
Natural Gas Pipelines

The State of Pipeline Safety

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Gas is Good

- Shale reserves are a transformational resource for Pennsylvania and the nation.
- Vital to nation's energy supply - representing 25% of energy consumption.
- Cleanest burning conventional source of energy.
- Domestically abundant, more than a century of supply.
- Domestic abundance enhances national security, provides well-paying American jobs.
- Reliable, available 24/7, regardless of weather.
- U.S. produces 85% of domestically consumed natural gas, only 2% of imports from outside North America.
- Natural gas is a key energy input for large foundational industry and manufacturing.

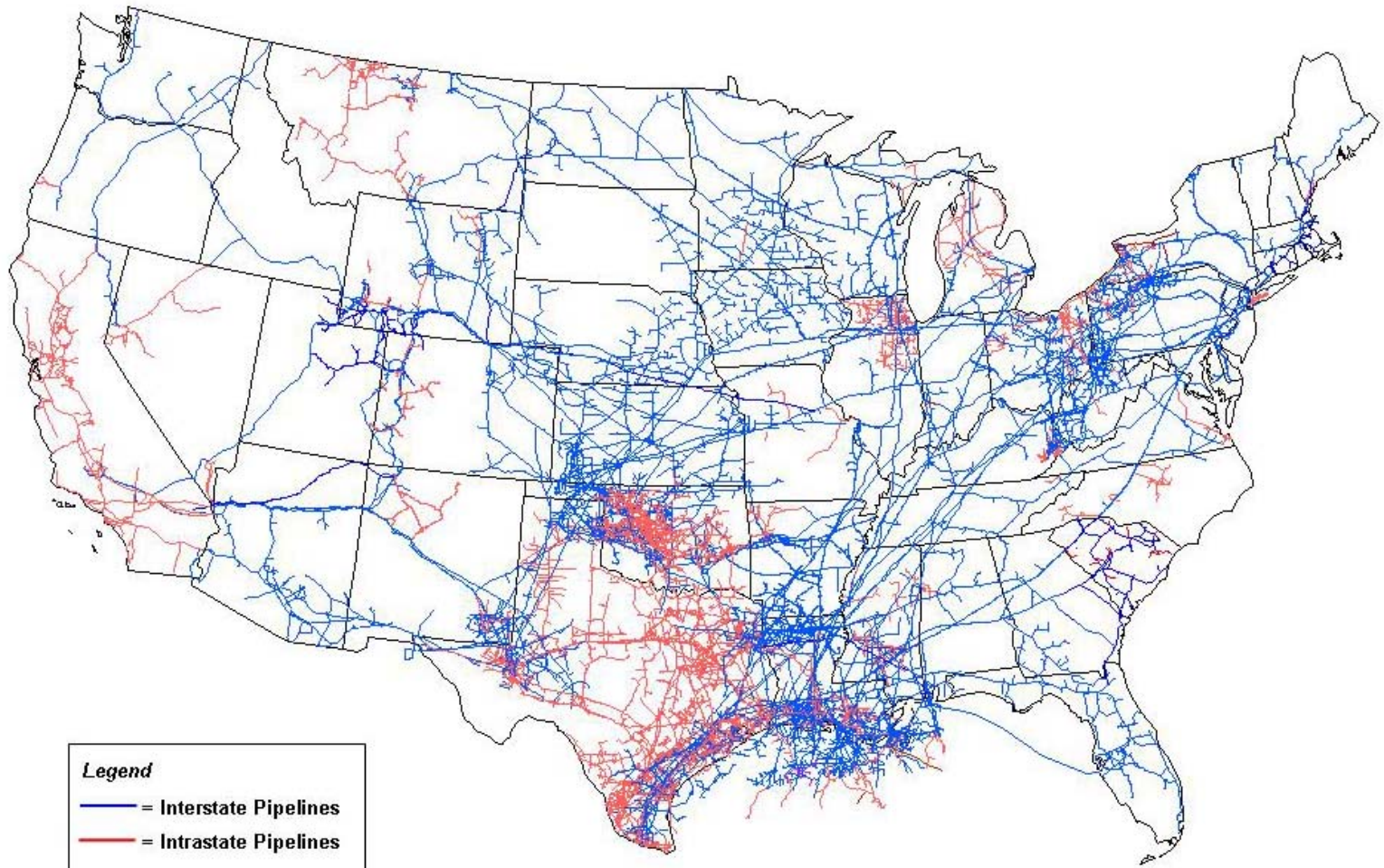
Reference: Interstate Natural Gas Association of America (INGAA)

