NORTHERN UTILITIES, INC.

DIRECT TESTIMONY OF

CHRISTOPHER J. LEBLANC AND JONATHAN R. PFISTER

New Hampshire Public Utilities Commission

Docket No. DG 15–121

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I. INTRODUCTION

Q. Please state your name and business address.

A. My name is Christopher J. Leblanc and my business address is 325 West Road Portsmouth, New Hampshire 03801. My name is Jonathan R. Pfister and my business address is also 325 West Road, Portsmouth, New Hampshire.

Q. Mr. LeBlanc what is your position and what are your responsibilities?

A. I am Director of Gas Operations for Unitil Service Corp., a subsidiary of Unitil Corporation that provides managerial, financial, regulatory and engineering services to Unitil Corporation's principal subsidiaries: Fitchburg Gas and Electric Light Company, Granite State Gas Transmission, Inc., Northern Utilities, Inc. ("Northern"), and Unitil Energy Systems, Inc. In this capacity, I manage all of Unitil's gas operations, and am responsible for the safe, reliable, and efficient production, transportation and delivery of natural gas service to customers.

Q. Mr. LeBlanc, please describe your business and educational background.

A. I have 25 years of experience in the utility industry and an extensive background in the operation, maintenance and construction of natural gas distribution systems. I joined Unitil in 2000 as a Field Technician; advanced to Project Leader in 2002; to Manager, Gas Operations in 2003; and assumed my current responsibilities as Director, Gas Operations in 2008. Prior to joining Unitil, I was employed for nine years at R.H. White Construction Co., Inc., where I was responsible for leading

and directing field crews in construction and installation of underground utility infrastructure.

I hold a Bachelor of Arts degree in Business Administration from Assumption College a Master's degree in Business Administration at the same institution. Additionally, I have completed civil engineering course work at the University of Massachusetts, Lowell.

Q. Mr. LeBlanc, please describe any industry specific training and certifications you possess that are relevant to the issues in this proceeding.

A. I have received certification as a Registered Gas Distribution Professional ("RGDP") from the Gas Technology Institute, which consisted of formal training in Gas Distribution Operations, Transmission Operations, Pipeline Design and Construction Practices and Regulator Station Design. I have also attended and participated in many conferences and training sessions hosted by the Northeast Gas Association as well as the New England Pipeline Safety Representatives ("NEPSR") annual conference. This conference is hosted by the safety divisions of all six New England States discusses relevant and on-going matters that pertain to pipeline safety. Representatives from the Pipeline and Hazardous Materials Safety Administration ("PHMSA") attend this conference and they present their views on various pipeline safety topics.

I have been Operator Qualified ("OQ") in 84 covered tasks, including those in the 60 Series that directly relate to pressure regulation and the operation and maintenance of regulator facilities.

Q. Mr. LeBlanc, have you previously testified before this Commission or other regulatory agencies?

A. Yes, I have testified before the Commission in Docket No. DG 11-196, *Show Cause Proceeding.* I have also participated in the Company's base rate case proceedings and rule making dockets related to the Commission's amendments to the Chapter 500 gas safety rules. In addition, I have testified before the Maine Public Utilities Commission regarding operational and safety compliance matters in Docket No. 2008-151, *Investigation into Cast Iron Replacement Program in Portland and Westbrook for Northern Utilities, Inc. d/b/a Unitil* and Docket No. 2011-92, *Proposed Increase in Base Rates*. I have also participated in various meetings and technical conferences before the Maine Public Utilities Commission and the Massachusetts Department of Public Utilities on issues that relate to gas safety and gas distribution system operations.

Q. Mr. Pfister, what is your position and what are your responsibilities?

A. I am Manager of Gas System Operations for Unitil Service Corp. In this capacity, I manage all of Unitil's gas system operations, and am responsible for energy production, pressure regulation and the Granite State Pipeline.

Q. Mr. Pfister, please describe your business and educational background.

A. I have 27 years of experience in the utility industry and an extensive background in the operation, maintenance and construction of natural gas distribution and transmission systems, LNG facility operations and maintenance and gas control operations. I joined Unitil in 2008 as the Manager of Gas System Operations. Prior to joining Unitil, I was employed for 20 years at NSTAR and its predecessor, Commonwealth Gas Company, where I held various positions in Engineering, Distribution and Gas Supply Operations. I hold a Bachelor of Science degree in Mechanical Engineering from the University of Vermont.

