



Pipeline Emergency Preparedness & Training: Case Study of a Petroleum Product Leak

On September 21, 2015 at 12:03 p.m. the Fairfax County Virginia 911 Center received a call reporting a gas odor emanating from a local restaurant in Centreville. The fire and rescue squad was immediately dispatched to a local restaurant located in a busy shopping plaza in a highly populated area.

Upon arriving at the scene, the Fairfax County Fire and Rescue Department (FCFRD) evacuated all persons from the restaurant, as well as several others in the surrounding area. Two other restaurants in the plaza were closed by the fire department as well, and an incident command center was established in the parking lot. Upon investigation, first responders were not able to detect the presence of flammable gas vapor inside the initial restaurant they responded to, so they were able to rule out a natural gas leak. However, a gasoline odor was emanating from most of the storm drains located around the shopping center, and flammable vapor in some storm drains was as high as 100 percent of the lower explosive limit (LEL), but no liquid was visible.

The Fairfax County Fire Marshal's office spoke with the operator of the nearby 32-inch and 36-inch diameter pipelines, and discovered these lines transported gasoline and other refined petroleum liquids. The pipeline company dispatched two right-of-way inspectors, who then contacted their control center to see if the pressure had dropped on the lines, at which time they were informed all systems were normal. The inspectors concluded that there was no evidence of a leak- including odor, dead vegetation, gasoline on pavement or in nearby water retention ponds.

Since the source of the odor was still unknown, the FCFRD hazmat team continued to check the storm drains and local drainage system

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Best Practices

"I share The Responder with my LEPC and Fire Departments. I have attended many 811 and local pipeline operator-sponsored training meetings."

"We continually work with our local first responders, LE, FD, EMS, LEPC, and OEM, to make sure we try and stay on top of training to help with our responses." – **Patrick Dooley, Rusk County OEM, Henderson, Texas**

"I attend pipeline operator sponsored training. I also participate in hazmat exercises as part of the LEPC."

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looking for outflow points. After discovering that a major outflow point in the shopping center was blocked, the hazmat team proceeded to clear vegetation and debris from the area, and in the process noticed black petroleum product. At this time it was assumed that the product had been illegally dumped in the area. Pumps were deployed and containment booms were placed in the water collecting over 90 gallons of product within 5 hours. Over the next several hours, the crew had collected over 3,000 gallons of water-petroleum product mixture, and it became obvious to the hazmat team that the amount of petroleum product was rapidly increasing, causing them to again suspect a pipeline leak.

The fire marshal's office contacted the pipeline operator, who proceeded to shut down both lines in the area, and dispatched inspectors to the scene again. Nearly 24 hours into the incident the operator was still unable to locate a leak on their system and issued a district-level response. Utilizing information on appurtenances, prior repairs and recent inline inspections, contractors and personnel were dispatched to six key locations along the line. After hours of digging, workers found a crack in the pipe allowing product to drip and accumulate in the trench. A sleeve was placed over the affected pipe to stop the leak, and the pipe was fully repaired and replaced several weeks later.

The National Transportation Safety Board (NTSB) reports that SCADA operations detect small leaks at approximately 2 percent of the flow volume of a pipeline. By extrapolating that out to the flow and size of the pipeline in this case, the flow was 550 times lower than the SCADA leak detection performance limit, making small leaks along liquids pipelines incredibly hard to detect. Ultimately the operator stated approximately 4,000 gallons of product were released from the pipe, and accident-related expenses were calculated at \$16.5 million.

It is important for first responders to always approach potential product leaks with the utmost caution, be flexible with situational assumptions, and recognize that response situations can continually shift and evolve.

Pipeline Emergency Response Tactics: Mitigating a Boiling Liquid Expanding Vapor Explosion (BLEVE)

On February 24, 1978, a propane tank car of a derailed Louisville and Northern railroad train exploded in Waverly, Tennessee resulting in sixteen fatalities (including the fire chief), forty-three injuries, sixteen destroyed buildings and twenty additional damaged structures. This event was a watershed moment in the history of

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Are You Prepared to Respond to a Pipeline Emergency? –Self Assessment

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First Responder Training Video Series

Learn how to safely and effectively respond to a pipeline emergency, how pipelines work, how different products impact response, response leading practices, how to better prepare to respond to pipeline incidents and roles in pipeline response. Videos feature interviews with pipeline and emergency response experts, covering a wide variety of emergency response disciplines.

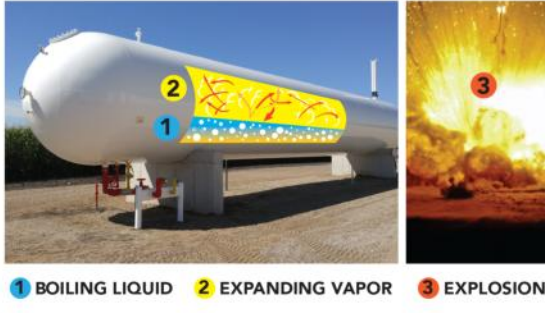
* Videos available at www.shoulder2shoulder.tv



www.shoulder2shoulder.tv

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B.L.E.V.E.



hazardous materials response and the springboard for increased understanding of the risks of boiling liquid expanding vapor explosions otherwise known as a “BLEVE”.

A BLEVE is a sudden, release of energy that occurs when a closed

container fails in two or more places at the point when the contained liquid reaches a temperature significantly above its boiling point. While many BLEVE incidents are attributed to direct flame impingement on a storage vessel, there can be other causes, such as damage from impact, or even corrosion. It is important to remember that BLEVEs are not limited to flammable materials. Any container, especially a pressurized one, exposed to fire can experience a BLEVE. Fragments from containers that have failed due to a BLEVE can travel great distances, at high velocities, and are a significant danger to personnel and equipment.

The U.S. Department of Transportation's **Emergency Response Guidebook** (ERG) contains useful safety-related response information regarding BLEVEs. The Guidebook includes a chart that provides data, such as recommended evacuation distances for containers exposed to direct flame impingement that are subject to failure. It is important to note that this data should be used with care, and that every situation involving a potential BLEVE should be treated with extreme caution. Further, responders should keep in mind that factors such as the duration of direct flame impingement on a pressurized container may be unknown upon arrival, and adequate water supply needed to cool a container subject to a BLEVE may be unavailable, especially in rural areas.

In the case of the BLEVE that occurred in Waverly, Tennessee, responders and recovery personnel did not recognize the BLEVE potential associated with the damage caused to the propane tank car during the derailment, and while conducting recovery operations. The BLEVE in Waverly was unusual, as it did not result from direct flame impingement. With no fire conditions present, the responders may not have anticipated failure of the tank due to metal fatigue and damage associated with the derailment, which occurred two days prior. Upon arriving at the scene of an incident involving pressurized containers, it is imperative that first responders conduct an effective scene size-up and be extremely cautious when determining

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WISER

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- *CHEMM 2.0 guidance and reference materials
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- *Protective distance “point into the wind” and more!

A set of WISER tutorial videos can be viewed [here](#) and videos can also be found in the training section of the [NLN YouTube Channel](#).



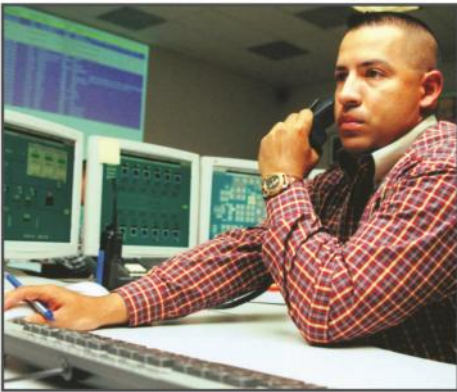
NPMS Launches iPhone app for PIMMA

The National Pipeline Mapping System has launched an iPhone app for PIMMA. It can be accessed by searching for "pipeline information" on the App store. You will need your PIMMA username and password to use the PIMMA iPhone app. To access the National Pipeline Mapping System online and locate transmission pipelines in your area, please go to <https://www.npms.phmsa.dot.gov/>

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isolation zones, evacuation distances, and the placement of personnel and apparatus.

