

10/1# P-287



National Transportation Safety Board

Washington, D.C. 20594
Safety Recommendation

Date: September 2, 1987

In reply refer to: P-87-35 through -38

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A new water main was being installed along 14th Street in Chicago Heights, Illinois by the Alpha Construction Company (contractor). Before the work was begun the Northern Illinois Gas Company marked the location of its service lines and mains. On the morning of March 13, 1986, while excavating east of the marked service line for 204 14th Street, the contractor's crew snagged a gas service line with a backhoe. Because this gas service line was approximately 4 feet away from the mark and because of the line's deteriorated condition, the contractor's crew assumed correctly that it was abandoned and used it as an indication that they were near the area of the active service line. The foreman instructed the backhoe operator to take off the "frost" using the backhoe, in preparation for excavating by hand digging. Shortly thereafter, about 7:30 a.m., the backhoe snagged the active, wrapped, 3/4-inch steel natural gas service line for 204 14th Street. The line was operating at 28 psig and was 30 inches below the surface. According to the foreman, the crew could smell gas but they did not observe any blowing gas around the snagged service line. The foreman radioed his office and reported the leak. At 7:37 a.m. the office personnel called the Northern Illinois Gas Company (gas company) and informed the gas company of the accident but received no instructions from it. The gas company's call record showed that there was a line hit reported at Route 30 (14th Street) and Garden. The record had the following handwritten note, "Hit line-Don't know if blowing"; however, the record was stamped "LEAK." 1/

The gas company did not know whether a main or a service line had been struck when it dispatched crews at 7:42 a.m. Since the report only gave the street and cross street of the accident, the dispatched crews assumed that a main line had been damaged. When questioned later, the crew members stated that they thought they were responding to an emergency situation. According to gas company officials, all leaks are treated as emergency situations.

When the gas company crew arrived about 7:50 a.m., they saw two contractor crews working on opposite sides of the street. Unable to determine which crew had hit the line, the gas company crew went to the site with the largest backhoe; however, after talking

1/ For more detailed information, read Pipeline Accident/Incident Summary Report—"Chicago Heights, Illinois, March 13, 1986," (NTSB/PAR-87/01/SUM).

with the laborers they found out this was not the correct site. The gas company crew took a few minutes to cross 14th Street due to heavy traffic, but on arrival they quickly determined that it was a service line that was damaged. The lead man of the gas company crew went to the house at 204 14th Street and closed the gas valve at the meter. When interviewed, the gas crew stated that there was no odor or only a slight odor of gas in the area. However, just as the lead man finished closing the valve about 8 a.m, the house exploded and began to burn; one of the two persons inside this house was killed and the other was injured. Two neighboring houses were damaged, and one gas company employee, two construction crew members, and four persons in the general area were injured by the explosion and subsequent fire. Although gas company personnel arrived on the scene approximately 10 minutes before the explosion and shut off the gas at the meter, neither they nor the contractor's crew had made an effort to warn or evacuate the residents of the house.

Additional gas company employees who arrived on the scene following the explosion reported it to their dispatcher and requested the fire department and an ambulance. The gas company crews continued their attempts to shut off the gas by digging over the service line near the house, but they were forced to withdraw due to the intensity of the fire. The gas was finally shut off about 8:45 a.m. after they dug through the asphalt at the intersection of 14th Street and Campbell and inserted a stopper ^{2/} into the main. A fire that had been burning in the area of the meter stopped burning at this time. After the gas was shut off, the gas company performed a leak survey of the area to check for migration of the gas and to determine if any of its facilities had been damaged by the explosion. The only area where gas was found was near the service line for 194 14th Street which was two houses east of the site of the explosion.

Excavation after the accident revealed that the service line for 204 14th Street was fitted with a compression coupling near the service riser located at the northeast corner of the basement of the house. The backhoe pulled the pipe from this coupling. Measurements indicate that the pipe had been moved 4 1/4 inches away from its pre-accident position on the street side of the coupling and 1 3/8 inches away on the house side. The service line had separated 1 1/4 inches on the street side but was still connected to the coupling on the house side. (See figure 1.) The walls of the basement were masonry and had several cracks any of which could have served as a path for the gas to enter the basement of the house.

The Safety Board believes that the use of excess flow valves could have prevented this accident. Had an excess flow valve been installed on the service line at its connection to the gas main, the flow of gas to the service line would have been shut off when it was pulled from the coupling and gas would not have accumulated in the house. In 1981, the Safety Board conducted a study ^{3/} on the use of excess flow valves and the Northern Illinois Gas Company was contacted as part of the background search. At that time, the gas company responded that it did not use excess flow valves. It believed that the service design features, (such as outside meters) produced the same effect in an accident and that the valves were generally unreliable. This policy remains unchanged. In its study, the Safety Board found that service design features do not completely protect against excavation damage downstream of the service-main connections. Accidents from these leaks may be prevented or the consequences reduced if excess flow valves are installed. Also, the Safety Board found that improved maintenance procedures and employee training can prevent false closures and thus improve the reliability of these

^{2/} A rubber plug inserted into the pipe to stop the flow of gas.

