National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: September 26, 2011

In reply refer to: P-11-32

Mr. Dave McCurdy
President and Chief Executive Officer
American Gas Association
400 N. Capitol Street, NW
4th Floor
Washington, DC 20001-1511

Mr. Donald F. Santa, Jr.
President and Chief Executive Officer
Interstate Natural Gas Association of America
20 F Street, NW
Suite 450
Washington, DC 20001

The National Transportation Safety Board (NTSB) is an independent Federal agency charged by Congress with investigating transportation accidents, determining their probable cause, and making recommendations to prevent similar accidents from occurring. We are providing the following information to urge your organization to take action on the safety recommendation in this letter. The NTSB is vitally interested in this recommendation because it is designed to prevent accidents and save lives.

The recommendation is derived from the NTSB's investigation of the September 9, 2010, San Bruno, California, pipeline accident and is consistent with the evidence we found and the analysis we performed. As a result of this investigation, the NTSB has issued 29 safety recommendations, 1 of which is addressed to the American Gas Association and the Interstate Natural Gas Association of America. Information supporting this recommendation is discussed below. The NTSB would appreciate a response from you within 90 days addressing the actions you have taken or intend to take to implement our recommendation.

On September 9, 2010, about 6:11 p.m. Pacific daylight time, a 30-inch-diameter segment of an intrastate natural gas transmission pipeline known as Line 132, owned and operated by the Pacific Gas and Electric Company (PG&E), ruptured in a residential area in San Bruno, California. The rupture occurred at mile point 39.28 of Line 132, at the intersection of Earl Avenue and Glenview Drive. The rupture produced a crater about 72 feet long by 26 feet wide. The section of pipe that ruptured, which was about 28 feet long and weighed about 3,000 pounds, was found 100 feet south of the crater. PG&E estimated that 47.6 million standard cubic feet of natural gas was released. The released natural gas ignited, resulting in a fire that

destroyed 38 homes and damaged 70. Eight people were killed, many were injured, and many more were evacuated from the area.[1]

The NTSB determined that the probable cause of the accident was PG&E's (1) inadequate quality assurance and quality control in 1956 during its Line 132 relocation project, which allowed the installation of a substandard and poorly welded pipe section with a visible seam weld flaw that, over time grew to a critical size, causing the pipeline to rupture during a pressure increase stemming from poorly planned electrical work at the Milpitas Terminal; and (2) inadequate pipeline integrity management program, which failed to detect and repair or remove the defective pipe section.

Contributing to the accident were the California Public Utilities Commission's (CPUC) and the U.S. Department of Transportation's exemptions of existing pipelines from the regulatory requirement for pressure testing, which likely would have detected the installation defects. Also contributing to the accident was the CPUC's failure to detect the inadequacies of PG&E's pipeline integrity management program.

Contributing to the severity of the accident were the lack of either automatic shutoff valves or remote control valves on the line and PG&E's flawed emergency response procedures and delay in isolating the rupture to stop the flow of gas.

Inspection Technology

The detection, identification, and elimination of pipeline defects before they result in catastrophic failures is critical to a successful integrity management program for gas transmission pipelines. In the NTSB's judgment, the use of specialized in-line inspection tools that identify and evaluate damage caused by corrosion, dents, gouges, and circumferential and longitudinal cracks is a uniquely promising option for identifying defects. Unlike other assessment techniques, in-line inspection is continuous throughout the entire pipeline segment and, when performed periodically, can provide useful information about defect growth. Although in-line inspection technology has detection limitations (generally at best a 90 percent probability that a certain type of known defect will be detected, although the probability of detecting a crack can be improved with multiple runs), it is nonetheless the most effective method for detecting internal pipeline defects.

At the time Line 132 was constructed, in-line inspection tools had not been developed. Due to construction limitations such as sharp bends and the presence of plug valves, many older natural gas transmission pipelines, like Line 132, cannot accommodate modern in-line inspection tools without modifications. According to testimony provided during the NTSB investigative hearing held on March 1–3, 2011, the technical challenges of conducting in-line inspections of older gas transmission pipelines relate not to the sensors, but to the platforms (the tool or pig) that need to move through the pipeline. Gas transmission pipeline operators have also asserted that, because of differences in the flow regimes between natural gas (a compressible fluid) and

[1] For additional information, see *Pacific Gas and Electric Company Natural Gas Transmission Pipeline Rupture and Fire, San Bruno, California, September 9, 2010,* Pipeline Accident Report NTSB/PAR-11/01 (Washington, DC: National Transportation Safety Board, 2011), which is available on the NTSB website at <http://www.ntsb.gov/>.

hazardous liquids (an incompressible fluid), the use of in-line inspection tools in gas transmission pipelines presents additional technical challenges, especially when the operating pressure many not be sufficiently high to push the tool through the pipeline.

According to testimony from the NTSB investigative hearing, current in-line inspection technology is advanced enough to have detected the defect that caused the rupture of Line 132, but it could not be used without significant modifications to the pipeline. The NTSB concludes that because in-line inspection technology is not available for use in all currently operating gas transmission pipeline systems, operators do not have the benefit of a uniquely effective assessment tool to identify and assess the threat from critical defects in their pipelines. Only in-line inspection can provide visualization of the internal pipe structure. The geometry of Segment 180,[2] like many older pipelines, would not accommodate in-line inspection tools. The NTSB is concerned that in-line inspection is not possible in many of the nation's pipelines, which—because of the date of their installation—have been subjected to less scrutiny than more recently installed lines.

Therefore, the National Transportation Safety Board makes the following recommendation to the American Gas Association and the Interstate Natural Gas Association of America:

> Report to the National Transportation Safety Board on your progress to develop and introduce advanced in-line inspection platforms for use in gas transmission pipelines not currently accessible to existing in-line inspection platforms, including a timeline for implementation of these advanced platforms. (P-11-32)

The NTSB would appreciate receiving the report referenced in the above recommendation within 6 months.

The NTSB also issued safety recommendations to the U.S. Secretary of Transportation, the Pipeline and Hazardous Materials Safety Administration, the governor of the state of California, the California Public Utilities Commission, and the Pacific Gas and Electric Company. Additionally, the report reclassifies two previously issued recommendations to the Pipeline and Hazardous Materials Safety Administration.

In response to the recommendation in this letter, please refer to Safety Recommendation P-11-32. If you would like to submit your response electronically rather than in hard copy, you may send it to the following e-mail address: correspondence@ntsb.gov. If your response includes attachments that exceed 5 megabytes, please e-mail us asking for instructions on how to use our secure mailbox. To avoid confusion, please use only one method of submission (that is, do not submit both an electronic copy and a hard copy of the same response letter).

[2] In 1956, PG&E relocated 1,851 feet of Line 132 that had originally been installed in 1948. This relocation included the installation of the pipe at the accident location. In 1961, PG&E completed a second relocation project on a portion of Line 132 immediately to the south of the 1956 relocation. As a result, 1,742 feet of the original 1,851 feet of pipe from the 1956 relocation project, including the rupture location, remained in operation. In PG&E's records, this segment is known as Segment 180.

Chairman HERSMAN and Members SUMWALT and ROSEKIND concurred in this recommendation. Vice Chairman HART and Member WEENER did not concur in this recommendation. Chairman HERSMAN filed a concurring statement and Vice Chairman HART filed a concurring and dissenting statement, both of which are attached to the pipeline accident report for this accident.

[Original Signed]

By: Deborah A.P. Hersman
Chairman