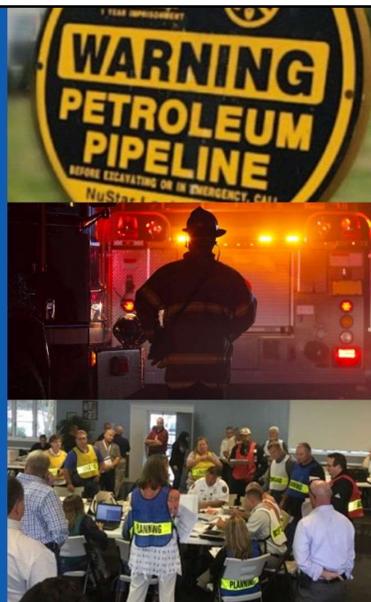


Pipeline Emergency Response Guidelines

 Pipeline Association
for Public Awareness



Slide 1

Notes

Opening Remarks and Introductions

Please introduce yourselves

The pipeline operators

PAPA members

and other dignitaries

Course Objectives

The goal of this training is to provide individuals with the following knowledge, skills, and abilities:

- Awareness of the different types of pipelines and their purposes
- Ability to recognize a pipeline right-of-way
- Knowledge of the information contained on pipeline markers
- Awareness of information available through various mapping systems
- Ability to recognize a pipeline leak
- Awareness of the potential hazards associated with a pipeline leak
- Knowledge of the actions to take in response to a pipeline leak, including the essential communications that may be necessary
- An understanding of how to coordinate response efforts with operators
- Knowledge of the actions operators take to maintain the integrity of pipelines
- Awareness of the additional resources that are available

Slide 2

Notes

The goal of this training is to provide individuals with the following knowledge, skills, and abilities:

1. Awareness of the different types of pipelines and their purposes
2. Ability to recognize a pipeline right-of-way
3. Knowledge of the information contained on pipeline markers
4. Awareness of information available through various mapping systems
5. Ability to recognize a pipeline leak
6. Awareness of the potential hazards associated with a pipeline leak
7. Knowledge of the actions to take in response to a pipeline leak, including the essential communications that may be necessary
8. An understanding of how to coordinate response efforts with operators
9. Knowledge of the actions operators take to maintain the integrity of pipelines
10. Awareness of the additional resources that are available

Introduction



Pipelines are the safest and most reliable way to transport energy products



Pipeline operators regularly monitor the integrity of their pipelines to ensure safe operations



Even with these efforts, an unintended release is possible and responding agencies must be prepared to act



This guide provides a general set of interoperable emergency response procedures and gives responders the basic information needed to safely handle a pipeline incident



<http://pipelineawareness.org>

Slide 3

Notes

- Pipelines are the safest and most reliable way to transport energy products
- Pipeline operators regularly monitor the integrity of their pipelines to ensure safe operations
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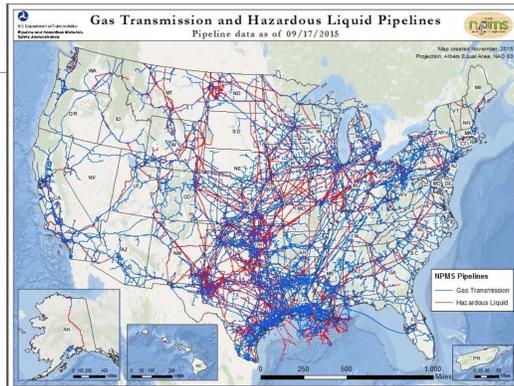
Overview



Pipelines



Gate Stations



Over 2.7 million miles of pipelines in the United States



Valves



Compressor Stations

Slide 4

Notes

- There are over 2.7 million miles of pipelines in the United States
- Pipelines are facilities through which hazardous liquids or gas move in transportation, and include:
 - Pipelines
 - Valves
 - Compressor stations
 - Pumping units
 - Meter stations
 - Storage tanks

Types of Pipelines

Gathering Pipelines

- Transport crude and natural gas from the well-head to processing facilities

Transmission Pipelines

- Transport natural gas and refined products from refineries to marketing or distribution centers through larger diameter higher pressure pipelines

Distribution Pipelines

- Transport natural gas from transmission pipelines to customers through lower pressure smaller diameter pipelines



Slide 5

Notes

Types of Pipelines

Gathering Pipelines

- Transport crude and natural gas from the well-head to processing facilities

Transmission Pipelines

- Transport natural gas and refined products from refineries to marketing or distribution centers through larger diameter higher pressure pipelines

Distribution Pipelines

- Transport natural gas from transmission pipelines to customers through lower pressure smaller diameter pipelines

Objective 1



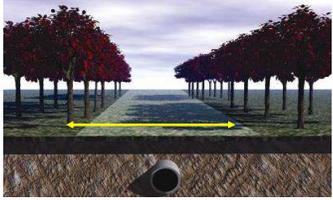
Pipeline Right-of-Way (ROW)

All pipelines are constructed along a clear corridor of land called the right-of-way (ROW)

The ROW may contain one or more pipelines, may vary in width, and will cross through public and private property

Enables pipeline personnel to gain access for inspection, maintenance, testing or emergencies

The ROW should be free of permanent structures (encroachments) and large trees



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Slide 6	Notes
<p>Pipeline Right-of-Way (ROW)</p> <ul style="list-style-type: none">• All pipelines are constructed along a clear corridor of land called the right-of-way (ROW)• The ROW may contain one or more pipelines, may vary in width, and will cross through public and private property• Enables pipeline personnel to gain access for inspection, maintenance, testing or emergencies• The ROW should be free of permanent structures (encroachments) and large trees	<p>Objective 2</p>

Pipeline Marker Signs

Aboveground signs and markers identify the approximate location of underground pipelines. Markers may look different, but every sign tells you the same information:

- Product Transported
- 24 Hour Emergency Phone Number
- Pipeline Company Name



The Most Important Size Up Information a Responder Can Have!

Pipeline Association for Public Awareness

7

Slide 7	Notes
<p>Pipeline Marker Signs</p> <p>Aboveground signs and markers identify the approximate location of underground pipelines. Markers may look different, but every sign tells you the same information:</p> <ul style="list-style-type: none">• Product Transported• 24 Hour Emergency Phone Number• Pipeline Company Name	<p>Objective 3</p> <p><i>The Most Important Size Up Information a Responder Can Have!</i></p>

Pipeline Marker Signs



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Slide 8

Notes

Pipeline Marker Signs

Aerial Marker

ROW

Vent Pipes

Approximate Locations

- Pipeline Markers are not exact locators of the line
- They can be Offset a considerable distance- Notice the 10 Foot on Marker

Objective 2



Pipeline Control Centers

When you call the 24-hour emergency phone number on a marker sign, you will speak with someone at the pipeline operator's control center.

