Chapter 2
Pipeline Regulations and Safety Programs

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Chapter 2
Pipeline Regulations And Safety Programs

Objectives

a) Describe The Basic Types And Categories Of Pipeline Systems, Including:
   i) Crude Oil Pipelines
   ii) Gathering Lines
   iii) Trunk Lines
   iv) Liquid Pipelines
   v) Transmission Lines
   vi) Distribution Lines
   vii) Natural Gas Pipelines
   viii) Gathering Lines
   ix) Transmission Lines
   x) Distribution Systems

b) List And Describe The Primary Federal Agencies That Regulate Pipeline Operations In The United States.

c) List And Describe The Primary State Agencies That Regulate Pipeline Operations In The United States.

d) List And Describe The Primary Federal And State Agencies That Investigate Significant Pipeline Accidents In The United States.

e) List And Describe The Primary Industry And Trade Associations That Develop Pipeline Standards In The United States.

f) List The Primary Causes Of Pipeline Incidents.

g) Describe At Least Three Industry And Governmental Programs To Prevent Pipeline Incidents, Including:
   i) One Call Systems
   ii) Common Ground Alliance / DIG SAFELY
iii) Public Education Programs
iv) Corrosion Prevention
v) Internal Inspection Devices (I.E., “Smart Pigs”)

Chapter 2 – Instructor Overview

1. Describe the basic types and categories of pipeline systems including:

a. **Crude Oil Pipelines** – this category of pipeline system is petroleum that is taken directly out of the ground.

   **Gathering lines** – small pipelines, 2-8 inches in diameter, that moves crude oil mixture from wellheads and production locations to an oil processing facility.

   **Trunk lines** – larger pipelines, 8-24 inches in diameter, that bring crude oil from gathering centers, oil producing areas and ports to refineries. Most recognized crude oil trunk line is the 42-inch diameter, 800 mile long Trans Alaska Pipeline System (TAPS).

b. **Liquid pipelines** – transport refined petroleum products, such as gasoline, jet fuels, diesel fuel, and home heating oils. Carbon dioxide and anhydrous ammonia also are liquids transported by pipelines.

   **Transmission pipelines** are used to move refined products from refineries to market and distribution terminals.

   **Distribution pipelines** move the product from refineries or storage directly to the consumer. Mostly accomplished via truck.

   *(Note: In the text book on page 12 under “liquid pipelines” information there is no mentioning of distribution pipelines.)*
c. **Natural Gas Pipelines** – the most common gas product transported by pipeline. Others include LPG, butane, ethylene and propylene.

**Gathering lines** – consist of pipelines from the wellhead to the storage and treatment facilities as well as from off shore platforms, and vessels.

**Transmission lines** – are large cross-country pipelines used to move natural gas to the consumer. Lines range in diameter from 20 to 42 inches with pressures from 300 to 1500 psi.

**Distribution lines** – move the natural gas from the transmission system and storage facilities directly to the consumer (industrial and residential). Line sizes range from ½ inch to 18 inches with pressure from 0.25 psi for residential up to 250 psi on the distribution main.

2. List and describe federal agencies involved with pipeline operations. (Pg 15-25)

**US DOT** – is a cabinet-level department. Office of Pipeline Safety (OPS) establishes rules and regulations governing the design, construction, operation, safety, and maintenance of interstate pipelines.

**Department of Homeland Security** – published Pipeline Security Information Circular that established a method that would verify pipeline operators had taken appropriate action and implemented satisfactory security procedures and plans.

**US DOL** – a cabinet-level department for enforcing safety and health regulations for employees ie, OSHA, HAZWOPER (Hazardous Waste Operations and Emergency Response), EPA (Superfund Amendments and Reauthorization Act – SARA; Oil Pollution Prevention; National Contingency Plan)

3. List and describe state agencies involved with pipeline operations. (Pg 25 text book)

State Public Utilities/Public Service Commission manage intrastate pipeline issues.

State Fire Marshal’s Office

State Department of Environment (Natural Resources or Environmental Quality

State and County Emergency Management Agency for emergency planning and notification requirements.