Pipelines – A Critical Network of Energy Delivery

- U.S. natural gas pipeline infrastructure
 - 300,000 miles of interstate transmission (120 systems)
 - 90,000 miles of intrastate transmission (90 systems)
 - 20,000 miles of field and gathering lines
 - Services about 1.1. million regional lines in 1,300 local distribution networks and 113 LNG plants
 - Approximately 4 trillion cubic feet of working gas capacity in underground storage

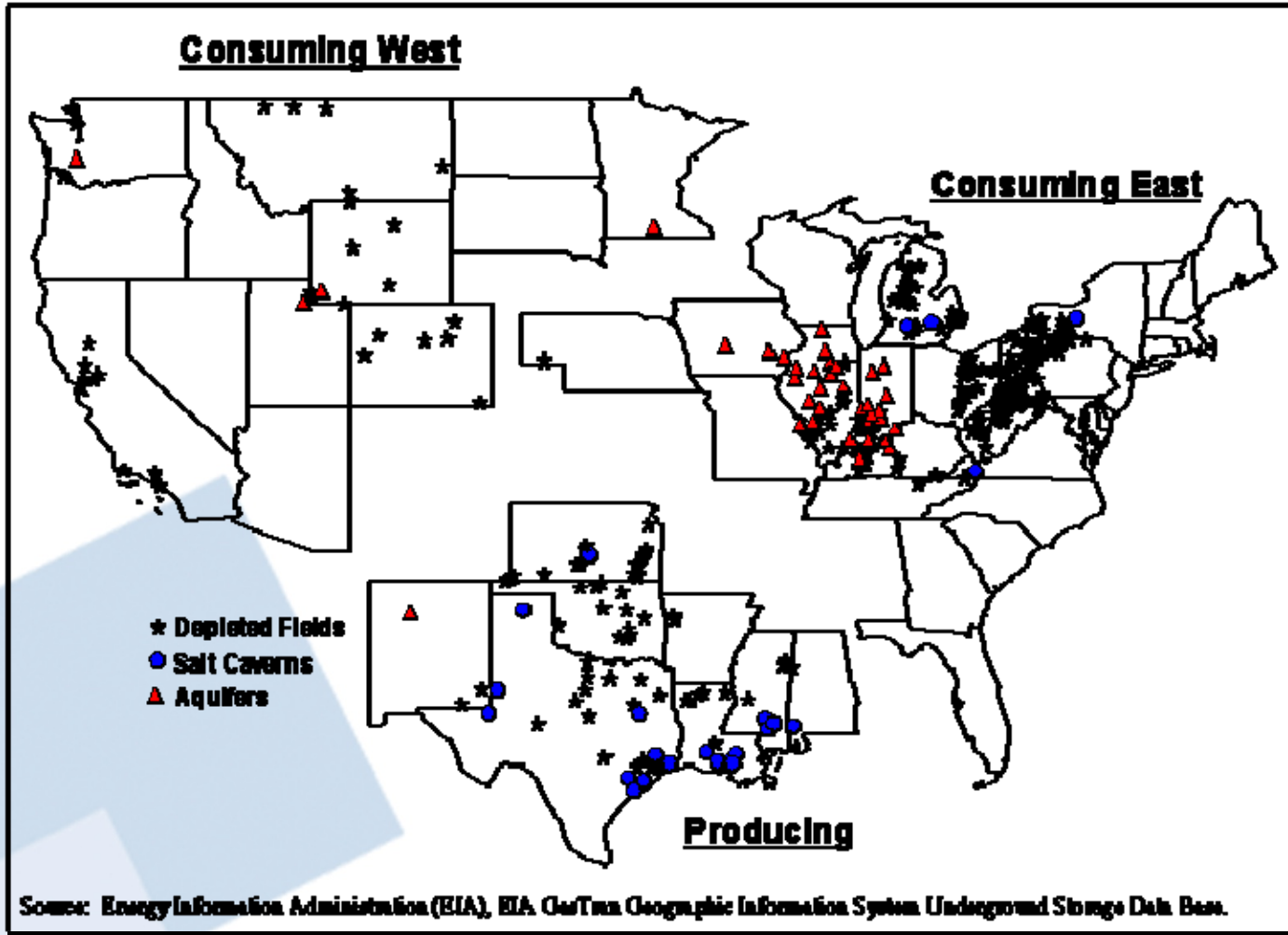
References: Congressional Research Service, Energy Information Association, INGAA

