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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: May 18, 1979

Forwarded to:

Mr. Robert B. Peabody
President
American Iron and Steel Institute
1000 16th Street, N.W.
Washington, D.C. 20036

Mr. Charles J. DiBona
President
American Petroleum Institute
2101 L Street, N.W.
Washington, D.C. 20037

SAFETY RECOMMENDATION(S)

P-79-8

At 12:02 a.m., c.d.t., on August 4, 1978, propane that had vaporized and spread widely from a ruptured 8-inch liquefied petroleum gas (LPG) pipeline owned by the Mid-America Pipeline System (MAPCO) was ignited by an unknown source in a rural area near Donnellson, Iowa. The intense fire killed two persons and critically burned three others; one of the critically burned persons later died. A farmhouse and six outbuildings were destroyed, and two adjacent homes were damaged.1/

The section of pipeline involved in this accident was constructed of 8 5/8-inch O.D., 0.156-inch wall, API 5LX, Grade 52 line pipe which was manufactured by the electric-resistance welding process. The industry piping code lists 0.104 inch as the least wall thickness recommended for 8 5/8-inch O.D. line.2/ The pipe was coated and wrapped, cathodically protected by rectifiers, and had 4 feet of cover at the point of rupture. The line was constructed in 1962, in accordance with the American Standard Code for Pressure Piping (ASA B31.4-1959). Steel mills commonly manufacture 8 5/8-inch O.D. line pipe in wall thicknesses up to 0.500 inch; some mills quote specifications up to 0.875 inch. In the range of wall thicknesses from 0.104 to 0.500 inch, 0.156-inch wall pipe lies in the first 20 percent--on the thin side--of the total range.

1/ For more detailed information read "Pipeline Accident Report--Mid America Pipeline System Liquefied Petroleum Gas Pipeline Rupture and Fire, Donnellson, Iowa, August 4, 1979" (NTSB-PAR-79-1).

2/ Table 404.1.1, "Least Nominal Wall Thickness for Steel Pipe," American National Standards Code for Pressure Piping, Liquid Petroleum Transportation Piping Systems, ANSI B31.4-1974.

A metallurgical examination of the failed section of pipe concluded that the failure was caused by external mechanical damage in the form of a dent and a gouge. The damaged section was relatively small and would have been difficult to detect with the naked eye.

Pipelines handling LPG, which the Safety Board has repeatedly shown to be a hazardous product that cannot be contained, controlled, or dispersed safely after escaping from a pipeline rupture, are not required by OPSO regulations to have either heavier walled pipe, tougher pipe, stronger pipe, or better pipe than other pipelines. Metallurgists can debate whether heavier wall pipe or tougher pipe may be more rupture-free than the pipe in this accident, but until some formal effort is made in this direction, accidents like this one, caused by previous damage to the pipe, will probably continue. The Safety Board believes that pipe can be manufactured to transport LPG more safely.

Therefore the National Transportation Safety Board recommends that the American Iron and Steel Institute and the American Petroleum Institute:

> Undertake research for more stringent specifications for line pipe manufactured for LPG pipeline service to minimize or mitigate the effects of dents and gouges. Consideration should be given to the research currently being conducted by the American Gas Association on this problem. (Class II, Priority Action)(P-79-8)

KING, Chairman, DRIVER, Vice Chairman, McADAMS and HOGUE, Members, concurred in this recommendation.

By: James B. King
Chairman