4. List and describe the primary federal and state agencies that investigate significant pipeline accidents.

NTSB (National Transportation Safety Board) investigates pipeline accidents involving a fatality or substantial property damage; releases of hazardous materials in all forms of transportation.

State agencies involved depends on the state laws. State Fire Marshal’s offices may have authority to investigate accidents involving fire or explosion; state EPA may have jurisdictions for permitting and regulating; department of labor may investigate regarding injury or death of a worker, etc.
5. List and describe the primary industry and trade associations that develop pipeline standards.

**American Gas Association** – represents local energy distribution companies and represents over 80% of all natural gas delivered by local companies.

**American Petroleum Institute** – (API) is the national trade association for the petroleum industry. Develops wide range of standards such as oil production, refining, pipelines, marketing terminals, safety and fire protection.

**American Society of Mechanical Engineers** (ASME) – is a professional engineering society supported by professional engineers from many diverse fields and industries.

**National Fire Protection Association** (NFPA) – is a nonprofit, voluntary association solely devoted to fire and safety standards. Provides training seminars for industry and firefighting personnel and public education programs. Many of the NFPA standards are adopted by reference by the federal government and state and local governments.

6. List the primary causes of pipeline incidents.

**Primary causes of incidents** are physical damage to the pipeline by third parties (contractors, farmers, homeowners, etc) and internal and external corrosion.

7. Describe at least three industry and governmental programs to prevent pipeline incidents, including:

**One-Call Systems** – To protect property and life industry joined together in creating notification centers that can be used by
anyone preparing to conduct work close to the pipeline. Call before you dig. Operated at the state level.

**Common Ground Alliance/Dig Safely** – industry partners with OPS worked to identify damage prevention best practices. DIG SAFELY was a DOT nationwide program to raise public awareness of the One-Call System.

**Public Education Programs** – pipeline operators have extensive programs to educate the public and key stakeholders on the presence of pipeline in their communities as well as actions taken to prevent incidents ie, recognition of pipeline markers, pipeline leaks, reporting procedures for emergency notification, one-call system, and excavation methods around pipelines.

**Corrosion Prevention** – the second leading cause of pipeline releases have programs/technologies to reduce or eliminate corrosion, such as cathodic protection, pipeline coating materials and OPS stringent corrosion prevention regulations.

**In-Line Inspection Devices** – include tools known as smart pigs. These tools are cylinder shaped plugs of roughly same diameter as pipeline fitted with sophisticated electronic sensors to locate anomalies. Magnetic flux leakage pigs are used to detect corrosion or defects caused by excavation or ground upheaval or cracks caused by stress. Other pigs scrape build-up of interior wall of liquid pipelines.
Slide [1]  
Chapter 2  
Pipeline Regulations And Safety Programs

[2] Objectives  
\[a\) Describe The Basic Types And Categories Of Pipeline Systems, Including:  
\[i\) Crude Oil Pipelines  
\[ii\) Gathering Lines  
\[iii\) Trunk Lines  
\[iv\) Liquid Pipelines  
\[v\) Transmission Lines  
\[vi\) Distribution Lines  
\[vii\) Natural Gas Pipelines  
\[viii\) Gathering Lines  
\[ix\) Transmission Lines  
\[x\) Distribution Systems

[3] Objectives  
\[a\) List And Describe The Primary Federal Agencies That Regulate Pipeline Operations In The United States.  
\[b\) List And Describe The Primary State Agencies That Regulate Pipeline Operations In The United States.  
\[c\) List And Describe The Primary Federal And State Agencies That Investigate Significant Pipeline Accidents In The United States.  
\[d\) List And Describe The Primary Industry And Trade Associations That Develop Pipeline Standards In The United States.
[4] Objectives
List The Primary Causes Of Pipeline Incidents.
   a) Describe At Least Three Industry And Governmental Programs To Prevent Pipeline Incidents, Including:
      i) One Call Systems
      ii) Common Ground Alliance / DIG SAFELY
      iii) Public Education Programs
      iv) Corrosion Prevention
 v) Internal Inspection Devices (I.E., “Smart Pigs”) P-10

