VGS 2017

EVALUATION REPORT OF GAS PIPELINE & COMPRESSOR STATION CONSTRUCTION

A completed **Standard Inspection Report** is to be submitted to the Director within 60 days from completion of the inspection. A **Post Inspection Memorandum (PIM)** is to be completed and submitted to the Director within 30 days from the completion of the inspection, or series of inspections, and is to be filed as part of the **Standard Inspection Report.**

Inspection Report		**Post Inspection Memorandum**	
Inspector/Submit Date:		**Inspector/Submit Date:**	
		Peer Review/Date:	
		Director Approval/Date:	

POST INSPECTION MEMORANDUM (PIM)

Name of Operator:	Vermont Gas Systems Inc	**OPID #:**	31190
Name of Unit(s):	ANGP	**Unit #(s):**	ANGP
Records Location:	85 Swift St, South Burlington VT	**Activity #**	
Unit Type & Commodity:	Natural Gas Pipeline		
Inspection Type:	Pipeline Construction	**Inspection Date(s):**	
PHMSA Representative(s):	G C Morris	**AFO Days:**	1/26/17 - 2/10/17 - 2/14/17 - 3/20/17 - 3/22/17 - 3/23/17 -

Summary:

- Design pg 3
- Compressor Design - N/A pg 3 - 4
- Welding - pg 4
- Weld inspection - pg 5
- construction - pg 6
- Corrosion — pg 6
- Testing —— pg 7

Findings:

EVALUATION REPORT OF GAS PIPELINE & COMPRESSOR STATION CONSTRUCTION

Name of Operator:	Vermont Gas Systems Inc		
OP ID No. [1]		**Unit ID No.** [1]	21190
H.Q. Address:		**System/Unit Name & Address:** [1]	
Co. Official:		**Activity Record ID#:**	
Phone No.:		**Phone No.:**	
Fax No.:		**Fax No.:**	
Emergency Phone No.:		**Emergency Phone No.:**	

Persons Interviewed	Titles	Phone No.
Tucker Mulholland	Owner & General Contractor Mulholland Welding & Fab.	off: 802-374-0127 cell: 802-779-1255
Lee Brown (VGS)	VGS supervisor	
Travis Henrichsmeyer	Gabes Const. HDD Foreman	cell 920.889.2409
Luke Rainville (VGS)	welding inspector, VGS	cell 802.598.8399
Chris LeForce (VGS)	Engineering Project Manager	802.233.4415

PHMSA Representative(s) [1]		**Inspection Date(s)** [1]	
Company Construction Maps (copies for Region Files):			

Description of Construction [1]

[1] Information not required if included on page 1.

PIPE SPECIFICATIONS			
.51	.55	Steel Pipe	
	▪	Manufacturer:	Paragon
	▪	Manufacturing Standard:	API 5L
	▪	Pipe Grade:	X65
	▪	Outside Diameter (D):	12.750
	▪	Wall Thickness (t):	.312
	▪	Type of Longitudinal Seam:	ERW
	▪	Specified Min. Yield Strength:	65000
	▪	Joint Design - Bevel:	30
	▪	External Coating:	FBE, Pritec, ARO
	▪	Internal Coating:	None
	▪	Minimum Joint Length:	≈ 60 feet
	▪	Footage or Miles:	57,900 feet