Overview of Pipeline Systems: Supervisory Control and Data Acquisition (SCADA) systems



Thanks to sophisticated supervisory control and data acquisition, or SCADA systems, monitoring miles of natural gas and liquids pipelines is a much less daunting task. Interstate natural gas transmission and highly volatile liquids (HVL) pipelines are required by federal pipeline safety regulations to be continuously monitored for safety.

Through the use of SCADA systems, pipeline operators have the ability to remotely monitor pressures and flow rates of the products being transported through the pipelines in real time. Through the use of cellular, landline, and satellite communications, SCADA systems have the ability to receive and transmit data to pipeline facilities that span large distances. In the event an anomaly is noted, system control personnel or “controllers” can quickly assess the situation and dispatch operations personnel for further investigation. In addition, controllers have the ability to remotely operate some valves and other equipment, such as pumps and compressors on the pipeline system to adjust pressures, isolate a section for maintenance, or during emergency situations.

Controllers assigned to system control centers undergo extensive training and certification. Federal pipeline safety regulations require that pipeline operators implement “control room management” processes that ensure controllers are properly trained, and that communications between control centers and field personnel are clear and consistent during operations. Controllers receive frequent on-going training that includes participation in simulated emergencies requiring SCADA system response and coordination.

Cyber security is a key concern for nearly all industries, and the pipeline industry is no exception. Since it is considered the “nerve center” for pipeline operations, great care is taken to ensure that pipeline control centers and SCADA systems employ the highest level of security and protection from cyber threats. Typically, SCADA systems are operated on secure servers that are isolated

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from a pipeline operator's other network systems to minimize risk of intrusion by cyber attackers. Pipeline operators frequently conduct cyber-related tabletop and response exercises to enhance preparedness in the unlikely event of a successful attack on the SCADA system.

In the event of a pipeline emergency, control centers and their associated SCADA systems are a key asset for incident mitigation. All pipelines that are federally regulated are required to have signage and markers that denote the name of the operator, the product being transported, and a telephone number that is answered 24 hours a day, seven days a week. In many cases, the emergency telephone number is answered by personnel located in the control center who can quickly initiate appropriate response actions utilizing the SCADA system.

Keeping Pipelines Safe/ Practices & Protocols: Cathodic Protection

Steel, left to its own accord will seek to become the basic product known as iron oxide, or rust. Corrosion is an inherent problem in metals used in modes of transportation, such as pipelines. Protecting the integrity of the pipeline is of the utmost importance to the energy industry, and cathodic protection plays a major role in this.

Cathodic protection (CP) is a technique that is used to control the corrosion of a metal surface by making it the cathode of an electrochemical cell, which is the reduction half rather than the oxidation or rusting half of the reaction. This is accomplished by two basic types of cathodic protection—impressed current and galvanic. In conjunction with the cathodic protection, the bare steel is usually coated to reduce the amount of CP current needed to protect the pipe.

Impressed current CP systems are used for larger and longer distance applications, such as transmission pipelines. In this system, DC current is supplied through a rectifier which converts AC power to DC output, and is then applied to the pipeline through the soil using a “ground bed”. This impressed current returns along the pipeline.

In the case of galvanic CP, sacrificial anodes, or metal alloys, having more negative potential than the steel, are connected to the pipeline, making them the oxidation half of the electrochemical reaction. The anodes are wired to the pipeline in what is referred to as the “ground bed”. These anodes are “sacrificed”, or are allowed

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to corrode to protect the steel pipeline. Sacrificial anodes are made up of a variety of materials, including zinc, magnesium, and aluminum. The sacrificial anode form of CP is typically used on short distances of buried pipe.

During construction of a new pipeline, the entire line is thoroughly inspected to ensure the integrity of the coating as the pipeline is placed into the ground. Once placed into service, corrosion control technicians periodically monitor rectifiers and measure CP levels at points along the pipeline to ensure cathodic protection is effective. If a pipeline is exposed during maintenance, construction, or for any other reason, the coating is examined and inspected, and repaired, if needed.

For more information on pipeline safety, please go to:
https://www.kindermorgan.com/ehs/pipeline_safety/ ■

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