



COALBED METHANE EXTRA

A publication of the Coalbed Methane Outreach Program (CMOP)

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In this issue

Technology

**International
Developments**

Upcoming Events

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Technology

Technology Spurs Efficient CMM Development

The previous issue of the EXTRA (December, 2000) reported on the tremendous progress made in the capture and utilization of (CMM) during the 1990s. Although much of the progress in CMM recovery and use is due to downstream market development and regulatory reforms

such as increased natural gas use and electric and gas industry restructuring, the role of technologies pioneered during the 1980s that reduced costs and improved recovery efficiencies should not be overlooked. The following article examines several of these technologies and how they have increased CMM production.

(Continued on Page 2)

New EPA Administrator Confirmed

Governor Christine Todd Whitman was unanimously confirmed by the U.S. Senate as Administrator of the U.S.

EPA on January 30, 2001. Prior to her appointment as Administrator, she was a two-term governor of New Jersey, the first woman to hold the state's highest elective office.

During her confirmation hearings, Ms. Whitman credited voluntary partnerships for helping improve New Jersey's environment. "We are working to forge strong partnerships among citizens, government, and business that are built on trust, cooperation, and shared mutual goals. Those partnerships are producing results—clear, measurable results," she commented. "We're doing a better job monitoring our air quality, and we're on target to reduce

greenhouse gas emissions below 1990 levels through incentives to encourage voluntary reductions..."

In April 2000, Governor Whitman

launched the New Jersey Greenhouse Gas Action Plan, which aims to reduce greenhouse gas emissions in the state to 3.5 percent below 1990 levels by 2005. "The fact is that climate change associated with greenhouse gases has an effect on every aspect of our daily lives," said



EPA Administrator Christine Todd Whitman.

Whitman.

For more information about the new EPA Administrator, please visit www.epa.gov/adminweb/about.htm.



Technology (Continued)

Steerable Motors. One of the biggest advances in CMM recovery has been the increased use of in-mine drilling techniques. The ability to accurately steer boreholes as long as 5,000 feet in advance of the mine face is the result of steerable motors coupled with precision borehole survey systems, both technologies developed during the 1980s.

In-mine directional drilling systems improve efficiency and lower costs by enabling fewer wells to contact the same quantity of coal. For example, instead of having to drill a series of relatively



Hydraulic fracturing operations, India. Photo courtesy REL.

short horizontal wells across the width of a longwall panel, several long holes can be drilled down the length of the panel to achieve the same degasification effect. Studies have shown that horizontal wells in a long wall panel can reduce methane levels in the panel by up to 50% within a six to nine month period.

Drilling fewer wells also reduces the amount of time required for inter-hole moves and allows for fewer gas gathering lines within the mine

workings. Producing the gas via in-mine techniques can therefore improve project economics and minimize environmental impacts.

Stimulation Techniques.

Considerable advancements in hydraulic fracturing and other stimulation techniques for coal seams were made during the 1980s. Stimulation techniques are designed to connect the wellbore to the formation's natural permeability by

getting past wellbore damage created during drilling.

Enhancing the drainage radius of a wellbore allows fewer wells to be drilled to produce the

same amount of gas, thereby reducing costs and surface disturbances. Diamond et. al. (1989) document that the 23 vertical, hydraulically fractured wells at the Oak Grove Mine produced 73% of the original gas in place in the Blue Creek coalbed over a ten year period. Methane reductions of 79% and 75% were achieved in the overlying Mary Lee and New Castle seams, respectively, over the same period.

End-Use Technologies. Prior to the early- to mid-1990s, most of the CMM not up to pipeline specifications was vented to the atmosphere. Progress in the areas of gas upgrading and power generation has allowed the industry to use more CMM for commercial applications. Today there are commercial power projects using CMM feed streams of 30% to 40% methane. The ability to use a wider range of the gas produced from coal mines helps lower the cost of mining by allowing the mine to capture revenue from their investment in the degasification system.

