

Pipeline Emergency Planning & Response Tools

Company and chief officers must prepare ahead of time for effective response to pipeline ruptures

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[\[Additional formatting of this article has been done to incorporate it on this website.\]](#)

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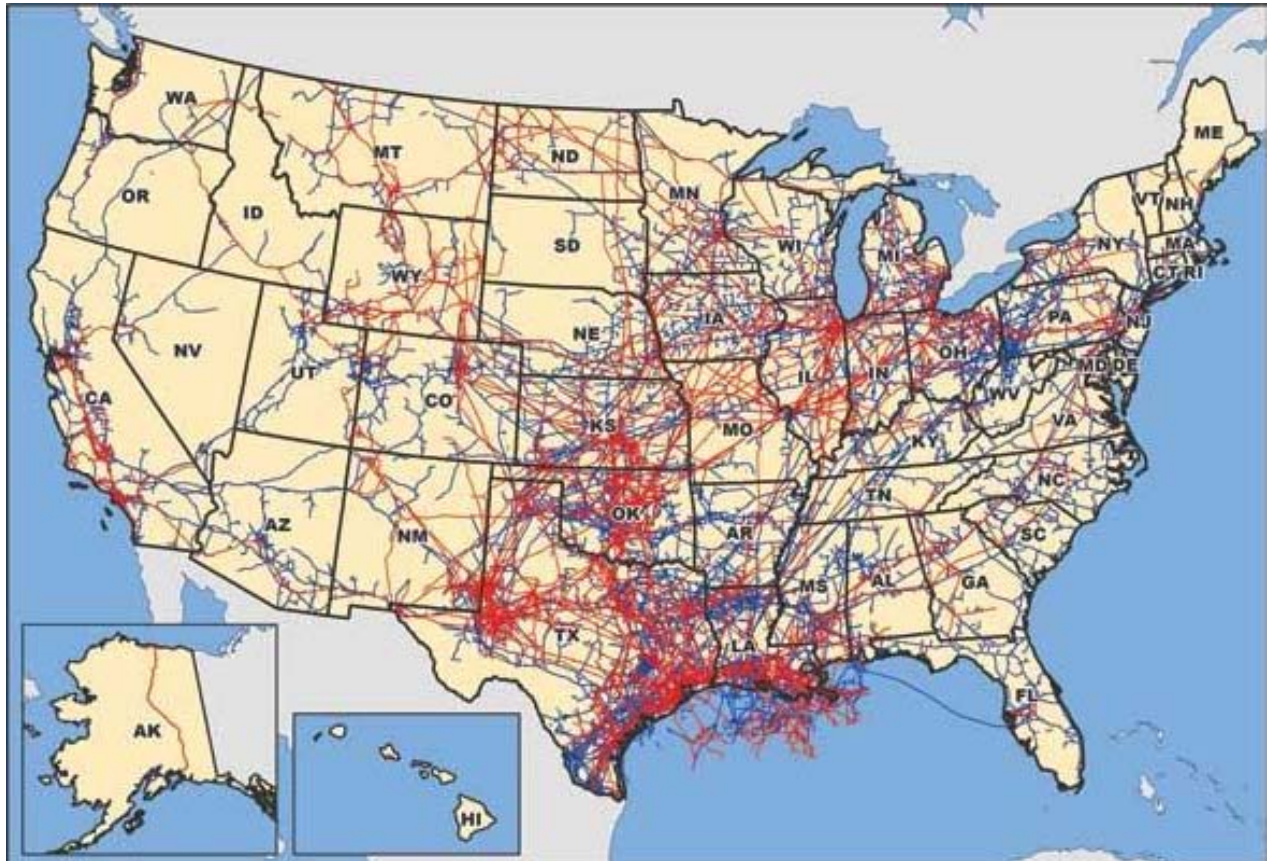
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Introduction

Approximately 2.5 million miles of natural gas and hazardous liquid pipelines crisscross the United States. That's enough to circle the earth about 100 times. Some are large transmission pipelines that operate under tremendous pressure, while others are smaller, lower-pressure distribution pipelines that serve our homes and businesses. These pipelines are operated by approximately 3,000 companies, large and small, but according to Pasadena (Texas) Fire Chief Lanny Armstrong, one thing unites them: "No matter the size, pressure or operator, all of these pipelines carry hazardous materials that can pose serious risks to people and the environment," he says.



Transmission pipelines in the US. Natural gas transmission pipelines are in blue; hazardous liquid pipelines are in red. This map does not depict natural gas distribution pipelines. Source: National Pipeline Mapping System (www.npms.phmsa.dot).

When compared to other options, pipelines are one of the safest and most economical means of transporting hazardous materials. The primary causes of pipeline incidents include corrosion; incorrect operation; material, weld or equipment failure; natural force damage like earthquakes and floods; excavation damage; and other outside force damage like vehicle collisions. Although pipeline incidents are relatively rare considering the total mileage of pipelines and the volume of products transported, pipeline incidents can have catastrophic consequences.

