Welcome to the CLU-IN Internet Seminar

CEC Training for OSCs...Pipeline Emergencies

Sponsored by: EPA Office of Superfund Remediation and Technology Innovation

Delivered: November 14, 2013, 2:00 PM - 5:00 PM, EST (19:00-22:00 GMT)

Instructors:

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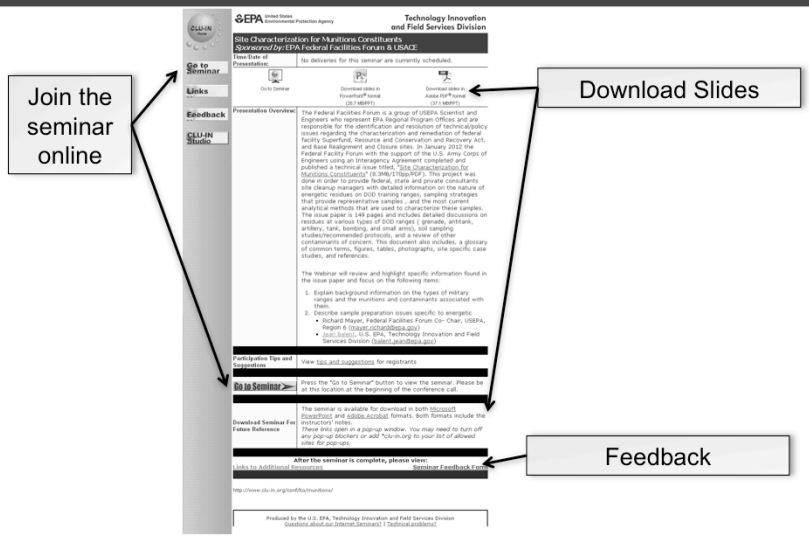
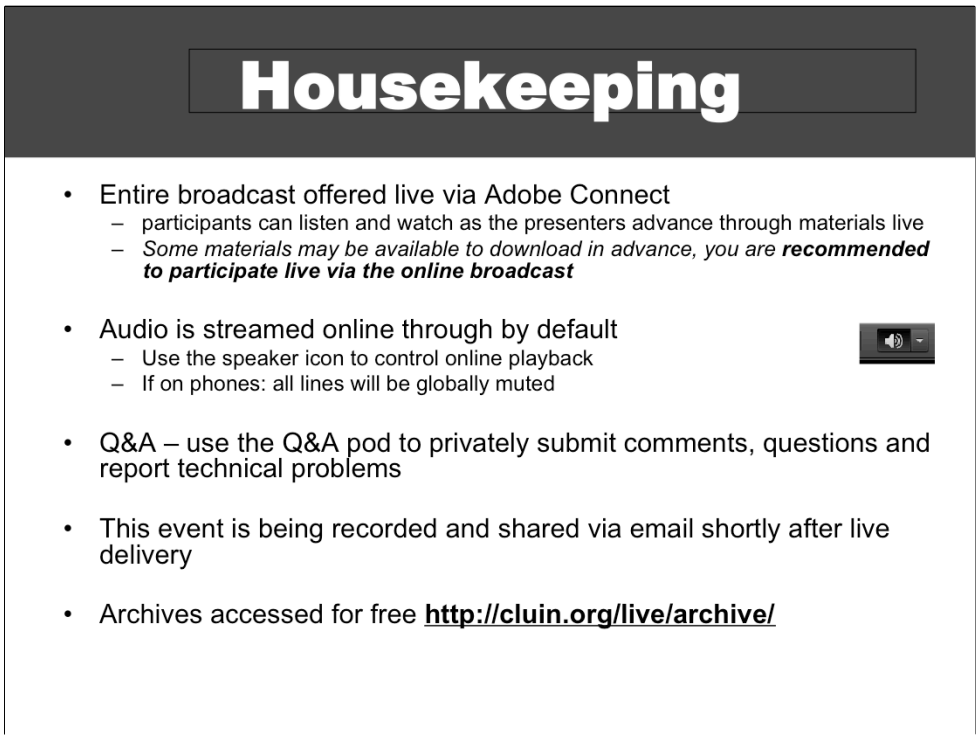
Seminar Homepage





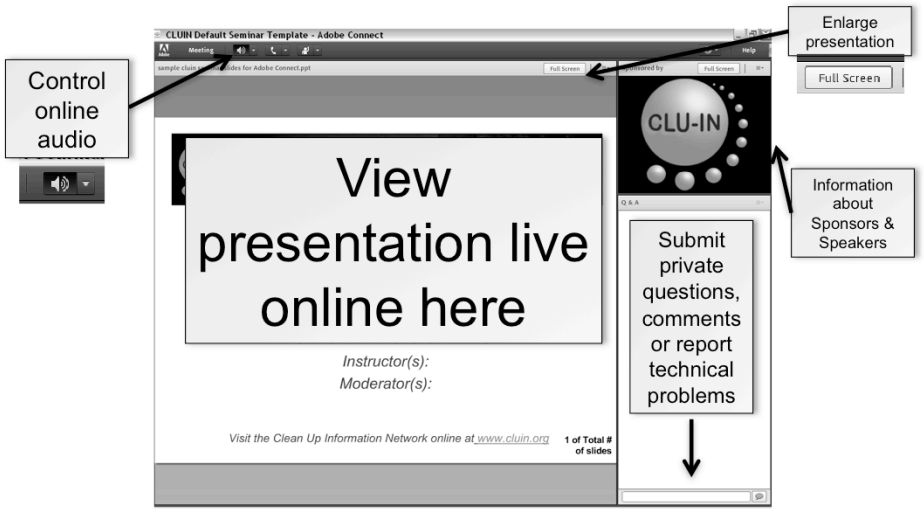
Although I'm sure that some of you have these rules memorized from previous CLU-IN events, let's run through them quickly for our new participants.

Please mute your phone lines during the seminar to minimize disruption and background noise. If you do not have a mute button, press *6 to mute #6 to unmute your lines at anytime. Also, please do NOT put this call on hold as this may bring delightful, but unwanted background music over the lines and interupt the seminar.

You should note that throughout the seminar, we will ask for your feedback. You do not need to wait for Q&A breaks to ask questions or provide comments. To submit comments/questions and report technical problems, please use the ? Icon at the top of your screen. You can move forward/backward in the slides by using the single arrow buttons (left moves back 1 slide, right moves advances 1 slide). The double arrowed buttons will take you to 1st and last slides respectively. You may also advance to any slide using the numbered links that appear on the left side of your screen. The button with a house icon will take you back to main seminar page which displays our agenda, speaker information, links to the slides and additional resources. Lastly, the button with a computer disc can be used to download and save today's presentation materials.

With that, please move to slide 3.

New online broadcast screenshot



Disclaimer

- The purpose of this presentation is to stimulate thought and discussion.
- Nothing in this presentation is intended to supersede or contravene Federal Statutes, Regulations, or Official EPA Policies.

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Instructor Bio

- Earl Liverman is an EPA On-Scene Coordinator located in the Region 10 Coeur d'Alene, Idaho, field office. Earl has been with EPA since 1991 working in the Remedial and Emergency Response and Removal programs.
- Jim Mullins works part time for TetraTech, a support contractor to EPA. Jim retired from the EPA Region 6 Dallas TX office after working 25 years in oil spill and hazardous waste response programs.

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Pipeline Emergency Response Webinar

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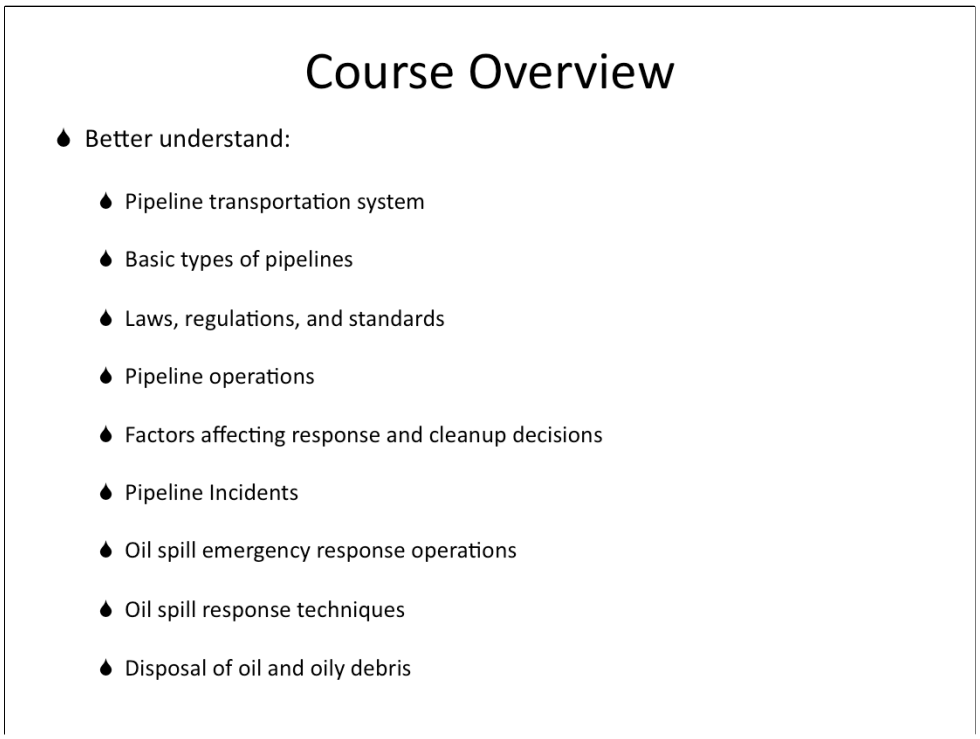
Instructors

- Instructors
  - Names
  - Work Experience
- Participants Overview

- Comment re background provided by introductory slides



- The purpose of this course is to provide an overview of pipeline emergency response operations.

- There is no way to include all possible subjects, references, or guidance for something as complex as incident response in a single course; however it is hoped that this course will assist you when responding to pipeline emergencies

AGENDA

- I. Introduction and Course Objective/Overview
- II. Pipeline Transportation System
- III. Basic Types of Pipelines
- IV. Laws, Regulations, Standards
- V. Pipeline Operations
- VI. Factors Affecting Response and Cleanup Decisions
- VII. Pipeline Incidents
- VIII. Oil Spill Emergency Response Operations
- IX. Oil Spill Response Techniques
- X. Disposal of Oil and Oily Debris
- XI. Summary Statement

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- Shows course modules . . . red highlight is where we are now

II. Pipeline Transportation System

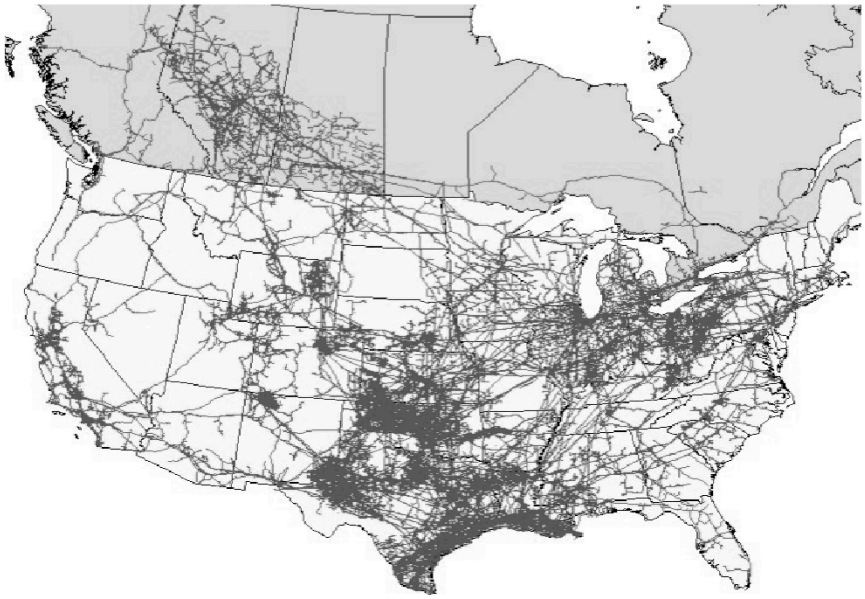
- In this brief, introductory module, we will provide an overview of pipeline transportation system

Pipeline Transportation System

- Nearly half a million miles of pipeline transporting natural gas, oil, and other hazardous liquids crisscross the United States
  - Roughly 170,000 miles carry hazardous liquids; over 75% of the nation's crude oil and around 60% of its refined petroleum products, along with other products
  - Within this network, there are 200 interstate crude oil and interstate pipelines, which account for roughly 80% of total pipeline mileage and transported volume

- These pipelines are operated by approximately 3,000 companies, large and small

All Commodities Map



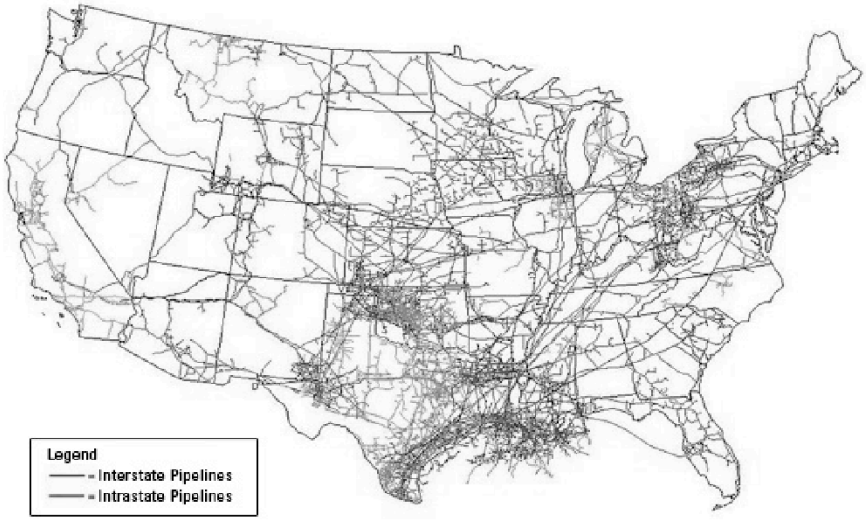
- Slide is shown to reinforce
  - There are many pipelines located throughout the U.S.
  - Pipelines are found in all EPA Regions . . . not evenly distributed

Pipeline Transportation System . . .

