

United States Senate

WASHINGTON, DC 20510

October 4, 2018

Stephen H. Bryant
President and Chief Operating Officer
Columbia Gas of Massachusetts
4 Technology Drive
Westborough, MA 01581

Joseph Hamrock
President and Chief Executive Officer
NiSource
801 E. 86th Avenue
Merrillville, IN 46410

Dear Mr. Bryant and Mr. Hamrock,

After reviewing Columbia Gas' safety, operations, and response plans provided to our offices, it appears that Columbia Gas was woefully unprepared for a major, system-wide disaster like the one that occurred on September 13, 2018 in Lawrence, Andover, and North Andover, Massachusetts. Materials that Columbia Gas has provided to our offices — including its Distribution Integrity Management Plan (DIMP), Operations and Maintenance Manual, September 18 Operational Notice, and 2018 Emergency Response Plan — demonstrate that the company underestimated the possibility of an extremely serious incident, did not adequately build redundancies into its operations or put in place key safety measures to prevent it, and was utterly unprepared to respond to it. Taken together, these failures created conditions that made this disaster a near certainty, yet Columbia Gas does not appear even to have contemplated that an incident of this magnitude could occur. We therefore have many important questions that Columbia Gas must answer before the public can have confidence in the safety of its future operations.

1. Integrity Management Plan

The DIMP is intended to “enhance safety by identifying and reducing gas distribution pipeline integrity risks.”¹ Companies must develop this plan under federal regulations, which require that “operators identify risks to their pipelines where an incident could cause serious consequences and focus priority attention in those areas” and “implement a program to provide greater assurance of the integrity of their pipeline.”² This plan helps pipeline operators understand their systems — the materials that make up the service and main lines, as well as the potential threats

¹ *Distribution Integrity Management Plan*, Columbia Gas of Massachusetts (May 4, 2017), at 5.

² 49 CFR § 192, Subpart P.

that might damage distribution systems. It also helps operators understand where and why leaks are occurring within a distribution system.

Threats to Cast Iron Low-Pressure Systems

The integrity of the system is particularly critical in Massachusetts, as more than 500 miles of Columbia Gas' pipeline main are cast or wrought iron. This material is particularly vulnerable to damage from over-pressurization, which can cause cast iron to crack or cause connections to disintegrate. In the Lawrence service area alone, more than 20 percent of the gas mains are made of cast iron, with 4,093 cast iron segments. All low-pressure systems face the dual threats of over-pressurization or under-pressurization, and more than 70,000 customers of Columbia Gas of Massachusetts are served by low-pressure pipelines.

As the Merrimack Valley disaster showed, over-pressurization can cause a high number of leaks along multiple miles of main line and can cause fires, explosions, injuries, and death. If the risk posed by over-pressurization is not sufficiently weighed and assessed, Columbia Gas cannot appropriately prioritize operational changes that would limit that risk, both during upgrade work and routine operations. Avoiding over-pressurization dangers requires considering how every component of the distribution system could cause an over-pressurization event — from the valves to the regulators to the control lines — and calculating the potential consequences and the probability of failure. Columbia Gas' DIMP does not have a separate threat category for over-pressurization, instead including it within threat categories for either equipment failure or incorrect operations, depending on the cause of the over-pressurization event.

The DIMP also fails to specifically identify the separate needs of low-pressure systems and how they might face different and more serious threats. It does not note any differences among the threat categories for low-pressure and high-pressure systems, impeding the company's ability to understand how different threats might affect distribution lines and mains.

Devaluing the Threat of Rare Events or Events that Have Not Yet Occurred

As part of the risk evaluation calculation, the DIMP assigns a value of zero to events that have not yet taken place, almost ensuring that incredibly rare but catastrophic events are not seriously evaluated by operators. It states that, “[i]f no actual leakage has occurred [...] the probability of failure will be given a score of 0 for the purposes of the analysis,” and “the consequence of failure will be given a score of 0 for the purpose of the analysis.”³ This minimizes the evaluation of risk from events like a system-wide over-pressurization, which is extremely unlikely to occur but very dangerous when it does.

