

PARTNER UPDATE

FALL 2005



Gas STAR Partners Reach Reporting Milestone

The Natural Gas STAR 2005 reporting season was a great success—a record year for partner achievements. In 2005, Gas STAR partners reported methane emissions reductions of more than 33.2 billion cubic feet (Bcf)—compared to 22.8 Bcf in 2004. To date, partners have cumulatively reported more than 403 Bcf of methane emission reductions.

This year's reports highlighted a wide variety of best management practices (BMPs) and partner reported opportunities (PROs) including several PROs never before reported to EPA. Some of the new PROs reported by Gas STAR partners include:

- ★ Conduct helicopter leak surveys
- ★ Eliminate gas venting during Absolute Open Flow tests
- ★ Move check valve closer to compressor to reduce gas blowdown during startup
- ★ Replace gas-operated chemical injection pumps with solar or electric-powered pumps
- ★ Use crude stabilizer to strip active gas from liquid prior to dispensing to tanks

Further details on these PROs will be available in the *Winter 2005 Partner Update*. EPA would like to thank all of the partners who submitted annual reports for another successful year!

12th Annual Natural Gas STAR Implementation Workshop

October 24–26, 2005
InterContinental Houston
Houston, Texas
(Details on page 4.)

In This Issue:

Partner Profile	1
Q & A	6
In the News	7
Calendar	8

Fall 2005

Partner Profile

Dynegy—Successful Initiatives Leading to Reduced Methane Emissions



Dynegy Midstream Services, L.P. has realized new methane emission reduction opportunities by implementing a comprehensive directed inspection and maintenance (DI&M) program using aerial optical surveying and handheld optical imaging. The company was introduced to this aerial imaging technology through an industry trade conference. Dynegy, a Gas STAR partner since 2000, is engaged in gathering and

Continued on page 2 ★ ★ ★

Dynegy—Successful Initiatives

Continued from page 1 ★ ★ ★

processing, as well as fractionating, storing, transporting, distributing, and marketing natural gas. With its gas plants processing nearly 1.6 billion cubic feet (Bcf) of natural gas per day, Dynegy has many opportunities to find and eliminate fugitive methane emissions.

Since 2000, as part of the U.S. Environmental Protection Agency's (EPA's) Phase I DI&M measurement study, Dynegy has been monitoring its fugitive methane emissions using various methods. Early on, one of the ways the company identified leaks was by covering its equipment and lines with a soapy solution and simply watching for bubbles to form. Recently, Dynegy has introduced infrared imaging cameras to its DI&M program. This technology uses videos or photos to monitor leaks, providing actual images of the gas plumes.

The Hawk Leak Detection System (HLDS), one example of an infrared imaging camera, developed by Leak Surveys Inc. (LSI), is a handheld or helicopter-mounted device that can detect leaks that are not visible to the naked eye. It can pinpoint the source and flow path of the escaping gas—showing where the gas is escaping and differentiating between hydrocarbon residue from substances such as penetrating oil and actual blowing gas leaks.

The Hawk can detect the following gases:

- | | |
|---------------|-------------|
| ★ Natural Gas | ★ Pentane |
| ★ Propane | ★ Propylene |
| ★ Butane | ★ Ethylene |
| ★ Methane | |

The Aerial Pilot Study

After Dynegy was introduced to the aerial imaging technology, the company hired a consultant to visit its New Mexico pipelines to conduct a pilot project that entailed flying over and analyzing its pipelines. Fugitive methane emissions were then located via the infrared imaging camera mounted on a helicopter. (Information on aerial imaging is available in the *Winter 2004 Partner Update*.)

This aerial imaging pilot study covered 150 miles of pipeline per day. Previously, only 10 to 15 miles a day could be monitored by driving a sniffer truck looking for lifeless vegetation (and other indications of natural gas leaks). Leaks

discovered in Dynegy's pipelines were fixed; and other companies were notified if leaks were found in their lines. The pipeline repairs, conducted as a result of the pilot study, reduced Dynegy's methane emissions by approximately 146 million cubic feet (MMcf) per year. Shankar Ananthakrishna, Dynegy's Gas STAR Implementation Manager, explained that emission savings were calculated by running a system balance check—comparing the amount of gas going into the system versus what was coming out of the system. After fixing the leaks in the pipelines, the balance was much closer than when calculated before the aerial imaging.



Success Leads to More Action

The success of the aerial imaging project led to additional efforts using the infrared imaging cameras—this time using handheld cameras instead of helicopter mounted. The first endeavor involved surveying Dynegy's Monument Plant. After fixing all of the leaks, Dynegy realized savings of approximately 148 MMcf per year.

In an effort to further reduce methane emissions, Dynegy also replaced several gas fired engines, equivalent to 18,500 horsepower, with integral electric compression. This project saved the company approximately 1.5 Bcf of fuel gas per year and reduced methane emissions by 41 MMcf per year.

Dynegy's second initiative was volunteering for EPA's Phase II DI&M measurement study in 2005. Based on the success and experience with its ongoing infrared imaging activities, the company volunteered two of its plants and four of its compressor stations to participate in the new study—through which it used the infrared imaging camera

Continued on page 4 ★ ★ ★



*To our Gas STAR friends in the Gulf Coast Region,
We are very sorry to hear about the devastation
caused by Hurricane Katrina. You and your
families are in our thoughts.*

*Sincerely,
The Natural Gas STAR Team*

Upcoming Natural Gas STAR Annual Workshop October 2005

The Natural Gas STAR Annual Implementation Workshop will be held October 24-26, 2005, at the InterContinental Houston in Houston, Texas.

The workshop will provide Gas STAR partners with an opportunity to obtain information about the most current and cost-effective methane emissions reduction technologies and practices and exchange ideas with more than 100 other Natural Gas STAR partner companies.

This year's meeting will focus on leadership strategies and successes in the Natural Gas STAR Program and will include concurrent sessions focusing on all areas of the natural gas industry: production, gathering and processing, and transmission and distribution.

If you are interested in exhibiting at or being a sponsor of this event, please contact Roger Fernandez at fernandez.roger@epa.gov or (202) 343-9386.



Directly following the Gas STAR Annual Workshop, a Producers Technology Transfer Workshop will be held, from noon to 5 p.m. on October 26, 2005, at the Marathon Oil Corporation's headquarters in Houston (just around the corner from the InterContinental Houston).

If you have any questions, please contact Chiara D'Amore at cdamore@icfconsulting.com or (202) 862-1109.

Dynegy—Successful Initiatives

Continued from page 2 ★ ★ ★

EPA's Directed Inspection and Maintenance Study

DI&M Phase I: Completed

The primary objective of EPA's Phase I DI&M study was to assess baseline methane emissions at natural gas processing and production facilities, and delineate and quantify the extent of cost-effective opportunities for reducing these emissions.

The results of this study provided the following:

- ★ Information on an increased number of gas processing facilities and components—giving an improved statistical basis for extrapolation of the results systemwide.
- ★ An indication of the effectiveness of repairs to the major leakers and the increases in leakage throughout time at gas plants.
- ★ An initial indication of methane and total greenhouse gas emission reduction opportunities at gas production facilities (e.g., gathering systems including compression and well-site facilities).

DI&M Phase II: Ongoing

The Phase II study expands the results of Phase I through broader industry participation and an increased emissions database. It is also broadening participation and subsequent implementation of DI&M based on the expected economic benefits demonstrated in the study.

Benefits of Implementing a DI&M Program

- ★ Typical payback period of less than 1 year
- ★ Improved safety
- ★ Increased greenhouse gas emission reductions
- ★ Potential reductions in hazardous air pollutants
- ★ Improved combustion efficiencies
- ★ Potential for reducing costs and improving survey efficiency by evaluating methane emission reduction technologies, tools, and methodologies

to identify fugitive methane emissions and paired it with high volume sampling equipment to quantify leaks.

Shankar noted three important issues to consider when using infrared imaging cameras:

1. The camera is a beneficial tool that can identify leaks on a qualitative basis for remote/inaccessible locations.
2. The person operating the camera and analyzing the video footage must be highly trained—someone that knows what they should be looking for.
3. When you can't determine how significant the leaks are through mass balance discrepancies, you should quantify them using another form of technology. The camera only identifies the leaks—it does not evaluate the size of the leak.

The following are advantages of gas leak infrared imaging:

- ★ Accurate visualization of gas leaks can be seen in a video format.
- ★ Imaging can be performed from up to 150 feet from the target.
- ★ The process doesn't impact plant operations or personnel responsibilities.
- ★ Inspection times are minimal, which can keep costs down.
- ★ The leaks are visible so leak rates, sources, and dispersion patterns can be calculated. In addition, maintenance, repair, and ordering of parts is less time consuming and expensive.
- ★ Most leaks can be visually detected from the ground, so inaccessible leaks will not be neglected.



Continued on page 6 ★ ★ ★

STAR Power: IOGCC Endorsers Natural Gas STAR Program

OKLAHOMA CITY—In a continued effort to protect the environment and maximize the nation's natural gas and oil resources, the Interstate Oil and Gas Compact Commission (IOGCC) signed on recently as an endorser of the U.S. Environmental Protection Agency's Natural Gas STAR Program.

The IOGCC will advance the Program as a valuable tool to more than 30 governors and state regulators, already effectively monitoring the industry's activities.