The control center is the heart of pipeline operations.

24 hours per day / 7 days a week free of charge

The quickest way to get operator help

Pipeline Specific Information

- Product
- Pressure
- Resources
- Additional Hazards



The Pipeline Control Center Is a Direct Line To Additional Trained

Slide 9

Notes

When you call the 24-hour emergency phone number on a marker sign, you will speak with someone at the pipeline operator's control center.

- The control center is the heart of pipeline operations.
- 24 hours per day / 7 days a week free of charge
- The quickest way to get operator help
- Pipeline Specific Information
 - Product
 - Pressure
 - Resources
 - Additional Hazards

The Pipeline Control Center Is a Direct Line To Additional Trained Personnel

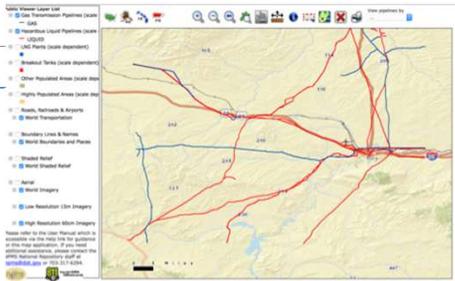
Additional Trained Personnel



Pipeline Maps

National Pipeline Mapping System

- NPMS contains information for all transmission pipelines
- Hazardous Liquids Pipelines
- Breakout tanks
- Natural Gas Pipelines
- LNG Plants
- Does NOT include gathering or local distribution pipelines
- Data is displayed by county
- Agencies can obtain this information in digital format
- PIMMA access provides additional information



<https://www.npms.phmsa.dot.gov/>

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Slide 10

Notes

National Pipeline Mapping System

NPMS contains information for all transmission pipelines

Hazardous Liquids Pipelines

Breakout tanks

Natural Gas Pipelines

LNG Plants

Does NOT include gathering or local distribution pipelines

Data is displayed by county

Agencies can obtain this information in digital format

PIMMA access provides additional information

Objective 4

Pipeline Maps



High Consequence Areas

Pipeline safety regulations use the term "High Consequence Areas" (HCAs), to identify specific locations and areas where a release could have the most significant consequences such as hospitals and schools

Once identified, operators are required to perform additional inspections and analysis to ensure the integrity of pipelines

"Identified Sites" are locations normally occupied by 20 or more people on a regular basis and may create an "HCA" if close enough to the pipeline

Slide 11	Notes
<p>High Consequence Areas</p> <ul style="list-style-type: none">• Pipeline safety regulations use the term "High Consequence Areas" (HCAs), to identify specific locations and areas where a release could have the most significant consequences• Once identified, operators are required to perform additional inspections and analysis to ensure the integrity of pipelines• "Identified Sites" are locations normally occupied by 20 or more people on a regular basis and may create an "HCA" if close enough to the pipeline	<p>Objective 4</p>

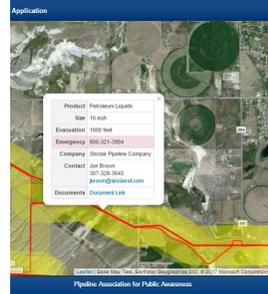
Identified Site Emergency Planning Application (ISEPA)

Mapping application for all types of pipelines that includes additional information

Emergency Responders can register "Identified Sites" on the map to inform pipeline companies of potential HCA's for planning purposes

Does NOT include all pipelines (member pipelines only)

Is not open to the public and requires a login ID and password (this will be provided to agencies upon request)



Slide 12

Notes

Identified Site Emergency Planning Application (ISEPA)

- Mapping application for all types of pipelines that includes additional information:
- Emergency Responders can register "Identified Sites" on the map to inform pipeline companies of potential HCA's for planning purposes
- Does NOT include all pipelines
- Is not open to the public and requires a login ID and password (this will be provided to agencies upon request)

Objective 4

The screenshot shows a web application interface for pipeline emergency response. On the left, there are navigation and filter options: 'View Instructions', 'Select State: Wyoming', 'Select County: Carbon', 'Base Map: Aerial with labels', and 'Overlays: Pipelines, Evacuation Areas, Identified Sites'. Below these are buttons for 'Add a New Site', 'Download Site Data', and 'Download User Report'. The main area is a map showing a pipeline route in red, with a yellow 'Evacuation Area' and a blue dot for an 'Identified Site "School"'. A popup window displays the following information:

Product	Petroleum Liquids
Size	10 inch
Evacuation	1000 feet
Emergency	800-321-3994
Company	Sinclair Pipeline Company
Contact	Jon Brown 307-328-3643 jbrown@sinclairoil.com
Documents	Document Link

At the bottom of the map, there is a scale bar (500 m, 2000 ft) and copyright information: 'Leaflet | Base Map: Tiles, Earthstar Geographics SLD, © 2017 Microsoft Corporation, © 2010 NAVTEQ, © AND, Image courtesy of USGS'. The footer of the application includes 'Additional Resources', 'Pipeline Association for Public Awareness', and 'Provide Feedback'. The slide number '13' is in the bottom right corner.

Slide 13

Notes

Click on pipeline for additional information:

- Product transported in the pipeline
- Pipeline size in inches (if provided)
- Recommended initial evacuation distance
- Pipeline company emergency phone number
- Company name and non-emergency contact information
- Link to document with additional information (if provided)

Common Products in Pipelines

Natural Gas

Petroleum Gas

Petroleum Liquids

Anhydrous Ammonia

Carbon Dioxide

Ethanol

Hydrogen Gas

Sour Crude Oil & Sour Gas



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Slide 14

Notes

Common Products:

- Natural Gas
- Petroleum Gas
 - LPG, HVL, NGL
- Petroleum Liquids
 - Crude oil
 - Refined products
- Anhydrous Ammonia
- Carbon Dioxide
- Ethanol
- Hydrogen Gas
- Sour Crude Oil
- Sour Gas

Objective 6

Natural Gas (DOT ERG 115)

Natural gas is the predominant product found in gas distribution pipelines, and is transported via pipelines in its gaseous form

It is transported through transmission pipelines to distribution centers (or distribution pipeline systems)

The main ingredient in natural gas is methane (94%)

At ambient temperatures it remains a lighter than air gas; however, it can be compressed (CNG) under high pressure to make it convenient for use in other applications or liquefied (LNG) under extremely cold temperatures (-260° F) to facilitate transportation

Natural gas is odorless, colorless, tasteless and nontoxic in its natural state.

