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Considerations for Natural Gas Pipeline Leak Detection Systems

PHMSA and NAPSR Public Meeting

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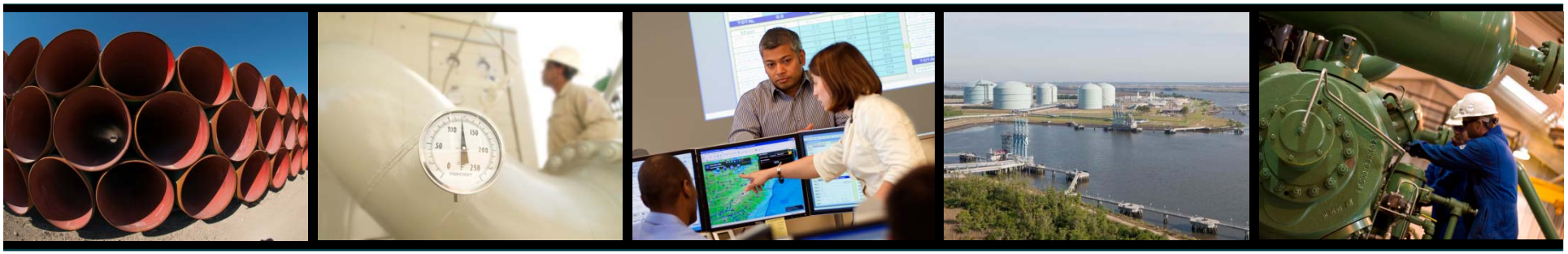


D E P E N D A B L E N A T U R A L G A S

Our Purpose

Provide natural gas and related energy products in a safe, efficient, and dependable manner

