



**Fire Department Pipeline Response,
Emergency Planning, and
Preparedness**

TOOLKIT



U.S. Department
of Transportation
**Pipeline and Hazardous Materials
Safety Administration**

Acknowledgements

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Introduction

Many volunteer fire and emergency agencies across the country have a liquid or gas pipeline running through their response area. Insufficient preparation can result in damages, injury, or death when responding to a pipeline incident. The National Volunteer Fire Council (NVFC) is working with the Pipeline & Hazardous Materials Safety Administration (PHMSA) to raise awareness and readiness levels within the volunteer fire and emergency response community to improve pipeline incident response outcomes with its Fire Department Pipeline Response Emergency Planning & Preparedness (FD PREPP) program.

According to the U.S. Department of Transportation, Bureau of Transportation Statistics, in 2019 there were 224,045 miles of hazardous liquid or carbon dioxide pipelines in the U.S., including 83,351 miles of crude oil pipelines and 63,090 miles of petroleum/refined product (gasoline, jet fuel, etc.) pipelines. In 2019, there were also 2,257,739 miles of gas pipelines, including 1,318,426 miles of distribution lines, 302,249 miles of transmission lines, and 17,502 miles of gathering lines. Although incidents related to pipelines are typically low frequency/high impact, these types of lines pose a potential hazard to the public and to the first responders who may be called to an emergency.

From 2005 to 2019, according to PHMSA's *Significant Incident Consequences Summary*, there have been 144 public fatalities; 44 industry fatalities; 646 public injuries; and 218 industry injuries. In addition to the human costs, pipeline incidents during the same timeframe also resulted in a staggering \$8.4 million in total costs (Industry Cost + Public Cost). Industry Costs include damage to the pipeline system, emergency response, and cost of lost product. Public Costs include damage to property not owned by the pipeline operator. Generally, the pipeline operator reimburses the community for all Public Costs. This data excludes "Fire First Incidents," which are gas distribution incidents with a cause of "Other Outside Force Damage" and sub-cause of "Nearby Fire/Explosion" as the listed, "Primary Cause of Incident".²



The FD PREPP program seeks to increase the awareness and operational capabilities of volunteer firefighters across the nation as it pertains to pipeline emergency response. This toolkit provides practical information, resources, tools, and references that can be easily utilized and adapted by volunteer agencies to best meet their needs. The NVFC encourages volunteer departments to build on strengths, identify and recognize gaps in training and/or equipment, and strive to formulate standards-based solutions to address shortcomings.

The following sections identify key areas of consideration along with corresponding resources and tools to assist your department in planning for, and responding to, pipeline incidents.

¹ <https://www.phmsa.dot.gov/data-and-statistics/pipeline/annual-report-mileage-hazardous-liquid-or-carbon-dioxide-systems>

² <https://www.phmsa.dot.gov/data-and-statistics/pipeline/pipeline-incident-20-year-trends>

Tools & Resources

1

Pre-planning

Pre-planning is essential for potential pipeline emergencies that may occur within a department's jurisdiction or in jurisdictions where mutual and/or automatic aid is provided.

> Risk Assessment

Conduct an assessment to determine the potential impacts from pipeline incidents in the jurisdiction. Risk assessments are also useful in identifying types of pipelines and operators. This document provides a simple, five (5) step model for conducting a pipeline risk assessment in your jurisdiction.

> Pipeline Standard Operating Procedure

Use this draft SOP to build upon an existing policy or to create a new policy specific to the jurisdiction.

> National Pipeline Mapping System (NPMS)

Using the NPMS login, agencies can identify pipelines, commodities carried, and potential impacts to infrastructure and high consequence areas within their jurisdiction. Pipeline operators and government agencies are encouraged to apply to PHMSA for Pipeline Information Management Mapping Application (PIMMA) access.

