Dynegy Midstream Services, L.P.
Experience in Methane Emissions Mitigation

Processor’s Transfer Workshop
April 22, 2005
Oklahoma City, Oklahoma
Outline

★ Background
★ Gas Processing Plant’s study
★ Pipeline Leak Study
★ Monument Gas Plant
★ Current Plans
★ Future Plans
Background

- **Dynegy Midstream Services, L.P.**
- **Corporate vs. Field staff**
- **Number of DMS facilities**
Gas Plant’s 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
Economics of LAUF

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

- At $4 Per 1000 Cubic Feet
- 0.238 cu ft/min
  Estimated Economical to Repair

Annual $ in Lost Product
$0.00
$500.00
$1,000.00
$1,500.00
$2,000.00
$2,500.00

Cubic Feet Per Minute
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
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

Wavelength (microns)

Absorbance

3.31 µm
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

PAT
LSI Camera Visualizes Gasoline Vapor

★ Field Portable
★ Rugged
★ Reliable
★ Repeatable
★ Sensitivity
★ Ease of Use - Doesn’t Require Frequent Adjustment
★ Capable of Identifying “Inaccessible” Leaks

[Image of a person using the camera to inspect a vehicle at a gas station.]
LSI Leak Surveys Video Imagery

Flange Leak

Buried Pipeline Leak
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 Processing Facility, Monument, NM
Monument Gas Plant

★ Original plant built in 1936
★ Modifications in 1963 & 1976
★ 31 engines for combined 25,000 hp
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
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
**Current Plans**

- Phase II - EPA Study - Eunice Gas Plant and upstream compressors
- Chico Gas Plant Retest
- Include the LSI Infra red camera (tool kit)
- Plan to implement DI&M surveys every two years at gas plants/compressor stations
Future Plans

- Increase management commitment through awareness of cost effective opportunities
- Dynegy is evaluating implementing D, I & M system wide
- Involve the Company media relation’s more effectively
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