



Technology Spotlight

Con Ed's Robotic Force: Repairing Leaks with CISBOT

Since 2000, CISBOT—a miniature robotic system—has been patrolling Consolidated Edison of New York's (Con Ed's) cast iron distribution pipes, sealing leaking joints and significantly reducing leak repair costs. CISBOT, short for Cast Iron Joint Sealing Robot, is a miniature robotic system developed with funding from Con Ed and Enbridge Consumers Gas and operated under license by ULC Robotics. CISBOT can be inserted directly into live six- to 12-inch diameter cast iron gas distribution lines to seal leaking joints with an anaerobic sealant, without disrupting service, and with minimal excavation. Since it began full-scale operations in 2000, CISBOT has sealed more than 3,000 cast iron joints, allowing Con Ed to



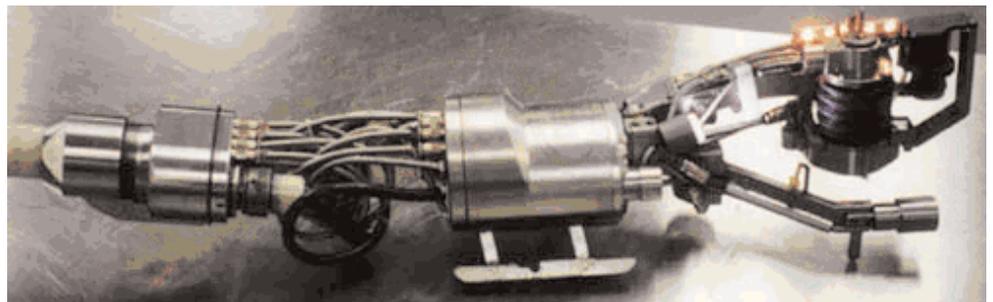
avoid excavating in the densely populated New York City and Westchester County street locations, which comprise its service territory.

Cast iron pipes were used extensively for low-pressure gas distribution piping from the late 19th century until the 1950s. With the switch to higher gas delivery pressures in the late 1950s and early 1960s, the industry began using more protected steel and eventually polyethylene pipe. A large portion of the original cast iron piping is still in use today, especially in the northeastern United States where the earliest gas distribution systems were laid. When installed, the 12-foot (3.66 meter)

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The CISBOT Robotic Head. Photo Courtesy of ULC Robotics.

Time to Show Off—Gas STAR Annual Reporting Season Begins This Spring!

It's that time of year again—time to gather your staff, collect your data, and share your methane emission reduction accomplishments with EPA. In mid-March, all Gas STAR Partners (domestic *and* international) will receive their annual reporting packages. Annual reports are due April 30, 2008.

This information allows Gas STAR to award top performers and share stories of voluntary emission reduction achievements across the industry. It also allows EPA to create each company's individual Benchmarking Report and helps EPA prioritize the services it provides to partners. Annual reporting is a very useful resource to partners in providing a record of voluntary methane emission reduction activities.

Resources

Partners might find the following tools helpful for completing annual reporting forms:

★ **Emission Reduction Quantification Reference Guide**

(epa.gov/gasstar/docs/quantifying_ngs_methane_reductions.xls):

EPA developed a reference guide to provide assistance in quantifying the methane emission reductions achieved by a particular technology or practice. Where applicable, the *Emission Reduction Quantification Reference Guide* provides methodologies for direct measurement, engineering calculations, and/or emission factors for Gas STAR recommended technologies and practices.

First Year for Natural Gas STAR International Reporting

2008 is the first year that partners of Gas STAR International are asked to submit their prior years' methane emission reduction data. Remember:

- ★ Use a separate reporting page for each facility and each technology/practice being reported.
- ★ Annual reports can be submitted online or in hard-copy format.

If you are not an international partner and would like to become one, more information is available online at: epa.gov/gasstar/international.htm.



Natural Gas STAR International Partners at September 2006 Signing Ceremony.

★ **Lessons Learned Studies**

(epa.gov/gasstar/techprac.htm): *Lessons Learned Studies* serve as comprehensive guides for methane emission reduction technologies and practices, providing detailed analyses and emission reduction opportunities. The summaries describe techniques and practices, suggest step-by-step decision processes for implementing the practices, summarize costs and benefits, and provide reference sources for more information. (Also available in Chinese, Russian, and Spanish.)