Due to improved extraction and utilization efficiencies, the CMM industry has progressed from a necessary (but often unprofitable) part of the coal mining process to one competing commercially in the conventional natural gas marketplace. Continued technology, regulatory and market developments, especially in the area of low quality ventilation air methane (see VAM article below), should allow mining companies to continue to efficiently and profitably develop CMM.

Technology continued on Page 3.



Technology (Cont'd from Page 2)

New VAM Website

As noted in previous CBM EXTRAs, technologies that cost-effectively combust or beneficially use ventilation air methane (VAM) could tap a world market in excess of \$2 billion while reducing methane emissions that otherwise would be released to the atmosphere.

To stimulate dialogue on VAM oxidation technology application, and to facilitate information transfer and assist project developers in planning and executing VAM oxidation projects in the US and abroad, CMOP soon will implement a major expansion of its web site (www.epa.gov/coalbed) to add a new family of VAM technology pages.

The new VAM pages will offer overviews of the technical and economic aspects of VAM oxidation technologies, allow downloading of documents relevant to VAM project

planning and execution, and provide insight into the potential for VAM projects to benefit from the evolving carbon emission reductions market. They also will identify and assess key parameters that drive VAM oxidation project economics, provide contact information for



CMM collection and processing facility.

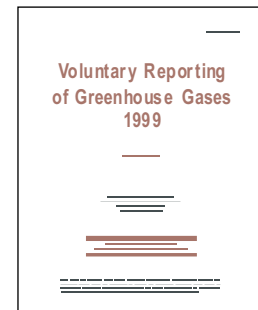
Photo courtesy REI.

those interested in various aspects of VAM project development, and review VAM project highlights and status. In conjunction

with the web site expansion, CMOP also will launch a new VAM list serve to provide an electronic (e-mail) discussion forum wherein interested parties can ask and answer VAM technology questions, obtain data necessary for project planning, and build project development teams. Look for the new VAM web pages and list serve by Spring 2001. Anyone wishing to convey VAM-related ideas, requests, questions, concerns, or market inquiries, to CMOP may contact Karl Schultz via e-mail at schultz.karl@epa.gov or Clark Talkington at talkington.clark@epa.gov.

EIA Releases "Voluntary Reporting of Greenhouse Gases 1999"

The Energy Information Agency (EIA) recently released its annual summary of the information reported to EIA's voluntary greenhouse gas reporting program, "Voluntary Reporting of Greenhouse Gases 1999." Each year, individuals, companies, or other organizations may report to EIA measures they have taken to reduce, avoid, or sequester greenhouse gas emissions.



In 1999, companies submitted reports on eighteen CMM projects, with reported reductions of 584,000 tons of methane. Of these eighteen projects, four are at the White Oak Creek property and three are at Oak Grove Mine, both located in Alabama. The companies reporting to EIA cited an association with EPA's CMOP program for eleven of the eighteen projects.

To obtain a PDF copy of EIA's report visit www.eia.doe.gov/oiarf/1605/frntvrgg.html



International

UK Government Investigates Methane Leakage From Abandoned Mines

According to a recent article published by the Financial Times (January 13, 2001; www.financialtimes.com), the UK government is launching a new investigation into the amount of methane

emitted from abandoned coal mines. The new study was prompted by two companies that claim at least 300,000

tonnes of methane (15.6 Bcf) is currently seeping from abandoned mines every year. This claim conflicts with a 1994 UK government study that said methane flows would be "negligible" a few years after the mine closures.

The two companies, Octagon Energy and Alkane Energy, estimate methane from UK mines may account for up to 10 percent of the UK's total greenhouse gas emissions. Octagon and Alkane capture a combined 25,000 tonnes per year of methane (1.3 Bcf) from abandoned mines and use the gas

for generating electricity. The companies are urging the government to make power plants utilizing CMM part of the "renewables obligation" that requires utilities to purchase 10 percent of their electricity from "green" power plants.



