

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

Log P-95

ISSUED: February 8, 1978

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Forwarded to:

Mr. Frank N. Ikard  
President  
American Petroleum Institute  
2101 L Street, N. W.  
Washington, D.C. 20037

SAFETY RECOMMENDATION(S)

P-78-12 through P-78-14

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At 4:30 a.m., e.d.t., on July 20, 1977, a 12-inch propane pipeline, owned by the Consolidated Gas Supply Corporation, ruptured near the town of Ruff Creek, Pennsylvania. The liquid, under 450-psig pressure, escaped from the pipeline, vaporized, and propane vapors settled like a fog over the bottom of a valley. 1/

About 6 a.m., two men in a pickup truck entered the propane cloud; the truck stalled and the propane gas ignited when an attempt was made to restart the truck. A flash fire, approximately 100 yards wide, followed a streambed located along the bottom of the valley and burned everything in its path for a distance of 1 mile. The flames were over 100 feet high at the point of the rupture and burned for 14 hours until the remaining propane liquid in the pipeline could be isolated in the pipeline by the use of valves and stopples.

As a result of this accident, the 2 persons in the truck were killed, the truck was destroyed, 57 head of cattle were killed, overhead power and telephone lines were destroyed, a hay storage shed containing 450 bales of hay was burned, 1,800 barrels of propane burned, and a meadow and wooded area 1 mile long by 100 yards wide was burned.

1/ For more detailed information about this accident, read "Pipeline Accident Report -- Consolidated Gas Supply Corporation, Propane Pipeline Rupture and Fire, Ruff Creek, Pennsylvania, July 20, 1977" (NTSB-PAR-78-1).

The natural gas pipeline industry was not generally aware of the phenomenon of stress-corrosion cracking (SCC) in pipelines until 1965 when a pipeline in Natchitoches, Louisiana, failed and killed 17 persons. Since then, the American Gas Association has been involved in several research programs to determine the cause and correction of SCC in gas pipelines.

Although SCC of liquid pipelines may be at the same stage that it was in the gas industry 13 years ago, this accident should be a warning sign that this type of accident could happen again unless more is known about the prevention of SCC in all kinds of pipelines.

The Safety Board is particularly concerned about the conversion of natural gas pipelines to liquid service where some incipient SCC could be present in a susceptible steel.

It would be desirable to nondestructively test (NDT) the natural gas pipeline before conversion. One NDT technique which has been used in the gas industry requires that the pipeline be stressed to emit a detectable sound when plastic deformation occurs at crack tips. Because the elements of stress and cracking for acoustic emission testing are present in SCC, this testing technique could possibly be used in the conversion of gas lines to liquid lines.

A common propane odorant was not required by regulation or used in this pipeline because it could contaminate the product or make it unsuitable for use with a processing catalyst. However, if an acceptable odorant or an irritant had been developed for this pipeline product, the men burned in this accident might not have tried to restart their truck and might have walked out of the propane vapors to clear air, less than 100 feet away.

Therefore, the National Transportation Safety Board recommends that the American Petroleum Institute:

Participate in and encourage research into stress-corrosion cracking, especially on older steel gas pipelines that have been converted to liquid service.  
(Class III, Longer Term Action) (P-78-12)

Conduct field tests, using acoustic emission testing techniques developed by the gas industry, to determine if highly stressed portions of liquid pipelines can be located, and stress-corrosion cracking can be detected by this means before failure. (Class III, Longer Term Action) (P-78-13)

Conduct research to develop some form of detector, either as an odorant or irritant, of the presence of liquefied petroleum gas. The detector should be one that will not contaminate the product or make it unsuitable for use with processing catalysts. (Class III, Longer Term Action) (P-78-14)

McADAMS, HOGUE, and KING, Members, concurred in the above recommendations. BAILEY, Acting Chairman, did not participate.



By: Kay Bailey  
Acting Chairman