DESIGN REQUIREMENTS			S	U	N/A	N/C
.51		**MATERIAL SPECIFICATIONS**				
	.55	Does the steel pipe meet one of the **API** or **ASTM** listed specifications?				
	.63(a)	Are pipe, valves, and fittings properly marked for identification?				
	.63(c)	Were pipe, valves, and fittings marked with other than field die stamping?				
.101		**PIPE DESIGN**				
	.105(a)	Was the pipeline designed in accordance with this formula: **P = (2St/D) x F x E x T**				
	.112	If the pipeline is designed to the alternative MAOP standard in 192.620 (80% SMYS) Refer to Attachment 1 for additional design requirements.				
	.113	Is the **longitudinal joint factor (E)** for steel pipe equal to 1? (See table)				
	.115	Is the **temperature derating factor (T)** for steel pipe equal to **1**? (See table)				
.141		**DESIGN of PIPELINE COMPONENTS**				
	.143(b)	The design and installation of pipeline components and facilities must meet applicable requirements for corrosion control found in subpart I of this part.				
	.145	Does each valve meet minimum requirements of **API 6D** or a national or international standard that provides an equivalent performance level?				
	.147	Does each flange or flange accessory meet the minimum requirements of **ASME/ANSI 16.5, MSS SP44, or ASME/ANSI B16.25**, or equivalent?				
	.149	Are steel butt welded fittings rated at or above the pressure and temperature as the pipe?				
	.159	Is the pipeline designed with enough flexibility to prevent thermal expansion or contraction from causing excessive stresses in the pipe or component?				
	.161(d)	For a pipeline to operate at 50% of SMYS, are structural supports not welded directly to the pipe, but to a member that completely encircles the pipe?				
	.161(e)	Is each underground pipeline that is connected to a relatively unyielding line or fixed object provided with enough flexibility to allow for possible movement, or is it anchored?				
	.179	Are transmission line valves spaced properly Each point in a Class 1 location within 10 miles of a valve Each point in a Class 2 location within 7 ½ miles of a valve Each point in a Class 3 location within 4 miles of a valve Each point in a Class 4 location with 2 ½ miles of a valve				
	.199	Are pressure relief and pressure limiting devices designed and installed correctly?				
	.201	Do pressure relief and pressure limiting devices have adequate capacity?				
.163		**DESIGN of COMPRESSOR STATION**				
	.163(a)	Is each compressor building located on property under the control of the operator?			X	
		Is the distance to adjacent property far enough to prevent the spread of fire?			X	
		Is there enough space around compressor buildings to allow free movement of firefighting equipment?			X	
	.168(b)	Are buildings constructed with non-combustible material?			X	

			DESIGN REQUIREMENTS	S	U	N/A	N/C
		.163(c)	Are there two separate and unobstructed exits on each operating floor of each compressor building?			X	
			Do doors swing outward?				
		.163(d)	Does each fence around a compressor station have at least two gates?				
			Does each gate located within 200 feet of a building open outwardly and when occupied must be operated from the inside without a key?				
		.163(e)	Is electrical equipment and wiring installed per ANSI/NFPA 70?				
		.165(a)	Are compressors protected from liquids?				
		.165(b)	Do liquid separators have a manual drain and if slugs of liquid could be carried into the compressor, automatic liquid removal, compressor shutdown, or high liquid level alarm?				
			Are liquid separators manufactured in accordance with Section VIII of the ASME Boiler and Pressure Vessel Code or a design factor less than or equal to 0.4 if constructed of pipe and fittings with no internal welding?				
		.167(a)	Does the compressor station have an emergency shutdown system?				
			Is the ESD able to isolate station and blowdown station piping?				
			Is discharge of gas from the blowdown piping at a location where the gas will not create a hazard?				
			Will ESD shutdown compressor, gas fired equipment and electrical facilities (except emergency lighting and circuits needed to protect equipment)?				
			Are there at least two ESD stations outside gas area near exits gates or emergency exists?				
		.169(a)	Does compressor station have overpressure protection devices of sufficient capacity to prevent pressure greater than 110% MAOP?				
		.169(b)	Do relief valves vent in safe location?				
		.171(c)	Are there slots or holes in baffles of gas engine mufflers?				
		.173	Are buildings ventilated to prevent the accumulation of gas?				
		.735(b)	Are aboveground oil or gasoline storage tanks protected per NFPA No. 30? (Dikes)				
		.736(a)	Does the compressor building have a fixed gas detection and alarm system?				

Comments:

.13(c)		WELDING AND WELD DEFECT REPAIR/REMOVAL REQUIREMENTS	S	U	N/A	N/C
	.225	(a) Are welding procedures qualified under **Section 5 of API 1104** or **Section IX of ASME Boiler and Pressure Code** by destructive test.	X			
		(b) Are welding procedures recorded in detail, including results of the qualifying tests?	X			
	Note: Alternate welding procedures criteria are addressed in API 1104 Appendix A, section A.3.				X	
	.227	(a) Are welders qualified according to **Section 6, API Std. 1104** or **Section IX, ASME Boiler and Pressure Vessel Code**? (Welders qualified under an earlier edition may weld but may not requalify under earlier edition)	X			
		(b) Welders may be qualified under **section I of Appendix C** to weld on lines that operate at **< 20% SMYS.**			X	
	.229	(a) Are all welders on compressor station piping and components qualified by means other than nondestructive testing?			X	
		(b) Has the welder welded with this same process and has a weld been tested and found acceptable according to **Section 6 or 9, API Std. 1104** at least twice each calendar year not to exceed 7 ½ months? (Welders qualified under an earlier edition may weld but may not requalify under earlier edition). (c) For "low stress" welder requalification requirements, references 192.229(d).	X			
	.231	Is the welding operation protected from the weather conditions that could impair the quality of the completed weld?	X			

