



Scroll Compressors for Vapor Recovery

Natural Gas Star Tech Transfer Workshop
May 14, 2009 Oklahoma City



Introduction

- VRU Background
 - Issues with Conventional VRU
 - Objectives of Scroll Pilot
- The Scroll Package
- Benefits



Background - Issues



Issues with VRUs

- Conventional VRU units blamed for O₂ spikes
- Frequent maintenance required
 - Created additional "down-time"
 - Resulting in increased emissions and valuable loss of high-BTU vapors
 - Could result in possible compliance issues
- Inefficient Operational Design
 - Undersized vent piping and/or with 90s creates frictional pressure loss
 - Lengthy connective piping contained "fluid traps"
 - Pressure control at the VRU





Background - Objectives



Operationally enhance our current VRU design



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Overcome downstream oxygen "spikes"

- We wanted to overcome our O₂ issue
- Reduce costs of obtaining an oxygen sensor
- Enhance operational design of our connective piping by increasing size and avoiding 90° angles
- Reduce distance from the tanks to the VRU unit and eliminate any "fluid traps"



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Increase Efficiency and Reduce Maintenance

- Increase efficiency and run-time of the VRU units
 - Eliminate time-consuming and costly maintenance
 - Mount remote sensor pressure transducer on tank to better regulate tank pressure
- vs.
- Current device mounted on the VRU unit



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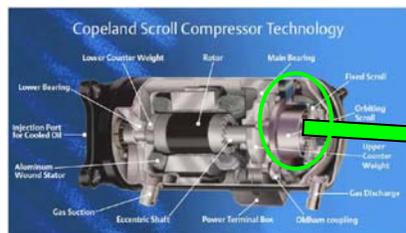




The Scroll Package



The Scroll Module & Compressor



Orbiting Scroll "Orbits", Rather Than Rotating

- Commercial refrigeration design basis
- Increased tolerance to liquid slugs or debris events
- Positive displacement, oil flooded design
- Low sound, virtually no vibration, no pulsations
- Hermetically welded motor-compressor, no shaft seals
- Built for variable speed operation (2400-4800 rpm)



Compressor "Module"

The Scroll Package - Benefits



The Scroll Package - Gunbarrel Service



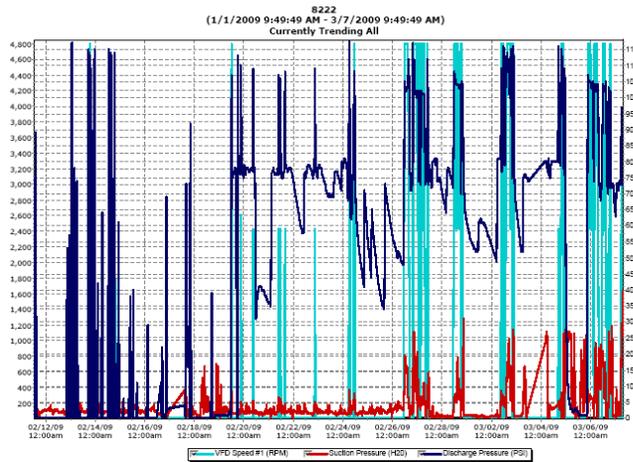
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The Scroll Package - VFD Performance



The Scroll Package - Benefits Over Conventional VRU

- Trailer or Skid-mounted packages
- Hermetically sealed design
- Once per year maintenance
 - Quick
 - Low-cost
- Variable Frequency Drive (VFD)
- Few moving parts
- Low noise levels
- Can optimize HP by installing parallel modules, matching HP to fluctuating flow rates and pressures



The Scroll Package - Designed for Reliability

- Inclusion of a Programmable Blanket Gas Loop which automatically detects a loss in pressure and switches on Blanket Gas to the tank battery which removes the need for leaving thief hatches open and reduces the possibility of O₂ (air) getting into the tanks.
- Automated blowcase and patented OMS is the key to handling high BTU vapors.



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Thank You.