> The Emergency Response Guidebook (ERG) /Wiser Application /Cameo Chemicals

Use these resources to help predetermine isolation distances and physical and chemical properties of commodities found in a jurisdiction's pipelines. WISER also has a mapping feature that will overlay the ERG isolation and protection distances onto a map/satellite view.

> Local Emergency Planning Council (LEPC) Plans

A LEPC may have developed plans with pipeline operators or have preexisting disaster plans that could be useful during a pipeline incident. LEPCs may also incorporate pipeline incident tabletop and field exercises into their activities.

> Operator-Specific Tools

Pipeline operators may provide specific information to your jurisdiction about what agencies can do at a pipeline release, specific isolation and protection distances (determined by consulting the Emergency Response Guidebook) for their commodities, and provide safety resources and training.

2

Existing Consensus Standards and Regulations

Review and utilize existing consensus standards and regulations when preparing for, and responding to, pipeline emergencies.

> National Fire Protection Association Standards

- NFPA 329, Recommended Practice for Handling Releases of Flammable and Combustible Liquids and Gases

This recommended practice details appropriate methods for responding to fire, explosion, and human health hazards resulting from the release of a flammable or combustible liquid, gas, or vapor that could migrate to a subsurface structure.

- NFPA 472, Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents

This standard identifies the minimum levels of competence required by responders to emergencies involving hazardous materials/weapons of mass destruction.

- **NFPA 475, Recommended Practice for Organizing, Managing, and Sustaining a Hazardous Materials Weapons of Mass Destruction Response Program, 2017 Edition**

This recommended practice establishes a common set of criteria for the organization, management, and deployment of personnel, resources, and programs for the public or private entities responsible for the hazardous materials/weapons of mass destruction emergency preparedness function.

- **NFPA 1072, Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications, 2017 Edition**

This standard identifies the minimum job performance requirements for Hazardous Materials/Weapons of Mass Destruction emergency response personnel.

> **American Petroleum Institute**

- **API RP 1162, Recommended Practice for “Public Awareness Programs for Pipeline Operators”**

API RP 1162 is an industry consensus standard that provides guidance and recommendations to pipeline operators for the development and implementation of enhanced public awareness programs. It addresses various elements of such programs, including the intended audiences, the kinds of information to be communicated, frequencies and methodologies for communicating the information, and evaluation.

- **API RP 1174, Recommended Practice for Onshore Hazardous Liquid Pipeline Emergency Preparedness and Response**

API RP 1174 provides operators of onshore hazardous liquid pipelines with a framework that promotes the continual improvement of emergency planning and response processes, including identification and mitigation of associated risks and implementation of changes from lessons learned. It assists the operator in preparing for a safe, timely, and effective response to a pipeline emergency.

> **Occupational Safety and Health Administration**

- **29 CFR OSHA 1910.120 Hazardous Waste Operations and Emergency Response**

This OSHA standard covers hazardous waste clean-up operations and emergency response activities.

> **Incident Command System Forms**

The following pre-filled forms adapted from the **National Incident Management System Forms Booklet** can be used as a starting point when developing pipeline Incident Action Plans (IAPs).

- **ICS 202 – Pipeline Leak Gas**

Agencies can use ICS Form 202 to create objectives at a gas pipeline incident. Standard objectives for each type of incident they could possibly encounter could be determined during preplanning. Use the FD PREPP Safe Response Checklist (located in the Response section) to determine objectives. Remember to make your objectives simple, flexible, attainable, and time sensitive.

- **ICS 202 – Pipeline Spill Liquid**

Agencies can use ICS Form 202 to create objectives at a liquids pipeline incident. Standard objectives for each type of potential incident can be determined during preplanning. Use the FD PREPP Safe Response Checklist (located in the Response section) to determine objectives. Remember to make your objectives simple, flexible, attainable, and time sensitive.

- **ICS 204 – Pipeline Leak Incident Gas**

Agencies can use ICS Form 204 when assigning tasks to aid in meeting the objectives created for gas leaks on Form 202. The need to establish air monitoring is prefilled on the form. This is essential in determining if protective or defensive actions are working. There is also a note to use air monitoring for migrating gas. Natural gas leaks can produce a situation where product may filter through soil, follow storm drains, sewers, water lines, or other utilities and then emerge some distance from the actual leak site. In the case of a transmission line, the odorant methyl mercaptan is likely absent, and air monitoring is the only reliable way to determine the presence of gas. In distribution systems, the methyl mercaptan may be removed, or, due to physical properties, the presence of gas may not be indicated by smell. Other related assignments may include evacuations, defensive product confinement, and rehab.

- **ICS 207 – Pipeline Incident Gas**

This partially prefilled Incident Organization Chart (ICS Form 207) considers the need for a pipeline incident to utilize unified incident command. Check with your local operator on how to train and prepare for unified command. Some will want to fill a command role and others may want to act as technical advisors. The inclusion of law enforcement within the unified command structure facilitates traffic control, evacuation, evidence preservation, and investigation if an incident is suspected of being intentional.

- **ICS 207 – Pipeline Incident Liquid**

This partially prefilled Incident Organization Chart (ICS Form 207) considers the need for a pipeline incident to utilize unified incident command. Check with your local operator on how to train and prepare for unified command. Some will want to fill a command role and others may want to act as a technical advisor. The inclusion of law enforcement within the unified command structure facilitates traffic control, evacuation, evidence preservation, and investigation tools if an incident is suspected of being intentional.

Note that hazmat operations can be divided between land and water due to the potential for a liquids release to impact waterways. Agencies with a liquids pipeline in its jurisdiction should preplan for such an incident. Consider access points for deploying defensive measures on those waterways.

- **ICS 213 – General Message Pipeline**

ICS Form 213 provides basic incident information regarding incoming resources during a change of command. The predetermined statements are the most commonly encountered on a pipeline incident. These can be added to when necessary. Incident size and complexity will determine if all ICS positions need to be filled. If multiple operational periods are needed, then a new form can be completed for each one.

- **ICS 215 – Pipeline Spill Liquid Waterway Impacted**

ICS Form 215 is initiated by the Operations Section Chief and often involves logistics personnel, the Resources Unit, and the Safety Officer. It supports the strategies and tactics developed in the incident action plan and allows tracking by ICS branch and division/group. It also provides a location of operation for each and conveys any special instructions. Common resource needs for a pipeline incident have been prefilled to aid requests and tracking. The overhead positions column has also been prefilled with the typical role assignments to oversee various aspects of an operation and special equipment needs. The final two columns identify where the resources are supposed to report to and their estimated arrival time.

- **ICS 215A – Pipeline Leak Gas With Fire**

The purpose of the Incident Action Plan Safety Analysis (ICS Form 215A) is to aid the Safety Officer in completing an operational risk assessment to prioritize hazards, safety and health issues, and to develop appropriate controls. This worksheet addresses communication challenges between planning and operations and is best utilized in the planning phase and for Operations Section briefings.

Pipeline incidents involving fire can create tremendous amounts of radiant heat. Establishing control zones, traffic control, eliminating ignition sources, and protection of exposed structures or vehicles is paramount. As the Safety Officer reviews the incident, these tasks shall be verified and addressed. In the case of viable patient rescue, training and discussion of risk vs. reward must be held ahead of time. A set of acceptable risk parameters can be developed during the preplanning phase.

Establishing long-term rehab for responders on scene should be discussed and even practiced ahead of time. Once an incident is in progress, it is very difficult to secure resources to support rehab without prior planning.

If your agency does not have air monitoring capabilities, part of your preplanning activities should include identifying resources that could respond to assist.

- **ICS 215 – Pipeline Spill Liquid With Fire**

Pipeline liquid spills involving fire create complex challenges for incident commanders. Liquids spills can quickly cover a large area creating numerous exposures. If the liquid enters a waterway the spread of the product can be exponential. This means there can be many exposures on all sides of the spill area when incidents involve fire. The IC must decide if they are going to initiate fire attack with available resources.

Special skills, tools, and agents are needed to properly fight a liquid spill fire. The IC will need to ensure that they have sufficient quantities of foam agents and an adequate water supply before initiating fire attack. This form is designed to assist the IC in assessing the resources needed to respond to a pipeline spill incident involving fire.

- **ICS 215A – Pipeline Leak Gas No Fire**

The purpose of the Incident Action Plan Safety Analysis (ICS Form 215A) is to aid the Safety Officer in completing an operational risk assessment to prioritize hazards, safety and health issues, and to develop appropriate controls. This worksheet addresses communication challenges between planning and operations and is best utilized in the planning phase and for Operations Section briefings.

Most pipeline incidents will pose a fire or explosion hazard. Establishing control zones, traffic control, eliminating ignition sources, and protection of exposed structures or vehicles is paramount. As the Safety Officer reviews the incident, these tasks shall be verified and addressed. In the case of viable patient rescue, training and discussion of risk vs. reward must be held ahead of time. A set of acceptable risk parameters can be developed during the preplanning phase.

Establishing long term rehab for responders on scene should be discussed and even practiced ahead of time. Once an incident is in progress, it is very difficult to secure resources to support rehab without prior planning.

If your agency does not have air monitoring capabilities, part of your preplanning activities should include identifying resources that could respond to assist.

One concern is the ability of gas leaks to migrate through the soil, follow water and sewer lines, or collect in storm drains. Since interstate pipelines often transport their products without an odorant added, the sense of smell is not a reliable indicator of the presence of gas. It's important to remember that even in pipelines or distribution systems where odorants are added, methyl mercaptan is heavier than natural gas and may not make it to surface level when gas is migrating.



Pipeline Operators

It is important for agencies to identify and communicate with pipeline operators within their jurisdiction. Operators can provide valuable safety information and training. Establishing a relationship will benefit all parties in the event of an incident.

- > **Pipeline Operator Contact Template**

Use this template to record emergency and non-emergency/preplanning pipeline operator contacts. It is also useful to provide the 911 center/dispatch with the emergency contact number for each operator in your area.

When talking with operators, determine the main sizes, pressure, and volume of flow in the lines to aid in preplanning and size up. In addition, identify any infrastructure that may be impacted by a release.

Use the [National Pipeline Mapping System](#) to assist in identifying pipeline operators.



Training

Training is essential for preparedness and increases the likelihood of positive outcomes when responding to a pipeline incident.

- > **National Association of State Fire Marshals (NASFM)**

NASFM offers a comprehensive, integrated emergency response training program designed to teach emergency responders and pipeline industry personnel to safely respond to, and effectively manage, pipeline incidents. The training portal is among the many initiatives the American Petroleum Institute and the Association of Oil Pipe Lines, together with supporting emergency response organizations, have created to assist first responders to learn the techniques and skills to address a hazardous liquid or natural gas pipeline incident.

> [Pipeline Association for Public Awareness](#)

The Pipeline Association for Public Awareness promotes open communication and cooperation with local organizations to enhance public safety, improve emergency preparedness, protect the environment, and prevent damage to property and facilities. Find links to valuable resources including training tools and scenarios.

> [Operator Provided Training](#)

Many pipeline operators are required to offer training for emergency responders. Reach out to determine what is available.



> [State PERI Programs](#)

Pipeline Emergency Responders Initiative (PERI) is an innovative, voluntary public-private partnership established to advance the ability of emergency responders to manage pipeline emergencies through improved training, cooperation, and communication with pipeline operators. Under the PERI program, training curriculum is developed to deliver “need to know” knowledge to emergency response personnel, including information to prevent the occurrence of a pipeline incident. The first PERI program was started in Georgia in May 2012 and completed in May 2014. A board consisting of emergency responders and pipeline operators was subsequently created under the Georgia Association of Fire Chiefs to move the PERI program forward. The success of this program has led to the development of PERIs in multiple states throughout the country. Learn more at www.gafc.org/Pipeline.aspx.

PHMSA and emergency responders share a common goal of public safety. PHMSA is focused on the safe transportation of hazardous liquid and gas through 2.7 million miles of pipelines. Emergency responders are trained to protect the public from emergencies that may arise from many different sources. Since emergencies involving high pressure gas and hazardous liquid transmission pipelines are low frequency events, emergency responders may not be receiving adequate pipeline emergency training. PHMSA’s goal is to assist pipeline operators and emergency responders in all 50 states in developing PERIs that are like the Georgia program, in the interest of promoting pipeline safety.

PHMSA strongly supports the PERI program, which is an integral part of its mission to protect the public from the risks inherent in transporting hazardous materials through pipelines. Strong and effective communication between emergency responders and pipeline operators is an important aspect of pipeline safety. The PERI program achieves this and much more. View a map of participating states [here](#).

5 Video Training Resources

The list below includes a sample of available videos that can be incorporated into pipeline training programs:

- > [How to Use the 2016 Emergency Response Guidebook \(PHMSA\)](#)
- > [Hazardous Materials Awareness \(PHMSA\)](#)
- > [Overview of Oil Spill Exercise and Response – Video 1 \(PHMSA\)](#)
- > [Anatomy of Oil Spill Exercise & Response – Video 2 \(PHMSA\)](#)
- > [Liquefied Natural Gas Safety and Emergency Response \(NASFM\)](#)
- > [Pipeline Emergency Response Tabletop Exercise \(Delaware County LEPC\)](#)



Response

> Pipeline Emergency Response Work Flow Job Aid

The first responding unit to a pipeline incident has an instrumental responsibility to gain some form of control and develop a plan of action to mitigate the incident. The actions during the first 60 minutes will strongly influence the following 8 hours. The following information should serve as a guide. Activities do not have to take place in the order listed. Incident size and location will determine how quickly you can build the command staff and if there is a need to fill all positions.

Actions in the first 60 minutes can include:

- Establishing initial isolation zones (typically 150' for liquids and 300' for gases).
- Gather information on the type of pipeline involved (gathering, transmission, or distribution) and the product(s) involved. If it is a liquids incident, determine how much has been released and the flow rate. Also, determine if a waterway has been impacted or, if not, the likelihood of that occurring.
- Determine if there are any victims with injuries or any victims still located in the isolation zone. Utilize a risk vs. reward approach on attempting victim rescues.
- If you are not aware of the pipeline owner, attempt to locate a pipeline marker to determine the owner and a contact number.
- Determine any exposures (life safety or environmental impacts) that are occurring or about to occur.
- Consider the current weather and how it may impact the incident. Follow this up by determining the forecast for the rest of the operational period. Consider an Incident and Decision Support Forecast, or Spot Forecast, from the National Weather Service.
- Reference any preplans, pipeline operator provided response guides, or SOP/SOGs for specific information.
- If pipeline specific information is not available, reference the ERG, specifically the pipeline section and guide pages for isolation/protection distances.
- Establish a command post uphill and upwind of the incident as soon as possible. Choose a location that will not be impacted if the incident expands in size.
- Notify the National Response Center (NRC) at 1-800-424-8802 or verify that the operator has notified the NRC. Follow this with any required state and/or local notifications.
- As soon as personnel are available, expand the Command Staff to better meet the incident's needs and to maintain an effective span of control. Remember to use unified command when possible: include all disciplines that would benefit from sharing a command role.
- Utilize a Public Information Officer (and coordinate with the pipeline operator) to maintain a timely and accurate flow of information.
- Use a liaison to help coordinate any needs with outside agencies and companies such as operating shelters or working with pipeline contractors.
- All hazmat incidents require the appointment of a Safety Officer. The Safety Officer should review and approve the Incident Action Plan, strategies, and tactics that are being used or will be used.
- If the incident size warrants, turn over tactical operations to an Operations Chief.
- A solid Logistics Chief can be a lifesaver when it comes to providing materials for rehab and rehydration, restroom facilities, or materials for diking and diverting liquid releases.
- Planning Chiefs, once in place, can assist with building upon the objectives already created, writing plans to meet them, and working towards objectives for the next operations period.

