United States
Environmental Protection Agency

Office of Air and Radiation
6207-J

EPA-430-N-00-004
Fall 2004

COALBED METHANE EXTRA

A publication of the Coalbed Methane Outreach Program (CMOP)

www.epa.gov/coalbed

International Methane to Markets Partnership to Facilitate CMM Project Development

On July 28, 2004, the United States, along with seven partner countries, announced the launch of the Methane to Markets Partnership, the first large-scale multi-lateral initiative to encourage recovery and use of methane from major man-made sources including coal mines, landfills, and natural gas systems. The Partnership will focus on deploying and implementing cost-effective technologies to reduce methane emissions globally in three industrial sectors. In addition to the U.S., Australia, Columbia, China, India, Italy, Japan, Mexico, Ukraine, and the United Kingdom are founding partners, and invitations have been extended to several other countries. Estimates suggest that the Partnership could result in additional methane emission reductions of up to 50-million tonnes per year of carbon equivalent by 2015, which equates to eliminating emissions from fifty 500 MW coal-fired power plants, heating 7.2 million households for a year, or removing 33 million cars from the road for one year.

In describing the Partnership, Ms. Dina Kruger, Director of the Climate Change Division at the U.S. Environmental Protection Agency (USEPA), notes,

> The Methane to Markets Partnership is a major milestone in international cooperation that will yield significant economic, environmental, mine safety, and energy benefits. The U.S. Government and its partners have every expectation that the Partnership will significantly

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Commercial-Scale Ventilation Air Methane Project Planned in Australia

On June 29, 2004 the Swedish company MEGTEC Systems AB, with global headquarters in DePere, Wisconsin, and BHP Billiton's Illawarra Coal announced a contract to develop a ventilation air methane (VAM) project at the West Cliff Colliery in New South Wales, south of Sydney, Australia. Using MEGTEC's VOCSIDIZER™ thermal flow reversal reactor technology, the project will oxidize VAM and generate heat that will power 5 MW (net) of electricity production. This promises to be the world's first commercial-scale project using VAM as a primary fuel. The Australian Greenhouse Office's Greenhouse Gas Abatement Program will provide up to A$6 million in support of the project, termed WestVAMP (West Cliff Ventilation Air Methane Project).

The VOCSIDIZER will direct the mine's VAM exhaust through a heat exchange bed that is preheated to or above methane's autoignition temperature. When the VAM flow encounters this high thermal environment it oxidizes, thereby releasing heat to maintain the heat transfer bed's temperature. An adequate VAM inflow can produce excess heat to power electricity generation or to supply local thermal markets (coal drying, space heating, etc.). Hundreds of successful installations worldwide controlling industrial volatile organic compound emissions prove the technology's efficacy, but no active coal mine has yet deployed it at commercial scale.

Information is not yet available concerning regulatory approvals of or constraints on how the VOCSIDIZER will be connected to the above-ground

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> accelerate the rate of methane emission reduction projects worldwide and thus will simultaneously facilitate the emergence and application of new technologies for the beneficial use of methane as a clean energy source.

Why the emphasis on methane? With a global warming potential more than 20 times that of carbon dioxide and value as a clean energy resource, methane mitigation offers particularly cost-effective opportunities for greenhouse gas emission reductions while generating significant near-term economic, social, and environmental benefits. Chart 1 identifies the major sources of global methane emissions with coal mines accounting for 8 percent of global emissions. Coal mine methane (CMM) is an especially attractive resource because mine degasification and ventilation are integral components to a mine's safety plans, CMM is produced in usable quantities, and reductions are relatively easy to measure and verify.

Even though the many benefits of CMM use are well documented, a lack of technical knowledge, limited options for project finance, and policy/legal hurdles continue to limit project development in all markets, especially those in developing countries and transition economies.