Q. Mr. Pfister, please describe any industry specific training and certifications.

A. I have received formal industry training in pressure regulation, meter and regulating station design and construction, corrosion control and integrity management. This training includes formal programs sponsored by the Northeast Gas Association and NACE International, as well as programs conducted by equipment manufacturers and distributors and consultants to the Company. Similar to Mr. LeBlanc, I have been OQ Qualified in numerous covered tasks, including those in the 60 Series that directly relate to pressure regulation and the operation and maintenance of regulator facilities.

Q. Mr. Pfister, have you previously testified or been involved in proceedings before this Commission or other regulatory agencies?

A. Yes. I have participated in various meetings and technical sessions at this Commission on matters pertaining to gas safety rulemaking. I have also participated in various technical sessions at the Maine Public Utilities Commission on matters pertaining to pipeline operations and regulatory compliance.

II. PURPOSE OF TESTIMONY

Q. What is the purpose of your testimony?

A. The purpose of our testimony is to discuss issues that are relevant to the Company's defense of the NOV that are currently pending in this proceeding related to the Company's New Hampshire Ave. Gate Station in Portsmouth. More specifically, we will provide a brief overview of the Company's facilities involved in the NOV, and a comprehensive discussion of the facts and code provisions which demonstrate why the NOV should be rejected by the Commission.

III. NOV PS1502 NU – PORTSMOUTH INTERMEDIATE PRESSURE SYSTEM

Q. Please provide a brief description of the Portsmouth intermediate pressure system.

A. The Company's Portsmouth intermediate pressure ("IP") distribution system[1] consists of a network of approximately 80.14 miles of natural gas mains providing service to 5,116 customers through 3,257 service lines predominately in the City of Portsmouth. A map of the Portsmouth IP System is provided as Attachment A. The Portsmouth IP System is fed from five City Gate[2] interconnection points with the Granite State Pipeline[3]. In addition to providing gas distribution service to the customers directly served by the Portsmouth IP System, that system also serves as a source of supply for the Portsmouth low pressure system,[4] through four district regulator stations[5].

Q. Please describe the New Hampshire Ave. pressure regulation station.

A. The direct testimony of Philip Sher provides background on how natural gas is moved through pipeline systems, including city gate stations, and is ultimately delivered to end users. The New Hampshire Ave. station is a city gate interconnection with the Granite State pipeline. The New Hampshire Ave. station takes high-pressure gas supplied by the Granite State pipeline (which has an

[1] The Portsmouth Intermediate Pressure System is also designated as System 17 and has a Maximum Allowable Operating Pressure ("MAOP") of 56 psig.

[2] A City Gate Station is the custody transfer of gas between an upstream transmission line and a local distribution company. These stations typically contain metering equipment as well as pressure regulation.

[3] The Granite State Pipeline is a FERC jurisdictional interstate pipeline that is a wholly owned subsidiary of Unitil Service Corporation and has an MAOP of 492 psig.

[4] The Portsmouth low pressure system has an MAOP of 13.5" water column.

[5] A district regulator station provides pressure regulation and over pressure protection.

MAOP of 492 psig), and reduces it to a pressure that is suitable for the Portsmouth IP system (which has an MAOP of 56 psig).

The New Hampshire Ave. station is an open air above ground station that is configured as a dual run[6] ("Run A" and "Run B"), and each run consists of two 2" Grove 900TE pressure regulators. The regulators in each run are connected in series in what is commonly referred to as a worker/monitor configuration. The gas is pre-heated and metered by the Granite State pipeline. A simplified one-line station schematic of the station is provided as Attachment B.

Q. What is the purpose of a worker-monitor configuration?

A. The purpose of a worker-monitor configuration is that the "worker" regulator has primary responsibility for regulating the pressure on the distribution system. The "monitor" regulator serves as a back-up to regulate the pressure on the distribution system if the "worker" regulator experiences a failure. Essentially, the "monitor" protects the downstream piping from being subjected to the significantly higher operating pressure of the upstream Granite State system if the "worker" regulator were to fail. The "monitor" regulator serves as "overpressure protection" (a term used in federal gas pipeline safety regulations), and will be discussed in greater detail later in this testimony.

Q. How do regulators regulate downstream pressure?

A. Without getting into too much technical detail, a regulator commonly is equipped with a pilot that senses the downstream pressure being regulated. That pilot has an adjustment screw that allows the operator to establish a "set point" for the regulator. The "set point" is the pressure that the regulator will seek to maintain for the downstream piping. As customers connected to the downstream piping consume gas from the distribution system, the regulator constantly adjusts the flow rate in response to changes in system demand and maintains pressure in the downstream piping at or near its set point.