- Resource and manpower intensive incidents can incur high costs. The use of a Finance Chief can aid in tracking those expenses and mutual/automatic aid resources. In the event the incident is reimbursable or declared a disaster area, this information aids in the ability to recover funds.
- Using the resources and information gathered on size up, determine if this will be a total defensive operation or if offensive operations will be necessary. Determine what resources are available and what training has been completed when considering offensive operations. Track incoming resources on ICS Form 211.
- Develop an Incident Action Plan based on the information that has been gathered during size up, objectives created, and determined strategies.
- Conduct an incident safety briefing and stress responder safety around the product, terrain, traffic, and weather based on the Incident Action Plan. Remind crews to work in a minimum of pairs and set a time frame for Personnel Accountability Report (PAR) checks. The safety briefing should also outline the initial operations period.
- If multiple entities are involved, communication may become a challenge. Form a communication plan to use various channels, cell phones, or even multiple radio networks if needed. Once the plan is in place, monitor progress and modify the plan as needed.

> Pipeline Incident Thought Process Work Flow

This quick reference flow chart compliments the Pipeline Emergency Response Job Aid. It walks a responder through the initial size up, developing an IAP, incident priorities, a safety briefing, confirming isolation zones, and evaluating progress.

> Sample Pipeline Incident Command Organization Chart

This template shows the positions in an organizational chart that may need to be filled. For example, staffing all of these would indicate a large scale or long-term incident. This chart is scalable to the needs of the incident.

> Pipeline Leak Sights, Smells, and Sounds

Use this document to become familiarized with the various presentations of pipeline incidents.

> Pipeline Products Flammability Reference Charts

Use this chart to determine the flammability of certain pipeline products.

> Site Safety Plan

The Site Safety Plan template covers the aspects of an incident that a Safety Officer would need to identify and approve as part of the Incident Action Plan. This includes:

- Name of the Safety Officer and main objective of the incident.
- Site description, location, and identification of potential hazards.
- Consider the following questions: What does the scene look like, the terrain, exposures, population? How close are the exposures? What is the current weather and the weather forecast? What caused the release, if known? Is that a factor in mitigating it? What are the objectives for personnel entering the hot zone?
- Identify command staff, pipeline representatives, federal agencies, state agencies, local agencies, and contractors.
- Create a site map showing control (isolation and protection zones). Determine who is responsible for scene control and entry authorization and if any confinement or containment procedures are being utilized.
- Determine what commodities are involved and what their exposure limits and chemical and physical properties are.
- Consider the appropriate PPE for specific locations or job functions on the incident site. Base the decision off the SDS sheet for products, information from WISER, CAMEO, and PPE specific guidance.
- Determine what types of environmental or air monitoring will be needed. If your agency does not have these capabilities, determine who will perform those functions.
- Determine what the emergency procedures are for an unanticipated event on site.

- Determine what the emergency procedures are for an unanticipated event on site.
- List site Safety Officers and the parties responsible for the EMS Branch/EMS Care (where they are located and how to contact them).
- Create a checklist naming resources and sanitation needs on a multi hour-long term incident.

> **FD PREPP Safe Response Checklist**

This quick reference checklist covers initial arrival at a pipeline incident. A quick series of factors are considered, such as: time of day, product(s) involved, type of pipeline, type of incident, and weather.

The checklist should be used to establish scene safety, protect the public, and to recognize considerations for incident command.

Note the ½ mile distance mentioned is for transmission pipelines. Check with local gathering or distribution line operators for their recommended protection distances.