[5] Introduction
   a) Pipelines Are Governed By A Wide Array Of Local, State And Federal Laws, Regulations And Ordinances.
   b) In This Chapter We Will Provide An Overview Of The Types And Categories Of Pipeline Systems That May Be Found Within The United States. P-11

[6] Overview
   a) Pipelines Are Conduits That Are Primarily Used To Transport Liquids And Gases
   b) A Pipeline System Is Defined As All Parts Of A Pipeline Facility Through Which A Hazardous Liquid Or Gas Moves In Transportation
      i) Including Piping, Valves, And Other Appurtenances Connected To The Pipeline, Pumping Units, Fabricated Assemblies Associated With Pumping Units, Metering And Delivery Stations, And Breakout Tanks. P-11
[7] Crude Oil Pipelines
   a) Crude Oil is Petroleum that is taken directly out of the ground
   b) The exact composition of the crude oil will vary depending upon where the crude is produced in the world
   c) There are two basic subsets of crude oil pipelines:
       d) Gathering Lines
       e) Trunk Lines
   i) Alaska Pipeline is a Trunk Line

[8] Liquid Pipelines
   a) Transported by pipelines are refined petroleum products
      i) Gasoline
      ii) Jet Fuels
      iii) Diesel Fuel
      iv) Home Heating Oils
      v) Carbon Dioxide and Anhydrous Ammonia Pipelines
   vi) Refined Petroleum Product Pipelines vary in size from 8-inch to 42-inch lines
   vii) Transmission Pipelines move refined products from refineries to marketing & distribution terminals

[9] Gas Pipelines
   a) The most common gas product transported by pipeline is Natural Gas.
   b) There are three basic subsets of natural gas pipelines:
      i) Gathering Lines
      ii) Transmission Lines
      iii) Distribution Lines
[10] US Pipeline System

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   i) **Laws** Are Primarily Created Through An Act Of Congress, State Legislatures, Or By Local Government Bodies.
   ii) **Regulations**, Sometimes Called Rules, Are Created By Federal Or State Agencies To Achieve The Goals Of The Law That Was Enacted Through Legislative Action. P-14
   iii) **Voluntary Consensus Standards** And Best Practices Are Normally Developed Through Professional Organizations Or Trade Associations As A Method Of Improving The Individual Quality Of A Product Or System.

[12] Federal Regulations
a) Federal Regulations Are Published In A Series Of Books Called *The Code Of Federal Regulations* (CFR)
   b) The CFR Is Organized Into 50 Groups Or "Titles" Each Title Of The CFR Contain The Rules And Regulations Pertaining To A Specific Agency Or Department P-14
c) There Are Three Federal Departments In Particular Whose Regulations Apply To Most Pipeline  
   i) The Department Of Transportation (DOT)  
   ii) The Department Of Labor - Occupational Safety And Health Administration (OSHA)  
   iii) The Environmental Protection Agency (EPA)

[13] Department Of Transportation
   a) The Department Of Transportation (DOT)  
   b) A Cabinet-level Department Of The United States Government  
   c) DOT Office Of Pipeline Safety (OPS) Establishes Rules And Regulations Governing The Design, Construction, Operation, Safety And Maintenance Of Interstate Pipelines. These Regulations Are Found In 49 CFR Parts 190 Through 199. P-15

[14] Key DOT Pipeline Regulations Of Interest
   a) Transportation Of Natural And Other Gas By Pipeline (49 CFR Part 192)  
      i) Part 192 Outlines The Minimum Safety Requirements For Pipeline Facilities And The Transportation Of Gas  
   b) Topics Covered By This Regulation Include:  
      i) Design And Construction Of Pipeline Components  
      ii) Operations, Maintenance And Emergency Procedures  
      iii) Corrosion Control  
      iv) Pipeline Integrity Management  
      v) Damage Prevention And Public Education  
      vi) Qualification Of Personnel  
      vii) Recordkeeping And Reporting

a) Part 193 Outlines Safety Standards For Liquefied Natural Gas (LNG) Facilities Used In The Transportation Of Liquefied Natural Gas By Pipeline That Is Subject To The Pipeline Safety Laws And Part 192 Regulations.

b) This Regulation Covers Pipeline Facilities Used For Liquefying Natural Gas Or Synthetic Gas Or Transferring, Storing, Or Vaporizing Liquefied Natural Gas.

