

# API Conference 2012

## Leak Detection - 101

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# Background

- Incidents
- Regulatory Requirements
- NTSB reports/recommendations
- PRCI Efforts
- What about Natural Gas Pipelines?
- The gap in finding small leaks. A small leak can cause a large spill.
- Ruptures/Large leaks should be easy to detect and need Rapid Response

# Rupture Recognition, Response and Reporting

- First R of Recognition in first 5 minutes; second R of Response in next 5 minutes; third R of Reporting in next 20 minutes.
- Possible Quantification: Detect a large leak (>50% leak rate) with 99.99% certainty in less than 5 minutes, under all operating conditions.
- Potential Objective: Having the ability to automatically shut-in a pipeline segment when a large leak or rupture is detected.

# Recognition Methods

- SCADA ROC and Deviation Alarms
- SCADA Based CPM Leak Detection
  - Should we have a separate alarming method for large leaks.
  - What about lines which are down?
- Other
- Is the confidence there?

# Confidence Issues

- Instrumentation Reliability
  - Flow, Pressure, Temperature, location
  - Etc.
- Slack Lines
- Communications Loss
  - Partial or Full
- System Reliability (SCADA and LDS).
- Field Work
  - Pressure Testing, etc
  - Detection of a Large Event does not necessarily imply large Confidence.

# Confidence Boosters

- More instrumentation?
- Maintenance of Instrumentation
- Reliable instrumentation
- Confirmation of event with other instrumentation
  - Did local pressure change as expected when the flow did?
  - Did local flow change as expected when the pressure did?
  - Does a leak pattern exist?
- Taking care of the slack
  - Backpressure? Can backpressure create issues?
  - Instrument around the possible slack area?
  - Modeling Slack?
- Highly reliable communications and SCADA systems
  - Partial or Full
- Procedures to handle Field Work
  - Pressure Testing, etc

# Reponses

- Shutdown by the pipeline controller.
- Automatic Shutdown by the SCADA system.

# Reporting

- Can we simply report what our leak detection tools says is the accumulated imbalance?
- What about drain down.
  - With a hill, this can be a larger amount than the accumulated imbalance.

# Should we want to know?

- How to achieve the desired level of confidence?
- How quickly should we be able to see a rupture?
- Should we try to automatically shut-in and under what conditions?
- What should we do for Natural Gas Pipelines?
- How should lines be treated when they are not running?

# Should we want to know? Con't

- Should we add instrumentation for quicker detection and more confidence?
- Can you declare a leak then wait to determine confidence as more information comes in?
- What is an acceptable method to use to quickly determine the reported volume?
- What should we do today?

# Where do we go from here?

- Short Term
  - Differentiate the alarm/response for large leak.
  - Automate some of the confirmation piece.
  - Automate the determination of spill volume.
  - Basically, automate wherever possible.
- Longer Term
  - Research/Investigate
    - Automated Shut-in
  - Industry Standards
    - Standardized Methods and Tools
    - Standardized Measurements
  - Best Practices