Recent Pipeline Incidents

Fire departments respond to gas pipeline incidents on a regular basis, but these incidents generally involve small distribution lines at homes or businesses. Large-scale pipeline incidents on major transmission pipelines are low-frequency but potentially high-consequence hazardous materials events. These larger transmission pipelines are very different from the smaller distribution pipelines that fire departments typically encounter.

According to Tim Butters, deputy administrator of the Pipeline and Hazardous Materials Safety Administration (PHMSA), effective risk assessment, emergency response planning and training

can increase the safety of the public, emergency responders, and property when pipeline incidents do occur. “The larger transmission pipelines do not always get the attention they deserve because major pipeline incidents are infrequent, emergency responders simply are not aware of major pipelines in their jurisdictions, or emergency responders are overwhelmed with information on a multitude of hazards and priorities in their jurisdictions,” he says.

Despite these facts, several recent pipeline incidents have highlighted the need for communities to be adequately prepared for pipeline emergencies. In September 2010, a gas pipeline rupture and the subsequent ignition in San Bruno, Calif., caused eight fatalities, injuries to more than 60 people, the complete destruction of 38 homes, and damage to 70 other homes. An investigation of the incident revealed that the local emergency responders were not adequately prepared to respond to the pipeline emergency.



A massive fire roars through a mostly residential neighborhood in San Bruno, Calif., following a pipeline explosion that killed eight people and incinerated the neighborhood. Photo: AP/Jeff Chiu

A second example: a gas pipeline emergency that occurred in Appomattox, Va., in September 2008. The rupture and ensuing fire injured five people and damaged homes and other property in a rural area.



An aerial view of the impact of a natural gas pipeline rupture and fire in Appomattox, Va., in 2008, that demolished two houses and damaged buildings 400 yards away. Photo: Pipeline Safety Trust

Tools Available to Emergency Responders

The most important aspects of pipeline emergency preparedness and response are communication and cooperation between pipeline operators and emergency responders. There is no substitute for establishing positive working relationships before emergencies occur. Federal regulations require pipeline operators to communicate with emergency responders in communities traversed by pipelines. Pipeline operators are required to communicate the following information to emergency responders:

- Location of transmission pipelines that cross their area of jurisdiction and how to get detailed information regarding those pipelines;
- Name of the pipeline operator and the emergency contact information for each pipeline;
- Information about the products carried/their hazards;
- Location of emergency response plans with respect to the subject pipeline;
- How to contact the pipeline operator regarding questions, concerns or an emergency;
- How to safely respond to a pipeline emergency;
- An overview of what operators need to do to prevent accidents and mitigate the consequences of accidents when they occur; and

- How to contact the pipeline operator with questions or comments about public safety, additional overview information on Integrity Management Programs to protect High Consequence Areas under their jurisdiction, land use practices, emergency preparedness or other matters.

Most pipeline operators comply with these regulations through annual mailings and periodic face-to-face liaison meetings. Armstrong notes that it is also imperative that pipeline operators provide a liaison to the incident commander as quickly as possible when pipeline emergencies occur. This liaison must have information related to the products, the size of the line, the pressure on the line and the operator's contingency for response, such as timelines for isolation, media interaction, response capabilities and resources.

Emergency responders also have the responsibility to know and understand pipeline risks and ensure that they have prepared response plans in cooperation with pipeline operators. In addition to the information provided to emergency responders by pipeline operators, there are several other pipeline-related resources available to emergency responders.

The National Pipeline Mapping System (NPMS)

"One of the most vital pieces of information emergency responders need when preparing for pipeline emergencies is the location of the pipelines," Armstrong says.

The National Pipeline Mapping System (NPMS) is a Web-based mapping tool produced by PHMSA that allows users to view maps and basic information about natural gas and hazardous liquid transmission pipelines in the United States (natural gas distribution pipelines and gathering pipelines are not included in the NPMS).

Other mapping data contained in the NPMS includes liquefied natural gas (LNG) plants, populated areas, aerial imagery, topography and street maps. The NPMS can be accessed at www.npms.phmsa.dot.gov.

Users of the NPMS can view and query the data in a variety of ways, including searching by pipeline type, operator name or zip code. Users can also view basic information about the pipelines in the NPMS, including operator name, pipeline diameter and commodities transported.

Due to security concerns, the NPMS does not contain information about pipeline interconnects, pump and compressor stations, valves, direction of flow, capacity, throughput or operating pressure. However, the NPMS provides a one-stop shop for mapping information on the major pipelines that traverse an area.