- U.S. natural gas pipeline network consists of around 217,000 miles on interstate transmission and 89,000 miles of intrastate transmission
- It also contains some 20,000 miles of field and gathering pipelines, which connect gas extraction wells to processing facilities
- Around 125 systems make up the interstate gas transmission network; another 90 or so systems operate strictly within individual states

- Typical natural gas drilling rig
- Natural gas wells

Natural Gas Pipelines

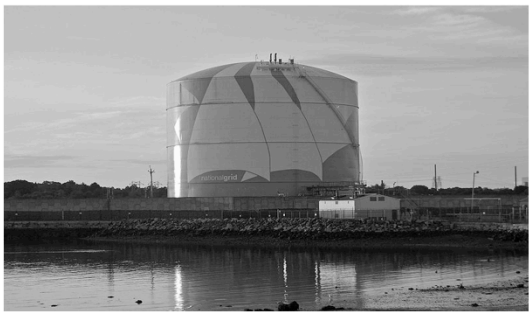


Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division, Gas Transportation Information System

- As mentioned earlier . . .
  - There are many pipelines located throughout the U.S.
  - Pipelines are found in all EPA Regions . . . not evenly distributed

Pipeline Transportation System . . .

- These interstate and intrastate gas transmission pipelines feed about 1.2 million miles of regional pipelines in some 1,400 local distribution networks
- Natural gas pipelines also connect to 113 liquefied natural gas storage sites



• The most important type of natural gas storage is in underground reservoirs, consisting of depleted gas reservoirs and salt cavern reservoirs

Pipeline Transportation System . . .

- Pipeline incidents can bring a wide range of organizations to the scene
- The type of respondents will depend on the scope and nature of the incident
- Key to success is to have a coordinated incident command structure where all of the respondents integrate their resources in a safe and efficient manner

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III. Basic Types of Pipelines

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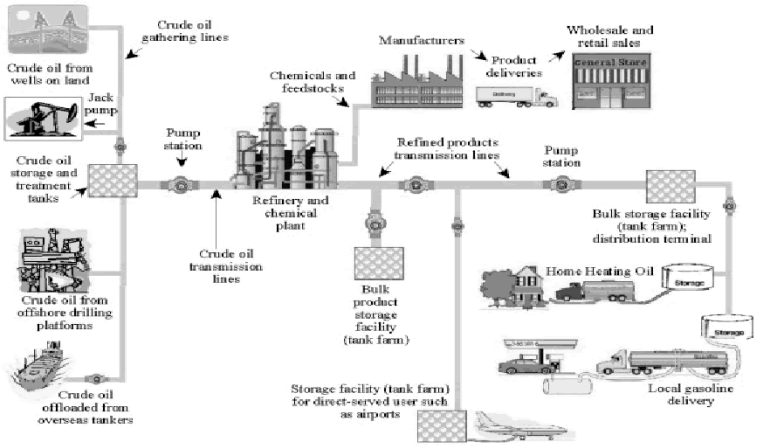
• Purpose of this module is to provide an overview of the basic types of pipelines – petroleum pipeline systems and natural gas pipeline systems

Petroleum Pipeline Systems



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- From the wellhead to the consumer, petroleum pipeline systems provide us with energy fuels and products we use every day. There are essentially three major types of pipelines along the petroleum transportation route: gathering systems, crude oil pipeline systems, and refined products pipeline systems

- Gathering pipeline systems gather crude oil from production wells

- Crude oil pipeline systems transport crude oil from the gathering systems to refineries. Crude oil systems can be tens to hundreds of miles in length and cross state and continental borders

- Refined products pipeline systems transport refined products such as gasoline, kerosene and many industrial feedstock petrochemicals from refineries to the end user or to storage and distribution terminals. Refined products pipelines can extend tens to thousands of miles and cross state and continental borders

- The pipe used in oil pipeline systems can range in size from 2 inches to 42 inches in diameter. Oil pipeline systems are owned and operated by many different companies. The location, construction and operation of these systems are generally regulated by federal and state regulations.

Crude Oil Pipelines

- Crude oil is petroleum taken directly out of the ground from both on-shore and off-shore production facilities
- The exact composition of this produced fluid varies depending upon where in the world the crude oil was produced

Crude Oil Pipelines . . .

- Gathering lines are small pipelines, usually 2 to 8 inches in diameter
  - They move the crude oil mixture from individual wellheads and production locations to an oil processing facility

- Depending upon the location of the production site and the type of crude oil being produced, the crude oil is then shipped through larger trunk lines, 8 to 24 inches in diameter, or by cargo tank trucks to a refinery or shipping terminal

- Most recognized crude oil trunk line is the 800-mile long Trans Alaska Pipeline System (TAPS)

Liquid Pipelines

- The most common liquids transported by pipelines are crude oil and refined petroleum products:
  - Gasoline
  - Aviation gas
  - Jet fuel
  - Home heating fuels
  - Diesel fuels
  - Natural gas liquids (NGL)
  - Liquefied petroleum gas (LPG)
  - Anhydrous ammonia

- Pipelines vary in size from 8- to 12-inch diameter pipelines up to 42-inch transmission lines

• Ammonia Carbon dioxide and anhydrous ammonia are not refined petroleum products . . . but both are transported by pipeline . . . particularly in the mid-west grain belt

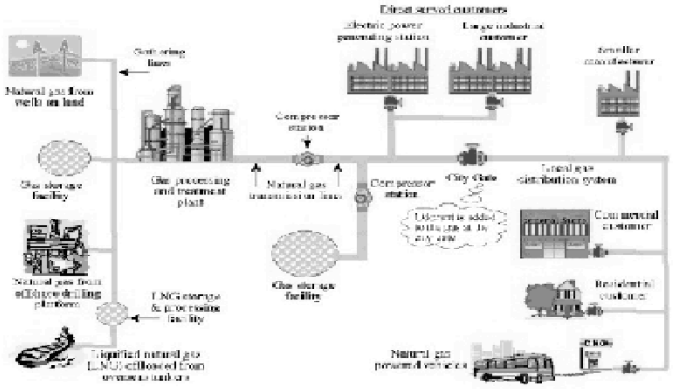
Liquid Pipelines . . .

- Transmission pipelines move refined products from refineries to marketing and distribution terminals
- The products are then loaded onto rail cars, cargo tanks trucks, and barges for delivery to the consumer
- Refined petroleum product transmission pipelines may several different liquid products sequentially

Liquid Pipelines – High Volatile Liquids

- Highly volatile liquids or "HVL" pipelines are hazardous liquids which will form a vapor cloud when released to the atmosphere
- Examples of common highly volatile liquids (HVLs)
  - Liquefied petroleum gas (LPG)
  - Propane
  - Butane
  - Ammonia
  - Carbon dioxide
  - Hydrogen

Natural Gas Pipeline Systems



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- There are essentially three major types of pipelines along the transportation route: gathering systems, transmission systems, and distribution systems

- Gathering pipeline systems gather raw natural gas from production wells

- Transmission pipeline systems transport natural gas thousands of miles across many parts of the continental United States

- Natural gas distribution pipeline systems can be found in thousands of communities from coast to coast and distribute natural gas to our homes and businesses through mains and service lines

- Except for gas service lines, the pipe used in natural gas pipeline systems can range in size from 2 inches to 42 inches in diameter; gas service lines are generally from ½ inch to 2 inches in diameter. Natural gas gathering and transmission pipeline systems are constructed from steel pipe. However, natural gas distribution systems have been constructed from many different materials including cast iron, steel, copper, and plastic pipe. Plastic pipe is most commonly installed today for gas distribution systems

- Natural gas pipeline systems are owned and operated by many different companies; the location, construction and operation of these systems are generally regulated by federal and state regulations.

Natural Gas Pipelines

- Transmission pipelines ranging up to 48-inches in diameter move the natural gas from production and processing to the distribution network
- Ultimately delivering the product to residential and industrial consumers via distribution lines ranging from a diameter of 0.5 inches to 18 inches

Time for Questions

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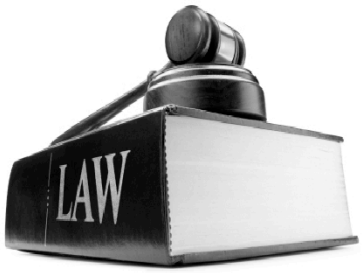
IV. Laws, Regulations, and Standards



- Pipeline design, construction, and operations are governed by a wide array of local, state, and federal laws, regulations, and ordinances

- In addition, there are industry voluntary consensus standards and industry best practices to help ensure that pipelines are safely operated and maintained

- Purpose of this module is to provide an overview of certain statutes, executive orders, and regulations so that you better understand EPA's statutory and regulatory authority for responding to an oil spill

Emergency Response Authorities

- The federal government's responsibilities for emergency response are established by statute and by executive orders issued by the President
- The **Stafford Act** provides the authority for the federal government to respond to disasters and emergencies in order to provide assistance to save lives and protect public health, safety, and property
- The **Federal Water Pollution Control Act Amendments of 1972/Oil Pollution Act of 1990** expands the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) to include response to releases of hazardous substances, as well as oil, to any navigable waters of the US. The Oil Pollution Act (OPA) broadens the response and enforcement authorities of the federal government.
- The **Resource Conservation and Recovery Act** (RCRA) gives EPA the authority to control hazardous waste from "cradle to grave", including its generation, transportation, treatment, storage, and disposal.
- The **Comprehensive Environmental Response, Compensation, and Recovery Act** (CERCLA) expands the NCP to apply to releases to any environmental media and to cover releases at hazardous waste sites requiring emergency removal actions.
- The **Emergency Planning and Community Right-to-Know Act** (EPCRA) expands EPA enforcement authority and establishes a chemical emergency response planning infrastructure at the state and local levels.

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Emergency Response Authorities . . .

- **EO 12088-Federal Compliance with Pollution Control Standards** delegates pollution prevention, control, and abatement responsibilities to federal agencies, including EPA
- E**O 12580-Superfund Implementation**, as amended by **EO 12777-Implementation of Section 311 of the Clean Water Act (CWA)**, delegates to EPA specific authorities under the NCP, as well as the responsibility for its amendment
- **Homeland Security Presidential Directives** give EPA the legal authority for its emergency response program.

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U.S. Environmental Protection Agency
CWA § 311 and OPA

- Section 311 of the Clean Water Act (33 U.S.C. §1251 *et seq.)* and the Oil Pollution Act (33 U.S.C. §2701 *et seq*.) are the primary federal programs for responding to oil spills
- Implementation of CWA § 311 and OPA dual responsibility of EPA (non-transportation-related facilities and onshore operations) and U.S. Coast Guard (vessels and marine transportation)
- Scope of CWA § 311 and OPA applies to traditional navigable waters and wetlands adjacent to navigable traditional navigable waters

- The term "waters of the US" is defined at 40 CFR 230.3(s):
  - All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide
  - All interstate waters including interstate wetlands;
  - All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters: (I) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or (ii)(From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or (iii) Which are used or could be used for industrial purposes by industries in interstate commerce;
  - All impoundments of waters otherwise defined as waters of the United States under this definition;
  - Tributaries of waters identified in paragraphs (s)(1) through (4) of this section;
  - The territorial sea;
  - Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (s)(1) through (6) of this section; waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the United States

- Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA

CWA/OPA Threshold Criteria for Initiating a Response

- The substance involved is an oil
- There is a discharge or substantial threat of discharge
- Discharge or substantial threat of discharge into navigable waters or adjoining shorelines
- Removal actions are consistent with the NCP

- Threshold criteria for initiating a response:

  - Is the substance involved an oil? [CWA § 311(a)(1)]

  - Is there a discharge or substantial threat of a discharge? [CWA § 311(c)(1)]

  - Is the discharge or substantial threat of discharge into navigable waters or adjoining shorelines? [CWA § 311(c)(1)]

  - Are removal actions consistent with the NCP? [CWA § 311(c)(3)]

Substantial Threat Determination . . .

- 33 CFR 154

Substantial threat of a discharge means any incident or condition involving a facility that may create a risk of discharge of oil. Such incidents include, but are not limited to storage tank or piping failures, above ground or underground leaks, fires, explosions, flooding, spills contained within the facility, or other similar occurrences

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- No single definition . . .

