly ROW limit of Pond Road and Monkton Road.
- The alignment continues southerly approximately 3.6 miles (MP 29.3 to 32.9) within the Old Stage Road/ Parks-Hurlburt/North Street ROW.

- The alignment continues westerly approximately 0.2 mile (MP 32.9 to 33.1) within the Plank Road ROW to return to the westerly side of the VELCO ROW.
- The alignment continues southerly generally parallel to the westerly VELCO ROW for approximately 2.3 miles (MP 33.1 to 35.4).
- The following approximately 1.7 miles (MP 35.4 to 37.1) of the alignment shifts to avoid the VELCO New Haven Substation and the Maine Drilling and Blasting Facility.
- The alignment continues southerly generally parallel to the westerly VELCO ROW for approximately 3.3 miles (MP 37.1 to 40.4) to River Road in New Haven.
- The alignment continues westerly within the River Road ROW limit for approximately 0.7 mile (MP 40.4 to 41.1) to Route 7.
- The alignment continues southerly within the Route 7 ROW limit for approximately 1.6 miles (MP 41.1 to 42.7) past the Exchange Street intersection ending at the Proposed Middlebury Gate Station.

Q6. Please describe the design specifications for the Transmission Mainline.

A6. The engineering design was guided by applicable federal and state standards including:

- U.S. Department of Transportation, Office of Pipeline Safety, Code of Federal Regulations Title 49, Part 192 – Transportation of Natural and Other Gas by Pipeline: Minimum Safety Standards ("Code");
- American Society of Mechanical Engineers ("ASME") B31.8 – Gas Transmission and Distribution Piping Systems;
- Vermont Public Service Board General Order #43, Rules and Regulations Prescribing Standards for Gas Utilities;
- American Petroleum Institute ("API") 5L, Specification for Line Pipe, 2009;
- API Specification 6D, Specification for Pipeline Valves, 2008;
- American Society for Testing and Materials ("ASTM") A53/A53M-07, Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless;
- ASTM D2513-99, Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing and Fittings;
- MSS-Standard Practice SP-44-2006 Standard Practice, Steel Pipeline Flanges; and
- Vermont Public Service Board Rule 6.100.

The Transmission Mainline will be designed and constructed to a Maximum Allowable Operating Pressure ("MAOP") of 1,440 pounds per square inch ("psi"). The pipeline will be constructed of carbon-steel pipe (12.75-inch outside

diameter), with a wall thickness of 0.283 inches in Class II (rural) [1] areas and 0.312 inches for the remainder of the route. The pipe material will have a specified minimum yield strength of 65,000 psi. For Class II and III areas, a design factor of 0.5 was used in the design pressure calculation, and for Class I areas a design factor of 0.6 was used, both of which are more stringent than required by the Code. This will allow the design pressure to stay the same even if there is a future change in the class location of the pipeline. The pipe will be manufactured in accordance with the API 5L, Specification for Line Pipe.

The pipe will have an external, corrosion-control coating; the coating will vary dependent upon soil conditions but in general it will consist of 15 mils thickness of fusion bond epoxy or Pritec. Segments of pipe to be installed by horizontal directional drill ("HDD") will have an additional 40 mils thickness of abrasion resistant coating over the external control coating. Cathodic protection will be provided by an impressed current rectifier system. The pipe will be hydrostatically-tested at a pressure of at least 2,160 psi for a minimum of eight hours before being placed in service. The test will assure there are no leaks and validate the MAOP of 1,440 psi. I discuss this testing below.

[1] Class location is the term used in the Code (49 C.F.R. Part 192) to classify the population density in the vicinity of the pipeline. The design of a pipeline may vary depending on the class location of the pipeline. Please refer to Mr. Teixeira's testimony for further explanation of this class location system.

The pipeline will be entirely welded in accordance with API recommended practice standard 1104 – Welding of Pipelines and Related Facilities. All welds will be nondestructively tested in accordance with API 1104 by x-ray techniques. The test records will be kept for the life of the facility.