³ *Distribution Integrity Management Plan*, Columbia Gas of Massachusetts (May 4, 2017), at 43-44.

For instance, in calculating the probability and consequences of failure from incorrect operation of a cast iron pipe or a regulator station, the Columbia Gas plan gives these scenarios a score of zero, even though the plan also notes that that score does not indicate there is zero risk.⁴ It is hard to imagine how this calculation would allow Columbia Gas to take effective steps to avoid operator error on cast iron pipes or at regulator stations, and calls into question the utility of this risk-ranking exercise.

Columbia Gas' DIMP evaluates risk only by looking at past events. By basing its risk calculation solely on events that have already occurred, Columbia Gas cannot properly evaluate potential future risks. Because a system-wide over-pressurization had never previously occurred in Columbia Gas operations, the DIMP was useless in projecting the risk that caused the Merrimack Valley disaster.

The structure of Columbia Gas' risk evaluation also undervalues events if they have not happened within the previous five years. The DIMP states that “[a]ctual risk is evaluated over a consecutive five year period.”⁵ This limitation means that Columbia Gas is likely to be underprepared for rare but significant failures.

Preventing Operator Error

Columbia's threat category of “incorrect operations” in the plan is inadequate, encompassing only two paragraphs and five one-sentence bullets. It fails to address in any detail the different needs of low-pressure systems or put in place real measures that could reduce operator error.

Additionally, 16 of Columbia Gas' 33 risk-management programs do not include steps to address operator error — either the consequences of incorrect operations or the likelihood that an error could occur.⁶ Programs dedicated to key operational procedures such as damage prevention and the inspection of regulator stations do not include steps to reduce operator error. Every facet of company management should address the possibility of incorrect operations.

The DIMP provides little specificity on Columbia Gas' plans to limit the risk of operator error.

1. Does Columbia Gas take cost into account when developing or adopting operating requirements or other measures to reduce risk?
2. If a threat has been assigned a risk score of zero because it has not occurred in the past (or within the past five years), does Columbia Gas feel that that unacceptably reduces the assessment of rare but extremely serious events, such as the Merrimack Valley disaster?

⁴ Table C-1, “Probability of Failure.”

⁵ *Id.* at 43.

⁶ *Id.*, Table D-1.

3. Why does Columbia Gas feel it is justifiable to not consider how threats might be different or greater for a low-pressure system?
4. If risks are only ranked relative to one another, how can Columbia Gas properly assess the likelihood of a catastrophic failure like that seen in the Merrimack Valley?
5. Why do 16 of Columbia Gas' 33 programs used to implement the DIMP not work to mitigate the risk of incorrect operations?

2. Operations and Maintenance Manual

Federal regulations require every operator to have an Operations and Maintenance (O&M) Manual, which must include “written procedures for conducting operations and maintenance activities and for emergency response.”⁷ This manual includes procedures for responding to over-pressure situations, shutting down pipeline operations, and replacing pipe sections in low-pressure systems — all of which are relevant to the Merrimack Valley disaster.

In light of the potentially serious system-wide consequences of an over-pressurization event, Columbia Gas' internal policies for responding to over-pressure alerts appear to be insufficient. The O&M manual lists specific actions that company representatives will need to take in response to calls from customers or alarms received at Columbia Gas control stations.⁸ But the actions required of Columbia Gas personnel in such an event are both too vague and lacking redundancy to help eliminate error.

For example, in an over-pressurization event, there is no requirement that the company identify the station(s) delivering gas to the system or check on the system's functionality, including at the regulator. The O&M manual provides a disturbing lack of guidance when an alarm is triggered, stating, “[w]hen a pressure alarm is received at Gas Control from telemetry monitoring, Gas Control will take proper action to address the alarm. In the case of a high-high pressure alarm, Gas Control will notify Gas Systems Operation personnel.”⁹ The manual does not explain what merits a “high-high pressure alarm” or identify the actions that Columbia Gas personnel should take in response.

