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NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: June 23, 1980

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Forwarded to:  
  
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SAFETY RECOMMENDATION(S)

P-80-50 through -53

At 10:12 a.m., c.d.t., on October 24, 1979, an explosion and fire destroyed the Greene County Clerk's office building and the adjoining Greene County Courthouse, gutted a connecting building which was under construction, and damaged nearby buildings in Stanardsville, Virginia. Thirteen persons were injured and the property damage was extensive. 1/

The Safety Board's investigation revealed that natural gas had leaked from a break in a 1 1/4-inch-diameter, coated, steel service line, which had been snagged by a backhoe that was being used to dig a footing for an addition to the county clerk's office building. The construction contractor, owner of the backhoe, was working for Greene County. The backhoe bucket hit the service line and pulled it about 3 inches out of the building wall. The tension on the pipe at the gas meter caused the pipe to crack at an elbow which connected the gas meter to a valve located inside the wall. An excess flow valve 2/ was not installed on the service line, and the rapid release of natural gas into the basement was not prevented. An excess flow valve closes automatically when the gas flow through the valve reaches or exceeds a predetermined flow rate. If an excess flow valve had been installed on the service line at Stanardsville, the gas flow would have been shut off when the service line was ruptured and this accident would have been prevented.

1/ For more detailed information read, "Pipeline Accident Report--Columbia Gas of Virginia, Inc., Explosion and Fire, Stanardsville, Virginia, October 24, 1979" (NTSB-PAR-80-3).

2/ An excess flow valve is a safety device usually installed at the intersection of the service line with the main line. The valve automatically and immediately will shut off gas flow at the main in the event of a service line rupture, preventing hazardous blowing of gas and preventing loss of pressure in the main until repairs are made and service line pressure restored.

The Safety Board pointed out the value of excess flow valves in a 1971 special study. <sup>3/</sup> The Safety Board also discussed this need in its accident report on the rupture of a service line in Lake City, Minnesota, on October 30, 1972, <sup>4/</sup> and in its accident report on the rupture of a service line in New York City, on April 22, 1974. <sup>5/</sup> In both reports the Safety Board noted that the use of an excess flow valve might have shut off the flow of natural gas after the service lines were ruptured and the resultant explosions and loss of life and property might have been averted or their severity reduced.

The Safety Board has twice recommended that the Materials Transportation Bureau (MTB) of the U.S. Department of Transportation develop standards for the rapid shutdown of failed pipelines and to study fail-safe devices to stop the flow of natural gas from ruptured lines. As a result of these recommendations, the MTB contracted for a study on the "Rapid Shutdown of Failed Pipeline Systems and Limiting of Pressure to Prevent Pipeline Failure Due to Over Pressure." The study, completed in October 1974, concluded that excess flow valves would improve safety, that they are available and technically feasible, and that they are economically feasible. The MTB is still reviewing the matter to determine what regulatory action it may take.

The service line was operated at 15-psig pressure and was buried under approximately 24 inches of cover. This line was connected to the gas main with a weld-on tapping tee and extended from the main, located under the street pavement, to the inlet side of a valve at the curb, and from there to the inlet side of the customer's meter. The original service line had been replaced in 1962, and the segment from the curb valve to the indoor meter, about 20 feet, was considered by Columbia Gas of Virginia, Inc., (gas company) to be a customer's line and not its responsibility. Title 49 CFR 192.3 defines a "service line" as "a distribution line that transports gas from a common source of supply to (a) a customer's meter or the connection to a customer's piping, whichever is farther downstream, or (b) the connection to a customer's piping if there is no customer meter." <sup>6/</sup>

The investigation disclosed that Greene County authorities did not invite the gas company to progress meetings on the construction project or to meet onsite with them to specify which lines might be subjected to damage. At the time of the accident, a "one-call" system was not in operation in Greene County, although a system was in use in the adjacent counties of Madison and Culpeper and in other Virginia counties. Approximately 44 of the 90 Virginia counties are using the "one-call" notification system at this time.

The most effective method of preventing excavation-caused damage to underground facilities is to notify the operators of utility companies in advance of the proposed excavation work to allow the operators to mark the location of their facilities before excavation begins. The most efficient and convenient method for excavators to

<sup>3/</sup> "Special Study--Effects of Delay in Shutting Down Failed Pipeline Systems and Methods of Providing Rapid Shutdown" (NTSB-PSS-71-1).

<sup>4/</sup> "Pipeline Accident Report--Northern States Power Company, Lake City, Minnesota, October 30, 1972" (NTSB-PAR-73-1).

