Transmission and Storage Operations

Natural Gas Infrastructure R&D and Methane Mitigation Workshop

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Agenda

• DTE Gas Snapshot

• NOx & CO
  – Combustion stability

• Methane
  – Packing
  – Blowdowns
  • Capture vs Flare
• DTE Gas
  – 41 Units
    • Age Range: 8-59yrs (Average 45yrs)
  – 118,200HP
    • 1,000-15,000HP
  – 7 different manufacturers
    • Cooper-Bessemer, Solar, Waukesha, DeLaval, IR, CAT, Ariel
  – Complete Mixture
    • Integral, Separable, 2-Cycle, 4-Cycle, Reciprocating, Centrifugal, High Speed, Mid Speed, Low Speed, Rich Burn, Lean Burn, Air Start, Gas Start
NOx and CO Reduction

Combustion Stability!!

- Combustion Stability Initiatives
  - Pre-combustion Chambers
  - Trapped Equivalency Ratio (Air/Fuel Curve Modification)
  - Catalysts
    - 98% Reduction in CO
    - NO Reduction in NOx
  - Ignition system upgrade
    - 81% Reduction in NOx
    - 15% Increase in CO

- Challenges
  - Technology resulting in less than 2g NOx emissions
  - Emission regulations dropping
  - Stability control with combining technologies
  - Cost
Methane Release Reduction

• Sealing Technology Limitations
  – Compressor rod seals require designed clearances to allow for independent rod and piston motion
    • Best industry standards sit around 10scfh, but range drastically
  – They are often shut down, but required to remain in operational, pressurized condition
    • Static vs Dynamic
  – Rod seals utilize cylinder pressure to activate the packing rings
    • DTE operational variations range between 230psi to 1250psi suction pressure

• Compressor Configuration
  – Leakage is inherent in all reciprocating compressors
    • Standard Packing (Currently seeing up to 60scfh in dynamic mode with new packing)
    • Low Emission Packing (Expecting to see less than 30scfh in dynamic mode)
    • Zero Emission Packing (Expecting to see minimal to none in static or dynamic mode)
  – Rates are dependent on size, mechanical wear and operating pressures
    • PM
    • PdM
Can the gas be captured or repurposed??

• Release Levels
  – Station
  – Unit
  – Component

• Capture Technology

• Flare Technology
  – Conversion of methane to CO2
    • Reduction of 95% methane emissions
• DTE Gas TSO Operations is continually looking for ways to upgrade our system and all equipment within

• We look forward to input, feedback and recommendations on all items mentioned

• Any follow up inquiries:
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QUESTIONS??