Responding to a Natural Gas Incident in a Highly Populated HCA

On December 15, 2003, the Pipeline and Hazardous Materials Safety Administration (PHMSA) published a regulation entitled "Pipeline Integrity Management in High Consequence Areas." This regulation mandated that operators of natural gas transmission pipelines identify areas along a pipeline route where a potential failure could have serious consequences for people or property. One of these areas, designated as High Consequence Areas, or HCAs for short, have a higher risk of a significant consequence such as loss of life or contamination to the environment, and are subject to additional inspections and oversight by PHMSA.

By its very nature, an HCA could contain a higher population density, location of congregation or limited mobility. Some examples include nursing homes, special needs care facilities, day cares, prisons, and sports venues. When responding to an incident involving a populated area, an initial strategic objective will most likely include evacuations. Obviously, nursing homes and rehabilitation facilities present additional logistical issues such as transportation and considerations for sheltering in a safe, suitable facility. In addition to the potential for evacuations, the initial scene size-up should include area isolation including traffic control. Additional resources may be needed early when responding to an incident within a populated area. In high density, commercialized areas, the potential for involvement of other

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Best Practices

"We hold annual meetings along with tabletop exercises and drill in partnership with our local LEPC and Industrial Mutual Aid Organizations. We will continue this in 2024."
Brent Hahn Assistant Fire Chief
Mont Belvieu (TX) Fire Department

"We created a quiz, incorporating the pipeline safety materials into an annual training module for our 911 dispatchers."

"I attend the local pipeline operator-sponsored training meeting;"
Chief David Ragon, Oil City Police Dept, Oil City, PA.

Pipelines in Your Area:

For more information on locating pipelines in your area and pipeline markers, please visit: **Public Awareness | Pipeline Facilities in your Communities | Kinder Morgan**

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utilities should also be considered. Subsurface electric lines, communications, water and sewer utilities can also be affected, especially if the trigger for the incident is an underground excavation incident, which is a leading cause for pipeline emergencies.

Operators of natural gas transmission pipelines are required to have a "transmission integrity management plan" which among other things manages the identification and inspection of HCA segments. In addition, Pipeline operators are required to engage public sector responders periodically to identify and confirm the location of existing and potential new HCAs including densely populated areas. Pipeline operators are your best source for additional information regarding HCAs for preplanning purposes and participation in response tabletop exercises and drills.

Case Study of LNG Incident in Plymouth, Washington

At approximately 8:19 a.m. on March 31, 2014, an LNG peak shaving plant in Plymouth, Washington experienced a catastrophic failure. This large facility houses liquid natural gas in two, 14 million-gallon tanks and serves as a primary artery for the transmission of natural gas to the Intermountain Region and Pacific Northwest. The LNG peak shaving storage facility pulls gas from the transmission system in the spring and summer, liquifies it, then vaporizes it during high-use periods such as winter. Liquifying natural gas reduces the gas volume 600 to 1. Plymouth lies on the border between Washington and Oregon and is along the Columbia River.

Photo Courtesy of WUTC

On the morning of March 31, plant personnel were attempting to restart the purification loop after purging of the line occurred for several weeks prior. Initially, the employees listening for the regeneration compressor to kick on heard the noise for several minutes, but ultimately a rolling detonation occurred after air in the pipe traveled downstream from the salt bath heater, auto igniting

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To download the Newest Version of the DOT ERG, go to:

Emergency Response Guidebook (ERG) | PHMSA (dot.gov)

NOTE

If you would like to request additional information, or to schedule a presentation or tabletop drill with Kinder Morgan, please fill out the form found at **http://PA-inforequest.kindermorgan.com**

Suggest an Article for The Responder!

Is there a topic you'd like to see featured in the next issue?! Please click **here** to suggest your topic for *The Responder* newsletter!

WISER

WISER has been discontinued as part of NLM's initiative to align and consolidate information. Other sources of hazmat, chemical, biological, radiological, and nuclear weapons can be found at **CHEMM, ERG2020, DHS' Hazardous Materials Release website, NIOSH Pocket Guide**.

WISER
Wireless Information System for Emergency Responders

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the upstream piping and resulting in failure of one of the adsorbers. The explosion could be felt as far as six miles away and generated pressure in excess of 1,774 psig. Over 250 pounds of debris and shrapnel traveled 900 feet, subsequently puncturing an LNG Storage Tank.

An employee evacuating the plant pulled the Emergency Shutdown (ESD) switch on his way out of the building, and the plant ESD switch was pulled by administrative personnel as they evacuated. Within minutes, 911 was called and Umatilla and Benton County firefighters and ambulances arrived on scene. One employee in the compressor station was badly burned and had injuries that required him to be flown to a hospital. Four others sustained minor injuries and were treated on scene. Within 45 minutes, a notification was made to the National Response Center (NRC) reporting a natural gas explosion and fire had occurred.

First responders executed evacuation orders for over 200 residents within a 2-mile radius of the plant. Incident Command was established and then needed to be relocated to a further location across the highway due to the smell of gas over a quarter of a mile away. Burlington Northern's Railroad tracks, located just outside the plant's grounds, were damaged from the ejected debris. As a result of the explosion, five employees were injured and over $45 million in damages were recorded.

In the Failure Investigation Report issued by PHMSA, it was determined that the primary cause of the incident was failure to purge air from the pipeline to 0 psig, leading to a gas-air mixture in the system that auto-ignited when the system was restarted.

