

**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

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Forwarded to:

Lowell L. Elder  
Chairman  
American Society of Mechanical  
Engineers Gas Piping Standards  
Committee  
United Engineering Center  
345 East 47th Street  
New York, New York 10017  
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SAFETY RECOMMENDATION(S)

P-76-102

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

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.

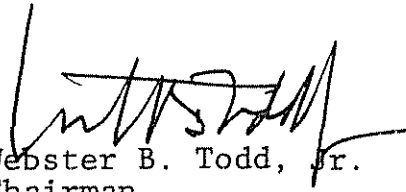
A contractor had made leakage surveys of the company's gas mains previously. These surveys consisted of sampling the atmosphere of 18-inch-deep holes probed over the gas mains (at intervals not exceeding the distance between the gas main and the closest building) as well as holes probed over service 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.

Appendix G-11 of the 1976, American Society of Mechanical Engineers (ASME) Guide for Gas Transmission and Distribution Systems provides for gas leakage control through various survey techniques, describes instrument types and characteristics, leak repair requirements, and means for evaluation of leakage history. Although not stated in the appendix, the guidelines are directed to operators who transport lighter-than-air gases and, therefore, are not equally applicable to systems that transport heavier-than-air gases.

Therefore, the National Transportation Safety Board recommends that the ASME Gas Piping Standards Committee:

Revise the Guide for Gas Transmission and Distribution Systems, Appendix G-11, to include information appropriate to heavier-than-air gases which will guide operators of systems transporting these gases in the selection of gas leakage detection techniques and procedures. (Class II, Priority Followup) (P-76-102)

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

  
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.