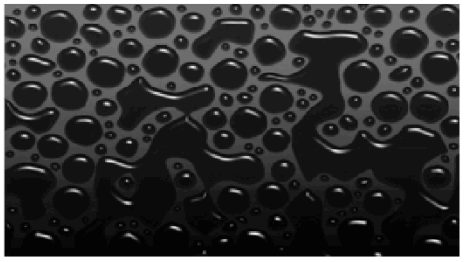
- **33 CFR Part 154 - FACILITIES TRANSFERRING OIL OR HAZARDOUS MATERIAL IN BULK**

  - This part applies to each facility that is capable of transferring oil or hazardous materials, in bulk, to or from a vessel, where the vessel has a total capacity, from a combination of all bulk products carried, of 39.75 cubic meters (250 barrels) or more.

Substantial Threat Determination . . .

- 40 CFR 112.1

  . . . which due to its location, could reasonably be expected to discharge oil in quantities that may be harmful, as described in part 110 of this chapter, into or upon the navigable waters of the United States or adjoining shorelines, or into or upon the waters of the contiguous zone .



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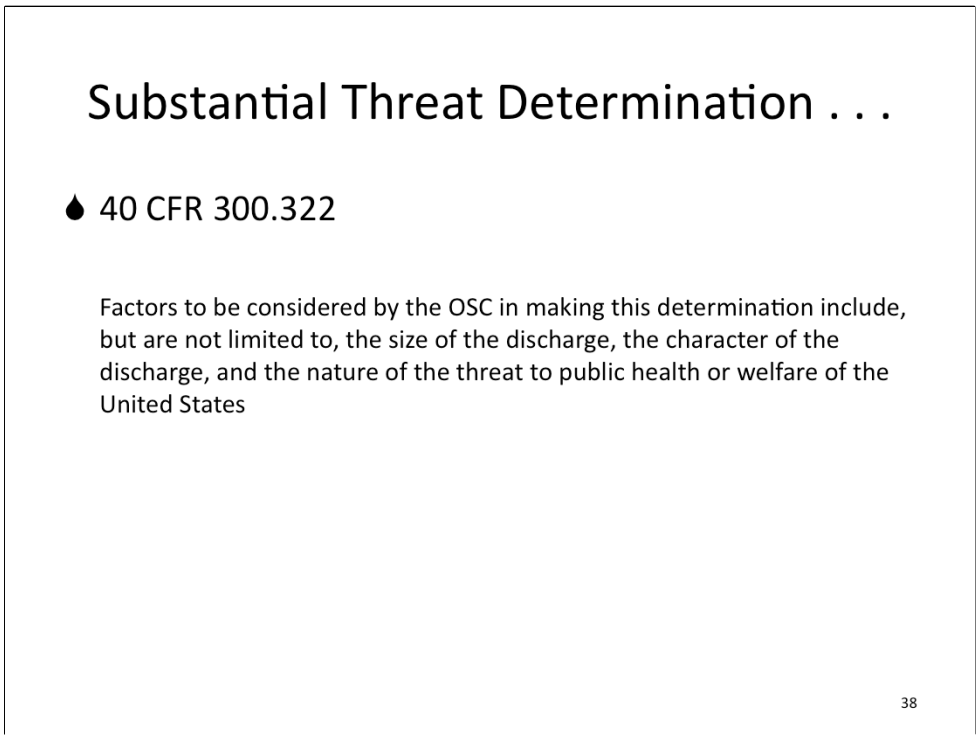
- **40 CFR Part 112 – OIL POLLUTION PREVENTION**

  - This part establishes procedures, methods, equipment, and other requirements to prevent the discharge of oil from non-transportation-related onshore and offshore facilities into or upon the navigable waters of the United States or adjoining shorelines

- Recall 40 CFR Part 110 - Discharge of Oil Regulation (Sheen Rule)

  - Discharges that cause a sheen or discoloration on the surface of a body of water

  - Discharges that violate applicable water quality standards



- **40 CFR Part 112 – OIL POLLUTION PREVENTION**
    - This part establishes procedures, methods, equipment, and other requirements to prevent the discharge of oil from non-transportation-related onshore and offshore facilities into or upon the navigable waters of the United States or adjoining shorelines
- Recall 40 CFR Part 110 - Discharge of Oil Regulation (Sheen Rule)
    - Discharges that cause a sheen or discoloration on the surface of a body of water
    - Discharges that violate applicable water quality standards

CERCLA Threshold Criteria for Initiating a Response

- Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant
- Conditions at the Site meet the § 300.415(b) criteria for a removal action
- Removal actions are consistent with the NCP

- Discuss why introduce CERCLA

CERCLA

- Comprehensive Environmental Response, Compensation, and Liability Act (1980) 42 U.S.C. §9601 *et seq*.
- Petroleum Exclusion
  - Term "hazardous substance" is defined in CERCLA section 101(14)
  - Definition excludes "petroleum, including crude oil or any fraction thereof," unless specifically listed or designated under CERCLA

CERCLA . . .

- Petroleum Exclusion
  - Term "pollutant or contaminant" is defined in CERCLA section 101(33)
  - Definition excludes "petroleum, including crude oil or any fraction thereof," unless specifically listed or designated under CERCLA, and shall not include natural gas, liquefied natural gas, or synthetic gas of pipeline quality (or mixtures of natural gas and such synthetic gas)

CERCLA . . .

- EPA interprets CERCLA section 104(14) to exclude crude oil and fractions of crude oil – including hazardous substances such as benzene, that are intrinsic in those petroleum substances – from the definition of hazardous substance
- Under this interpretation, petroleum includes hazardous substances that are normally mixed with or added to crude oil or crude oil fractions during the refining process
- This includes intrinsic hazardous substances, the concentrations of which are altered a normal part of the refining process

Tie to pipelines . . . provide examples

When could CERCLA be used to respond to a Pipeline Emergency?

- Hazardous substances added to petroleum or that increase as a result of contamination of the petroleum during use are not considered part of the petroleum, and are therefore regulated under CERCLA

- In each case, entire volume of the mixture is treated as a hazardous substance

- Examples not within the exclusion:
  - PCBs mixed with oil
  - Pesticides in an oil-based carrier or propellant
  - Oil-based paints and solvents
  - Used oil contaminated with hazardous substances

Stafford Act

- Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) was enacted to support state and local governments and their citizens when their resources are overwhelmed by the effects of a disaster

- Enacted in 1974 to provide federal assistance to state and local governments in disaster relief; amended by the Disaster Mitigation Act of 2000

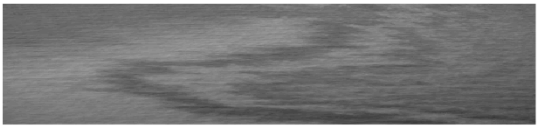
Stafford Act . . .

- ESF#10 - Oil and Hazardous Materials
  - Coordinates, integrates, and manages overall Federal effort to detect, identify, contain, decontaminate, clean up, dispose or minimize discharges of oil or releases of hazardous materials, or prevent, mitigate, or minimize the threat of potential releases
  - Provides OSCs for incidents within its jurisdiction
  - Manages EPA special teams under the NCP, which provide specialized technical advice and assistance to responders

Discharge of Oil Regulation

(40 CFR 110)

- Discharge of Oil regulation, commonly known as "sheen rule," establishes criteria for determining whether an oil spill may be harmful to public health or welfare as follows:
  - Discharges that cause a sheen or discoloration on the surface of a body of water
  - Discharges that violate applicable water quality standards
  - Discharges that cause a sludge or emulsion to be deposited beneath the surface of the water or on adjoining shorelines



• Because the Oil Pollution Act of 1990, which amended the Clean Water Act, broadly defines the term "oil," the sheen rule applies to both petroleum and non-petroleum oils (e.g., vegetable oil)

• The regulation also provides several exemptions from the notification requirements:

• **Properly functioning vessel engines** → discharges of oil from a properly functioning vessel engine are not deemed to be harmful and, therefore, do not need to be reported; however, oil accumulated in a vessel's bilge is not exempt

• **Research and development releases** → EPA Administrator may permit the discharge of oil on a case-by-case basis in connection with research, demonstration projects, or studies relating to the prevention, control, or abatement of oil pollution

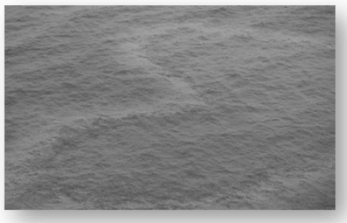
• **NPDES-permitted releases**

• **Discharges permitted under MARPOL** → Certain discharges beyond the territorial seas (defined as extending three miles seaward from the coast) are allowed if they are permitted under international law (International Convention for the Prevention of Pollution from Ships [MARPOL])

Discharge of Oil Regulation . . .

- *Sheen* means an iridescent appearance on the surface of water

- *Sludge* means an aggregate of oil or oil and other matter of any kind in any form other than dredged spoil having a combined specific gravity equivalent to or greater than water



Key Provisions of the NCP

- §300.120 – Establishes general responsibilities of federal On-Scene Coordinators
- §300.135(a) – Authorizes pre-designated OSC to direct all federal, state, and private response activities at the site of a discharge
- §300.135(d) – Establishes unified command structure for managing responses to discharges
- §300.175 – Lists federal agencies that have duties associated with responding to releases

Key Provisions of the NCP Related to Oil Removal

- 300.317 - Establishes national priorities for responding to a discharge
- §§300.320 - Establishes the general pattern of response to be executed by the OSC, including determination of threat, classification of the size and type of the release, notification of the RRT and the NRC, and supervision of thorough removal actions

Key Provisions of the NCP related to Oil Removal . . .

- §300.322 - Authorizes the OSC to determine whether a discharge poses a substantial threat to the public health or welfare of the United States based on several factors
- §300.323 - Provides special consideration to discharges which have been classified as a spill of national significance
- §300.355 - Provides funding for responses to oil discharges under the OSTLF, provided certain criteria are met
- Subpart J – Product Schedule (dispersants and other chemical or biological products)
- Appendix E to Part 300 – Oil Spill Response

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

- The Pipeline and Hazardous Materials Safety Administration (PHMSA) is the primary federal regulatory agency responsible for ensuring that pipelines are safe, reliable, and environmentally sound
  - Oversee the development and implementation of regulations concerning pipeline construction, maintenance and operation, and we share these responsibilities with state regulatory partners
- Protect people and the environment from the risks inherent in transportation of hazardous materials - by pipeline and other modes of transportation

• Federal Hazardous Materials Transportation Statute, 49 U.S.C. § 5101 *et seq*; Hazardous Materials Safety Regulations, Title 49 CFR Parts 100-185

Hazardous Materials Regulations (HMR) govern the transportation of hazardous materials by highway, rail, vessel, and air. HMR address hazardous materials classification, packaging, hazard communication, emergency response information and training.

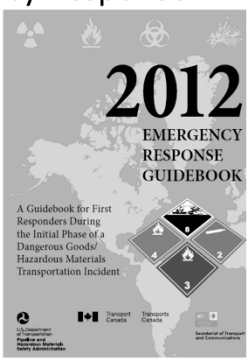
• Pipeline Safety Statute, 49 U.S.C. § 60101 *et seq*; Pipeline Safety Regulations, Title 49 CFR Parts 190 – 199

Pipeline Safety Regulations governs the design, construction, operation, safety, and maintenance of interstate pipelines.

•

PHMSA Base Programs

- Data Analysis and Trending
- Regulatory Development and Coordination
- Inspection, Enforcement and Emergency Response
- State Pipeline Safety Grant Programs
- Damage Prevention and Public Education
- Research and Development



PHMSA Organization

PHMSA from an FOSC's Spill Response Perspective

- FOSC responsible for response operations (NCP §300.120)
- PHMSA is not a response agency (informed, but seldom seen on-Site), rather functions as a technical specialist
  - Do not hesitate to ask for assistance
- PHMSA responsible for pipeline repair and resumption of pipeline operations
- Preparedness - Pipeline operators required to develop response plans outlining planning, training, and response to an oil spill

• 2nd statement. For example, ask PHMSA what kind of questions to ask, including requests for information such as last couple of corrosion pipe to soil readings, last valve actuation report, and a copy of the last pipeline inspection report (required anytime a pipeline is exposed)

State and Local Government

- State Public Utilities/Public Service Commission
- State Fire Marshal's Office
- State Department of the Environment
- State and County Emergency Agency
- Local Fire Department

• A state or local government may adopt additional or more stringent regulations, provided they are consistent and compatible with OPS regulations

