

P-0263

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

Corrected Copy

ISSUED: November 27, 1984

Forwarded to:

Mr. Marvin E. White  
Chairman and Chief Executive Officer  
Columbia Gas Distribution Companies  
99 North Front Street  
Columbus, Ohio 43215

SAFETY RECOMMENDATION(S)

P-84-46 through -48

At 3:49 p.m., e.s.t., on January 19, 1984, natural gas at 20 psig leaked from Columbia Gas of Pennsylvania's (Columbia) 12-inch steel distribution pipeline which was installed in 1954 along West King Street, in York, Pennsylvania. Gas escaping from a cracked circumferential weld migrated underground and entered the basement of a three-story building at 31-33 West King Street where it was ignited by an undetermined source. The resulting explosion and fire substantially damaged the building and an adjacent vacant building, injured eight persons located on the first floor of the three-story building, and broke windows in buildings nearby.

At 3:36 p.m. the York Fire Department had received a telephone call from the County Emergency Control dispatcher advising that gas odors had been detected in a building at West King and South George Streets (a location 500 feet east of the destroyed building). Fire equipment and personnel were dispatched promptly to the reported location and on arrival began checking the building for evidence of escaped gas. Meanwhile, at 3:39 p.m., the owner of a beauty parlor located on the first floor of the building at 31-33 West King Street telephoned Columbia's dispatcher advising that she had detected the odor of gas in her building. A Columbia serviceman was dispatched to investigate; as he approached the building, there was an explosion and the building became engulfed by flames. He closed valves located on the service lines at the curb for the three-story building and an adjoining building.

After the explosion, additional Columbia personnel were dispatched to search for gas inside and outside of buildings in the immediate area. Also, firefighters who had responded to the gas report at West King and South George Streets rushed to fight the fire and helped in the rescue and evacuation operations. About 200 persons were evacuated from buildings within an eight-block area.

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The flow of gas on the 12-inch main was stopped by closing a valve in East King Street about 1 mile from the accident site and by closing four valves in the vicinity of West King Street and South Beaver Streets. Excavation of the gas main at the intersection of West King and South Cherry Lane revealed that the main had cracked within a circumferential weld, that the depth of burial at the cracked weld was 34 inches, and that frost had penetrated to a depth of 24 inches.

A section, approximately 4 feet long, containing the cracked weld was removed and replaced with new pipe on January 20, 1984. Examination of the cracked weld and adjoining pipe segments by Safety Board metallurgists determined that the crack in the weld resulted from stresses imposed upon a pre-existing defect in the weld which appeared to be a hot crack. <sup>1/</sup> Additionally, the entire pipe joint reflected poor welding technique including incomplete penetration, and joint misalignment.

The welds made on the 1,200 feet of 12-inch, steel main installed in 1954 were to have been made in accordance with the American Petroleum Institute (API) Standard 1104, 1st Edition, 1953, "Standard for field welding of pipe lines." However, metallurgical examination of the cracked weld indicated that the weld would not have met the 1953 API 1104 welding code.

A search of Columbia's records disclosed that gas leaks in two welds on the 12-inch main, located about 600 feet west from the January 19, 1984, accident site, previously had been repaired: one in 1981 and another in 1983. The 1981 leak was repaired by applying additional weld passes over the old weld, while the 1983 leak was repaired by installing a leak clamp over the cracked weld. No metallurgical analyses were performed to determine the cause of these failures.

Additionally, Columbia's records show that 20 other gas leaks in the vicinity of West King and South Beaver Streets were repaired by installing clamps, but that metallurgical examinations were not performed to determine the causes of those leaks. During the period from July 10, 1981, to September 13, 1981, a total of 15 clamps were installed on 4-, 6-, and 12-inch steel and 4-inch cast-iron mains. During the period of June 21-24, 1983, five additional clamps were installed on these mains -- four on the 6-inch steel main and one on the 4-inch cast-iron main.

The poor quality of the weld involved in the January 19, 1984, accident and the fact that the cause of previous leaks at welds in the 12-inch, steel gas main was not investigated brings into question the structural integrity of other welds made during the construction of this pipeline. Moreover, the large number of leaks in other gas mains in the area of the January 19, 1984, accident requiring repair by clamping and the fact that the causes of such leaks have not been investigated by Columbia gives the Safety Board concern regarding the safety of the continued operation of these gas mains.

Therefore, the National Transportation Safety Board recommends that Columbia Gas of Pennsylvania:

Expose and inspect a representative quantity of welds in the 12-inch, steel distribution pipeline installed in 1954 in York, Pennsylvania, and, if indicated, institute a program to replace or repair welds which do not comply with applicable requirements of the Federal minimum safety standards contained in Title 49, Code of Federal Regulations, Part 192. (Class II, Priority Action) (P-84-46)


<sup>1/</sup> A crack formed in a weld from internal stress developed during cooling.

Expose and inspect the previously repaired leaks in the cast-iron and steel distribution mains in the vicinity of West King and South Beaver Streets, York, Pennsylvania, to ascertain the cause of the leaks and, if indicated, institute a program of corrective actions. (Class II, Priority Action) (P-84-47)

Institute a company practice of removing failed pipeline segments for metallurgical examination, on a random sampling basis, as a means of eliminating causes of failures and to assist in determining when portions of its pipeline should be replaced. (Class II, Priority Action) (P-84-48)

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 actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter.

BURNETT, Chairman, GOLDMAN, Vice Chairman, and BURSLEY, Member, concurred in these recommendations.

  
By: Jim Burnett  
Chairman 