



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Log P-313J

Date: MAR - 6 1996

In reply refer to: P-96-20

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About 6:45 p.m. on June 9, 1994, a 2-inch-diameter steel gas service line that had been exposed during excavation separated at a compression coupling about 5 feet north of the north wall of the John T. Gross Towers (Gross Towers), an eight-story retirement home. Gross Towers, located at 14th and Allen Streets (1339 Allen Street), is one of several subsidized-rent residence buildings operated by the Allentown Housing Authority (housing authority) in Allentown, Pennsylvania. Towers East, a 13-story building that is connected to Gross Towers, is also a rent-subsidy building for senior citizens that is operated by the housing authority.

The separated service line, which was owned by UGI Utilities, Inc., (UGI), released natural gas at 55 psig pressure. The escaping gas flowed underground to Gross Towers, where it passed through openings in the building's foundation and filled the space beneath the mechanical room, which served as a combustion air intake reservoir for boilers. Gas then entered the mechanical room through openings in the floor. The gas then migrated to the building's other floors through an adjacent tower that housed the boiler exhaust stacks, through a trash chute, and through floor openings for electrical and other building services.

At the same time, a backhoe operator, an employee of the Environmental Preservation Associates, Inc., (EPAI) was removing fuel-contaminated soil from the excavation site and detected the odor of gas coming from the building. He heard a woman in a third-floor apartment shout to him about a heavy gas odor. The loader, another EPAI employee, opened a side door to the building that led to the boiler room and encountered a very heavy gas odor that "took my breath away." He told his foreman of his observation, and the foreman told the backhoe operator to shut off the machine.

About 6:58 p.m., the natural gas that had accumulated within the building was ignited, causing an explosion. A second explosion occurred about 5 minutes later. At the time of the

explosion, many of the Gross Towers and Towers East residents were out of the building. The accident resulted in 1 fatality, 66 injuries, and more than \$5 million in property damage.¹

The National Transportation Safety Board determines that the probable cause of the explosion and fire was the failure of the management of EPAI to ensure through project oversight compliance with its own excavation requirements and those of the Occupational Safety and Health Administration (OSHA). Contributing to the accident was the failure of the EPAI workmen to notify the UGI that the line had been damaged and was unsupported.

The EPAI had several opportunities to prevent the separation of the service line. It could have supported (shored up) the excavation's side walls during the excavation, as it was required to do by both its own health and safety program and OSHA. Had the walls been shored up, the one next to the service line would not have collapsed and undermined the line's support. The EPAI would have known that the walls were not shored up had it had a supervisor overseeing the project, as its own procedures required it to. Even after the wall collapsed, the EPAI still could have prevented the accident by telling the UGI that the service line was no longer supported, thus giving the company a chance to protect the line. The Safety Board concludes that the EPAI could have avoided the accident by shoring up the excavation, by having effective supervisory oversight, or by reporting the lack of pipe support and the damage to the UGI.

Once the line and coupling separated, the EPAI could have limited the consequences. When the EPAI foreman was told about the strong odor of gas within the building, he should have immediately called "911." Contrary to his postaccident statement, telephone records show that he did not attempt to call "911" until after the explosion. Had he immediately reported the emergency to the fire department, it would have known almost 15 minutes before the explosion, giving it enough time to respond, notify the UGI, initiate evacuations and building ventilation, and, using the UGI responders, shut off the flow of gas into the building, which would have either prevented the explosion or reduced its force. The Safety Board concludes that the consequences of this accident could have been significantly reduced had the foreman promptly called "911" and had his helpers promptly told the occupants of the building to evacuate.

Although it was after normal business hours, the foreman first called the UGI's Lehigh Division business office (the EPAI had not obtained and provided the foreman with the UGI's 24-hour emergency telephone number). Even after contacting the UGI, he did not say, and the UGI did not question, whether the odor of gas had been detected within the building. Had the UGI known that gas was already in the building, it probably would have told him to evacuate the occupants, which he could have done with the help of his crew and the bystanders. The UGI probably also would have notified the fire department, thus giving it more time to respond.

Before the accident, the workcrew had not had any formal training in excavation and trenching or in actions to take as a unit to protect lives and property in an emergency. The lack of training may account for why the crew did not shore the excavation site or tell the UGI that the

¹For more information, read Pipeline Accident Report *UGI Utilities, Inc., Natural Gas Distribution Pipeline Explosion and Fire, Allentown, Pennsylvania, June 9, 1994* (NTSB/PAR-96-01).

gas line was unsupported. The crew foreman, despite not having any information about the construction of the gas line, said that he thought the entire line was welded tubular steel. His assumption may have led him to believe that the line could be adequately supported by crossbucks. In any event, he made a critical choice in assuming that it would be safe to leave the gas line uncovered and exposed for 2 weeks. A more prudent course of action would have been to immediately inform the UGI that the line was exposed.