[16] Key DOT Pipeline Regulations Of Interest

a) Response Plans For Onshore Oil Pipelines (49 CFR Part 194)

i) Part 194 Outlines The Oil Spill Emergency Planning Requirements To Reduce The Environmental Impact Of Oil Discharged From Onshore Oil Pipelines

ii) Under This Regulation, Operators Of Oil Pipelines Are Required To Develop Response Plans That Outline Their Planning, Training And Response To An Oil Spill

iii) Planning Elements Include:

iv) Determination Of A Worst-case Discharge

v) Notification Points And Numbers For The Pipeline Operator

vi) Inventory Of Oil Spill Equipment And Supplies

vii) Spill Response Training Program and Exercise Schedule
[17] Key DOT Pipeline Regulations Of Interest
a) Transportation Of Hazardous Liquids By Pipeline (49 CFR Part 195)
b) Outlines Safety Standards And Reporting Requirements For Facilities / Transportation Of Hazardous Liquids And Carbon Dioxide
   i) Topics Covered By This Regulation Include:
   ii) Pipeline Design, Construction And Welding Considerations
   iii) Transportation Of In Pipelines Constructed With Non-steel Materials
   iv) Pressure Relief Devices – Design And Installation
   v) Corrosion, Operations, Maintenance And Emergency Procedures
   vi) Pipeline Integrity Management In High Consequence Areas

[18] Pipeline Security
a) Pipeline Security Information Circular

[19] Pipeline Security
a) The Circular Requested That Pipeline Operators Submit A Written Statement Confirming That The Operator Has:
   i) Reviewed The Information Circular And The Pipeline Security Contingency Planning Guidance
ii) Reviewed The Consensus Security Guidance Appropriate To Its Segment (Oil Or Natural Gas) Of The Pipeline Industry

iii) Identified Its Critical Facilities

iv) Developed A Corporate Security Plan


[20] Department Of Labor

a) Occupational Safety And Health Administration

b) The U.S. Occupational Safety And Health Administration (OSHA) Is The Lead Federal Agency Responsible For Protecting The Safety And Health Of Workers In The Workplace.

c) Examples Of Areas Where OSHA Regulations Influence Pipeline Industry Operations Include:

i) Accident Prevention Measures

ii) Reporting On-the-job Accidents

iii) First Aid And Medical Attention For On-the-job Injuries

iv) Job Related Safety Training

v) Fire Protection On The Job

vi) Confined Space Operations

vii) Fall Protection

viii) Construction, Trenching And Excavation Operations


a) Also Known As HAZWOPER, This Federal Regulation Was Issued Under The Authority Of The Superfund Amendments And Reauthorization Act Of 1986 (Sara).

b) The Regulation Establishes Important Requirements For Both Pipeline Industry...
And Public Safety Organizations That Respond To Hazmat Or Hazardous Waste Emergencies.


a) Requirements Cover The Following Areas:
   i) Hazmat Emergency Response Plan.
   iii) Specific Training Requirements Covering Instructors And Both Initial And Refresher Training.
   iv) Medical Surveillance Programs.
   v) Post-emergency Termination Procedures.

[23] Environmental Protection Agency

a) Community Emergency Planning Regulations (40 CFR 301-303)
   i) This Regulation Is The Result Of Title III Of The Superfund Amendments And Reauthorization Act Of 1986 (SARA) And Mandates The Establishment Of Both State And Local Planning Groups
   ii) The Coordinating Point For Both Planning And Training Activities At The Local Level Is The Local Emergency Planning Committee (LEPC)

[24] Environmental Protection Agency

a) The LEPC Is Specifically Responsible For Developing And/Or Coordinating The Local Emergency Response System And Capabilities.
b) Develop, Regularly Test, And Exercise The Hazmat Emergency Operations Plan.
c) Conduct A Hazards Analysis Of Hazmat Facilities, Transportation Corridors And Pipeline Right-of-ways Within The Community.

d) Receive And Manage Hazmat Facility Reporting Information.