Q7. What is the width of the Transmission Mainline corridor?

A7. Generally, the Transmission Mainline corridor will occupy a 50-foot wide permanent ROW, together with a 25-five foot temporary easement area that will be used to complete construction. Vanasse Hangen Brustlin, Inc. ("VHB") has studied up to a 300-foot wide area for purposes of conducting its environmental resource impact analysis for this Section 248 application.

In areas where construction will parallel a public road ROW, VGS will utilize a 20-foot ROW on private land adjacent to the road ROW where possible. If obtaining a ROW on private land is not possible, the pipeline will be located in the public ROW and the construction crews will utilize the road as work space. The entire ROW will be cleared of vegetation in order to allow for construction. After completion of construction, the entire ROW area will be graded back to its previous contours and restored consistent with the Erosion Prevention and Sediment Control plan (provided as an attachment to Exhibit Petitioner JAN-9).

Q8. Earlier you mentioned a number of reroutes and revisions that occurred to accommodate sensitive environmental and cultural resources along the route first identified in the Preliminary Alignment for the Transmission Mainline. Please summarize those revisions.

A8. Designing the Project is a complex, interdisciplinary and iterative process that has taken months to develop. Once the CIRC and VELCO corridors were identified as the Preliminary Alignment for the Transmission Mainline (the process for which is more fully discussed in Mr. Howe's prefiled testimony), VGS hired CHA and environmental, archaeological and aesthetic consultants to undertake detailed assessments of the Preliminary Alignment. Based upon that input, we continued to refine the Project design in dozens of locations to avoid or minimize impacts. Overall, we modified over 31 miles or about 73% of the Preliminary Alignment in order to avoid or mitigate these sensitive resource areas, as follows:

- 26 miles (pipeline reroutes and alignment shifts)
- 3.6 miles (narrowing of ROW)
- 2.3 miles (HDD)

Please refer to Exhibits Petitioner JH-14 (Impact Minimization/Avoidance, Pipeline Reroutes and Alignment Shifts), JH-15 (Impact Minimization/ Avoidance, Through Horizontal Directional Drill) and JH-16 (Impact Minimization/Avoidance, Through Right-of-Way Narrowing).

One significant re-route is located on the southern side of the Winooski River in the area parallel to Redmond Road in Williston. There, the Final Alignment will extend west of the CIRC to connect to Redmond Road near the Chittenden Solid Waste Facilities, and continue south and southeast along Redmond Road at a point where Mountain View Road in Williston meets up with the CIRC corridor. This re-route, the so-called "Redmond Road Re-Route" is approximately 1.9 miles in length. This change to the Preliminary Alignment along the CIRC was undertaken by VGS following input from regulators and stakeholders in order to avoid and minimize potential impacts to forested wetlands and wetland habitat, as discussed in more detail in the testimony and exhibits of Jeffrey Nelson of VHB. These areas are depicted on the Transmission Mainline Engineering Plans, Exhibit Petitioner JH-3. Mr. Nelson also addresses this re-route in his testimony and exhibits.

Additionally, a number of the re-routes noted in Exhibit Petitioner JH-14 resulted in the pipeline being located within the public highway corridor to avoid environmental and cultural resources. Proposed construction within built portions of the public highway ROW has increased by approximately 9.0 miles for a total of 18.3 miles. This results in an approximate $5.0 million dollars in addition to the Project costs, which are included in Exhibit Petitioner JH-11.

The approximately 3.6 miles of the pipeline ROW that was narrowed from 75 feet to 50 feet, results in an approximate 5.5-acre reduction in wetland impacts. The reduction of ROW width will result in additional costs to the Project which are currently estimated at approximately $560,000. These additional costs are also included in the Project Cost Estimate, Exhibit Petitioner JH-11.

Q9. What other measures will be taken to minimize impacts?

