

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: July 31, 1978

Forwarded to:
Mr. Lowell Elder, Chairman
American Society of Mechanical Engineers
Gas Piping Standards Committee
United Engineering Center
345 East 47th Street
New York, New York 10017

SAFETY RECOMMENDATION(S)
P-78-43

At 9:00 a.m., c.d.t., on July 30, 1977, a low-order explosion followed by fire destroyed a house in Cherokee, Alabama. One person in the house suffered third-degree burns, was hospitalized, and died on August 3, 1977. The National Transportation Safety Board's investigation of the accident revealed that natural gas, leaking from a broken 2 1/4-inch cast-iron gas main, migrated into the house through a recently backfilled sewer trench and was ignited by a cigarette lighter. The sewer laterals were perpendicular to and below the gas main. Earth settlement of the sewer backfill, aided by recent heavy rainfall, caused the failure of the cast-iron main, which was owned by the Cherokee Water and Gas Board (Cherokee).

A recorded increased rate of gas flow and concurrent pressure drop shown on a 7-day chart at the Alabama-Tennessee Natural Gas Company's Cherokee City Gate Station indicated that the main broke at 9:00 p.m. on July 29, 1977. Metering pressure was 4 psig below normal. In the 12 hours between the break and the explosion, approximately 200 Mcf* of gas escaped through a 1/4-inch fracture.

The city of Cherokee has a small single-gate station pressure regulating distribution system serving 211 residential and commercial customers. The average summer load is only 12 Mcf/day; a maximum hour demand of 14.5 Mcf was sustained during a peak daily demand of 346 Mcf on December 1, 1976. The leak under discussion occurred during a minimal load period, but would have been apparent on this system at any time of the year. There are many small systems comparable to Cherokee's throughout the United States.

* Mcf = Thousand Cubic Feet

Federal regulations (49 CFR 192.741) require all but single-gate pressure-regulating distribution systems to telemeter or record gas pressure in the system. On systems that are supplied by a single-gate pressure-regulating station, the Federal regulations are ambiguous and leave it up to the operator as to whether telemetering or pressure gauges are necessary in the system. However, in either case, the standards do not require that a pipeline operator continuously monitor the gas pressure to insure early detection of any problems. As in the case at Cherokee, the 7-day chart readily displayed the problem, but the chart was not looked at until after the accident and therefore was of no use in the early detection of the leak. Had Cherokee been aware of the pressure drop or rate-of-flow increase immediately, corrective action could have been taken.

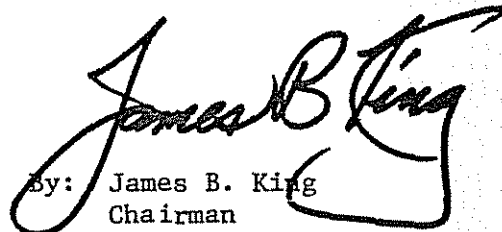
The use of telemetering equipment, although not specifically required, is a practical consideration for small, single-gate systems if it can be monitored continuously. However, most small systems do not have enough personnel for this. Cherokee has only two full-time gas system employees.

Because it is expensive and inefficient for small systems like Cherokee to provide personnel for 24-hour monitoring, many distribution operators, although not required to do so, have telemetering devices with a high/low alarm system in operation for each station. If the pressure or the flow rate changes beyond preset limits, an alarm sounds. In this case, an alarm at the gas company's Cherokee City Gate Station could be telemetered to a continuously monitored location such as the city's emergency desk or the pipeline supplier's station. The party receiving the alarm could then have alerted gas company personnel to the problem and initiated corrective action.

Therefore, the National Transportation Safety Board recommends that the Gas Piping Standards Committee of the American Society of Mechanical Engineers:

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)

KING, Chairman, McADAMS, HOGUE, and DRIVER, Members, concurred in the above recommendation.


By: James B. King
Chairman