.13(c)	WELDING AND WELD DEFECT REPAIR/REMOVAL REQUIREMENTS	S	U	N/A	N/C
	.233 Miter joints (**consider pipe alignment**)			X	
	.235 Are welding surfaces clean, free of foreign material, and aligned in accordance with the qualified welding procedure?	X			
	Repair and Removal of Weld Defects				
	.245 (a) Are cracks longer than 8% of the weld length removed?	X1			
	For each weld that is repaired, is the defect removed down to clean metal and is the pipe preheated if conditions demand it?			X2	
	(b) Are the repairs inspected to insure acceptability?			X	
	If additional repairs are required, are they done in accordance with qualified written welding procedures to assure minimum mechanical properties are met?			X	
	(c) Repair of a crack or any other defect in a previously repaired area must be in accordance with a written weld repair procedure, qualified under **§192.225**			X	

Comments:

Note 1: all cracks are cut-out
Note 2: no welds req'd repair for this segment

.13(c)	WELD INSPECTIONS and NONDESTRUCTIVE TESTING REQUIREMENTS	S	U	N/A	N/C
	.241 Are inspectors performing visual inspection to check for adherence to the welding procedure and the acceptability of welds as per Section 9, API Std. 1104, except for Subsection 9.7 for depth of undercutting adjacent to the root bead? Note: If the alternative acceptance criteria in API 1104 Appendix A are used, has the operator performed an Engineering Critical Assessment (ECA)?	X			
	.243 (a) Is a detailed written **NDT** procedure established and qualified?				
	(b) Are there records to qualify procedures?				
	(c) Is the radiographer trained and qualified? (Level II or better)	X			
	(d) Are the following percentages of each days field butt welds nondestructively tested:				
	(1) **10%** in **Class 1** locations.			X	
	(2) **15%** in **Class 2** locations			X	
	(3) **100%** in **Class 3** and **4** locations, river crossings, within railroad or public highway ROWs, tunnels, bridges, overhead road crossings: however, if impracticable may test not less than **90%**.	X			
	(4) **100% at pipeline tie-ins.**	X			
	(e) Is a sample of each welder's work for each day nondestructively tested? (see code for exceptions)	X			
	(f) Do the radiograph records and daily reports show:				
	▪ Number of welds made.	X			
	▪ Number of welds tested.	X			
	▪ Number of welds rejected.	X			
	▪ Disposition of rejected welds.	X			
	▪ Is there a correlation of welds and radiographs to a bench mark? (Engineering station or survey marker)	X5			

Comments: 1/26/17 NDT observation on welds of pipestrings for HDD installation at Geprags Park.

- Note 5: welds of HDD pipe are correlated utilizing weld maps indicating joint lengths
- Electronic Document Vermont Gas ANGP "Reader Sheet" is submitted to VGS by radiographer daily, this includes all items of .243(f)

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.301		CONSTRUCTION REQUIREMENTS	S	U	N/A	N/C
	.303	Are comprehensive written construction specifications available and adhered to?				
	.305	Are inspections performed to check adherence to the construction specifications?				
	.307	Is material being visually inspected at the site of installation to insure against damage that could impair its serviceability?				
any/ [illegible]	.309(a)	Are any defects or damage that impairs the serviceability of a length of steel pipe such as a gouge, dent, groove, or arc burn repaired or removed?				
2	.309(c)	If repairs are made by grinding, is the remaining wall thickness in conformance with the tolerances in the pipe manufacturing specifications or the nominal wall thickness required for the design pressure of the pipe?				
	.313(b)	If a circumferential weld is permanently deformed during bending, is the weld nondestructively tested?			X	
	.319(a)	When pipe is placed in the ditch, is it installed so as to fit the ditch, minimize stresses, and protect the pipe coating from damage?				
	.319(b)	Does backfill provide firm support under the pipe and is the ditch backfilled in a manner that prevents damage to the pipe and coating from equipment or the backfill material?				
	.461(c)	External protective coating is inspected (by jeeping, etc.) prior to lowering the pipe into the ditch. Coating damage repaired, as required.				
	.325(a)	Is there **12 inches** clearance between the pipeline and any other underground structure? If **12 inches** cannot be attained, are adequate provisions made to protect the pipeline from damage that could result from the proximity of the other structure?				
	.327(a)	▪ Is pipe in a **Class 1** location installed with **30 inches** of cover in **normal soil**, or **24 inches** of cover in **consolidated rock**?			X	
		▪ Is pipe in **Class 2, 3,** and **4** locations, drainage ditches of public roads and railroad crossings, installed with **36 inches** of cover in **normal soil** or **24 inches** of cover in consolidated rock?				
		▪ Does pipe installed in a river or harbor have **48 inches** of cover in **soil** or **24 inches** of cover in **consolidated rock**?			X	
		▪ If the above cover cannot be attained, is additional protection provided to withstand anticipated external loads?				
	.328	If the pipeline will be operated at the alternative MAOP standard calculated under 192.620 (80% SMYS) Refer to Attachment 1 for additional construction requirements				

