

Log P-201

**NATIONAL TRANSPORTATION SAFETY BOARD**  
WASHINGTON, D.C.

ISSUED: September 8, 1982

Forwarded to:

Mr. David C. Harison  
President and Chief Executive Officer  
Missouri Power and Light Company  
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SAFETY RECOMMENDATION(S)

P-82-32 through -36

About 10:30 a.m., e.s.t., on January 28, 1982, at Centralia, Missouri, natural gas at 47 psig entered a low pressure distribution system which normally operated at 11 inches water column (0.40 psig) after a backhoe bucket snagged, ruptured, and separated the 3/4-inch-diameter steel pressure regulator control line at the Missouri Power and Light Company's district regulator station No. 1. The backhoe, which was owned and operated by the city of Centralia, was being used to clean a ditch located adjacent to the pressure regulator station. The high pressure gas entering customer piping systems in some cases resulted in high pilot light flames which initiated fires in buildings; while in other cases, the pilot light flames were blown out, allowing gas to escape within the buildings. Of the 167 buildings affected by the overpressure, 12 were destroyed and 32 sustained moderate to heavy damages. Five persons received minor injuries. <sup>1/</sup>

The Safety Board's review of the annual inspection reports for regulator Station No. 1 indicated that during the 5-year period before the accident the regulator station's relief valve had been variously turned off or not checked. The annual inspection reports for the regulator station had been filed and never reviewed or studied by gas company management and the fact that the relief valve was placed in an inoperative mode was not known to management, nor did it know why it was inoperative, why any deficiency was not immediately repaired, or make any analysis of what the consequences might be if the valve was left in the inoperative mode. Because such analysis of these inspection records was not routinely performed, gas company management was not alerted to the fact the overpressure protection for the low-pressure system in Centralia had been nullified. The serviceman who performed the last annual inspection for station No. 1 said that he reported the position of the relief valve to his supervisor; however, no records exist to indicate what action the supervisor took to rectify the situation. If, at the time of the control line rupture, the relief valve had been in the open or operational position, this accident would have been avoided because the high pressure gas would have been vented to the atmosphere through the relief valve's vent line and the low-pressure distribution system would have been protected from overpressure.

The loading and sensing lines for the regulator were attached to the high and low pressure piping, respectively, outside the metal building and were, therefore, vulnerable to damage from excavation operations. Although no Federal regulations for

<sup>1/</sup> For more detailed information, read "Pipeline Accident Report -- Missouri Power and Light Company, Natural Gas Fires, Centralia, Missouri, January 28, 1982," (NTSB-PAR-82-3).

the design and installation of regulator stations were in effect when station No. 1 was built in 1957, industry standard ASA B31.8 was in existence. The Missouri Power and Light Company should have installed the regulator station according to the standard, which is a recommended guide and not a mandatory practice.

If the pressure readings at the four regulator stations in Centralia had been telemetered to the dispatching center in Moberly, which is manned 24 hours per day, and if the station had been connected to an alarm, the abrupt increase in pressure in the low-pressure system and the rapid pressure drop in the high-pressure system (47 to 40 psig) would have immediately alerted the dispatcher to the overpressure condition in the low-pressure distribution system. He could have sent a service line worker to the regulator station to shut it down sooner. Although telemetering of pressures to a central manned office is not a Federal regulation requirement, had the process been used in this instance, it would have identified the overpressure problem and allowed the company to implement prompt, explicit action and to employ adequate resources.

The Safety Board has previously made recommendations to the Missouri Power and Light Company concerning the use of telemetered equipment. On January 8, 1981, the Safety Board investigated a 2-inch-diameter gas main which pulled apart at a compression coupling in downtown Mexico, Missouri. Natural gas at 43 psig escaped and was ignited in a nearby building. The explosion and fire destroyed the building, damaged an adjacent building, broke windows, and damaged several vehicles. There were no fatalities; however, three firefighters were injured while fighting the fire. The increased rate of flow that occurred when the coupling failed was shown at that time on the telemetered gas pressure and rate of flow chart at the then unmanned Missouri Power & Light Company's service center. As a result of its investigation, the Safety Board recommended that the Missouri Power & Light Company:

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

Even though the city officials and the foreman believed that the culvert cleaning operations did not constitute an act of excavation, the Safety Board believes that the Missouri Statute clearly included this type of operation within its definition of the term "Excavation" and intended that notification of such operations be provided to operators of underground facilities. Even absent of any statutory requirements for actions to prevent damage to underground facilities, there continues to exist an urgent need for the city and the gas company to take action for the prevention of excavation damage to the underground gas system because of the numerous crossings of city drainage ditches over the underground gas piping system. The potential for the city's ditch cleaning operations to damage the gas pipeline system has existed for years and, as verified by the city's foreman, such operations have on several occasions damaged the gas system. Since these damages never resulted in an accident, the foreman was never particularly concerned. He considered these accidents to be unimportant and he did not realize the potential for a major accident. However, neither the city nor the gas company acted to inform the city employees about the potential consequences of damaging the underground piping system or to assure that pipelines in the vicinity of proposed excavations were located and marked before work was begun. Had such actions been taken before this accident, the foreman would have been aware of the location of the pipeline and could have been briefed about the types of facilities which existed in the path of the proposed cleaning operations. With this information, it is doubtful that mechanized equipment would have been used at this location to perform the work.

Had a one-call system been in operation in Centralia before the accident, the city's task in giving notice of proposed excavations to the gas company and other underground facility operators would have been simplified; but of greater importance, the "one-call" system could have reinforced the Missouri Statute through educational and promotional efforts to acquaint excavators and operators with the purpose of the system and the importance of damage prevention measures. Experience with existing "one-call" systems shows that they serve to focus the damage prevention efforts of all underground facility operators, including those operated by government agencies, into a more effective and less costly damage prevention program, motivate increased cooperation between excavators and operators of underground facilities, and provide an effective means for disseminating information about applicable laws and regulations. As previously stated by the Safety Board 2/, "The effectiveness of any program to prevent damage to ...pipelines depends on many separate but interrelated factors. A program which does not address all factors can only be partially effective." At the time of this accident, only one of the factors considered necessary for an effective program existed -- Missouri Statute, Chapter 319.

Data based on accidents reported under 49 CFR Part 191, "Transportation of Natural Gas by Pipeline; Report of Leaks," to the Materials Transportation Bureau of the U.S. Department of Transportation, indicate that outside force damage caused by excavation activities is the primary cause of pipeline failure. In view of this information, the Safety Board is concerned about the possibility of accidents similar to the Centralia accident occurring in other gas distribution systems.

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

Implement a procedure for the systematic review of inspection records to assure that unsafe conditions noted by inspectors are promptly corrected. (Class II, Priority Action) (P-82-32)

Conduct an inspection of all of its district regulator stations system-wide to determine if all relief valves and control sensing line valves are in their correct positions and if the regulator station control lines are adequately protected against excavation damage and take corrective action as necessary. (Class II, Priority Action) (P-82-33)

Review its maps and records of district regulator station piping to determine their accuracy and completeness and take appropriate action where necessary to correct these documents. (Class II, Priority Action) (P-82-34)

Establish a public awareness program for the prevention of excavation caused damage to underground facilities and support the establishment of a "one-call" notification system in its area of operation. (Class II, Priority Action) (P-82-35)

2/ Special Study, "Prevention of Damage to Pipelines," NTSB-PSS-73-1, June 7, 1973, p. 7.

Install equipment to transmit gas pressure or gas flow data from district regulator stations in Centralia to the dispatcher at Moberly, Missouri, with alarms to alert the dispatchers in the event of abnormal gas flow rates or pressures. (Class II, Priority Action) (P-82-36)

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "...to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations." (P.L. 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations. Therefore, we would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter.

BURNETT, Chairman, and McADAMS, BURSLEY, and ENGEN, Members, concurred in these recommendations. GOLDMAN, Vice Chairman, did not participate.

*Donald A. Engen*  
for By: Jim Burnett *Member*  
Chairman