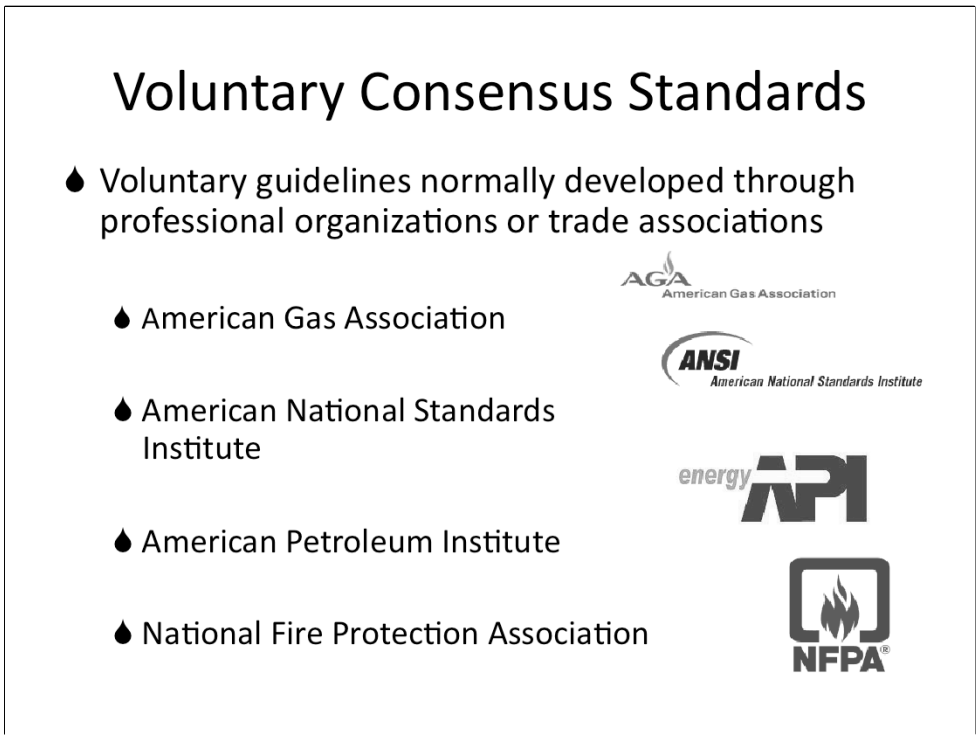
• State Public Utilities/Public Service Commission: Many states manage intrastate pipeline issues

• State Fire Marshal's Office: Typically responsible for regulation of flammable liquids and gases

• State Department of the Environment: Development and enforcement of environmental safety regulations such as oil pollution contingency plans

• State and County Emergency Management Agency: Local emergency planning

• Local Fire Department: Enforces fire prevention and hazardous materials codes



• Normally developed through professional organizations or trade associations as a method of improving quality of a product or system

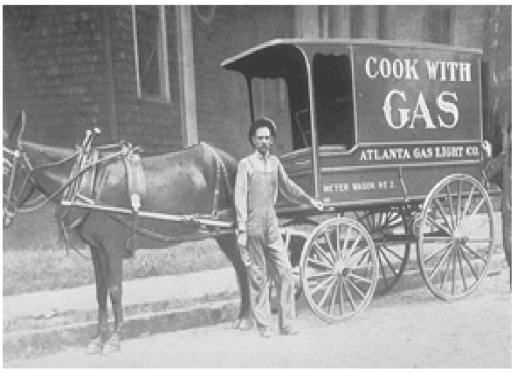
• American Gas Association: represents local energy distribution companies that deliver natural gas to homes, businesses, and industries

• American National Standards Institute: establishes process and procedures requirements for the standards development process

• American Petroleum Institute: national trade association for the petroleum industry

• National Fire Protection Association: association devoted to fire prevention and safety

Time for Questions



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OSC Pipeline Response Authority Scenarios

- Pipeline scenarios selected based upon the common and likely pipeline incidents that OSCs may encounter

- Each scenario follows a similar format – present scenario and discuss the OSC's regulatory authority to respond

- There are one or more "brain teasers"

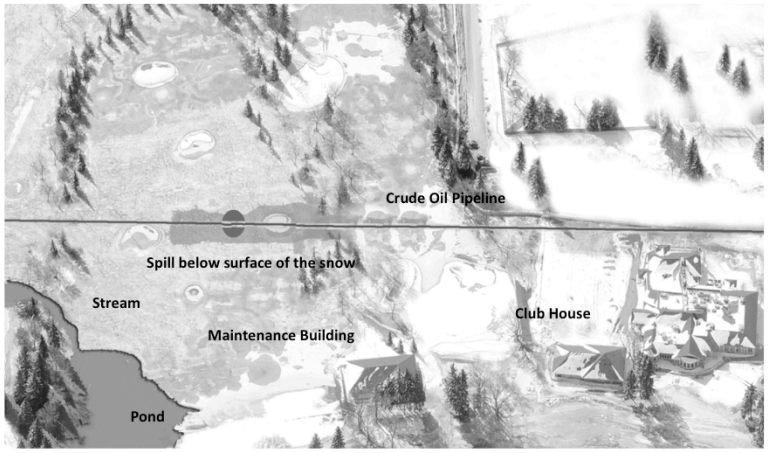
Scenario I

- Rupture of a 24-inch Crude Oil Transmission Pipeline

- Alarm sounded in a Pipeline Control Center (PCC) notifying personnel of a suspected rupture of a 24-inch crude oil transmission pipeline leak

- PCC initiates teleconference call involving federal, state, and local personnel to determine regulatory framework for response

Scenario I – Site Map



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• Note proximity of release to pond and stream, as well as club house and maintenance building.

Does EPA have CWA/OPA Authority to respond to this incident?

- Pipeline Control Center requests EPA assistance
- You are the phone duty officer; how do you respond?
  - Yes
  - No
  - Maybe

Answer

- Depends on whether threshold criteria for initiating a response under CWA § 311 are met

Is it oil?
Is it entering /threatening to enter water?
Are the waters appropriately classified as “navigable waters” ?
Are actions taken consistent with NCP (implementing regulations)?

Would your answer change if . . . ?

- Would your answer change if:

  - The pond were a swale or erosional feature?
  -This suggests ephemeral flow patterns.

  - A ditch excavated wholly in and draining only uplands and that do not carry a relatively permanent flow?
  -Not trib to waters of the US

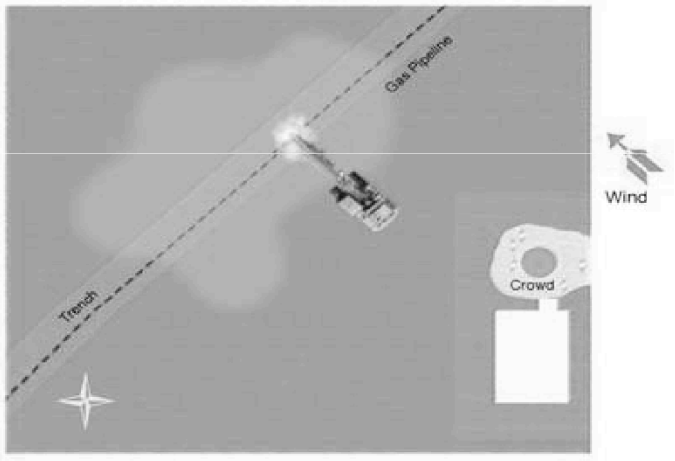
Scenario II

- Puncture of a 20-inch liquid transmission line transporting gasoline in an urban area

- An excavation contractor punctured a 20-inch pipeline transporting gasoline; local fire department personnel respond to the incident and addressed the immediate threats to life and property

- You are the assigned EPA Response Duty Officer and are watching television coverage in the emergency operations center (EOC) when a televised new flash advises viewers of the incident

Scenario II Site Map



- MSNBC notes that reporters are traveling to the incident, and in the meantime shows the following site map

- The newly appointed Regional Administrator walks into the EOC at the same time the news flash crosses the television screen and sees the site map, paying particular attention to the nearby crowd

Does EPA have CWA/OPA or CERCLA Authority to respond to this incident?

- Regional Administrator exclaims EPA must have CWA/OPA or CERCLA authority to respond to the incident and asks whether you intend to deploy EPA resources to the incident
- You are the phone duty officer; how do you respond?
  - Yes
  - No
  - Maybe

Answer

- CWA/OPA → No . . . Federal criteria for initiating a response under CWA § 311 are not met
- CERCLA → No . . . Petroleum Exclusion

Scenario III

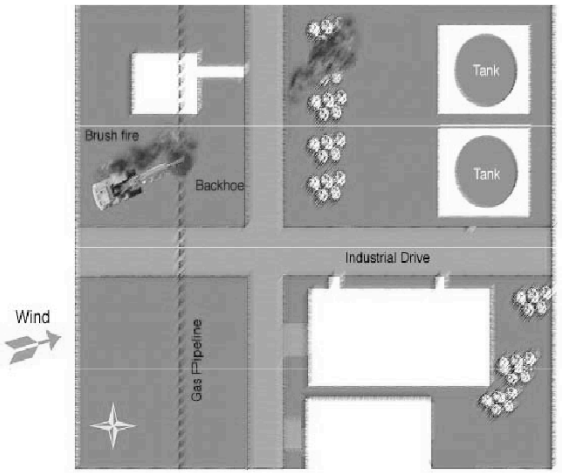
- Rupture of a 6-inch plastic natural gas distribution pipeline in an industrial area

- A backhoe operator accidentally struck a 6-inch plastic underground natural gas distribution line

- The natural gas ignited creating a flash fire; the backhoe operator was able to escape unharmed

- The brush fire near the backhoe was rapidly spreading to a nearby field located next to a petroleum storage tank facility

Scenario III – Site Map



Does EPA have CWA/OPA or CERCLA Authority to respond to this incident?

- You are an OSC visiting with a coworker from another program when both of you hear this incident described on the radio; your coworker is curious and asks if someone from the removal program will respond to the incident
- Do you respond?
  - Yes
  - No
  - Maybe?

Answer

- CWA/OPA → No . . . Federal criteria for initiating a response under CWA § 311 are not met
- CERCLA → No . . . Petroleum Exclusion

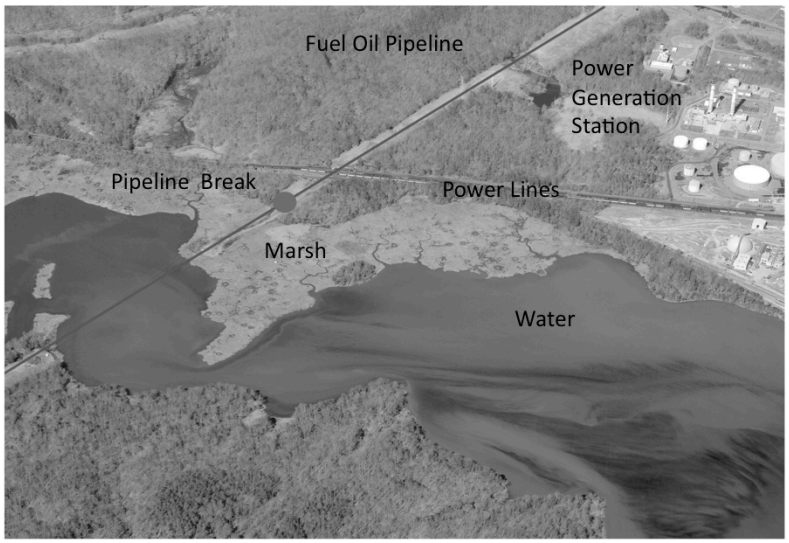
Scenario IV

- Rupture of a 6-inch Fuel Oil Pipeline

- A 6-inch pipeline transporting No. 6 fuel oil ruptures and discharges about 15,000 gallons of fuel oil into a nearby brackish marsh

- The incident is not discovered for several hours

Scenario IV – Site Map



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- Note “salt water” marsh

Does EPA have CWA/OPA Authority to respond to this incident?

- You are the phone duty officer and receive the National Response Center incident report
- You report this incident to you Removal Manager (RM) and the RM asks for your recommendation whether EPA should respond
- What is your advice?
  - Yes
  - No
  - Maybe

Answer

- CWA/OPA → Yes . . . Federal criteria for initiating a response under CWA § 311 are met
- Should EPA respond → Likely no because the incident occurred in the coastal zone
  - § 300.120(a)(1) USCG shall provide OSCs for discharges or releases into or threatening the coastal zone
  - § 300.120(a)(2) EPA shall provide OSCs for discharges or releases into or threatening the inland zone
- However, responsibility for response could shift from USCG to EPA or visa versa (see § 300.140)

Scenario V

- All North Slope crude oil flows into PS01 which is one of eleven pump stations
- A leak was detected in the Booster Pump Building basement at PS01; TAPS was shut down within one hour of discovery of leak
- No release to the environment, but EPA is directed by HQ to respond

Deadhorse, Alaska

Scenario V – Site Map

- North Slope oil flows into PS01 before flowing through TAPS to the Valdez Loading Facility.
- On 8 January 2011, a leak was detected in the Booster Pump Building basement at PS01; TAPS was shut down within one hour of discovery of leak.

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Does EPA have CWA/OPA or CERCLA Authority to respond to this incident?

- Yes
- No
- Maybe

Answer

- CERCLA → No . . . Petroleum Exclusion
- CWA/OPA → Yes . . . Federal criteria for initiating a response under CWA § 311 are met

• Immediate removal of a discharge, and mitigation or prevention of a substantial threat of a discharge, of oil or a hazardous substance . . . .

Scenario VI

- A 36-inch natural gas transmission pipeline ruptures near an apartment complex with 1500 residents
- Recognizing the likely impact on the community and resources, the Fire Chief immediately requests federal assistance

Scenario VI – Site Map

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Does EPA have Authority to respond to this incident?

- Yes
- No
- Maybe

Answer

- CWA/OPA & CERCLA → No
- Other approach → Yes. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act - 42 U.S.C. 5721 et seq.)
  - Authorizes the President to issue "major disaster" or "emergency" declarations before or after catastrophes occur
  - Emergency declarations trigger aid that protects property, public health, and safety
- FEMA issues Mission Assignment (ESF-10) to EPA

While this is possible, it is not too likely. Stafford Act mobilizations are generally rather slow…..days or sometimes weeks after the "insult" is over. Reality is that the place burns down before the Stafford Act can be invoked.

Scenario VII

- A gasoline pipeline ruptures releasing an estimated 116,000 gallons of gasoline to soil

Does EPA have Authority to respond to this incident?