^{3/} For more detailed information read: Special Study "Pipeline Excess Flow Valves" (NTSB/PPS-81-1).

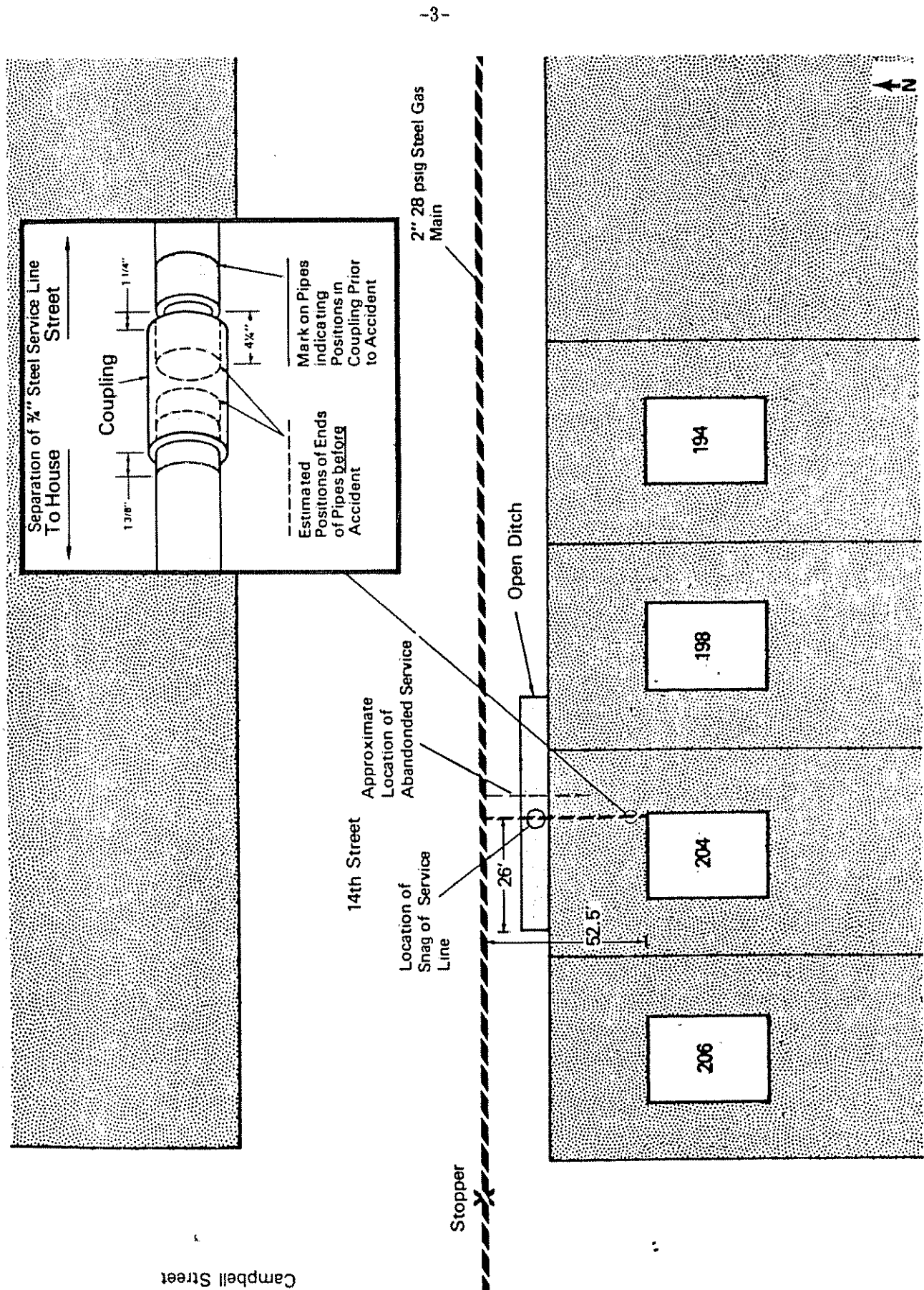


Figure 1.—View of accident location and detail.

valves. Companies that use excess flow valves have reported an average failure rate of 3×10^{-6} failures/year per valve. The Safety Board believes that the Northern Illinois Gas Company should reexamine its excess flow valve policy in light of this accident and the improvements made to these valves since 1980.