- When transported via transmission pipelines, natural gas typically does not have odorant added.
- An odorant is added when it is delivered to a distribution system

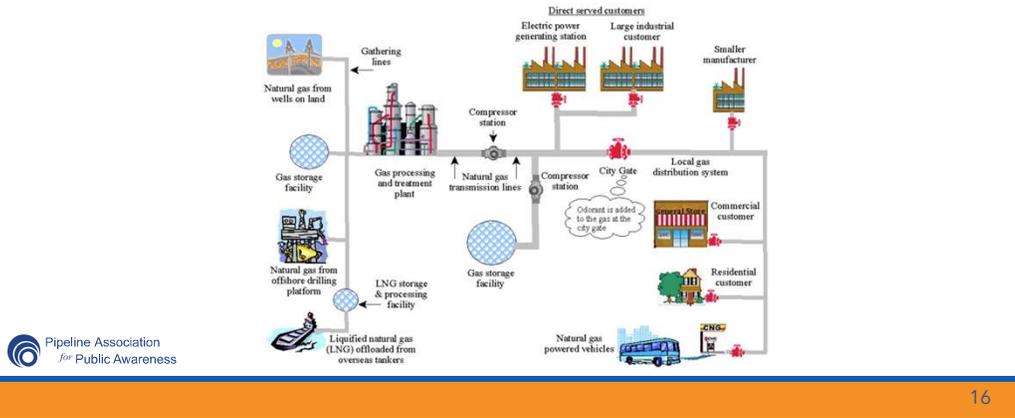


Slide 15

Notes

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Natural Gas Operations



Slide 16

Notes

Natural Gas (DOT ERG 115)



Well Head



Processing Plant



Compression Station



Customer Service Meter and Shutoff Valve



Gate Station

Slide 17

Notes

Natural Gas (DOT ERG 115)



Indications of a Leak:

- An odor like rotten eggs or a burnt match (odorized natural gas only)
- A loud roaring sound like a jet engine
- A hissing or whistling noise
- Fire coming out of or on top of the ground
- Dirt blowing from a hole in the ground
- An area of frozen ground in the summer
- An unusual area of melted snow in the winter
- An area of dead vegetation
- Bubbling in pools of water

Slide 18

Notes

Indications of a Leak:

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- An area of dead vegetation
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Objective 5

Natural Gas (DOT ERG 115)

Hazards of a Release:

- Highly flammable and easily ignited by heat or sparks
- Will displace oxygen and can cause asphyxiation
- Fire may produce irritating and/or toxic gases
- Vapors may form an explosive mixture with air
- Vapors may cause dizziness or asphyxiation without warning (non-odorized gas)
- Is lighter than air and can migrate underground and into enclosed spaces



Natural Gas Can Migrate Long Distances Underground



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Slide 19

Notes

Hazards of a Release:

- Highly flammable and easily ignited by heat or sparks
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Objective 6

Natural Gas (DOT ERG 115)

Odorization:

In all natural gas distribution pipelines, and often in transmission pipelines located in heavily populated areas, the natural gas must be odorized

Mercaptan products are added for leak recognition (smells like rotten eggs or a burnt match)

Remember, anytime anyone smells the distinct mercaptan odor, they should be very cautious

Odorant may be scrubbed from gas that has migrated through soil



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Slide 20

Notes

Odorization:

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- Odorant may be scrubbed from gas that has migrated through soil

Petroleum Gas (DOT ERG 115)



Petroleum gas is a mixture of gaseous hydrocarbons, primarily propane, butane, or ethane, which are easily liquefied under pressure and commonly used for residential and commercial heating or other industrial applications

Propane and butane are normally stored and transported under pressure as a liquid (LPG)



LPG transported in transmission pipelines may be called Highly Volatile Liquids (HVLs) or Natural Gas Liquids (NGLs)

Vaporized propane and butane may be in gas distribution pipeline systems

LPG is a tasteless, colorless and odorless gas.

LPG in pipelines typically does not have odorant added. Odorant is added when products are off-loaded to a distribution system or transport tanks

Slide 21

Notes

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- Vaporized propane and butane may be in gas distribution pipeline systems
- LPG is a tasteless, colorless and odorless gas.
- LPG in pipelines typically does not have odorant added. Odorant is added when products are off-loaded to a distribution system or transport tanks

Petroleum Liquids (DOT ERG 128)



Petroleum liquids is a broad term covering many products, including: crude oil, gasoline, diesel fuel, aviation gasoline, jet fuel, fuel oil, kerosene, natural gas liquids, naphtha, xylene and other refined products.

Crude oil is unrefined petroleum that is extracted from beneath the earth's surface through wells.

Refinement of crude oil produces refined petroleum products that we use every day, such as motor oils and gasoline.

Refined petroleum products are normally transported in transmission pipelines to rail or truck terminals for distribution to consumers.

These products have an odor like petroleum or gasoline.

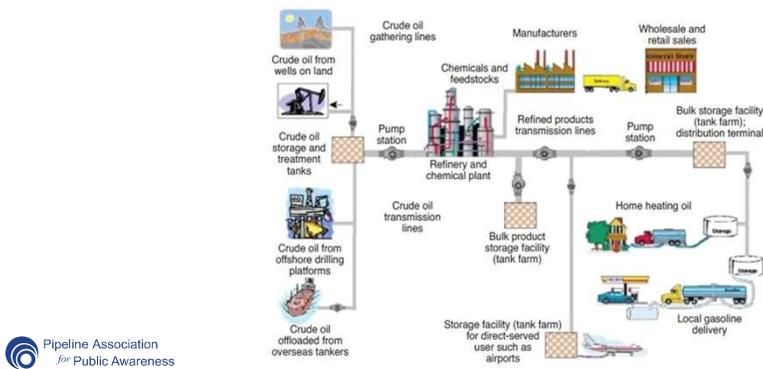
Slide 23

Notes

Petroleum Liquids (DOT ERG 128)

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Petroleum Liquid Operations



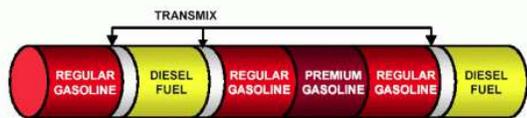
24

Slide 24

Notes

Petroleum Liquid Operations

Typical Sequence of Petroleum Products Flow through a Pipeline



Compatible Interfaces

Transmix (Interface Material Which Must Be Reprocessed)



Slide 25

Notes

Anhydrous Ammonia (DOT ERG 125)

Anhydrous ammonia is the liquefied form of pure ammonia gas. It is a colorless gas or liquid with an extremely pungent odor. It is commonly used in the Midwest for agricultural fertilizer or industrial refrigerant.