"The choice to endorse the Program was a no-brainer," said Christine Hansen, IOGCC executive director. "The Gas STAR Program and the IOGCC are similar in that both value efficiency and innovation, and seek creative solutions to wisely maxi-

mize oil and natural gas in harmony with our environment." Hansen noted also that the Program presents a unique opportunity for IOGCC member states to reach out to independent producers that may not have access to resources offered by the Gas STAR Program.

The IOGCC is a multi-state government agency that champions the conservation and efficient recovery of domestic oil and natural gas resources while protecting health, safety, and the environment. Established by the charter member states' governors in 1935, it is the oldest, largest, and most effective interstate compact in the nation.



Updated Tools for Gas STAR Partners

Six modules of the BMP/PRO Economic Analysis Tool have been updated and are now available online at ergweb.com/gasstar/analytical_tool. The newly improved modules include:

- ★ Install Flash Tank Separators
- ★ Install Flares
- ★ Install Static Pads at Compressor Stations
- ★ Install Plunger Lift Systems
- ★ Options for Reducing Methane Emissions from Pneumatic Devices
- ★ Using Hot Taps for In-Service Pipeline Connections

Gas STAR continues to revise and expand upon its tools for its partners. Two new modules—Composite Wrap and Desiccant Dehydrators—should be finalized early this fall.

Technical Resources Available

EPA would like to announce the availability of technical documents on the Gas STAR Web site—*Methane Emissions from the Natural Gas Industry*. The series of 15 reports, sponsored by the Gas Research Institute (GRI) and EPA, describes a multi-year project (1991-1996) performed to quantify methane emissions from the natural gas industry. The reports are now available at epa.gov/gasstar/reports.htm. Bound copies can be ordered by e-mailing techdocorders@gastechnology.org or visiting the GRI Web site, gastechnology.org.

Dynegy—Successful Initiatives

Continued from page 4 ★ ★ ★

The Future

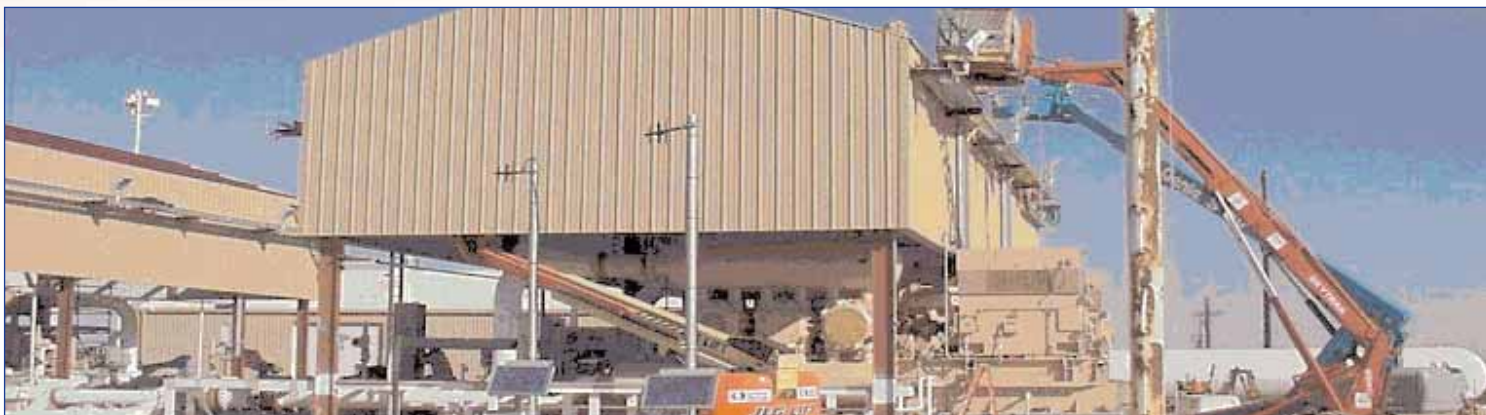
Dynegy's management has been very pleased with the results of the infrared imaging activities and continues to find opportunities to put the technology to use. Approximately every six months, Dynegy has its consultant conduct aerial pipeline imaging; and any leaks found are repaired. The company also plans on studying leaks at other Dynegy gas plants and compressor stations, and it will be analyzing opportunities to use infrared imaging cameras to survey its other gathering systems. Plus, all of Dynegy's findings and lessons learned will be applied to other facilities to decrease methane emissions throughout the entire company.

Further Information:

EPA's DI&M Study—Phase 1:
epa.gov/gasstar/pdf/gti_report.pdf

Aerial Imaging:
Winter 2004 Partner Update

Leak Surveys Inc:
leaksurveysinc.com



Q: How can I improve efficiency and reduce emissions from glycol dehydrator systems?

A: Reducing the glycol circulation rate in dehydrators improves dehydrator unit efficiency, saves gas, decreases energy use, and reduces methane and VOC emissions at relatively negligible costs. It is recommended that circulation rate adjustment be incorporated into regular O&M practices. Installing flash tank separators on dehydrators can further reduce emissions.

