

Pipeline Significance In The Texas Oil and Gas Industry

Sponsors:

Texas Oil and Gas Association

Texas Independent Producers & Royalty Owners

Texas Alliance of Energy Producers



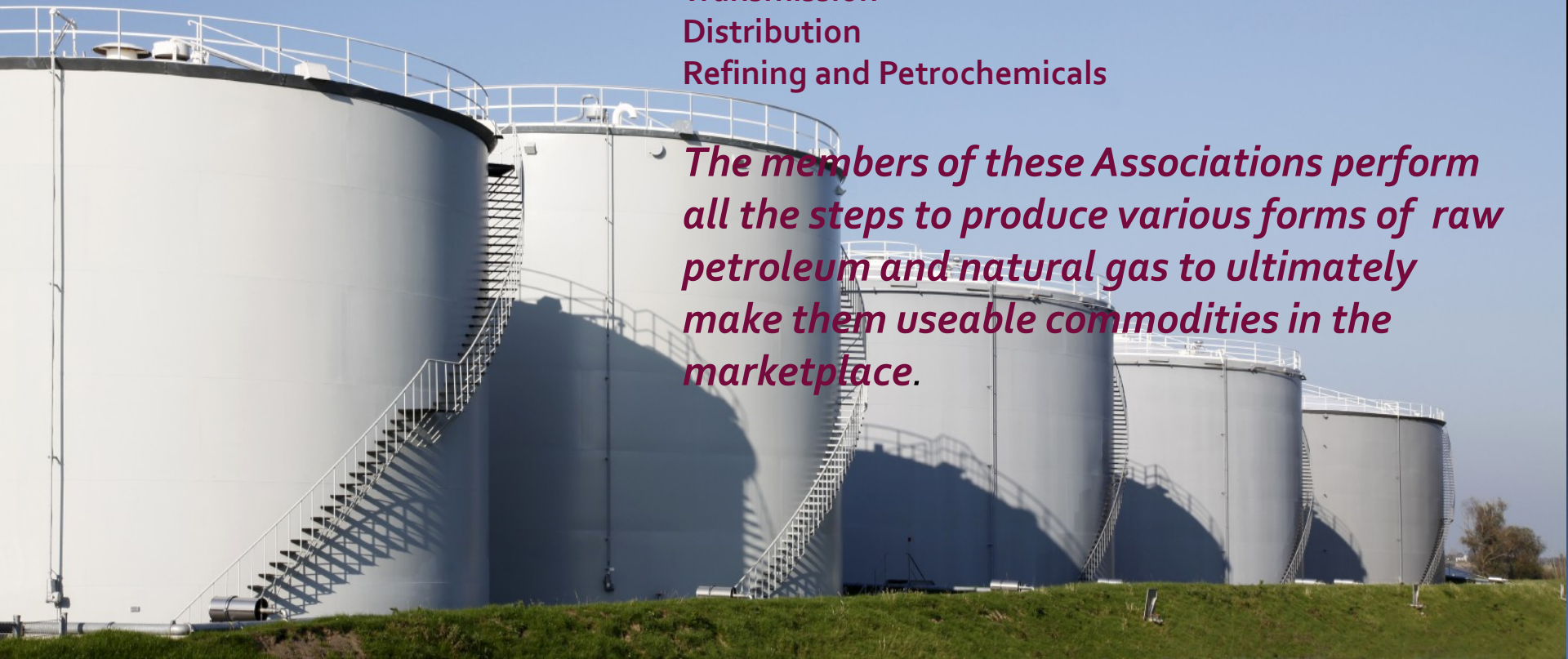
Texas Oil and Gas Association

Texas Independent Producers & Royalty Owners

Texas Alliance of Energy Producers

Oil, Natural Gas, Natural Gas Liquids
Lease Management
Refined Petroleum Products
Gathering and Measuring
Treating and Field Services
Field and Transmission Compression
Gas Processing
Transmission
Distribution
Refining and Petrochemicals

The members of these Associations perform all the steps to produce various forms of raw petroleum and natural gas to ultimately make them useable commodities in the marketplace.



Texas Oil and Gas: Generates \$2.6 Billion for State Revenues





Texas Oil and Gas

- Texas produces 20% of US Domestic Oil Production
 - 1.1 Million Barrels per day; most in the nation
 - U.S. Consumption is ~19 Million Barrels per day
 - Import ~ 13.5 Million Barrels per day
 - Texas produces 25% of US Domestic Gas Production
 - 16 Billion Cubic Feet per day
 - U.S. Gas Consumption ~64 Billion Cubic Feet per day
 - Texas employees ~315,000 in oil and gas
 - In Houston roughly 5,000 companies are engaged in Oil and Gas
- 



Pipelines?