A9. Because of the nature of a long, linear pipeline expansion project such as this, complete avoidance of all environmental and cultural resource areas is not possible, but a number of precautions will be taken to minimize impacts. In wetlands and agricultural areas, where trenches are used, soil horizons will be removed in order and stockpiled so that horizons can be restored as closely as possible to pre-construction conditions. In some cases, we will employ coffer dams for stream crossings and we will use matting for all work in wetland areas. Silt fences and other erosion control techniques will be used, as well as matting, construction limit barriers, etc. Mr. Nelson's testimony describes the techniques that will be employed to minimize environmental impacts to sensitive areas during Project construction.

As I have also noted, where appropriate, we will horizontally directional drill under certain streams, rivers, wetlands, and other natural resources. These areas include:

Indian Brook, MP 0.88;
Indian Brook, MP 1.35;
Indian Brook, MP 3.6;
Winooski River, MP 6.8;
Allen Brook, MP 10.2;
LaPlatte River, MP 19.6;
Lewis Creek, MP 22.9;
Norris Farm Archaeological Site, MP 24.4;
Little Otter Creek, MP 33.1;
VT AD 446 (Arch site), North Quarry Road, MP 34.1;
VT AD 793(Arch site), Locus 2 and 3, MP 34.6;South of Town Hill Road (Arch site), MP 36.6; and
New Haven, MP 40.2.

The use of HDD in these areas has eliminated over 1.7 acres of wetland impact, over 58,000 square feet of stream impact, impact to six rare, threatened and endangered species habitat and seven archaeological sites. The additional cost associated with the installation of HDDs in these areas is approximately $3.0 million and is reflected in the Project Cost Estimate, see Exhibit Petitioner JH-11.

These areas are identified in Exhibit Petitioner JH-15.

2.2 Distribution Mainlines to Vergennes and Middlebury

Q10. Please describe the Distribution Mainlines.

A10. There are two Distribution Mainlines. The site plans are included as Exhibit Petitioner JH-5. The first is an approximately 4-mile segment of 6-inch polyethylene ("PE") pipe that will begin at the new Plank Road Gate Station in New Haven, and run approximately 4 miles though the Towns of New Haven, Ferrisburgh, and Waltham, to the intersection of Route 7 in Waltham, just east of Vergennes (the "Vergennes Distribution Mainline"). Network construction will begin at this point extending into the City of Vergennes.

The second Distribution Mainline is also 6-inch PE pipe which will run approximately 1.0 mile along Route 7 and Exchange Street in Middlebury, between the new Exchange Street Gate Station and into the Middlebury industrial park.

Both Distribution Mainlines will be located within the public ROWs of Plank Road and Route 7/Exchange Street. The Project plans for the Distribution Mainlines are included as Exhibit Petitioner JH-5.

2.3 Gate Stations and Valves

Q11. Please describe each of the three Gate Stations.

A11. A gate station is a necessary component of a gas distribution system. The purpose of a gate station is to reduce the higher pressure in the transmission pipeline to the lower pressure used in the distribution network. A photograph of a VGS gate station is provided as Exhibit Petitioner JH-6.1.

The first Gate Station will be located near Route 2 in Williston to reinforce the existing distribution system. A site plan for the Williston Gate Station is included as Exhibit Petitioner JH-7. It will include an approximately 55-foot by 85-foot fenced-in yard with a small parking area, an approximately 12-foot wide by 32-foot long prefabricated metal meter and regulator building, a 6-foot wide by 8-foot long SCADA[2] building and an approximately 6-foot wide by 15-foot long concrete pad on which the pipeline heater will be mounted. Each enclosure building will be approximately 11 feet high from ground level to the roof peak. The enclosure buildings will house three major components of the Gate Station: (1) SCADA and telecommunications equipment, (2) the pressure regulation equipment, and (3) the meter. A Dry-Line heater system will be installed outside on the concrete pad. A Dry-Line heater works by producing steam within a vacuum, and heating the gas passing through pipes within the heater shell with low temperature steam.