Vision & Values

the **place** to work

Employees
Safety

the **neighbor** to have

Compliance
Facility integrity

the **company** to own

Reliability

Profitability

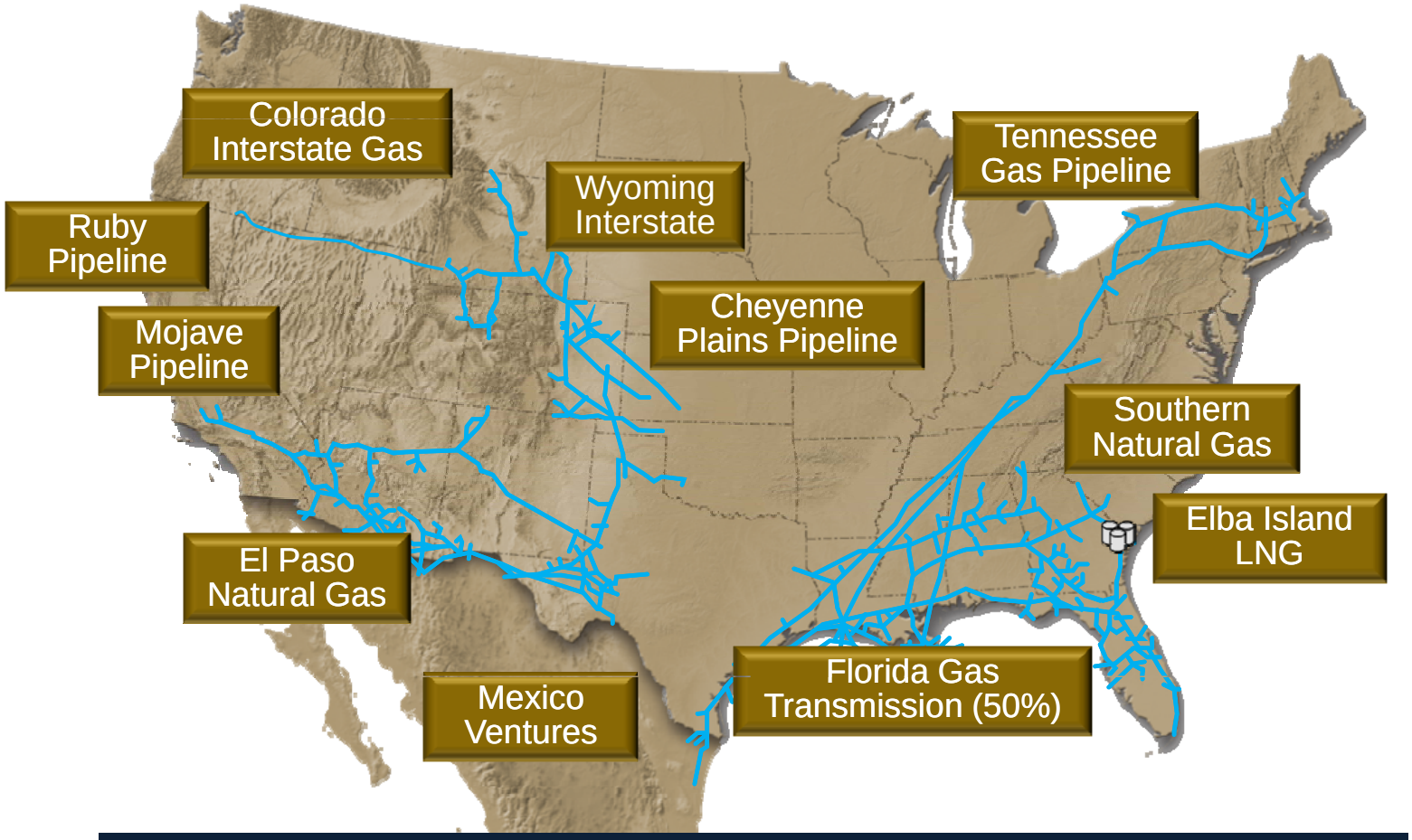
Customer Service

Operational Excellence

Introduction

- Objective: provide a broad overview of how the operating companies of the El Paso family of pipelines use various tools and procedures for early detection and mitigation of pipeline leaks
  - also address presentation considerations
- El Paso operates over 38,000 miles of natural gas pipelines across the US

El Paso Pipeline Systems



- 19% of total U.S. interstate pipeline mileage
- 28 Bcf/d capacity (13% of total U.S.)
- 17 Bcf/d throughput (26% of gas delivered to U.S. consumers)

Leak Detection

- Leak detection practices the result of melding several decades of operational experience with technology advances
  - Gas Control Center monitoring tools
  - Aerial Patrols and Driving (visual)
  - Checks during maintenance work
  - “Walking the line” with handheld instruments
  - Aircraft equipped with leak detection devices
  - Odorant detection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Leak Detection

- Layering of various leak detection methods and practices helps create an environment that supports early detection of pipeline leaks
  - A broad approach focused on early detection can prevent a small leak from growing into a large problem

Leak Detection

- The science of leak detection has to be tempered with operational experience to enhance the value of the leak detection process
  - Swamps & methane detection
  - New technology “blind spots”
  - Understanding and reflecting on leak detection practices considered “effective” a few decades ago

Leak Detection

- External factors and certain operating conditions have an impact
  - 3rd Party Damage
  - A small tubing line connected to a valve operator may need replacement after many years of service
- Options for managing such potential problems are vastly different
- It is important the pipeline operator has effective practices to manage the issues at both ends of the potential problem spectrum

Leak Mitigation

- Once a leak is identified, mitigation could include the following steps:
  - Closing of pipeline valves (mainline and other facilities; includes auto-close devices)
    - Such actions typically apply only to pipe body leaks
  - Large percentage of leaks found are not in the pipe body (tubing lines, crossover piping, etc.)
  - Corrective action can be simple in many cases:
    - Replacing packing in a valve stem
    - Greasing valves
    - Tightening a tubing connection
    - Tightening bolts on flange connections

