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**NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.**

ISSUED: March 5, 1980

Forwarded to:

Mr. A. D. Schmidt
President
Northwestern Public Service Company
Northwestern National Bank Building
Huron, South Dakota 57350

SAFETY RECOMMENDATION(S)

P-80-12 and -13

At 10:25 a.m., c.d.t., on August 28, 1978, natural gas, which had escaped from a circumferential fracture in a socket heat-fusion coupling on a 2-in. polyethylene (PE) main, operating at 40-psig pressure, migrated beneath a one-story house in Grand Island, Nebraska, exploded, and then burned. One person was injured; the house at 2517 Apache Road was destroyed; and three adjacent houses were damaged. The gas was ignited by an unknown source.

The 2-in. PE main was installed by a contractor for the Northwestern Public Service Company at a depth of 30 in. in a north-south utility easement along a lot line, terminating just south of 2517 Apache Road. The main was inspected and tested on November 12, 1971. On December 6, 1971, a 4-in. acrylonitrile butadiene styrene (ABS) sewer service was installed at a depth of 52 in. perpendicular to and just beyond the end of the gas main and was inspected. On August 22-24, 1972, the gas main was extended 495 ft., inspected, and tested. The failed coupling was 23 in. south of the coupling used to tie in the extension.

When the flexible, 2-in. PE gas main was exposed after the accident, it was laying on the semirigid, 4-in. ABS sewer pipe at a depth of 52 in. The coupling that failed was located at a depth of 48 in. A 64-in. section of pipe, from a point 27 in. north of the sewer line to a point 37 in. south of the sewer line, was displaced from its original depth of 30 in. This sharp displacement, caused by the settling of improperly compacted backfill material, initiated a stress in the coupling which, in time, resulted in the circumferential fracture on the bottom of the coupling.

The downward force which caused the displacement might have been prevented if the company had followed the construction procedure outlined in the Northwestern Public Service Company specifications for plastic pipe installation. Section 18, BACKFILL, of these specifications contains the following instructions:

The Contractor shall make sure the line is properly supported by undisturbed earth in the trench bottom before the back-fill operation begins. Any voids under the line shall be filled by hand. Special care shall be taken to assure proper support at transition points from steel to plastic. Where bell-holes have been dug for any reason, the back-fill shall be compacted below the line before mechanical back-fill operation begins.

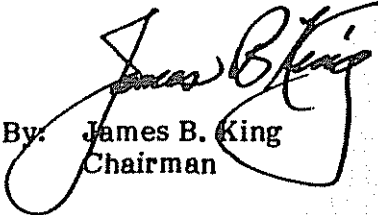
Other sections of the specifications make the contractor responsible for preventing damage to the pipe during the construction process. Although Northwestern Public Services Company's construction procedures were in accordance with 49 CFR 192 Subpart G, apparently the procedures were not followed carefully during the construction of the main extension in August 1972.

Therefore, the National Transportation Safety Board recommends that the Northwestern Public Service Company:

Emphasize the enforcement of company construction procedures by project engineers and inspectors through training programs and supervisory followup. (Class II, Priority Action) (P-80-12)

Examine sample locations of utility crossings and tie-ins, and take the necessary appropriate corrective measures to insure that mains are properly supported. (Class II, Priority Action) (P-80-13)

KING, Chairman, DRIVER, Vice Chairman, McADAMS and BURSLEY, Members, concurred in these recommendations. GOLDMAN, Member, did not participate.

By: 
James B. King
Chairman