The goal of the Partnership is to spur additional methane recovery through collaboration among all partners to identify, plan, and implement methane-reduction projects. Strong participation by the private sector, including financial institutions and multi-lateral organizations, also will be sought. In fact, such participation is critical for accomplishing the technology transfer, capacity building, and investment necessary to achieve the Partnership's goals. Although specific tasks and objectives remain to be finalized through ministerial level talks, it is generally anticipated that member countries will:

- Develop a methane emission reduction action plan and implementation evaluation process,
- Build on existing methane emission source identification and monitoring systems,
- Identify cost-effective methane emission reduction project opportunities,
- Collaboratively implement technically and economically viable projects,
- Support developing voluntary consensus standards, and
- Identify and address barriers to the creation of effective energy markets that will foster methane emission reduction project implementation.

In announcing the Partnership, the U.S. Government has also pledged to provide up to $53 million to the Partnership over the next five years through activities including the export of successful U.S. voluntary programs, data development and institution building, feasibility assessments, and technology demonstrations. The USEPA leads U.S. involvement, with collaboration from the Department of Energy, Department of State, the Agency for International Development, and the Trade & Development Agency.

The United States will host the first Ministerial Meeting of the Partnership members in Washington, DC, on November 15–17, 2004. Ministers and delegations from 15 countries that share an interest in methane recovery and use opportunities and the overall goals of the Partnership have been invited and include: Australia, Brazil, Canada, China, Colombia, India, Italy, Japan, Mexico, Nigeria, Poland, Russia, South Africa, Ukraine, and the United Kingdom. Observer delegations from other governments as well as participants from the private sector are encouraged to attend.

Interested persons can register for the meeting and make hotel reservations at **www.methanetomarkets.org**. Registration will be on a first-come, first-serve basis. Those traveling from outside and requiring visas for entry to the United States are encouraged to begin the process of applying for a U.S. visa as soon as possible. For additional assistance or questions, persons should contact Erin Birgfeld, at birgfeld.erin@epa.gov, or +1-202-343-9079.

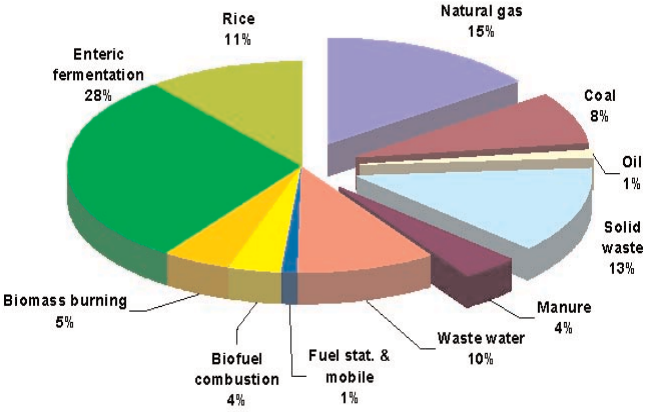

Chart 1: Global Methane Emissions by Source

Interested parties can obtain additional information concerning methane emissions and the Methane to Markets Partnership on the Web at **http://www.epa.gov/methane/international.html#1**. ■

CBM/CMM News

China CMM Project Awarded US$503,000 for Technical Assistance

In September, the U.S. Trade and Development Agency (USTDA) announced an award of US$503,000 to the Shanxi Jincheng Anthracite Coal Mining Group Company, Limited of China (JMC). The grant will fund a technical assistance program for the development of a 120-megawatt (MW) power plant that will use coal bed methane (CBM) and CMM from the Sihe mine site as a feedstock. The Sihe mine site, which is owned and operated by JMC, was selected by the Chinese Government as the site for a demonstration project following a detailed assessment of the mine's CBM and CMM production. The mine began operations in early 2002 when about 1.5 million tons of coal were produced. At present, the mine produces about 435,000 cubic meters (m^3) of CMM per day, of which about 30 percent is captured and used, and 70 percent is vented into the atmosphere. It is estimated that coal production at the mine will increase to 8 million tons per year by 2008, when CMM drainage will reach more than 500,000 m^3 of CMM per day. The USTDA-funded technical assistance program will provide JMC with detailed design and procurement assistance in the development and implementation of the power facility. For more information, please visit **www.tda.gov**, "Press Releases."

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CMOP Hosts Ventilation Air Methane Technology Vendor Meeting

On June 2–3, 2004 in Washington, DC, the USEPA Coalbed Methane Outreach Program convened an informal workshop for technology vendors that have potential applicability for coal mine ventilation air methane (VAM) emission mitigation or utilization. Government representatives, finance experts, project developers, vendors/manufacturers and technical experts from the United States, UK, Canada, Australia, Mexico, Sweden, and Japan participated in the workshop. The meeting characterized markets for VAM projects in the United States and globally; addressed market, regulatory, technical, and economic barriers to VAM technology deployment; and considered how those barriers can most effectively be resolved with USEPA's assistance.

The key summary points from the meeting were:

- Very little progress will occur in the VAM industry until a mine safety regulatory agency in one or more countries approves the first application for a mine operation to capture, treat, and utilize VAM (see related article on a commercial-scale VAM project planned for Australia in this issue).
- Because it employs technology that is unfamiliar to them, mining companies have expressed some reservations regarding VAM plants, such as physical impracticality, safety, technical uncertainty, regulatory uncertainty, economic feasibility, and gas ownership complexity.
- The value for the emission reductions generated by VAM projects is necessary in almost all cases to make a project economically feasible. For this reason, countries other than the United States may be the best targets for concerted near-term market development by technology vendors.
- Several technology developers are making progress in adapting their systems to match the realities of the marketplace. For example:
  - Several expect to be capable of handling lower concentrations than originally anticipated,
  - Some will be more portable to accommodate shaft relocations, and
  - Some have reduced cost projections.
- Despite the many uncertainties associated with developing VAM projects, it is apparent that several key vendors and research agencies are preparing for the design, construction, and operation of creative and robust systems that are capable of meeting these challenges. ■

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GE Jenbacher and Sasyakdo Mine in Ukraine CMM Power Project

A major CMM project in the Donetsk region at the Sasyadko Mine was recently announced by GE Jenbacher Energy. The project, reported to be the world's largest in terms of total power output, will utilize 22 complete gas engine cogeneration systems to generate 131 MW of electrical and thermal output. The cogeneration systems will be GE Jenbacher JMS 620 GS-S-LC engines manufactured at their facilities in Jenbach, Austria. The projected electrical efficiency of the units is 42.9%, and the thermal output is 41.3% (of input fuel energy), yielding a total project efficiency of 84.2%. The equipment will be installed in 10 stages, beginning June 2004. For more, visit Jenbacher's Web site at **http://www.jenbacher.com/shared/download/040506_presse_ukraine_e.pdf** or contact Alex Pavlov at alex.pavlov@GEJenbacher.com

U.S. Government and Government of Ukraine Initiate Multi-Phase Coal Mine Safety and Utilization Project

The U.S. Government through the Department of Labor and Environmental Protection Agency have begun a technical assistance program with the State Committee on Labor Safety and the Ministry of Fuels and Energy in Ukraine to improve mine safety and increase utilization of CMM. The new program contains three focus areas to enhance mining conditions: improving mine ventilation systems to reduce leakages and increase efficiency; implementing a state-of-the-art in-mine long-hole horizontal drilling and drainage program; and conducting a training program to identify and implement end-use options for the methane emitted. Work on the ventilation and drilling programs, both funded by the U.S. Department of Labor, began in January and July 2004, respectively. The EPA is supporting the downstream, or utilization, aspect of the program, which began at the end of September. Partnership for Energy & Environmental Reform (PEER) with offices in Kyiv and Donetsk, Ukraine is the implementing organization for the U.S. Government agencies. For more information, please contact Jerry Triplett, President of PEER at trip@public.ua.net.

Japan CBM Forum

The Japan CBM Forum was founded in January 2003 under the Japan Institute of Energy for the purpose of promoting CMM, CBM, abandoned-mine methane, and VAM recovery and use. The Forum members consist of specialists from many different fields who have common interests in CBM/CMM development. Associate organizations include the University of Tokyo, Hokkaido University, Japan Coal Energy Center (JCOAL), Japan National Oil Corporation (JNOC), Kawasaki Heavy Industries, the New Energy Industrial Development Organization (NEDO), and Mitsui Mining. The Japan CBM Forum meets every three months. For more information, contact Dr. Sohei Shimada at the University of Tokyo at s-shimada@k.u.-tokyo.ac.jp.

U.S. Government Provides Financing to Support Botswana CBM Project

In July 2004, the U.S. Overseas Private Investment Corporation (OPIC) announced that it will provide an $8.5 million investment guaranty to Kalahari Gas Corporation to finance equipment purchase and the drilling of CBM wells in eastern Botswana. OPIC helps U.S. businesses invest overseas, fosters economic development in new and emerging markets, and complements the private sector in managing risks associated with foreign direct investment. The support provided by OPIC follows on a 2003 grant from the U.S. Trade & Development Agency to study the feasibility of CBM development in Botswana. For more information visit **www.opic.gov** and enter "Botswana" in the search window.

U.S. Farm Offsets Carbon Emissions with CMM Investment

Stonyfield Farm of Londonderry, New Hampshire has invested in a project to capture and utilize methane being vented from sealed coal mines in Ohio and other states. This project will use a small, modular power generation set to produce electricity from the vented methane. For more information on the project, visit **http://www.stonyfield.com/EarthActions/ClimateChange.cfm**

U.S. CBM Production Declines Slightly in 2003

The recently released Advanced Summary of the U.S. Crude Oil, Natural Gas & Natural Gas Liquids Reserves: 2003 Annual Report (**http://www.eia.doe.gov/pub/oil_gas/natural_gas/data_publications/advanced_summary_2003/adsum2003.pdf)** shows that CBM production declined from 1.614 Trillion Cubic Feet (Tcf) to 1.600 Tcf in 2003 (45.71 Bm^3 in 2002 to 45.31 Bm^3 in 2003) even though the average price of natural gas increased. CBM accounted for 8% of total U.S. natural gas production in 2003.

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Feasibility of VAM/CMM Power Production at Polish Mine Assessed

Wisconsin-based MEGTEC Systems has recently completed a feasibility study for a VAM- and CMM-fueled power plant system that would produce 12 MW of electric power at the Brzeszcze Mine in Poland. The study was funded with a U.S. Trade and Development Agency (TDA) grant, and MEGTEC's work was supported by International Resources Group, Ltd. (IRG) of Washington, DC.

Some of the gassiest mines in the world are located in Poland, and the country's mining leaders are making impressive strides in capturing and using drained CMM and VAM. Several mines have used drained CMM for heating plants, district heating systems, and chemical processing for years.

The system under consideration would employ five thermal oxidizers (trade name VOCSIDIZER) to be designed and built by MEGTEC. The VOCSIDIZERs would ingest a blend of VAM and drained CMM, which would oxidize at high temperatures (i.e., above 1000°C (1832°F) in each oxidizer's core environment), releasing heat to produce steam. The steam would drive steam turbine-generators that would supply power for the mine and the utility grid. If implemented the project could be the first VAM recovery initiative in Europe and the first to consume all of the VAM emitted from a single mine ventilation fan. It is expected that the project would receive revenues from power sales as well as from carbon emission reductions. ■

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ventilation system exhaust (evasé). It is hoped, however, that this installation will begin to establish precedents necessary to allow accelerated implementation of VAM emission mitigation at active underground coal mines worldwide. (See VAM oxidation world market analysis at **http://www.epa.gov/coalbed/pdf/ventilation_air_methane.pdf** and related articles in this issue on the new Methane to Markets Partnership and a recent CMOP-hosted VAM technology vendor workshop.) ■

New Publications

Proceedings from the Third International Methane and Nitrous Oxide Mitigation Conference, held November 17–21, 2003 in Beijing, China, are available at **http://www.coalinfo.net.cn/coalbed/meeting/2203/papers/index.html**. CDs can be ordered by contacting 1-888-782-7937 or by writing energystar@optimuscorp.com. The hard copy proceedings may be obtained by contacting Ms. Liu Xin or Mr. Liu Wenge at the China Coal Information Institute at cbmc@public.bta.net.cn. The CD is free of charge, but there is a charge for hard copies.

Methane Emissions From Abandoned Coal Mines in the United States: Emissions Inventory Methodology and 1990–2002 Estimates can be downloaded from the EPA Coalbed Methane Outreach Program's Web site at **http://www.epa.gov/coalbed/resources/creports.html**. Look under "New Reports." The report also can be obtained in hard copy or on CD from the Energy Star hotline (call 1-888-782-7937).

Identifying Opportunities for Methane Recovery at U.S. Coal Mines: Profiles of Selected Gassy Underground Coal Mines 1997–2001 provides an overview of the U.S.'s 50 gassiest mines, including mine-specific data on ventilation emissions and degasification systems. The report, which also provides summary tables and other information on the U.S. CMM industry, is available at **http://www.epa.gov/coalbed/resources/creports.html** and in hard copy from the Energy STAR hotline (call 1-888-782-7937).

The China Coalbed Methane Clearinghouse has published the *Investment Guide for China CMM/CBM* in English and Chinese. With the largest CMM emissions in the world, a rapidly growing economy with a large demand for energy, and strong government support for CMM and CBM development, the guide serves as an important primer on technical, market, and legal issues affecting CBM/CMM development in China. The English-language edition can be obtained online at **http://www.epa.gov/coalbed/resources/reports/international.html** or in hard copy by contacting the Clearinghouse at cbmc@public.bta.net.cn.

Advanced Summary of the U.S. Crude Oil, Natural Gas & Natural Gas Liquids Reserves: 2003 Annual Report
http://www.eia.doe.gov/pub/oil_gas/natural_gas/data_publications/advanced_summary_2003/adsum2003.pdf

USEPA and the UNECE Announce New Three-Year Project to Promote CMM Recovery in Eastern Europe and the CIS

On September 23, 2004, the Coalbed Methane Outreach Program (CMOP) of the USEPA and the UN Economic Commission for Europe (UNECE), based in Geneva, announced a three-year jointly sponsored program to promote the implementation of coal mine methane projects in Eastern Europe and the Commonwealth of Independent States (CIS). CMOP performs analytical and outreach services to promote the profitable use of CMM. The UNECE serves as a regional arm of the United Nations and is one of the five UN Regional Commissions. The UNECE carries out a cooperative program on coal under the auspices of the Ad Hoc Group of Experts on Coal in Sustainable Development, which operates under the Committee on Sustainable Energy to promote sustainable development within the coal sector and to enhance international economic cooperation in order to achieve this goal.

A new Ad Hoc Group of Experts on Coal Mine Methane will be launched by the UNECE in December to facilitate and support implementation of this project. The goal of the project is to develop bankable CMM projects in Central and South-Eastern Europe and the CIS leading to additional emission reductions. The expected project outcomes include:

1. Three or more bankable project documents, which shall be considered by investment funds;
2. Lessons learned on preparing the most effective bankable project documents for approval by financing organizations (to be disseminated to project developers from the Region and elsewhere); and
3. Elaboration of a roadmap for financing additional CMM projects in the region formulated by the end of the project period.

For more information, please contact Charlotte Griffiths at the UNECE at charlotte.griffiths@unece.org, Clark Talkington at USEPA at talkington.clark@epa.gov, or Pamela Franklin at USEPA at franklin.pamela@epa.gov. ■

Contact CMOP

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Please notify us if your contact information (postal or e-mail address, phone or fax number) changes.

Upcoming CBM/CMM Events

2004

Fall 2004 North American Coalbed Methane Forum, *October 28–29, 2004*
Radisson at Waterfront Place, Morgantown, West Virginia, USA
Kashy Aminian, West Virginia University
Phone: 1 (304) 293-7682 ext. 3406, Fax: 1 (304) 293-5708 or
E-mail: khaminian@mail.wvu.edu

1st Annual Midcontinent Coalbed Methane Symposium, *November 7–9, 2004*
Crowne Plaza Hotel, Tulsa, Oklahoma, USA
Kim Kohler, Oklahoma Independent Petroleum Association
Phone: 1 (405) 942-2334, ext. 215 or Fax: 1 (405) 942-4636
http://www.nmcpttc.org/CBM/

The Successful Commercialisation of Global Coalbed and Coalmine Methane Projects, *November 10–11, 2004*
Hilton Paddington, London, UK
Paul Morris, The CWC Group
Phone: 44-207-089-4183 or E-mail: pmorris@thecwcgroup.com

Ministerial Meeting of the Methane to Markets Partnership, *November 15–17, 2004*
Mayflower Hotel, Washington, DC, USA
Erin Birgfeld, USEPA
Phone: 1 (202) 343-9079 or E-mail: birgfeld.erin@epa.gov
www.methanetomarkets.org

6th Annual Unconventional Gas Conference—Unconventional Gas: The Key to Energy Supply, *November 17–19, 2004*
Hyatt Regency Hotel, Calgary, Alberta, Canada
Dennis Gaudet, Director, Technology Transfer, Petroleum Technology Alliance Canada
Phone: 1 (403) 218-7710 or E-mail: dgaudet@ptac.org
http://www.ptac.org/techcbmf.html

4th Annual Coal Seam Gas and Coal Mine Methane Conference, *November 22–23, 2004*
Stamford Plaza, Brisbane, Australia
Peter Lagios, Customer Service Manager, Informa.com
Phone: 61-2-90804307or E-mail: registration@informa.com.au
http://www.theajmonline.com

The 4th International China CBM / CMM Symposium, *December 1–2, 2004*
Kunlun Hotel, Beijing, China
Mr. Liu Wenge, Deputy Director of Energy & Safety, China Coal Information Institute
Phone: 010-84657948, Fax: 010-84657948 or
E-mail: cbmc@public.bta.net.ca
http://www.coalinfo.net.cn/coalbed/meeting/2004/040802/m2004.htm
The U.S. registration site that allows for payment by credit card can be reached at http://www.ravenridge.com/online_registration.htm.

2005

Clearwater Coal Conference, 30th Annual International Technical Conference on Coal Utilization and Fuel Systems—Call for papers, *April 17–22, 2005*
Sheraton Sand Key Hotel, Clearwater, Florida, USA
Barbara Sakkestad, Coal Technology Association
Phone: 1 (301) 294-6080, Fax: 1 (301) 294-7480, or
E-mail: BarbaraAsk@aol.com
www.coaltechnologies.com

2005 International Coalbed Methane Symposium—Call for papers, *May 16–20, 2005*
Bryant Conference Center, Tuscaloosa, Alabama, USA
Abstracts due October 29, 2004
Ms. Nova Hodo, College of Continuing Studies, University of Alabama
Phone: (205) 348-3029, Fax: 1 (205) 348-9276, or
E-mail: donna.keene@ccs.ua.edu or nhodo@ccs.ua.edu

Non-CO_2 Greenhouse Gases (NCGG-4) Science, Control, Policy, and Implementation—Call for papers, *July 4–6, 2005*
Utrecht, Netherlands
Abstracts due December 1, 2004
Han van Dop, Co-ordinator, Organizing Committee, Netherlands Association of Environmental Professionals
Phone: 73-621-5985, Fax: 31-73-621-6985, or
E-mail: cfp@ncgg4.nl
http://www.milieukundigen.nl/pages/ncgg4/

Eighth International Mine Ventilation Congress, *July 6–8, 2005*
Sheraton Hotel, Brisbane, Australia
Alison M McKenzie, Senior Conference & Events Coordinator, The Australasian Institute of Mining and Metallurgy
Phone: 61-3-9662-3166, Fax: 61-3-9662-3662, or
E-mail: conference@ausimm.com.au
http://www.ausimm.com/mineventilation/home.asp

31st Biennial International Conference of Safety in Mines—Call for papers, *October 2–5, 2005*
Brisbane, Queensland, Australia
Abstracts due November 30, 2004
Mr. Stewart Bell, Research Institutes
E-mail: stewart.bell@nrme.qld.gov.au

2006

11th U.S./North American Mine Ventilation Symposium—Call for papers, *June 5–7, 2006*
University Park, Pennsylvania, USA
Kelly O. Henry, University of Pennsylvania
Phone: 1 (814) 865-3439 or E-mail: koh1@psu.edu
www.egee.psu.edu/USMVS2006/