Leak Mitigation

- Once a leak is identified, mitigation could include the following steps (contd.)
  - Removing gas from pipeline segment of interest
  - Pipeline repair
  - Reflecting on what happened and how it could have been prevented ("lessons learned")
    - All leaks have a causative story and can be markers for pipeline integrity program effectiveness

Leak Mitigation

- Isolation of a segment of pipe with a leak (by closing off the supply source) is in general the initial corrective action
- Other factors driving the corrective steps:
  - Size and location of the leak
  - Impact to neighbors and customers
  - Locations of valves to help isolate the leak
    - Segment in general 5+ miles long
  - Options for safely moving gas away from the leak
  - Greenhouse gas considerations

Leak Mitigation

- Portions of the pipeline system are equipped with “auto close” valves that quickly responds to large drops in pressure
  - Time & Pressure drop based control process
- Other locations have valves that can be operated remotely
  - These available options do not “stop the leak”
  - But it helps start the corrective action process

Leak Mitigation

- A pipeline section with a leak can be isolated sooner by utilizing a combination of leak detection technologies and auto-close valves
  - How much sooner will depend on the location
- Typical costs:
  - Adding auto-close devices to a valve: $40k-$75k
  - Additional maintenance costs are minor if the valve is already part of an inspection regime

Technology Advances

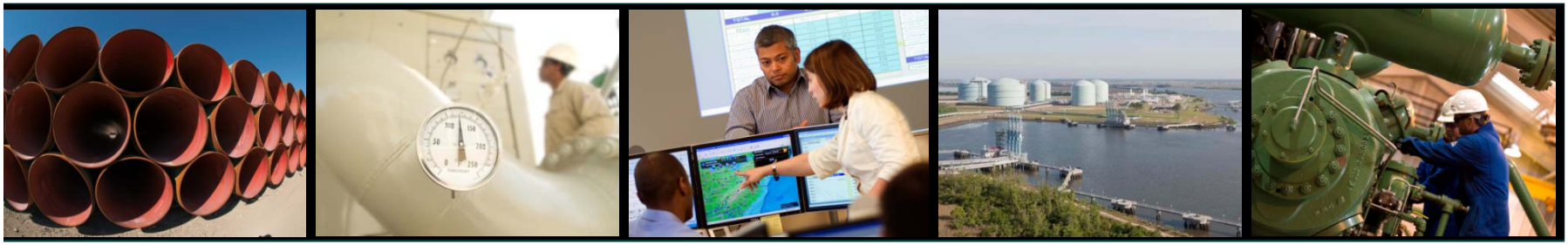
- El Paso has continued to remain actively interested by staying engaged with new leak detection technologies and research efforts
  - Imaging cameras
  - Handheld devices
  - Aircraft equipped with leak detection instruments
  - Support of Pipeline Research Council International (PRCI) and other research efforts

Concluding Remarks

- There isn't one solution that can eliminate the potential for a pipeline leak
- Pipeline companies can focus on several different areas to improve the overall process
  - Holistic solution approach
  - Continue to eliminate factors that create leaks
    - Public Awareness
  - Stay engaged with leak technology advances
    - Smarter cost effective options may be available
  - Attention to "lessons learned" (includes industry)

Appendix

“Panelist Charge”



Panel 3: Considerations for Natural Gas Pipeline Leak Detection Systems

Individual NG Transmission Operator Perspectives:

- Should specifically address the presentation considerations shown below.
  - How can you factor layers of redundancy into an overall leak detection strategy?
  - How can shut in times be improved by utilizing leak detection technology along with valves, meters and CPM?
  - What are the CAPEX/OPEX costs with installing/maintaining systems on existing vs new pipelines?
  - How are false positives/negatives addressed with LDS?
  - How do human factor issues impact leak detection performance?
  - How do external/environmental and operating conditions (i.e. temperature, pressure differentials and time lag) impact technology or system performance?
  - Are you following, pilot testing new advances in technology or are you supporting any related research?