e) Coordinate The Community Right-to-know Aspects Of SARA, Title III.


a) The EPA Oil Pollution Prevention Regulation Was Enacted To Prevent Oil Spills And To Assure That Oil Facility Personnel Are Prepared To Respond If A Spill Occurs.

b) A Facility Response Plan Is A Document For Responding, To The Maximum Extent Practicable, To A Worst Case Discharge And To A Substantial Threat Of An Oil Discharge. P-22

[26]National Contingency Plan Or NCP (40 CFR 300, Subchapters A Through J)

a) This Regulation Outlines The Policies And Procedures Of The Federal Agency Members Of The National Oil And Hazardous Materials Response Team (Also Known As The National Response Team Or The NRT).

b) Each Of The Ten Federal Regions Also Has A Regional Response Team (RRT) That Mirror The Make-up Of The NRT. P-23

[27]Other Federal Agencies

a) New Pipeline Construction


c) All Pipeline Projects Must Follow Specific Federal, State And Local Permitting Requirements. Federal Environmental Permitting Requirements Are Established By The U.S. Army Corps Of Engineers, U.S. Fish And Wildlife, Bureau Of Land Management, U.S. Forest Service, And Others. P-23
Wildlife, Bureau Of Land Management, U.S. Forest Service, And Others.

[28] Oil Spill Response Planning
a) Pipeline Operations Involve Both Onshore And Offshore Areas, As Well As Coastal And Inland Locations. As A Result, There May Be Confusion Over Who Is Responsible For Emergency Planning Regulations And Requirements.

[29] Incident Investigations
a) The National Transportation Safety Board (NTSB) Is An Independent Federal Agency Charged By Congress With Investigating Every Civil Aviation Accident In The United States And Significant Accidents In The Other Modes Of Transportation - Railroad, Highway, Marine And Pipeline - And Issuing Safety Recommendations Aimed At Preventing Future Accidents.
   b) The Safety Board Determines The Probable Cause Of:
   c) All U.S. Civil Aviation Accidents And Certain Public-use Aircraft Accidents

[30] Incident Investigations
a) The Safety Board ...
   i) Selected Highway Accidents;
   ii) Railroad Accidents Involving Passenger Trains Or Any Train Accident That Results In At Least One Fatality Or Major Property Damage;
   iii) Major Marine Accidents And Any Marine Accident Involving A Public And A Nonpublic Vessel;
   iv) Pipeline Accidents Involving A Fatality Or Substantial Property Damage;
v) Releases Of Hazardous Materials In All Forms Of Transportation; And  
vi) Selected Transportation Accidents That Involve Problems Of A Recurring Nature.

[31] Economic Regulation  
a) Most Interstate Liquid Petroleum And Gas Pipelines Operate As "Common Carriers" And Provide Transportation Services For A Fee On A Non-discriminatory Basis To Qualified Customers.  
b) The Maximum Transportation Fees / Rates That A Pipeline In Interstate Commerce Can Charge Are Regulated By The Federal Energy Regulatory Commission (FERC).  

[32] State And Local Government Regulations  
a) Enforcement Activities At The State And Local Levels Are Usually Accomplished Through On-the-spot Inspections. State And Local Agencies That May Enforce Pipeline Regulations Include:  
i) State Public Utilities  
ii) Public Service Commission  
iii) State Fire Marshal's Office.  
iv) State Department Of The Environment (Sometimes Known As Natural Resources Or Environmental Quality).  
v) Local Fire Department  
vi) State And County Emergency Management Agency

[33] Voluntary Consensus Standards  
a) Industry Standards Must Be Updated Constantly To Meet The Changing Needs And Technology  
b) Pipeline Industry Relies On Many Organization For Standards  
i) American Petroleum Industry  
ii) American Gas Association  
iii) American Society Of Mechanical Engineers  
iv) American Nation Standard Institute  
v) Association Of Oil Pipelines  
vi) Interstate Natural Gas Association Of America  
vii) National Fire Protection Association
[34] American Gas Association
  a) The American Gas Association (AGA) Represents Local Energy Distribution Companies That Deliver Natural Gas To More Than 52 Million Homes, Businesses And Industries Throughout The United States.
  b) AGA Is An Advocate For Local Natural Gas Utility Companies And Provides A Broad Range Of Programs And Services For Member Natural Gas Pipelines, Marketers, Gatherers, International Gas Companies And Industry Associates.