National Pipeline Network

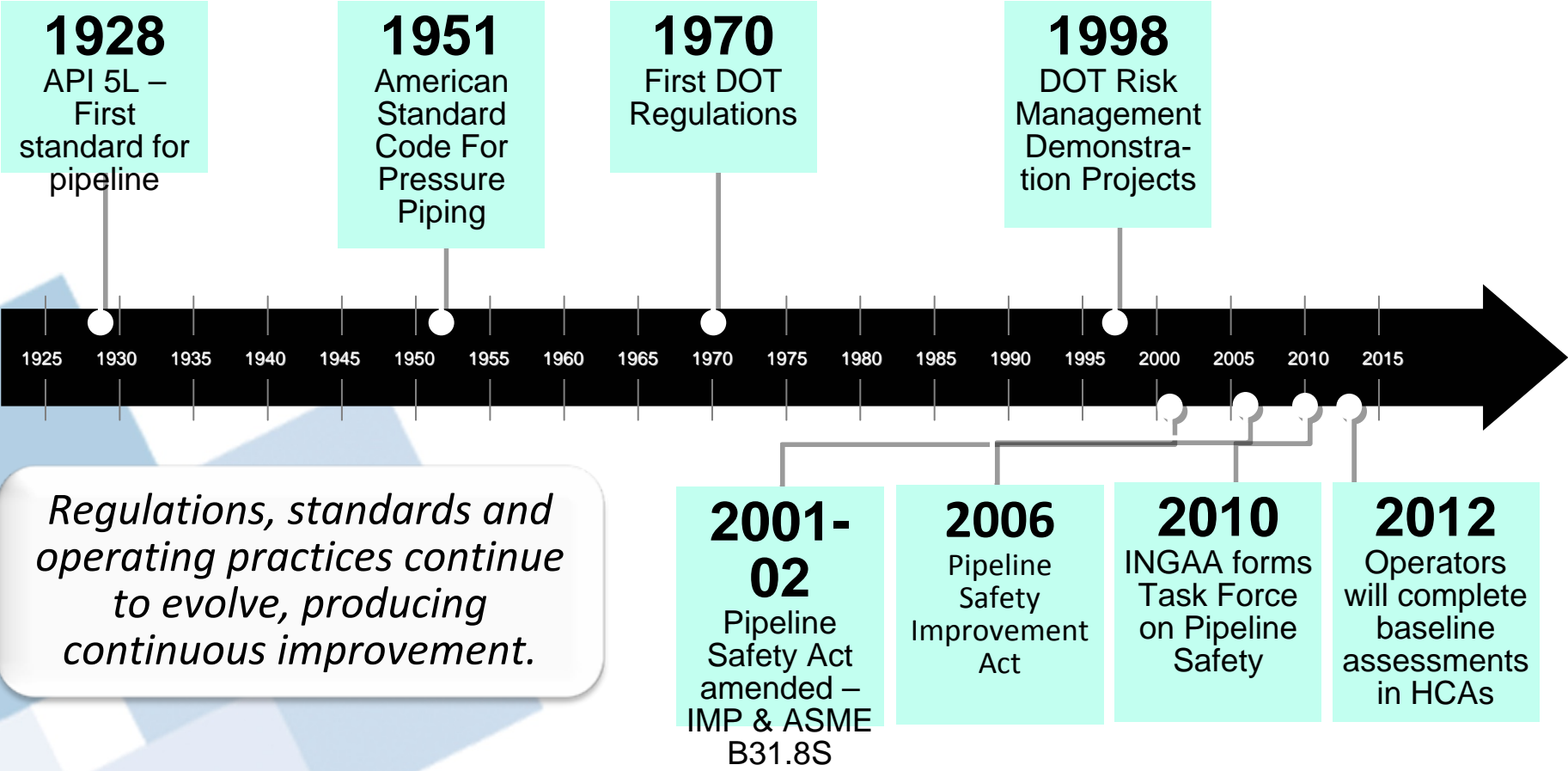


Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division, Gas Transportation Information System

Underground Storage Facilities



Evolution of Pipeline Safety and Regulation



Current State of Pipeline Safety

- According to DOT, pipelines are one of the safest ways to transport large quantities of energy products over long distances.
- Third-party damage accounts for 25% of serious incidents. Industry promotes national Call Before You Dig response center – 811.
- Industry spends more than \$6 billion / year to ensure natural gas is delivered safely and efficiently.
- Active involvement with Common Ground Alliance, collaborative group of industry and public stakeholders.
- Industry supports reauthorization of the pipeline safety law. The Lautenberg-Rockefeller bill is a good starting point to meet common objectives for a safer system that effectively meet nation's energy needs.

Multiple Threats to Gas Transmission Pipeline Safety

<i>Safety Threat</i>		<i>Mitigation</i>
Corrosion: <ul style="list-style-type: none">• Internal• External• Stress Corrosion	Threat increases over time	Periodic assessment
Defects: <ul style="list-style-type: none">• Manufacturing• Fabrication & Construction• Equipment	Threat is stable unless activated by change in service conditions	One-time assessment
Events: <ul style="list-style-type: none">• Excavation Damage• Incorrect Operation• Natural Force Damage• Other outside forces	Threat occurs randomly	Prevention & surveillance

Reference: ASME B31.8s Integrity Characteristics of Vintage Pipelines, INGAA, 2005

Integrity Management Action Plans

