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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

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Forwarded to:

Mr. Phillip Lathrop, Chairman
American Society of Mechanical Engineers
Gas Piping Standards Committee
c/o Pacific Gas and Electric Company
77 Beale Street
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SAFETY RECOMMENDATION(S)

P-82-47

At 1050 a.m., e.d.t., on September 7, 1982, natural gas, blowing at 15 psig from the open ends of a 2 1/4-inch cast-iron gas main located in a deep, narrow excavation at the intersection of Cooper and Marshal Streets in Dublin, Georgia, was ignited by an unknown source. Three City of Dublin gas department employees who were working in the excavation were critically burned. The acting superintendent of the gas department, who was standing at the edge of the excavation, helped the injured out of the ditch and was seriously burned in the process.

The City of Dublin, population 16,000, owns and operates a gas distribution system serving 3,900 customers in the city and surrounding areas. Six full-time gas department employees operate and maintain the system: an acting superintendent, a foreman, two equipment operators, and two laborers. The Dublin gas department receives its natural gas from the Southern Natural Gas Company at two town border stations.

On September 7, 1982, a private contractor working for the city was installing an 18-inch concrete drain pipe under and across Cooper Street at its intersection with Marshal Street. The contractor requested that a section of 6-inch plastic water line and a section of 2 1/4-inch cast-iron gas main under Cooper Street be lowered since the drain pipe was to be installed at the depth at which these two facilities were currently located.

To lower the gas main in this area, the gas department decided to cut out an 11-foot section of the pipe, deepen the excavation 2 feet, and install a 16-foot-long piece of 1 1/4-inch plastic pipe with an adapter at each end as a temporary gas line to pass below the 18-inch concrete drain. The excavation would then be partially filled so that the 18-inch concrete drain could be installed 3 feet above the temporary gas line.

At 8:15 a.m., the gas department's crew unloaded a backhoe at the site and proceeded to expose the gas main. The crew then deepened the excavation an additional 2 feet below the gas main for the installation of the temporary connection. The gas main was then cleaned to prepare it for cutting and removing the 11-foot section of pipe. Gas department trucks were parked in the street intersection and around the excavation site to act as a traffic barrier; however, the area was not cordoned off nor were any warning signs posted. Portable hand-held, dry chemical fire extinguishers were on the trucks but were not readily accessible at the edge of the excavation. No air breathing equipment was on hand nor were any safety belts and ropes readily available for the emergency retrieval of persons from the excavation.

When the two workers had finished cleaning the pipe, the acting superintendent and the foreman asked them if they wanted the gas main isolated by valve closure and then purged so that the main could be cut without being under pressure. The two workers elected to cut the gas main under 15 psig; they had done this several times in the recent past without incident. Valve books showing the location of all the isolation valves in the system were in the trucks but were not used at this time. A review of the valve books after the accident showed that closing three valves, one within 2 feet of the excavation and the other two one block away from the excavation, would have isolated the involved section and would have cut off service to only one customer.

At 10:45 a.m., using a three-wheeled hand operated pipe cutter, the two workers completed the first cut on the gas main at the south end of the excavation. The workers quickly shifted the pipe cutter to the north end of the excavation and cut the pipe there. Gas was escaping under pressure, but the cut section of pipe remained in position because it was in compression. Another worker, standing at the edge of the excavation, jumped on the cut section and it fell to the bottom of the ditch. Blowing gas, dust, and debris then filled the ditch. The two other workers in the ditch quickly attempted to connect the plastic replacement section to the gas main using pre-positioned clamps at each end of the open gas main. The workers first attached the replacement section to the north end of the gas main and began tightening the bolts on the clamp. At 10:50 a.m., as the workers were positioning the other end of the pipe to the gas main, the gas ignited and fire burned from both ends of the open gas main. The three workers in the ditch, their clothes on fire, crawled out of the ditch or were helped out by the acting superintendent.

The foreman, who was then across the street, ran back to the site and at 10:52 a.m., radioed the city fire department and requested ambulances and assistance. The fire department arrived at 10:54 a.m. and was followed by the police department and ambulance at 10:56 a.m. The four injured workers were taken to the local hospital for examination. Three of the workers were listed in critical condition and were transported by helicopter to a burn treatment center in Augusta, Georgia. The acting superintendent was hospitalized locally in serious condition.


Fire continued at the accident site with flames 18 feet high across the entire excavation. The foreman and a former gas department superintendent, who had been summoned because he was familiar with the gas system and because they now lacked experienced help, arrived with the police and proceeded to close valves to shut off the gas still fueling the fire. The valve located within 2 feet of the north end of the excavation which was one of the three valves which could have been closed to isolate the area initially could not be reached because of the intense heat and flame. The foreman and former superintendent, therefore, closed the second line of six valves located in a two block area around the accident site. The closure of the six valves affected only seven customers; four of the customers used gas only for heating, and their furnaces were off for the summer. Although the precise time of closure was not noted, all valves were closed within 10 minutes and the fire burned out about 11:30 a.m. Later, relighting procedures were initiated and all customer services were restored at 7 p.m.; the open 2 1/4-inch gas main was isolated within one block and no customers were affected by this isolation.

The Safety Board is concerned that the practice of cutting gas mains under pressure, in other than emergency conditions, involves undue risks and that the Dublin gas department failed to follow required safety practices. The Safety Board is also concerned that this is not an isolated problem in one small gas distribution system. The Board has investigated 48 pipeline accidents involving small operators, both municipally and

privately owned, wherein similar problems of operation and maintenance were involved. Therefore, the National Transportation Safety Board recommends that the American Society of Mechanical Engineers, Gas Piping Standards Committee:

Revise the American Society of Mechanical Engineers Gas Guide provided for compliance with Part 192.751, Prevention of Accidental Ignition, of Title 49, Code of Federal Regulations, to advise against cutting gas mains under pressure unless specific conditions can be identified wherein such a practice can be performed safely. If such conditions exist, identify them in the guide and describe the safeguards necessary for safely cutting gas pipelines under pressure. (Class II, Priority Action) (P-82-47)

BURNETT, Chairman, GOLDMAN, Vice Chairman, McADAMS, BURSLEY, and ENGEN, Members, concurred in this recommendation.


By Jim Burnett
Chairman