Working Group 2
Leak Detection/Mitigation

Leader: Ray Philipenko Enbridge
Leader: Doug Robertson TCPL

Facilitator: Robert Smith

Attendance Breakdown

Approximate total attendance	60
Federal Regulators	2
State Regulators	0
International Regulators	0
Pipeline Industry/Service Providers	34
Standard Developing Organizations	1
Researchers	12
Academics	9
Other	2

Top 3 Hazardous Liquid Identified R&D Gaps

Gap #1 – TECHNOLOGY: Increasing CPM Performance with Leaks How to optimize/balance reliability with sensitivity

Gap #2 – TECHNOLOGY: Testing External Sensors

Gap #3 – GENERAL KNOWLEDGE: Cost Benefit Deploying/Retrofitting External Based Sensors

Top 3 Gas Transmission Identified R&D Gaps

Gap #1 – STANDARDS: Development of External LD Recommended Practice

GAP #2 – STANDARDS: ELD Cable Based Leak Detection Research Study

GAP #3 – GENERAL KNOWLEDGE: Consolidation of LDS Sensor Research Information

Top 3 Gas Distribution Identified R&D Gaps

GAP #1 – TECHNOLOGY: Improved Plume Modeling

GAP #2 – STANDARDS/TECHNOLOGY: Residential deployment of Methane Detectors

GAP #3 – STANDARDS/TECHNOLOGY: Develop Recommended Practice for Predictive Analytics Related to damage prevention and safety

Hazardous Liquid (Gap #1)

Increasing CPM Performance with Leaks
How to optimize/balance reliability with sensitivity?

Technology Development: Instrumentation and uncertainty, how well are they calibrated.
Alarm management and filtering and prioritization
Can we use machine learning to assist with alarm management?
Understanding the limits of current systems. Steady state vs transient conditions. Shut in pressure testing when leaks are suspected.
Timing: 1-3 years

Hazardous Liquid (Gap #2)

Testing External Sensors

Technology Development

Quantification and Validation of external sensor systems performance. Continuous based and non-continuous based systems. Field testing as best to real operating/environmental conditions. Buried, on ground or airborne.

Timing: 1-3 years

Hazardous Liquid (Gap #3)

Cost Benefit Deploying/Retrofitting External Based Sensors

General Knowledge

How to effectively deploy/retrofit existing systems with new technology? Maintaining performance parameters. Continuous or non-continuous. Incremental benefit vs costs. Accurate location, strike detection/avoidance, positional accuracy of the retrofit.

Timing: 1-3 years

Gas Transmission (Gap #1)

Development of External LD Recommended Practice

Standards: Initially develop sensor based sensitivity definition. Application of various technology types (cable PT sensor, laser, handheld) includes technology detection standards, application of tech types.

Establish an organization that will certifying technologies against the standard. This would address operator concerns. Minimum performance standards for vendors.
Timing: 1-3 years

Gas Transmission (Gap #2)

ELD Cable Based Leak Detection Research Study

General Knowledge

Cost Benefit Analysis, articulate benefits, identify risk mitigation of a multiuse system. Cable based deployment. New and retrofit. Externally or internally deployed. Examples: ROW monitoring, strain based monitoring. Add as much benefit beyond just leak detection. Best practices for construction (open trench - HDD). Need performance info – will it survive installation or long term operations.

Timing: 1-3 years

Gas Transmission (Gap #3)

Consolidation of LDS Sensor Research Information

General Knowledge: Coordinate, organize the funding orgs efforts around tech categories: internal, external, buried, on ground or airborne systems. Federal vs Private. Also include best practices. Goal is to accelerate knowledge transfer and become more efficient with available research dollars.

Timing: 1-3 years

Gas Distribution (Gap #1)

Improved Plume Modeling

Technology Development

- Develop recommended practice
- Facilitate pinpointing and quantification of leaks
- Research human factors related to pinpointing leak
- Facilitate modeling for mobile technology search
- Improve safety for first responders and evacuation procedures
- Review input data and validate model performance

Timing: 1-3 years

Gas Distribution (Gap #2)

Residential deployment of Methane Detectors

Standard/technology development

- Improve ease of adoption
  - Address sensor design – combine with existing CO and Smoke detector units
  - Change UL standard from 25% LEL to 10% LEL
  - Facilitate Industry Advocacy for new standard, need a good public awareness campaign
  - Low frequency, high consequence events

Timing: 6-12 months

Gas Distribution (Gap #3)

Develop Recommended Practice for Predictive Analytics Related to damage prevention and safety

Standard/technology development

- Develop Recommended Practice
  - Review current data collection and analytical models to facilitate development of RP
    - For high risk digs, leak/failure prediction, etc.
    - Evolve models and predictive tools
  - Facilitate optimization of field/safety resources to reduce risk
  - Need mechanism for consensus building between states.

Timing: 1-3 years

Additional Identified Gaps

- Liquid: Changing operator mentality from I can't have a leak to maybe I do have a leak.
- Liquid: Human factors: learning from other sectors for improved confidence in leak detection equipment.
- Liquid: Small leaks on water - Detection
- Gas Trans: Leak Surveys – Accessibility to ROW. Ground based challenges, land owners, environmental. Accuracy of device to leak location.
- Gas Trans: Implementation of CPM system on gas trans pipelines
- Gas Trans: Guidelines of PT and pressure monitoring
- Gas Trans: Applications for smart pipe
- Gas Trans: Sensitivity targets and guidelines - how influenced by HCAs
- Gas Dist: Meter or other component redesign for longer life and less leaks.
- Gas Dist: Reg framework for adopting new tech – consensus building between states and methodology for comparison of tech with each other.
- Gas Dist: Study on the propagation of underground gas migration
- Gas Dist: Performance based specs and testing requirements for LD and equipment.
- Gas Dist: Improved sensitivity of plume visualization tech.
- Gas Dist: SCADA system for gas dist.
- Gas Dist: Addressing the generation of leaks and how fast they can grow