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P-217

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

ISSUED: January 27, 1983

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Forwarded to:

Honorable Howard Dugoff  
Administrator  
Research and Special Programs  
Administration  
U.S. Department of Transportation  
Washington, D.C. 20590  
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SAFETY RECOMMENDATION(S)

P-83-1

At 3:20 a.m., m.d.t., on June 28, 1982, a natural gas explosion demolished a house, killed five persons, and critically injured one person at 827 West 18th Street in Portales, New Mexico; the critically injured person died later at a burn treatment center. The gas service line to the house had been damaged 37 days earlier when a contractor's backhoe pulled up the line during conduit excavation work for the local telephone company. At the same time the line was pulled out at the excavation site, the line was pulled out of a compression coupling buried under the street. The pullout at the excavation site was repaired, but the pullout under the street was not repaired until after this accident because the gas company did not detect it when it happened. 1/

The gas service line involved in this accident was part of a typical residential gas service operation. The 3/4-inch-diameter gas service line extended approximately 63 feet from the 2-inch-diameter gas main to the property line of 827 West 18th Street, where it was connected to the customer's 1 1/4-inch-diameter service line, which extended 30 feet to the gas meter on the front of the house. The gas in the system was transmitted at a 25- to 60-psig pressure. The gas main and service line were buried at a depth of 28 inches. The house at 827 West 18th Street was the only one on that block that had gas service from the front. Other gas service lines in the area were connected to a 2-inch-diameter gas main in an alley behind the 800 block of West 18th Street.

In 1966, the gas company replaced an old 2-inch-diameter gas main along West 18th Street with a new, coated, wrapped, and cathodically protected 2-inch-diameter steel main. At that time, the bare steel 1 1/4-inch-diameter service line to 827 West 18th Street was replaced with a new 3/4-inch-diameter, coated, and wrapped steel line. The old line was abandoned in place, and the new line was connected with a compression coupling to the existing 1 1/4-inch customer service line at the property line. Later in 1966, the city of Portales installed a water line in the middle of West 18th Street, and to facilitate the construction of the water line, the city asked the gas company to cut the gas service line to 827 West 18th Street. When the water line installation was completed, the gas company reconnected the gas service line by installing two compression couplings and reconnecting the service line. The area was then backfilled, and the road surface was repaved.

1/ For more detailed information, read Pipeline Accident Report--"The Gas Company of New Mexico, Natural Gas Explosion and Fire, Portales, New Mexico" (NTSB-PAR-83-1).

The contractor stated that he had visited the gas company to look at maps and to identify locations where the proposed conduit crossed the gas main. The contractor also stated that the gas company told him that he would not encounter any gas lines along West 18th Street until he began to excavate west of South Avenue I. The contractor stated that gas company personnel and telephone company personnel stopped by several times each day to talk and observe the work he was performing.

The contractor stated that a gas company employee had informed him earlier that there were no gas lines in the 800 block of West 18th Street between Golden Acres Road and South Avenue I, and that all service lines for the residential housing in that block were run from the alley behind and not from the front of the property on the street. The gas company has denied that the gas company employee gave the contractor such information.

The maps for the gas mains in Portales are aerial photos of the city which show only the gas mains. The gas company does not enter its gas service lines on these aerial maps. In its investigations of pipeline accidents in Greenwich, Connecticut, on May 25, 1977, in Williamsport, Pennsylvania, on January 25, 1977, and in Mansfield, Ohio, on May 17, 1978, the Safety Board found that the inaccuracy of, or the lack of, system maps caused or contributed to the accidents. On August 21, 1978, the Safety Board recommended that the Materials Transportation Bureau (MTB) of the Research and Special Programs Administration, U.S. Department of Transportation:

Revise 49 CFR 192 to require that gas company system maps and records be maintained accurately to identify the location, size, and operating pressure of all of their pipelines. (P-78-50)

In a letter to the Safety Board dated November 8, 1978, the MTB stated that,

MTB has completed its review of the NTSB report and has concluded that the implementation of these Recommendations would improve pipeline safety. Because both require a revision of the Federal Regulations, we will consider these Recommendations in developing our regulatory schedule commencing in January 1979.