Q. Please describe Unitil's philosophy in setting worker and monitor regulator set points.

A. When a worker regulator fails, the monitor regulator assumes control of the downstream pressure. Because a monitor regulator is a mechanical device, there is an inherent "build-up" pressure that the system will experience before it takes over control of downstream system pressure. Northern establishes its set points for monitor regulators below the MAOP of the downstream system to ensure that, in the event of a worker regulator failure, the downstream system pressure will not exceed the system MAOP plus a Code-allowed pressure buildup that occurs while the monitor takes control of system pressure. *See* 49 C.F.R. 192.201. After the build-up pressure has dissipated,

[6] A dual run station consists of an active run, which is providing pressure regulation and gas supply to the downstream system and stand-by run which will take control in the event the active

the monitor regulator will control system pressure it its set point which, again, is set below the downstream system MAOP.

Following this approach, the two monitor regulators at the New Hampshire Ave. station were set at 55 psig, which is 1 psig below MAOP for the Portsmouth IP system.

Worker regulators on "active" runs are typically set 2 to 5 psig lower than the monitor regulator, and worker regulators on "standby" runs are commonly set 2 to 3 psig lower than the worker regulator on the active run.

Q. What was Northern Utilities' philosophy for regulator set points prior to the acquisition by Unitil?

A. Prior to Unitil's acquisition, Northern Utilities routinely established set points for monitor regulators at or above MAOP, but within the maximum pressures stated in 49 C.F.R. § 192.201. Section 192.201 is discussed in greater detail below. As discussed in the direct testimony of Mr. Sher, many operators adjust their monitor regulator set points at or above the downstream systems MAOP. Northern's current practice of setting monitor regulators at 1 psig below MAOP is a more conservative approach that is consistent with the Federal Code.

run fails in the closed position.

Q. Please describe why it is necessary to have a pressure differential between set points on monitor and worker regulators.

A. Pressure regulators are mechanical devices and, under normal operating conditions, system pressure downstream of the regulator can fluctuate based on a variety of factors that include changes to system load and upstream pressure. The pressure differential in set points is necessary to avoid the possibility of the worker and monitor regulator "fighting" each other for control of the system when these commonly occurring pressure fluctuations occur.

Q. Are there any Federal Codes that dictate the requirements for MAOP and over pressure protection?

A. Yes. Federal Code, as provided by 49 C.F.R. Part 192, includes requirements for establishing system MAOP and for over pressure protection. Code provisions relevant to this proceeding, which will be explained in more detail later in this testimony and in the direct testimony of Mr. Sher, are as follows:

49 C.F.R. Subpart L (Operations)

§ 192.619 "Maximum Allowable Operating Pressure"

§ 192.739 "Pressure limiting and regulator stations: Inspection and Testing"

49 C.F.R. Subpart D (Design of Pipeline Components)

§ 192.195 "Protection Against Accidental Over-pressuring"

§192.197 "Control of the Pressure of Gas Delivered from High Pressure Distribution systems"

§192.199 "Requirements for Design of Pressure Relief and Limiting Devices"

§192.201 "Required Capacity of Pressure Relieving and Limiting Stations"

Copies of these code provisions are provided as Attachments C through H.

Q. Are there other Federal Code Provisions that may be relevant?

A. Yes. 49 C.F.R. § 192.141, which defines the scope of Subpart D (Design of Pipeline Components), provides:

> This subpart prescribes minimum requirements for the design and installation of pipeline components and facilities. In addition, it prescribes requirements relating to protection against accidental overpressuring.

In other words, Subpart D addresses two discrete issues: (1) minimum design requirements; and (2) requirements relating to protection against accidental overpressuring. A copy of Section 192.141 is provided as Attachment I.

Q. How does Unitil apply State and Federal pipeline safety codes when operating and maintaining its gas distribution systems?

A. The Federal Code prescribes the minimum requirements that operators must meet. States can impose additional requirements that are more stringent than federal regulation if the state standards are compatible with federal codes, but the States are prohibited from enacting state law requirements that are more relaxed than the minimum federal law requirements. Prior to the implementation of any activity related to the operations, maintenance or construction of the distribution system,

the Company must ensure that its activities are performed in accordance with applicable federal and state codes. The Company has developed comprehensive Pipeline Safety Procedures to be followed by our personnel to ensure that all activities are performed in this manner.

