



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Log P-3176

Date: April 30, 1998

In reply refer to: P-98-16 and -17

Mr. Richard E. Cota
President
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Despite the general acceptance of plastic piping as a safe and economical alternative to piping made of steel or other materials, the Safety Board notes that a number of pipeline accidents it has investigated have involved plastic piping that cracked in a brittle-like manner. For example, on October 17, 1994, an explosion and fire in Waterloo, Iowa, destroyed a building and damaged other property.¹ Six persons died and seven were injured in the accident. The Safety Board investigation determined that natural gas had been released from a plastic service pipe that had failed in a brittle-like manner at a connection to a steel main.

Excavations following the Waterloo, Iowa, accident uncovered, at a depth of about 3 feet, a 4-inch steel main. Welded to the top of the main was a steel tapping tee, manufactured by Continental Industries, that was connected to a 1/2-inch plastic service pipe. The National Transportation Safety Board determined that the probable cause of the Waterloo natural gas explosion and fire was stress intensification, primarily generated by soil settlement at the connection to the steel main, on a polyethylene pipe service line that had poor resistance to brittle-like cracking. The connection was not covered by a protective sleeve.

Almost all of the plastic pipeline accidents the Safety Board has investigated involving brittle-like cracking have been linked to stress intensification generated by external forces acting on the pipe. Examples of conditions that can generate stress intensification include differential earth settlement, particularly at connections with more rigidly anchored fittings; excessive bending as a result of installation configurations, especially at fittings; and point contact with rocks or other objects.

The Safety Board's special investigation determined that much of the available guidance to gas system operators for limiting stress intensification at plastic pipeline connections to steel

¹For more information, see National Transportation Safety Board Pipeline Special Investigation Report--*Brittle-like Cracking in Plastic Pipe for Gas Service* (NTSB/SIR-98/01).

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter. Please refer to Safety Recommendations P-98-16 and -17 in your reply. If you need additional information, you may call (202) 314-6469.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in these recommendations.

By:



Jim Hall

Chairman