Vapor Recovery Unit Application

Glenwood Springs Producers Technology Transfer Workshop

Presenter: Bill Herrmann
Company: Williams Production RMT
Block Flow Diagram – Crawford Trail

- INLET SEPARATION
- COMPRESSORS
- DEHYDRATION
- CONDENSATE FLASH TANK
- VAPOR RECOVERY UNIT
- CONDENSATE STORAGE

Flow Arrows:
- FROM WELLS to INLET SEPARATION
- INLET SEPARATION to COMPRESSORS
- COMPRESSORS to DEHYDRATION
- DEHYDRATION to SALES
- INLET SEPARATION to CONDENSATE FLASH TANK
- CONDENSATE FLASH TANK to VAPOR RECOVERY UNIT
- VAPOR RECOVERY UNIT to CONDENSATE STORAGE
- CONDENSATE FLASH TANK to VAPORS
- VAPORS to VAPOR RECOVERY UNIT
- VAPORS & NON-CONDENSABLE STILL VAPORS to DEHYDRATION

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Vapor Recovery Unit
Condensate Flash Tank
### SPECIFICATIONS FOR VAPOR RECOVERY SYSTEM

**Trail Ridge Compressor Station**

**Site Elevation:** 8500 FT  
**Ambient Temperature (Min/Max):** -50 to 110°F

**Gas Analysis (Mole%):**

<table>
<thead>
<tr>
<th>Component</th>
<th>Mole%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Dioxide</td>
<td>7.29</td>
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<tr>
<td>Methane</td>
<td>51.43</td>
</tr>
<tr>
<td>Ethane</td>
<td>18.53</td>
</tr>
<tr>
<td>Propane</td>
<td>11.34</td>
</tr>
<tr>
<td>i-Butane</td>
<td>3.10</td>
</tr>
<tr>
<td>n-Butane</td>
<td>3.25</td>
</tr>
<tr>
<td>i-Pentane</td>
<td>1.35</td>
</tr>
<tr>
<td>n-Pentane</td>
<td>0.97</td>
</tr>
<tr>
<td>Hexane Plus</td>
<td>2.44</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>102.00</td>
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</tbody>
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**Inlet Pressure:** 14 PSIA  
**Inlet Temperature:** 40°F  
**Discharge Pressure:** 212 PSIA  
**Capacity:** 0.322 MMSCFD  
**Gas:** SWEET NATURAL GAS

**Molecular Weight:** 25.78  
**Specific Heat Ratio (k/R):** 1.251  
**Compressibility Factor (Z):** 0.9924

**Driver:** ELECTRIC MOTOR  
**Power:** 400 VOLT 3 PHASE 60 CYCLE  
**Motor Enclosure:** TIER C  
**Electrical Area Classification:** CLASS I, DIV 2
- Regulation 7 of the Colorado Air Pollution Control Division (APCD)
- Revised - 40 CFR, Subpart HH / O&G Area NESHAP
  - Rule effective on January 3, 2007
  - Subpart HH formerly addressed only major sources
  - Area source requirements now included in Subpart HH
VRU Skid: $93,000 X 1.5 installation factor = $139,500
Condensate Flash Tank: $40,000 X 2.5 installation factor = $100,000
Total Estimated Cost: ~$240,000
Advantages of VRU over Flaring

- Conserves BTU’s of the recycled stream ($$$)
- Eliminates flare stack that may be visible to the public
- Controls CO2 emissions (greenhouse gasses)
Operational Challenges

- Designing for future expansion while maintaining operability at low flow rates
- Reliable power
- Operator understanding