Q. Does the Company have procedures regarding pressure regulation and over-pressure protection?

A. Yes. The Company has adopted Section 2-L "*System Operations,*" and a copy of this procedure is provided as Attachment J.

Q. Do the New Hampshire Chapter 500 Rules for Gas Service include requirements for set points for over pressure protection?

A. No, the Commission's Chapter 500 rules do not address set points for over pressure protection. Therefore, the Company follows Federal Code requirements when implementing operations and maintenance programs related to over pressure protection set points.

Q. Please provide an overview of NOV PS1502NU related to the New Hampshire Ave. station.

A. The Safety Division alleges that Unitil violated two Federal Code provisions, 49 C.F.R. §§ 192.619 and 192.195, for operating pipeline segments on June 25, 2014

for approximately 1 to 2 minutes in excess of the established MAOP for the Portsmouth IP system.[7]

Q. What is the MAOP of the Portsmouth IP System?

A. The MAOP of the Portsmouth IP is 56 psig.

Q. What was the highest recorded pressure above the MAOP identified in the NOV?

A. The NOV alleges that the maximum pressure was 57.2 psig, and this was confirmed through discovery.

Q. Was the entire system pressurized to 57.2 psig?

A. No. The 57.2 psig reading was taken within the station with a digital pressure gauge located approximately six feet downstream from the pressure regulators. The Company monitors the Portsmouth IP system through SCADA[8], which did not record any increase in pressure above MAOP. As discussed in greater detail in the direct testimony of Richard Ahlin, the pressure at those two SCADA points did not register more than 53 psig (3 psig below MAOP) during the afternoon of Staff's inspection of the regulator station on June 25, 2014.

[7] The NOV states that the Company performed an annual inspection of the New Hampshire Avenue station on May 14, 2015. The Company has no record that an inspection was performed on that date. Rather, inspections were performed on July 31, 2013 and September 9, 2014 in accordance with Section 192.739.

Q. Did this event occur as a result of a failure of the worker regulator at the New Hampshire Ave. station?

A. No. This event occurred during a regulator station inspection being conducted by PUC Staff. PUC Form No. 5 is the inspection module used by Staff when conducting such an inspection. A copy of the Form No. 5 completed by Staff after the inspection is provided as Attachment K.

Q. Please explain what was being inspected when the event occurred?

A. As Commission Staff has confirmed through discovery, the event occurred when Staff directed Unitil personnel to simulate the failure of a worker regulator so Staff could assess the operation of the monitor regulator at the station. A copy of Staff 1-22 is provided as Attachment L. Staff apparently directed the Company to fail the worker regulator to allow Staff to complete its inspection module referenced above.

Q. During Staff's test did the regulator equipment at the New Hampshire Avenue Station function properly and as designed?

A. Yes. Pressure regulators are mechanical devices, and it is expected that a small build-up in pressure above set point will briefly occur as the monitor regulator assumes control over the system pressure. The Company reviewed the

[8] Supervisory Control and Data Acquisition ("SCADA") is a system that allows remote monitoring of system pressures and flows from Unitil's Gas Control center located in Portsmouth, NH.

performance of the regulators with the manufacturer's representative and confirmed that they performed within normal operating parameters.

Q. Was station designed in accordance with 49 C.F.R. § 192.195?

A. Yes. The design requirements in 49 C.F.R. § 192.195 that apply to protection against accidental overpressuring provides:

> (a) General requirements. Except as provided in §192.197, each pipeline that is connected to a gas source so that the maximum allowable operating pressure could be exceeded as the result of pressure control failure or of some other type of failure, **must have pressure relieving or pressure limiting devices that meet the requirements of §192.199 and §192.201.**
>
> (b) Additional requirements for distribution systems. Each distribution system that is supplied from a source of gas that is at a higher pressure than the maximum allowable operating pressure for the system must
> (1) Have pressure regulation devices capable of meeting the pressure, load, and other service conditions that will be experienced in normal operation of the system, and that could be activated in the event of failure of some portion of the system; and
> (2) Be designed so as to prevent accidental overpressuring.