- Yes
- No
- Maybe

Answer

- CERCLA – No. The terms "hazardous substance" and "pollutant or contaminant" do not include petroleum or natural gas
- CWA – No . . . Release to soil.

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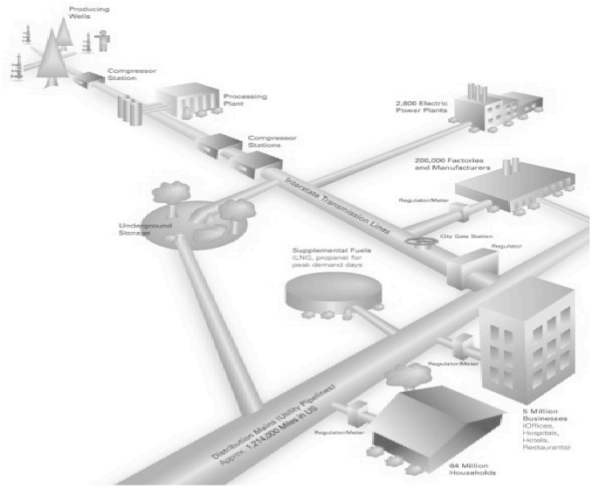
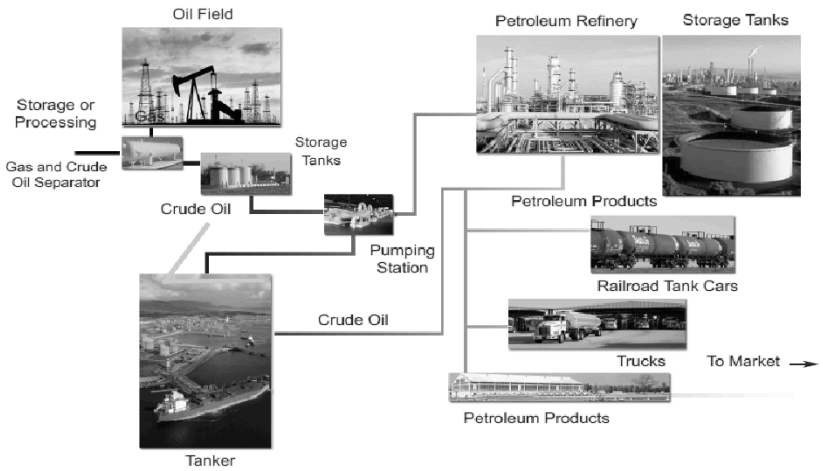
V. Pipeline Operations



Pipeline Transportation Chain

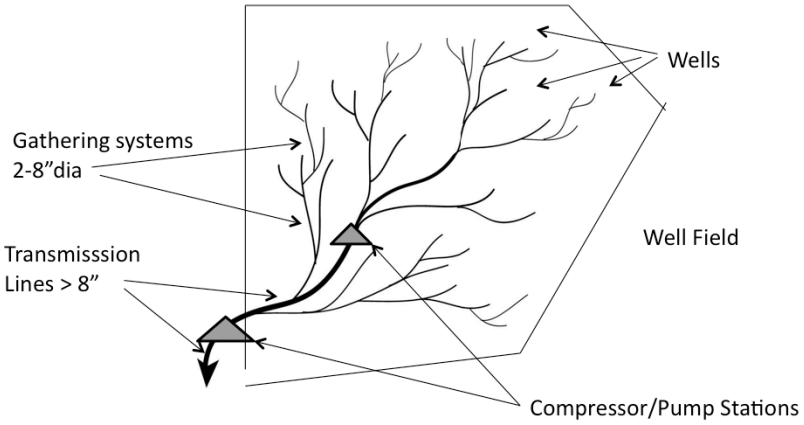


Basic Pipeline System Design

- Balance of effort/expense with capacity
- Simple “dendritic pattern”
  - Gathering systems (2” to 8” diameter)
  - Transmission lines-typically 8” and larger
  - Distribution systems

- Dendritic pattern shown on next slide

Pipeline System Basic Design



- This dendretic pattern is common to transmission pipelines and to natural rivers. The outline of this pattern (drainage basin of a river) could represent a mineral field (or portion of a field)

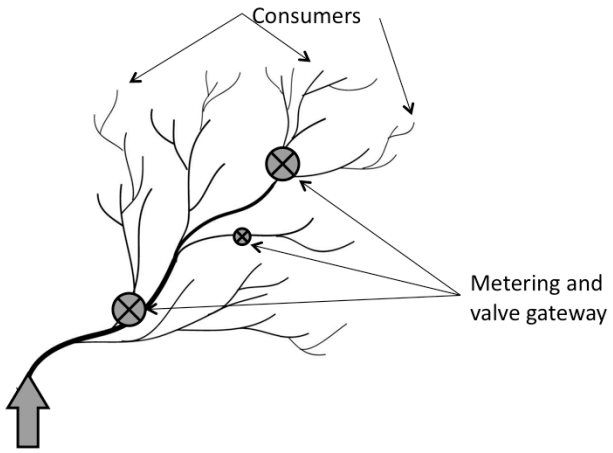
- At the end of each "tributary" is a well, which is the supply source

- Wells are served by gathering lines (2-8" diameter); gathering lines connect to transmission pipelines >8" diameter

- Pumping or/compressor stations are spaced about every 40-100 miles

- Not shown are valves throughout and manual and/or remote valve operation (SCADA)

Gas Pipeline Distribution System



- Distribution system follows the familiar “riverine dendritic” pattern, but flow is reversed—from the mouth of the river to the headwaters of the tributaries
- Meter and valve stations are essential and may be for City Utilities
- Consumers are at the headwater of each tributary

Identification of Pipelines

- The location of an underground pipeline is usually marked by aboveground signs and markers that indicate the presence of a pipeline

- The primary function of these markers is to alert those who might be working along the pipeline corridor or doing construction in close proximity to the pipeline, and to provide initial emergency contact information

- Markers are required to be present whenever a pipeline crosses under roads, railroads, or waterways

- They may also be found at other intervals and locations along the pipeline right-of-way, such as near buildings and structures

Identification of Pipelines . . .

- Various types of pipeline markers may be found to identify location of liquid and gas pipelines

- Might even see small signs epoxyed to city street curbs

Identification of Pipelines . . .

- Although color, format, design may vary, all markers are required to provide:

- No. 1 - Pipeline contents
- No. 2 - Pipeline operator
- No. 3 - Emergency telephone number

Pipeline Rights-of-Way

• The ROW is a strip of land usually about 25 to 150 feet wide containing one or more pipelines or other subsurface utilities (e.g., cables communications)

• ROW:

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

- Maintains an unobstructed view for frequent aerial surveillance of the pipeline Identifies an area that restricts certain activities to protect the landowner and the community

- May be located adjacent to a power line right-of-way or within a highway right-of-way

Basic Pipeline Design and Construction

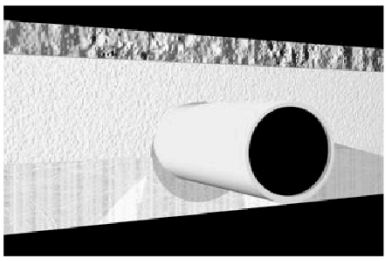
- Powered by pumps/compressors
- Restricted by valves and storage capacity
- Controlled by hand and remote SCADA

Pipeline Construction

- Pipelines can vary from 2-inch diameter for gathering lines to 48-inches for transmission or trunk lines
- Most modern pipelines are constructed of either seamless steel or steel with a welded longitudinal seam (straight or spiral) in 40- to 60 foot sections

Pipeline Construction . . .

- The individual pipe joints are welded together into sections
- To inhibit corrosion, pipe coatings and wrappings applied at the steel mill or on-site are used

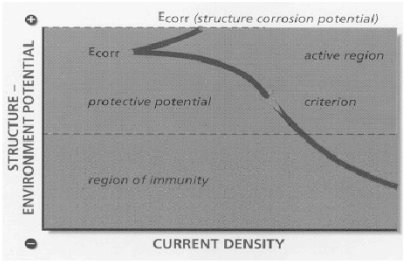


Pipeline Construction . . .

- When crossing a river, most pipelines are drilled under the riverbed without disturbing the bottom surface
- If drilling is not possible, the piping may be laid and weighted with concrete or steel anchors to keep it on the bottom or laid in a cut trench and covered on the bottom

Corrosion Control

- Corrosion is a natural process that, under the proper conditions, can affect any metal or alloy
- Pipeline operators must also have written guidelines and procedures for most corrosion-related activities
- Pipeline corrosion is most prevalent when the failure of coatings, inhibitors, or cathodic protection occurs in a corrosive environment



- Typical cathodic protection curve for steel

Corrosion Control . . .

- External corrosion may be caused by damage to coatings, manufacturing defects within the metal, or through the loss of cathodic protection
- Internal corrosion of pipelines is a concern because
  - Causes include chloride, carbon dioxide, hydrogen sulfide, oxygen, and micro-biological activity
  - Stress corrosion cracking (SCC) is the cracking of a pipeline from the combined influence of tensile stress and a corrosive medium

Corrosion Control . . .

Maintenance, Inspection, and Prevention

- Corrosion protection tools
  - Corrosion control injection systems
  - Protective coatings
  - Inhibitors
  - Cathodic protection

- Corrosion inspection and monitoring
  - Laboratory samples of fluids
  - Corrosion coupons
  - Electrical readings at specific along the pipeline
  - In line inspection tools or smart pigs

Moving and Controlling the Product - Pumps/Compressors

- Pumps
  - Provide the pressure and force to move products in a liquid pipeline

- Compressors
  - Typically used on gas pipelines to boost and maintain pipeline pressure, thereby keeping the gas flowing

• Pump stations and compressor stations are placed at regular intervals along liquid and gas transmission lines in order to sustain product flow through the pipeline

• Size of pumps and compressors used will be dependent on the type of product and the volumes being transported

• NEVER operate valves – always have the company do it

Moving and Controlling the Product - Valves

- Critical and essential element of a pipeline system in controlling the movement and flow of product
  - May be manually actuated, electric, pneumatic
- Depending on type, location, and pipeline pressures, a considerable amount of time and effort may be required to close a pipeline

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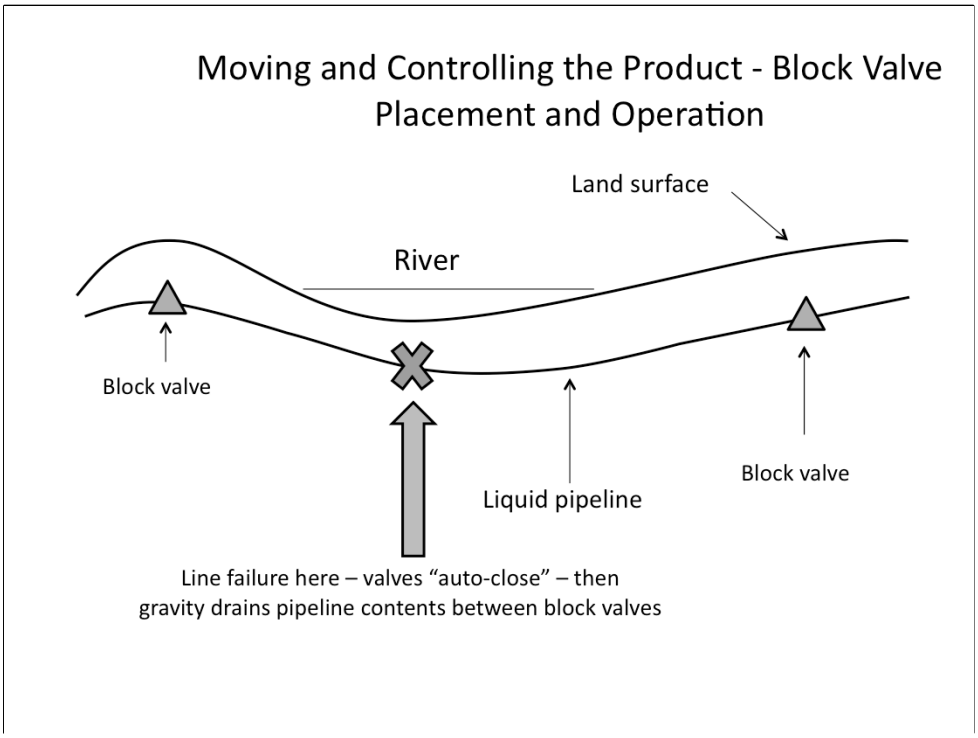
Moving and Controlling the Product - Block Valves

- "Block" is function; not a type
  - Ball, check, gate, and other valve types
  - Remote & manual operation
  - "Auto-close"—rapid change pressure/volume

• Valves, need their own inspection programs. U.S. Department of Transportation has developed natural gas pipeline valve inspection criteria detailed in CFR Title 49, part 192, "The Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards." Paragraph 192.745 of that title states, "Each transmission line valve that might be required during any emergency must be inspected and partially operated at intervals not exceeding 15 months, but at least once each calendar year." Similar requirements are published for crude oil and hazardous liquid pipelines in CFR Title 49, part 195, "Transportation of Hazardous Liquids by Pipeline," paragraph 195.420.

• Many block valve installations are outfitted with automatic shutdown controls. These controls are set to close the valve if pressure or flow rates change, indicating a possible breach in the line. By having these valves spaced throughout the line, the amount of potential fluid leakage that might occur during a line break is limited. Additionally, many pipeline valves are designated as emergency shutdown valves (ESD), which are remotely operated from the pipeline control center.