Comments: the segment inspected is designed to be installed by HDD

.451		CORROSION REQUIREMENTS	S	U	N/A	N/C
	.455(a)	(1) Does the pipeline have an effective external coating and does it meet the coating specifications?	X			
		(2) Is a cathodic protection system installed or being provided for?	X			
	.471(a)	Are test leads mechanically secure and electrically conductive?				X
	.471(b)	Are test leads attached to the pipe by cadwelding or other process so as to minimize stress concentration on the pipe?				X
	.471(c)	Are bare test leads and the connections to the pipe coated?				X
	.476	Systems designed to reduce internal corrosion (a) New construction				
		(b) Exceptions – offshore pipeline and systems replaced before 5/23/07			X	
		(c) Evaluate changes to existing systems				

Comments:

.501		TESTING REQUIREMENTS	S	U	N/A	N/C
	.503(a)	(1) Is a hydrostatic pressure test planned to substantiate the MAOP?				
		(2) If the pipeline has been hydrostatically tested, have all potentially hazardous leaks been located and eliminated?				
	.505(a)	▪ Is there a specified hydrostatic pressure testing procedure?				
		▪ Is the **specified test pressure equal to: 1.1 x MAOP for Class 1 locations, 1.25 x MAOP for Class 2 locations, and 1.5 x MAOP for Class 3 and 4 locations**? Refer to Attachment 1 for additional testing requirements for Alternate MAOP.				
	NOTE:	Verify ASME Vessels (ASME Code standard is a 1.3 test factor) are designed for 1.5 test factor, or isolate them when testing to 1.5 x MAOP.				
	.505(c)	For pipelines which operate at **30% of more of SMYS**, is the minimum test duration for the pipeline at least **8 hours**? (Strength Test)				
	.505(e)	Is the minimum test duration for pretested fabricated units and **short sections of pipe** at least **4 hours**?				
	.515(a)	Does the operator take every reasonable precaution to protect the general public and all personnel during the test?				
	.515(b)	Does the operator insure that the test medium is disposed of in a manner that will minimize damage to the environment?				
	.517 (a)	Do the test records include the following:				
		(1) Operator's name, name of operator's employee responsible for making the test, and the name of the test company used.				
		(2) Test medium used.				
		(3) Test pressure.				
		(4) Test duration.				
		(5) Pressure recording charts, or other record of pressure readings.				
		(6) Elevation variations, whenever significant for the particular test.				
		(7) Leaks and failures noted and their disposition.				

Comments:

.801 - .809	OPERATOR QUALIFICATION FIELD VERIFICATION	S	U	N/A	N/C
	Operator Qualification - Use PHMSA Form 15 Operator Qualification Field Inspection Protocol Form if applicable to the project.				
.620	If performance of a construction task associated with implementing the alternative MAOP standard in 192.620 can affect the integrity of the pipeline, the operator treats those tasks as "covered tasks" and implements the requirements of subpart N as appropriate.				