★ **Partner Reported Opportunities (PRO) Fact Sheets**

(epa.gov/gasstar/techprac.htm): *PRO Fact Sheets* provide partners with basic information for evaluating the economic and operational feasibility of relevant technologies and practices in their operations. These fact sheets represent an initial effort to present information on available methane emission reduction opportunities to partners interested in evaluating additional options for reducing emissions and improving operational efficiency. (Also available in Chinese, Russian, and Spanish.)

2008 ANNUAL REPORTING DATES

- Now**—Begin collecting methane emission reduction data for practices and technologies voluntarily conducted/installed in 2007 (and those that have not been reported in the past).
- Early March**—Begin reporting using the reporting forms located at: epa.gov/gasstar/resources/forms.htm or the online reporting system at: db2.erg.com/gasstar/gasD/login.asp.
- Mid-March**—Receive Gas STAR annual reporting package in the mail.
- April 30th**—Gas STAR annual report due.

epa.gov/gasstar



Southwestern Energy Company's Strong Corporate Guidelines Enable Winning Emission Reduction Efforts

Southwestern Energy Company joined the Natural Gas STAR Program in 2005 and won the Rookie of the Year Award in October 2007. This production company reported the highest 2006 normalized emission reductions of all rookie partners. Its reductions were achieved through implementation of a variety of new technologies and practices, including five Partner Reported Opportunities (PROs) which were:

★ **Install plunger lift system in gas wells.** In mature gas wells, the accumulation of fluids in the well can impede and sometimes halt gas production. Plunger lift systems use gas pressure buildup in the well to lift a column of accumulated fluid out of the well, restoring petroleum flow from the well, minimizing the need for well blowdowns, and significantly reducing methane emissions.

- ★ **Automate compressor systems operations to reduce venting.** Automated compressor control systems, such as the ignition system, reduces the number of system start-ups and shutdowns, thereby reducing methane emissions from the compressor system.
- ★ **Convert gas-driven chemical pumps to electric pumps.** Electric-powered pumps are more efficient and reduce methane emissions when compared to gas-driven pumps. These pumps circulate desiccant fluid through glycol dehydration systems to dry out natural gas.
- ★ **Install automated air/fuel ratio control systems.** Natural gas-fueled internal combustion (IC) engines often have non-combusted methane still left in the system's exhaust. Installing an automated air/fuel ratio control system on the IC engine—which injects a



Southwestern Energy Company

lean fuel/high oxygen mixture into the engine—results in significantly less leftover methane in the engine's exhaust.

- ★ **Install vapor recovery units (VRUs).** VRUs are relatively simple systems that can capture about 95 percent of the light hydrocarbon vapors that naturally evaporate out of petroleum liquid during storage. These captured hydrocarbon vapors can be sold or used onsite as fuel.

Southwestern Energy Company was successful at significantly reducing the company's methane emissions in 2006, according to Mike McAllister—Director of the Health, Safety & Environmental (HS&E) department—due to the company's strong commitment to this effort.

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“We made the decision to invest in a new vapor recovery unit to help reduce our methane emissions. It was an eye-opening experience for our company...the dollar savings we gained by recovering and selling the gas actually paid for the unit within six months.”

—**Mike McAllister**, Director of the Health, Safety & Environmental department, Southwestern Energy Company



Drilling Rig Owned by Southwestern Energy/DeSoto Drilling Inc. Photo Courtesy of Southwestern Energy Company.



In the News

New Mexico Approves Rules Requiring Greenhouse Gas Emissions Reports

On October 10, 2007, New Mexico's Environmental Improvement Board approved greenhouse gas emissions reporting rules. The rules require that industries in New Mexico (including the oil and gas industry) that report emissions of other air pollutants, such as sulfur dioxide,

nitrogen oxides, and particulates, must include greenhouse gas emissions in their annual emissions reports. The rules went into effect on January 1, 2008, and allow for a phasing in of the greenhouse gases being reported, starting with carbon dioxide, followed by methane, and finally

nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

For more information, please visit the Air Quality Bureau page of the New Mexico Environment Department's Web site at: nmenv.state.nm.us/aqb/GHG/documents/20.2.87NMACeff01-01-08.pdf.

Montana Proposes Climate Change Plan to Reduce Emissions

The Montana Governor's Climate Change Advisory Committee (CCAC) has proposed a plan for addressing climate change which includes numerous means to achieve net greenhouse gas reductions. Among the dozens of recommen-

dations is one to reduce carbon dioxide and methane emissions from oil and gas production. Another notable piece of the plan is that "the CCAC recommends that Montana adopt a policy to encourage natural gas companies in the state to par-

ticipate in EPA's Natural Gas STAR Program and provide enforcement and verification of participation." More information about the action plan can be found at: mtclimatechange.us/CCAC.cfm.

EPA Partners with ONGC to Promote Technology Transfer

In August 2007, Oil and Natural Gas Corporation (ONGC) of India became the 8th Natural Gas STAR International Partner. In doing so, it agreed to work with U.S. EPA in identifying and implementing projects to cost-effectively reduce methane emissions. ONGC is India's largest oil and gas company, contributing to over 70 percent of the total oil and gas produced in India. With extensive onshore and offshore operations both ONGC and EPA realize the significant potential for methane emissions reductions in India. As a result, cooperative efforts have been moving forward swiftly.

In early December 2007, ONGC and EPA conducted four Technology Transfer Workshops at different ONGC production assets across India: Mumbai (Maharashtra), Ahmedabad (Gujarat), Nazira (Assam), and Rajahmundry (Andhra Pradesh). The aim of the workshops was to raise awareness within ONGC staff and build capacity in the application of new technologies and practices to identify and reduce methane emissions. The workshops were coordinated by Mr. A. B. Chakraborty (General Manager – Head, Carbon Management Group), and were launched by presenta-



Pictured in This Photo from Left to Right Are: Mr. A.B. Chakraborty (ONGC), Mr. Sachin Nagdive (ICF International), Ms. Carey Bylin (U.S. EPA), Mr. Hemant Mallya (ICF International), and Mr. Don Robinson (ICF International).

tions from senior management, including Mr. A. K. Hazarika (Director—Onshore) and Mr. N. K. Mitra (Director—Offshore).

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Top U.S. Production Companies Partnering With Natural Gas STAR

With the recent addition of Chesapeake Energy Corporation to the partnership, all but four of the top oil and gas production companies operating in the United States are Natural Gas STAR partners. Together, these companies are helping to reduce the industry's greenhouse gas footprint through the implementation of voluntary, cost-effective technologies and practices to reduce emissions of methane.

 Natural Gas STAR Partners

 Non-Partners

Top 25 Production Companies Operating in the United States¹

Anadarko Petroleum Corp.	ExxonMobil Corp.
Apache Corp.	Forest Oil Corp./Houston Exploration Co. ²
BP	Marathon Oil Corp.
Cabot Oil & Gas Corp.	Newfield Exploration Co.
Chesapeake Energy Corp.	Noble Energy Inc.
Chevron Corp.	Occidental Petroleum Corp.
ConocoPhillips	Pioneer Natural Resources Co.
Devon Energy Corp.	Questar Corp.
Dominion Exploration & Production	Shell Exploration and Production Company
El Paso Corp.	Ultra Petroleum
EnCana	Williams Cos. Inc.
EOG Resources, Inc.	XTO Energy Inc.
Equitable Supply	

¹ Source: Oil & Gas Journal, 2007.

² Houston Exploration Co. was acquired by Forest Oil Corp. in 2007.

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sections of cast iron pipes were connected at the joint by a bell and spigot. To seal the joints, jute—a plant fiber used in making burlap and twine—was packed into the back of the joint, and molten lead or wet cement was poured into the front of the jute packing, which when cooled created a gas-tight seal. Over time, however, ground movement caused by heavy overhead traffic loads, freeze-thaw cycles, and naturally shifting soils cause the joints to leak.

CISBOT in Action

The CISBOT system consists of a robotic head that is inserted into the gas main, an umbilical cable that connects to the control panel and is used to move the robot inside the pipeline, and an operator control panel. The robotic head slides through the gas main on a retractable ski assembly and is equipped with a video camera, four pointer lights, support arms, a drill head, and a sealant injector.

To use CISBOT, operators excavate a section of the cast iron pipe and install a permanent full encirclement bidirectional fitting. The operator then drills the main in both directions and installs a

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Con Ed's Award-Winning Program

In April 2007, Anthony Hranicka of Consolidated Edison Company of New York, Inc. received the Gas Industry Research Award for his company's development and use of CISBOT for repairing leaking cast iron bell and spigot joints. This award, sponsored by the Gas Appliance Manufacturers Association, recognizes an individual whose research has helped the natural gas industry to reduce operating costs, improve safety, and support environmental compliance with national and state standards.

Update: Proposed Climate Change Legislation Relevant to the Natural Gas Industry

The Fall 2007 issue of the *Partner Update* provided an overview of emerging greenhouse gas (GHG) cap and trade legislation introduced into Congress and explained the legislation's potential impact on the natural gas sector. This article provides updated information related to the GHG cap and trade bills including findings of a recent U.S. Environmental Protection Agency (EPA) economic assessment of the Bingaman-Specter bill (S.1766).

Update: Greenhouse Gas Cap and Trade Bills

As of March 2008, 12 cap and trade bills for reducing GHG emissions have been introduced in the 110th Congress. The Fall 2007 issue of the *Partner Update* featured a table displaying the 10 bills that had been introduced as of that date and the major components of those bills. In October 2007, Senators Joseph Lieberman (ID-CT) and John Warner (R-VA) introduced America's Climate Security Act (S.2191). The Lieberman-Warner bill calls for the creation of an economy-wide cap and trade program beginning in 2012. Economy-wide means that it covers all major sectors of the economy. However, as particularly relevant to the natural gas industry, this bill would specifically require natural gas processing plants, facilities that produce natural gas in the state of Alaska, or any entity that imports natural gas to submit emission allowances that account for all of the GHG emissions that the facility

emitted in that year to EPA, on an annual basis. The Senate Environment and Public Works Committee passed S. 2191 on December 5, 2007. Senator Harry Reid (D-NV), Senate Majority Leader, has indicated support for bringing the Lieberman-Warner bill up for a vote in the Senate in the spring or summer of 2008.

Recent Activities Related to Proposed Climate Change Legislation: EPA's Economic Analysis of S. 1766

Senators Bingaman and Specter asked the EPA and the Energy Information Administration (EIA) to conduct a technical and economic analysis to estimate the costs of their bill, the Low Carbon Economy Act of 2007 (S. 1766), to the U.S. economy. The key components of S. 1766 include an economy-wide cap and trade system that takes a hybrid approach to regulating emissions sources. The Bingaman-Specter bill also contains provisions for early action such as credit for reductions registered with the Department of Energy's 1605b Program and state or private registries, as well as EPA's Climate Leaders Program.

Some of the key findings from the EPA analysis of the S. 1766 include:

- ★ Relative to the reference scenario, S. 1766 would reduce U.S. GHG emissions by about 25 percent in 2030, and by about 40 percent in 2050. Compared to historical

emissions, emissions under S. 1766 would be approximately equal to 2000 levels in 2030, and 10 percent lower than 2000 levels in 2050.

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Hidden Assets: Discovering the True Value of Methane Emission Reductions

International Workshop on Methane Emission Reduction Technologies in the Oil and Natural Gas Industry

April 17-18, 2008, China University of Petroleum (Qingdao Campus) Huadong, China

Co-sponsored by EPA, the Methane to Markets Partnership, and the China University of Petroleum, this workshop will focus on cost-effective technologies and practices to reduce methane emissions from the natural gas and oil production, processing, transmission, and distribution sectors.

The implementation of current cost-effective methane emission reduction technologies and practices in the oil and gas industry can lead to reduced product losses and therefore, increased operational efficiency, enhanced environmental protection at the local level and reduced methane emissions, which is a potent greenhouse gas.

More information is available online at methanetomarkets.org/events/2008/oilgas/docs/17apr08_wrkspflyer_eng.pdf. We look forward to seeing you at the workshop!



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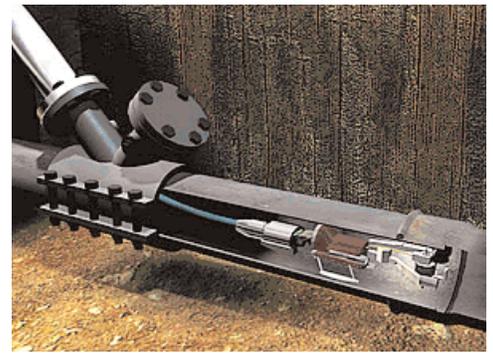
robot launch tube on the fitting. Next, the robotic head is inserted into the launch tube and pushed into the main. Once in the main, the ski assembly is extended, and the umbilical cable pushes the robotic head to its full extent (approximately 150 feet in each direction) down the length of the main. The operator then begins to retract the robotic head and uses the video camera assisted by the pointer lights to locate the first joint and properly position the robotic head for joint drilling and sealing. Once in the proper position within the joint, the support arms are extended to stabilize the robotic head and the drill bit is raised and begins drilling through the spigot into the jute. The drill bit is shaped to create a chamfer at the drill hole that allows the injection nozzle to create a clean tight seal. The drill head can rotate through 90 degrees (i.e., it can be rotated from the 10:30 position to the 1:30 position), so if the first injection attempt is not successful, others can be made. After drilling, the injection nozzle is rotated over the drill stem and is pressed firmly into the drill hole. A measured amount of sealant is then injected into the joint. The anaerobic sealants used by CISBOT are liquids, similar to a two-part epoxy, that remain in liquid form until they are mixed in the absence of air and exposed to a catalyst—in this case, the metal ions of the cast iron pipe, at which point they solidify and seal the leak.

Once injection is complete, the nozzle and drill bit are withdrawn, the support arms retracted, and the robotic head is pulled back to the next joint toward the

entry point to repeat the process. Once all joints in one direction are sealed, the robotic head is withdrawn and reinserted into the gas main in the other direction. Because cast iron pipe segments are 12 feet, CISBOT can seal 25 joints per excavation. In addition to sealing leaks, anaerobic sealant injections act like a valve packing within the joint and help reduce future leaks. CISBOT is not used for joint inspection or leak detection. Leak detection is done externally by leak detection crews equipped with gas sniffers.

Benefits of Using CISBOT: Con Ed's Experience

Using CISBOT as a preventative maintenance tool repairing leaks in service areas where communities are planning street repaving, allows Con Ed to service its line while minimizing excavation and repaving costs. It also helps preserve the integrity of community streets by reducing the amount of cutting and repaving and helps avoid potential ill will from residents affected by the excavation of



CISBOT Enters the Gas Main Via Its Launch Tube Attached to the Bidirection Fitting. Photo Courtesy of ULC Robotics.

newly paved streets. Once Con Ed identifies repaving projects, it sends in leak detection crews to detect pipeline leaks. CISBOT is then dispatched to repair the leaking sections of pipe.

“We have been successfully using CISBOT for a number of years now and are very satisfied with our results,” said Anthony Hranicka, Con Ed’s project manager responsible for CISBOT operations. “But I really don’t think we have reached its full potential.” He conservatively estimates that CISBOT could

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New Tool Available on Natural Gas STAR Web site!

The Nodal Analysis Tool: An Interactive Web-Based Flow Diagram of the Oil and Gas Industry

The Nodal Analysis Tool is an information source and learning tool for individuals who might not be familiar with the oil and gas industry or would like to learn more about a specific aspect of the industry and project opportunities. This tool provides a high-level flow diagram illustrating how different types of facilities and sections of the industry relate to each other. The Nodal Analysis Tool also features a built-in glossary of key terminology, background information on the types and magnitude of methane reduction opportunities, and dropdown lists of project opportunities. Ultimately, the user will be able to navigate or “drill down” to different levels of detail, utilize pop-up boxes and hyperlinks to address relevant questions, and easily access information on cost-effective technologies and practices that reduce methane emissions in the oil and gas industry.

Although still a work in progress, the Nodal Analysis Tool will become a permanent feature on the Natural Gas STAR Web site. The overall usefulness of the tool depends on the quality of the user’s experience. Hence, users’ feedback will lead to the continued enhancement of the tool. Please send your comments to the Methane to Markets Administrative Support Group (asg@methanetomarkets.org).

The Nodal Analysis Tool is available at epa.gov/gasstar/resources/nodaltool.htm.

The tool was developed as part of the Methane to Markets Partnership. The Partnership would like to acknowledge the Government of Canada for sponsoring this work and the other individuals and organizations that contributed time and resources to facilitate development of the tool.

Partner Profile

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According to Mr. McAllister, Southwestern Energy employees work diligently to identify and reduce natural gas emissions through a systematic, ongoing review of facility operations. One of the methods Southwestern Energy Company operations teams implement is the Process Optimization Review (PRO-OP) approach to building new or refurbishing existing natural gas facilities.¹ The process emphasizes energy efficiency, natural resource conservation, and waste minimization, as well as implementing Natural Gas STAR Best Management Practices (BMP) to

reduce methane emissions. Southwestern Energy uses these principles in choosing which projects to implement based on three general issues: 1) the cost of implementation, 2) the potential revenue flow from the additional natural gas saved, and 3) the estimated methane (and other greenhouse gases) emissions reductions.

Winning the Natural Gas STAR award was extremely gratifying for Mr. McAllister and Southwestern Energy. Overall, Southwestern Energy Company believes that the EPA's Natural Gas STAR Program is a great example of an effective industry-government partnership that benefits oil and natural gas stakeholders, as well as makes methane emissions reductions a top line business opportunity.



A Natural Gas Wellhead Owned by Southwestern Energy/SEECO Inc. Photo Courtesy of Southwestern Energy Company.

In the News

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Each workshop was well attended with 30 to 45 participants, including field managers and engineers from production, engineering, and processing operations. The workshops provided an excellent forum for the presentation and active discourse on topics such as vapor recovery units, directed inspection and maintenance with optical imaging, reduced emissions completions, plunger lifts, and smart well automation.

Additionally, to assist with the overarching goal of assisting ONGC in identifying and implementing methane emission reduction projects, EPA visited production, gathering, and processing sites at three of the assets. Currently, EPA and ONGC are reviewing and analyzing field data to identify the best opportunities to reduce

methane emissions at other ONGC assets. This work will culminate in an April 2008 measurement study at four ONGC sites. The goal of the measurement study will be to use methane detection equipment, such as the infrared (IR) camera, to identify fugitive and vented methane emission sources, and to use measurement tools to quantify emissions from such sources. Being able to “see” emissions with the IR camera will have multiple benefits, including guiding the measurement activities, allowing field personnel and management to see and understand emission sources, and building capacity

within ONGC personnel to replicate such studies in the future. Actual measurements will be taken and documented to provide quantifiable baseline emissions estimates, which will serve as the basis for EPA recommendations for future methane emission reduction projects.

EPA and ONGC's ongoing work exemplifies beneficial collaboration between two founding Methane to Markets countries, and, more importantly, provides a platform for the reduction of methane emissions to the atmosphere, and corresponding increased quantity of natural gas for sale or use by ONGC.

We Need Your Input!

Provide us with your suggestions for future *Partner Update* articles!

Are there topics that you would like to see featured in future issues of the *Partner Update*? Is your company using new or innovative methane emission reduction activities that you think other *Partner Update* subscribers would find interesting? We would like to hear your suggestions. Please e-mail suggestions or comments to gasstar@erg.com.

¹ For more information on Process Optimization Review, visit: epa.gov/gasstar/pdf/AppB_ProcOpRev.pdf.

Calendar 2008 UPCOMING EVENTS

2008 GAS STAR TECHNOLOGY TRANSFER WORKSHOPS

- ★ **Producers Technology Transfer Workshop, Denver, Colorado**
April 29, 2008
Sponsored by: Marathon Oil Corporation
 - ★ **Offshore Producers Technology Transfer Workshop, New Orleans, Louisiana**
May 6, 2008
Sponsored by: Shell Oil Company and Chevron Corporation
 - ★ **Producers and Processors Technology Transfer Workshop, Midland, Texas**
July 23, 2008
Sponsored by: Chevron Corporation
 - ★ **Producers Technology Transfer Workshop, Rock Springs, Wyoming**
May 1, 2008
Sponsored by: EnCana USA
 - ★ **Transmission Technology Transfer Workshop, Charlotte, North Carolina**
June 25, 2008
Sponsored by: Southern Gas Association
- These are events that the Natural Gas STAR Program is currently planning. For updates and further information, please check epa.gov/gasstar/workshops.htm or contact Jerome Blackman at blackman.jerome@epa.gov or (202) 343-9630.

METHANE TO MARKETS WORKSHOP

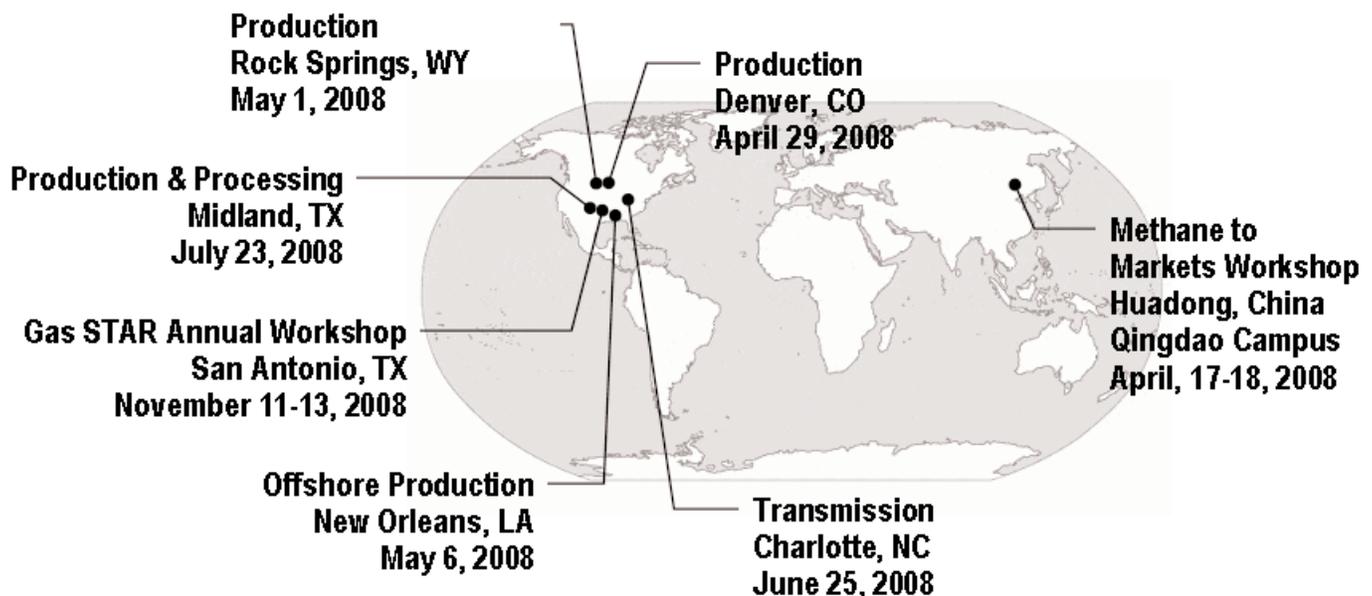
- ★ **Oil and Natural Gas Technology Transfer Workshop**
April 17-18, 2008
China University of Petroleum (Qingdao Campus), Huadong, China

For more information please contact:
Roger Fernandez at
fernandez.roger@epa.gov or
(202) 343-9386

GAS STAR ANNUAL IMPLEMENTATION WORKSHOP

- ★ **San Antonio, Texas**
November 11-13, 2008
Westin Riverwalk Hotel
For more information please visit
epa.gov/gasstar/workshops/imp_workshops.htm.

Gas STAR and Methane to Markets Workshops



Calendar

2008 RELATED INDUSTRY EVENTS

- ★ **Gas Processors Association
87th Annual GPA Convention**
March 2–5, 2008
Gaylord Texan Resort & Convention Center
Grapevine, Texas

GPA expects over 1,500 attendees, from more than 20 countries and approximately 475 companies, to attend this year's annual convention. The convention will feature forum topics and presentations applicable to the natural gas, gas processing, and natural gas liquids industries.

For more information and online registration, please visit:
gasprocessors.com/convention.html.
- ★ **American Gas Association
Public Relations & Marketing
Communications Meeting**
March 6–7, 2008
Pointe Hilton Squaw Peak
Phoenix, Arizona

The AGA program will include discussions on leading issues facing the natural gas industry, including climate change and energy efficiency. The meeting provides an opportunity for energy industry professionals to network with peers and to discuss strategies for communicating with customers and increasing the natural gas industry's profile.

For more information and online registration, please visit: aga.org/Events/EventsataGlance/PRMarketingcommunicationsmeeting2008.
- ★ **National Petrochemical and Refiners Association 2008 International Petrochemical Conference**
March 30–April 1, 2008
Henry B. Gonzalez Convention Center
San Antonio, Texas

The NPRA meeting will feature a variety of sessions covering political, economic, and environmental issues affecting the petrochemical industry.

For more information and online registration, please visit: npra.org/forms/meeting/MeetingFormPublic/view?id=D23F00000012.
- ★ **Air & Waste Management Association
The Climate Policy Puzzle: Putting the Pieces Together**
April 2–3, 2008
Marriott Crystal City Gateway
Arlington, Virginia

The Air & Waste Management Association's "Climate Policy Puzzle" conference will provide a neutral forum for stakeholders to discuss topics including greenhouse gas emissions and climate change policies, and engage in discussions about solutions.

For more information and online registration, please visit: awma.org/events/view_event.html?typeid=1&id=86.
- ★ **The American Institute of Chemical Engineers 2008 Spring National Meeting**
April 6–10, 2008
New Orleans Convention Center
New Orleans, Louisiana

The AIChE meeting will include topical conferences in distillation, energy processes, natural gas symposium, and sustainable development.

For more information and online registration, please visit: aiche.org/Conferences/SpringMeeting/index.aspx.
- ★ **American Petroleum Institute (API)
2008 Pipeline Conference and Cybernetics Symposium**
April 8–10, 2008
The Florida Hotel and Conference Center
Orlando, Florida

The API conference will include an environmental discussion on air emissions and greenhouse gases.

For more information and online registration, please visit: api.org/meetings/topics/pipeline/index.cfm.
- ★ **Interstate Oil and Gas Compact Commission 2008 Midyear Issues Summit**
May 4–6, 2008 (Calgary, Alberta, Canada)

On May 5, the conference will feature a session on Environment and Safety.

For more information and online registration, please visit: iogcc.state.ok.us/events.html.
- ★ **American Gas Association
AGA Operations Conference**
May 14–16, 2008
Pointe Hilton Tapatio Cliffs
Phoenix, Arizona

The annual AGA Operations Conference hosts natural gas utility and transmission company operations management from across North America and around the world for the sharing of technical knowledge, ideas and practices to promote the safe, reliable, and cost-effective delivery of natural gas to the end-user. The Operations Conference will focus on topics such as gas measurement, operations advocacy, safety, environment, storage, engineering, construction and maintenance, gas control, supplemental gas, corrosion control, and plastic materials.

For more information and online registration, please visit: aga.org/Events/EventsataGlance/AGAOperationsConference.
- ★ **Gas Processors Association
Environmental Subcommittee Meeting**
May 21, 2008
Anadarko's Offices, The Woodlands, Texas

For more information, please visit: gasprocessors.com/calendar.html.

Are you a Gas STAR Endorser and have an event you would like listed here? Please e-mail pertinent event information to gasstar@erg.com.

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easily seal about 1,600 cast iron joints annually during its eight-month working season (CISBOT is generally not used at temperatures below freezing). To date, CISBOT has only been used in the northeastern and Mid-Atlantic regions of the country. It is possible that the working season might vary in other regions depending on local climate. Mr. Hranicka based his estimate on CISBOT servicing two sites per week (300 feet of pipeline/25 joints per site) during its 32-week working season, from April through November. This equates to rehabilitating more than 19,000 feet of cast iron distribution pipe each year.

Mr. Hranicka explains that calculating Con Ed's savings from using CISBOT is complicated. "Trying to isolate all of the variables in repairing or replacing cast iron pipes makes it difficult to come up with a definitive number," Mr. Hranicka explains. "I tend to think in terms of general savings. For example, since CISBOT is a trenchless method of pipeline repair it typically reduces costs by 30 to 40 percent from traditional trenching operations. We also view CISBOT's use not as a spot repair, but as rehabilitating 300 feet of old cast iron pipe for continued long-term use and savings."

Con Ed owns the CISBOT system through a licensing agreement with ULC Robotics. In addition to its work

with Con Ed, Greg Penza of ULC Robotics said that ULC Robotics has performed demonstration projects for other Natural Gas STAR distribution sector partners, including Keyspan Energy Delivery, Washington Gas, and UGI Utilities, Inc., and has an open purchase order to perform services with Public Service Enterprise Group (PSEG) (also a Natural Gas STAR partner). According to Mr. Hranicka and Mr. Penza, the CISBOT system costs between \$200,000 and \$250,000. Because of its cost, purchasing a CISBOT system probably does not make economic sense for most utilities, a driver in the choice made by Con Ed and PSEG to contract services from ULC Robotics.

Legislation Update

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- ★ In 2095, if S. 1766 becomes law and international climate policies described in the Senate scenario of the analysis are carried out, global CO₂ concentrations are estimated to be approximately 504 parts per million (ppm), compared to approximately 718 ppm in the reference

("without measures") case. Under S. 1766, the analysis suggests that the U.S. contributes about 10 ppm to this reduction. (Note: in 2005 global CO₂ concentrations were approximately 380 ppm).

Detailed information on assumptions, considerations and results of EPA's assessment of S. 1766 (as well as two other proposed bills) can be found at epa.gov/climatechange/economics/economicanalyses.html#s1766.

Overview of Cap and Trade: Cap and trade is a market-based mechanism for reducing emissions from a group of sources throughout a broad geographic region. This approach has been used since the early 1990s by EPA's Acid Rain Program (established under Title IV of the 1990 Clean Air Act Amendments) to reduce sulfur dioxide (SO₂) emissions from power plants on a national level. Under this type of approach, the cap establishes a maximum amount of emissions per compliance period, for all affected sources. Authorizations to emit in the form of emission allowances are then distributed to affected sources, and the total number of allowances cannot exceed the cap. To comply with a cap and trade program, affected sources are required to report their emissions and submit an equivalent number of allowances at the end of the compliance period (e.g., one year). Individual control requirements are not specified; instead, sources have flexibility in how they comply and can either limit emissions to meet the number of allowances allocated to them or trade (buy and sell) allowances.

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