Dehydration Technologies:
Methanol Injection

Don Anderson
Western Gas Resources

George and Mike Fourqurean
Solar Injection Systems, Inc.

Natural Gas Star
2004 Implementation Workshop
Houston, Texas
Outline

- Hydrates
- Hydrate Prevention
  - Dehydration
  - Inhibition
- Western Gas Resources’ Experience
- Other Uses of Solar Pumps
Hydrates
Hydrates - a physical combination of water and other small molecules to produce a solid which has an “ice-like” appearance.

Water content of gas depends on pressure, temperature and composition.

Hydrate formation
- Gas below water dew point
- Low temperature
- High pressure
Hydrate Prevention
Dehydration

- Removal of water
- Liquid or solid desiccant
- Liquid glycol most common
- Not as effective at lower line pressures
  <300 psig
Inhibition

- Injection of a glycol or methanol
- To lower the hydrate formation temperature at a given pressure
Field Conditions

- Cold winter temperatures (Wyoming)
- Low pressure gathering system
  - 50 to 400 psig
- Wet gas freezing up in glycol pumps
  - downtime
Solution

- Methanol Injection
- Solar Powered Pumps
- Manufactured by Solar Injection Systems, Inc.
  - www.Sunpumper.com
Benefits

- Eliminate Dehys
- Lower Emissions
  - VOC’s, methane and CO$_2$
- Fewer Environmental Problems
- Lower Fuel and Gas Usage
- Ease of Operations
Reduced Emission Estimates

- **Methane Emissions - Dehy**
  - (GRI-GHGCalc ver 1.0)
  - Dehy fugitive emission factor: 1374 lb/dehy-yr
  - Dehy vents emission factor: 11.63 lb/MMscf
  - Dehy Kimray pumps emission factor: 41.88 lb/MMscf

- Methane lb/scf: 0.042 lb/scf
## Methane Reduction vs. Dehy Throughput

<table>
<thead>
<tr>
<th>Daily Volume (MMscfd)</th>
<th>Annual Methane Emission (MMscf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>0.265</td>
</tr>
<tr>
<td>1.0</td>
<td>0.498</td>
</tr>
<tr>
<td>5.0</td>
<td>2.358</td>
</tr>
<tr>
<td>7.0</td>
<td>3.288</td>
</tr>
<tr>
<td>10</td>
<td>4.683</td>
</tr>
</tbody>
</table>
Other Uses of Solar Pumps
Other Uses

- Any gas driven chemical pump
- Any electric chemical pump
- Any instrument air pump
- Examples
  - Corrosion inhibitor
  - $\text{H}_2\text{S}$ Scavenger
  - $\text{O}_2$ Scavenger
Contact Info

- **Solar Injection Systems, Inc.**
  Mike Fourquarean
  1513 W. Montgomery
  Midland, TX 79701
  Ph. 432.570.8144
  [www.sunpumper.com](http://www.sunpumper.com)

- **Don Anderson**
  Western Gas Resources, Inc.
  1099 18th Street Suite 1200
  Denver, CO 80202
  Ph. 303.450.8411
Questions and Answers

- ??????????