1. Stakeholder Outreach	Two-way communication with meaningful performance measures
2. Risk Management	Apply risk management concepts beyond High Consequence Areas (HCAs) with comprehensive threat analysis
3. Integrity Management Tools	Actively promote PIPA (Pipeline and Informed Planning Alliance) and enhance corrosion and anomaly management
4. Pipelines Built Prior to PHMSA Regulations	Develop inventory and protocols to manage integrity
5. Technology Development & Deployment	<ul style="list-style-type: none">• Improve crack-detection tools & management• Work with PHMSA to produce a R&D road map• Define assessment alternatives for non-piggable lines
6. Management Systems	Apply safety culture principles to drive learning across the industry
7. Emergency Preparedness Response	Update isolation valves automation and enhance public awareness
8. New Construction	Fully implement the 2010/2011 INGAA Foundation Pipe and Construction Action Plans

INGAA Guiding Principles

Integrity Management Continuous Improvement

1

Our goal is zero incidents a perfect record of safety and reliability for the national pipeline system.

We will work toward this goal every day.

2

We are committed to a safety culture as a critical dimension to **continuously improve** our industry's performance.

3

We will be relentless in our pursuit of **improving by learning** from the past and anticipating the future.

4

We are committed to **applying integrity management principles** on a **system-wide** basis.

5

We will **engage our stakeholders**, the local community to the national level - so they understand and can **participate in reducing risk.**

Reference: INGAA

Conclusions

