

NATIONAL TRANSPORTATION SAFETY BOARD WASHINGTON, D.C.

ISSUED: August 3, 1981

 Forwarded to:
 Mr. David C. Harrison
 President
 Missouri Power & Light Company
 P.O. Box 780
 Jefferson City, Missouri 65102

SAFETY RECOMMENDATION(S)
P-81-21 and -22

At 10:15 p.m., c.s.t., on January 8, 1981, a 2-inch-diameter plastic gas main pulled apart at a compression coupling under an alley in downtown Mexico, Missouri. Natural gas at 43-psig pressure escaped and migrated through a sanitary sewer into a nearby building where it was ignited by an undetermined source at approximately 10:25 p.m. The explosion and fire destroyed a commercial building, severely damaged an adjacent building, broke nearby windows, and damaged several vehicles. There were no fatalities; however, three firefighters were injured while fighting the fire.

The Missouri Power & Light Company installed a 4-inch-diameter cast-iron gas main in the alley in 1950. Part of this gas main was later replaced by a 4-inch-diameter steel gas main. In 1975, the remaining 170 feet of cast-iron gas main was inserted with 2-inch-diameter polyethylene plastic pipe. During this installation, the length of plastic pipe needed was misjudged, and an additional 10-inch-long segment of 2-inch-diameter plastic pipe had to be added. Two standard compression couplings were used for the connection. The pullout resulting in this accident occurred at the upstream end of the downstream coupling. The 170-foot-long segment of plastic pipe had contracted because it was not restrained and had pulled out of the short-barreled compression coupling with a smooth steel insert which was not designed to prevent pullout.

The Safety Board has issued two major pipeline accident reports 1/ involving the pullout of compression couplings joining polyethylene plastic pipe to steel pipe. In each case, more than 100 feet of plastic pipe had been inserted in gas mains and the unrestrained plastic pipe had been joined to the steel pipe by a standard, short-barreled compression coupling with a smooth steel insert. These failures were caused by thermal contraction of the plastic pipe which exerted pullout forces on the compression couplings. Recommendations were made to inspect locations where comparable conditions may already exist and to properly design, install, test, inspect and anchor future installations.

1/ Pipeline Accident Report--"Nebraska Natural Gas Company, Pathfinder Hotel Explosion and Fire, Fremont, Nebraska, January 10, 1976" (NTSB-PAR-76-6); Pipeline Accident Report--"Kansas Public Service Company, Inc., Explosion and Fire, Lawrence, Kansas, December 15, 1977" (NTSB-PAR-78-4).

The city of Mexico is served by a town border station with dual-orifice meter runs. The failure and subsequent shutdown of the gas main were indicated on the station's charts which record gas pressure and gas flow. The increased rate of flow that occurred when the coupling failed was also shown on the telemetered charts in the unmanned service center of the local Missouri Power & Light Company. Many gas distribution systems employ telemetry to monitor facilities to insure continuity of service and to effect shutdown in the event of a line failure. The addition of a monitored alarm to the telemetered equipment on the single-feed distribution system serving Mexico would provide a prompt warning.

The Safety Board also investigated a similar accident where no alarm system was installed which occurred on July 30, 1977, in Cherokee, Alabama, and in which a house was destroyed and one person died. As a result of this accident, the Safety Board recommended that the Gas Piping Standards Committee of the American Society of Mechanical Engineers (ASME):

Develop guidelines for the installation and operation of pipeline monitoring alarms on applicable single-feed systems, such as Cherokee, which will promptly alert operators to emergency conditions such as linebreaks which are evidenced by abnormally high gas flow rates or pressure reductions. (Class III, Longer Term Action) (P-78-43)

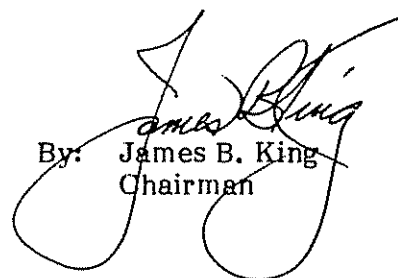
On August 3, 1978, the ASME replied that the committee would initiate whatever action was required. On September 6, 1978, the ASME Gas Piping Standards Committee stated that the action recommended in P-78-43 was under review. The Safety Board has received no statement as to any action taken as a result of the review.

Therefore, the National Transportation Safety Board recommends that the Missouri Power & Light Company:

Review company records and maps to identify locations where compression couplings have been installed on unrestrained plastic pipe of sufficient length that thermal contraction could cause separation from the couplings and take corrective action as necessary to prevent such separations. (Class II, Priority Action) (P-81-21)

Install alarms on the existing gas pressure and gas flow telemetering equipment to promptly alert operators to emergency conditions such as linebreaks which are evidenced by abnormally high gas flow rates or pressure reductions. (Class II, Priority Action) (P-81-22)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN, and BURSLEY, Members, concurred in these recommendations.


By: James B. King
Chairman