[2] The acronym SCADA stands for "supervisory control and data acquisition."

Plantings will be installed to provide screening for the facility, as shown on the visual report provided by Michael Buscher, Exhibit Petitioner MJB-2.

The design criteria for the Williston Gate Station are described as follows:

Design maximum station inlet pressure: 1440 psi;

Design minimum station inlet pressure, at regulators: 250 psi;

Design normal station inlet pressure, at regulators: 400 psi;

Design maximum station outlet pressure: 100 psi;

Design flow volume, summer: 350 mcfh;

Design flow volume, peak: 500 mcfh;

Gate Station piping wall thickness: Schedule 80 or XH Seamless;

Gate Station piping grade: API 5L Grade B or X-42;

Safety device: monitor and relief;

Relief set pressure at 110% of Maximum Operating Pressure ("MOP"): 110 psi;

Inlet gas temperature: 32 deg. F;

Outlet gas temperature: 40 deg. F;

Heater: Dry-Line heater system;

Meter: Turbine; and

Gate Station outlet control methodology: redundant Grove 900TE monitor/regulator runs.

A second Gate Station will be located on Plank Road in New Haven to initially provide natural gas service to Vergennes. A site plan for the Plank Road Gate Station is included as Exhibit Petitioner JH-8. It will include an approximately 55-foot by 55-foot fenced-in yard with a small parking area, an approximately 12-foot wide by 32-foot long prefabricated metal meter and regulator building, a 6-foot wide by 8-foot long SCADA building and an approximately 6-foot wide by 15-foot long concrete pad on which the pipeline heater will be located. Each enclosure building will be approximately 11 feet high from ground level to the roof peak. The enclosure buildings will house three major components of the Gate Station: (1) SCADA and telecommunications equipment, (2) the pressure regulation equipment, and (3) the meter. A Dry-Line heater system will be installed outside on the concrete pad. Plantings will be installed to provide screening for the facility, as shown on the visual report provided by Michael Buscher, Exhibit Petitioner MJB-2.

The design criteria for the Plank Road Gate Station are as follows:

Design maximum station inlet pressure: 1440 psi;

Design minimum station inlet pressure, at regulators: 250 psi;

Design normal station inlet pressure, at regulators: 400 psi;

Design maximum station outlet pressure: 125 psi;

Design flow volume, summer: 250 mcfh;

Design flow volume, peak: 400 mcfh;

Gate Station piping wall thickness: Schedule 80 or XH Seamless;

Gate Station piping grade: API 5L Grade B or X-42;

Safety device: monitor and relief;

Relief set pressure at 110% of MOP: 137 psi;

Inlet gas temperature: 32 deg. F;

Outlet gas temperature: 40 deg. F;

Heater: Dry-Line heater system;

Meter: Turbine; and

Gate Station outlet control methodology: redundant Grove 900TE monitor/regulator runs.

The third Gate Station will be located on the southeast side of the intersection of Route 7 and Exchange Street in Middlebury. A site plan for the Middlebury Gate Station is provided as Exhibit Petitioner JH-9. It will include an approximately 85-foot by 85-foot fenced-in yard with a small parking area, an approximately 12-foot wide by 32-foot long prefabricated metal meter and regulator building, a 6-foot wide by 8-foot long SCADA building and an approximately 6-foot wide by 15-foot long concrete pad on which the pipeline heater will be located. Each enclosure building will be approximately 11 feet high from ground level to the roof peak. The enclosure buildings will house three major components of the Station: (1) SCADA and telecommunications equipment, (2) the pressure regulation equipment, and (3) the meter. A Dry-Line heater system will be

installed outside on the concrete pad. Plantings will be installed to provide screening for the facility, as shown on the visual report provided by Michael Buscher, Exhibit Petitioner MJB-2.