- Crude diagram to illustrate principles:
  - River
  - Liquid pipeline river crossing
  - Block valves installed (could be miles apart---5 to 20 miles
  - Pipeline fails . . . block valves automatically close (less than 1 minute) … gravity does NOT fail

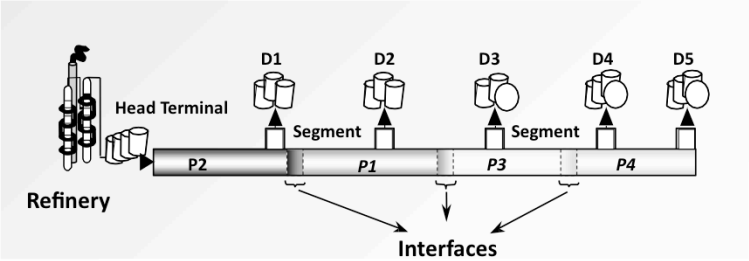
- No absolute spacing requirements; block valves miles apart will have a large drainup quantity

- What do you expect now?

  - Volume = cross sectional area x distance between valves
  - For example: approximately 16,550 gallons per linear mile are contained within a 24 inch diameter pipeline

Batched Products

- Pipelines move different grades of a product or distinct products sequentially through the same line in “batches”
- Batches of different grades and products are pumped back-to-back in the line without any separating device; at the boundary of two consecutive batches some mixing occurs
- Dissimilar and especially sensitive products may be separated using spherical plastic “pigs” to prevent mixing



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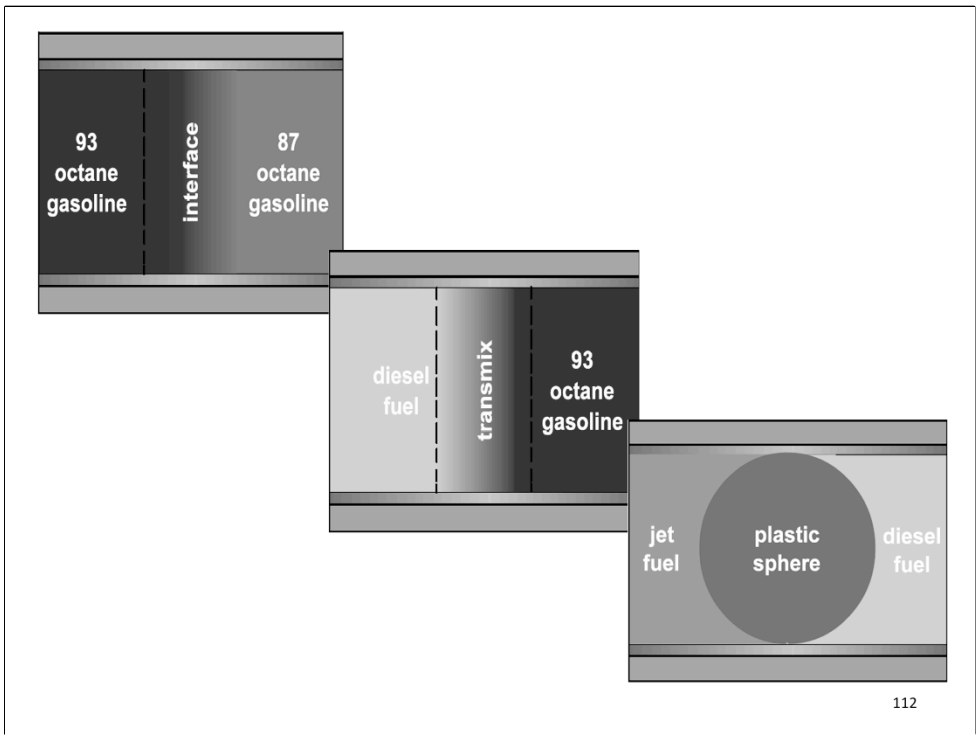

• **No. 1:** Interface - if the two batched products are similar, such as different grades of gasoline

• No. 2: Transmix – two dissimilar products, such as diesel and gasoline

• **No. 3:** "Pigs" such as plastic sphere are used to prevent mixing between especially sensitive products such as jet fuel from other pipeline contents

Significance of Batching to OSCs

- Pipeline rupture with discharge of contents → block valves closes
- Product(s) discharge to environment between block valves (drainup)
- Safety considerations may vary
- Cleanup techniques may vary

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Moving and Controlling the Product - Manifolds

- Both liquid and gas pipelines use valve manifolds to control the flow path of products
- Manifolds, with numerous valves and meters, are used to divide the pipeline flow into parts, to combine several flows into one larger pipeline flow, or to reroute product flow to several possible locations

Pipeline Control Centers

- Pipelines are controlled remotely
  - Supervisory Control and Data Acquisition (SCADA)
  - "Control Rooms"

- Information about the pipeline's operating equipment and parameters is communicated into the control center, where operators use computers to monitor the pipeline operation

- Major transmission and distribution pipelines have an automated leak detection system that constantly checks the "line balance" and system pressures

- People make a career out of the Star Trek/Star Wars screens

- Satellite/Phone Tower/any reliable comms

- Some fail safe mechanisms

- SCADA is monitored in central control rooms "alarm fatigue"

Takeaways

- Take the time to at least call 811 or your state One Call agency
  - Federal OSC's have influence and a presence
  - Industry tends to be responsive when directed to do so
- Understand the energy stored in the system
  - Physical, Chemical
  - Never operate the system

Time for Questions

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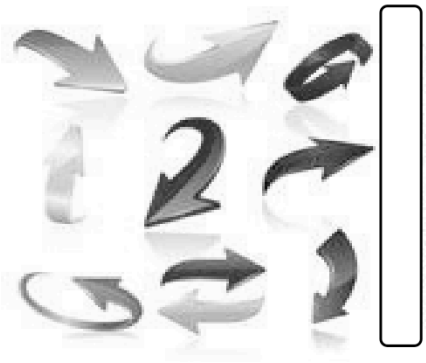
VI. Factors Affecting Response and Cleanup Decisions



- Purpose of this module is to provide an overview of the environmental and human factors affecting cleanup decisions

Potential Human and Ecological Concerns Associated with Pipeline Incidents

- Pipelines carry products that can directly or indirectly cause risks to human health and the environment
  - Refined petroleum products such as diesel, gasoline, and jet fuel, and anhydrous ammonia
  - Flammable and nonflammable gas products such as natural gas, vaporized liquefied petroleum gases

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- 2008 Aleyska Pipeline Incident
- 2004 anhydrous ammonia pipeline rupture with vapor cloud, Kingman, KN
- 2010 gas pipeline rupture with vapor cloud, Fort Worth, TX

Human

- Health
  - Type of product released
  - Location and quantity of release
  - Media affected by release
  - Weather

•**Type of product released** → Recall from prior modules that heavy crudes and heavy fuel oils (persistent; potential to travel great distances) or refined products such as gasoline and diesel (not as persistent)

• **Location and quantity of release** → Influence requirement for and extent of response, as well as the degree of damage to the environment and economic resources

  • Nuisance to people living along the affected shoreline (health concerns, breathing difficulties)

  • Cultural artifacts either through direct contact with oil or as a result of cleanup operations

  • Heritage sites may require extreme care and sensitivity

• **Media affected by release** → open water/at-sea response or shoreline

• **Weather** → seasonal differences with use

Human . . .

- Industry
  - Need to keep production and cleanup activities from interfering with each other
  - Management of response operations
  - Organizational context and learning
  - Cost

• **No. 1:** Avoid restricting access and prolonged closures (continue to conduct business activities)

• **No. 2: (1)** Setting the command structure; **(2)** speed of establishing command; **(3)** decision-making outside the command structure; **(4)** appropriate role of a responsible party; **(5)** allocation and management of resources; **(6)** costs; **(7)** role of federal, state, local, and tribal governments

• **No. 3:** Institutional pressures (governments, regulators, customers, competitors, community, interest groups, industry groups), which in turn influence organizational characteristics such adoption of environmental management practices and performance beyond regulatory compliance; may be tendency to react to perceptions and pressures, rather than basing decisions on technical realities

• **No. 4: Varies considerably** from one incident to another depending on a number of interrelated factors including:

- Type of oil; location of the spill and characteristics of affected area; quality of contingency plan; management and control of response operations

Human . . .

- Political
  - Agency
  - Legal constraints
  - Multi-agency jurisdiction
  - Public opinion
  - Non-governmental interest

- **No. 1:** Internal and external agency constraints/initiative/policy

- **No. 2: (1)** Statutory and regulatory framework; **(2)** influence of existing agreements (MOAs, MOUs, etc.)

- **No. 3:** Coordination/interaction of federal, state, local, and tribal agencies with different legal, geographic, and functional responsibilities

  - Occurs in context of I/UC

  - Agencies have responsibilities beyond the immediate scope of the incident that they are responsible for

- **No. 4:** Perceptions of **(1)** control; **(2)** appropriate role of responsible party; **(3)** role of state and local and tribal governments; **(4)** how clean is clean (very important → will discuss in greater detail tomorrow)

- **No. 5:** Such groups may press for aggressive responses on oiled shorelines (off-shore, near shore, shoreline) despite evidence that such operations can cause greater long-term environmental damages

Human . . .

- Socio-economic
  - Amount spilled, spill location, and rate of spillage
  - Aesthetic appeal and amenity the shoreline and beaches

  - Media
  - Primary and secondary

- **No. 1:**

  - Some areas will be of **high** regional, national, or international importance, whereas others will rank as **locally** important

  - **Seasonal differences** will also occur in the sensitivity of these resources to an oil spill, and therefore the economic impact of the incident (e.g., salmon spawning run)

- **No. 2:**

  - Is the affected area aesthetically and recreationally pleasing or has the experience been degraded?

- **No. 3:**

  - May be referred to as "social media" or "social networks" and include channels such as "Facebook" and "Twitter"

  - One v. many spokespeople

  - Communications tactics may not be directly transferable across mediums

  - Consider the ethics of social channels

- **No. 4:**

  - Loss of income due to tourism, marina and fishing harbors, and fishery closures

  - Substitute income: **(1)** Primary: Wages or taxes earned resulting from cleanup activities; **(2)** Secondary: Buy products from local suppliers and purchase transportation and other services from local companies

Legacy Concerns

- Pumps and Compressor Stations
  - Potential soil and groundwater contamination
  - Metering
  - Disposal Pits

• Older pipeline pump and compressor stations (1940s. 50s 60s) had operations different than today . . . mostly since the environmental statues and EPA did not exist yet. Employees often lived on site. Most of these sites had a burn and/or disposal) pit.

• Fireproof lubricants of the day were PCB based (20-60% by weight). Absent any regulations, these spent lubricants (oil change waste) were disposed of in the pits or used for dust control on local unimproved (dirt) roads. Degreasing solvents were similarly used and indiscriminately disposed of in the pit.

• Metes for measuring flow in this era were Mercury filled manometers. These were spilled, broken, vandalized, and/or repaired thru the years. Result was mercury everywhere . . . or dumped into the onsite pit.

• Cooling towers often develop a biological growth that clogs filters and valves, and interferes with pumping. These growths are collectively referred to as “slime”. Slime was historically most often controlled with “slimicides” which are typically heavy metals such as chrome (hexavalent). Disposal in an onsite pit (historical practice) creates larger problems later.

• Result was soil and/or groundwater contamination. If these problems exist and the pipeline operator is aware, a PRP cleanup will likely follow.

Ecological

- Type of product released
- Location and quantity of release
- Geology of shoreline and rate of flow
- Weather

- This category include both physical and biological components

- **No. 1**: You'll recall from earlier modules that the type of oil and the amount spilled and rate of spillage are important factors

    - Lighter oils tend to evaporate and degrade very quickly; heavier oils tend to form thick oil-and-water mixture which clings to rocks and sand

    - Larger spills will result in far wider contamination and will require a far more extensive cleanup response

    - Response to a large release of oil may be considerable but may be completed in a couple of weeks; however, the same quantity of oil lost over several months may prompt a major cleanup effort, repeated cleaning of amenity areas, and long-term effects on natural resources and tourism

- **No. 2**: Physical characteristics such as prevailing winds, currents, water depth, distance from shoreline will have considerable bearing on the feasibility of mounting a cleanup

- **No. 3**: Oil tends to stick to sediments and surfaces of cobbles and pebbles; standing or slow-moving water is more likely to incur severe impacts than flowing water

Ecological . . .

- Type and sensitivity of biological communities likely to be affected
  - Physical properties
  - Food chain
  - Habitat

•**No. 1:** Animals and plants may be affected by physical properties of spilled oil (e.g., form surface sheens, sludge's, emulsions, soluble fractions of oil) which prevent respiration, photosynthesis, or feeding

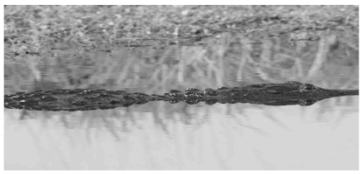
- Asphyxiation of fish and benthic fauna due to **coating by oil**; harm to waterfowl because of **loss of buoyancy or loss of insulating capacity of feathers**

- May cause fish kills due to increased biological oxygen demand and/or "closing" the air water interface where gas exchange occurs

• **No. 2:** May be toxic to some animals and plants which other organisms may depend on for food

Ecological . . .

