

# 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

---



- 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  
<300psig

# Inhibition

---

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



**Western Gas  
Resources'  
Experience**





# Field Conditions

---

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



# Solution

---

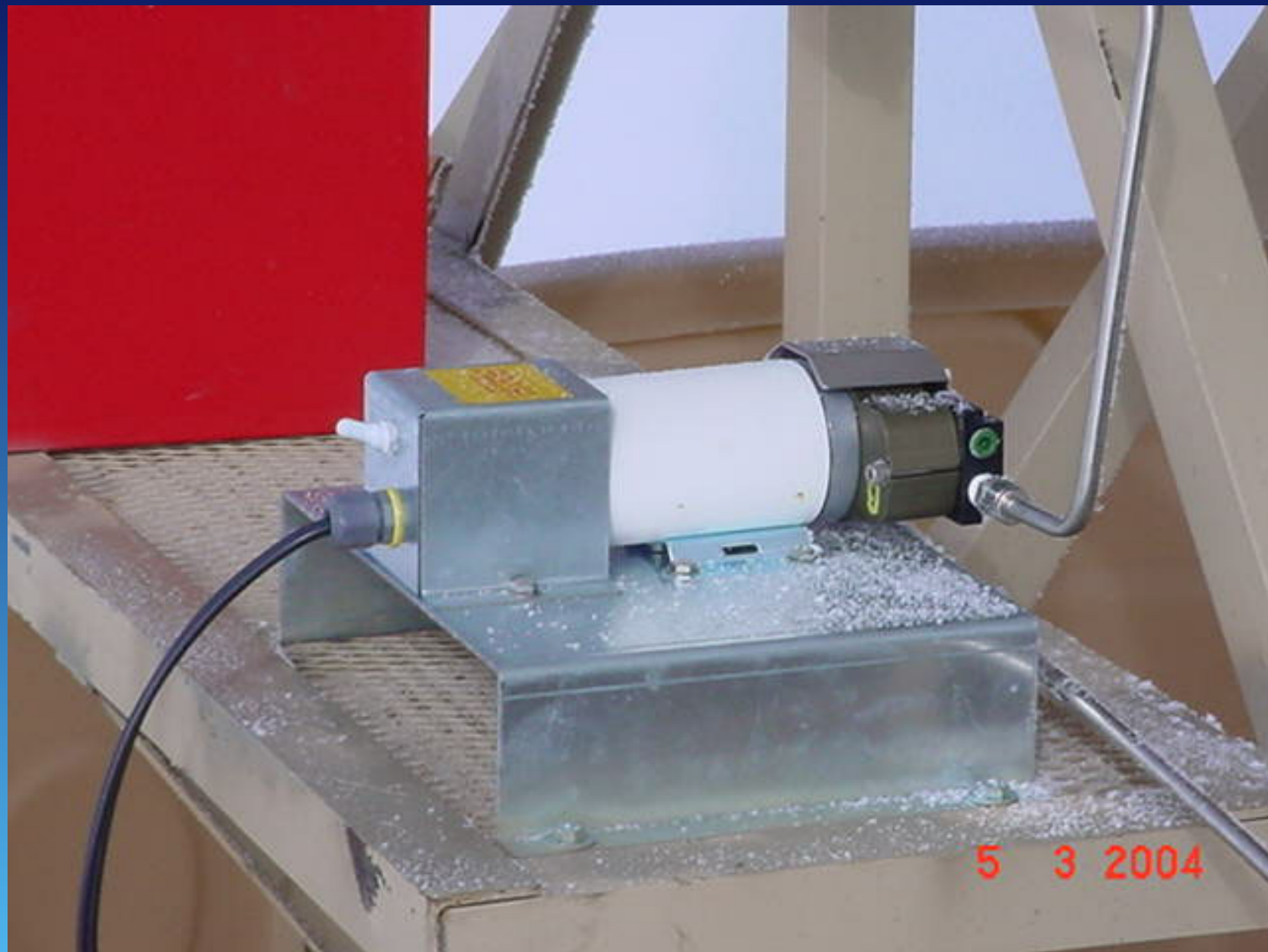


- **Methanol Injection**
- **Solar Powered Pumps**
- **Manufactured by Solar Injection Systems, Inc.**
  - [www.Sunpumper.com](http://www.Sunpumper.com)





5 3 2004





# Benefits

---



- **Eliminate Dehys**
- **Lower Emissions**
  - VOC's, methane and CO<sub>2</sub>
- **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



Daily Volume (MMscfd)	Annual Methane Emission (MMscf)
0.5	0.265
1.0	0.498
5.0	2.358
7.0	3.288
10	4.683

# Other Uses of Solar Pumps



# Other Uses

---



- Any gas driven chemical pump
- Any electric chemical pump
- Any instrument air pump
- Examples
  - Corrosion inhibitor
  - H<sub>2</sub>S Scavenger
  - O<sub>2</sub> Scavenger

# Contact Info

---

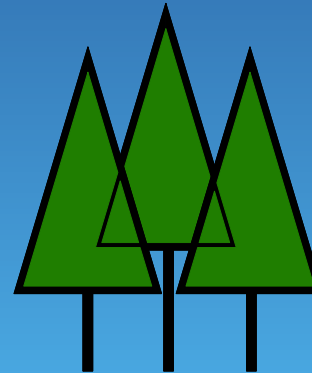
➤ **Solar Injection Systems, Inc.**

Mike Fourqurean  
1513 W. Montgomery  
Midland, TX 79701  
Ph. 432.570.8144

[www.sunpumper.com](http://www.sunpumper.com)

➤ **Don Anderson**

Western Gas Resources, Inc.  
1099 18<sup>th</sup> Street Suite 1200  
Denver, CO 80202  
Ph. 303.450.8411



# Questions and Answers

---



➤ ??????????