This operating procedure also does not detail the manner in which an emergency shutdown may need to be implemented following a system-wide over-pressurization, stating only that “[i]f system integrity has been compromised (e.g. leakage) or if risk to life or property is imminent, emergency shutdown shall be considered.”¹⁰ The operating procedure is silent on who makes that decision, what factors must be considered regarding the over-pressurization, or how fast the decision needs to occur.

⁷ 49 CFR § 192.605.

⁸ G.S.1150.080, “Response to Over Pressure.”

⁹ *Id.* at 2.

¹⁰ *Id.* at 3.

6. Why does Columbia Gas not provide a timeline in its operations manual for considering an emergency shutdown if a system-wide over-pressurization is detected?
7. Why does Columbia Gas not delineate who has the responsibility for initiating an emergency shutdown in an over-pressurization situation?
8. What actions does Gas Control take to respond to high-pressure telemetry alarms and why are these actions not specified in the O&M manual?
9. In the company's operations manual, why does Columbia Gas not specify redundancies in the system that ensure over-pressurization situations are identified and addressed promptly, both in equipment and in operating personnel?

3. Updated Operational Policies

On September 18, 2018, Columbia Gas issued an Operational Notice entitled "Additional Requirements for Tie-Ins Involving Low Pressure Facilities." The notice updated the company's policies regarding work to replace and upgrade pipelines. This is precisely the work that may have been occurring prior to the Merrimack Valley disaster. This updated company policy raises several questions about the manner in which Columbia Gas had been conducting its upgrade and repair work.

The notice updating company policy was issued five days after the over-pressurization incident linked to the Merrimack Valley gas explosions and fires. The updated Operational Notice lays out several new steps for performing tie-in work on low-pressure mains, but many of these steps appear to be common-sense measures that Columbia Gas should have instituted long before the Merrimack Valley disaster.

The notice directs workers to identify the stations that deliver gas directly to the low-pressure system in the area where the work is being done, including the regulator stations that take gas systems from high or medium to low pressure. The updated policy emphasizes that the location of control lines must be identified through a field survey prior to any work and then updated in the regulator station records. In fact, the new policy twice reiterates the importance of understanding the location of control lines, with underlining for emphasis.¹¹

The Operational Notice now requires that "[q]ualified company personnel will be on site and in charge" of this kind of upgrade work, "[a]ll stations identified in the tie-in plan will be monitored throughout the tie-in process until the tie-in gauges are removed to assure proper operation," and that the gauges will be "monitored following completion of the tie-in for a minimum of 30 minutes."¹²

¹¹ ON 18-09 at 1.

¹² *Id.* at 2.

The omission of these sorts of safety measures from Columbia Gas' operating procedures prior to this disaster is alarming and unacceptable. It raises serious questions as to why these policies were not previously in place for Columbia Gas' systems and whether that failure was the result of negligence, cost considerations, or incompetence.

It is also imperative that, as Columbia Gas continues work upgrading its system throughout the state, its safety standards are evaluated. In a previous response, Mr. Bryant stated that low-pressure systems operated by Columbia Gas currently serve 86,679 customers in Massachusetts. There will be 20 projects in the Lawrence System restoration focused on upgrading the system from low pressure to a higher pressure rating. Residents must be assured that Columbia Gas will conduct this work safely.

10. The updated operating requirements now state that "[q]ualified company personnel will be on site and in charge" of the tie-in execution.
 - a. Does this mean that, before this updated notice was issued, no qualified company personnel were required to be on site during work that ties in new pipes to existing low-pressure systems?
 - b. Does this mean that qualified company personnel were not in charge or even present while this work was conducted in the area prior to the disaster?
 - c. Over the past five years, how many other instances are there of this type of work being done without the supervision of Columbia Gas employees in Massachusetts?
11. Before Columbia Gas issued this updated operating policy, what oversight did its personnel in regulator stations engage in when work was being conducted on low pressure systems? If no personnel were required to be physically present in or at regulator stations, how did Columbia Gas justify that operating procedure?
12. Has Columbia Gas issued any other new Operating Notices since September 13? If so, please provide unredacted copies of each notice.