Q. How did the station design comply with Section 192.195(a)?

A. In the event of a failure of the active worker regulator at the New Hampshire Ave. station, pressure on the 56 psig MAOP Portsmouth IP system could be exceeded due to the higher upstream pressure (492 psig MAOP) of the Granite State system. Accordingly, Section 192.195(a) requires the installation of an overpressure protection device. The monitor regulator serves that function.

Section 192.195(a) further requires that the pressure limiting monitor regulator meet the requirements of Section 192.199 and 192.201. Section 192.199

addresses, among other things, the material from which the monitor regulator is constructed and the installation of the regulator. *See* Attachment G.

Section 192.201 governs the pressure regulating performance of the monitor regulator:

> (a) Each pressure relief station or pressure limiting station or group of those stations installed to protect a pipeline must have enough capacity, and must be set to operate, to insure the following:
>
> (1) In a low pressure distribution system, the pressure may not cause the unsafe operation of any connected and properly adjusted gas utilization equipment.
>
> (2) In pipelines other than a low pressure distribution system:
>
> (i) If the maximum allowable operating pressure is 60 p.s.i. (414 kPa) gage or more, the pressure may not exceed the maximum allowable operating pressure plus 10 percent or the pressure that produces a hoop stress of 75 percent of SMYS, whichever is lower;
>
> (ii) **If the maximum allowable operating pressure is 12 p.s.i. (83 kPa) gage or more, but less than 60 p.s.i. (414 kPa) gage, the pressure may not exceed the maximum allowable operating pressure plus 6 p.s.i. (41 kPa) gage**; or
>
> (iii) If the maximum allowable operating pressure is less than 12 p.s.i. (83 kPa) gage, the pressure may not exceed the maximum allowable operating pressure plus 50 percent.
>
> (b) When more than one pressure regulating or compressor station feeds into a pipeline, relief valves or other protective devices must be installed at each station to ensure that the complete failure of the largest capacity regulator or compressor, or any single run of lesser capacity regulators or compressors in that station, will not impose pressures on any part of the pipeline or distribution system in excess of those for which it was designed, or against which it was protected, whichever is lower.
>
> (c) Relief valves or other pressure limiting devices must be installed at or near each regulator station in a low-pressure distribution system, with a capacity to limit the maximum pressure in the main to a pressure that

> will not exceed the safe operating pressure for any connected and properly adjusted gas utilization equipment.

Because the Portsmouth IP system has an MAOP of 56 psig, the overpressure protection must be set in accordance with Section 192.201(a)(2)(ii), which limits the downstream system pressure to MAOP plus 6 psig. This limit would be 62 psig for the Portsmouth IP system (56 + 6).

Q. What was the maximum pressure reading at the New Hampshire Ave. station during Staff's inspection when they instructed the Company to fail the active worker regulator?

A. The maximum pressure was 57.2 psig, which is well below the 62 psig limit established by Section 291.201(a)(2)(ii).

Q. How did the station design comply with Section 192.195(b)?

A. Section 192.195(b) imposes "[a]dditonal requirements for distribution systems" and requires distribution systems supplied from sources of gas at a pressure greater than the MAOP of the distribution system to:

> (1) Have pressure regulation devices capable of meeting the pressure, load, and other service conditions that will be experienced in normal operation of the system, and that could be activated in the event of failure of some portion of the system; and
> (2) Be designed so as to prevent accidental overpressuring.

The Portsmouth Ave. station met Section 192.195(b) because it had a worker regulator that was capable of meeting the pressure, load, and other service conditions that will be experienced in "normal operation of the system" as well as

a monitor regulator that "could be activated in the event of failure of some portion of the system." As discussed in greater detail in Mr. Sher's testimony, PHMSA considers regulator stations configured with worker and monitor regulators to be in compliance with the requirement in Section 192.195(b) that regulator stations be designed so as to prevent accidental overpressuring.

Q. Was this event an accidental overpressuring of the Portsmouth IP system?

A. No. The monitor regulator prevented the system from accidentally overpressuring. Although the worker regulator malfunction was a simulation that Staff directed Northern to perform, the monitor regulator properly kept the buildup pressure below 62 psig (56 + 6) as required by Section 192.201(a)(2)(ii), and brought pressure in the station down to the monitor's 55 psig set point. An accidental overpressuring was avoided.

Q. Does the Company use simulated failures of worker regulators to test its distribution system?

A. No. The Company does not simulate the failure of worker regulators to determine at what pressure the monitor regulator will control system pressure. Mr. Ahlin describes in his testimony the procedure that the Company's technicians follow to establish the set points for monitor and worker regulators without exceeding the MAOP for the distribution system.