- Species of wildlife present
- Timing of breeding cycles and seasonal migration



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- Shows course modules . . . red highlight is where we are now
- Break may not occur exactly when shown on this agenda

VII. Pipeline Incidents

U.S. Department of Transportation Incident Definition

- Fatality or major injury
- Evacuation of 25 or more
- Closure of a major transportation artery
- Alteration of an aircraft flight plan or operation

U.S. Department of Transportation Incident Definition . . .

- Release of radioactive materials from packaging

- Release of over 11.9 gallons or 88.2 pounds of a severe marine pollutant
- Release of a bulk quantity (over 119 gallons or 882 pounds) of a hazardous material

U.S. Department of Transportation Definition of Hazardous Material . . .

- A substance or material capable of posing an unreasonable risk to health, safety, or property when transported in commerce

- Other DOT definitions

  - Hazardous Substance--Appendix A to § 172.101 and the quantity in one package equals or exceeds the reportable quantity (RQ). Material may be in solution or mixture. This definition does not apply to petroleum (lubricants or fuel) products. EPA CERCLA definition

  - Hazardous Waste- Any material that is subject to the Hazardous Waste Manifest requirements of the EPA. Refer to 40 CFR Part 262.

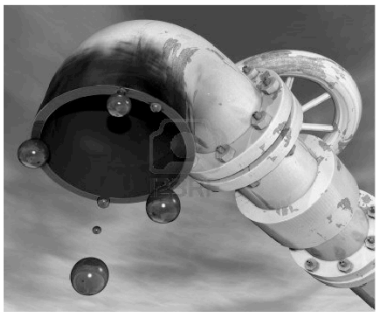
Pipeline Incident Experience

- Pipeline transport
  - Safe
    - Underground
    - Public contact
    - Safest mode of
  - Efficient
    - Low cost per unit
    - High Volume
  - Low accident rate

• Primary incident cause—physical damage to pipeline by third party, material or weld failure/corrosion, operator error

Pipeline Incidents

- Releases of a product carried by these pipelines can impact surrounding populations, property, and the environment, and may result in injuries or fatalities as well as property and environmental damage

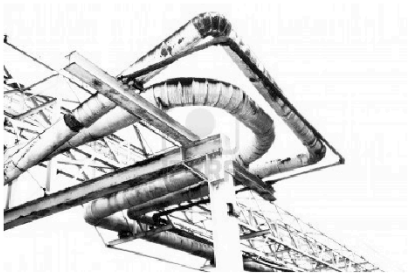


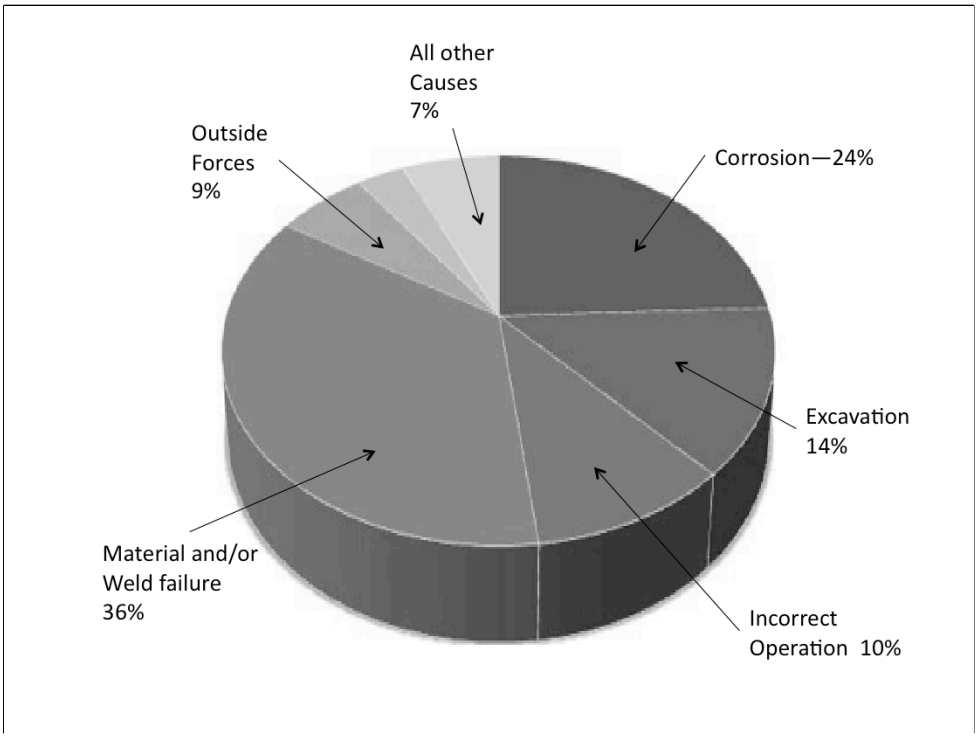
What causes pipeline failure?

- Region 5---look familiar?

Major Causes

- Material and/or weld failures
- Corrosion
- Excavation damage
- Incorrect operation
- Outside forces
- All other causes



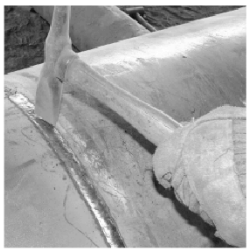


• Summary of the principle failure causes of main liquid transmission pipelines—2011 stats for trunk line liquids. Stats vary some from year to year, and for gas transmission. Stats vary some between gathering, transmission, and distribution…..but trends are well illustrated

We will go thru each category briefly on next slides
Apx 1/3 is weld/material failure
Apx ¼ are corrosion
Apx 1/6 are Excavation related
1/10 are bad operation
Apx 1/10 are outside forces
Apx 1/10 are all other causes

Material or Weld Failure

- Approximately 1/3 of all incidents
- Steel pipe joining technique
- Extremely large number nationally
- Technique
  - 1970 Electric Resistance Abandoned
  - Welding-abandoned
  - Weld inspection
    - Fresh welds
    - Failure analysis

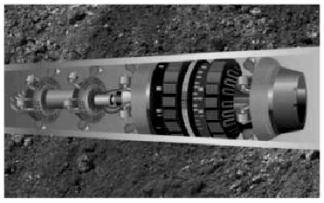


X-ray inspection of welds

Note: The cylindrical source passes through the pipe, and film wrapped around the pipe records the images

Corrosion

- Approximately ¼ of incidents
- Prevention
  - Protective coatings
  - Injections-inhibitors, biocides, dewaxers, etc.
  - Cathodic protection
  - Inspection and monitoring (pigs, smart pigs)



Excavation

- Approximately 1/6 of all incidents
  - Pipeline workers
  - Third party
  - Gas distribution pipelines
- Largely preventable
- One-call system 811
  - State level operation and

Incorrect Operations

- Approximately 1/10 of incidents

- Inadvertent actions
  - Wrong valve open
  - Overfilling or overpressuring a piece of equipment
  - Mismarking an underground pipeline prior to excavation work
- Training related
  - Not following proper procedures
  - Using improper equipment or techniques to effect a repair
  - Improperly assessing a situation resulting in inappropriate actions or decisions

Not a major cause

Outside Force

- Approximately 1/10 of incident
  - Earth Movement
  - Weather
  - Fire or explosion external to the pipeline
  - Being struck by vehicles not related to excavation, rupture of previously damaged pipe
  - Vandalism

Time for Questions

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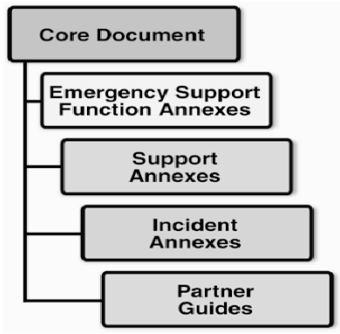
VIII. Pipeline Emergency Response Operations

Incident Management

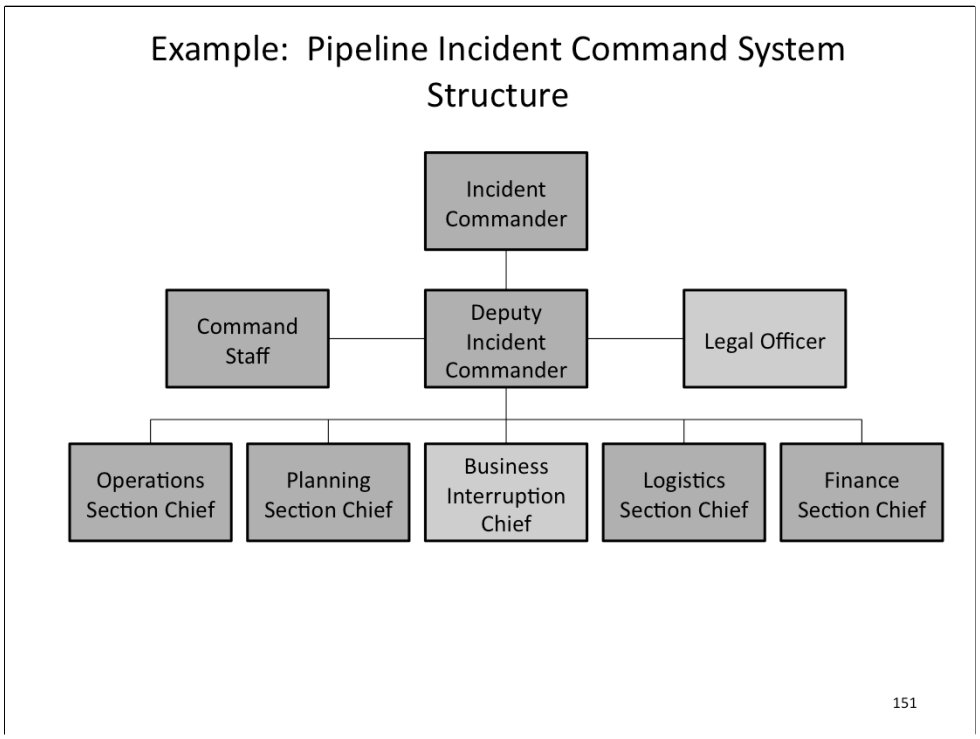
- Pipeline emergencies require coordination of information and resources among the various players in no different manner than other emergency response actions

Incident Management . . .

- National Incident Management System (NIMS) approach
- Incident Command System (ICS) Organization
- May encounter different characterizations of incident phases



- As with EPA, you can anticipate a national approach to incident management (NIMS)
    - Flexibility: system components can be utilized to develop plans, processes, procedures, agreements, and roles for all types of incidents; it is applicable to any incident regardless of cause, size, location, or complexity
    - Standardization: provides an organized set of standardized operational structures, which is critical in allowing disparate organizations and agencies to work together in a predictable, coordinated manner
- ICS is an organzed systems of roles, responsibilities, and procedures for the command and control of incidents
- Reactive phase v. emergency response phase; proactive phase v. cleanup phase



• Note potential presence of non-standard positions such as legal officer and business interruption section chief

• Legal officer: advice and direction on matters such as claims, legal requirements relating to emergency response, investigations, major procurement contracts, insurance coverage, and review of information releases to media, government agencies, public

• Business interruption section chief: identify, contact, and consult with all internal and external groups whose business is impacted by the incident; determine staffing needs for impacted business while continuing to manage daily operations; address and communicate agreements for prior commitments or contracts that are related to the impacted business

• Branches, Divisions/Groups, Single Resource/Strike Teams/Task Forces created on an as needed basis

Development of the Incident Action Plan

- Development of the IAP will be based upon a number of factors, including:
  - Size and type of pipeline
  - Product(s) involved
  - Nature of the incident
  - Exposures

• Some of the factors to consider when developing the Incident Action Plan may sound familiar to you, while others may not:

- ***Size and type of pipeline:*** what type is involved – gathering, transmission, or distribution pipeline? What is its diameter? What is its operating pressure?

- ***Product(s) involved:*** what products are being transported by the pipeline – crude oil, natural gas, refined liquid petroleum products? If a refined petroleum products pipeline is involved, can other products become involved?

- ***Nature of the incident:*** flammable liquid or gas leak with no fire? Flammable liquid or gas leak with fire? Toxic vapor cloud release?

- ***Exposures:*** what types of exposures are in proximity to the incident? Is the problem in an urban, suburban, or rural area?

Development of the Incident Action Plan

- Environmental conditions
- Safety considerations
- Isolation of the pipeline
- Incident potential
- Infrastructure impacts

- ***Environmental conditions:*** how ill current and future weather conditions affect the incident? For example, liquid releases into waterways must consider temperature, wind, and wave direction, velocity, and tides

-***Safety considerations:*** are there any unique safety hazards or considerations associated with the incident?

- ***Isolation of the pipeline***. Can the pipeline be isolated? What is the distance between pipeline isolation points? Will the pipeline contents backflow to the breach point? If so, how much product can be expected and for what duration of time will the backflow continue?

Incident potential. Can the incident escalate into a more serious event? Influencing factors may include weather, damage to surrounding pipeline facilities and operations, release of additional product, and the potential for ignition of flammable vapors or gases.

Infrastructure impacts. What are the upstream and downstream impacts of the incident? Are any special occupancies or infrastructures impacted by the incident?

