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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: May 18, 1979

Forwarded to:

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

SAFETY RECOMMENDATION(S)

P-79-7

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 rupture in the pipeline was approximately 33 inches long and originated on the west side of the line. It propagated longitudinally about 17 inches and then spiralled over 360 degrees at each end and stopped. Close examination of the outside surface showed gouge marks along and on either side of the fracture. The most severe gouge was approximately 7 1/2 inches long and 1/4 inch wide and was located along the bottom side of the fracture. The depth of the gouge was approximately 0.005 to 0.007 inch. Metallographic examination also indicated that the pipe had been dented.

MAPCO records and other data showed that no excavation activities other than the lowering of the pipeline had been undertaken by either the company or by others at the rupture area. This indicates that the damage was done between the time the pipe was manufactured and the time the pipeline was constructed. Even though the damaged section was relatively small and would have been difficult to detect with the naked eye, the pipe was inspected four times. The pipe was inspected at the steel mill, again when it was unloaded and stockpiled near the right-of-way, again when it was being coated, and finally when the coating was

1/ For more detailed information read "Pipeline Accident Report-- Mid-America Pipeline System Liquefied Petroleum Gas Pipeline Rupture and Fire, Donnellson, Iowa, August 4, 1978" (NTSB-PAR-79-1).

being inspected before the pipe was lowered into the ditch. Although the small size of the damage and its location toward the bottom of the pipe would have made detection difficult, the Safety Board believes that a careful, thorough inspection of the pipe during construction might have revealed the damage.

Three months before the accident, MAPCO completed lowering a section of the Farmington lateral under Highway 2 adjacent to the accident site. Because of the widening of the highway and the depth of the drainage ditches on each side of the road, it was necessary to lower the pipeline more than 11 feet. In order to obtain enough slack in the pipeline to lower it this much, the company's "rule of thumb" practice required that for every foot the 8-inch steel pipe was to be lowered, a 35-foot-long section had to be exposed.

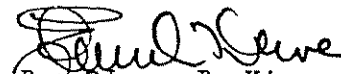
MAPCO and contractor personnel excavated a trench 237 feet from the north side of the highway along the pipeline. Approximately every 30 feet, the crew left a column of dirt under the pipeline for support. It was later determined that MAPCO had started lowering the pipeline 15 feet from where the rupture occurred and the pipe elevation had changed 10 feet along 170 feet of pipe from that point.

The crew then cut south across the highway and dug a trench exposing the pipeline for another 290 feet. The pipeline was then reportedly lowered slowly and allowed to follow the contour of the trench. The trench was then backfilled and compacted. Additional casing was added to the original casing on the section of pipeline across the highway before backfill. The pipeline was not operating at the time the line was lowered; however, it did have a static pressure of 200 to 250 psig.

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

Advise its member companies who operate similar LPG pipelines of the importance of careful, thorough inspection during pipeline construction to minimize the incidence of dents and gouges which could result in similar accidents, and bring to their attention the need to use proper engineering techniques when it is necessary to relocate or lower a section of pipeline. (Class II, Priority Action) (P-79-7)

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


By: James B. King
Chairman