

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

FOR RELEASE: 6:30 P.M., E.S.T., JANUARY 17, 1977
(202) 426-8787

ISSUED: January 17, 1977

Forwarded to:

Mr. Frank Stark
President
Maine Utility Gas Company
c/o Utilgas Service Corporation
660 Madison Avenue
New York, New York 10021

SAFETY RECOMMENDATION(S)

P-76-96 through P-76-100

At 2:40 p.m., on August 13, 1976, a flash fire in the basement of a house at 243 Union Street in Bangor, Maine, killed one gas company employee, burned two other employees, and caused minor damage to the house. The National Transportation Safety Board's investigation of the fire disclosed that liquefied petroleum gas (LPG) admixed with air at 7-inches water-column pressure, had escaped from a severely corroded segment of a 1½-inch bare steel service line at the basement wall. The escaping gas migrated underground along the service line and entered the basement through numerous openings in the stone foundation wall.

Two Maine Utility Gas Company servicemen had arrived at the house about 2 p.m. to investigate a customer's report of low gas pressure. When they could not locate the source of the problem, two streetcrew personnel were dispatched to assist the servicemen. At 2:20 p.m., the streetcrew opened a plug on a 1½-inch tee on the service line in the basement and determined that there was no gas pressure. A rag was used to partially seal the opening in the tee while a rod was put through the opening to probe into the service line. This restored gas pressure at the tee. When the rod was removed from the service line, however, the gas pressure returned to zero. The service line was probed again in the same manner until gas pressure was restored; then the plug was replaced in the tee. A serviceman went upstairs and attempted to light the gas range. There was no gas pressure, however, so he returned to the basement and reported this to the streetcrew foreman. He noted that the streetcrew foreman, in the front of the basement, was smoking a cigarette. The other serviceman, in

P-76-96 through P-76-100

the rear of the basement, who also was aware of the lighted cigarette, lit a match to illuminate his way as he started toward a water heater to check gas pressure in its fuel line. At this moment a ball of flame appeared around the feet of the streetcrew foreman and flashed toward the back of the basement. The streetcrew foreman burned to death, and the two servicemen suffered severe burns.

The gas company's operating procedures did not include instructions for this type of operation. They did not require servicemen to vent open service lines to a safe outside location or to monitor the atmosphere for combustible gases when working in confined locations. The procedures did not prohibit smoking or the introduction of other ignition sources while working near gas facilities.

A contractor had made leakage surveys of the company's gas mains previously. These surveys consisted of sampling the atmosphere of 18-inch-deep holes probed over the gas mains (at intervals not exceeding the distance between the gas main and the closest building) as well as holes probed over service line connections to the gas mains. Since service lines were not included the surveys were not adequate to locate potential gas leakage from the service lines or meter set assemblies. OPSO Advisory Bulletin 73-12 and 49 CFR 192.723(b) require that "The type and scope of the leakage control program must be determined by the nature of the operations and the local conditions" The fact that liquefied petroleum gas is heavier than air, that much of this system is buried more than 3 feet below the surface in a clay-type soil, and that this is a low-pressure gas system makes it doubtful that the surveys were adequate to detect gas leakage from this system.

The house's service line evidenced active corrosion as defined in 49 CFR 192.457(c). Although incomplete, the gas company's records show nine service line leaks from 1974 through July 1976, while Bangor Fire Department records show three gas service line leaks not recorded by the company from 1973 through July 1976; all of the leaks were caused by corrosion at the foundation wall. The gas company's 1970 through 1975 annual reports to the Office of Pipeline Safety Operations (OPSO) reported that 77 corrosion leaks were repaired. The annual reports to OPSO since 1970 show that 1,320 service lines have been retired and 30 have been replaced. The Safety Board learned that at least one-fourth of the service lines retired were corroded to the degree that replacement would have been necessary for future use. Many other leak reports to which the gas company responded are recorded by the Bangor Fire Department but do not appear in gas company records.

Title 49 CFR 192.457(b) requires that buried or submerged pipelines installed before August 1, 1971, except those made from cast iron, must be cathodically protected in areas of active corrosion by August 1, 1976. This gas system does not comply with the requirement, but the company has contracted for a survey to determine areas of active corrosion and for development of recommendations for cathodic protection.

One of the gas company servicemen stated that the only time the odor of gas was detected at the house was when it came from the service line tee. The other serviceman said he never smelled the odor of gas while at the house. The system received liquefied petroleum gas (LPG) in 30,000-gallon tank cars and the bills of lading indicated that 1½ pounds of ethyl mercaptan, an odorant, was added for every 10,000 gallons before it was shipped. The LPG was vaporized and mixed with air as needed. The company's only odor-level check was a monthly sniff test made by an employee without the aid of a device that determined the gas-in-air concentration at which the odor is first perceived. This action was not sufficient to insure that the intensity of the odor would be readily detectable throughout the system. Such assurance is required by 49 CFR 192.625 and OPSO Advisory Bulletin No. 74-1.

Therefore, the National Transportation Safety Board recommends that the Maine Utility Gas Company:

Develop written procedures to insure the safety of its personnel and the public when work is performed on active gas facilities within buildings or other enclosed locations and train its employees in the use of the procedures. These procedures should require the use of equipment to monitor the atmosphere for combustible gases and should prohibit smoking, open flames, or other sources of ignition.
(Class I, Urgent Followup) (P-76-96)

Inspect a sample of the bare steel gas service lines at foundation walls to determine the systemwide extent of corrosion and perform a survey capable of detecting gas leakage that includes all service lines, meter set assemblies, and openings in foundation walls near gas service lines. Based upon the results of the inspection and survey, take necessary corrective action.
(Class I, Urgent Followup) (P-76-97)

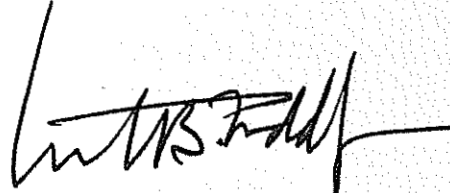
P-76-96 through P-76-100

Determine areas of active corrosion and install necessary cathodic protection to stop corrosion which could result in a condition detrimental to public safety. (Class I, Urgent Followup) (P-76-98)

Determine the odor intensity of the gas at one-fifth of its lower explosive limit and periodically sample the intensity at representative locations. (Class I, Urgent Followup) (P-76-99)

Maintain operation and maintenance records as required by 49 CFR 192. (Class I, Urgent Followup) (P-76-100)

TODD, Chairman, BAILEY, Vice Chairman, McADAMS, HOGUE, and HALEY, Members, concurred in the above recommendations.



By: Webster B. Todd, Jr.
Chairman

THIS RECOMMENDATION WILL BE RELEASED TO THE PUBLIC ON THE ISSUE DATE SHOWN ABOVE. NO PUBLIC DISSEMINATION OF THIS DOCUMENT SHOULD BE MADE PRIOR TO THAT DATE.