



COALBED METHANE EXTRA

A publication of the Coalbed Methane Outreach Program (CMOP)

www.epa.gov/coalbed



Project Update: VAM Technology Demonstration Project Begins Operation This Spring

U.S. Environmental Protection Agency's (EPA) Coalbed Methane Outreach Program (CMOP) is cooperating with the U.S. Department of Energy's (DOE) National Energy Technology Laboratory (NETL) to support the first-ever U.S. demonstration of a technology designed to utilize ventilation air methane (VAM) from coal mines. The potential benefits of the technology include the reduction of greenhouse gas (GHG) emissions from coal mining activities and the generation of clean energy. CONSOL Energy is hosting the project, which has just completed the construction and commissioning phase, at its Windsor Mine Portal, a closed, underground mine near West Liberty, West Virginia (see Figure 1). CONSOL Energy has tested the safety, operating, monitoring, and data

see *VAM TECHNOLOGY*, page 5



Figure 1. MEGTEC's VOCSIDIZER installed at CONSOL Energy's Windsor Mine Portal in West Virginia.

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Methane to Markets Update

Methane to Markets (M2M) Coal Subcommittee Meeting

The Methane to Markets (M2M) Coal Subcommittee Meeting was held at the Palais des Nations in Geneva, Switzerland, on April 3-4, 2007. The successful two-day meeting directly followed the Third Session of the United Nations Economic Commission for Europe (UNECE) Ad-Hoc Group of Experts on Coal Mine Methane (CMM), convened April 2-3, 2007. Both meetings were well attended by governmental and intergovernmental agencies, financial entities, and private sector organizations. Topics presented during the UNECE meeting included standardization of CMM terminology, greenhouse gas project insurance instruments, and the use of low-quality coal mine methane.

The M2M Coal Subcommittee Meeting focused primarily on plans for the M2M Partnership Expo, which will take place October 30 – November 1, 2007, in Beijing, China. Several countries submitted project templates to showcase at the Expo and the Subcommittee expects to receive many more before the July 1 deadline. Updates on CMM activities were given by country delegations, including highlights of new developments in CMM in Australia, Russia, Mexico, and Poland. In addition, the Subcommittee discussed progress on activities in the Action Plan, including two databases (global CMM projects and technologies), as well as future Subcommittee plans for 2008.

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CONSOL Energy Demonstrates Coal Mine Methane-Fired Microturbine



Photo courtesy of CONSOL Energy

Microturbine Installation at CONSOL Energy's Bailey Mine in Pennsylvania.

In a first-of-a-kind project in the United States, CONSOL Energy, in partnership with CNX Gas Corporation and Ingersoll Rand Energy Systems, is successfully demonstrating electricity generated by a microturbine fueled by unprocessed coal mine methane (CMM) at an active underground coal mine. The project uses CMM directly from the underground workings at CONSOL's Bailey Mine. Located in Greene County, Pennsylvania, the Bailey Mine is one of the largest underground coal mines in the world, producing over 10 million short tons of coal in 2006.

Project Summary

Currently, the unit is running and will undergo a one-year operational phase. The microturbine is a 70 kilowatt (kW) unit with low-Btu fuel (350-575 Btu per cubic foot) capability. Designed and built by Ingersoll Rand Energy Systems, the off-the-shelf microturbine is a small mobile electricity generator modified in order to accommodate project-specific requirements, including:

- ▶ installation of auxiliary equipment to remove moisture from the gas and boost the gas pressure entering the microturbine,
- ▶ addition of an automatic shutoff valve on the mine vent, and
- ▶ inclusion of a communications package that allows remote monitoring of the equipment.

Each year, the 70 kW microturbine is expected to generate approximately 500 megawatt-hours of electricity while consuming approximately 8 million cubic feet of methane that would have otherwise been emitted, which is equivalent to taking 690 cars off the road in terms of its reduction in global warming potential. Every kilowatt of electricity generated on site directly reduces the amount of electricity purchased from the grid. The pilot microturbine project received a grant from the Pennsylvania Department of Environmental Protection (DEP). CONSOL Energy will donate the monetary value of the electricity generated during the first full year of operation of the microturbine to the West Greene School District.

