

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

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Forwarded to:

Mr. W. T. Barnhouse
President
and Chief Operations Officer
Gas Company of New Mexico
P.O. Box 26400
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SAFETY RECOMMENDATION(S)

P-83-2 and -3

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/

Soon after the contractor pulled up the line on Sunday, May 23, 1982, the contractor saw a gas company vehicle pull up at a nearby store and told the gas company employee in the vehicle about the line. The gas company employee telephoned a gas company serviceman who came to the site, determined that it was a gas service line, cut the line at the north side of the ditch, and plugged it with a 3/4-inch-diameter rubber plug. When the line was cut, the sound of escaping gas was heard, and the odor of gas was detected by both the contractor and the gas company employees. The section that was cut from the line was neither measured nor examined carefully by the gas company employees or the contractor. After the line was plugged, a gas company employee told a resident of the house at 827 West 18th Street that the gas service had been interrupted because of the service line break, and that service would be restored in the morning. The gas company serviceman recorded the incident on a leak report and rated it as a Grade I leak.

On May 24, 1982, a gas company construction and maintenance foreman and a senior crewman were dispatched to 827 West 18th Street to repair the gas service line. The foreman asked the contractor about the location of the section of line that had been removed because he wanted to measure it to determine more accurately the amount of line needed for reconnecting the line. The foreman was told that the damaged section of line was on the contractor's trailer, but the foreman did not find it on the trailer or elsewhere. The contractor estimated that he pulled up 10 to 12 feet of the line, and the gas company employees who had been at the scene on Sunday estimated that 6 to 7 feet of the line had been pulled up. The contractor and the gas company employees were not sure of their estimates.

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 foreman, using a backhoe, excavated between the curb and the sidewalk to uncover the customer's service line, a 1 1/4-inch-diameter steel line which extended approximately 33 feet from the gas meter at the front of the house to the property line, where it was coupled to the gas company's 3/4-inch gas service line, which extended another 60 feet to a 2-inch-diameter gas main under the north side of West 18th Street. The foreman found that the line had been pulled out of the coupling, which was about 7 feet from the plugged end of the 3/4-inch line at the north side of the ditch. To reconnect the line, the foreman first welded onto the 1 1/4-inch line a 7-foot-long section of 3/4-inch wrapped line which included a 1-inch-diameter pipe nipple and a 1 1/4-inch-diameter pipe nipple to make the transition from the 3/4-inch line to the 1 1/4-inch line. To connect the 7-foot section of pipe to the existing 3/4-inch line, a 3/4-inch compression coupling was installed on the open end of the replacement line, the plug was removed from the existing line, the compression coupling was positioned over the ends of the replacement line and the existing line, and the coupling was tightened.

The foreman later stated that "we then probed in the customer's yard, in the bank of the contractor's ditch toward the street under the blacktop, and at the service tap. The only reading was a trace (2 percent LEL) picked up in the ditch by the cut." The welds and the compression coupling joint were tested for leaks using a soap solution; no leakage was noted. The service line from its connection with the gas main to the meter at 827 West 18th Street, approximately 93 feet, was not pressure tested. The foreman backfilled the area between the curb and the sidewalk at 9:30 a.m. and telephoned for a gas serviceman to relight the customer's appliances. The gas serviceman relit two water heaters at the owner's request and, after checking their operation, left. The contractor completed the excavation, installed the telephone conduit, backfilled the ditch, and poured a 4-inch-thick protective cap of concrete to finish the excavation later in the day.

Telephone company personnel inserted telephone cables into the newly installed conduit and connected the sections of cables within the manholes. The telephone company requires its personnel to use combustible gas indicators (CGI) to test the atmosphere in manholes and vaults before they enter these structures. Work in the manhole at the southwest corner of West 18th Street and South Avenue I was completed on June 21, 1982. From May 24 through June 21, 1982, telephone company personnel working in this area neither heard sounds nor detected the odor of leaking gas. Gas company records indicate no reports of gas odor in this area during this period.

