Outline

- Background
- Phase I - Study
- Pipeline Leak Study
- Monument Gas Plant
- Phase II - Study
Background

- GRI Study – D I & M
- D I & M - BMP
- Dynegy’s experience with D I & M
Phase I Study

- Two DMS facilities in study
- Cost was $ 30 K
- Amount methane saved = 100 MMSCF/yr
  ($700K @ $7/MSCF)
- Savings Realized within 18 Months – Largest Cost-Effective Leaks Repaired
Chico Gas Plant
Chico Gas Plant – Old Flares
Chico Gas Plant – New Flare
Economics of LAUF

Lost and Unaccounted For Product
Potential $ Savings
Equating Pure Methane Leak Rate to Dollars

\[
\text{Annual \$ in Lost Product} \quad \text{At $4 Per 1000 Cubic Feet}
\]

- $0.00
- $500.00
- $1,000.00
- $1,500.00
- $2,000.00
- $2,500.00

\[
0.238 \text{ cu ft/min}
\]

Estimated Economical to Repair

\[
\text{Cubic Feet Per Minute}
\]
Optical Remote Leak Detection

Infrared Differential Absorption

★ **Mid wave Infrared - 3 to 5 µm**
★ **Long wave Infrared - 8 to 11 µm**
★ **Visible  - 0.4 to 1.0 Microns**
★ **Near IR  -0.9 to 1.6 Microns**

Remote sensing is the science and art of obtaining information about an object, area, or phenomenon through the analysis of data acquired by a device that is not in contact with the object, area, or phenomenon under investigation.

From Remote Sensing and Image Interpretation, Lilles and Kiefer, 1987
Similar to Gas Chromatography

Absorbance

Wavelength (microns)

3.31μm

butane, ethane, propane, methane, water, CO2
Active vs. Passive Imaging

- Active techniques employ an artificial radiation source (e.g. a microwave transmitter, a laser, a thermal heater, etc.) for illumination of the target area.
- Passive techniques utilize the naturally occurring ambient radiation.
Passive Remote Optical Infrared Leak Detection, Quantification, and Speciation
LSI Camera Visualizes Gasoline Vapor

★ Field Portable
★ Rugged
★ Reliable
★ Repeatable
★ Sensitivity
★ Ease of Use - Doesn’t Require Frequent Adjustment
★ Capable of Identifying “Inaccessible” Leaks
Infrared LSI Camera
High Volume Sampler
Pipeline Leak Study

- Driving – visible signs (e.g. vegetation stress)
- Driving with sniffer trucks twice a year
- 25 – 40 miles per day
Pipeline Leak Study

- Mass Balance Discrepancy Identified Need for Survey
- Infrared Remote Sensing from helicopter
- 200-400 miles per day
- Amount of methane estimated at ~146 MM SCF /yr or (0.5 MMSCFD)
Monument Gas Plant
Monument Gas Plant

★ Infrared survey conducted to identify sources of leakage

★ ~200 leaking sources identified

★ Largest opportunities - blow down vents and valve packing

★ Amount of methane saved is ~146 MMSCF/yr $1022K @ $7/MSCF
Monument Gas Plant

- 26 engines to be replaced with integral electric compression
- 18, 500 HP Replaced
- Amount of fuel saved is 1.5 BCF/yr and Corresponding CO2 Reductions
Monument Gas Plant
Monument Gas Plant
Monument Gas Plant

★★ Cost of this project $ 8.3 MM

★★ Amount of fugitive methane losses saved is

~41 MMSCF/yr

★★ Ancillary Benefit - Criteria (e.g. NOx) and HAPs pollutant reduction
Phase II Study

★ Eunice Gas Plant and upstream compressors

★ Chico Gas Plant Retest and upstream compressors

★ Included the LSI Infra red camera (tool kit)
Eunice Plant – Engine Room
Eunice Plant
Eunice Plant
Eunice Plant
Chico Plant
Future Plans

★ Coordinated Efforts for Sharing BMPs with Field Operations and Maintenance Personnel in 2005.

★ Increase management commitment through awareness of cost effective opportunities

★ Dynegy is evaluating implementing D, I & M system wide
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