On November 29, 1979, the MTB issued an Advance Notice of Proposed Rulemaking (ANPRM), "Transportation of Natural Gas and Other Gas by Pipeline; Maps and Records," Docket PS-61, inviting comments "relative to the need to establish regulations which would require gas pipeline operators to have adequate maps and records of their pipeline systems."

Eighty-three comments were received; most respondents were opposed to a Federal requirement for maps and other records and stated that the proposed requirements already were being fulfilled. At the Technical Pipeline Safety Standards Committee Meeting of April 15, 1980, MTB orally stated its position that the proposed regulations were directed at companies that did not have adequate maps and records and needed the prodding of such a regulation. On February 29, 1980, the Safety Board commented in support of the ANPRM stating that,

Maps and records sufficient to identify and locate the major components of buried pipelines are essential for a gas pipeline operator to conduct safely the expansion, operation, and maintenance activities normal to this industry. Also, these records are required to provide early location information to persons proposing to excavate near gas facilities

. . . . Safety Board reports of gas pipeline accidents have identified the clear need for such improved records. Operators of liquid pipelines subject to 49 CFR 195 are now required to maintain maps and other pipeline identification and location records and we urge the MTB to act expeditiously to require similar records for gas systems.

More than 2 years later, the MTB announced its intention to withdraw its rulemaking project concerning maps and other record requirements for natural gas pipelines (see 47 Federal Register 48666, October 28, 1982) because it had determined that a requirement for such documents would not be cost-effective. The Safety Board learned that the reason for the decision to withdraw the proposed rulemaking was the MTB's April 1981 report entitled, "Cost Benefit Analysis of Increased Natural Gas Pipeline Safety Regulations," issued in response to requirements contained in Section 110 of the Pipeline Safety Act of 1979 (Act). This section of the Act required the Secretary of Transportation to study the adequacy and cost-effectiveness of existing pipeline safety regulations and address, among other things, the issue of "whether natural gas pipeline safety could be significantly enhanced in a cost-effective manner by regulations requiring operators to prepare and maintain a general description of their natural gas pipeline facilities."

The MTB report assessed the effect of the existing regulations upon gas system safety and assessed the need for additional rulemaking action by analyzing data provided to the MTB by reporting gas companies on Individual Leak Reports and Annual Reports. The Safety Board, in its report, "Safety Effectiveness Evaluation of the Material Transportation Bureau's Pipeline Data System" (NTSB-SEE-80-4), showed these data to be incomplete, inaccurate, and unusable for meaningful safety analysis purposes.

To assess the cost-effectiveness of a requirement that operators of gas systems prepare and maintain a general description of their natural gas pipeline facilities, the MTB report postulated a requirement for maps and records which encompassed:

- (1) the location of the pipeline and the pipeline facilities;
- (2) the type, age, manufacturer, and method of construction of such pipeline facilities;
- (3) the nature of the materials transported, the sequence in which they are transported, and the pressure at which they are transported;
- (4) the climatic, geologic, seismic, and other conditions (including soil characteristics) associated with the areas in which the pipeline facilities are located, and the existing and projected populations and demographic characteristics within such areas; and
- (5) specific types of detailed data such as the type of joining method used and material specification.

Notably, however, the proposal which was evaluated did not include a requirement that the service lines be included in the pipeline facility description.

In reviewing the current practices of pipeline operators, the MTB report used responses to the ANPRM from the Interstate Natural Gas Association of America (INGAA) and the American Gas Association (AGA), which provided comments "on typical practices of pipeline operators as they relate to the data elements that might be required for the description of pipeline facilities." Cost estimates for preparing and maintaining a

description of pipeline systems as described above were obtained from pipeline companies, and a cost for the gas industry to comply with a potential requirement to prepare and maintain a description of its pipeline systems as described above was projected.

No data were developed concerning the benefits which might be expected should the pipeline operators prepare and maintain the proposed description of their pipeline systems. A discussion about the possible use of the proposed data in relation to the prevention of excavation damages was included in the MTB report. The fact that accidents have occurred as a direct result of a pipeline operator not knowing the location of gas pipeline facilities was not emphasized in the report, and the resultant loss of life, injuries to persons, and property damage were not considered. The MTB report recognized that the operators of large pipeline systems now voluntarily incur the costs associated with preparing and maintaining maps and other records necessary for the location of their buried pipeline facilities, but the report did not address the reasons why they have elected to do so.

The MTB report concluded that, based on a 20-year life for such records, to require pipeline operators to develop and maintain a description of their pipeline facilities, as defined in the report, would not "warrant the costs of compliance." Consideration of requiring alternatives other than the MTB-defined "system description" or of individual elements or combinations of individual elements contained in the MTB-defined "system description" were not considered.

The gas company's Operating and Maintenance Plan, "Operations Mapping, 671.7," states that maps shall be kept in detail and up to date. Contrary to this specific directive, however, maps were not available showing the location of the service line to 827 West 18th Street or any other service line in that area. If the gas service line to the house at 827 West 18th Street had been shown on the gas company maps, presumably it would have been pointed out to the contractor and marked. This lack of mapping of service lines prevented the gas company personnel who discussed the conduit excavation project with the contractor and with the telephone company from identifying all of the gas company's facilities on West 18th Street and marking them. Because telephone company personnel and the contractor had met with gas company personnel before and during the project, and because these meetings had resulted in precautions taken at locations shown on gas company maps where the conduit crossed the gas main, the Safety Board believes that had the service line to 827 West 18th Street been made known to the contractor and marked at the site before excavation, it too would have been protected from damage, and this accident would not have happened.

Also, because gas service lines are not shown on the gas company maps, gas company employees relied upon their general knowledge and memory concerning line location. Consequently, the fact that other service lines in the area were connected to a main in the alley behind the 800 block of West 18th Street probably influenced gas company employees to tell the contractor that there were no more lines in his path. This fact probably further influenced gas company personnel on the night of the accident to search for the gas meter in the alley behind the house instead of in the front. While the delay in locating the gas meter in this emergency did not result in any additional loss of life or damage, it demonstrates the importance of having accurate maps or other immediately available records for locating gas facilities.

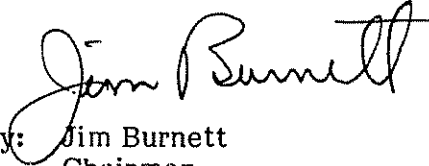
The Safety Board is concerned that there continues to be no regulations requiring gas pipeline maps and records. The Safety Board believes that the MTB's April 1981 report on its study concerning the cost-effectiveness of pipeline system maps and records for improving gas pipeline safety is deficient because the study is based primarily upon

data which the Safety Board has previously determined to be incomplete and erroneous. Moreover, the study considered only one of many possible combinations of data which could provide adequate information for the location of pipeline facilities. The data which the MTB considered were very detailed, and included superfluous information not essential for identifying and locating pipeline facilities. Thus, the Safety Board concludes that the results of the study do not justify the MTB's intended withdrawal of its ANPRM regarding the need to establish regulations which would require gas pipeline operators to have adequate maps and records of their pipeline systems. The Safety Board believes that its recommendation P-78-50 concerning maps and records is still valid, and the Safety Board further believes that the MTB should not withdraw its ANPRM.

Therefore, the National Transportation Safety Board recommends that the Research and Special Programs Administration of the U.S. Department of Transportation:

Discontinue its planned withdrawal of rulemaking in Docket PS-61 and expedite rulemaking to require pipeline operators to maintain maps and records necessary for the safe operation of their systems. (Class II, Priority Action) (P-83-1)

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

  
By: Jim Burnett  
Chairman