Comments:

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Attachment 1

Additional Requirements for Steel Pipe Using Alternative MAOP

For additional guidance refer to http://primis.phmsa.dot.gov/maop/faqs.htm

For FAQs refer to http://primis.phmsa.dot.gov/maop/faqs.htm

	Additional Design Requirements for Pipe Using Alternative MAOP	S	U	N/A	N/C
.112(a)	General Standards				
	(1) Plate microalloyed, fine grain, fully killed, continuously cast				
	(2) Carbon equivalents not greater than 0.25% by weight Pcm or 0.43% IWW				
	(3) Diameter to wall thickness ratio less than 100 and measures to prevent denting and ovality				
	(4) Pipe manufactured to API 5L level 2				
.112(b)	Fracture Control				
	(1) Pipe toughness properties for fracture propagation per API 5L or ASME B31.8 and correction factors				
	(2) (i) Resistance to fracture initiation through full range of operating variables and pipeline life				
	(ii) Toughness adjusted for each pipe grade and decompressive behavior of gas				
	(iii) Ensure 99% probability of fracture arrest within 8 pipe lengths; 90% within 5 and,				
	(iv) Fracture toughness testing equivalent to API 5L supplementary requirements				
	(3) Crack arrestors or heavier wall pipe used if toughness properties not achieved				
.112(c)	Plate/Coil Quality Control				
	(1) Quality program at mills to eliminate defects and inclusions				
	(2) (i) Mill inspection program includes ultrasonic test at ends and at least 35% of plate/coil or pipe to identify defects. Also, 95% of the pipe is tested and done in accordance with ASTM A578 or API 5L				
	(ii) Macro etch test or equivalent to identify inclusions or,				
	(iii) Operator audits of steelmaking facilities quality control plans and manufacturing specs, equipment maintenance records, casting superheat and speeds, and centerline segregation monitoring				
.112(d)	Seam Quality Control				
	(1) Quality assurance program for seam welds to assure tensile strength per API 5L				
	(2) Vickers Hardness test to a minimum of 280 Vickers for a seam cross section of one pipe from each heat plus one pipe from each welding line per day and a minimum of 13 readings for each cross section sample				
	(3) Ultrasonic test of all pipe seams after cold expansion and mill hydrostatic testing				
.112(e)	Mill Hydrostatic Test				
	(1) Hydrostatic test at the mill to 95% hoop stress for 10 seconds per API 5L, Appendix K				
	(2) Pipe in operation prior to 11/17/08 must have mill hydrostatic test to 90% SMYS for 10 seconds				
.112(f)	Coating				
	(1) Pipe coating must be non- shielding				
	ML (2) Pipe coating used for trenchless installation must also be abrasion resistant				
? →	(3) Coating quality inspection and testing must cover pipe surface quality, surface cleanliness, blast cleaning, application temperature control, adhesion, cathodic disbondment, moisture penetration, bending, thickness, holiday detection and repair.				
.112(h)	Compressor Stations				
	(1) Designed to limit the temperature of the nearest downstream segment to 120°F or,				
	(2) Research , testing and monitoring to demonstrate coating will withstand higher temperatures if needed				
	(3) If operating above 120°F , implement a long-term coating integrity monitoring program				

Comments:

192.328	Additional Construction Requirements for Pipe Using Alternative MAOP	S	U	N/A	N/C
	(a) Quality Assurance				
	(1) Quality assurance plan addressing pipe inspections, hauling and stringing, bending, welding, NDT, coating, lowering, backfill, and hydrostatic testing				
	(2) Quality plan for girth weld coating equivalent to plan required in §192.113(f)(3) and performed by individuals with knowledge, skills and abilities in coating application				
	(b) All girth welds have non-destructive testing in accordance with §192.243(b) and (c)				
	(c) At least 36 inches of cover or top of pipe 1 foot below deepest tilling penetration				
	(d) No initial hydrotest failures indicative of systemic material defects – root cause analysis of any failures				
	(e) Impacts of induced alternating current on corrosion control addressed				

Comments:

192.620	Pressure Testing & Notification Requirements for Pipe Using Alternative MAOP	S	U	N/A	N/C
	(a)(2)(ii) The alternative test factor for Class 1 is 1.25, and Class 2 and 3 is 1.5.				
	(c) If an operator elects to use the alternative maximum allowable operating pressure calculated under paragraph (a) of this section for a pipeline segment, the operator must do each of the following:				
	(1) Notify each PHMSA pipeline safety regional office where the pipeline is in service of its election with respect to a segment at least 180 days before operating at the alternative maximum allowable operating pressure. An operator must also notify a State pipeline safety authority when the pipeline is located in a State where PHMSA has an interstate agent agreement, or an intrastate pipeline is regulated by that State.				
	(3) Send a copy of the certification required by paragraph (c)(2) of this section to each PHMSA pipeline safety regional office where the pipeline is in service 30 days prior to operating at the alternative MAOP.				

Comments: