EPA United States Environmental Protection Agency

PARTNER UPDATE

SPRING 2006

NaturalGas EPA POLLUTION PREVENTER

In This Issue:

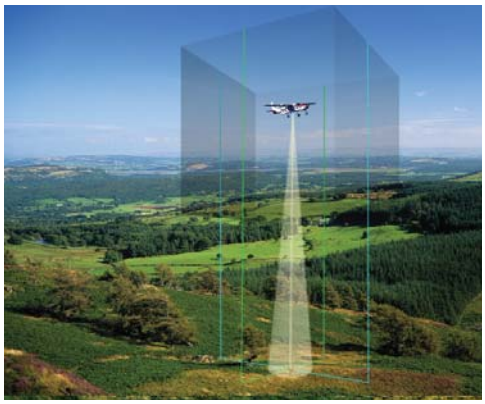
In the News 1
Technology Spotlight 2
Partner Profile 3
Program Achievements 5
Calendar 6
Q&A 7
New Partners 8

Airborne Leak Detection Hits National News

Sealing all the leaks in the 2.3 million miles of natural gas pipelines in the United States would save enough gas to fuel about 4 million homes. The Associated Press (AP) recently reported on a new airborne technology developed by ITT Industries that enables natural gas companies to find these leaks 100 times faster than through traditional methods—saving them valuable time and money, and benefiting the environment.

On January 22, 2006, AP reported on the potential for airborne leak detection to help decrease the amount of natural gas seeping out of our country's pipelines. The article, titled, "Gas Leaks Prompt High-Tech Detection Tools," provided a history of leak detection and discussed the process of detecting natural gas leaks from the sky.

AP spent a day with ITT learning about the company's Airborne Natural Gas Emission Lidar (ANGEL) Service, which uses Differential Absorption Lidar (DIAL). This active remote-sensing technology detects, quantifies, images, and maps natural gas emissions while flying in an airplane about a quarter of a mile above a pipeline. The ANGEL Service also captures high-resolution, geo-referenced digital images and video of the rights-of-way (ROWs) and surrounding areas. The ANGEL Service collects nearly 180,000 laser measurements per minute, can survey the entire ROW width of 125 feet (checking for migrating gas beneath the surface), and can cover more than 1,000 miles in one day. This practice is significantly faster compared to more traditional pipeline inspection methods.



The ANGEL Service surveys a 125-foot width of pipeline ROW in a single overflight.

ANGEL Service Key Applications

- ★ Leak Survey
- ★ Patrolling
- ★ Continuing Surveillance
- ★ Threat Identification
- ★ Emergency Plans
- ★ High Consequence Area (HCA) Identification
- ★ Recordkeeping

Annual Reporting Reminder

Reports Due By March 31, 2006

(see page 5 for more details)

Continued on page 6 ★ ★ ★

Technology Spotlight

Scrubber Dump Valves

Leaking scrubber dump valves can be a significant source of methane emissions from a compressor station or natural gas processing plant. Fortunately, identifying these leaks can be as simple as listening for the gas venting at the atmospheric slop tanks.

Scrubbers, also known as gas liquid separators, are pressure vessels located at natural gas compression and processing facilities designed to separate solids, water, and hydrocarbon liquids from the natural gas stream, prior to the natural gas entering process equipment. A multi-stage reciprocating compressor will usually have a scrubber on each stage of compression to collect liquids that condense after the prior stage of compression and cooling.

The liquids captured by a scrubber are dumped to an atmospheric storage tank, often called a slop tank, either manually, or automatically with a liquid level sensing switch and an electric or pneumatic dump valve.

Methane leaks can occur from the dump valve when solids—or liquids freezing in the valve—prevent the dump valve from fully closing. Physical erosion of the valve seats can also cause leaks.

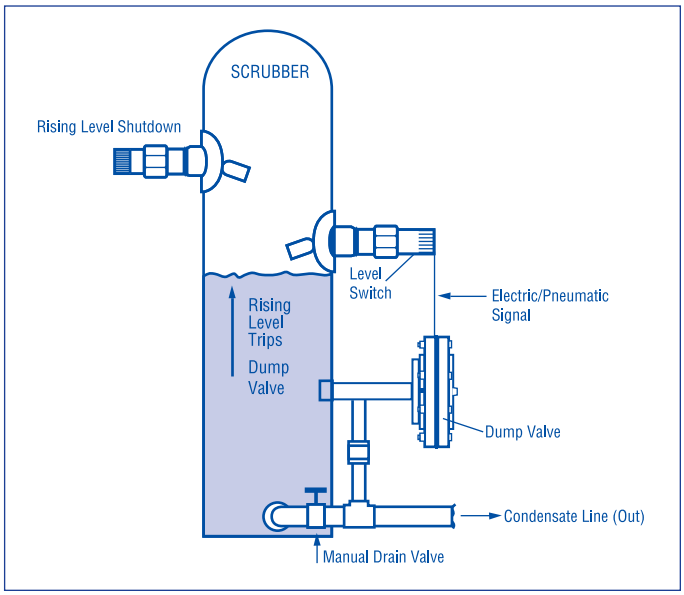
Leaks from dump valves that fail to fully close can be significant and are dependent on the pressure in the scrubber. Scrubber pressures vary based on where they are located in the natural gas process stream. A scrubber on the inlet compressor for a Powder River, Wyoming, coal seam natural gas gathering system could operate in the range of 1 to 5 per square inch gauge (psig), while a scrubber located on an interstate natural gas transmission line might operate at more than 900 psig.

Methane leaks through dump valves can be discovered in several ways:

- ★ Go to the slop tank and listen for excess gas flowing to or through the tank (the easiest method).
- ★ Look at the sight glass on the scrubber (if so equipped); if there is no liquid in the vessel, a leak should be suspected.
- ★ Examine the throttling of gas through a leaking dump valve; a valve with frost indicates a leak.
- ★ Listen for a leak through a dump valve.
- ★ Use ultrasonic leak detection equipment with a touch probe to locate leaks through dump valves.

Avoiding methane leaks through dump valves requires specifying valves that are appropriate for the anticipated service, along with ensuring that solids are removed from the natural gas stream upstream of the valves. Non-freeze dump valves where the trim and seat are immersed in the fluid can be specified on high-pressure scrubbers to reduce leaks as a result of freezing. Additionally, facility inlet filter separators can be installed to remove solids and liquids from the natural gas stream prior to entering process equipment.

If your company has experience reducing methane emissions through rehabilitation, repair, or replacement of scrubber dump valves, be sure to include the relevant project information in your Gas STAR annual report. Also, if you are interested in working with EPA to develop a technical fact sheet on the subject, please contact Carey Bylin, of the Gas STAR Program, at (202) 343-9669.



One Implementation Manager's Story: Promoting the Gas STAR Program

Ruth Jensen, an Environmental Specialist at Northern Plains Natural Gas Company, LLC, has worked in the natural gas industry for nearly three decades and has been one of Gas STAR's biggest supporters during the Program's existence. In 1986, Ms. Jensen entered the environmental arena during her tenure with InterNorth, Inc. (later Enron) where she helped the company become a Gas STAR partner. She then went on to serve as the first Implementation Manager for Northern Natural Gas Company, an Enron spin-off. In 2004, she joined Northern Plains, the operator of Northern Border Pipeline Company, Midwestern Gas Transmission Company, Viking Gas Transmission Company, and Guardian Pipeline. Once again she took on the role as the Gas STAR Implementation Manager. In addition to her Gas STAR responsibilities, Ms. Jensen oversees environmental compliance for 13 Northern Border Pipeline facilities and air permit compliance for all of Northern Plains' facilities.

Ms. Jensen first embraced the Gas STAR Program to support her employer's interest in identifying and capturing lost and unaccounted for (L&U) natural gas—which results in the emission of greenhouse gases (methane). She explained that achieving support at both Northern Natural Gas Company and Northern Plains Natural Gas Company was fairly easy—management at both companies recognized the environmental impact of fugitive emissions and its impact on the bottom line. After securing buy-in, Ms. Jensen was tasked with fulfilling the vital role of communicating the value of Gas STAR to field employees, investigating the pipeline operations to locate emission reduction opportunities, and managing the annual reporting process.

The Gas STAR Program helps companies like Northern Plains identify and reduce L&U gas by facilitating technology transfer workshops, distributing Web and print resources on methane emission reduction technologies and practices, and, most importantly, through annual reporting. Ms. Jensen notes that while annual reporting is generally the most challenging aspect of participation, she has successfully encouraged field personnel to document Gas STAR activities and get credit for their work. Her tactics are straightforward and effective. Ms. Jensen asks that field personnel simply report Gas STAR-related activities to her and she works with them to quantify the emissions savings—she even created a tracking spreadsheet that is accessible to all field employees. Beginning this year, she is trying to tie field employees' performance goals to Gas STAR activities. In this way, she hopes to further encourage field employees to continuously find and report new and innovative practices. Another tactic she employed in the past was to appoint regional Gas STAR representatives who were responsible for collecting and reporting emission reductions only for facilities in their area. This practice allowed the representatives to focus on operations with which they were most familiar.

I believe that our operations employees take pride in reducing emissions. They genuinely feel good about their personal contributions to improving the environment and their company's bottom line.

—Ruth Jensen

Earlier in her career at Northern Natural Gas Company, Ms. Jensen helped the company identify many PROs resulting in significant emission reductions. Some of these innovative practices included installing vapor recovery units to capture and re-inject flash gas, rerouting high pressure gas to lower pressure pipelines

Continued on page 4 ★ ★ ★

Partner Profile

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during repairs, using hot taps, and verifying pipeline leak repairs. Ms. Jensen noted that each BMP and PRO must be carefully evaluated to determine optimal implementation by analyzing the value of the emission reductions and the viability of tracking and reporting the reductions to Gas STAR. After completing this analysis, the Implementation Manger must then investigate each facility or pipeline operation for opportunities.

In Ms. Jensen's experience, the process of identifying appropriate Best Management Practices (BMPs) and Partner Reported Opportunities (PROs) is different for every pipeline, but a primary consideration is the pipeline's age. For example, Northern Border Pipeline Company's pipeline was put in use in the early 1980s and many of the compressor stations were brought on-line in the late 1990s. As with many new technologies, the developers included features to minimize natural gas venting in the original design of these stations, such as dry gas seals and Yale closures. Because these technologies were incorporated into plan design from the start, a directed inspection and maintenance (DI&M) program for Northern Border has not proven to be cost-effective. Alternatively, the pipelines owned by Midwestern Gas and Viking Gas were constructed in the early 1960s, and can therefore get value from a DI&M program.

Midwestern Gas Transmission Company's Portland Compressor Station located near Portland, Tennessee.

Northern Border Pipeline Company Compressor Station No. 11 located near Brandt, South Dakota.

Other factors that impact Gas STAR Program implementation at compressor stations include the original design of the facility, the type of horsepower installed at the facility (e.g. turbines or reciprocating engines), and the number of engines at the facility. Each factor plays an important role in determining the most likely source of methane emissions. For instance, Viking Gas, which has facilities with multiple engines, uses a control system that can route blowdown gas from one engine to a second engine to be used as fuel. This significantly reduces the amount of natural gas vented to the atmosphere and increases overall efficiency. In addition, older pipelines can benefit greatly by switching control systems to instrument air—a common practice in new pipelines. Successful Implementation Managers work closely with their field personnel to identify the most appropriate practices for their facilities and encourage these employees to value the Gas STAR designation.

Ms. Jensen has proven to be an effective Gas STAR Implementation Manager by overcoming the challenges of implementing and administering the Program everywhere she has worked. In collaboration with her colleagues, she articulates the value of participation to her field personnel, gets buy-in from management, selects appropriate BMPs and PROs to implement and track, and, as a result, has helped her employers win many Gas STAR awards.

Five Steps to Being a Successful Gas STAR Implementation Manager:

- ★ Gain support of upper management
- ★ Communicate the value of Gas STAR to field employees
- ★ Identify cost-effective emission reduction technologies and practices
- ★ Develop useful and accessible tools for tracking Gas STAR activities
- ★ Summarize achievements through the annual reporting process

Ms. Jensen Contributes to Her Employers' Success:

- ★ 2002—Rookie of the Year, Northern Natural Gas
- ★ 2000—Continuing Excellence, Enron Transportation Services
- ★ 1998—Transmission Partner of the Year, Enron
- ★ 1997—Transmission Partner of the Year, Enron
- ★ 1996—Transmission Partner of the Year, Enron

Program Achievements

Get in the Running… How to Win a Natural Gas STAR Award

Each year at the Natural Gas STAR Annual Implementation Workshop, the U.S. Environmental Protection Agency (EPA) recognizes a select group of Gas STAR partners as award winners. Companies are recognized in a variety of categories—Partner of the Year (for each industry sector, including an international partner), Rookie of the Year, and Continuing Excellence. Being recognized as a Gas STAR award winner provides increased visibility to your company for its environmental achievements and rewards Implementation Managers and staff for their efforts to reduce methane emissions.

Are you wondering how your company can receive a Gas STAR award? The first step to put your company in the running is to submit your Gas STAR annual report (due by March 31, 2006). By submitting an annual report detailing your company's methane emission reduction activities to EPA, you are sharing your achievements, as well as creating a lasting record of the work your company is doing to reduce methane emissions.

EPA takes into account the relative sizes of the Gas STAR partners when making award decisions. So even if you are not the biggest oil or gas company in the world, you still have a good chance of receiving recognition.

In addition to reviewing the data in your company's annual report, EPA also considers the following when making award decisions:

- ★ Increasing emission reductions over time
- ★ Implementing new technologies
- ★ Participating in or making presentations at the annual workshop and/or technology transfer workshops
- ★ Participating in the development of articles for the *Partner Update*, *Lessons Learned* documents, or *PRO Fact Sheets*
- ★ Acting as a leader in the Program by working with other partners and sharing your company's Gas STAR experiences

It is important for partners to report all of these activities to EPA. You can do this quickly and easily by completing the "Additional Accomplishments" section of the annual report. This section allows you to include a narrative detailing additional Gas STAR activities your company has undertaken during the year. You can also contact EPA or your STAR Service Representative at any time to discuss your company's Gas STAR activities.

Take the time this year to submit your annual report for 2005, and remember to include any additional Gas STAR efforts—your company could be in the running for an award. Keep up the good work!

It's Reporting Time Again—Annual Reports Are Due March 31st

Every spring, Gas STAR announces its annual reporting season—and it's that time again. If you are a Gas STAR partner, you should have already received your annual reporting packet in the mail. If you haven't, please contact EPA or your STAR Service Representative immediately.

In the near future you will be hearing from your STAR Service Representative and from an EPA Manager to see if you need any assistance or have any questions regarding reporting this year.

Remember, Gas STAR annual reports are due by March 31, 2006. We look forward to learning about what you have accomplished this past year.

Airborne Leak Detection

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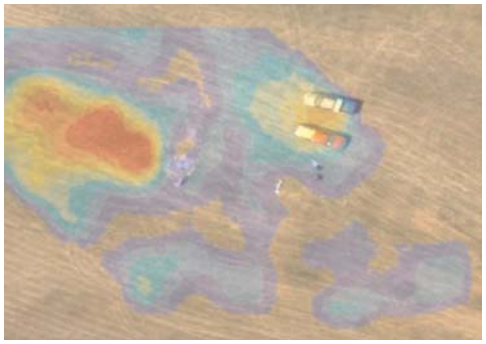
In flight, the ANGEL System continuously collects and examines data; after the flight, ITT scientists further analyze the information collected. The process incorporates GIS data to help companies pinpoint a gas plume's location, allowing them to assess its impact and accessibility. Companies receive leak survey reports, color aerial orthophotography, GIS shapefiles, and color videos to help analyze leak locations and better monitor corridor conditions.

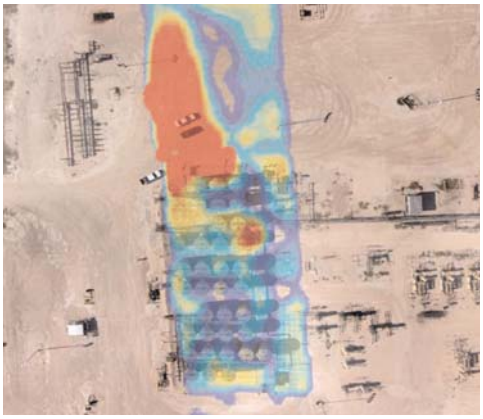
The story was featured in over 50 regional/local papers, as well as *USA Today, BusinessWeek, Boston Globe, ABC News, Washington Post, Wired News, Forbes, MSN Money, CNN, Yahoo!, Newsday,* and *AP Online*. Full text of the article can be found online; one location is: abcnews.go.com/Technology/wireStory?id=1529318&page=1.



Gas plume detected by the ANGEL Service.

Additional Information:

- ★ Information on the ANGEL Service is available online at ITT's Web site, ssd.itt.com/angel.
- ★ Gas STAR first reported on the ANGEL Service in the Fall 2004 issue of the *Partner Update* (epa.gov/gasstar/pdf/fall2004update.pdf) and was discussed at the annual *Gas STAR Implementation Workshop* in October 2005 (epa.gov/gasstar/workshops/houston-oct2005/brake.pdf).
- ★ Gas STAR has also reported on other partners using aerial infrared imaging: Enbridge—Winter 2004 (epa.gov/gasstar/pdf/winter2004update.pdf) and Dynegy—Fall 2005 (epa.gov/gasstar/pdf/ngstar_fall2005.pdf). In addition, the 2005 Annual Implementation Workshop included presentations from Enbridge Energy Partners, L.P. and ITT Industries on this topic. The presentations are also available on the Gas STAR Web site at epa.gov/gasstar/workshops/12th_agenda.html.



Gas plume detected by the ANGEL Service.

Calendar

2005 Technology Transfer Workshops

★ **Producers and Processors Workshop**
May 9, 2006
Wingate Inn of Gillette
Gillette, Wyoming
Co-Sponsors: Western Gas Resources and Petroleum Association of Wyoming

★ **Producers and Processors Workshop**
May 11, 2006
Holiday Inn Rock Springs
Rock Springs, Wyoming
Co-Sponsors: Western Gas Resources and Petroleum Association of Wyoming

★ **Producers and Processors Workshop**
May 25, 2006
Prism Training Center
Kenai, Alaska
Sponsor: ConocoPhillips Alaska, Inc.

Register online at epa.gov/gasstar/workshops.htm.

Methane to Markets Workshops

★ **Oil and Gas Technology Transfer Workshop**
April 25-26, 2006
Camino Real Hotel
Villahermosa, Mexico
For further information and online registration visit methanetomarkets.org.

★ **Oil and Gas Subcommittee Meeting**
April 27, 2006
Camino Real Hotel
Villahermosa, Mexico
For further information and online registration visit methanetomarkets.org.

Miscellaneous Events

★ **85th Annual Gas Processors Convention**
March 5-8, 2006
Gaylord Texan Resort & Convention Center
Grapevine, Texas
More information is available online at gasprocessors.com/convention.html.

★ **AGA Operations Conference**
May 2-4, 2006
The Westin Copley Place
Boston, Massachusetts

★ **International Gas Union (IGU) World Gas Conference**
June 5-9, 2006
Amsterdam, The Netherlands
More information is available online at wgc2006.nl.

Are you a Gas STAR Endorser and have an event you would like listed here? Please contact fernandez.roger@epa.gov to notify us about it.

Scrubber Dump Valves

Q: What is the difference between a scrubber and an oil field separator?

A: The difference is where they are located and the volume of liquid separated from the gas stream. Scrubbers are usually located at a compressor station or natural gas processing plant. Scrubbers are designed to separate a small amount of liquid from a large amount of natural gas

An oil field separator is usually located in the field and is the first separation of oil and natural gas. An oil field separator is designed to separate somewhat comparable volumes of liquids and natural gas.

The dump valves on a scrubber are usually smaller than on an oil field separator based on the lower anticipated daily liquid volume. Dump valves on both scrubbers and separators can leak natural gas as a result of solids in the valve, erosion of the valve seats, and freezing.

Q: What can be done to prevent scrubber dump valve leaks?

A: The root causes of dump valve leaks are solids in the gas stream and freezing. Solids will either block a dump valve from fully closing, or cause erosion on the valve seats. A good inlet filter separator is necessary to keep solids out of the natural gas system. Freezing at the dump valve is a result of the pressure drop and rate of flow from the scrubber. Dump valves with submerged seats and trim can be specified.

Q: Is it expensive to prevent scrubber dump valve leaks?

A: Retrofitting equipment, installing filter separators, or replacing scrubber dump valves are quite expensive. In a new facility, inlet filters that catch solids will save on erosion throughout the facility, and usually make good design sense. Specifying dump valves with trim and seats appropriate for the anticipated service can reduce leaks.

Q: Is it expensive to monitor a scrubber dump valve for leaks?

A: It should be cost-effective to monitor a facility for scrubber dump valve leaks. As part of daily rounds, an operator can include a trip to the slop tank to listen for high vapor flow rates. An operator can look at, and perhaps touch, dump valves to locate frozen valves. At facilities with access to ultrasonic equipment, staff can monitor dump valves at the same time that rotating equipment is monitored.

New Partners

EPA would like to welcome one new partner and two new endorsers to the Gas STAR Program.

Partner

Enbridge, Inc. (Transmission)

Enbridge, which operates in Canada, the United States, and South America with more than 4,400 employees, owns the world's longest crude oil and liquids pipeline system. The company owns and operates Enbridge Pipelines Inc. and a variety of affiliated pipelines in Canada and owns approximately 11 percent interest in Enbridge Energy Partners, L.P. (an existing Gas STAR partner) which owns the Lakehead System in the United States. These pipeline systems have operated for more than 50 years and comprise approximately 8,500 miles, delivering more than 2 million barrels of crude oil and liquids per day. Enbridge is also involved in liquids marketing and international energy projects and has a growing involvement in the natural gas transmission and midstream businesses (through the Alliance and Vector pipelines and various U.S. assets that transport, gather, process and market natural gas and other petroleum products). Visit the comany's Web site at enbridge.com.

Endorsers

Petroleum Technology Transfer Council

The Petroleum Technology Transfer Council (PTTC) is an industry-directed, regionally focused, nonprofit organization, which shares exploration and production technologies with U.S. producers. By accelerating the application of profitable technologies, PTTC enhances domestic oil and natural gas production. Visit the Council's Web site at pttc.org.

Texas Alliance of Energy Producers

The Texas Alliance of Energy Producers, born from the merger of two of the oldest oil and gas associations in the United States—the North Texas Oil & Gas Association and the West Central Texas Oil & Gas Association—has nearly 2,800 members and is one of the largest oil and gas trade associations in the nation. The Alliance has members in 300 cities and 25 states with the shared goal of protecting the oil and gas industry. Visit the alliance's Web site at texasalliance.org.

Gas STAR Web Site Improvements

PRO Fact Sheets, *Lessons Learned* studies, technical presentations, and technical *Partner Update* articles for each Gas STAR technology and practice can now all be found in one place—The Gas STAR "Recommended Technologies and Practices" page (epa.gov/gasstar/techprac.htm). Cost-effective emission reduction activities are grouped by equipment type, industry sector, and estimated payback period to facilitate your search. Now everything you need to know about methane emissions technologies and practices is only a mouse click away. Bookmark it today!

Excess Flow Valves (EFV) Update

The Natural Gas STAR Program received several comments on the Technical Spotlight article in the Winter 2005 edition of the *Partner Update*. The EPA would like to make the following clarifications to the article:

EFVs used underground are usually installed at the point where the service line connects to the gas utility main in the street. Some EFVs are also located before the gas meter at a residence or business, as stated in the article.

For a new or renewed gas service line, the cost of an EFV can be as low as $10 for multiple installations according a DOT Benefit/Cost Analysis (RSPA-2003-14455-40, September 2003.) and Mr. Paul Preketes (U.S. Department of Transportation, Pipeline and Hazardous Materials Administration (PHMSA) Public Meeting. June 17, 2005.) The article in the *Partner Update* had stated that the cost for new installations is $100-$200.

Also, the article stated that a by-pass EFV allows about 5 scf per hour of natural gas to flow through the valve after it closes. The EFV regulation (FR 192.381 June 20, 1996.) states that upon closure, an excess flow valve may permit no more than 5 percent of the manufacturer's specified closure flow rate, up to a maximum of 20 cubic feet per hour.

The Natural Gas STAR Program appreciates the comments received and invites readers to send additional information whenever they see the need.

IUEP Grants Are Available for Methane Emission Reduction Projects

The International Utility Efficiency Partnerships, Inc. (IUEP) has recently announced its 2006 Request for Proposals (RFP) on methane emission reduction projects resulting in the reduction, avoidance, or sequestration of greenhouse gases, as well as the development and implementation of international energy efficiency projects. The RFP will provide assistance to approximately 10 to 15 projects; financial support will total $4 million, including a 50/50 cost share requirement.

The IUEP encourages the submittal of proposals for projects that would qualify for the Asia-Pacific Partnership and the Methane to Markets initiative. Further information on the RFP is available online at ji.org/RFP2006/index.php.

USAID Call For Methane to Markets: Public-Private Alliance Proposals

The United States Agency for International Development (USAID) invites prospective Methane to Markets (M2M) partner organizations to form public-private alliances to carry out activities in support of the M2M initiative. A wide range of organizations are eligible for this assistance including: U.S. and non-U.S. nongovernmental organizations (NGOs), private businesses, business and trade associations, international organizations, colleges and universities, other donor governments, host country governments, and regional organizations. Proposals for funding during the current fiscal year must be submitted before September 30, 2006. For additional information and guidance on how to submit a proposal, please visit USAID's Global Development Alliance Web site at usaid.gov/our_work/global_partnerships/gda.

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For additional information on topics in this *Update*, please contact Roger Fernandez.

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