



U. S. Department of Labor
Occupational Safety and Health Administration
Directorate of Science, Technology and Medicine
Office of Science and Technology Assessment

Hazards Associated with Striking Underground Gas Lines

Safety and Health Information Bulletin

SHIB 03-05-21

Preface

The National Transportation Safety Board (NTSB) reported an incident involving the rupture of an underground natural gas pipeline during excavation that resulted in the release of natural gas and a subsequent explosion.¹ Following their investigation, the NTSB recommended that the Occupational Safety and Health Administration (OSHA) “[r]equire excavators to notify pipeline operators immediately if their work damages a pipeline and to call 911 or other local emergency response numbers immediately if the damage results in a release of natural gas or other hazardous substance or potentially endangers life, health, or property.”

Purpose

The purpose of this Safety and Health Information Bulletin is:

- to remind contractors of OSHA’s requirements to prevent accidental damage to underground utility installations during excavation work. (29 CFR 1926.651(b)); and
- to recommend notifying the pipeline operator **immediately** if the excavator causes damage to a pipeline and to call 911 or other emergency response numbers if the damage results in a release of natural gas or other hazardous substances.

This Safety and Health Information Bulletin is **not** a standard or regulation, and it creates no new legal obligations. The Bulletin is advisory in nature, informational in content, and is intended to assist employers in providing a safe and healthful workplace. The Occupational Safety and Health Act requires employers to comply with hazard-specific safety and health standards. In addition, pursuant to Section 5(a)(1), the General Duty Clause of the Act, employers must provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm. Employers can be cited for violating the General Duty Clause if there is a recognized hazard and they do not take reasonable steps to prevent or abate the hazard. However, failure to implement these recommendations is not, in itself, a violation of the General Duty Clause. Citations can only be based on standards, regulations, and the General Duty Clause.

Background

On December 11, 1998, while attempting to install a utility pole support anchor in a city sidewalk in St. Cloud, Minnesota, a cable construction company installation crew struck and ruptured an underground, 1-inch-diameter, high-pressure, plastic gas service pipeline, resulting in a natural gas leak. Approximately 39 minutes later, while utility workers and emergency response personnel were assessing the situation and taking preliminary steps to

¹National Transportation Safety Board. 2000. *Natural Gas Pipeline Rupture and Subsequent Explosion in St. Cloud, Minnesota, December 11, 1998*. Pipeline Accident Report NTSB/PAR-00/01. Washington, D.C. www.nstb.gov/publictn/PAR0001.htm

stop the gas leak, an explosion occurred. As a result of the explosion, 4 persons were fatally injured; 1 person was seriously injured; and 10 persons, including 2 firefighters and 1 police officer, received minor injuries. Six buildings were destroyed.

Incident Description

The cable construction company installation crew was installing a utility pole support anchor in a city sidewalk. They struck and ruptured an underground, high-pressure gas service pipeline, resulting in a natural gas leak.

Within a minute of striking the gas line, the company crew foreman, following company procedures, informed his supervisor. However, the supervisor did not **immediately** notify the owner of the gas line or emergency response agencies. About 15 minutes after the gas line was struck, another individual, who was not associated with the construction project, notified emergency responders. The supervisor called the owner of the gas line about 30 minutes after the line was struck.

A fire truck and four firefighters were on the scene about 18 minutes after the rupture and about 2 minutes after being notified. Two power company employees, a gas technician specialist, and a utility locator technician, having been notified by the fire department, arrived on the scene about 26 minutes after the pipeline was ruptured.

The gas technician specialist entered the basement of a nearby building, which housed a deli and a pizza restaurant. While the gas technician specialist was taking readings with a combustible gas monitor, the locator technician was determining whether the service line was properly marked. Approximately 39 minutes after the gas line was struck, the explosion

killed the gas technician specialist, the utility locator technician, one person in the building, and a nearby pedestrian. A three-person power company construction crew, which had been dispatched to shut down the damaged portion of the line, was still 2 blocks away from the accident site when the explosion occurred.

According to the report of the Minnesota Fire Marshal, the explosion occurred in the basement of the building that housed the pizza restaurant and deli. The report could not identify the source that ignited the gas that was accumulated in the basement. However, potential ignition sources included gas water heaters.