Q&A:

- How does drinking water get to your tap?
 - Your City's Water (*pipeline*).
- How does rainwater drain from your street?
 - Your City's Storm Drain(*pipeline*).
- Is your home heated by Natural Gas?
 - Your Local Gas Company Distribution (*pipeline*).
- If energy sources are offshore, how does it get onshore?
 - An offshore gathering (*pipeline*) system.
- With a limited number of refineries, how is gasoline distributed?
 - A petroleum products transmission (*pipeline*)system and terminal distribution.

Why Pipelines?

Question: how would you move these to market?

- Texas produced ~37 Million Barrels of Crude Oil in February 2012
 - Some was trucked to a refinery, some was railed, most was pipelined
 - About 90% of US domestic oil production is pipelined
- Texas produced ~425 Billion Cubic Feet of Natural Gas in February 2012
 - Essentially all was moved from the well head by pipeline

As a matter of economics, safety, and environmental considerations, pipelines are the choice for the movement of petroleum and natural gas based products

Why Pipelines?

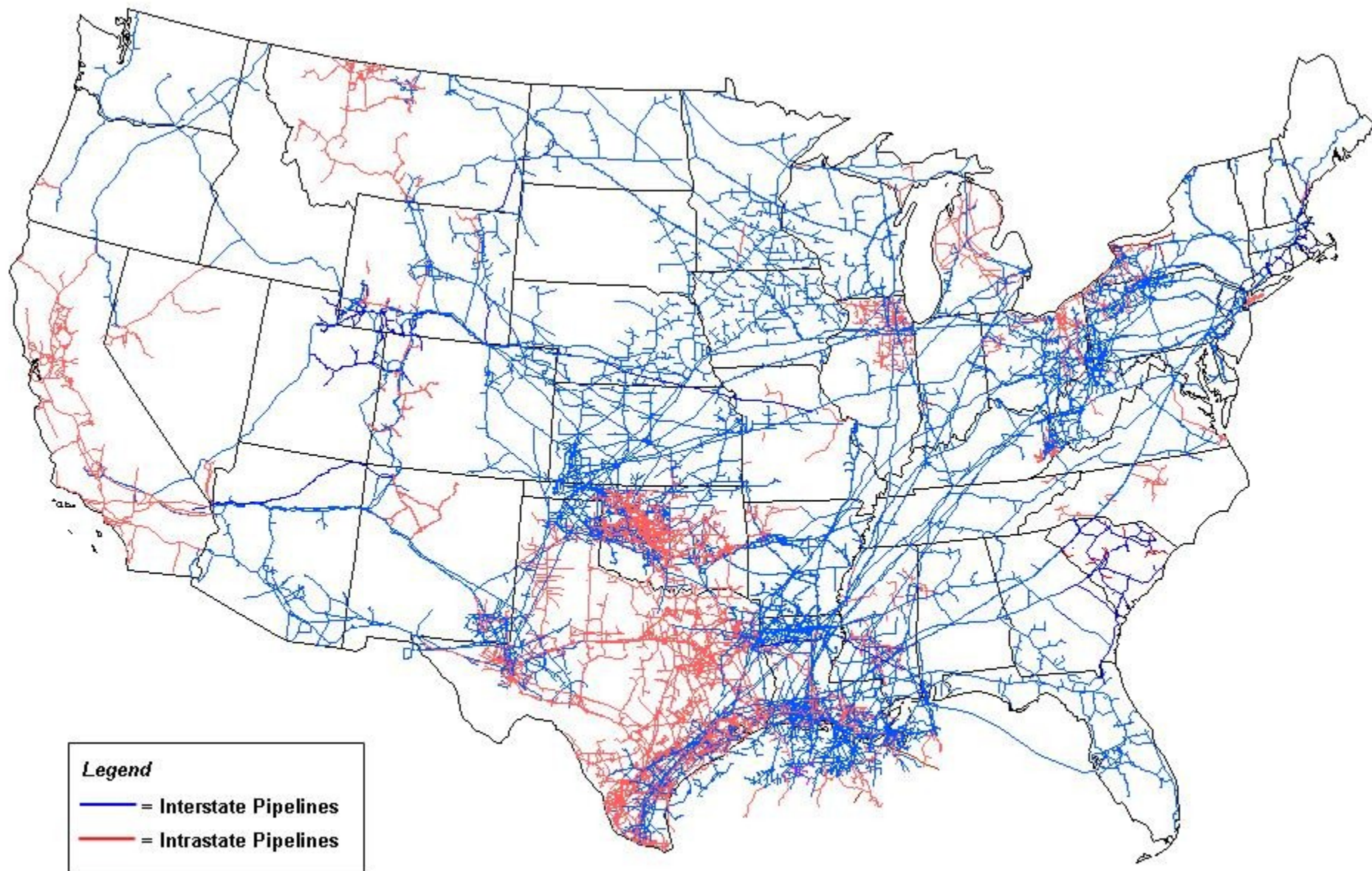
Crude Oil Example:

- If a pipeline moves 150,000 Barrels per day of crude –
 - Railroad train of 75 tank cars of 2,000 barrels each or 84,000 Gallons each
 - Truck equivalent: 750 trucks each with 200 Barrels
 - Texas February Production: 18,500 tank cars; 185,000 trucks
- From PHMSA, compared to pipelines:
 - 87 times more oil transport truck-related deaths
 - 35 times more oil transport truck related fires/explosions
- *The pipeline produces much less air pollutants, less spillage, and improves safety by reducing vehicles used in ground transport*

Why Pipelines?

Natural Gas Example:

- To hold the February Texas Natural Gas production:
 - Need 425 Billion 1x1x1 foot boxes (i.e. a cubic foot)
 - Lined up that is 80 million miles – the sun is 93 million miles away
- By squeezing the gas, i.e., compressing the gas, the production is readily moved by pipelines
 - High Pressure Cylinder Trucks can move compressed natural gas
 - A 250 Million Cubic Foot per day pipeline displaces 1,375 tube trucks per day
 - Texas February production would require 77,774 tube trucks on the roads
 - *For natural gas to be moved in quantity and safely natural gas pipelines are the only effective transportation system*



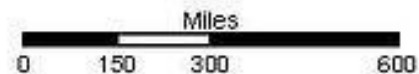
Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division, Gas Transportation Information System



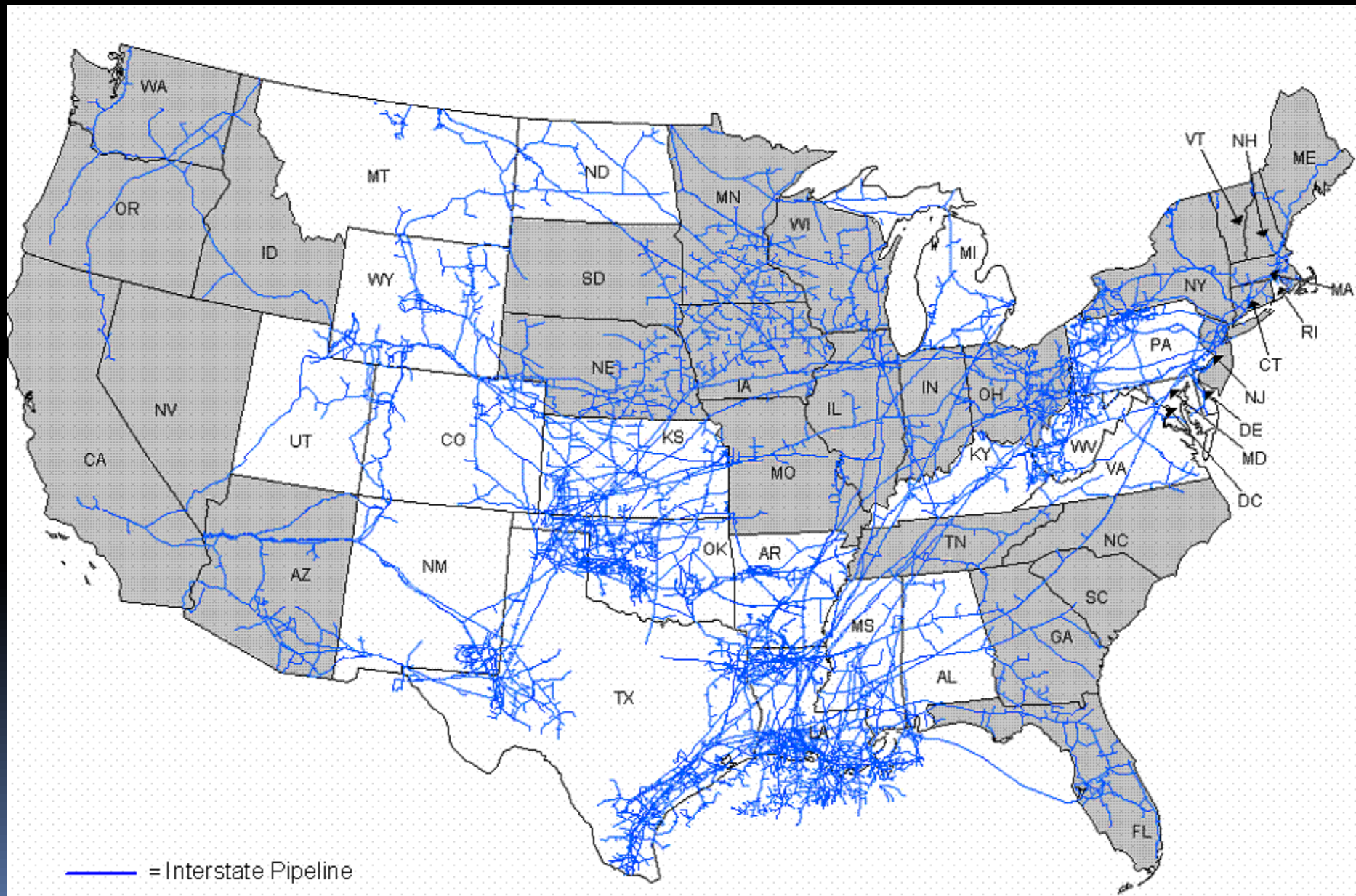
United States Shale Gas Plays

Stacked Appalachian Plays

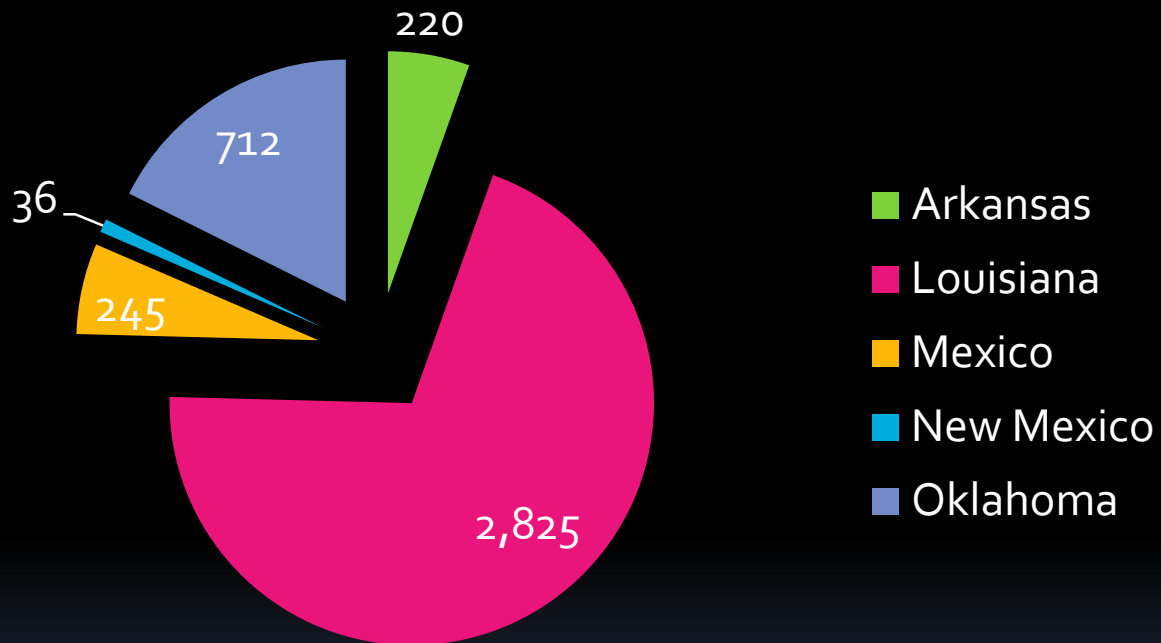
November 2008



States Dependent Upon Natural Gas Pipelines



2010 Texas Domestic Transfers BCF



Texas Transfers Approximately 70% of Annual Gas Production

Typical O&G Products Moved In Pipelines

- Crude Oil:
 - Sweet, Sour, Heavy and Light
- Refined Products:
 - Motor Gasoline, Diesel, Heating Oil, Kerosene, Jet Fuel

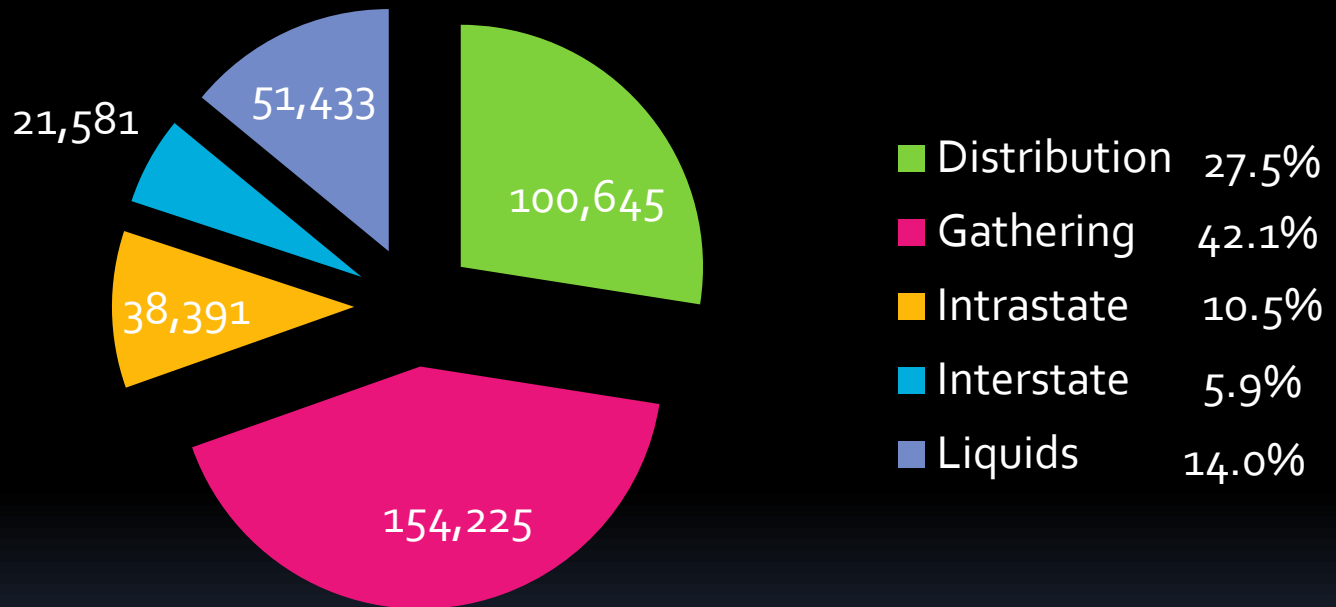
Note: The same pipeline can move these products by “batching”
- Natural Gas:
 - In the transmission pipelines it is compressed, dry, odorless
- Natural Gas Liquids:
 - Ethane: Basic Petrochemical Building Block; plastics
 - Propane: Petrochemicals and Heating
 - Butane: Motor Gasoline Winter Blend, Heating
 - Pentanes or “Natural Gasoline”: Motor Gasoline Blending
 - Mixed NGL’s



What are the types of Natural Gas Pipelines?

- Flow or Production Pipelines – From the Wellhead
 - Gathering Pipelines – Separation/Treating/Measuring
 - Separate production fluids
 - Initial separation of contained water – dehydration
 - Initial phase of volumetric measurement
 - Initial Condensate capture
 - Initial removal of “unwanted” content – e.g., Hydrogen Sulfide
 - Gas Processing to remove natural gas liquids
 - Interstate and Intrastate Transmission Pipelines
 - Long haul pipelines
 - Interconnect with other pipelines
 - Direct delivery to industrial customers – e.g., power plants
 - Distribution Pipelines
 - LDC (Local Distribution Co.) to residential customers
- 

Texas Pipelines – 366, 275 Miles



Onshore Gathering Pipelines: Key Attributes

- Gathering Line Regulation:
 - Once the line is determined to be an onshore gathering pipeline:
 - In rural areas outside of towns, villages or areas designated as residential or commercial areas – not regulated
 - In non-rural areas – must meet same safety standards for design, construction, operation and maintenance as gas transmission lines
 - Gathering Line Definition:
 - A pipeline that transports gas from a current production facility to a transmission line or main
 - *There has been substantial difficulty in defining gathering pipelines; under the current DOT PHMSA 49CFR192 various installation parameters are described and the various gathering cases are captured*



Key Pipeline Route Design Considerations

- Route Selection:
 - Location of the new gas supply
 - Location of the gas market connection
 - Desktop Layout:
 - The Straight Line “Ideal”
 - Avoid Cities, Schools, Hospitals, Rivers, Lakes, Parks, other “sensitive areas”
 - Compressor, Gas Plant, Interconnections, environmental aspects (air), etc.
 - Survey:
 - Is the “desktop” route possible?
 - Landowner interface
 - Final Design:
 - Engineering parameters finalized – e.g., number and location of compressors.
 - Contractor selection, project feedback and award
- 

42 Inch Pipeline Welding Stage



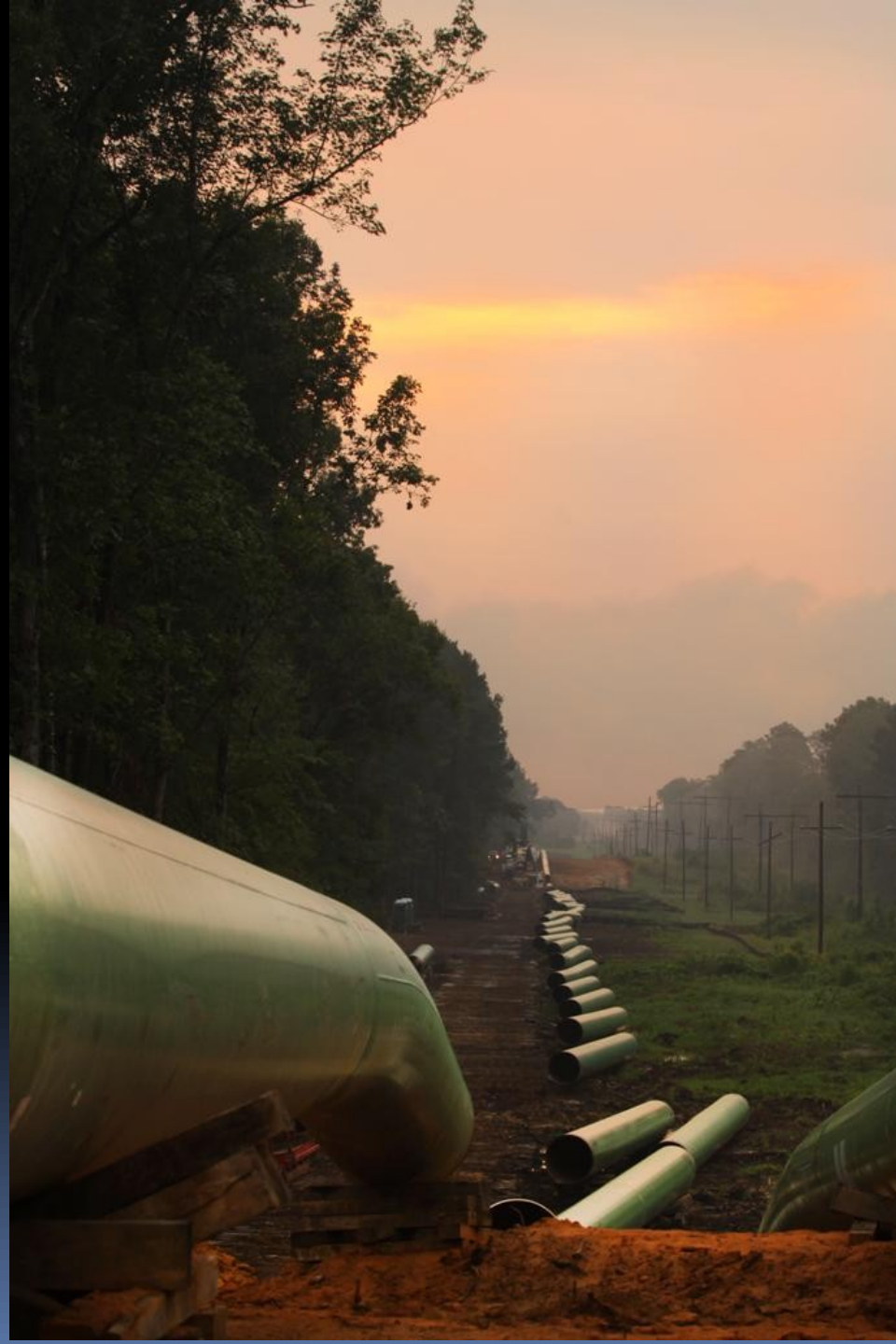
Automated Welding
42 Inch Pipeline



42 Inch Pipeline Staging

Notes:

- Start of Work Day
- Essential Straight Line
- Width of Right of Way
- Existing Power Line Corridor
- Pipeline Crib
- Equipment Mats



42 Inch Pipeline Staging

Notes:
Visible Progress



Welded Section Ready for Placement

Notes:

Ditch depth provides depth of cover

Placement on clay

- no stress points

- pad used in rocky conditions

Cribbing protects pipe

Straight Line

Pipe Coating Anomaly

Flex "Requirement" of Pipe



Pipeline Lowering Technique

Notes:

Flexibility Of Pipeline

Soil condition: Clay

- No Apparent Rock

Condition of Pipe Coating

- Soft Sling Protects Coating

Size of Block: Heavy Equipment

Backfill Stacked and Ready



Final Grading After Pipeline Installation



Completed Right of Way: Eagle Ford Shale Development



“Major” Natural Gas Pipeline Assets

- Dehydration
 - Water creates operational issues and displaces BTU heat content
 - Typical specification is seven pounds per million cubic feet of gas
- Treating
 - Carbon Dioxide (CO₂) and Hydrogen Sulfide (H₂S) are commonly removed
 - 2% CO₂; 16 ppm H₂S are common pipeline “sales gas” specifications
- Compression
 - Enables movement of volume
 - Safety controls establish maximum pressures (“MAOP”)
- Meter Stations
 - At the wellhead, at the central gathering point, at the gas plant, at delivery
- Gas Processing Plant
 - Extracts valuable components
 - Helps maintains a “fungible” national gas quality heat content
 - 1040 – 1060 BTU per Cubic Foot is a common “sales gas” heat content

Dehydration Unit: Removes Water and Carbon Dioxide



Natural Gas Compressor Station: Carthage, Texas



MarkWest Natural Gas Compressor Station in Washington County, Pennsylvania:
Marcellus Shale



Gas Processing: Extracts Natural Gas Liquids



Natural Gas Meter Station





Natural Gas Pipeline Safety

- Integrity Management
 - Federal: Title 49 Part 192 Subpart O - Gas Transmission Pipeline Integrity Management
 - Texas: TAC Title 16 Part 1 Chapter 8 Subchapter B Rule 8.101
 - Essence: Pipelines given specific timeline to test pipeline segments of “consequence”
 - December 17, 2012 Initial Assessments must be finalized
 - Smart Inspection Tools
 - Fly, Drive and/or Walk Over
 - Leak observation, land condition, unusual/unexpected conditions
 - Pressure Testing
 - Initial Construction: Water Test At Multiple of Maximum Allowable Pressure (“MAOP”)
 - Pre-1970: Grandfathered Operation at Historical Records; PHMSA Advisory
 - Excavator Concerns
 - Call Before You Dig “811”
 - Odorization Requirements
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Natural Gas Pipeline Safety

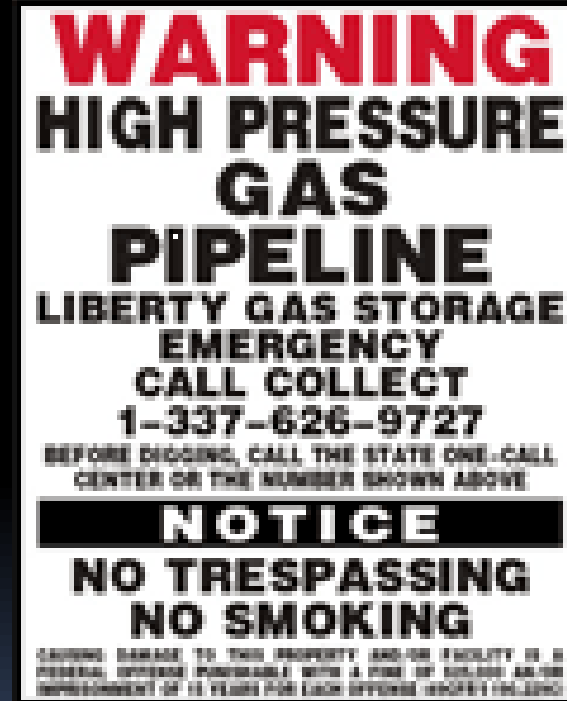


One Call Board of Texas



**Know what's below.
Call before you dig.**

Typical Pipeline Market: CPS Energy; Liberty Gas Storage



Standard Type Pipeline Marker and Cleared Right of Way



Cleaning "Pig"



Gauging Tool



Corrosion detection smart tool



Pipeline Pig Launcher and Receiver



Safety Regulation: Primary Regulators

	Natural Gas	Crude Oil	Liquids
<u>Interstate</u>			
Transmission	PHMSA	PHMSA	PHMSA
Offshore	PHMSA/BOEMRE	PHMSA/BOEMRE	PHMSA/BOEMRE

	Natural Gas	Crude Oil	Liquids
<u>Texas Intrastate</u>			
Transmission	RRC	RRC	RRC
State Offshore	RRC	RRC	RRC
Gathering	RRC/PHMSA	RRC/PHMSA	-
Lease	RRC	RRC	-
Distribution	RRC/PHMSA	-	-



Safety Regulation: Additional Jurisdiction

- FERC
 - EPA
 - TCEQ
 - OSHA
 - NTSB
 - Homeland Security
 - Corps of Engineers
 - GLO
 - Texas Historical Commission
 - TxDOT
 - Texas One Call Board
- 



Standard Safety Practices:

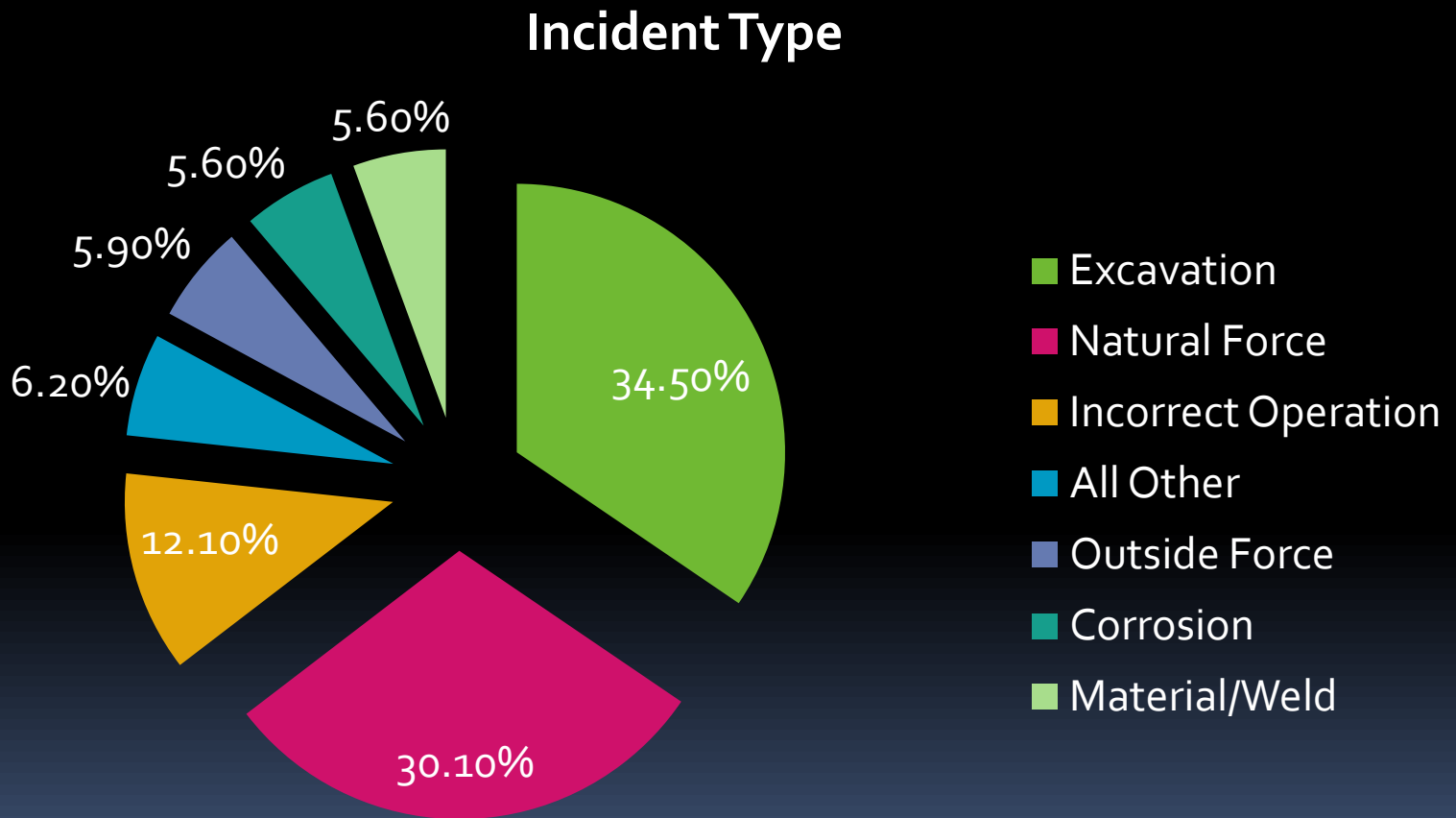
- Standards Associations: e.g., ASME and ANSI
 - ASME 31.8 – Natural Gas Pipeline Design
 - ASME 31.4 – Liquids Pipelines and Plant Piping Design
- Corporate Standards
 - Pipeline Coatings
 - Depth of Cover Standards
 - Construction Practices
 - Welding Standards and Welder Certification
 - Piping Inspection from Mill Run to Installation
- Cathodic Protection
 - Corrosion Protection



Pipeline Control Room Practice

- SCADA - Supervisory Control and Data Acquisition
 - Automated “Eyes” on the pipeline at key operational points
 - Control Room Manned 24x7
 - Field Office Response for Valve Operation
 - Automated Valves versus visual verification
 - Response Time Criteria
 - Leak Detection Protocols
 - Pressure Monitoring
 - Volumetric Flow Criteria
 - Local Response Coordination
 - First Responder Protocols
 - PHMSA Control Room Management Rules
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PHMSA Incident History 1990 - 2009





Concluding Remarks

- Integrity Testing:
 - Energy Transfer Example:
 - Year 2011: \$33.4 Million – 395 Miles Tested
 - Initial assessment will be finalized prior to December 17, 2012 Deadline
 - Media Position:
 - Energy Industry:
 - A poor job in defending record in the Barnett Shale
 - Air Quality: the final report indicates acceptable air impact
 - Right of Way/Eminent Domain has seen recent legislative improvement
 - Industry Position:
 - Compliance with regulations is a priority
 - We live where we work and want a healthy environment
 - Safety is a first and foremost practice
 - We are proud of our record in manufacturing and transporting the nation's key energy creating fuels and products
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Questions?

Thank You!

