Who are we?
Current Methane Emission Reduction Programs

• Natural Gas Star Initiatives:
  • Conduct AGL Inspections and repair leaks found
  • Identify and replace high-bleed pneumatic devices
  • Installing engine blow down recovery systems in existing compressor stations
  • Replace orifice meters with ultrasonic meters
  • Use YALE enclosures during ESD testing to prevent full station blowdowns and performing capped ESD

• Methane Challenge: Hot Taps and Pipeline Pressure Reductions

• Lost and Unaccounted for Gas (LAUFG) Internal Initiatives

• Methane Million Internal Initiative
GIG Voluntary Methane Savings
Reductions – LAUFG, NG Star, Methane Challenge & Methane Millions

Projected Gas Loss reduction is equivalent to the annual GHG emissions of 3,400 MW of clean gas fired power generation capable of powering ~850,000 homes
Technology Review

- Extended Pressurized Hold (Centrifugal Compressors)
- Pipeline Pressure Reduction
- Engine Blow Down Recovery (Reciprocating Compressors)
Extended Pressurized Hold (Centrifugal Compressors)

- Minimizes blow downs
- Allows compressor to stay pressurized for long periods of time
- Case pressure managed through installed compression and minimizes vent during start up
- Minimizes the need for purging during start up
- Limits blow down events to maintenance activities
Extended Pressurized Hold (Centrifugal Compressors)
Pipeline Blow Down Options

• Use isolation valves to minimize impact
• Install plugging equipment to shorten segment of pipeline involved in outage
• Lower pressure in the pipeline prior to event
• Stationary compressors that manage pressure
• Portable compressors
• Delivery to customers (LDC, Power Gen., etc.)
• Re-direct into storage vessel (field) or low-pressure header (fuel gas or gathering system)
• Install duct burners, thermal oxidizers or flares
Pipeline Pressure Reduction

• Reduces Methane release through pressure reduction

• Pressure reduced using existing compression to a reasonable pressure

• Pressure further reduced using temporary equipment.
  • *Detailed processes and procedures are developed and put in place prior to utilization to ensure compliance with pipe line safety rules and regulations.*
Reducing Pipeline Pressure Prior to Blowing Down

Field Compressor

Downstream Compressor Station

Isolation Point A (valve)

Isolation Point B (valve)
## DETI Benefits from Pressure Reductions

<table>
<thead>
<tr>
<th>Year</th>
<th>Opportunities to Reduce Pressure</th>
<th>Total Volumes Not Released to Atmosphere (Mcf)</th>
<th>Average Savings per Opportunity (Mcf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>116</td>
<td>109,650</td>
<td>945</td>
</tr>
<tr>
<td>2013</td>
<td>47</td>
<td>175,142</td>
<td>3,726</td>
</tr>
<tr>
<td>2014</td>
<td>45</td>
<td>177,096</td>
<td>3,935</td>
</tr>
<tr>
<td>2015</td>
<td>19</td>
<td>177,919</td>
<td>9,364</td>
</tr>
<tr>
<td>2016</td>
<td>38</td>
<td>264,045</td>
<td>6,949</td>
</tr>
<tr>
<td>TOTAL</td>
<td>265</td>
<td>903,852</td>
<td>3,411</td>
</tr>
</tbody>
</table>
Engine Blow Down Recovery
(Reciprocating Compressors)

• Reduces methane release by 77% on average

• Minimizes blow downs during start up

• Recovered gas is regulated and fed into lower pressure source.
Engine Blow-Down Recovery System

Low Pressure System
## DETI Engine Blow-Down Recovery System Benefits

<table>
<thead>
<tr>
<th>Year</th>
<th>Potential Blow Down Volumes (Mcf)</th>
<th>Total Volumes Recovered (Mcf)</th>
<th>Percent Recovered</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>22,004</td>
<td>16,829</td>
<td>76%</td>
</tr>
<tr>
<td>2011</td>
<td>30,397</td>
<td>25,031</td>
<td>82%</td>
</tr>
<tr>
<td>2012</td>
<td>102,162</td>
<td>74,175</td>
<td>73%</td>
</tr>
<tr>
<td>2013</td>
<td>122,159</td>
<td>98,899</td>
<td>81%</td>
</tr>
<tr>
<td>2014</td>
<td>84,686</td>
<td>56,781</td>
<td>67%</td>
</tr>
<tr>
<td>2015</td>
<td>135,464</td>
<td>104,915</td>
<td>77%</td>
</tr>
<tr>
<td>2016</td>
<td>163,265</td>
<td>129,290</td>
<td>79%</td>
</tr>
<tr>
<td>Total</td>
<td>660,137</td>
<td>505,920</td>
<td>77%</td>
</tr>
</tbody>
</table>
Questions?