The gas company's emergency plan has two sections that specifically address responding to gas leaks; one section describes how to handle calls and the other section describes actions to be taken at the site of a suspected leak. The practices emphasize that human safety is the first concern. According to the plan, at the site of a leak, the gas crewmember is to check inside buildings for leaks; if the crewmember detects the odor of gas, he is to warn the residents and evacuate them from the buildings. If no gas odor is present anywhere in the building or at the service line, then an outside survey is conducted.

Northern Illinois Gas Company has a customer education program which is promoted through bill stuffers, elementary school programs, and newspaper advertisements. This program provides guidance on the hazards of natural gas and directs customers to call the customer information center when they detect a leak. When a residential customer reports a leak, the customer service clerk supplies basic instructions on what to do until the gas company arrives. The basic instructions include opening the windows and leaving the residence. However, similar instructions are not given to persons reporting an industrial problem, such as a contractor striking a pipe line. In the event of such a report, the basic response by the customer service clerk is, "Thank you, we will send a crew out to the site." The Safety Board believes that this response encourages the caller to wait until the gas company personnel arrive thereby wasting time that could be used to warn the public.

The gas company trains local fire departments as required by 49 CFR 192.615. Firefighters are instructed in the hazards of natural gas, natural gas firefighting techniques, and how to perform simple emergency repairs such as plugging a pipe or how to shut off gas service at the meter. Despite this training, gas company policy is that the fire department is not called for assistance unless there is an explosion or fire. The Safety Board continues to be concerned that gas companies fail to use local emergency response agencies to promptly initiate lifesaving actions for residents near gas leaks.

In its investigation of an accident on February 27, 1985, at Sharpsville, Pennsylvania ^{4/} the Safety Board found that the local police department advised the gas company at 3:15 a.m. of a gas leak approximately 35 minutes before an explosion destroyed a building and killed two persons. Although he had been dispatched quickly it took 45 minutes for the gas company serviceman to arrive on site. The gas company did not use the local emergency response agencies to warn the public. The accident in Sharpsville demonstrates how public safety can be endangered when gas companies do not request the assistance of local emergency response agencies or others to warn the public.

As a result of the Sharpsville accident, the Safety Board issued Safety Recommendation P-85-32 to the American Society of Mechanical Engineers, and the American Petroleum Institute, and P-85-33 to the International Association of Fire Chiefs, the International Association of Chiefs of Police, and the International Society of

^{4/} For more detailed information read, Pipeline Accident Report—"National Fuel Gas Company Natural Gas Explosion and Fire, Sharpsville, Pennsylvania, February 22, 1985" (NTSB/PAR-85/02).

Fire Service Instructors. These safety recommendations asked that these agencies work together to develop guidelines for utilities to describe circumstances under which local emergency response agencies should be called to respond to pipeline emergencies. None of these groups has responded and the recommendations are classified as "Open—Awaiting Response." A recommendation was made to the gas company to develop procedures for coordinating with local emergency response agencies. It responded that it will revise its emergency plan with emphasis on the section related to the use of emergency response agencies.

While the gas company in Chicago Heights responded quickly, approximately 20 minutes elapsed between the time the contractor called the gas company and the time of the explosion. In that time, the contractor's crew or the emergency response personnel could have warned and evacuated the residents of nearby buildings.

Therefore, the National Transportation Safety Board recommends that the Northern Illinois Gas Company:

Develop procedures for and train its dispatchers to inform contractors and other reporters of gas pipeline leaks, about the proper actions to take to protect public safety such as warning or evacuating residents of nearby structures. (Class II, Priority Action) (P-87-35)

Develop a program to use, in the event of gas pipeline leaks, civil emergency response agencies to implement emergency actions such as alerting residents and ventilating and evacuating buildings pending the arrival of gas company personnel. (Class II, Priority Action) (P-87-36)

Revise its policy on the use of excess flow valves considering the improvements made in these valves since 1980 and install them where necessary to protect public safety. (Class II, Priority Action) (P-87-37)

Emphasize in company training the importance of following company procedures for making areas near gas pipeline leaks safe for the public by evacuation or other means. (Class II, Priority Action) (P-87-38)

Also, as a result of its investigation, the Safety Board issued Safety Recommendation P-87-39 to the Alpha Construction Company.

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" (Public Law 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter. Please refer to Safety Recommendations P-87-35 through -38 in your reply.

BURNETT, Chairman, GOLDMAN, Vice Chairman, and LAUBER, NALL, and KOLSTAD, Members, concurred in these recommendations.

By:  Jim Burnett
Chairman