Partners have reported using GRI-GLYCalc™ software to calculate and adjust circulation rates. GRI-GLYCalc™ Version 4.0 is a Windows™-based software program developed by the Gas Technology Institute (formerly the Gas Research Institute) for estimating air emissions from glycol units that use triethylene glycol (TEG), diethylene glycol (DEG) or ethylene glycol (EG).

To obtain the GRI-GLYCalc software, contact GTI directly or visit gastechnology.org for online ordering (GTI Document Number: GRI-00/0102).

Q: How significant are the effects of TEG feed and pressure to TEG loss?

A: If an operator increases the TEG circulation rate by a factor of two (while

holding the volume of gas dehydrated constant), the emissions from the still column vent also increases by a factor of two—indicating a near linear relationship. The relationship for pressure is not linear—the higher the pressure of the contact tower, the lower the emissions from the still column vent.

For more information on reducing methane emissions from glycol dehydrators, please see:

- ★ epa.gov/gasstar/pdf/lessons/II_flash tanks3.pdf
- ★ epa.gov/gasstar/pdf/emissions_report/14_glycol.pdf
- ★ bre.com/technicalpapers/technicalpaper.asp?articlenumber=34



In the News



Methane to Markets

Upcoming Meeting Reminders

The following meetings were previously announced. Further information can be found online at methanetomarkets.org.

- ★ **Russia Oil and Gas Methane Emissions Reduction Workshop**—Hosted by the Russian Academy of Sciences and the Methane to Markets Partnership. September 14-16, 2005, in Tomsk, Russia.
- ★ **Oil and Gas-Sector Methane Emissions Reduction Workshop**—Hosted by Occidental Petroleum, Colombian Ministries of Energy and Environment, and the Methane to Markets Partnership. October 6-7, 2005, in Bogotá, Colombia.

Methane International Released

The Methane to Markets Partnership recently released its first issue of *Methane International*, the Partnership's quarterly newsletter. It provides timely information on Partnership activities, meetings, and related news in an easy-to-read format. This current edition of *Methane International*, available online at methanetomarkets.org/docs/m2m_newsletter_june29.pdf, includes:

- ★ An update from the Coal Technical Subcommittee Meeting in Geneva
- ★ Information about a new member country
- ★ News briefs from the Partnership
- ★ Information on upcoming meetings



Upcoming Meetings

Oil and Gas Subcommittee Meeting

September 13-14, 2005

Tomsk, Russia

This annual meeting is being held in conjunction with the Methane Emissions Reduction Workshop (previously mentioned), sponsored by the Russian Academy of Sciences. Subcommittee and Project Network members will discuss steps to advance the Partnership, including a review of recently completed Country Profiles, current activities, and project opportunities for 2005 and beyond. The preliminary agenda is available online at methanetomarkets.org.

Steering Committee and Technical Subcommittee Meetings

November 2-4, 2005

Buenos Aires, Argentina

During this meeting, the Steering Committee and all three technical Subcommittees will report progress and plan next steps. A detailed agenda will be posted online at methanetomarkets.org as soon as it is available. Online registration is available at methanetomarkets.org.





THE 12TH ANNUAL NATURAL GAS STAR IMPLEMENTATION WORKSHOP

October 24-26, 2005 ★ InterContinental Houston ★ Houston, Texas

2005 TECHNOLOGY TRANSFER WORKSHOPS

★ **Gas STAR Producers Workshop**

October 26, 2005
Marathon Oil Corporation
Headquarters
Houston, Texas
Co-sponsored by Marathon
Corporation.

For more information or to register for this
Gas STAR workshop, please visit epa.gov/gasstar.

★ **Russia Oil and Gas Methane
Emissions Reduction Workshop**

September 14-16, 2005
Tomsk, Russia
Hosted by the Russian Acad
of Sciences and the Methane
Markets Partnership.

★ **Columbia Oil and Gas Methane
Emissions Reduction Workshop**

October 6-7, 2005
Bogotá, Colombia
Hosted by Occidental Petroleum,
Colombian Ministries of Energy
and Environment, and the
Methane to Markets Partnership.

more information
register for these
shops, please visit
anetomarkets.org.

OTHER NATURAL GAS-RELATED EVENTS

★ **Domestic Petroleum Council 2005 Winter Meeting**

Houston, TX
December 2005
Hosted by the Domestic Petroleum Council.
More information is available at [dpcusa.org/
calendar/index.html](http://dpcusa.org/calendar/index.html)

★ **GPA Fall Technical & Section Meetings**

Houston, TX
October 5-6, 2005
Hosted by the Gas Processors Association.
Further information is available at
gasprocessors.com/calendar.html



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