Since the accident, the crew foreman and the heavy equipment (backhoe) operator, as well as other employees, have each received 8 hours of training in trench construction and safety and 24 hours of training in confined-space entry and rescue training from the Maryland Fire and Rescue Institute, a part of the University of Maryland. However, the EPAI has not developed procedures to guide the actions of its workcrews, nor has it given emergency-responder training to those of its employees who excavate. The Safety Board believes that the EPAI and all other contractor excavators should train their employees in notifying local response agencies of emergencies and in what to do to save lives, such as evacuating endangered members of the public, while waiting for the representatives of the response agencies to arrive.

The Safety Board concludes that the excavation crewmembers did not evacuate the residents and the foreman did not call the fire department before the explosion because they had not been trained in handling an emergency.

Because the EPAI's management failed to prepare the workcrew properly, the crew foreman did not notify the UGI about the unsupported line, left it unsupported for 2 weeks, and did not protect the line while performing operations that could damage it. The Safety Board believes that only the facility operator can assess the safety of gas lines and other buried facilities once they have been damaged or otherwise disturbed and that he can make the assessment only after investigating thoroughly, including reviewing his construction information. Consequently, the EPAI, as well as other excavators, should instruct its employees to notify the facility operator promptly any time excavating alters the support of a buried facility, deforms its structure, or harms its coating.

The Safety Board's report² on a July 22, 1993, pipeline accident, which cost 2 lives and injured 12 persons, also involved excavation damage and issues similar to the ones in this accident. The report discussed how important it is for excavators to notify local emergency-response agencies promptly. In that accident, the excavator notified the pipeline operator promptly after gas was released, but he did not notify the local response agencies until more than 20 minutes later. Had the fire department been notified earlier, it might have been able to save lives and prevent injuries. As a result of that accident, the Safety Board recommended that the American Public Works Association (APWA):

²Brief of Pipeline Accident: *Northern States Power Company Gas Pipeline Accident, July 22, 1993, St. Paul, Minnesota* (DCA-93-MP-011).

Advise your members of the circumstances of the July 22, 1993, explosion in St. Paul, Minnesota, and urge them to develop and implement written procedures and training to prevent excavation-caused pipeline damage. (P-95-24)

Urge your members to call "911" immediately, in addition to calling the gas company, if a natural gas line has been severed. (P-95-25)

On June 2, 1995, the APWA told the Safety Board that it would incorporate the lessons learned from the report on the St. Paul accident in its publication *Public Works Management Practices*, which it was in the process of rewriting. Also, the report and recommendations would be discussed at the September 1995 International Public Works Congress and Exposition. On July 2, 1995, the Safety Board thanked the APWA for its timely and effective response to the recommendations. The Board added that it looked forward to reviewing the APWA's revised practices. Safety Recommendations P-95-24 and -25 were classified "Open--Acceptable Response."

The Associated General Contractors and the National Utility Contractors Association, two organizations that represent the interests of most contractors, give contractors extensive guidance on excavation issues affecting employee safety. The Safety Board believes these associations should also support the APWA initiative by encouraging their members to notify the owners of damaged buried facilities, to notify local response agencies of emergencies, and to take initial lifesaving actions when a damaged buried facility endangers public safety.

The National Transportation Safety Board therefore issues the following safety recommendation to the National Utility Contractors Association:

Inform its members about the 1994 Allentown accident and encourage them to train their excavation employees in: (a) notifying local emergency-response agencies of any emergency conditions immediately; (b) helping members of the public who are in the immediate vicinity of an emergency, including evacuating anyone who is in danger; (c) notifying the buried-facility owner of any changes in the work plan; (d) notifying the buried-facility owner of any damage to or lack of support for his facility promptly and relying on the buried-facility operator to decide whether corrective action is needed. (Class II, Priority Action) (P-96-20)


Also, the Safety Board issues Safety Recommendations P-96-2 to the Research and Special Programs Administration; P-96-3 to the States and the District of Columbia; P-96-4 through -6 to UGI Utilities, Inc.; P-96-7 to Environmental Preservation Associates, Inc.; P-96-8, through -10 to the Governor of the Commonwealth of Pennsylvania; P-96-11 and -12 to the city of Allentown; P-96-13 to the International Association of Fire Chiefs; P-96-14 through -16 to the Department of Housing and Urban Development; P-96-17 and -18 to the Allentown Housing Authority; and P-96-19 to the Associated General Contractors.

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 recommendation in this letter. Please refer to Safety Recommendation P-96-20 in your reply. If you need additional information, you may call (202) 382-0670.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT and GOGLIA concurred in this recommendation.

By:


Jim Hall
Chairman