Indications of a Leak

- A white vapor cloud that may look like smoke
- A hissing or whistling noise
- Dirt blowing from a hole in the ground
- An irritating and pungent odor

Hazards of a Release

- Vapors are heavier than air and will collect in low areas
- Contact with skin may cause burns, injury, or frostbite
- Toxic and may be fatal if inhaled
- Vapors are extremely irritating and corrosive to skin and Eyes
- Under the right conditions can burn. Fire may produce irritating by products
- Runoff may cause pollution



Slide 27

Notes

Anhydrous ammonia is the liquefied form of pure ammonia gas. It is a colorless gas or liquid with an extremely pungent odor. It is commonly used in the Midwest for agricultural fertilizer or industrial refrigerant.

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Objective 5

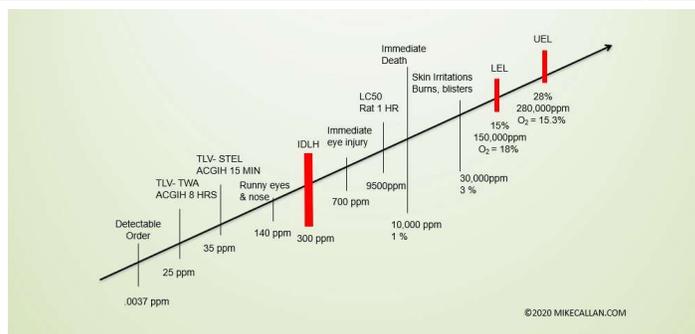
Objective 6

Pipeline Emergency Response

- Runoff may cause pollution



Anhydrous Ammonia (DOT ERG 125)



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Notes

Carbon Dioxide (DOT ERG 120)

Carbon dioxide is a heavy gas that is normally transported in transmission pipelines as a compressed fluid. It is a naturally occurring colorless, odorless and tasteless gas used in the petroleum industry. Under normal conditions carbon dioxide is stable, inert and nontoxic.

Indications of a Leak

- A hissing or whistling noise
- Dirt blowing from a hole in the ground
- An area of frozen ground in the summer
- An unusual area of melted snow in the winter
- Bubbling in pools of water

Hazards of a Release

- Will displace oxygen and can cause asphyxiation
- Vapors are heavier than air and will collect in low areas
- Contact with skin may cause burns, injury, or frostbite
- Vapors may cause dizziness or asphyxiation without warning



Slide 29

Notes

Carbon dioxide is a heavy gas that is normally transported in transmission pipelines as a compressed fluid. It is a naturally occurring colorless, odorless and tasteless gas used in the petroleum industry. Under normal conditions carbon dioxide is stable, inert and nontoxic.

Indications of a Leak

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- Dirt blowing from a hole in the ground
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- An unusual area of melted snow in the winter
- Bubbling in pools of water

Hazards of a Release

- Will displace oxygen and can cause asphyxiation
- Vapors are heavier than air and will collect in low areas
- Contact with skin may cause burns, injury, or frostbite

Objective 5

Objective 6

Pipeline Emergency Response

- Vapors may cause dizziness or asphyxiation without warning



Ethanol (DOT ERG 127)



Ethanol, also called ethyl alcohol, is a colorless liquid that is widely used as an additive to automotive gasoline. It may be transported in buried transmission pipelines.

Indications of a Leak

The pooling of liquid on the ground
An odor like petroleum liquids or gasoline
An area of dead vegetation

Hazards of a Release

Highly flammable and easily ignited by heat or sparks
Vapors are heavier than air and will collect in low areas
Contact with skin may cause burns, injury, or frostbite
Fire may produce irritating and/or toxic gases
Runoff may cause pollution
Vapors may form an explosive mixture with air

Slide 30	Notes
<p>Ethanol, also called ethyl alcohol, is a colorless liquid that is widely used as an additive to automotive gasoline. It may be transported in buried transmission pipelines.</p> <p>Indications of a Leak</p> <ul style="list-style-type: none"> • The pooling of liquid on the ground • An odor like petroleum liquids or gasoline • An area of dead vegetation <p>Hazards of a Release</p> <ul style="list-style-type: none"> • Highly flammable and easily ignited by heat or sparks • Vapors are heavier than air and will collect in low areas • Contact with skin may cause burns, injury, or frostbite • Fire may produce irritating and/or toxic gases • Runoff may cause pollution • Vapors may form an explosive mixture with air 	<p>Objective 5</p> <p>Objective 6</p>

Hydrogen Gas (DOT ERG 115)

Hydrogen gas is commonly produced from the steam reforming of natural gas.

It is frequently used near its production site, with the two main uses being petrochemical processing and ammonia production.

It is a flammable gas that is colorless, odorless and lighter than air.

It is nontoxic, but can act as a simple asphyxiant in confined spaces.

Hydrogen is normally transported between industrial facilities as a gas.



Slide 31

Notes

Hydrogen gas is commonly produced from the steam reforming of natural gas.

- It is frequently used near its production site, with the two main uses being petrochemical processing and ammonia production.
- It is a flammable gas that is colorless, odorless and lighter than air.
- It is nontoxic, but can act as a simple asphyxiant in confined spaces.
- Hydrogen is normally transported between industrial facilities as a gas.

Sour Crude Oil (DOT ERG 131) Sour Gas (DOT ERG 117)



Products containing little or no sulfur are often referred to as “sweet”, whereas, products containing high concentrations of sulfur and hydrogen sulfide (H₂S) are commonly referred to as “sour”

Hydrogen sulfide is a colorless, flammable, corrosive and extremely toxic gas with an offensive rotten egg odor.

