



FACE INVESTIGATION

SUBJECT:

Two gas well workers were struck and killed when a drainage pipe broke free during a gas well pressure test.

Investigation #01TX13302

Release Date: March 25, 2002

SUMMARY:

Two gas well workers were killed by the explosion of a flow back line on a gas well. The flow back line removed sand and a coagulating agent from the drill site of the gas well they were working on. The gas well was a natural gas extraction unit with several lines running into and out of the central pump assembly. The victims were standing by during the testing of the gas well which had only been erected two days prior. The well was not yet in production at the time of the incident. The flow back line was approximately 4 inches in diameter and was attached to the pump assembly which ran horizontally along the ground approximately 2 yards to a waste pit.

The victims, along with three other co-workers, were standing between two parked trucks in an area adjacent to the flow back line. The pump assembly was activated for testing. A build up of pressure caused the pipe to rupture. The flow back line struck the victims as it broke loose following the rupture. The victims were killed immediately. Two of their co-workers suffered catastrophic injuries. One of the two suffered an amputation of both legs.

The TX Face (Fatality Assessment & Control Evaluation) Investigator concluded that to reduce the likelihood of similar occurrences, employers should:

- **Ensure that operating, maintenance, and repair procedures are established, implemented, and documented to include a thorough hazard analysis and a continuous safety-training program regarding all heavy machinery and equipment**
- **Place warning signs and/or barricades and ensure that all nonessential personnel**

are out of the area when testing of well equipment is being conducted

- **Ensure that workers' assigned to hazardous tasks have close supervisory contact throughout the duration of the work being performed.**

INTRODUCTION:

Five gas well workers, including the two victims, were on the site of a newly erected gas well. The victims were experienced gas well workers and had worked for the company for several years. The employer was an oil and gas extraction company with over 2,000 employees nationwide. The company had been in operation for over 70 years. The company has experienced numerous fatalities. The TX FACE investigator conducted a site visit during which the employer's safety director was interviewed. There were no police or coroner reports obtained.

A designated safety director managed the safety program. The employer had a written safety program and scheduled training for employees. Orientation for new employees and weekly safety meetings were conducted. Drug testing was a mandatory requirement for employment.

INVESTIGATION:

On July 19, 2001 two gas well workers were killed when the flow back line of a gas pump exploded. This incident occurred in the field where the pump assembly had been erected. The victims had completed the task of erecting the pump assembly and were awaiting the results of a test of the system. The victims and three co-workers were standing behind a truck parked within several feet of the pump assembly. Installation of the pump assembly had been completed the previous day. The gas well was designed to extract natural gas from a ground source. The pump assembly had several lines running both in and out of the device. One line brought a coagulating agent into the fissure from which the natural gas emanated. The purpose of the coagulating agent was to prevent the fissure from sealing up. The coagulating agent is a saline solution, which keeps soil and other particulates from clogging the fissure. It is necessary to constantly pump the coagulating agent out of the fissure to prevent blockage. A 4-inch drainage, or flow back line, removed the coagulating agent, soil, and other debris from the fissure and ran approximately 2 yards to a pit which held the waste material.

Installation of the pump assembly was complete and system tests were being initiated by a subcontractor brought in to test the well. The victims and their co-workers were not involved in the testing procedures. The victims and their co-workers were standing between two parked trucks in an area adjacent to the pump assembly as testing began. As testing commenced it was noted that pressure began building in the flow back line, indicating possible blockage. Pressure continued to build, ultimately reaching an estimated 6,800 psi. The equipment had been approved to handle pressure up to 5,000 psi. Without warning the clamp holding the flow back line in place broke. The line then went under the parked truck and struck and killed the two victims. Two other workers standing with them were seriously injured. One co-worker was not

injured. Emergency medical services were notified by the site manager. EMS responded within 15 minutes. The two victims were declared dead at the scene.

CAUSE OF DEATH:

The victims died as a result of internal injuries associated with blunt force trauma.

RECOMMENDATIONS/DISCUSSION:

Recommendation #1: Ensure that operating, maintenance, and repair procedures are established, implemented, and documented to include a thorough hazard analysis and a continuous safety-training program regarding all heavy machinery and equipment

Discussion: Pre-planning work activities and discussion with experienced design personnel, machine operators, and management are vital when it comes to reducing the likelihood of accidents. Employers, with the participation of employees, should develop, implement, and enforce a comprehensive safety program. The program should include an analysis of hazards associated with machinery and equipment and the implementation of methods to control those hazards. It should also include training for all employees in hazard recognition and use of controls. Operators and other employees should be thoroughly trained on sources of hazardous energy and how to recognize and avoid those hazards.

Recommendation #2: Place warning signs and/or barricades and ensure that all nonessential personnel are out of the area when testing of well equipment is being conducted

Discussion: Procedures should be in place to isolate workers not involved in testing procedures. Signs or barricades indicating hazardous areas are one effective method of notifying workers of the potential dangers that exist in different areas of a job site. CFR 1910.145 offers examples of such signs and when their use is appropriate. The victims were not actively engaged in work activities at the time of the accident and could have taken a break in a more secure location. The nature of the gas well is such that engineered guards are impractical if not impossible; therefore company policy should be established to secure the affected area of the site when testing or repair is underway.

Recommendation #3: Ensure that workers' assigned to hazardous tasks have close supervisory contact throughout the duration of the work being performed.

Discussion: Company management should ensure that when assigning employees to hazardous tasks that involve the potential for traumatic injury or death, close supervision is essential to protect the lives of exposed workers. In the case of hazardous duties that are only rarely or periodically required, the importance of having close managerial supervision is even greater.

29 CFR 1910.145 Code of Federal Regulations, Washington, D.C.: U.S. Government Printing Office, Office of the Federal Register.