Pipeline 101
What you need to know about pipelines
Why Do We Need Pipelines?

- Safe, efficient and economical way to move energy resources
- Moves resources from production areas or ports of entry to consumers, airports, military bases and more
  - 185,000 miles of liquid petroleum pipelines
  - 320,000 miles of gas transmission pipelines
  - 2 million miles of gas distribution pipelines
- No matter your mode of travel, pipelines likely supplied the energy
What Do Pipelines Transport?

Transportation Industry
- Gasoline
- Diesel
- Jet fuel
- Kerosene

Heating Resources
- Home heating oil
- Natural gas
- Propane

Refiners & Manufacturers
- Crude oil (for refiners)
- Raw natural gas liquids
- Propylene (for headlights, foam insulation, hoses and more)

Agriculture Industry
- Anhydrous ammonia (for fertilizer)
- Diesel fuel
- Propane
Types of Pipelines

Liquid Petroleum Pipelines

- **Crude Oil Pipelines**
  - Moves oil from production areas to collection points or storage facilities (2-8 inches in diameter)

- **Refined Products Pipelines**
  - Avg. 8-12 inches in diameter
  - 95,000 miles of pipelines nationwide (transports gasoline, jet fuel, home heating oil, diesel fuel, etc.)
  - Delivers petroleum products to fuel terminals for distribution via tanker trucks
  - Supplies major industries, airports and electrical power generation plants

- **Highly Volatile Liquid Pipelines**
  - Transports ethane, butane and propane

- **Carbon Dioxide Pipelines (CO₂)**
  - Transports CO₂ to storage sites

Gathering pipelines: Gather raw products from production wells and transport it to transmission pipelines.

Transmission pipelines: Transport products thousands of miles from processing facilities to distribution centers and storage facilities.

Distribution pipelines: distribute products to end users.
Types of Pipelines

Natural Gas Pipelines

- Supply more than 20 percent of all energy used in U.S.
- More than 71 million residential, commercial and industrial natural gas customers in U.S.
- Delivered directly to homes and businesses
- Natural gas liquids (NGLs) – divided into “dry” and “wet” natural gas products and transported in different pipelines
The History of Pipelines

1800s
- 1879: Tidewater Pipeline, a 6-inch diameter, 110-mile wrought-iron pipeline connects production center in Coryville, PA to Williamsport, PA
- 1880-1905: Refineries built near oil fields and connected by pipelines to production sites

1900 – 1950
- 1920s: Pipeline mileage triples to 115,000 miles due to automobile boom
- 1945: Pipelines expanded further to support more product lines during WWII

1950 – present
- 1950s - 1960s: Pipeline industry installs infrastructure in U.S. Gulf Coast, Midwest and West Coast
- 1968: Colonial Pipeline established to supply products to eastern seaboard
- 1970-1977: Trans-Alaska Pipeline System (TAPS) completed
- 2000s: North American energy revolution leads to dramatic gains in crude oil and natural gas production
Who Operates Pipelines?

• **Pipeline Operators**
  - Sole operators
  - Publicly traded Master Limited Partnerships
  - Stock corporations
  - Power and chemical plant companies

• **No ownership of products transported**
  - “Transportation service intermediaries”
  - Shippers reserve specific amount of space per month to transport products
Transportation Process

- **Batching**
  - Transport different types of liquid petroleum in same pipeline
  - Fuel delivered may not be the exact fuel shipped, but meets same specifications

- **Cost & Oversight**
  - Transportation cost equals about 2.5 cents per gallon of gasoline
  - Federal Energy Regulatory Commission (FERC) regulates rates for interstate transport
    - Rates based on volume, distance between delivery points and competition in marketplace
  - Natural gas pipelines regulated like traditional monopoly utility
Where Are Pipelines Located?

- **Exist almost everywhere throughout U.S.**
  - 3 to 4 feet underground or deeper (rivers or roads)

- **Marked by aboveground signs, placards or stakes**
  - Indicate presence, approximate location, product carried and pipeline operator
  - Signs are generally yellow, black and red

- **Fenced and secured areas (for aboveground piping)**
  - Routinely patrolled by foot, ATV, airplanes and/or helicopters

- **Protected by National Call 811 Programs**
Where Are Pipelines Located?

- **Private Land**
  - Written agreements, or easements, allow pipelines to traverse private property

- **Right-of-Way (ROW)**
  - Strip of land 25-150 feet wide containing the pipeline, which:
    - Enables workers to gain access for inspection, maintenance, testing or emergencies
    - Maintains unobstructed view for aerial surveillance
    - Identifies area that restricts certain activities
Where Are Pipelines Located?

Are Pipelines Safe?

- Barrel of crude oil or petroleum reaches destination safely 99.999% of time

- Better safety record than other modes of transportation for petroleum liquids

- Incidents – how do pipeline operators prepare?
  - Control room technologies
  - Emergency response plans and drills
  - Training with local first responders
  - Partner with National Transportation Safety Board (NTSB) and Pipeline Hazardous Materials Safety Administration (PHMSA) to determine incident causes and address potential problems
Are Pipelines Safe?

• Integrity Management
  o Evaluating, inspecting and maintaining pipelines to prevent releases
  o Millions spent each year on research into new inspection technologies
  o Billions spent each year on safety, etc.
    ▪ “Smart pigs” – high-tech diagnostic device that travels inside pipeline to identify pipe irregularities; 90% detection rate
    ▪ 24/7 control room operators reviewing information from instruments along pipeline
    ▪ Shut-off valves to stop product flow within minutes and isolate pipelines where data indicates a possible leak
How Can You Help With Safety?

• “Call 811” (One Call Centers)
  o 811 safeguards underground infrastructure including pipelines
  o Contact your local One Call Center before digging

• Awareness
  o Know where pipelines are located and lookout for irregularities

• Leak Detection – use your senses
  o Sight: Discolored vegetation, pools of liquid along right-of-way or suspicious vapor/mist
  o Smell: Unusual odor or scent
  o Sound: Hissing or roaring sound along right-of-way
How Can You Help With Safety?

- **In the event of a leak:**
  - Leave leak area immediately and walk into the wind away from fumes
  - Do not touch, breathe or make contact with leaking liquids
  - Do not do anything to create a spark such as lighting a match, starting an engine or using a mobile phone
  - From a safe location, call 9-1-1 or your local emergency response number – and the pipeline company
  - Warn others if you can do so safely
  - Do not drive into a leak or vapor cloud area
Resources

- Call811.com
- NPMS.phmsa.dot.gov
- CommonGroundAlliance.com
- AmericanPetroleumInstitute.com
- AOPL.org (Association of Oil Pipe Lines)