Testimony of

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Before the

Committee on Commerce, Science, & Transportation
United States Senate

— On —

Pipeline Safety in the Merrimack Valley: Incident Prevention and Response

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An Independent Federal Agency

Good morning Senator Markey. Thank you for inviting the National Transportation Safety Board (NTSB) to testify today.

The NTSB is an independent federal agency charged by Congress with investigating major transportation disasters – including pipelines. We determine the probable cause of accidents and issue safety recommendations aimed at preventing future accidents. We do not assign fault nor place blame.

On September 13, 2018, about 4:00 p.m. eastern daylight time, a series of explosions and fires occurred after high-pressure natural gas was released into a low-pressure gas distribution system in the northeast region of the Merrimack Valley, Massachusetts. The distribution system was owned and operated by Columbia Gas of Massachusetts (Columbia Gas), a subsidiary of NiSource, Inc. The system overpressure damaged 131 structures, including at least 5 homes that were destroyed in the city of Lawrence and the towns of Andover and North Andover. Most of the damage was a result of structure fires ignited by gas-fueled appliances. Several structures were destroyed by natural gas explosions. One person was killed and at least 21 individuals, including 2 firefighters, were transported to the hospital. Seven other firefighters received minor injuries.

On behalf of the entire NTSB, I would like to begin by offering my sincerest sympathies, to all of those in the Merrimack Valley who have been impacted by this tragedy. Our investigation continues, and our commitment is to keep the Commerce Committee informed of any updates, along with all those affected by this tragic event.

Including this tragedy, we are currently investigating seven natural gas pipeline explosions in which lives were lost, homes destroyed, and communities severely affected. Further, we have successfully completed over 120 pipeline investigations and issued more than 1,300 pipeline safety recommendations, with over 80 percent closed favorably, since 1967.

We launched this investigation to answer the very questions that you have raised:

What happened?

Why did it happen?

What can be done to make sure that it never happens again?

What happened?

Based on our investigation so far, we know that over-pressurization of a low-pressure natural gas distribution system initiated the accident sequence.

The cast-iron, low-pressure distribution system was installed in the early 1900s and had been partially improved with both steel and plastic pipe upgrades since the 1950s. The low-pressure distribution system in the affected area relied on 14 regulator stations to control gas at the required pressure into structures serviced by the system, unlike high-pressure gas distribution

systems that place an individual regulator to reduce pressure at each customer service. Each of the regulator stations reduced the pressure from about 75-pounds per square inch gauge (psig) natural gas main pipeline to 12 inches of water column (about 0.5 psig) for delivery to customers.

Prior to the accident, Columbia Gas had an overarching plan consisting of multiple projects to replace 7,595 feet of low-pressure, existing cast-iron and plastic natural gas main with 4,845 feet of low-pressure and high-pressure plastic gas main on South Union Street and neighboring streets.

On September 13, prior to the overpressure event, a Columbia Gas-contracted work crew, which included a Columbia Gas inspector, executed one of the Columbia Gas-designed and -approved pipe-replacement projects at the intersection of South Union Street and Salem Street in South Lawrence. The project was to install a plastic distribution main and abandon in place a cast-iron distribution main. The distribution main that was abandoned still had the regulator-sensing lines that were used to detect pressure in the distribution system and provide input to the regulators to control the system pressure. Once the contractor crews disconnected the distribution main that was being abandoned, the section containing the regulator-sensing lines began losing pressure.

As the pressure in the abandoned distribution main dropped to about 0.01 psig, the regulators responded by opening further, increasing pressure in the distribution system. The regulators opened completely when they no longer sensed system pressure, allowing the full flow of high-pressure gas to release into the distribution system supplying the neighborhood. As a result, natural gas was delivered to customers at a pressure well above the maximum-allowable operating pressure which led to the ignition of fires and explosions in homes.

Minutes before the fires and explosions occurred, the Columbia Gas monitoring center in Columbus, Ohio, received two high-pressure alarms for the South Lawrence gas pressure system: one at 4:04 p.m. and the other at 4:05 p.m. The monitoring center had no control capability to close or open valves; its only capability was to monitor pressures on the distribution system and advise field technicians accordingly. Following company protocol, at 4:06 p.m., the Columbia Gas controller reported the high-pressure event to the Meters and Regulations group in Lawrence. A local resident made the first 9-1-1 call to Lawrence Emergency Services at 4:11 p.m.

In response, three technicians were dispatched to perform field checks on 14 regulators. Columbia Gas shut down the regulator at issue by about 4:30 p.m. The critical valves of the natural gas distribution system were closed by 7:24 p.m. Beginning about midnight, crews consisting of two Columbia Gas technicians escorted by two emergency response personnel began shutting off the meters at each house to isolate the homes from the natural gas distribution system. All meters were shut off by the following morning.

Why did this happen?

We know that the tasks required for this work were developed and approved by the utility and did not account for the location of the sensing lines. Therefore, they did not require their relocation so that the actual system pressure was detected and controlled. We know that not all of the utility's internal departments were required to review the plans nor were they required to be approved by a professional engineer, who then places his/her official seal on the documents (a process known as "sealing"). Further, we know that a practice had been *discontinued* several years ago that required personnel to be in place to monitor work on gas mains and be available to immediately respond to any abnormalities.

Our investigation will further look into why the placement of the regulator sensing lines were not considered in the planning phase and why it was not caught by inspectors. We are also looking at the response by Columbia Gas of Massachusetts once the event started to determine if actions taken were timely and appropriate.

Urgent Safety Recommendations: What can be done to make sure that it never happens again?

Our investigations are thorough, and it will take some time for us to issue a final report regarding the probable cause and to make recommendations to improve safety. However, as in all of our investigations, if we identify safety issues requiring immediate action, we have the capability to issue interim safety recommendations. In fact, recently, we issued five interim safety recommendations as a result of this investigation, including four which are classified as "urgent." We only issue urgent recommendations when we determine that the course of action requires immediate attention to avoid imminent loss due to a similar accident.

One recommendation calls upon the Commonwealth of Massachusetts to eliminate the existing professional licensure exemptions and require the seal of a professional engineer (PE) on all public utility engineering drawings. The NTSB believes that it is critical that an engineer with appropriate qualifications and experience review engineering plans for a gas company, if not develop them. The Commonwealth of Massachusetts exemption for the requirement of PE licensure to perform "industrial" and public utility work forecloses an opportunity to detect this design oversight. The seal of a PE should be required on all public utility engineering plans to reduce the likelihood of accidents such as this occurring.

We issued the four urgent safety recommendations to NiSource, the pipeline owner, operating as Columbia Gas of Massachusetts.

First, revise the engineering and constructability review process to include all internal departments and require plans to be sealed by a professional engineer prior to construction. Second, ensure that all natural gas systems records are complete and readily available. Third, incorporate risk assessments into project development. Lastly, while any modifications are being made to gas mains, actively monitor pressures and require personnel to be in place to immediately respond to any abnormal changes in the pipeline system.

Conclusion

Over the last 51 years, our investigations have found that safe operation of pipelines is a shared responsibility among operators, government oversight agencies, and local communities.

Pipelines remain one of the safest and most efficient means of transporting vital commodities used to power homes and supply businesses. However, as many in this room know all too well, the consequences are tragic when there is insufficient safety planning and oversight. To that end, the NTSB urges expeditious implementation of all five interim safety recommendations.

We recognize the progress that has been made; yet, there will always be room for improvement. The NTSB stands ready to work with you and this Committee to continue improving the safety of our nation's pipeline systems.

Thank you again for the opportunity to testify today. I am happy to answer your questions.