Common Strategic Goals at Pipeline Incidents

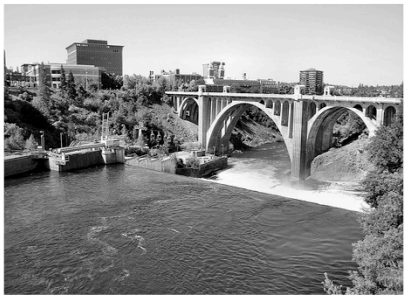
- Safety of public and response personnel
- Rescue
- Spill Control (confinement)
- Leak Control (containment)
- Fire Control
- Recovery

Common Strategic Goals at Pipeline Incidents . . .

- Keep stakeholders and the public informed of response activities
- Maximize protection of environmentally sensitive areas
- Recover/rehabilitate injured wildlife

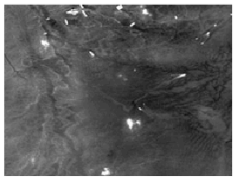
Common Strategic Goals at Pipeline Incidents . . .

- Minimize adverse economic impacts
- Minimize adverse impact to cultural and historic resources



Cleanup Endpoints

- Cleanup endpoints can be:
  - Qualitative which are based primarily on visual, olfactory, or tactile observations and do not necessarily require collection of analytical chemistry data



  - Quantitative which rely on measurements or quantitative data, as opposed to qualitative data such as categorical observations (e.g., sheen or

Examples of Qualitative Cleanup Endpoints

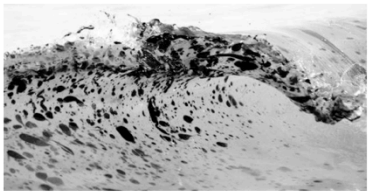
- There is no longer any detectable constituent or compound of concern present on the water, adjoining shorelines, or places where it is likely to reach the water again
- Further removal operations would cause more environmental harm than the constituent or compound of concern to be removed
- Cleanup measures would be excessively costly in view of their insignificant contribution to minimizing a threat to the public health or welfare, or the

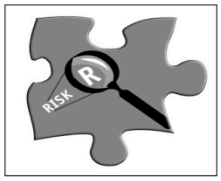
Examples of Quantitative Cleanup Endpoints

- Constituent or compound of concern on surface water, groundwater, soil, or sediment does not exceed background concentrations for the constituent or compound of concern
- Constituent or compound of concern of concern on surface water, groundwater, soil, or sediment does not exceed predetermined concentrations for the constituent or compound of concern

Issues Affecting the Selection Of Endpoints

- Type and amount of constituent or compound spilled
- Type of shoreline
- Value of habitat or use of the segment and the timing of that use
- Technical and operational feasibility of cleanup activities
- Anticipated rate of natural attenuation
- Environmental influences such as weather
- Perceptions of risk





• Process of determining appropriate endpoints range from a relatively simple one to one that is difficult and complex and involves several rounds of negotiation

• Often requires a compromise due to the wide range of factors that come into play and the varied interests of national, state, regional, local, and tribal government agencies, political groups, the media, and the local population that live in the affected area

Practical Considerations for Achieving Cleanup

- Type and amount of constituent or compound spilled
- Environmental sensitivities
- Consultation
- Widely varying cleanup standards

• Decision to bring cleanup operations to a close depends on a wide range of different considerations and often there are conflicting concerns to be resolved and overcome

• The most frequently encountered conflict likely arises from a demand to remove every last drop of constituent or compound

Practical Considerations for Achieving Cleanup . . .

- Long-term deployment of absorbent materials
- Not all spilled constituent or compound oil will be recovered
- Weather
- Natural attenuation

Practical Considerations for Determining When the Cleanup is Complete When Not All Spilled Constituent or Product is Recoverable

- Technical and operational feasibility of investigation and cleanup
- Is there a balance between cost in relation to the added degree of protection or reduction of risk afforded by additional cleanup?
- Is there a state or other entity that has the capability to assume responsibility for the cleanup action?
- Anticipated rate of natural removal processes

• **No. 1:** Is it practicable at what cost (cost balancing)

• **No. 2:** Question is more than a technical or logistical issue: potentially has profound social and political dimensions

- Perceptions of risk can vary depending on whether risk is:
  - Familiar v. unfamiliar
  - Visibility of threat
  - Catastrophic v. non-catastrophic
  - Character of affected resource
  - Equal v. unequal affects

Practical Considerations for Determining When the Cleanup is Complete When Not All Spilled Constituent or Compound is Recoverable . . .

- Institutional constraints/pressures
- Is the remaining constituent or compound likely to damage environmentally sensitive resources?

- Does it interfere with the aesthetic amenity use of the land base?
- Is the constituent or compound detrimental to economic resources or disrupting economic activities?

Common Operational Modes for Pipeline Incidents

- Offensive mode
- Non-intervention mode
- Defensive mode

• Offensive mode: Aggressive leak, spill, and fire control tactics designed to quickly control or mitigate the emergency

• Defensive mode: Less aggressive spill and fire control tactics where certain areas may be "conceded" to the emergency, with response efforts directed towards limiting the overall size or spread of the incident

  • Examples include isolating a pipeline by closing remote valves, shutting down pumps, constructing dikes, and exposure protection

• Non-intervention mode: 2008 natural gas transmission pipeline explosion due to corrosion.

Pipeline Emergency Response Safety Issues

- Basic safety issues that likely apply to all types of pipeline emergencies:
  - Products flowing from liquid pipeline ruptures can be large and create significant runoff control problem
  - Pipeline emergencies can present multiple hazards

- Recall “batching”

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IX. Oil Spill Response Techniques

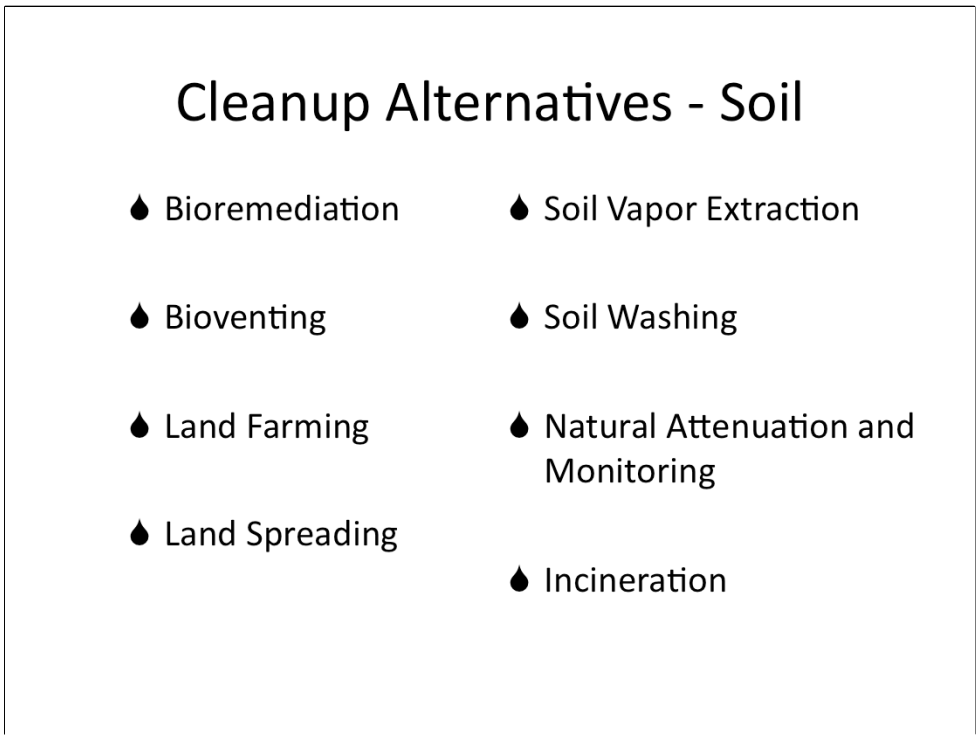
- Purpose of this module is to review a variety of oil spill techniques

Selecting Response Options

- Benefits and impacts of response options depend upon incident-specific conditions
- Incident-specific feasibility considerations include:
  - Safety
  - Nature and amount of oil
  - Proximity
  - Timing
  - Environment
  - Authorization

- Specific response options vary based on affected media

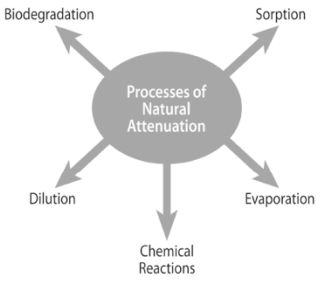
Insert statement somewhere noting emphasis on surface water v. soil and groundwater



Soil cleanup of oil must endanger surface water…….else you have no authority

Cleanup Alternatives - Groundwater

- Natural attenuation and monitoring
- Bioremediation
- Air sparging
- Pump-and-Treat



Cleanup Alternatives – Surface Water

- Statement regarding emphasis given surface water

Natural Attenuation and Monitoring

- Need image(?)

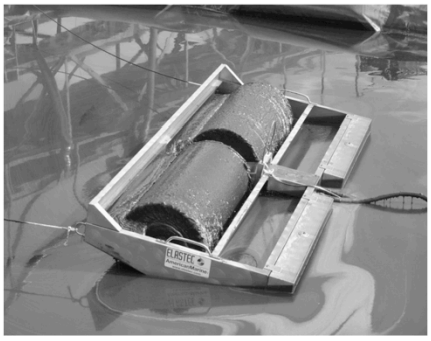
- Basically a “no action” alternative that allows for oil to be removed and degraded by natural means such as

  - Evaporation (removal of lighter-weight components)
  - Photooxidation (sunlight reacts with oil components leading to breakdown of more complex compounds into more simpler compounds)
  - Biodegradation (microorganisms oxidize petroleum hydrocarbons)

Barriers/Berms

Booms

Skimmers



- Image of weir oil skimmer (known as weir skimmers because they rely on oil to flowing into a sump)

- Image of drum skimmer (known as oleophilic skimmers because they use process of adhesion to pick up oil; in this instance oil adheres to rotating drum)

Physical Herding

Manual Oil Removal/Cleaning

Mechanical Oil Removal

Sorbents

Vacuum

- Photo of worker with vacuum hose sucking up oil from shoreline

Debris Removal

Flooding

- Photo of workers and a small ship spraying multiple streams of water

Flushing

- Photos of workers spraying water on rocky shore

Alternative Countermeasures

- Chemical Dispersants
- Biological Agents
- In-situ Burning

Response Options to Protect Wildlife

- Keep the oil away from the resource
- Keep the resource away from the oil
- Capture and treat oiled wildlife

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X. Disposal of Oil and Oily Debris

- Gulf oil soaked debris heading for local landfill.

What types of wastes are collected from response and cleanup activities?

- From shoreline cleanup:
  - Oiled debris, oiled solid materials sand, wood, and vegetation, personal protective equipment (PPE), disposal equipment
  - From oil containment and recovery operations
  - Oil and oily water, oiled debris and solid materials, oiled sorbent materials, PPE

- From vessel or other decontamination operations:
  - Oily water, oiled sorbent materials, PPE

• Oil spill response and cleanup will generate several types of waste, and key considerations are the types, characteristics, and quantities of waste.

• These factors are largely dependent on the specific cleanup methods employed, which may change as the work progresses.

•Oily water in vac trucks/tanks may be decanted on site and “clean water” discharged back to stream… Regional differences/preferences.
•Oiled debris/vegetation may be open-burned/buried in some States under some circumstances (Katrina-Murphy Oil)….. Regional differences/preferences.

What must be done with wastes resulting from response and cleanup activities?

- To the extent practicable, water is separated from the oil, treated and reused, or disposed at permitted facilities
- Recovered oil is sent to facilities that recycle or reprocess the oil
- Recovered oil that is not suitable for recycling or reprocessing may be disposed of at properly permitted facilities
- Oil spill response and cleanup activities may generate small quantities of other wastes such as chemical and solvents and wildlife carcasses
- Oil, oily solids, oiled debris, and other wastes must be handled in accordance with all relevant regulations of local/state/federal health and environmental agencies

Is oiled waste considered hazardous?

- Petroleum products such as diesel generally do not designate as hazardous waste
  - If not designated as a hazardous waste they are classified and managed as solid waste
- Knowledge of the material spilled can be used to classify all of the released material
- Oily waste that cannot be recycled or reprocessed may need to be analyzed for hazardous characteristics before choosing a treatment or disposal option

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XI. Summary Statement

Summary Statement

- The purpose of this course is to provide an overview of pipeline emergency response operations.
- There is no way to include all possible subjects, references, or guidance for something as complex as incident response in a single course; however it is hoped that this course will assist you when responding to pipeline emergencies

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Certificates

- If you are interested in receiving a certificate for participating in this training, please send an email to Austin Oelschlager, Tetra Tech, at austin.oelschlager@tetratech.com
- An electronic certificate will be emailed to you within 30 days

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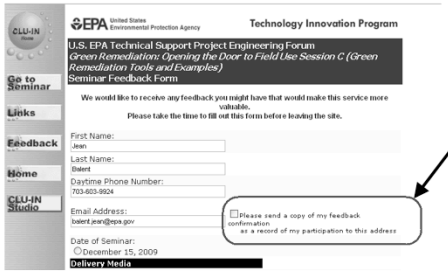
Resources & Feedback

- To view a complete list of resources for this seminar, please visit the **Additional Resources**
- Please complete the **Feedback Form** to help ensure events like this are offered in the future



Need confirmation of your participation today?

Fill out the feedback form and check box for confirmation email.