The NTSB determined that the accident was related to the lack of adequate procedures by the cable construction company to prevent damage to underground utilities when excavating. Contributing to the severity of the accident was the company's delay in notifying the utility operator and proper authorities.

The Minnesota OSHA, Minnesota Department of Labor and Industry, investigated the accident and cited the cable construction company for violating workplace safety programs, the Minnesota General Duty Clause, and excavation requirements (29 CFR 1926. 651(b) standard).

Other Information

In 1997, NTSB published a safety study that discussed industry and government actions to prevent excavation damage.² The study concluded that, at a minimum, "excavators should formulate an emergency response plan appropriate for the specific construction site and ensure that employees working at that site know the correct action to take if a buried facility is damaged."

²National Transportation Safety Board. 1997. *Protecting Public Safety Through Excavation Damage Prevention. Safety Study* NTSB/SS-97/01. Washington, D.C. www.nstb.gov/publicatn/1997/ss9701.htm

The safety study referred to a previous safety recommendation, NTSB P-95-25, issued to the American Public Works Association (APWA) following a 1993 NTSB accident investigation in St. Paul, Minnesota. NTSB P-95-25 recommended that the APWA urge its “members to call 911 immediately, in addition to calling the gas company, if a natural gas line has been severed.”

In August 1999, the Department of Transportation published *Common Ground: The Study of One-Call Systems and Damage Prevention*.³ The report recommended that “if the protective coating of an electrical line is penetrated or gases or liquids are escaping from a broken line which endangers life, health or property, the excavator [should] immediately contact local emergency personnel or call 911 to report the damage location.”

The National Utility Locating Contractors Association (NULCA) has published guidelines for excavation practices and procedures for damage prevention. These guidelines suggest that excavators call 911 if excavation damage “involves a potential risk to life, health or significant property damage.”

The State of Minnesota revised Minnesota Statute 216D, effective August 1, 1999. The law states, in part:

“If any damage occurs to an underground facility or its protective covering, the excavator shall notify the operator promptly. When the operator receives a damage notice, the operator shall promptly dispatch personnel to the damage area to investigate. If the damage results in the escape of any flammable, toxic, or corrosive gas or liquid or endangers life, health, or property, the excavator responsible shall **immediately** notify the operator and the

911 public safety answering point...and take immediate action to protect the public and property.” (Emphasis added)

OSHA Standards

OSHA’s 29 CFR 1926.651 standard establishes specific excavation requirements designed to protect employees and prevent accidental damage to underground utility installations. The requirements include:*

- Establishing the location of underground installations prior to opening an excavation;
- Contacting utility companies or owners within established or customary local response times. When utility companies or owners cannot respond to a request to locate underground utility installations within 24 hours or cannot establish the exact location of these installations, the employer may proceed with caution using detection equipment or other acceptable means to locate utility installations;
- When approaching the estimated location of underground installations, the exact location of the underground installations shall be determined by safe and acceptable means; and
- While the excavation is open, underground installations shall be protected, supported, or removed as necessary to safeguard employees.

³The *Common Ground* report was prepared by more than 160 individuals representing a wide range of interests, organizations, and viewpoints. The report focuses on preventing damage to underground facilities. The project was initiated by the U.S. Department of Transportation’s Office of the Pipeline Safety, an element of the Research and Special Programs Administration, in response to the Transportation Equity Act for the 21st Century, Public Law 105-78, enacted on June 9, 1998. The purpose of the year-long study was to identify and validate existing best practices to prevent damage to underground facilities.

Conclusions

Excavators need to: establish a detailed work plan and train their employees prior to excavating on the proper procedures of determining the locations of underground utilities; contact and coordinate with the utilities companies to establish the locations of the underground installations; and take all necessary precautions to prevent damaging underground utility installations.

If an underground utility is damaged, the utility operator is in the best position to determine the hazards associated with the damage and implement appropriate countermeasures. OSHA recommends that the excavator notify the utility operator promptly. If the damage results in the release of hazardous gases or liquids, both the utility operator and appropriate emergency response officials should be notified **immediately**.

* Please refer to the Code of Federal Regulations for the full text of the requirements.