Working Group 2
Leak Detection/Mitigation & Storage

WG Leader: Ray Philipenko
WG Leader: Dave Bolon
Facilitator: Max Kieba
Facilitator: Bob Smith

Attendance Breakdown

Approximate total attendance	21 persons
Federal Regulators	3 persons
State Regulators	1 persons
International Regulators	0 persons
Pipeline Industry	6 persons
Service Providers	7 persons
Standard Developing Organizations	0 persons
Researchers	4 persons
Academics	0 persons
Other	0 persons

Top 4 Identified R&D Gaps

Gap #1 – Reducing False Alarms of Leak Detection Systems

Gap #2 – Leak Detection for New and Existing Systems

Gap #3 – Smart System Development

Gap #4 - Mobile Based Leak Detection System Testing

Reducing False Alarms of Leak Detection Systems
Gap #1

1. New or Improved Technology / General Knowledge

a. What pipeline type(s) does the technology target? All, primarily gas/liquid txmission

b. What operating environment(s) would the technology operate? Onshore, arctic, all climates

c. What are any functionality and or performance requirements? Operates under all pipeline operating conditions,

- Time to detection of leak and time to validate
  - Technology/algorithm and alarm management/philosophy (human factors)
- Complementary technologies – voting system philosophy
- HL – LD for Transient operations and shut down/start up
- System's ability to cross check
  - Availability, accuracy & detection
  - Alarm confidence in real-time
  - Self diagnosis

d. What road blocks or barriers prevent the technology deployment? Different pipe types, risk tolerance, leak sensitivity requirements (variable thresholds, HCA's)

e. What are anticipated targets or timeframes to complete this research? Short term 1-3 years

Leak Detection for New & Existing Systems
(Gap #2)

1. New or Improved Technology

a. What pipeline type(s) does the technology target? All – Liquids & Gas transmission, distribution, & gathering (new vs. existing pipelines)

b. What operating environment(s) would the technology operate? onshore, arctic

c. What are any functionality and or performance requirements?

- HL:
  - External LDS for liquids (Fiber optic, odor sensing, Atmospheric, acoustic, infrared) Portable aerial mobile platforms
  - LD for Small Leaks – weeper/seeper
- NG
  - Internal LDS/CPM for gas (large pipes uses it but doesn't cross over to smaller systems not used)
  - Using SCADA to better pinpoint large/rupture leaks (transmission pipeline)
- HL – Upstream LD, multiphase fluid
- Capex / opex costs

d. What road blocks or barriers prevent the technology deployment? Retrofit dilemma on existing pipelines, in-situ field testing on operational pipelines, environmental issues with released product, etc.

e. What are anticipated targets or timeframes to complete this research? Variable timeframes depending on pipe type

Leak Detection for New & Existing Systems
(Gap #2) - Continued

2. New or Revised Consensus Standards (standards, guidelines or recommend practices)

Guidance needs to address Liquids and Gas pipelines(API & AGA & INGAA)

– follow process to integrate guidance appropriately

3. Creation and Dissemination of General Knowledge

a. Can any targets or timeframes be identified to complete this research? Variable timelines based On pipe type

Guidance on:

- on benefits/drawbacks on LD for smaller operators
  - Assessing requirements and specifying solutions
- LDS standard methodology similar to Germany (TRFL) (5/6 different LDS) to help avoid confusion
- Expanding 1130 or creating new standard via API?
- Ability to retrofit & simplifying installation and retrofit

Smart System Development
(Gap #3)

1. New or Improved Technology

a. What pipeline type(s) does the technology target? All (liquid, gas transmission, gas distribution, gathering)

b. What operating environment(s) would the technology operate? Onshore, offshore, arctic

c. What are any functionality and or performance requirements?

Leak Detection sensors, health monitoring

- Miniaturization, robustness in harsh environments (Oil and gas)
- completion of nanotechnology into a sensing device, valve control
- automation (plug and play, networking, scalable)
- Clarification of life-cycle costs (capex, opex)

Natural Gas

- Automatic metering addition of LD sensor (real-time monitoring through SCADA) (gas distribution & transmission)
- New development of sensors & instrumentation

d. What road blocks or barriers prevent the technology deployment? Sensor development & requirements & testing lifecycle considerations of the sensors

e. What are anticipated targets or timeframes to complete this research? Long term >3 years, some elements could be shorter term

Mobile Based Leak Detection System Testing
(Gap #4)

1. New or Improved Technology

a. What pipeline type(s) does the technology target? All (liquid & gas transmission, distribution, gathering)

b. What operating environment(s) would the technology operate? (onshore, offshore, arctic)

c. What are any functionality and or performance requirements?

Mobile based LDS System Testing: Enhance LDS technologies and test on a moving platform (e.g. aerial, mobile vehicles) for demonstrations of accuracy

- Real-time assessment and processing; size of leak/plume, monitoring & alarming
- Liquid and gas
- Aerial for gas / liquid (manned / unmanned aircraft)
  - Increase detection capabilities of technologies
  - Extend range
  - Improve location accuracy
- Develop systems to address Underwater leaks

d. What road blocks or barriers prevent the technology deployment? Urban environments, FAA regulations, underwater environments,

e. What are anticipated targets or timeframes to complete this research? Short term (<3 years)

Other Topics Discussed

• Natural Gas Storage discussed however several PRCI studies should conclude to drive more or less focus.