Q. Has the Company discussed with PHMSA the regulator set points and performance of the regulators during Staff's inspection?

A. Yes. Following Commission Staff's June 25, 2014 inspection, Mr. LeBlanc had an informal discussion with PHMSA's Training and Qualification Division.[9] PHMSA personnel told Mr. LeBlanc that the Company's worker and monitor set points and regulator performance were consistent with Federal Code requirements.

Q. Did the Company request a formal interpretation from PHMSA of the Federal Codes that are implicated by the NOV related to the New Hampshire Ave. station?

A. Yes. On September 25, 2014, the Company requested a formal interpretation from PHMSA regarding system pressures and over pressure protection. A copy of this request is provided as Attachment M.

Q. Staff suggested during discovery that the Company agreed to file a joint request for interpretation with Staff, and then the Company submitted the request to PHMSA without consulting Staff. Is this accurate?

A. No. The Company did advise Staff that we were filing a request for interpretation with PHMSA, but we did not commit to filing it jointly with the Staff or requesting Staff's input on such a request. The Company did, however, provide

[9] PHMSA's Training and Qualification Division ("TQ") offers technical assistance, training and nationwide seminars for operators and inspectors to educate them on the consistent and thorough application of the regulations and compliance requirements, inspection techniques and enforcement procedures.

Staff with a copy of the request when it was sent to PHMSA. If Staff believed that there were inaccuracies in the letter, or that it unfairly portrayed the relevant issues, Staff could have filed a clarifying letter with PHMSA or even submitted its own request for interpretation to PHMSA as other regulators have commonly done.

Q. Did PHMSA provide the Company a formal interpretation?

A. Yes. On April 21, 2015, PHMSA issued a formal interpretation and concluded that the over pressure protection equipment had operated within the Federal Code requirements. A copy of the PHMSA interpretation is provided as Attachment N. One of the questions that the Company sought to have answered by PHMSA was:

> During a system emergency, such as a failed worker regulator, on a high pressure distribution system with a properly established MAOP of 56 psig, does the operator violate § 192.201(a) if the system pressure does not exceed 62 psig?

PHMSA responded to this question as follows:

> No, the operator does not violate§ 192.201(a) as long as the MAOP limits are met during a system emergency and the pipeline meets the Subpart D - Design of Pipeline Components requirements. **In this case, the emergency operating limit is 62 psi (56+ 6 psi).** Emergency operating overpressure conditions are only allowed for the time required to activate the overpressure protection device and are not meant for long term or frequently occurring normal operating or periodic maintenance conditions and, therefore, require immediate response by the operator either to shut down or reduce the operating pressure to the normal operating conditions.

Q. How do you interpret PHMSA's response?

A. PHMSA concluded that the operating limit during a monitor regulator malfunction emergency, such as the malfunction emergency that Staff directed the Company to simulate here, for a 56 psig system is 62 psig (56 + 6) pursuant to Section 192.201(a)(2)(ii). This "emergency operating overpressure condition" is allowed to exceed MAOP only temporarily. As PHMSA stated, it applies only "for the time required to activate the overpressure protection device" and it "[is] not meant for long term or frequently occurring normal operating or periodic maintenance conditions."

Q. Did the Portsmouth IP system present a danger to public safety as a result of Staff's June 25, 2014 inspection of the New Hampshire Ave. station?

A. No, not at all. It is important to keep in mind that the 57.2 psig pressure reading was taken from a digital gauge within the regulator station, located about six feet downstream of the regulators. As noted above, the pressure readings at the two SCADA points on the Portsmouth IP system were no greater than 53 psig that afternoon.

Moreover, as Mr. Sher discusses in his testimony, pipeline systems are designed with a built-in safety factor. For example, much of the piping on the Portsmouth IP system is built with 2" high density polyethylene ("HDPE") plastic piping. Pursuant to Section 192.121, which provides the design criteria for gas piping, 2"

HDPE has a design pressure of 102 psig.[10] In other words, 2" HDPE can be safely operated at about 100 psig. That design pressure calculation performed under Section 192.121 includes a 32 percent safety factor. Thus, 2" HDPE piping could be pressurized to about 318 psig (102/0.32) before it would be likely to deform.

Finally, the 57.2 psig pressure reading was measured within the regulator station. The regulator station is constructed of 2" and 4" steel piping. The lowest design pressure of that piping is about 1,000 psig, which is significantly greater than the 57.2 psig that was observed during the Staff's inspection. There was no threat to public safety during the 1-2 minutes that the pressure in the station was 57.2 psig.