The design criteria for the Middlebury Gate Station are described as follows;

Design maximum station inlet pressure: 1440 psi;

Design minimum station inlet pressure, at regulators: 250 psi;

Design normal station inlet pressure, at regulators: 400 psi;

Design maximum station outlet pressure: 125 psi;

Design flow volume, summer: 350 mcfh;

Design flow volume, peak: 500 mcfh;

Gate Station piping wall thickness: Schedule 80 or XH Seamless;

Gate Station piping grade: API 5L Grade B or X-42;

Safety device: monitor and relief;

Relief set pressure at 110% of MOP: 137 psi;

Inlet gas temperature: 32 deg. F;

Outlet gas temperature: 40 deg. F;

Heater: Dry-Line heater system;

Meter: Turbine; and

Gate Station outlet control methodology: redundant Grove 900TE monitor/regulator runs.

The Station configuration being proposed consists of two separate regulator runs, with one run serving as a full back up to the other. Each regulator run consists of two identical regulators set up in what is termed a working and monitor set. The Station will also include a relief valve to provide a secondary device for overpressure protection. This configuration provides for both overpressure protection and redundancy. A single regulator run in the Station is designed to handle the existing load requirement of the local distribution system.

Q12. What is the height of the fence to be installed at each Gate Station?

A12. The fence will be 6-foot high galvanized chain link with one additional foot of barbed wire at the top.

Q13. Please describe the access and parking areas for each Gate Station.

A13. The access will consist of a 15-foot wide stabilized pervious surface underlain by geogrid. The parking area will be large enough for two vehicles and will consist of the same surface material as the access drive.

Q14. Please describe the Gate Station external lighting plans.

A14. Only limited night-time lighting will be needed at each Gate Station, at the entrance and at the building. The lights will be 100-watt floodlights or luminaries, angled downwards.

Q15. Please describe the valves and valve locations.

A15. Eight sectionalizing valves will be installed along the pipeline length to allow for isolation of pipeline segments in the event that they need maintenance or in the case of an incident. Valve spacing is dictated by the Code and is based on the class location of the pipeline. The valve placement along the Transmission Mainline will exceed the requirements of 49 C.F.R. Section 192.179 (Transmission Line Valves).

A photograph of a VGS Mainline Valve ("MLV" or "Sectionalizing Valve") is included as Exhibit Petitioner JH-6.2. A typical MLV site is shown in Exhibit Petitioner JH-10. Valve locations along the Transmission Mainline are identified in Exhibit Petitioner JH-3 at the following mile points:

MLV 0 at the Colchester Tie-In, MP 0.0;

MLV 1 at Redmond Road, Williston, MP 7.6;

MLV 2 at Lincoln Road, Williston, MP 14.4;

MLV 3 at Charlotte Road, Hinesburg, MP 19.9;

MLV 4 at Pond Road, Monkton, MP 26.4;

MLV 5 at Plank Road, New Haven, MP 33.0;

MLV 6 at Hunt Road, New Haven, MP 39.0; and

MLV 7 at Middlebury Gate Station, MP 42.7.

3. Project Construction

Q16. Please describe the pipeline construction process.

A16. The process involves a series of sequential steps, as graphically illustrated on Exhibit JH-13. The pipeline construction process will generally proceed in the following sequence:

1. The construction is expected to be sequenced from north to south although there will be multiple construction sections called "spreads."
2. The route is first cleared and temporary work areas are prepared.
3. Perimeter erosion control measures, such as silt fences are installed along sensitive resource areas such as stream edges and wetlands to control sediment.
4. For the Transmission Mainline, a four to five-foot wide trench will be excavated to a depth of approximately five feet, and soil from the trench will be stockpiled adjacent to the trench within the construction corridor. There will be different construction configurations for each of the different types of area to be crossed, including wetlands, agricultural areas and within the public highway ROW. These configurations are shown in Exhibit Petitioner JH-3. Smaller trenches of approximately four feet by five feet will be used for the Distribution Mainlines.

5. Pipe lengths will be welded together, inspected, laid in the trench and warning tape will be laid over the line, and then the trench will be backfilled. The pipe will be covered by at least 36 inches of soil. The pipeline will have four feet of cover in agricultural areas and residential areas; and generally five feet of cover at road crossings and seven feet of cover at open cut streams.
6. The landscape will be restored as close as possible to pre-construction conditions in accordance with applicable permit requirements.

As Project Manager, it will be my responsibility to oversee that the Project is constructed in accordance with all applicable Code and permit requirements.

Q17. Is water required for Project construction or operation?

A17. The Project will not require the use of water for on-going operations. The three Gate Stations are unmanned and therefore do not have sink or toilet facilities. However, as part of construction, the Project will require approximately 1.4 million gallons of water to hydrostatically pressure test the Transmission Mainline. The pipe will be hydrostatically tested at a pressure of at least 2,160 psi for a minimum of eight hours before being placed in service. The test will prove there are no leaks and will validate the MAOP of 1,440 psi. For the hydrostatic

test, water will be taken from a Town of Colchester municipal water hydrant near the Colchester Tie-In. VGS has contacted the Champlain Water District which supplies Colchester Fire District #3, where we propose to obtain the water for our test. The Champlain Water District has stated that it will be able to provide the water volume required. When the test is complete, the water will be discharged to a nearby upland area at the tap as indicated on the Erosion Prevention and Sediment Control Plans included with Mr. Nelson's prefiled testimony as Exhibit Petitioner JAN-9. These plans are being submitted as part as the Construction Stormwater Discharge Permit to the Vermont Department of Environmental Conservation, as discussed in more detail in Mr. Nelson's testimony.

The two sections of Distribution Mainlines will be tested independently with air at a pressure of 190 psi for a period of eight hours.

In addition, water, sourced from a local water hauler, will be used to control dust during construction.

Q18. Has VGS identified the construction access points and laydown areas?

A18. Yes. We have identified locations where access to the Transmission Mainline corridor will be used as well as temporary work areas for equipment and materials staging areas. These locations are identified in Exhibit Petitioner JH-3 and were studied by our environmental and cultural resource experts and are noted in the

VHB natural resources mapping, provided as an appendix to Exhibit Petitioner JAN-2.

Q19. How will VGS manage construction waste?

A19. The generation of construction debris from the Project will be minimal. Construction debris will be disposed of at an approved landfill. While not generally considered construction waste, VGS will handle woody debris as follows: trees under 6 inches in diameter, slash and brush will be chipped—not burned—and spread along the ROW in upland areas. Trees greater than 6 inches in diameter will be cut into logs, stacked in upland areas and offered to landowners along the ROW for landowner use.

Q20. Will blasting be required for pipeline installation?

A20. Yes, we anticipate that blasting will be required for approximately 35% of the proposed route. Areas requiring blasting will be further defined during the final design process. VGS will use a blasting contractor licensed in the State of Vermont. It should be noted that blasting for projects of this nature will have limited impacts. Any blasting that is required for the Project would be conducted by state-licensed professionals in accordance with applicable blasting codes and local blasting requirements. All blasting would be conducted during daylight hours and would not begin until appropriate local authorities and the occupants of nearby buildings, including residences and places of business, have been notified.

In general, blasting would involve installation of small drill holes, and the use of low energy charges. Potential fracture impacts would be avoided through the use of open-face blasting techniques, which would direct the energy of the blast upward to the surface instead of downward. Delayed charges would be ignited in sequence to facilitate the upward movement of rock along the rock face. VGS will also conduct pre-blast inspections of nearby facilities and structures; install blasting mats to control the scattering of loose rock; use warning signals, flags and barricades to limit access to the blast area; and conduct post-blast surveys as necessary to assess damage. Notwithstanding the limited impact of the blasting, VGS will adhere to a rigorous blasting plan, highlights of which are described below.

Pre-Blast Surveys/Notifications

Pre-blast surveys and Water Quality/Flow Testing will be offered to all property owners that are within a 600-foot radius from the blast site. Appropriate notices will be given and appointments arranged for those owners who desire a survey. Pre-blast surveys will be conducted by a qualified firm approved by VGS. Results of those surveys will be documented through video or still photographs and appropriate narration or written reports.

Blast Monitoring

All blasts will be monitored by a representative of a qualified firm approved by VGS who has been properly trained in the setup and use of seismic monitoring equipment. At least one seismograph will be in use at all times. Placement of monitoring equipment will be at the nearest structure to the blast site. Results of blast monitoring will typically be available before the next blast. Results can be reviewed and modifications can be made to the blast design for the next blast if necessary.

Sequence of Blasting

All blasting operations will be strictly coordinated with VGS's on-site representative and local Fire Departments. Emphasis will be on the safe and efficient removal of the rock existing on this project without impact to surrounding structures.

Blasting Procedures

1. Blasting operations shall commence after 7:00 AM and cease before 7:00 PM, Monday through Saturday.
2. Blasting cannot be conducted at times different from those announced in the blasting schedule except in emergency situations, such as electrical storms or public safety required unscheduled detonation.

3. Warning and all-clear signals of different character that are audible within a range of one-quarter mile from the point of the blast shall be given. All persons within the permit area shall be notified of the meaning of the signals through appropriate instructions and signs posted.
4. Access to the blasting area shall be regulated to protect the public from the effects of blasting. Access to the blasting area shall be controlled to prevent unauthorized entry before each blast and until the perimeter's authorized representative has determined that no unusual circumstances exist after the blast. Access to and travel in or through the area can then safely resume.
5. Areas in which charged holes are awaiting firing shall be guarded, barricaded and posted, or flagged against unauthorized entry.
6. Blasting mats shall be used to cover blasts and prevent fly rock.

<u>Blast Security</u>

Each blast will be preceded by a security check of the affected area. Communications will be made with job site supervisors and local officials as required to ensure the safest possible operation. All personnel in the vicinity closest to the blast area will be warned.

No blast will be fired until the area has been secured and determined safe. The blast site will be examined by the blaster prior to the all-clear signal to determine that it is safe to resume work.

Blast Vibration

Blast vibration will be monitored at the blast site, typically at the structure(s) closest to the blast site. Vibration limits will closely follow industry limits and the State and Local Regulations. Blast designs will be modified as required to stay within the guidelines. Blasting operations will be modified accordingly when approaching buildings and utilities.

4. Right-of-Way Acquisition

Q21. Will the Project require ROW acquisition?

A21. Yes. VGS will purchase easements from landowners along the Transmission Mainline where public ROWs are not being used. Landowner parcels along the Final Alignment are shown on Exhibit Petitioner JH-3. VGS has contacted all landowners along the pipeline route and is currently in discussions to obtain easements. VGS is targeting to have all easements in place by the end of 2013.

5. Noise Impacts

Q22. Will the Project generate noise?

A22. During construction, the Project will generate general construction noise associated with construction vehicles and equipment. Construction activities will normally occur between 7:00 AM and 7:00 PM and will only last during the

construction period. Once constructed, because they are buried, the Project pipelines will not generate any additional noise.

The sectionalizing valves are not pressure-reduction valves containing any mechanized components, and therefore will not result in additional noise.

VGS has selected a heater system for the Gate Stations that emits very little noise. VGS has calculated that after construction of the Project and during the peak hour of operation, the noise level at each Gate Station will be approximately 50 dBA when measured at the fence line. The closest occupied structure to any of our proposed Gate Stations is approximately 215 feet, and at this distance, the noise is projected to drop well below the 45 dBA nighttime and 55 dBA daytime noise levels required in other Board proceedings.