This microturbine demonstration project will evaluate the economics of using this technology to generate electricity using CMM. This project is intended to aid in future technology transfer by providing potential mine sites with a robust operational data set that will allow mines to consider microturbines as an option to generate electricity for mining operations while reducing greenhouse gas emissions.

Benefits of Power Generation from Coal Mine Methane

Generating power from raw coal mine methane has several advantages over other end-use options. There are no formidable location requirements other than sufficient onsite space and appropriate terrain for installation. Compared to natural gas pipeline injection, where gas quality is a key consideration, power generation equipment can operate using medium-quality gas. In some cases, depending upon the level of impurities in the gas, plant designers may recommend gas pre-treatment. As long as regional electricity prices are sufficiently high, the generated power

"We've been able to demonstrate that this unit is an innovative way to harvest and use a greenhouse gas that would normally be vented into the atmosphere...If the economic evaluation is positive, this technology can be applied in coalfields either in isolated areas that may lack access to electricity transmission lines or at individual commercial power generation sites."

Nicholas Deluliis
President and CEO
CNX Gas Corporation



can offset part of the electricity needed to operate the mine's equipment, conveyor belts, ventilation fans, and coal preparation plants. Alternatively, if prices are attractive, the mine may choose to sell electricity to the grid via existing transmission lines.

To generate power from drained CMM, three broad classes of technologies are commercially available: internal combustion engines, gas turbines, and microturbines. Internal combustion (IC) engines are the most popular technology choice for electricity production at coal mines around the world. Conventional gas turbines require fairly high methane flows – about 500,000 cubic feet per day (cfm) for a 1.5 megawatt (MW) unit.

Microturbines are the most practical choice for smaller operations with a capacity of less than one MW. Table 1 summarizes key characteristics of this technology. Microturbines operate much like gas turbines except the high-speed turbine, compressor, and generator are packaged into a container the size of a refrigerator. Their relatively small output ranges – 30 to 250 kW each – make them applicable to small CMM flows. Microturbines are compact, quiet, clean and reliable, and they work well in remote areas. Additionally, microturbines are scalable and can be configured to match capacity from as little to 30 kW up to several MW. In addition, as a modular system they can be configured to meet both power and physical installation requirements. If the right conditions exist, microturbines can provide coal mines with economical, reliable, and price-stable electric power. Microturbines have relatively low air emissions, which makes them easier to permit.

Small mines with very low methane emissions, as well as abandoned mines, whose methane recovery and production decrease with time, may be well-suited for microturbines. For example, from 2000 to 2005, the abandoned Akabira Coal Mine in Sumitomo, Japan, utilized five microturbines each with a generating capacity of 30 kW. Several factors made the microturbines very appealing at this site. Only about 17.7 million cubic feet of CMM was recovered and utilized per year, a flow small enough to rule out the use of IC engines or turbines. In addition, Japanese

regulations are less restrictive for turbine use than engine use. Finally, the low maintenance and operating requirements of the microturbine system proved attractive.

Typical Output Range (MW)	0.03 to 0.25
Required CMM Supply (cfm)	About 100,000
Output Flexibility	Excellent
Compatibility with VAM	Being Tested
Waste Heat Recovery	Fair to Poor
Other Benefits	Suitable for decreasing methane production at abandoned mines
Typical Installation Cost (\$/kW)*	1,500-2,000
Typical Maintenance Cost (\$/kWh)*	0.003-0.01
* Highly case specific	

Outlook

With demand for electricity likely to grow during the next decade, clean power technologies such as CMM-fired microturbines will help meet demand while controlling emissions of greenhouse gases. By generating electricity from coal mine methane gas that is currently being vented, the CONSOL demonstration project is reducing emission and generating value from a previously wasted resource.

For CONSOL Energy's press release describing this project, see:

http://energy.ingersollrand.com/news/article.asp?news_id/107

www.epa.gov/coalbed
www.methanetomarkets.org

M2M Update *from page 1*



Methane to Markets

Call for Projects and Announcement of Sponsorship Opportunities



The Methane to Markets Partnership Administrative Support Group (ASG) is accepting submissions of methane recovery and use project opportunities. Selected projects will be showcased at the upcoming Partnership Expo in Beijing, China, to be held October 30 - November 1, 2007. In particular, the Partnership is seeking methane recovery or use projects in four sectors: Agriculture (e.g., dairy or swine waste management), Coal Mines, Landfills, and Oil and Gas Systems. The Expo will provide attendees with the opportunity to:

- Showcase project opportunities for potential investors
- Meet with potential project partners and financiers
- Learn about the latest technologies and services
- Explore key technical, policy and financial issues

For complete details about how to submit a project for consideration for the Expo, visit the project submission Web page at www.methanetomarkets.org/expo/ and select "Submit a Project". The submission deadline is July 2, 2007.

For information about becoming a Sponsor of the Expo, please visit <http://www.methanetomarkets.org/expo/sponsors.htm>

For more information about the Partnership, please visit www.epa.gov/methanetomarkets.

Overall, the meetings were productive and it was exciting to see the growing interest in CMM project development worldwide.

Meeting minutes and presentations are posted on-line at <http://www.methanetomarkets.org/events/2007/coal/coal-2apr07.htm>

For more information on submitting projects to be showcased at the M2M Partnership Expo in Beijing, please see <http://www.methanetomarkets.org/expo/submit.htm>

Methane to Markets Three-sector Workshop in India

On February 22nd and 23rd, the U.S. Environmental Protection Agency, the Federation of Indian Chambers of Commerce and Industry (FICCI), and the Government of India jointly organized a two-day workshop on the Methane to Markets Partnership and methane recovery and use project opportunities in India. The workshop provided an introduction to the Partnership and specific technical and project level discussions in three industry sectors: coal mining, landfills, and oil and natural gas.



The meeting was held at FICCI's building in Delhi and attracted more than 100 participants. Presentations were given by a diverse set of speakers from government, academia and the private sector. The workshop featured three separate technical workshops (focused on coal, landfills, and oil & gas sectors) along with an opening plenary session with keynote speakers from the nodal Indian Ministries, the U.S. Embassy and from the USEPA.

The Indian Minister of Environment, Dr. Prodipto Ghosh, headlined the plenary session and provided an overview on why methane reductions in India are important and how the Methane to Markets Partnership can contribute. FICCI will be developing an action plan based on a facilitated discussion that was held in each sector session in order to use the momentum from this workshop to push forward on project development in India in the three targeted sectors. There was also discussion of launching an initiative in the animal waste management sector.

VAM Technology from page 1

logging systems for proper function. The system was deemed fully operational in April 2007. CONSOL will operate the equipment for eight months.

The project is being funded through an interagency agreement between EPA and DOE with the agencies providing \$500,000 and \$1.1 million, respectively. In addition, CONSOL Energy and MEGTEC Systems, the technology supplier, are providing about \$400,000 in funding and resources as well as technical support. EPA will also provide technical and analytical support during the demonstration project and will assist in the analysis, interpretation, and extrapolation of the demonstration results.

Project Background

Methane explosions and fires are the leading cause of coal mining fatalities globally. Methane is explosive in concentrations ranging from 5 to 15% in air. The primary mechanism for removing methane from operating mines is through ventilation systems that circulate fresh air into the mine to dilute the in-mine methane concentration. Large fans move a large enough volume of air to reduce in-mine methane concentrations to below 1 or 2% as required by most international safety regulations for coal mining.

A potent greenhouse gas, methane is over twenty times more effective than carbon dioxide at trapping heat in the atmosphere. Methane emissions from coal mines represent about 10% of U.S. anthropogenic methane released to the atmosphere. The largest source of this coal mine methane is dilute methane emitted from mine ventilation shafts (VAM), which accounts for over 55% of all methane emitted by U.S. coal mines.¹ VAM is difficult to capture and use because it has a low methane concentration (typically ranging from 0.3-1.5% methane), and because of the large volume airflows associated with ventilation systems, typically on the order of 100,000 to several 100,000 cubic feet per minute (cfm).

One novel approach to reducing VAM emissions involves oxidation of the dilute methane gas and the recovery and transfer of heat to generate energy. The technology used in this demonstration project is MEGTEC's thermal flow reversal reactor (TFRR), known as the VOCSI-

DIZER. Over 700 VOCSIDIZER units have been installed globally and have proven to be effective in a variety of industrial applications including odor abatement and the destruction of volatile organic compounds. The VOCSIDIZER system efficiently and safely produces heat from the dilute methane in VAM, which may be transferred for local heating needs or for the production of electric power.

Technology Description

The VOCSIDIZER consists of a ceramic bed in an airtight steel container (Figure 2), to facilitate regenerative heat exchange between the inflowing VAM and a solid heat exchanger medium. The process fan at the inlet side of the VOCSIDIZER forces the ventilation air through the reactor in one direction. The dilute methane stream gains temperature as heat is transferred from the electrically-preheated bed until it reaches a temperature at which the methane is oxidized. The thermal energy released during methane oxidation is recovered by the bed medium as the air flows to the outlet side of the reactor. To maintain the high temperature zone within the ceramic bed, the air flow through the reactor is reversed periodically using large switching valves. As a result, the part of the bed that was initially heated then heats the incoming gas and the process repeats.

The VOCSIDIZER is self-sustaining at low methane concentrations (0.2%-1.2%) and requires no other source of fuel. Because of the system's rugged construction, few moving parts, and advanced controls, it requires little maintenance. The homogenous temperatures within the reactor ensure low pollutant emissions. Oxidizing methane converts it to CO₂ and water, which reduces its global warming potential by 87%. The system produces virtually no SO_x, NO_x, or particulates, and only minor quantities of CO. The VOCSIDIZER system for this demonstration project consists of a single oxidizing unit with a throughput of 30,000 cubic feet per minute (cfm). A typical large commercial mine ventilation fan in the U.S. has a flow rate of around 180,000 cfm. Because the oxidizer units are modular, the system can be scaled up simply by adding additional units.

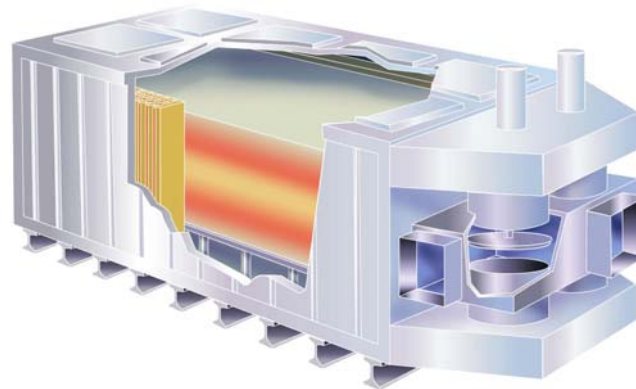


Figure 2. Internal View of VOCSIDIZER showing bed, insulation, switching valves, and air plenum.

Photo courtesy of MEGTEC Systems, Inc.



International Projects

This project represents the first trial of the VOCSIDIZER to oxidize ventilation air methane in the U.S., although this application of the technology has been successfully tested at the small pilot scale in other countries. The first pilot-scale test was conducted at British Coal's Thoresby Mine in the United Kingdom in 1994. In this case, the system oxidized a VAM flow (4,700 cfm) from a gassy underground mine (at concentrations of 0.3-0.6% methane), and demonstrated self-sustaining operation at 0.1 % methane. In 2001-2002, a project in Australia at BHP Billiton's Appin Colliery provided additional proof of the ability to oxidize ventilation air (3,500 cfm), and also recovered 90% of the heat as hot water. Finally, the world's first commercial-scale VAM-to-power project began construction in 2005 at BHP Billiton's West Cliff Colliery in New South Wales, Australia. For this project, the oxidation of close to 150,000 cfm of ventilation air is expected to generate between 5 and 6 megawatts (MW) of electricity. This project is expected to be fully operational in 2007.

“This project shows how we can work through public-private partnerships to develop innovative, climate-friendly technologies. By capturing methane from coal mines, we can promote clean energy while reducing greenhouse gases.”

Bill Wehrum
Acting Assistant Administrator
EPA's Office of Air and Radiation

Project Objectives and Outcome

The U.S. demonstration project will simulate VAM concentrations at an active mine by diluting gob gas from an abandoned coal mine. This simulation will allow project operators to manipulate flows and vary methane concentrations, enabling testing of system performance over a wide range of operational parameters. Testing this range is important because while VAM is emitted from every underground coal mine in the world, each coal mine has unique characteristics. The demonstration program will

result in the generation of better capital, operating, and maintenance cost information, which will substantially reduce the economic uncertainty associated with future installations.

The project aims to determine the long-term technical and economic feasibility of applying the technology to the safe and efficient operation of a large underground coal mine. The primary objectives of this demonstration project are to:

- ▶ Design and prove an effective, safe interface between the TFRR and the mine ventilation system
- ▶ Verify the ability of the TFRR to oxidize the low and variable concentrations of methane effectively in long-term operation
- ▶ Conduct an engineering/economic evaluation of the technology as applied to both methane oxidation and to energy recovery

Conclusions

Mitigation of ventilation air methane from coal mines would make a major contribution to reducing greenhouse gas emissions while providing a new source of clean energy. For example, a large commercial-size installation (180,000 cfm) of TFRR technology on a single typical mine ventilation bleeder fan could reduce methane emissions by 14,200 to 23,700 tons per year (equivalent to 260,000 to 430,000 tons CO₂). Although beyond the scope of the current demonstration project, the heat recovered from VAM oxidation may be utilized for electricity generation. This would reduce the demand on fossil fuel generating stations, thus reducing the emissions of SO_x, NO_x, CO, and other criteria pollutants. A single commercial TFRR installed on a typical mine bleeder fan unit could produce 4.7-7.7 MW of electricity or 18-30 MW of thermal energy. The potential emissions reductions across the U.S. if even 25% of the VAM from gassy mines was recovered would be enormous: equivalent to 7.2 million tons CO₂. Thus, the successful demonstration of this technology would be a very encouraging first step towards the large-scale application to U.S. active underground mines. 🗑️

¹Sources: Energy Information Administration, "Emissions of Greenhouse Gases in the United States 2005." DOE/EIA-0573(2005), November 2006; U.S. Environmental Protection Agency, "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005." EPA 430-R-07-002, April 15, 2007.

What do you want to know about?

If you have suggestions or requests for future CBM Extra content, please drop us a line.

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CBM/CMM News

U.S. State Department Issues Grants Solicitation for Asia-Pacific Partnership (APP) on Clean Development and Climate

The U.S. State Department announced a competitive process for up to \$26 million in grants to be awarded to projects that contribute to the goals of APP through innovative public-private partnerships. The two-step process calls for short Concept Papers initially by April 27, and if approved, full proposals by May 29. The projects are expected to fall under one of the eight APP Task Forces (including the Coal Mining Task Force) but exceptional cross-cutting or other relevant proposals may be considered. Current restrictions on the funding limit grants to projects in India. Both U.S. and international organizations are eligible. More information can be found at <http://www.grants.gov> (search "APP").

Alberta Energy Utilities Board Rules on CBM Ownership on Canadian Non-Crown Lands

As reported by the Canadian Press, the Alberta Energy and Utilities Board (EUB) released a decision on March 28, 2007, which frees companies to develop coalbed methane in disputed areas on non-Crown lands in the province. The dispute arose between companies with mineral rights to coal seams, who argue that methane gas embedded in the ore belongs to them, while opposing parties argue that coalbed methane should be considered natural gas with separate drilling rights. In the recent ruling, the EUB decided against the owners of the coal rights,

and said the owners of the gas licenses have the right to develop the resource. Existing laws already identify coalbed methane on Crown lands as natural gas.

As reported by the Canadian Press, conservative estimates peg Western Canadian coalbed methane reserves at 75 trillion cubic feet, and experts predict it could contribute up to 10 percent of Canada's natural gas production. About 10 percent of Alberta's mineral rights are freehold and spread across southern Alberta, butting against lands being developed for coalbed methane.

The Canadian Press – March 29, 2007 <http://www.cbc.ca/cp/business/070329/b0329103A.html>

NAL Oil & Gas Trust Commences Production of CBM at Lacombe, Alberta

NAL Oil & Gas Trust has commenced production from its Horseshoe Canyon coalbed methane project in the Lacombe area of Central Alberta. In 2006, NAL drilled 37 wells at Lacombe and Clive and installed gas processing and pipeline infrastructure. These wells are being completed and tied-in during the first quarter of 2007. Capital costs for drilling and facilities construction totaled CA\$20.5 million gross (CA\$13 million net), primarily spent in 2006.

Collectively with several existing conventional wells in the area, production rates in the Lacombe/Clive area in Alberta province are expected to be 5.7 million cubic feet per day (MMcfd) gross (3.8 MMcfd net) by the second quarter of 2007. The second phase of CBM development at Lacombe in 2007 is projected to add another 2.7 MMcfd gross (1.8 MMcfd net) production by year-end. NAL forecasts that by year end 2007, total production from the Lacombe/Clive/

Nevis area will be 13.7 MMcfd gross (8.6 MMcfd net).

Canadian NewsWire (press release) – March 8, 2007

<http://www.newswire.ca/en/releases/archive/March2007/08/c8695.html>

Sultan Energy Philippines Corp. to Use CBM to Produce Electricity

Rufino Bomasang, president of Sultan Energy Philippines Corp., announced his company's plans to invest \$100 million to build a mine-mouth coal-fired power plant in Mindanao in the Philippines' Daguma Mountain range. The plant, which will become operational by 2011, will utilize coal from the Daguma coal mine. Bomasang also announced plans to make additional investment to develop the area's extensive coalbed methane resources, estimated to be about 100 billion cubic feet in a 7,000 hectare area, and use the coalbed methane to generate electricity. The estimated capacity of this area is about 100 MW.

The Philippines has about 19 coal districts, which contain significant coal deposits. Coal resources in the areas are estimated at about 2.3 billion metric tons with total coalbed methane potential of about 16.4 billion cubic meters (equivalent to about 600 billion cubic feet).

Manila Standard Today – March 15, 2007 http://www.manilastandardtoday.com/?page=business4_mar15_2007

China Adopts New Coalbed Methane Tax Policy

China has adopted new preferential tax policies for the utilization of coalbed methane in the course of coal mining in an effort to encourage clean and safe production in the country. According to a joint state-



ment by the Ministry of Finance and State Administration of Taxation, under the new policies, which took effect on January 1, 2007, CBM producers will enjoy a full rebate on the value-added tax they pay for their gas production. These producers will also enjoy corporate income tax exemption for their incremental CBM output that arises from the application of new technology through research and development funded by their tax rebate. The government also allows CBM producers to adopt accelerated depreciation methods on facilities and equipment related to CBM production. Producers can use corporate income tax to offset 40% of the funds they spend on investing in Chinese-made equipment related to the revamp of their CBM exploitation technology. The government also gives other preferential tax treatment to producers to encourage development, research and adoption of new technologies for CBM production. Moreover, no resources tax is levied on onshore exploitation and production of CBM.

China United Coalbed, Hong Kong Longmen Ink CBM Contract

China United Coalbed Methane Corp has signed a product sharing contract to jointly explore for coalbed methane in northwestern China's Shaanxi province with Hong Kong's Longmen Hui Feng Investment Co Ltd, the official Xinhua news agency reported. The deal is the first venture by Hong Kong investors in mainland China's coalbed methane sector. The Hancheng block, located in Hancheng city, has total coalbed methane reserves of 404.87 billion cubic meters (Bcm), according to a preliminary prediction by the China United Coalbed Methane Corp. The block covers 460.93 square meters. Sun Maoyuan, the president of China

United Coalbed Methane, said China's coalbed methane output is expected to reach 10 Bcm by 2010 and 40 Bcm by 2020.

China Daily – March 23, 2007
http://www.chinadaily.com.cn/bizchina/2007-03/23/content_834743.htm

Green Power Plant Drives Mine

As reported in *The Courier-Mail* (Brisbane, Australia), Anglo Coal Australia opened a new AU\$43 million gas-fired power station at its German Creek mine, near Middlemount in central Queensland. It uses gas extracted from the coal seam to provide 32 megawatts of energy for its mining as well as supplying into the national grid. The station can provide power for about 8,000 homes. Supported by an AU\$15 million federal government grant, the plant will cut greenhouse gas emissions in the area by the equivalent of 250,000 cars.

Anglo Coal Australia is working with Brisbane-based Energy Developments Ltd (EDL) – which designed and built the German Creek power station – on a similar project at its Moranbah mine. It already runs a gas power station at its Dawson mine, which is undergoing a \$1.3 billion expansion.

The Courier-Mail – March 23, 2007
<http://www.news.com.au/couriermail/story/0,23739,21435582-3122,00.html#>

Constellation Energy Partners to Expand Coalbed Methane Operations into Kansas and Oklahoma

Constellation Energy Partners LLC has signed a definitive purchase agreement to acquire coalbed methane properties from EnergyQuest

Resources LP for an aggregate purchase price of \$115 million. The properties are located in the Cherokee Basin in Kansas and Oklahoma. The acquisition is expected to close in mid-April 2007.

Highlights of the deal include: estimated proved reserves of 49 billion cubic feet; reserve life index of 17 years; current net production of approximately 7,900 thousand cubic feet per day; over 550 producing wells with an average 75 percent operated production; over 800 low-risk, low-cost drilling and recompletion opportunities on approximately 96,000 gross acres; and over 500 miles of pipeline gathering systems.

Constellation Energy Partners LLC (press release) – March 8, 2007
<http://news.thomasnet.com/companystory/512144>

CNX Gas Replaces 340% of Production and Increases Proved Reserves 11.9%

CNX Gas Corporation announced it added 191 billion cubic feet (Bcf) of reserves in 2006, which is 3.4 times the company's 2006 gas production of 56.1 Bcf. The company's proved reserves as of December 31, 2006, totaled 1,265 Bcf, an increase of 135 Bcf, or 11.9 percent, compared with the 1,130 Bcf of proved reserves as of December 31, 2005. During the year, 89 Bcf of reserves were added from the drilling program, while 102 Bcf consisted of upward revisions.

The majority of proved reserves (1,221 Bcf) are associated with CNX Gas Virginia coal bed methane operations.

CNX Gas Corporation (press release) – February 20, 2007
<http://sev.prnewswire.com/oil-energy/20070220/NYTU04220022007-1.html>

Announcements: U.S. Coal Mine Methane Conference



Preliminary Announcement

U.S. Coal Mine Methane Conference to be held in St. Louis, Missouri, September 25-27. More details to follow on the CMOP website.

Announcement of Sponsorship Opportunities

For more information, please contact Ms. Charlee Bergamo at cbergamo@ravenridge.com or Ms. Barbora Jemelkova at jemelkova.barbora@epa.gov

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Vietnam Joins Methane to Markets Partnership as 20th Partner Nation

The Methane to Markets Partnership marked a milestone as it continues to build international participation. On April 4, 2007, Vietnam became the 20th Methane to Markets partner, working to capture and use methane as a clean-energy source. Vietnam joined 19 other countries and a growing Project Network of more than 500 public and private sector organizations that are reducing emissions of methane, a powerful greenhouse gas. At the same time, participants enhance economic growth, air quality, industrial safety, and energy security in markets around the world.

The Partnership currently focuses on four sources of methane emissions: Agriculture (animal waste management), coal mines, landfills, and oil and gas systems.

Vietnam has coal reserves estimated at 150 million tonnes, most of which is anthracite. The country's coal production in 2003 was about 16 million tonnes. Coal accounts for nearly one-quarter of Vietnam's energy production. The country is seeking to increase production of its deeper anthracite reserves. Vietnam's estimated coal mine methane emissions in 2005 were 83 million cubic meters, ranking it 24th globally.

Read EPA's press release:

<http://yosemite.epa.gov/opa/admpress.nsf/e87e8bc7fd0c11f1852572a000650c05/e236f6e59506d825852572ba004bdc2e!OpenDocument>

For a profile of Vietnam's coal mining and coal mine methane opportunities, please see its profile developed by the Coal Subcommittee of the Methane to Markets Partnership:

<http://www.methanetomarkets.org/resources/coalmines/overview.htm> 

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www.epa.gov/coalbed
www.methanetomarkets.org



Upcoming CBM/CMM Events

North American Coalbed Methane Forum (NACBMF) Spring Meeting

1-2 May 2007
Hilton Garden Inn at Southpointe
Canonsburg, PA
Contact: Dr. Kashi Aminian, Phone: 304-293-7682 x 3406
Contact: Ihor Havryluk, Phone: 412-445-5803

Ukraine - Donetsk CBM Project Business Briefing

Sponsored by U.S. Trade & Development Agency (USTDA)
4 May 2007
Lakeview Golf Resort & Spa
Morgantown, WV
Website: <http://www.mseov.com>
***Accessible to U.S. entities only**

28th Annual Energy & Mineral Law Institute

13-15 May 2007
Doubletree Guest Suites
Charleston, SC
Website: <http://www.emlf.org/Content/charleston.aspx>

Third International Conference on Clean Coal Technologies for Our Future

15-17 May 2007
Cagliari, Sardinia, Italy
Email: info@cct2007.it
Website: <http://www.cct2007.it/>

2007 International Coalbed Methane Symposium

21-25 May 2007
Tuscaloosa, Alabama
Website: <http://bama.ua.edu/~coalbed/>

Unconventional Gas Resources - Forum

3-8 June 2007
Colorado Springs, CO
Website: http://www.spe.org/spe/jsp/meeting/0,2460,1104_1535_5227540,00.html

National Coal Show/Longwall USA 2007

5-7 June 2007
David L. Lawrence Convention Center
Pittsburgh, PA
Website: <http://www.mining-media.com/longwall/index.html>

2007 National Meeting of the Joseph A. Holmes Safety Association

5-7 June 2007
San Diego, CA
Contact: Al Simonson
Phone: 507-625-9084
Mobile: 507-351-2381
Email: sineun@hickorytech.net
Contact: Robert Glatter
Phone: 202-693-9575
Email: glatter.robert@dol.gov
Website: <http://www.msha.gov/events/2007HolmesFlyer.pdf>

Asia Pacific Partnership on Clean Development and Climate – Coal Mining Task Force Meeting

11-13 June 2007
Steamboat Springs, CO
Contact: Nell Triplett
Email: TriplettNX@state.gov

Rocky Mountain Association of Petroleum Geologists (RMAG) “Coalbed Methane Symposium”

19 June 2007
Denver, CO
Contact: Druce Kelso, Phone: +1-303-825-3344
Contact: Bob Lamarre, Phone: +1-720-488-1396

Canadian Institute's 6th Annual Coalbed Methane Symposium

20-21 June 2007
Calgary, Alberta, Canada
Contact: Janelyn Loresco
Phone: +1-877-927-7936
Email: J.Loresco@canadianinstitute.com

Air and Waste Management Association 100th Annual Conference

26-29 June 2007
Pittsburgh PA
Phone: +1-800-270-3444
Email: info@awma.org
Website: <http://secure.awma.org/ACE2007/>

24th Annual International Pittsburgh Coal Conference

10-14 September 2007
Johannesburg, South Africa
Contact: Johan van Dyk
Phone: +27 16 960 4505
Fax: +27 11 219 2398
Email: pitt2007@sasol.com
Website: <http://www.engr.pitt.edu/pcc/2007%20Conference.htm>

Commonwealth of Virginia Energy & Sustainability (COVES) Conference

18-20 September 2007
Virginia Military Institute
Lexington, VA
Phone: 540-464-7740
Email: bangja@vmi.edu
Website: <http://www.energyvacon.org/>

Polish Mining Congress Workshop: New Trends in Coal Mine Methane Recovery and Utilization

19-21 September 2007
Krakow, Poland
Contact: Jacek Skiba M.Sc. Eng
Phone: +48 32 3246603
Email: jskiba@gig.katowice.pl
Website: <http://www.pkg.com.pl/node/93>

Coal Marketing Days

20-21 September 2007
Omni William Penn Hotel
Pittsburgh, PA
Contact: James Gillies
Phone: 781-860-6110
Email: james_gillies@platts.com

USEPA Coalbed Methane Outreach Program – U.S. Coal Mine Methane Conference

25-27 September 2007
Millenium Hotel
St. Louis, MO
Contact: Ms. Charlee Bergamo
Email: cbergamo@ravenridge.com
Website: <http://www.epa.gov/coalbed>

Methane to Markets Partnership Expo

30 October – 1 November 2007
China World Hotel
Beijing, China
Website: <http://www.methanetomarkets.org/expo>

Managing the Social and Environmental Consequences of Coal Mining in India: 1st International Conference

19-21 November 2007
New Delhi, India
Phone: +91 326 2206372
Email: s_gurdeep2001@yahoo.com
Website: <http://www.mining.unsw.edu.au/>

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