



Pipeline Emergency Preparedness & Training: Emergency Response and the Risks Associated With Hydrogen Sulfide

It is important to understand the characteristics of hydrogen sulfide (H₂S) when responding to an emergency. It is a flammable, colorless gas that occurs naturally during crude oil and natural gas exploration and production.

If dispatched to an incident potentially involving H₂S, extreme caution should be exercised.

- Exposure to H₂S, even in low concentrations, is hazardous. The Immediately Dangerous to Life or Health (IDLH) exposure limit is 100 parts per million. At 400 parts per million unconsciousness can occur and at 1,000 parts per million exposure is fatal.
- Although H₂S has a characteristic “rotten egg” smell in low concentrations, this cannot always be used as a warning sign because the ability to sense this odor will rapidly disappear when breathing low concentrations. At high concentrations the ability to smell H₂S can be lost immediately.
- H₂S is heavier than air and can accumulate in low lying areas such as tank dikes, storm drains, sewers, and basements.
- H₂S is flammable and explosive in high concentrations; therefore, precautions against ignition should be taken. Combustion of H₂S produces sulfur dioxide (SO₂), which is also a toxic gas.

Responders dispatched to petroleum or natural gas well sites, or production facilities should include the potential for H₂S to be present as part of the initial risk assessment. Additionally, depending on the pipeline, H₂S may be transported as an individual commodity or may be transported as a component of petroleum or natural gas commodities. Pipelines that transport H₂S, or product

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Best Practices

“We host the Green River Basin Pipeline Association meetings and assist with annual seminars/safety presentations.”

“I feel the local pipeline operator meetings are great! I think the St. Elmo, Fayette/Effingham County Illinois team does a great job!” - **Effingham County Sheriff, David Mahon**

“We incorporate pipeline response into our local exercise plan. We attend local pipeline operator-sponsored training meetings. We incorporate information from pipeline operators in our emergency response plans.”

Looking for more training resources?

Access our Tabletop Drill Guides and Scenarios, and Emergency Response Self-assessment form here https://www.kindermorgan.com/public_awareness/additionalinformation/trainingmeetings.aspx

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containing H₂S meeting State and Federal safety criteria, should have signage labeled “Sour Gas” or “Poison Gas”.

Responders should approach the area from an upwind direction, isolate the downwind area, eliminate ignition sources, ventilate the area if possible, and prohibit entry without appropriate protective clothing and self-contained breathing apparatus. Monitoring of the area should be accomplished using continuous monitoring detection equipment capable of measuring H₂S. Monitoring should include areas that are susceptible to accumulation of the material.

Kinder Morgan operates pipelines that could contain hydrogen sulfide gas in the transported commodities. For additional information please contact Kinder Morgan online https://www.kindermorgan.com/public_awareness/additionalinformation/requestAdditionalInformation.aspx or by calling 800-276-9927.

Pipeline Emergency Response Tactics: Conducting Effective Scene Size-Up at a Natural Gas Incident

While incidents involving natural gas pipelines are rare, firefighters and other emergency response personnel need to be prepared should they occur. Basic knowledge of the properties of natural gas, as well as scene size-up techniques for emergency response can be crucial for life safety.

Effective scene size-up begins with pre-planning, facility familiarization and joint training opportunities with pipeline personnel prior to an emergency. Upon arrival at a suspected natural gas incident, first responders should take a moment to assess the situation and then approach cautiously from an upwind, uphill location. Although natural gas is non-toxic, it is a simple asphyxiant. If incident conditions are unknown, assess the situation from at least 1/4-mile from the incident site.

If available, emergency responders should utilize a combustible gas indicator (CGI) to measure the combustible gas or vapor content in the air and establish the flammable area, also known as the “hot zone”. The use of CGI equipment may be especially important since natural gas is naturally colorless and may be odorless. The explosive range can vary with the composition of natural gas and can range from 4% to 17% by volume in air. The lower explosive/flammable limit (LEL/LFL) is the lowest concentration of combustible gas in air that will explode or burn when ignited. The upper explosive/flammable limit (UEL/UFL) is the highest concentration of combustible gas in the air that will explode or burn when ignited.

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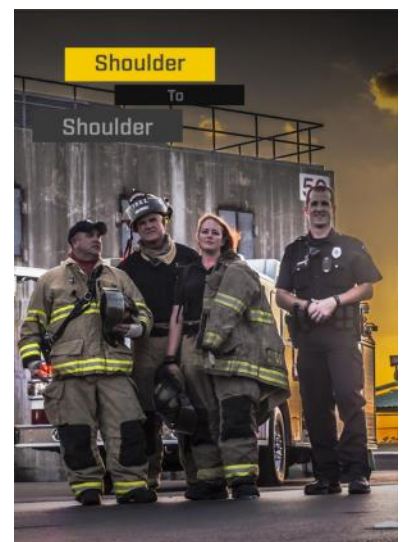
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Is there a topic you'd like to see featured in the next issue?! Please click [here](#) to suggest your topic for *The Responder* newsletter!

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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If natural gas is present and confirmed, it is critical that the scene be secured, and all potential ignition sources including electronics, vehicles, cell phones, radios, non-intrinsically safe flashlights, etc. be removed from the area.



At this point, the Incident Command System (ICS) should be employed and command should be established upwind, uphill and upstream at a safe distance from the scene (for more information on ICS, please refer to the last article in this issue, "Pipeline Emergency Response Tactics: Overview of the Incident Command System"). Pipeline operator personnel are familiar with ICS and understand the importance of dovetailing their response with public sector first responders. They should be able to assist emergency responders in evaluating the situation and providing recommended actions, and requesting additional resources, if needed.