6. <u>Transportation Impacts</u>

Q23. What impacts will the Project construction have on traffic and transportation facilities?

A23. We plan to conduct horizontal directional drilling ("HDD") or boring under a number of street crossing and railway crossings, namely:

Mill Pond Road, Colchester; Uncased bore;

Colchester Rd. (Route 2A), Essex; Uncased bore;

New England Central RR, Essex; Cased bore;

Upper Main St. (Route 15), Essex; Uncased bore;

Essex Way, Essex; Uncased bore;

River Rd. (Route 117), Essex; HDD with Winooski River;

New England Central RR, Essex; Cased bore;

Redmond Road at CSWD, Williston; Uncased bore;

Mountain View Rd. , Williston; Uncased bore;

Williston Rd. (Route 2), Williston; Uncased bore;

Interstate Highway 89, Williston; HDD;

Hurricane Lane, Williston; Uncased bore;

St. George Rd. (Route 2A), Williston; Uncased bore;

Vermont Route 116, St. George; Uncased bore;

Shelburne Falls Road, Hinesburg; Uncased bore;

Charlotte Road, Hinesburg; Uncased bore;

Hollow Road, Monkton; Uncased bore;

Monkton Road, Monkton; Uncased bore;

Plank Road, New Haven; Uncased bore;

North Road, New Haven; Uncased bore;

Plank Road, New Haven; Uncased bore;

Quarry Road, New Haven; Uncased bore;

Main St. (Route 17), New Haven; Uncased bore;

Town Hill Road, New Haven; Uncased bore;

Hunt Road, New Haven; Uncased bore;

River Road, New Haven; Uncased bore; and

Happy Valley Road, Middlebury; Uncased bore.

HDD or boring involves the installation of pits at either side of the area to be crossed and drilling or auguring the pipe beneath that area, creating no disturbance at the surface. This technique, although more expensive, allows us to avoid direct impacts to these areas.

In areas where we will install the pipe with traditional open-cut methods across roadways, we will employ standard traffic control measures to maintain at least one lane of traffic during installation. Additionally, there are areas where we will be installing pipe within the road ROW or shoulder. In these areas we will employ traffic control measures and maintain one lane of traffic during construction. Road surfaces will be protected and restored to original or better condition if impacted by construction.

During construction in these areas, VGS will utilize traffic control methods that comply with Vermont Agency of Transportation ("VTrans") standards, including employment of appropriate signage and the services of sheriffs or other traffic control personnel to manage traffic flow. VGS will obtain highway permits from VTrans and local municipalities for work in state and local roadways.

The Winooski River is considered a navigable water under Section 10 of the Rivers and Harbors Act of 1899, and is subject to the permit jurisdiction of the Army Corps of Engineers ("ACOE"). As explained in Mr. Nelson's testimony, VGS has applied for a Section 10 permit for this crossing. From a practical standpoint, this will have no impact on river transportation and navigation, as we plan to HDD the crossing, and thus will not impact surface waters.

7. Cost Estimate

Q24. Please provide the estimated cost of the Project.

A24. The Project is estimated to cost $83,800,444, which includes the proposed Transmission Mainline and Distribution Mainlines; it does not include the distribution networks in Middlebury and Vergennes. A breakdown of the cost estimate is set forth in Exhibit Petitioner JH-11. The cost estimate was prepared using quotes from equipment vendors, discussions with contractors familiar with the work and historical costs from similar projects.

8. Schedule

Q25. What is the schedule for the Project?

A25. The current schedule is to construct the Project in 2014. This will bring gas service to anchor customers in the Middlebury industrial park by late 2014. The distribution networks in Middlebury and Vergennes would be constructed in

2015, with residential and commercial customers receiving gas service by the 2015/16 winter.

9. Conclusion

Q26. Does this conclude your testimony at this time?

A26. Yes, it does.