Response Priorities for an LNG Incident

- Assess the scene
- Rescue any individuals who may be trapped in the area
- Issue evacuations for the appropriate perimeter
- Control the scene and establish Incident Command

Mitigating a Boiling Liquid Expanding Vapor (BLEVE) Explosion

A boiling liquid expanding vapor explosion (BLEVE) can occur when a pressurized vessel containing a stored liquid is subject to a significant temperature increase, often due to direct flame impingement causing rapid boiling and vaporization of the contained product. When the vapor pressure inside the vessel reaches a point after exceeding relief valve capability, a catastrophic failure may occur.

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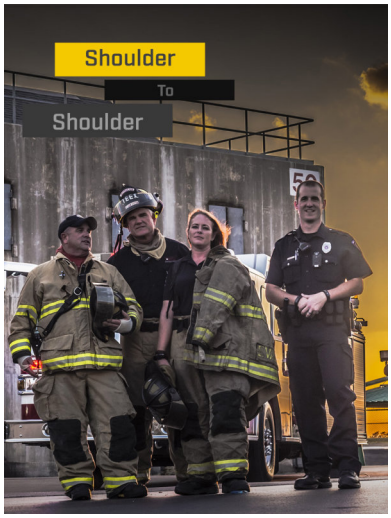
BUXUS

For more information on BUXUS or to register, go to **www.buxus.io**

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 **https://www.youtube.com/channel/UCLQv4arPbGluPt7j_JuETWw**



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The risk of BLEVE incidents was tragically highlighted in an accident that occurred in Waverly, Tennessee on February 24, 1978. Two days before, a freight train derailment involving several vehicles, two of which contained liquefied petroleum gas (LPG), occurred in the downtown area of Waverly. One of the cars, thought to be of double wall construction, was in fact only a single wall type. During clean-up operations, atmospheric temperatures rose significantly. The tank which apparently was damaged during the clean-up sustained a crack which weakened the integrity of the vessel. A BLEVE subsequently occurred resulting in 16 fatalities, 43 injuries and significant damage to the downtown area. The local fire chief and police chief were among those killed that day. This incident has continued to highlight the risk of BLEVEs and the need for a safe and effective response.

Whether it is a barbecue propane cylinder or a 43,000 gallon tank car, a BLEVE can occur when the vessel is exposed to rapid temperature increases. As with any response to a hazardous materials incident, an effective, thorough scene size-up is a must. Evacuations should be considered a top priority – especially if a BLEVE is thought to be imminent. Cooling master streams can be used effectively to lower vapor pressure only if there is ample water supply and risk to personnel has been minimized. Variables such as the amount of time a pressure vessel has been exposed to elevated temperatures and the amount of water required to provide effective cooling must be considered.

The 2024 edition of the U.S. Department of Transportation Emergency Response Guidebook (ERG) provides useful information regarding BLEVE mitigation beginning on page 357. The section includes a chart with recommended isolation distances based on vessel capacity. Keep in mind, this is only a guide, and each situation will be unique and require specific mitigation and response actions.

Featured Best Practices from Your Emergency Responder Peers

One of the most effective ways to learn about emergency preparedness is from our peers. The South Montgomery County Fire Department in Texas (SMCFD) engages in multifaceted pre-planning for pipeline incidents. This pre-planning includes involvement in their Local Emergency Planning Committee (LEPC) to facilitate a coordinated approach to emergency response.

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NPMS and PIMMA Updates

NPMS website and documentation updated to reflect Phase 0 changes to data submittal requirements. OSAVE is available for CY2023 reporting, including updates to reflect NPMS data submittal requirements. In summary, Phase 0 implements

- Abandoned pipeline facilities are required.
- Breakout tank submittals are required.
- Pipeline diameter attributes are required (reported in Nominal Pipe Size, NPS).

Please refer to the January 2024 **NPMS Operator Standards** manual for details on submissions and required attribute information.

Did you know ...

811 is the nationally recognized three digit number to provide notification of pending excavation activity so that utilities can properly locate underground assets. Help us spread the word for safety ...**Call 811 before you dig!**

811®
Know what's **below.**
Call before you dig.

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SMCFD utilizes the National Pipeline Mapping System (NPMS) and the BUXUS app to maintain awareness of what is located in their territory and to facilitate timely responses, should an incident occur. Additionally, SMCFD attends pipeline operator sponsored meetings, such as those offered by Paradigm Liaison Services. These meetings are sponsored by local pipeline operators, who are frequently in attendance, and allow first responders and pipeline personnel to familiarize themselves with one another prior to an incident. Educational materials such as pipeline maps, business cards and 811 information are also provided to meeting attendees. SMCFD also identifies pipeline incidents in their Threat and Hazard Identification and Risk Assessment (THIRA).

For better integration into response models and the Incident Command System, the South Montgomery County Fire Department has purchased a mobile operations center. This unit facilitates other stakeholders' participation in the command structure. SMCFD's Incident Management and Command Training has prepared its members to effectively respond to pipeline emergencies, enabling incident management through a unified command structure that integrates various stakeholder and subject matter experts, as needed.

"Getting involved in our LEPC and integrating our local Hazmat Teams with the Committee are recommended practices that have benefited our department, said Battalion Chief Matthew Adelman. "This effort has proven beneficial for building relationships within the industry. We look forward to hosting tabletop exercises in our new mobile operations center in the near future."

Special thanks to Matthew Adelman and the South Montgomery County Fire Department for their assistance with this article.

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