Hazardous Liquid Pipeline

3-27-12 PUBLIC EVENT

IMPROVING PIPELINE LEAK DETECTION SYSTEM EFFECTIVENESS

PANEL 2

LEAK DETECTION SYSTEM CAPABILITIES AND RESEARCH

HLP Leak Detection

- Beware of Release Leak Detection propaganda or temptation
  - No one sells leak detection claiming it doesn't work!
- Big difference in what public wants vs what they need to hear
  - Detecting all releases is currently unrealistic
- Burden is on the industry
  - Watch out for "spin" on both sides
  - Welcome to the misinformation age

HLP Leak Detection

- The Leak Detection Conundrum
  - The lower the leak detection threshold
    - The greater the potential for false alarms
    - The greater the time needed to possibly identify the release
  - Lower thresholds aren't always better
- False leak alarms train operators to ignore real events
- Disconnect between what public wants vs what industry can deliver
  - Leak detection thresholds as a function of throughput make no sense
  - It's release rate (bbls/hr), especially for ruptures, that matter

HLP Leak Detection

- Internal vs External leak detection (API 1130)
  - Internal = calculate mainly from changes in measured fluid flow properties using algorithms to indicate possible types of release (CPM)
  - External = sensors directly detect commodity release
- Rupture vs leak
  - High volume rate rupture releases vs smaller rate leaks
  - Advise primary focus on rupture, then address leak challenge
- Remote release detection is harder than it looks!
  - Compressible liquid
  - Not a research project

HLP Leak Detection

- Example - 50 mile long 30-inch crude oil pipeline
  - ~ 35,000 tons in segment's inventory
  - Not a refinery vessel!
- Pipelines don't actually "mass balance"
  - An illusion definitely limited by volume measurements
  - Inventory correction "noise" usually limits detection thresholds
  - Not liquid full (slack line) ➔leak detection gets really complicated!

HLP Leak Detection

- Beware Control Center Release False Alarm Overload
  - Usually one of first things investigated after event
  - Control room operator setup?
  - Lower false alarm thresholds aren't better
- For internal leak detection approach
  - Simplify alarming/presentation
  - Avoid "political" temptation to lower thresholds
- For external leak detection approach
  - Many different approaches developing
  - Limited applications in field and pipeline length
  - Can generate many false alarms from other hydrocarbon sources

HLP Leak Detection Recommendations

- Internal Detection (advise focus on rupture)
  - Driven by number / type of sensors and location
  - Simulations help but seldom reflect actual release
  - Inventory “corrections” usually significantly limit the detection threshold
  - Smaller leak indication usually not quick
- External Detection (advise focus on leaks)
  - Many different approaches developing
    - Noise/frequency
    - Hydrocarbon identification
    - Fiber optics
  - Need to separate false indications from other sources