<sup>5/</sup> "Pipeline Accident Report--Consolidated Edison Company, Explosion at 305 East 45th Street, New York, New York, April 22, 1974" (NTSB-PAR-76-2).

<sup>6/</sup> A customer meter is the meter that measures the transfer of gas from an operator to a consumer.

make this notification is through a "one-call" system. A "one-call" system establishes a center to which an excavator can make one telephone call to effect notification to all participating underground facility operators of the date and location of a proposed excavation project. The center alerts each operator so that each of their underground facilities near the work area can be located and marked. There are now 106 "one-call" systems operating in 41 States. Some systems provide Statewide coverage. In a 1978 special study, <sup>7/</sup> the Safety Board reported that a 1977 survey of "one-call" systems found a markedly downward trend in damage to underground facilities after the "one-call" systems were established. The greatest number of accidents to underground facilities after the "one-call" was established was attributed to excavators who did not notify the operators of underground facilities before undertaking excavation.

Throughout the country, the "one-call" notification system has been effective in reducing accidents and damage involving underground facilities. As an example, in 1972, the first year that the system was used by the gas, electric, telephone, and water utilities serving the two Maryland counties adjacent to the District of Columbia, there were 2,103 incidents of damage to their underground facilities. During 1976, the last year these statistics were recorded by the "one-call" center, the number of incidents had been reduced by 1,299--a reduction of 61.8 percent. In that same period, "one-call" notifications had increased tenfold.

The gas company was approached by the manager of "Miss Utility," the "one-call" system operating in central Virginia, in the spring of 1978, again in the spring of 1979, and again after the accident, and asked if it would be willing to cooperate in the expansion of the "one-call" notification system into Greene County. The gas company replied that because of the small number of facilities operating in that area, membership was not justifiable at that time.

The Safety Board is aware that there are a number of smaller communities similar to Stanardsville served by the gas company and where there are no gas company employees permanently stationed. It should be the responsibility of the gas company to train the local authorities (police, fire, or emergency units) in these communities to know where shutoff valves are located and to know how to operate them.

In this case, Columbia Gas Transmission Corporation personnel, who worked for the parent company of the gas company, were located at a compressor station within 3 miles of the accident site. The pipe was broken by the backhoe at 10 a.m., the gas company's Culpeper, Virginia, office was first notified at 10:10 a.m. of the line break, just before the explosion, and that office telephoned the compressor station to request help at the accident site. However, it was not until 10:45 a.m., 33 minutes after the explosion, that the pipeline system was shut down, and it was not until 10:50 a.m. that the first gas company personnel arrived at the accident site. Earlier arrival in this particular case would not have stopped the explosion or the resultant fire and personal injuries, but under different conditions it might have.

Therefore, as a result of its investigation of this accident, the National Transportation Safety Board recommends that the American Gas Association:

<sup>7/</sup> "Safe Service Life for Liquid Petroleum Pipelines" (NTSB-PSS-78-1).

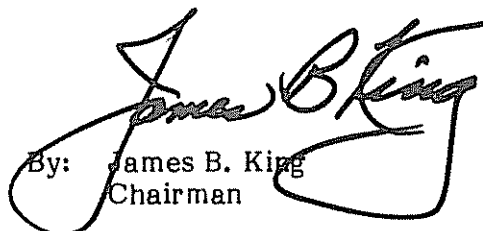
Advise its member companies of the importance of including in their operating and maintenance plans specific procedures, the same as for company-owned service lines, for the part of a service line identified under various companies' policies as "customer's service lines" or "yard lines." (Class II, Priority Action) (P-80-50)

Encourage its member companies to install excess flow safety valves on all newly installed or renewed high-pressure natural gas service lines in order to minimize a hazardous release of natural gas after a rupture. (Class II, Priority Action) (P-80-51)

Urge its member companies to participate in and encourage improvement in any "one-call" system in areas where their pipelines operate, and help organize and expand systems where they do not exist. (Class II, Priority Action) (P-80-52)

Advise its member companies to require in their emergency procedures the training and equipping of local emergency response agencies for the control of gas distribution pipeline failures in systems where qualified gas company employees cannot respond rapidly. (Class II, Priority Action) (P-80-53)

KING, Chairman, McADAMS and GOLDMAN, Members, concurred in these recommendations. DRIVER, Vice Chairman, and BURSLEY, Member, did not participate.

  
By: James B. King  
Chairman