Replacing Compressor Rod Packing at SoCalGas

EPA Technology Transfer Workshop
Glen Allen, VA
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Overview

» Southern California Gas Company Overview
» EPA Gas STAR Program History
» Operational and Technology Challenges
» Regulatory Climate
» Compressor Rod Packing Replacement Drivers
  ▪ EPA Gas STAR
  ▪ Methane Challenge
  ▪ CARB Oil and Gas Rule
» Conclusion
Company Overview

- 140 Years in Service
- 5.8 Million Meters
- 21 Million Customers
- 135 Bcf Storage Capacity
- 100,000 Miles Distribution Mains & Services
- 3,500 Miles Transmission Lines
- 9 Compressor Stations
- 4 Gas Storage Fields
SoCalGas Territory
## Storage Fields and Compressor Stations

<table>
<thead>
<tr>
<th>Facility</th>
<th>Engines</th>
<th>Cylinders</th>
<th>Packing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aliso Canyon</td>
<td>5</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Blythe</td>
<td>8</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Blythe</td>
<td>2</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Goleta</td>
<td>7</td>
<td>2</td>
<td>14</td>
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<tr>
<td>Honor Ranch</td>
<td>5</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td>Honor Ranch</td>
<td>2</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>North Needles</td>
<td>2</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
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<td>5</td>
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</tr>
<tr>
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<tr>
<td>South Needles</td>
<td>7</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>Ventura</td>
<td>3</td>
<td>2</td>
<td>6</td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>152</strong></td>
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EPA Gas STAR Program History

» Joined EPA Gas STAR Transmission Sector in 1993
» Cumulative methane emissions reductions of 2,489,804 Mcf (as of 2016)
» Equates to Total Reduction 1,028,300 MTCO2e
» Achieved Reductions from:
  ▪ Replacement of High-Bleed Pneumatics
  ▪ Use of Turbines at Compressor Stations
  ▪ Redesign Blowdown/ESD Practices
  ▪ Reduce System Pressure
  ▪ Replace Compressor Rod Packing
EPA Gas STAR Program Reductions

Cumulative Reductions for Southern California Gas Company: 2,489,804 Mcf

- Redesign blowdown/alter ESD practices: 36.8%
- Replace compressor rod packing systems: 22.4%
- Use of turbines at compressor stations: 21.4%
- Reduce/downgrade system pressure: 15.8%
- Identify and replace high-bleed pneumatic devices: 2.4%
- Other: 1.1%
EPA Gas STAR Program Reductions

2016 Reductions for Southern California Gas Company: 75,203 Mcf

- Replace compressor rod packing systems: 44.9%
- Redesign blowdown/alter ESD practices: 2.8%
- Reduce/downgrade system pressure: 52.3%
# Recent Rod Packing Replacements

<table>
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<tr>
<th>YEAR</th>
<th># ROD PACKINGS</th>
<th>Mcf CH4</th>
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<tbody>
<tr>
<td>2008</td>
<td>41</td>
<td>35,465</td>
</tr>
<tr>
<td>2009</td>
<td>31</td>
<td>26,815</td>
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<tr>
<td>2010</td>
<td>29</td>
<td>25,085</td>
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<tr>
<td>2011</td>
<td>13</td>
<td>11,245</td>
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<td>2012</td>
<td>60</td>
<td>51,900</td>
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<td>2013</td>
<td>63</td>
<td>54,495</td>
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<td>2014</td>
<td>58</td>
<td>50,170</td>
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<td>2015</td>
<td>29</td>
<td>25,065</td>
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<tr>
<td>2016</td>
<td>39</td>
<td>33,735</td>
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Operational Reasons for Replacement

» Audio Inspection
» Periodic Compressor Performance Checks
» Compressor cylinder is repaired/overhauled
» Over 26,000 hours run time (per Methane Challenge)
Regulatory Drivers for Replacement

- Programs requiring methane/natural gas measurements or reductions
  - EPA Natural Gas STAR (Voluntary)
  - EPA Methane Challenge (Voluntary)
  - EPA GHGRP (Annual Leak Survey)
  - CARB MRR (Annual Leak Survey)
  - CARB Oil and Gas Rule
    - Quarterly Leak Survey
    - Annual Compressor Vent Measurement
  - SB1371 Best Practices
    - BP #23 - Prevent/Minimize/Stop Fugitive & Vented Methane Emissions
Observations and Challenges

» All Rod Packings are Not Created Equal
  ▪ Diverse Vintage Engine Types
  ▪ Effectiveness and Life Span may Vary
  ▪ Investigating various materials and ring designs that form a better seal against rod
  ▪ Run Hours Provides Good Metric for Replacement
  ▪ Replacing due to Run Hours Could be Premature (if packing in good condition)

» Regulatory Changes In California Reduces Impact of Voluntary Programs for SoCalGas
  ▪ CARB Oil and Gas Rule (2 scfm leak threshold)
  ▪ SB1371 Best Practices – reducing leakage
Thank You for Your Attention!

QUESTIONS?