



**GulfTerra**

# GulfTerra Energy Partners

---

Presentation to Natural Gas STAR  
Workshop

October 26, 2004



# A BRIEF HISTORY ( Who's on First ?)



- \* 1928-1983 El Paso Natural Gas
- \* 1983-1991 Subsidiary of BNI
- \* 1991-1993 Subsidiary of BR
- \* 1993-1995 Subsidiary of El Paso Energy
- \* 1995-2004 Business Unit of El Paso Corporation
- \* October 2004 Merger & Acquisition by Enterprise Products Partners.

# GulfTerra Energy Partners L.P.



- \* 24,000 miles of gas gathering and transmission lines, including onshore and offshore systems
  - >10.3 Bcf/d
- \* 16 Offshore Platforms
  - > 635,000 bbls/d
- \* 12 Gas Plants
  - > 170,000 bbl/d
  - > 2.7 Bcf/d
- \* 105 Compressor Stations/Treating Facilities
  - >900,000 hp

# Drivers For Participation



- \* Not solely for the purpose of reducing methane emissions
- \* Cost savings / Cost reductions
- \* Increased system throughput
  - New equipment has reduced emissions
  - Increased throughput requires equipment shutdown due to modified operating conditions, reducing emissions

# Drivers For Participation



- \* Safety
- \* Good Corporate Environmental Stewardship
- \* Management Commitment

# Participation in Gas Star



## \* Management Commitment

- Assignment of personnel with expertise and time to participate
- Implied authority to request operations resources (time) to gathering data

## \* Utilization of EPA STAR Program “tools”

# Participation in Gas Star - Challenges



- ✦ Changes in facility ownership/loss of project knowledge
- ✦ Engineering and middle management staff reduced
- ✦ Retirement of location supervisors, with replacement coming from other locations and/or companies

# Participation in Gas Star - Challenges



- \* Interest of operations (location) personnel
- \* Reduced number and multi-tasking of technicians (location staff has more to do)
- \* Ever-increasing documentation demands (regulations / budgets / reports / etc) with no additional assistance
- \* Voluntary Program – not necessarily a high priority at the operations level

# Participation in Gas Star - Challenges



## \* Estimating the reduction in methane emissions

- Historical approval of projects not based on estimation of methane savings.
- Projects may be similar, but not identical, to projects that have had typical reductions measured.
- Some projects without measured reductions have no reliable estimating technique and must be “swagged”

# GulfTerra Energy Partners

## Historical Methane Reduction/Recovery



- ✦ 16.035 BSCF 1990-2003
  - 12.035 BSCF Rupture Pins
  - 3.469 BSCF Dehydrator Shutdowns
  - 296.6 MMSCF Vapor Recovery Systems
  - 106.6 MMSCF Flare Systems
  - 71.0 MMSCF Hot Taps for Pipeline Connections
  - 43.6 MMSCF Compressor Replacements
  - 5.4 MMSCF Clock Spring Pipe Repairs
  - 27.4 MMSCF All Others

# GulfTerra Energy Partners Highlighted PRO

## The Rupture Pin

---



# Rupture Pin - Background



- \* El Paso has significantly reduced methane emissions by shutting down dehydration units
- \* Only 3 dehydration units have had emissions reduced through a partial reduction in glycol flow rate
- \* Increasing throughput in the San Juan Basin was accomplished by a drop in the gathering system pressure.

# Rupture Pin - Background



- \* Wellhead dehydration units in the San Juan Basin are remote from a source of electric power. Gas/glycol driven pumps supplied the pressure to circulate glycol in the units.
- \* Resulting gathering system pressures were so low that the pumps would not operate. Shutdown of the units was the only practical alternative.
- \* Shutdown of the dehydration units increases the amount of water vapor in the gathering system

# Rupture Pin - Background



- ✦ Additional water vapor in the gathering system results in an increased frequency of gas hydrates in the gas gathering system.
- ✦ In the absence of an alternate reliable means to protect the gathering system, methane emissions could increase from relief valves operating to protect the design pressure of the gathering system.

# The Problem : How do you protect the gathering system and prevent methane emissions ?

## THE SOLUTION:

### The Rupture Pin Device.



# What does the Rupture Pin Device Do?



- ✦ The Rupture Pin Device has a pressure sensitive pin (cylindrical rod) inside that holds the plug of the valve-like device open. When the line pressure reaches the crush pressure of pin, the pin deforms, and allows the spring-loaded plug to close, shutting off the flow, and protecting the downstream piping.

# Advantages of the Rupture Pin Device



- \* Inexpensive (about the same cost as a relief valve)
- \* Easy to install and maintain
- \* Shuts off, does not vent, high pressure gas flow
- \* Allows for remote detection of gathering system plugging due to hydrates.

# Typical scenario with gathering system protected by relief valves



- ✦ A Gas hydrate plugging the gathering system causes location wellhead or CPD relief valve(s) to open, discharging methane to atmosphere

# Typical scenario with gathering system protected by relief valves



- \* A Gas hydrate plugging the gathering system causes location wellhead or CPD relief valve(s) to open, discharging methane to atmosphere
- \* **Release is undetected by metering/SCADA**

# Typical scenario with gathering system protected by relief valves



- \* A Gas hydrate plugging the gathering system causes location wellhead or CPD relief valve(s) to open, discharging methane to atmosphere
- \* Release is undetected by metering/SCADA
- \* **Initial methane loss is >> than average system flow due to gathering system backflow and depressurization**

# Typical scenario with gathering system protected by relief valves



- ✦ **Emission can continue for many hours (possibly days) until detected by gathering system technician driving by and hearing relief valve discharging.**

# A Better View of the Rupture Pin



# What happens when you use the Rupture Pin Device to protect the gathering system?



- ✦ **When the hydrate forms and the gathering system overpressures, the device rupture pin closes, shutting off the flow from the wellhead or CPD source**

# What happens when you use the Rupture Pin Device to protect the gathering system?



- \* When the hydrate forms and the system overpressures, the device rupture pin closes, shutting off the flow from the wellhead or CPD source
- \* **Loss of measured gas flow is detected very quickly by the location delivery meter, and is transmitted to operations control via installed SCADA**

# What happens when you use the Rupture Pin Device to protect the gathering system?



- \* When the hydrate forms and the system overpressures, the device rupture pin closes, shutting off the flow from the wellhead or CPD source
- \* Loss of measured gas flow is detected very quickly by the location delivery meter, and is transmitted to operations control via installed SCADA
- \* **Closed-in delivery line causes high discharge pressure shutdown of location compressor(s), saving fuel gas.**

# Summary



- ✦ GulfTerra Energy Partners participation involves implementing projects justified on the basis of good business sense, increased throughput, cost savings, improved safety, and corporate environmental stewardship.
- ✦ Management support is critical to program participation and implementation

# Summary



- ✦ The estimation of methane emission reductions that have been reported to Gas Star has, for the most part, involved the application of Engineering judgment to arrive at a “reasonable” estimate of methane emission reductions.

# Summary



- \* Over 95% of the methane emission savings reported to date have resulted from the combined shutdown of gas dehydration units and the synergistic development and installation of rupture pin devices in the San Juan Basin. Without the development of the rupture pin shutoff, the projects to increase gathering system throughput would have actually increased emissions by a factor of 3.

# Questions ?