Q. Staff's NOV seeks to impose a modification of the Company's operations and maintenance manual to require monitor regulators to be adjusted to set points that are low enough that their build-up pressure during an emergency condition will not exceed the system MAOP. Is the Company concerned with Staff's proposed requirement?

A. Yes. In addition to not being consistent with Federal Code, such a requirement may also significantly affect the reliability of the Company's distribution systems. As noted above, it is necessary to adjust worker regulator set points below the monitor regulator set points to avoid the two regulators "fighting" for control. When the normal operating pressure of a distribution system is reduced, that in

[10] Section 192.123 (a) generally limits the design pressure of pressure of plastic pipe to no greater than 100 psig.

turn reduces the capacity of the system to provide natural gas to customers connected to the system. Reduced capacity could jeopardize the reliability of the distribution system during the cold weather months and limit growth opportunities with no corresponding benefit to public safety. On a system with an MAOP of 56 psig, the monitor regulator would need to be set in the 52-53 psig range and the worker regulator would need to bet set in the 49-50 psig range.

Q. Has the Company performed any analysis concerning the operational effects of reducing monitor and worker regulator set points as Staff would require?

A. Yes. Unitil's Gas Engineering personnel performed a high level analysis of operating its intermediate and low pressure distribution systems at lower regulator set points consistent with Staff's recommendation.

Q. What were the results of the engineering analysis for the intermediate and low pressure systems?

A. The capacity of all of the IP systems would be significantly reduced, and would limit the Company's customer growth opportunities. In addition, a few of the IP systems would require system improvements (i.e., new regulator stations and mains to provide additional supply capacity to the IP systems) to maintain operating pressures within engineering parameters during cold winter weather when system demand is greatest.

Q. Has the Company developed detailed cost estimates and engineering designs for the required system improvements?

A. No, we have not. As a rough estimate, the cost to provide additional capacity to the three IP distribution systems would likely cost millions of dollars.

Q. What were the results of the engineering analysis for the low pressure systems?

A. The Company has a low pressure distribution system located in Dover and a second low pressure system in Portsmouth. If the set points on our monitor and worker regulators were required to be lowered to ensure that MAOP will never be exceeded as a result of the failure of a worker regulator, then system analysis indicates that we could experience low pressures during winter peak demand on these systems.

Q. Could these low pressure conditions on the low pressure distribution systems result in customers losing their gas service?

A. Yes, that is certainly a possibility. It is particularly challenging for customers who have high-efficiency heating equipment, which is typically more sensitive to low pressure conditions than traditional gas-fired boilers and water heaters.

IV. CONCLUSION

Q. Would you please summarize the conculsions in your testimony?

A. The NOV related to the New Hamsphire Ave. station is based on a misinterrpetation of the applicable provisions of the Federal Code. The NOV fails to acknowledge that, when a worker regulaor malfunctions, Section 192.201 allows system pressure to exceed MAOP temporarily while the monitor regulator assumes control of system pressure. Section 192.201(a)(2)(ii) limits that temporary pressure to 72 psig for a system with an MAOP of 56 psig. In this instance, the monitor regulator took over pressure control and the pressure in the station temporarily rose to 57.2 psig for one to two minutes, before the pressure was reduced to the monitor's set point of 55 psig. If PHMSA believed that this was contrary to the Federal Code, they would not have issued a formal interpretation that found no Code violation.

In addition, if the Company were required to adjust its regulator set points downward as Staff has suggested to ensure that system pressure at all times and under all circumcumstances never exceeds MAOP, then the Company is in danger of not having sufficent gas capacity on its system to serve customers during peak winter load.

Finally, it is important that the Commission understand that there was no risk to public safety during the 1-2 minutes when the pressure in the regulator station exceeded MAOP by 1.2 psig. The distribtuion system is purposefully designed

with a safety factor such that thes temporary pressure increases of the magnitude authorized by Section 192.201 pose no credible threat to public safety. The safety and reliability of Northern's distribution system are the Company's top priorities, and if the Company believed that its compliance with Section 192.201 would be harmful to these principles, we would adopt different regulator station designs and inveest the millions of dollars necessary to construct additional system improvements to reliably serve customers at lower operating pressures.

Q. Does this conclude your testimony?

A. Yes, it does.