[35] American National Standards Institute
  b) ANSI Establishes Processes And Procedures Requirements For The Standards Development Process, And Accredits Other Standards Development Organizations That Meet These Requirements. For Example, API And NFPA Are Accredited As Meeting ANSI’s Due Process Requirements For Standards Development.

[36] American Petroleum Institute
  b) API Has A Committee Structure That Is Open To Companies That Own And Operate Crude Oil And Petroleum Product Pipelines.
[37] American Society Of Mechanical Engineers
a) The American Society Of Mechanical Engineers (ASME) Is A Professional Engineering Society Supported By Professional Engineers From Many Different Fields And Industries.
b) One Of The Objectives Of ASME Is The Coordination And Development Of Manufacturing Standards For Pressure Vessels (Tanks) That Are Used In Pipeline And Storage Facilities.
c) The ASME Pressure Vessel Code Has Been Revised Many Times And Issued In Over 22 Editions.

[38] National Fire Protection Association
b) NFPA’s Hazardous Materials, Flammable Liquids And Flammable Gas Standards Are Widely Used By Both Industry And Public Safety Organizations As Recommended Practices For Inspection, Safe Handling And Installation.
c) NFPA Has No Enforcement Power - Its Standards Are Merely Advisory. However, The Association Enjoys A Unique Reputation For Its Technical Accuracy And Procedural Fairness.

[39] Other Pipeline Industry Organizations
a) Association Of Oil Pipe Lines (AOPL)
b) Acts As An Information Clearinghouse For The Public, The Media And The Pipeline Industry
c) Interstate Natural Gas Association Of America (INGAA)
d) Is A Trade Organization That Advocates Regulatory And Legislative Positions Of...
Importance To The Natural Gas Pipeline Industry In North America.

[40] Pipeline Safety And Incident Experience
a) Pipelines Are Used To Transport Petroleum Products For Two Principal Reasons – Safety And Efficiency
b) Pipelines Are Usually The Only Feasible Transportation Mode For Moving Significant Volumes Of Petroleum.
c) Pipelines Are Extremely Safe When Compared With Other Transportation Modes.

[41] Causes Of Pipeline Incidents
a) The Primary Causes Of Pipeline Incidents Are Physical Damage To The Pipeline By Third Parties (E.G., Contractors, Farmers, Homeowners, Etc.), And Internal And External Corrosion.
b) The Goal Of The Pipeline Industry Is To Achieve Safe, Efficient And Reliable Operations That Are Incident Free.

[42] Cause of Pipeline Accidents
[43] Public Education
   a) Pipeline Operators Carry Out Extensive Public Education Programs To Educate The Public And Key Stakeholders On The Presence Of Pipelines Within Their Communities
      i) Recognition Of Pipeline Markers. Appropriate Steps To Recognize A Pipeline Leak.
      ii) Proper Reporting Procedures, Including Emergency Points Of Notification. Use Of The One Call System To Protect Pipelines.
      iii) Proper Excavation Methods When Working In And Around A Pipeline Right-of-way.

[44] One Call Systems
   a) To Protect The Community, Pipeline Neighbors, Sensitive Environmental Areas, As Well As The Pipeline Itself, The Pipeline Industry And Other Operators Of Underground Facilities And Utilities Joined Together In Creating Notification Centers That Can Be Used By Anyone Preparing To Conduct Work Close To The Pipeline.
   b) Known As “One Call Centers,” They Serve As A Clearinghouse For Excavation Activities That Are Planned Close To Pipelines And Other Underground Utilities.