It is created naturally by the bacterial breakdown of sulfur-containing organic materials.

In natural gas and crude oil, it is a contaminant that must be removed before products are sent to commercial markets.

Hydrogen sulfide is heavier than air, it will collect in low places.

Slide 33

Notes

Sour Crude Products

- Products containing little or no sulfur are often referred to as “sweet”, whereas, products containing high concentrations of sulfur and hydrogen sulfide (H₂S) are commonly referred to as “sour”
- Hydrogen sulfide is a colorless, flammable, corrosive and extremely toxic gas with an offensive rotten egg odor.
- It is created naturally by the bacterial breakdown of sulfur-containing organic materials.
- In natural gas and crude oil, it is a contaminant that must be removed before products are sent to commercial markets.
- Hydrogen sulfide is heavier than air, it will collect in low places.

Objective 5

Sour Crude Oil (DOT ERG 131) Sour Gas (DOT ERG 117)

Hydrogen sulfide's offensive odor is readily detectable at very low concentrations.

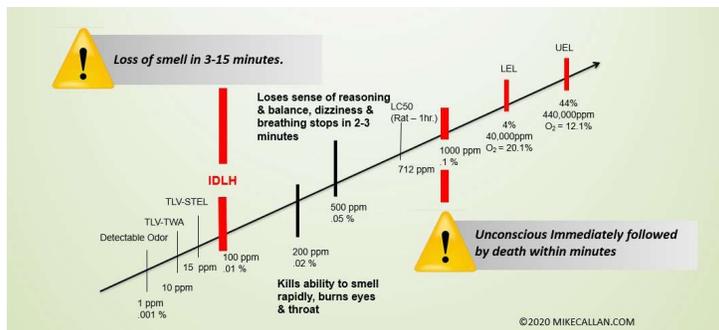
However, smell cannot be relied upon to forewarn of dangerous concentrations because it rapidly degrades the sense of smell due to paralysis of the olfactory nerve.

A longer exposure to lower concentrations has a similar desensitizing effect on the sense of smell. Exposure to relatively low levels of hydrogen sulfide can be fatal.



Slide 34	Notes
<p>Hydrogen sulfide's offensive odor is readily detectable at very low concentrations.</p> <ul style="list-style-type: none">• However, smell cannot be relied upon to forewarn of dangerous concentrations because it rapidly degrades the sense of smell due to paralysis of the olfactory nerve.• A longer exposure to lower concentrations has a similar desensitizing effect on the sense of smell. Exposure to relatively low levels of hydrogen sulfide can be fatal.	<p>Objective 6</p>

Hydrogen Sulfide H₂S



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Slide 35

Notes

Emergency Preparedness



Pipeline operators will report hazardous conditions that may have an adverse impact on public safety or the environment to local 911 centers

Advance knowledge of pipelines in your community along with knowing how to contact and work together with the pipeline operator are key factors to a safe response

Following standardized procedures brings consistency to the overall response and help minimize the risk of exposure to all involved

In most cases, the pipeline operator must be involved to manage the incident effectively

Slide 36

Notes

- Pipeline operators will report hazardous conditions that may have an adverse impact on public safety or the environment to local 911 centers
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- Following standardized procedures brings consistency to the overall response and help minimize the risk of exposure to all involved
- In most cases, the pipeline operator must be involved to manage the incident effectively

Emergency Preparedness

What you should know before an incident:

Names of the Companies operating pipelines in your community along with their emergency and non emergency contact information

Approximate location of the pipelines and the products they carry

Physical indications of a leak and possible hazards associated with a release

Potential impact on the community and what steps that should be taken to protect the public

The response capabilities of the pipeline Companies and ho to engage in mutual assistance with operators



National Pipeline Mapping System



Emergency Response Capabilities



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Slide 37

Notes

What you should know before an incident:

- Names of the Companies operating pipelines in your community along with their emergency and non emergency contact information
- Approximate location of the pipelines and the products they carry
- Physical indications of a leak and possible hazards associated with a release
- Potential impact on the community and what steps that should be taken to protect the public
- The response capabilities of the pipeline Companies and ho to engage in mutual assistance with operators

Objective 7

Incident Response Steps



Every incident is different - each will have special problems and concerns

Responders must understand the hazards and risks associated with the incident

Seek additional information about the pipeline in question as soon as possible by calling the 24-hour emergency phone number for the pipeline operator

Refer to information contained in the North American Emergency Response Guidebook (NAERG) or more commonly the DOT ERG

Continue to gather information and monitor the situation until the threat is removed

Slide 38

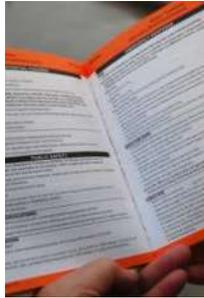
Notes

Incident Response Steps

- Every incident is different - each will have special problems and concerns
- Responders must understand the hazards and risks associated with the incident
- Seek additional information about the pipeline in question as soon as possible by calling the 24-hour emergency phone number for the pipeline operator
- Refer to information contained in the North American Emergency Response Guidebook (NAERG) or more commonly the DOT ERG
- Continue to gather information and monitor the situation until the threat is removed

Objective 9

Step 1 - Approach with Caution from Upwind, Uphill or Upstream



Approach with Caution

- Stay clear of vapors, fumes, smoke and spills
- Do not walk or drive into a vapor cloud or puddle of liquid.
- Do not park over manholes or storm drains.
- Do not approach the scene with vehicles or mechanized equipment until the isolation zones have been established.
- Vehicle engines are a potential ignition source.
- Use appropriate air-monitoring equipment to establish the extent of vapor travel.

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Notes

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- Do not approach the scene with vehicles or mechanized equipment until the isolation zones have been established.
- Vehicle engines are a potential ignition source.
- Use appropriate air-monitoring equipment to establish the extent of vapor travel.

Objective 7

Step 2 - Secure the Scene



Establish Isolation Zones and Set Up Barricades

Isolation zones and barricades prevent unauthorized people and unprotected emergency responders from entering the hazard area and becoming injured.

Based on the type of incident, use any or all of the following to calculate and establish isolation zones:

- DOT Emergency Response Guidebook
- Information from the pipeline operator's representative
- Heat intensity levels
- Measurements from air-monitoring equipment

Use visible landmarks, barricade tape or cones

Define entry and exit routes

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Notes

Establish Isolation Zones and Set Up Barricades

- Isolation zones and barricades prevent unauthorized people and unprotected emergency responders from entering the hazard area and becoming injured.
- Based on the type of incident, use any or all of the following to calculate and establish isolation zones:
 - DOT Emergency Response Guidebook
 - Information from the pipeline operator's representative
 - Heat intensity levels
 - Measurements from air-monitoring equipment
- Use visible landmarks, barricade tape or cones
- Define entry and exit routes

Objective 7

Step 3 - Identify the Hazards

Identify

Locate pipeline marker sign:

- Product
- Operator
- 24-hour emergency phone number

Contact pipeline operator

Refer to the DOT Emergency Response Guidebook



Slide 42	Notes
<p>Identify</p> <ul style="list-style-type: none">• Locate pipeline marker sign:<ul style="list-style-type: none">• Product• Operator• 24-hour emergency phone number• Contact pipeline operator• Refer to the DOT Emergency Response Guidebook	<p>Objective 7</p>

Step 4 - Assess the Situation



 Pipeline Association
for Public Awareness

Assess

Is there a fire, spill or leak?

Is there a vapor cloud?

What are the weather conditions?

What direction is the wind blowing?

What is the terrain like?

Who and what is at risk: people, property or environment?

What actions should be taken:

- Evacuation
- Shelter in-place
- Diking?

What human/equipment resources are required?

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Notes

Assess

- Is there a fire, spill or leak?
- Is there a vapor cloud?
- What are the weather conditions?
- What direction is the wind blowing?
- What is the terrain like?
- Who and what is at risk: people, property or environment?
- What actions should be taken:
 - Evacuation
 - Shelter in-place
 - Diking?
- What human/equipment resources

are required?



Step 5 – Obtain Assistance

Contact Your Organization and initiate the local emergency response plan

Call The Pipeline Operator and have:

- Call Back numbers, contact name
- Detailed Location and address
- Type of Emergency (Fire, Leak, Gas)
- Time of release
- Known injuries
- Exposures
- Any special situations



The Pipeline Control Center Is a Direct Line To Additional Trained Personnel

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Slide 44	Notes
<p>Obtain Assistance</p> <p>Contact Your Organization and initiate the local emergency response plan</p> <p>Call The Pipeline Operator and have:</p> <ul style="list-style-type: none">• Call Back numbers, contact name• Detailed Location and address• Type of Emergency (Fire, Leak, Gas)• Time of release• Known injuries• Exposures• Any special situations	<p>Objective 8</p> <p><i>The Pipeline Control Center Is a Direct Line To Additional Trained Personnel</i></p>

Step 6 - Respond to Protect People, Property and the Environment

The protection of people is always the highest priority.

Rescue and Evacuate People

Do not walk or drive into a vapor cloud or puddle of liquid.

Evacuate or shelter-in-place as appropriate

Administer first aid and medical treatment, as needed.

Enter the area only when wearing appropriate protective gear - such as Structural Fire Fighters' Protective Clothing



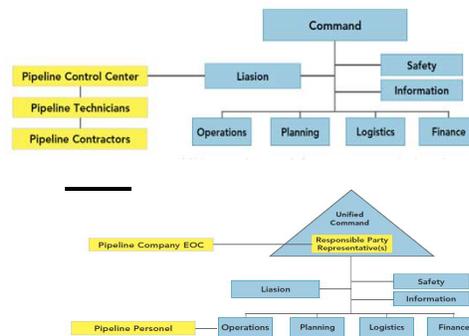
If Natural Gas is escaping in a building refer to Appendix D for additional precautions.

Slide 45	Notes
<p>The protection of people is always the highest priority.</p> <p>Rescue and Evacuate People</p> <p>Do not walk or drive into a vapor cloud or puddle of liquid.</p> <p>Evacuate or shelter-in-place as appropriate</p> <p>Administer first aid and medical treatment, as needed.</p> <p>Enter the area only when wearing appropriate protective gear - such as Structural Fire Fighters' Protective Clothing</p>	<p>Objective 7</p> <p>If Natural Gas is escaping in a building, refer to Appendix D for additional precautions.</p>

Step 6 - Incident Command System

Employing the Incident Command System (ICS) is one of the most important actions to take. It provides common terminology, structure, and operational procedures among operator personnel and response agencies.

In larger incidents, operator personnel trained in ICS and having proper authority with the pipeline company can participate in a **unified command**



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Slide 46

Notes

Employing the Incident Command System (ICS) is one of the most important actions to take. It provides common terminology, structure, and operational procedures among operator personnel and response agencies.

In larger incidents, operator personnel trained in ICS and having proper authority with the pipeline company can participate in a **unified command**

Objective 7

Appendix C - Natural Gas Recommended Minimum Evacuation Distances

(Not applicable for Butane, Propane, or other Hazardous Liquids)

Pressure (psig)	Pipeline Size (Inches)											
	4	6	8	10	12	16	20	22	24	30	36	42
100	91	137	182	228	274	365	456	502	547	684	821	958
200	129	193	258	322	387	516	645	709	774	967	1161	1354
300	158	237	316	395	474	632	790	869	948	1185	1422	1659
400	182	274	365	456	547	730	912	1003	1094	1368	1642	1915
500	204	306	408	510	612	816	1020	1122	1224	1529	1835	2141
600	223	335	447	558	670	894	1117	1229	1340	1675	2011	2346
700	241	362	483	603	724	965	1206	1327	1448	1810	2172	2534
800	258	387	516	645	774	1032	1290	1419	1548	1935	2322	2709
900	274	410	547	684	821	1094	1368	1505	1642	2052	2462	2873
1000	288	433	577	721	865	1154	1442	1586	1730	2163	2596	3028
1100	302	454	605	756	907	1210	1512	1664	1815	2269	2722	3176
1200	316	474	632	790	948	1264	1580	1738	1896	2369	2843	3317
1300	329	493	658	822	986	1315	1644	1809	1973	2466	2959	3453
1400	341	512	682	853	1024	1365	1706	1877	2047	2559	3071	3583
1500	353	530	706	883	1060	1413	1766	1943	2119	2649	3179	3709
1600	365	547	730	912	1094	1459	1824	2006	2189	2736	3283	3830
1700	376	564	752	940	1128	1504	1880	2068	2256	2820	3384	3948
1800	387	580	774	967	1161	1548	1935	2128	2322	2902	3482	4063
1900	398	596	795	994	1193	1590	1988	2186	2385	2981	3578	4174
2000	408	612	816	1020	1224	1631	2039	2243	2447	3059	3671	4283
2100	418	627	836	1045	1254	1672	2090	2299	2508	3134	3761	4388
2200	428	642	856	1069	1283	1711	2139	2353	2567	3208	3850	4492



Table 1 - Evacuation Distance in Feet

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Notes

APPENDIX C - The applicable leak or rupture condition is that of a sustained trench fire fueled by non-toxic natural gas escaping from two full bore pipe ends. Blast overpressure is not addressed. The distances shown in Table 1 are intended to provide protection from burn injury and correspond to a thermal heat flux exposure level of 450 Btu/hr ft². This is the accepted limit of heat exposure for unprotected outdoor areas where people congregate; as established by the US Department of Housing & Urban Development Code 24CFR51.

The formula is: square root of pressure x nominal pipe size x 2.28.

That model does not take into account wind or other factors which may greatly influence specific conditions.

Users are advised that the distances shown in Table 1 are considered to be “general information” only and are not intended to replace a site specific risk analysis. The Pipeline Association for Public Awareness makes no warranty with respect to the usefulness of this information and assumes no liability for any and all damages resulting from its use. Anyone using this information does so at their own risk.

Pressure (psig)

Pipeline Size (Inches)

Step 6 - Respond to Protect People, Property and the Environment



Eliminate Ignition Sources

- Park vehicles in a safe location
- Park all emergency vehicles at a safe distance beyond the isolation zone (upwind).
- Do **NOT** light a match, start an engine, use a telephone or radio, Do **NOT** switch lights on or off or use anything that may create a spark.

Fire Control

- Let primary fire burn
- Cool surrounding structures
- Beware hot spot re-ignition
- Eliminate potential ignition sources
- Do **NOT** inhale fumes, smoke or vapors
- Do **NOT** Operate pipeline equipment

Slide 48

Notes

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Objective 7

Step 6 - Respond to Protect People, Property and the Environment

Vapor Control

Limiting the amount of vapor released from a pool of flammable or corrosive liquids requires the use of proper protective clothing, specialized equipment, appropriate chemical agents, and skilled personnel.

It is best to contain the hazards and wait for the pipeline operator's representative to handle the pipeline and its product.

- Do not inhale fumes, smoke or vapors.
- Eliminate ignition sources! Flammable gases may escape and be ignited by a source in the area.
- Do not ignite a vapor cloud!
- Avoid forced ventilation of structures and excavations.
- Limited fog misting can be of some benefit if knocking down a vapor



Slide 49

Notes

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Objective 7

Step 6 - Respond to Protect People, Property and the Environment



Leak Control

liquid pipeline leaks and ruptures can create major problems with spill confinement and containment.

Ask yourself where the spill will be in a few hours?

What can be done to confine the spill or divert it away from exposures.

Establish barriers to prevent leaks from spreading to water sources, storm drains or other sensitive areas.

- Storm sewer or manhole dam
- Small stream containment boom
- Pipe skimming underflow dam
- Wire fence or straw filter dam

If a leak is accidentally ignited, firefighting should focus on exposures, but in NO circumstances should efforts be made to extinguish the fire until the source of supply has been cut off or controlled.

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Notes

Leak Control

Objective 7

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Step 7 - Working Together with the Pipeline Operator

Organizations should establish and maintain a mutual understanding regarding cooperation and coordination of response efforts. Their respective roles and responsibilities include:

911 Centers and Pipeline Control Centers

- Receive initial notifications and collect critical information
- Dispatch personnel and equipment to the scene
- Disseminate information to other agencies or organizations
- Establish a point of contact for ongoing communications

Slide 51	Notes
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Step 7 - Work Together with the Pipeline Operator



Pipeline Operators:

- Investigate all abnormal or unsafe conditions involving pipeline facilities
- Shut off the supply of product and isolate pipeline segments
- Determine the extent of a product release and potential impact on the surrounding area
- Establish contact with the Incident Commander before and upon arrival on scene to avoid accidental entry into isolation zones or ignition of the release

Slide 52

Notes

Pipeline Operator's Representative

- Serves as the primary contact for communication between the operator's team and emergency responders
- Establishes contact with the Incident Commander before and upon arrival
- Recommends actions to take especially as they relate to containment and control of the pipeline product

Objective 7

Step 7 - Work Together with the Pipeline Operator



Pipeline Operators:

Provide information regarding additional potential hazards that may be present at the location and Safety Data Sheets as necessary.

Recommend actions to take related to containment and control of leaking pipeline products

Help evaluate possible complications that may result from response activities

Fight small fires with hand-held extinguishers

Assist with evacuations or traffic control

Administer basic first aid and possibly CPR

Slide 53

Notes

Pipeline Operator's Representative

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- Establishes contact with the Incident Commander before and upon arrival
- Recommends actions to take especially as they relate to containment and control of the pipeline product

Objective 7

Step 7 - Work Together with the Pipeline Operator



Emergency Responders:

- Maintain site control and act as Incident Commander (IC)
- Eliminate ignition sources and suppress vapor generation
- Initiate evacuation or shelter in place protective actions
- Provide standby rescue personnel to pipeline operator personnel entering the incident area to stop the release
- Help maintain containment dams and install more as needed
- Monitor the atmosphere in the repair and containment areas

Slide 54

Notes

Emergency Responders

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- Eliminate ignition sources and suppress vapors
- Provides standby rescue personnel to pipeline operator personnel entering the incident area to stop the release
- Monitor the atmosphere in the repair and containment areas

Objective 7

Step 7 - Work Together with the Pipeline Operator



Together Incident Commander and Pipeline Operator's Representative

- Identify public health hazards and additional protective actions to be taken
- Establish Unified Command as soon as practicable
- Determine when the operator's personnel can safely enter the area
- Determine when the zone of influence needs additional diking
- Coordinate public information needs
- Decide when it is safe for the public to re-enter the area
- Share any "after action" reports and cooperate on improvements to response procedures

Slide 55

Notes

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- Share any "after action" reports and cooperate on improvements to response procedures

Security

In our nation's time of heightened security, it is more important than ever to protect pipelines against damage or attack. Homeland Security and infrastructure protection is a shared responsibility.

Always report any unusual condition or suspicious activity along a pipeline right-of-way to the pipeline operator. They will immediately investigate and repair any damages.

The Transportation Security Administration (TSA) also wants to know about incidents that are indicative of deliberate attempts to disrupt pipeline operations or activities that could be precursors to such an event.

Local authorities may also be notified of these kinds of events and be asked to participate in follow up investigations.



Slide 56	Notes
<ul style="list-style-type: none">• In our nation's time of heightened security, it is more important than ever to protect pipelines against damage or attack. Homeland Security and infrastructure protection is a shared responsibility.• Always report any unusual condition or suspicious activity along a pipeline right-of-way to the pipeline operator. They will immediately investigate and repair any damages.• The Transportation Security Administration (TSA) also wants to know about incidents that are indicative of deliberate attempts to disrupt pipeline operations or activities that could be precursors to such an event.• Local authorities may also be notified of these kinds of events and be asked to participate in follow up investigations.	<p>Objective 8</p>

Potential Security Events

- Explosion or fire of suspicious nature
- Actual or suspected attacks on pipeline systems
- Bomb threats or weapons of mass destruction threats
- Theft of company vehicles, uniforms or credentials
- Suspicious personnel or vehicles around pipelines
- Suspicious photography or surveillance activities
- Suspicious individuals applying for sensitive positions
- Suspicious inquiries regarding operations or security practices
- Theft of detailed maps or security plans
- Actual or suspected cyber attack on IT systems



Slide 57	Notes
<ul style="list-style-type: none">• Explosion or fire of suspicious nature• Actual or suspected attacks on pipeline systems• Bomb threats or weapons of mass destruction threats• Theft of company vehicles, uniforms or credentials• Suspicious personnel or vehicles around pipelines• Suspicious photography or surveillance activities• Suspicious individuals applying for sensitive positions• Suspicious inquiries regarding operations or security practices• Theft of detailed maps or security plans• Actual or suspected cyber attack on IT	<p>Objective 8</p>

systems



Pipeline Integrity

Right of Way Inspections
24/7 Monitoring
Cathodic Protection
Pipeline Coatings
ILI tools - Smart Pigs



Slide 58

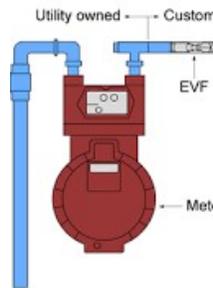
Notes

Pipeline Integrity

- The pipeline industry uses a wide range of tools and technologies to maintain safe operations by visually inspecting aboveground pipes and related equipment for corrosion and damage
- On a regular basis, personnel walk, drive and fly over pipeline right-of-ways inspecting them for unauthorized activities, leaks, and other conditions that might endanger the pipeline
- Pipeline operators also use in-line inspection tools known as “smart pigs” to inspect below grade pipe and equipment by hydrostatic testing, electro-magnetic testing, and other techniques to identify defects which could threaten pipeline integrity
- When inspection efforts identify any integrity-threatening conditions, the operator takes corrective action to maintain safe operations

Objective 8

Excess Flow Valves (EFV) and Curb Valves



Excess Flow Valves

Automatically restrict the flow of gas in service lines that have been cut or damaged
Excess flow valves may **not** be installed in all service lines

Curb Valves

Protect against uncontrolled gas releases from larger commercial and industrial users, gas distribution companies are required to install curb valves, manually operated shutoff valves near the service main, or EFVs

Policies regarding the operation of curb valves by emergency response personnel should be coordinated with the local gas company so all parties are clear about what might be expected

Slide 59

Notes

- **Excess Flow Valves** automatically restrict the flow of gas in service lines that have been cut or damaged
- Excess flow valves may **not** be installed in all service lines
- **Curb Valves** protect against uncontrolled gas releases from larger commercial and industrial users, gas distribution companies are required to install curb valves, manually operated shutoff valves near the service main, or EFVs
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Objective 8

Emergencies Affecting Pipelines



Many types of emergency situations can affect buried pipelines (train derailments, floods, earthquakes, forest fires, structure collapses, etc.)

Pipeline companies should be notified so they can monitor and verify the integrity of nearby pipelines

Responders may be able to notify pipeline operators of the emergency by calling 811 and informing the One-Call Center of the situation

Coordination with pipeline operators during emergencies will ensure the safety of the response team and also the surrounding community

Slide 60

Notes

Emergencies Affecting Pipelines

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- Coordination with pipeline operators during emergencies will ensure the safety of the response team and also the surrounding community

Objective 9

Summary

Responding to pipeline emergencies is as detailed as any hazardous materials event. Responders must:

- Be well acquainted with the transmission, distribution and service systems
- Understand the hazard and risks of the products transported
- Have a strong knowledge base to operate safely at these incidents
- Understand how to work together with operators and coordinate response efforts

Slide 61	Notes
<p>Summary</p> <ul style="list-style-type: none">• Responding to pipeline emergencies is as detailed as any hazardous materials event• Responders must understand the hazard and risks of the products• Be well acquainted with the transmission, distribution and service systems• Understand how to work together with operators to coordinate response efforts• Have a strong knowledge base to operate safely at these incidents	

Appendices

- A. Leak, Hazard and Emergency Response Information
 - B. General Product Characteristics
 - C. Recommended Minimum Evacuation Distances For Natural Gas Pipeline Leaks and Ruptures
 - D. Natural Gas Escaping Inside a Building
 - E. Storage Facilities
-
- Additional Resources
 - Emergency Response Capabilities
 - Incident Response Checklist

Slide 62	Notes
<p>Appendices</p> <ul style="list-style-type: none">A. Leak, Hazard and Emergency Response InformationB. General Product CharacteristicsC. Recommended Minimum Evacuation Distances For Natural Gas Pipeline Leaks and RupturesD. Natural Gas Escaping Inside a BuildingE. Storage Facilities <ul style="list-style-type: none">▪ Additional Resources▪ Emergency Response Capabilities▪ Incident Response Checklist	<p>Objective 9</p>

Additional Training Resources

[HTTPS://TRAINING.PIPELINEAWARENESS.ORG](https://training.pipelineawareness.org)

Slide 63	Notes
<p><u>Additional Training Resources</u></p> <ul style="list-style-type: none">• Response Guidelines<ul style="list-style-type: none">Down load a copy of the PERG• Training Tools<ul style="list-style-type: none">Lesson PlanPowerPoint PresentationsEvaluations• Response Scenarios• Case Studies	