After the accident on June 28, 1982, the gas company pressure tested the entire service line from its connection with the gas main to the valve at the meter; the service line did not hold pressure. The service line was excavated in the area of the May 24, 1982, repair where the compression coupling had been installed and the area backfilled with dirt. The line between the coupling and the gas meter was tested; the line held pressure. Next, the line between the coupling and the gas main connection was tested; it did not hold pressure. After excavating and exposing the service line under West 18th Street, gas company employees discovered that the service line was separated by 65 inches where it had been pulled out of a compression coupling under the middle of the street.

In 1966, the gas company had 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.

The critical element here is the missing piece of service line which could not be located. The contractor stated that he thought the missing piece was 10 to 12 feet long, but he did not measure it, and he later stated that he could not be sure of his estimate. The two gas company employees, one of whom cut and plugged the service line on the day of the pullout, estimated that the missing piece was 6 to 7 feet long, but they also stated that they were not sure of their estimate and that they had not measured or carefully examined the piece either. The gas company employee correctly identified the pullout as a Grade I leak requiring immediate repair because it represented a hazardous condition. However, he reacted only to the obvious fact that a service line had been damaged and he failed to investigate the conditions surrounding the pullout. His investigation should have included the examination and measurement of the snagged line. This omission was critical to this accident, because the information should have been available on the following day when the gas company foreman reconnected the gas service line to the customer service line at 827 West 18th Street. He used only 7 feet of new line; had the missing line been 12 feet long, and had the foreman known this, then when he saw that he needed only 7 feet of new line to reconnect the gas service line to the customer service line, he presumably would have realized that an additional 5 feet of line was missing somewhere on the service line. Undoubtedly, he would have taken steps to find the gap in the line by either digging up the line across West 18th Street or by excavating the line at the gas main and then pressure testing the entire service line to 90 psig. Another gas company omission was the failure of its personnel to retain the pulled out piece of line. Had they done so, the piece would have been available for the foreman's inspection and measurement the next day, this might have prevented the accident. Both of these omissions--the failure to measure and inspect the damaged line and the failure to retain the cut-out--were contrary to the gas company policy of investigating failures to minimize the possibility of a recurrence.

Unfortunately, on the following day, there was a further failure to follow completely the company procedures which state that service lines which have been "disturbed" shall be tested as new service lines--at a pressure of 90 psig in this case. The foreman did not excavate the service line at its connection with the gas main, separate it from the gas main, and initiate a 90-psig test of the service line from the gas main to the house meter. Had he done so, the line would not have held pressure, and a search for the leak would have resulted in the discovery of the 65-inch separation.

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 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.

Finally, if the gas company employee who cut and plugged the snagged service line on May 23 or if the crew which reconnected the service line on May 24, 1982, had checked available company records which showed that compression couplings had been installed on the service line under the middle of the street in 1966, they might have been alerted to consider the possibility of an additional pullout under the street, given the amount of pipe crimped around the backhoe, and additional inspection and pressure testing might have been performed and the line separation discovered and repaired.

The gas company's training program appears adequate, in that the frequency of training courses received by the employees in recent years, as well as the scope of the courses, was appropriate. Nevertheless, the employee who plugged the service line on the day of the pullout and the crew which reconnected the service line on the following day failed to follow gas company procedures. Moreover, the employees' experience with gas operations should have alerted them to the possibility of a second pullout as a result of the forces produced when a service line is snagged and pulled out by a backhoe. In this case, neither the company training nor the experience of these employees sufficed to alert them to the potential danger posed by the pulled out service line; apparently, the training in maintenance and repair and emergency procedures did not make a lasting impression.

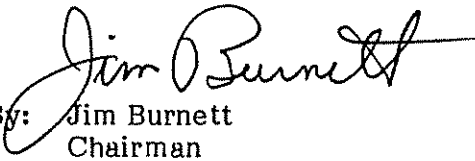
Therefore, the National Transportation Safety Board recommends that the Gas Company of New Mexico:

Include accurate information on its system maps to identify the existence and location of all service lines. (Class II, Priority Action)
(P-83-2)

Revise its construction, maintenance, and emergency procedures and its training program, and develop explicit instructions for its employees to follow when repairing damaged gas facilities. Particular emphasis should be placed on investigating and testing for unseen pipe separation. (Class II, Priority Action) (P-83-3)

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 recommendation(s). Therefore, we would appreciate a response from you regarding action taken or contemplated with respect to the recommendation in this letter.

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


By: Jim Burnett
Chairman