Emergency responders should also use CGIs to check surrounding buildings and the incident perimeter for the presence of natural gas. Pedestrian and vehicular traffic should be routed around the incident site accordingly. If pipeline personnel are not already present at the scene contact them as quickly as possible. When the pipeline operator's emergency number is unknown, emergency responders should locate the nearest pipeline marker to obtain the operator's name and phone number.

Typically, when there is a natural gas release, the pipeline operator will shut off the natural gas supply to the area, which may include isolating the area by closing pipeline valves. Emergency responders should not attempt to operate any pipeline valves.

Scene Size-up at a Natural Gas Incident – Actions:

- Approach from an upwind, uphill and upstream location
- Isolate and eliminate ignition sources
- Utilize a CGI to determine if gas is present
- Notify the pipeline operator
- Implement ICS
- Evacuate the area, when appropriate
- Restrict pedestrian and vehicular traffic
- Establish control zones

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WISER

WISER 5.1 Update Release Includes:

- *CHEMM 2.0 guidance and reference materials
- *New Acute Exposure Guideline Levels for airborne chemicals (AEGL) data from the EPA
- *Data updates based on the last Hazardous Substances Data Bank (HSDB) content
- *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 [NLM YouTube Channel](#).



NPMS Launches iPhone app for PIMMA

The National Pipeline Mapping System (NPMS) 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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For more information specific to natural gas properties, please refer to the Safety Data Sheet (SDS) or the Emergency Response Guidebook (ERG). To request additional information on training opportunities with Kinder Morgan please fill out the form found at https://www.kindermorgan.com/public_awareness/AdditionalInformation/RequestAdditionalInformation.aspx

Overview of Pipeline Systems: Natural Gas Transmission Mainline Valves



Mainline valves are an integral component of natural gas pipeline transmission systems. They function as gateways that, when open, allow the gas to flow freely or, when closed, stop the flow of gas or isolate a segment of the pipeline. They may be utilized during emergency

response in order to isolate impacted pipeline segments.

Valves are located along the pipeline system at minimum intervals, as prescribed by pipeline safety regulations. When deciding where to locate valves, many factors are taken into account, including population, environmentally sensitive areas, elevation changes and terrain. Valves can be located as closely as a couple miles from one another or up to 20 miles apart.

There are different types of mainline valves utilized in the design and operation of natural gas transmission pipeline systems:

- Manual valves are operated by hand, from an actual above-ground valve location and need to be turned open or closed by pipeline operator personnel.
- Remote control valves (RCVs) allow a control room operator to send a signal to a specific valve or set of valves, isolating a section of pipe and stopping the gas flow.

Automatic shut-off valves (ASVs) work by automatically closing when pressure sensors near the valve signal a pressure drop that meets predetermined operating criteria. Generally speaking, an ASV typically closes more rapidly than a manual valve that requires personnel to be on the scene. During normal operations and

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NOTE

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emergency response, closing one or more mainline valves in a pipeline segment may require opening valves to other sections of the pipeline to maintain pressure and customer deliveries.

Keeping Pipelines Safe/Practices & Protocols: Overview of the Incident Command System

The Incident Command System (ICS) is the nationwide standard for managing emergencies, including pipeline emergencies. Developed in California in the 1970s in response to significant wildfire events, the ICS is a standardized, organizational structure that can be used to manage any emergency situation, as well as non-emergency events with public safety implications.

The Incident Commander is typically first on the scene. The Incident Commander role may change as the situation warrants. The Incident Commander will designate the Command Post location and strategically manage the emergency based on three priorities: Life Safety, Incident Stabilization, and Property Conservation. The Incident Commander is augmented by the Command Staff which includes a Safety Officer, Logistics Officer, and Public Information Officer. The ICS structure is further comprised of the Operations, Planning, Logistics, and Finance/Administration Sections.



The Incident Command System transcends organizational differences and provides a proven and adaptable structure for the management of any type of emergency event. Public and private entities can operate jointly within the ICS system. During a pipeline emergency, a unified ICS structure should be implemented whereby representatives from responding organizations are collocated and jointly determine strategy and objectives for safely managing the event. Kinder Morgan utilizes the ICS when responding to pipeline emergencies.

Pipeline response personnel can serve in a technical specialist role for the Incident Commander and advise on the proper steps for leak/spill isolation, atmospheric monitoring, and risks associated with the released product. In addition, the pipeline operator can provide key information to the Public Information Officer for

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NOTE

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First Responder Online Pipeline Training

To access the API-AOPL Emergency Response Team's free online training, click <https://nasfm-training.org/>

NOTE

To read past issues of *The Responder*, please go to the archived issues at http://www.kindermorgan.com/pages/public_awareness/The_Responder/archive.aspx

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dissemination to the news media. Lastly, during large scale events, a pipeline operations representative can be paired with the public sector Operations Section Chief to aid in coordination of tactical response activities. Integral to any ICS structure is the designation and use of a Staging Area for collection, management, tracking, and assignment of resources.

The ICS affords standardized documentation of an incident through the use of FEMA/Department of Homeland Security 200 series forms. These forms provide a framework to collect and disseminate critical information to all entities engaged in response to an emergency event.

The ICS should be employed for any emergency response regardless of size or complexity. By its very nature, use of the ICS contributes to personnel accountability and safety. The effectiveness of ICS is only as good as the training which is conducted to support it. Execution of tabletop exercises and mock emergency drills should have ICS implementation as a key objective. Opportunities to implement unified command with outside parties, such as pipeline operators should be sought during any joint exercise events. ■

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