

Operating Blind—Training

- Lack of fuel transfer procedures ends with fatalities
- Vapor cloud explodes breaking windows up to 2 km away
- Community endures an eleven day fire

BACKGROUND

A worker was lining up valves to transfer kerosene and gasoline from one terminal to a neighboring terminal operated by another company. During the process, he changed the position of a figure-eight type line-blind valve.

Unfortunately, block valves upstream of the blind had been opened out of sequence. As he swung the blind, a jet of gasoline sprayed out at high volume. The worker was unable to stop the release and was soon overcome by fumes.

WHAT HAPPENED

A supervisor attempted to rescue the worker, but he too was overcome with fumes and barely escaped. A second worker also attempted rescue and was also overcome. A third worker normally on site was offsite for personal reasons, leaving no one at the site to initiate further control actions. By the time response personnel arrived, vapors from the leak had engulfed the entire site. Recognizing the danger of explosion, they retreated. One hour and fifteen minutes later, the vapor cloud exploded, creating a fireball that engulfed entire site and broke windows in the surrounding community up to 2 km away. The ensuing fire soon spread to all the other tanks on the site and continued to rage for eleven days. Due to the scale of the fire, responders decided to allow the fire to burn itself out rather than try to control it. Ultimately six workers and five in the community lost their lives.

The investigating commission (Ref E.6) determined the accident was caused by valves being operated out of sequence and was exacerbated by the absence of a remote isolation valve and/or remotely operated shut-off. The commission noted there were no operating instructions for making the transfer, leaving the procedure up to the operators who were not well trained in this procedure.

While the commission did not comment specifically on company process safety culture, several recommendations show they were clearly thinking about it. Among the recommendations, the commission recommended creating an independent process safety function reporting to the Chief Engineering Officer and that line management practice conduct of operations to ensure all process safety functions are carried out. What other culture factors could the commission have considered?

SAFETY CULTURE FOCUS

- ✓ Strong leadership must ensure process safety training is an integral part of the operations.
- ✓ Encouraging a questioning environment is critical to identifying and mitigating risk.
- ✓ Clear and well documented procedures are essential for effective communication.

****Only 63% of those surveyed indicated training was a strength in their organization.****

IMPROVING HYDROGEN SAFETY CULTURE

LEARNING OPPORTUNITIES FROM OTHER'S EXPERIENCES

***“Safety culture is how the organization behaves...
...when no one is watching.”***

Safety Culture Framework

- ▶ Safety is everyone's responsibility
- ▶ Strong leadership support
- ▶ Integrated into all activities
- ▶ Open, timely, effective communications
- ▶ Questioning/learning environment
- ▶ Mutual trust
- ▶ Continuous improvement

What are the benefits?

- ✓ Eliminates common weaknesses identified as contributing factors to catastrophic events.
- ✓ Promotes trust in the hydrogen energy industry's ability to deliver safe, reliable, quality products and services.
- ✓ Supports a sustainable legacy for companies and the hydrogen industry.
- ✓ Fosters efficiency and productivity in the workplace.

Resources

- ✓ For further information and resources on safety culture, see: <https://www.aiche.org/ccps/safety-culture-what-stake>
- ✓ For further case studies on safety culture, see: <https://h2tools.org>