4. The Emergency Response Plan

The Emergency Response Plan lays out guidelines to help the company classify an incident and judge how to respond. The highest and most severe level of emergency contemplated by Columbia Gas, "Level 1," is reserved for an incident that results in "1,000 and greater customer outages" and is expected to last for "72 hours or longer."¹³ Although several reporting requirements in the response plan direct the company to report to state and federal authorities on the number of fatalities or injuries, there are no guidelines for additional steps the company must take after members of the public are injured or killed, such as a heightened level of coordination with first responders. The Merrimack Valley disaster left almost 8,600 meters without gas

¹³ D.P.U. 18-ERP-01 (Tab 2, Appendix B, Attachment 1).

service and some outages are expected to last until the entire restoration process is completed on November 19. Twenty-five people were injured and one person was killed. This is a disaster that appears to be several orders of magnitude greater than the most severe emergency for which Columbia Gas had prepared a response.

The Emergency Response Plan also has no timelines for communicating with the public as soon as practicable following a disaster. In an emergency of this magnitude, communicating early and often with the public is essential, yet Columbia Gas does not appear to have made any public statements about this disaster for four hours after the explosions began. Columbia Gas' response plan requires only that website and media updates begin "upon completion of a damage assessment or after the first 24 hours of the damage assessment, whichever comes first," which is woefully insufficient.¹⁴ By failing to provide a plan for immediately informing customers and the public, Columbia Gas' response plan meant that the public was kept in the dark for what was a dangerously long time while the disaster was ongoing.

13. Why did Columbia Gas not appear to contemplate a response for a worst-case-scenario disaster that could affect many thousands of meters for a significant period of time, as well as result in injury and death, such as we saw with the Merrimack Valley gas explosions and fires?
14. Will Columbia Gas update its Emergency Response Plan so it is prepared for a region-wide or system-wide disaster as occurred in the Merrimack Valley? If not, why not? If yes, by when will this update be available?
15. Will Columbia Gas update its Emergency Response Plan to include a set of guidelines on appropriate responses to take when members of the public have been injured or killed? If not, why not? If yes, by when will this update be available?
16. Will Columbia Gas update its Emergency Response Plan to include procedures for immediately notifying the public in the event of an emergency such as this disaster? Will this update include a deadline for notifying customers and the public? If not, why not? If so, by when will this update be available?

5. Safety Management System

Columbia Gas has not finalized a Pipeline Safety Management System (PSMS), as recommended by the American Petroleum Institute (API). According to the API, "[a]dopting and implementing a PSMS will strengthen the safety culture of an organization" and "[n]ewly developing or improving a PSMS will enhance effectiveness of risk management and enable continual improvement of pipeline safety performance."¹⁵ The recommendation was published in July 2015, and developed with input from the Pipeline and Hazardous Materials Safety Administration and the National Transportation Safety Board.

¹⁴ D.P.U. 18-ERP-01 (Tab 2, Appendix B, Page 5 of 12).

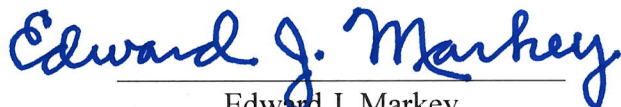
¹⁵ API Recommended Practice 1173.

17. Why has Columbia Gas not yet adopted a Pipeline Safety Management System as recommended by API in 2015?
18. By what date will Columbia Gas have a finalized Pipeline Safety Management System?

We are extremely concerned that it does not appear that Columbia Gas ever considered that a disaster of this scale could occur. Residents of the Merrimack Valley affected by this disaster, the 86,679 customers currently served by low-pressure systems operated by Columbia Gas in Massachusetts like the one where this disaster occurred, and people all across the Commonwealth deserve answers on this apparent failure of Columbia Gas' safety and response plans.

Should you have any questions in response to this letter, please contact Morgan Gray in the office of Sen. Markey at 202-224-2742.

Sincerely,



Edward J. Markey
United States Senator



Elizabeth Warren
United States Senator