Facilities/Compression/LNG

DOT R&D Forum

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Houston, TX

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Technology for Energy Pipelines

Facilities / Compression / LNG Track

LNG – Jeryl Mohn, Panhandle Energy
Charlie Helm, DOT-OPS
Measurement – Jim Witte, El Paso
Angela Floyd, Panhandle Energy
Eric Kelner, SwRI
Compression – Bill Couch, El Paso
Eric Thomas, GMRC
Jasmine Urisk, JTU Consulting (Canada)
Allison Berkowitz, NiSource
Mike Whelan, PRCI
Session Chair – Mike Whelan
Session Facilitator - Tom Logan - GE

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Definition Reminder

- **Technology Gap**

  “Where existing/planned programs are today vs. where we desire to be”

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Biological Metaphor

- **Compressor Stations**
  - The Heart of the system
- **Measurement**
  - The Nervous system
- **LNG**
  - Increasingly, the blood in the system

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LNG Technology Gaps

- **End Use Equipment Compatibility**
  - Characterize effect of LNG blended gas on end use equipment – including gas pipeline infrastructure
    - "Current & Critical need" per NGC Study
- **Custody Transfer at terminal**
  - "Archaic" methods used to measure shipboard volumes (strapping)
- **Incident Modeling**
  - Continuing improvement of incident models to further refine safety zones and support public dialogue

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Measurement Technology Gaps

- **Custody Transfer Accuracy & Bias**
  - Orifice Plate compliance & variation
  - In-situ meter proving
  - Pipeline noise interactions with USM's
  - Ultrasonic meter recalibration intervals
  - Why?? 0.1% improvement at $6 gas = $450MM/yr
- **Gas Quality (& Internal Corrosion control??)**
  - Advancing beyond the gas chromatograph
    - NMR or Micro-electro-mechanical concepts for C6+
    - Real-time BTU meter for equipment controls
  - Evaluate SOA of Hydrocarbon Dew Point prediction tools

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Measurement Technology Gaps

- **Sensors and Diagnostics**
  - Intelligent meters
    - Moving diagnostics into mechanical meters
      - Self-adjusting orifice plates
    - Self-report condition & calibrate?
  - Real-time, high-speed sensor & data fusion
    - What do we do with all of today's data??
      - Visual & graphic display
        - See patterns, trends, data-mining

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Measurement Technology Gaps

- **Standards Development & Maintenance**
  - What happens when the level of R&D no longer supports standards maintenance?
    - Default case is that ISO standards may be forced onto the industry
      - Millions of $$ to reconfigure the system
  - Standards a necessary element of any new measurement technology development
    - A critical tech transfer piece

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Compression Technology Gaps

- **Emissions compliance**
  - "Cost exposures within the fence comparable to those outside the fence"
    - Ultra-low NOx retrofit equipment for reciprocating engines
    - Targeting 2010 levels of ½ gram NOx/bhp-hr
      - Systematic approach to resolving interdependent gaps being pursued
    - Cost-effective emissions monitoring

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Compression Technology Gaps

- **O&M Cost Reduction**
  - Compressor-side improvements that are retrofittable to existing integral units
  - Gas turbine hot section part life

  - 56% of all pipeline O&M costs are incurred at compressor stations (ex-fuel)

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Compression Technology Gaps

- **System level modeling & optimization**
  - Increase productivity of existing infrastructure
    - Improved dispatch models for overall system efficiency and throughput increases
    - Fuel savings and increased capacity
      - Is this suitable as ‘shared’ R&D?
      - 660 Bcf of fuel consumed annually
        - ~$4 billion of fuel cost

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