Economic Best Management Practices for Small and Medium Sized Producers

Lessons Learned from Natural Gas STAR

Small and Medium Sized Producer Technology Transfer Workshop

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Economic BMPs: Agenda

- What is the problem?
- BMP I: Identify and replace high-bleed pneumatic devices
- BMP II: Install flash tank separator on dehydrators
- BMP III: Additional profitable BMPs that reduce methane emissions
- Discussion questions
What is the Problem?

- **Pneumatic devices**
  - 250 thousand gas pneumatic controllers in production sector
  - Release gas to atmosphere by design
  - Production operations emit 31 Bcf/yr

- **Glycol dehydrators**
  - 38 thousand dehydrators in the gas industry
  - Remove moisture from gas but also absorb methane, VOCs and HAPs
  - Vent absorbed methane, VOCs and HAPs to atmosphere

- **Other opportunities**
  - Stock tank venting, well venting, compressors, fugitives
  - Releases of gas to atmosphere by design or unintentionally
Solution: Implement BMPs

- Best Management Practices (BMPs) posted on Gas STAR website
  - www.epa.gov/gasstar
  - Program overview
  - Technical Support Documents: Lessons Learned
- Replacing high-bleed pneumatics
  - Saves gas for sale instead of venting
- Flash tank installation
  - Recovers all methane bypassed and most methane absorbed by glycol
- Partner Reported Opportunities (PROs)
  - Technical Support Documents
BMP I for Pneumatic Devices

Replace High-Bleed Devices with Low-Bleed Devices
Replacing with Low-Bleed Benefits

- Up to 80% of high-bleed devices can be replaced or retrofitted with low-bleed equipment.
- Every low-bleed replacement/retrofit gives gas savings from $135 to $780 or more per year.
  - Implementation cost often recovered in less than a year.
  - Replacement/retrofit can provide better system-wide performance, reliability and monitoring.
BMP II for Glycol Dehydrators

Install Flash Tank Separator (FTS)
Glycol Dehydrator Methane Emissions

- While glycol removes moisture from gas, glycol also absorbs methane, VOCs and HAPs

- Dehydrators vent absorbed methane, VOCs and HAPs to the atmosphere, which wastes gas, costs money and contributes to air quality problems
Glycol Dehydrator Methane Emissions

- **Glycol Contactor**
  - **Dry Sales Gas**
  - **Inlet Wet Gas**
  - **Gas Bypass**
  - **Glycol Energy Exchange Pump**
  - **Lean TEG**
  - **Driver**
  - **Rich TEG**
  - **Pump**

- **FTS**
- **Glycol Reboiler/Regenerator**
- **Fuel Gas**
- **Gas Recovery**
- **Water/Methane/VOCs/HAPs to Atmosphere**

Reducing Emissions, Increasing Efficiency, Maximizing Profits
Installing Flash Tank Separator

- Flashed methane can be captured using an FTS
- Many units are not using an FTS

![Bar chart showing MMscfd processed with and without FTS for different MMscfd ranges: <1, 1-5, >5. The chart shows the percentage of MMscfd processed with FTS and without FTS.]

- Flashed methane can be captured using an FTS
- Many units are not using an FTS
How Can Glycol Dehydrator Emissions Be Minimized?

- Flash tank installation
  - Recovers all methane bypassed and most methane absorbed by glycol
- Optimized glycol circulation rates
  - Methane emissions are directly proportional to glycol circulation rate
- Electric pump installation
  - Eliminates need to bypass gas for motive force
  - Twice as much gas bypassed as absorbed
  - Eliminates lean glycol contamination by rich glycol
Installing Flash Tank Benefits

- Most dehydrators send the glycol/gas mixture from pump driver to regenerator
- An FTS, operating at fuel gas system or compressor suction pressure, recovers ~90% of methane and 10 to 40% of VOCs
- Low capital cost; short payback period
Installing Flash Tank Decision Process

1. IDENTIFY dehydration units without flash tanks
2. ESTIMATE gas savings potential
3. IDENTIFY destination for low pressure gas
4. ESTIMATE capital and installation costs of flash tank
5. CONDUCT economic analysis
## Flash Tank Economics

<table>
<thead>
<tr>
<th>Option</th>
<th>Capital Costs</th>
<th>Annual O&amp;M Costs</th>
<th>Emissions Savings</th>
<th>Payback Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Install Flash Tank</td>
<td>$5,000 - $14,000</td>
<td>Negligible</td>
<td>236 – 7,098 Mcf/yr</td>
<td>5 months – 17 months</td>
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</tbody>
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Partner Experiences

- Shell Exploration and Production Company installed flash tank separators on 106 dehydrators over an 8-year period
  - Estimated methane emissions reduction of 216 MMcf/yr
  - Estimated savings of $650,000
  - Capital and installation costs of $15 to $30 thousand per dehydrator
  - 3-year payback period
BMP III

Partner Reported Opportunities
Many production facilities have identified practical, cost-effective methane emissions reduction practices.

Production partners report saving 187 Bcf since 1990, 80% from PROs.


38 PROs applicable to production.

56 total PROs.
Discussion Questions

- To what extent are you implementing these BMPs?
- What are the barriers (technological, economic, lack of information, regulatory, etc.) that are preventing you from fully implementing these BMPs?
- What PROs have you identified in your operations?