Screen shot: National Pipeline Mapping System, Public Map Viewer(<https://www.npms.phmsa.dot.gov/>)

Emergency Response Guidebook

The next edition of PHMSA's Emergency Response Guidebook (ERG) will be published in the first or second quarter of 2012. The 2012 edition will contain expanded information about pipelines, including:

- A basic overview of pipeline types, associated structures and markers;
- Indications of pipeline leaks and ruptures; and
- The fundamentals of a safe and effective response.

Product information, as well as the physical state and pressure of the product in the pipeline, is critical to responders to initiate public protective actions as soon as possible. Initial isolation zones and downwind protective action distances are listed in the ERG. To learn more about the ERG, visit <http://phmsa.dot.gov/hazmat>.

Pipeline Emergencies Training

Several pipeline emergency training resources are available at no cost. The most comprehensive of these is the second edition of “Pipeline Emergencies,” available for free at www.pipelineemergencies.com.

The “Pipeline Emergencies” training manual was produced through a cooperative agreement between PHMSA and the National Association of State Fire Marshals and was released in May 2011. Authors Greg Noll and Mike Hildebrand, with input from pipeline and emergency response experts from around the country, have improved upon the successful first edition of the training manual with updated information about commodities transported by pipelines, related videos, an instructor guide for fire trainers, and mobile apps for iPhone and Android devices.

“Pipeline Emergencies” also provides a comprehensive overview of pipeline operations tailored to the needs of emergency responders. “‘Pipeline Emergencies’ is an excellent resource for emergency responders wishing to enhance their capability to safely and efficiently mitigate pipeline incidents,” Armstrong says.

A Final Word

Catastrophic pipeline emergencies are rare, but recent incidents have demonstrated that they happen. Adequate preparation and response are essential to minimizing risks to life and property when pipeline emergencies do occur. To effectively plan for and respond to pipeline emergencies, it’s essential that emergency responders and pipeline operators establish positive working relationships prior to emergencies occurring and understand how best to work together during a pipeline emergency response. In addition to these critical liaison responsibilities, company and chief officers should use the tools and resources available to them to assist with emergency preparedness and response.

You can take some immediate steps to improve the safety of pipelines in your community. For example, encourage excavators and homeowners to call 8-1-1 before doing any digging. Butters also encourages communities to consider implementing the recommended practices that were produced by the Pipelines and Informed Planning Alliance (www.PIPA-Info.com). These recommended practices address how to best protect people, property and pipelines from encroaching development on existing transmission pipeline rights-of-way.

A recent conference between emergency responders and pipeline operators in Houston emphasized several pipeline emergency response issues that need some attention. Perhaps the most important of these is the need to improve the efficiency and effectiveness of communication and cooperation between emergency responders and pipeline operators.

Another major issue is the need to incorporate pipeline training into existing hazardous materials training curricula. The solutions to these problems will take shape www.npms.phmsa.dot.gov in the coming years with the dedicated efforts of emergency responders, pipeline operators and pipeline regulators.

Accessing the National Pipeline Mapping System

There are three ways to access the NPMS:

- The public viewer, which is available to everyone and does not require a password. The public viewer shows all of the pipelines in the system, but limits the geographic extent that can be viewed to a single county (selected by the user) and does not display all of the available attributes about the pipelines.
- The password-protected version, available only to government officials, that allows users to view larger geographic areas and access all of the attribute information available for the pipelines. The NPMS website at www.npms.phmsa.dot.gov contains instructions for requesting access to the password-protected version.
- The authorized government area, where authorized government representatives can download the pipeline geospatial data for use in their own geographic information systems. The NPMS Manager, Amy Nelson, can be reached at amy.nelson@dot.gov.

Pipeline Facts

The construction and operation of the vast network of gas and hazardous liquid pipelines in the United States are regulated by the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) and state regulatory partners. The pipeline network includes approximately:

- 175,000 miles of onshore and offshore hazardous liquid pipeline;
- 321,000 miles of onshore and offshore gas transmission and gathering pipelines;
- 2,066,000 miles of natural gas distribution mains and service pipelines; and
- 114 active liquefied natural gas plants connected to our natural gas transmission and distribution systems.

Pipelines transport a variety of hazardous materials, including natural gas, crude oil, heating oil, diesel, gasoline, jet fuel, kerosene, propane, butane, ethylene, propylene, hydrogen, carbon dioxide, anhydrous ammonia and other products.

For more information on pipeline operations in the U.S., visit PHMSA's homepage at <http://www.phmsa.dot.gov> and PHMSA's Stakeholder Communications website at <http://primis.phmsa.dot.gov/comm>.

Web Extra!

When firefighter/paramedics encounter a natural gas explosion, they should be ready to perform multiple functions on the scene. Gailynne Ferguson uses a recent gas pipeline explosion in Allentown, Pa., to illustrate the many tasks that must be preplanned and executed. <http://tinyurl.com/Allentown-explosion>