[45] One Call Systems
   a) A Call Center Is Set Up So That Anyone Who Will Be Digging Or Excavating Can Make One Telephone Call To Give Notice To Dig In A Specific Area 48 To 72 Hours Prior To Any Excavation Activity.
   b) Underground Facilities Are Usually Marked With Aboveground American Public Works Association (APWA) Color Coded Markings, As Outlined Below:
      i) Electric Red
ii) Gas – Oil Yellow
iii) Communications / Cable TV Orange
iv) Water Blue
v) Sewer Green
vi) Proposed Excavation White

[46] One Call Systems
a) Some People Mistakenly Believe That The Precise Location Of A Pipeline Can Be Determined By Simply Drawing A Straight Line Between Right-of-way Marker Signs. This Is A Myth For Two Main Reasons:
  i) Right-of-way Markers Along A Pipeline Route Or At A Grade Crossing Only Show The Approximate Location Of A Pipeline, As The Right-of-way Is Much Wider Than The Pipeline.
  ii) A Pipeline May Curve Or Make An Angle Underground As It Runs Between Markers In Order To Avoid Some Natural Or Mannmade Feature (E.G., Historical Site) Or Another Underground Facility (E.G., Television Cable, Power Line).

[47] Dig Safely Program
a) In 1999, DOT Launched A Nationwide Damage Prevention Campaign Known As “Dig Safely©” To Support Communications Efforts To Raise Public Awareness Of The One Call System And How To Contact The Appropriate Call Center.
  b) Dig Safely© Stresses Five Key Reminders:
    i) Call Before You Dig
    ii) Await The Required Time
    iii) Respect The Marks
    iv) Excavate (Dig) With Care
    v) Safety Is Everyone’s Responsibility
[48] Common Ground Alliance (CGA)


b) One Example Of A Best Practice Is The Development Of An Inexpensive Orange Plastic Mesh That Is Laid In A Partially Filled Pipeline Trench Before The Trench Is Filled Either Following Maintenance Or If Located In An Area That Might Be At A High Risk Of An Excavation Accident.

[49] Common Ground Alliance (CGA)

a) An Excavator Will Hit – And See – The Buried Brightly Colored Mesh Before Striking The Pipeline And Damaging It. The Center Of The Mesh Also Includes A Wide Strip Of Yellow Warning Tape With Black “Warning” Markings.

b) The Bright Orange Mesh Will Also Act As An Easily Spotted Visual Indicator Of Possible Trouble During Aerial Inspections Along The Pipeline Rights-of-way.

[50] Corrosion Prevention

a) Corrosion Is The Second Leading Cause Of Pipeline Releases. The Pipeline Industry And OPS Have Developed A Range Of Tools And Technologies To Eliminate Or Reduce Corrosion, Including:

b) Cathodic Protection

i) Required On All Interstate And Local Distribution Pipelines Subject To External Corrosion

ii) Uses A Constant Low Voltage Electrical Current Run Through The Pipeline To Counteract Corrosion.

iii) Improvements In Pipeline Coating Materials
[51] In-line Inspection Tools

a) In-line Inspection (ILI) Tools, Also Known As Smart Pigs, Are Cylinder Shaped Plugs Of Roughly The Same Diameter As A Particular Pipeline

i) Smart Pigs Are Fitted With Sophisticated Electronic Sensors That Can Help To Locate “Anomalies” In The Pipeline Wall

ii) Magnetic Flux Leakage (MFL) Pigs Are Used To Detect Corrosion Or Other Internal Defects

iii) Other Pigs Can Detect Dents Caused By Excavation Or Ground Upheaval, Or Cracks Caused By Stress

iv) Some Pigs Can Also Scrape Build-up Off The Interior Wall Of Liquid Pipelines To Help Prevent Interior Corrosion

[52] Summary

a) There Are Three Basic Types: Crude Oil Pipelines, Liquid Pipelines, And Gas Pipelines

i) Crude Oil Pipelines - Crude Oil Is Petroleum That Is Taken Directly Out Of The Ground

ii) Liquid Pipelines - The Most Common Liquids Transported By Pipelines Are Refined Petroleum Products, Such As Gasoline, Jet Fuels, Diesel Fuel, And Home Heating Oils Gas Pipelines - The Most Common Gas Product Transported By Pipeline Is Natural Gas

b) Pipeline Design, Construction And Operations Are Governed Through A Body Of Laws, Regulations And Voluntary Consensus Standards