Alkane Energy's Markham Plant.

association with NSW Coal Mine Managers Association, Seedsman Geotechnology, Strata Control Technology and Strata Engineering, and the University of Wollongong held a one-day colloquium in February 2001 to acknowledge the early role played by Dr. Alan J. Hargraves in the development of rock mechanics and gas drainage. The colloquium presented the state of the art in operations of rock mechanics and gas drainage and their challenges. For the more information, visit the website at www.uow.edu.au/eng/conf/colloquium.

Australian Gas Drainage Meeting

The Illawarra Branch of The Australasian Institute of Mining and Metallurgy (AusIMM), in

Russian CBM Center Completes Studies

The Russian CBM Center recently completed two feasibility studies funded by the ROLL program of the Institute for Sustainable Development, a U.S. AID sponsored program. The two feasibility studies, CMM for Boiler Firing at the Komsomlets Mine and CMM for Heat and Electricity Production at the Lenina and Usinskaya Mines, were conducted as part of the project entitled "Replication of the CMM Utilization Investment Projects Preparation Experience in Kuzbass Basin". Both studies examined the geological conditions of the mines, the CMM/CBM resources producible through degasification systems, and the appropriate options for CMM/CBM utilization. For more information, please contact Oleg V. Tailakov at the Russian CBM Center at tailakov@mail.stanet.ru.

International Cont'd on Page 5.

Correction

In the previous issue of the EXTRA (December, 2000) it was incorrectly reported that the cumulative volume of CMM emissions reductions in CO₂ equivalent was 429 million tons. The figure should read 120 million tons of CO₂ equivalent or 297 Bcf in emission reductions.



International

(Continued from Page 4)

Ukraine CMM Handbook Available

In January, the Partnership for Energy and Environmental Reform (PEER), through a grant from the US EPA Coalbed Methane Outreach Program, released a Handbook titled "Coal Mine Methane: Opportunities for Production and Investment in the Donetsk Coal Basin." The Handbook is designed to help potential investors identify CMM project opportunities at specific coal mines in the Donetsk Basin, also referred to as the Donbass. Based on analysis of data and information from all Ukrainian coal mines for the years 1998 and 1999, twenty-nine coal mines located in the Donetsk Coal Basin were profiled in the Handbook. The Handbook contains information concerning regional geological structure, methane resources of Donbass, structure of the coal industry, and related environmental and legislative issues in Ukraine. The twenty-nine mine profiles presented in the Handbook contain general and geologic information about the mines, their mining conditions, current degasification parameters, methane emissions data during 1990-1999, and analysis of coal production and methane emissions relationships.

The Handbook is now available in both English and Russian. An electronic version will also be available through CMOP's website at www.epa.gov/coalbed.

For more information about the Handbook, please contact Mr. Alexander Filippov at the Alternative Fuels Center, Kiev, phone at 011-380-44-2254152 or e-mail at aef@public.ua.net.



Now Available

"Coalbed Methane Notes"

a short weekly e-mail from the Coalbed Methane Outreach Program providing updates on industry and program activities, is now available. CBM Notes is only being disseminated to those who email a subscription request to energystar@optimuscorp.com.

If interested, simply send a message with the word "SUBSCRIBE" in the subject box. We are interested in feedback on this service and welcome ideas for upcoming Notes. EPA is also planning on posting all Notes on the website at www.epa.gov/coalbed.

India's CMM/CBM Project Underway

As reported in the September 2000 issue of the EXTRA, India recently launched a CMM/CBM recovery and utilization project supported by the Global Environmental Facility (www.gefweb.org) and the Government of India. Last December, technical experts in the fields of surface drilling and completion, underground drilling and gas collection, and laboratory analysis visited India to develop drilling and completion programs and develop equipment specifications for the procurement phase of the project.

In January 2001, a letter requesting expressions of interest for the equipment procurement was sent to various equipment manufacturers, suppliers, and service companies. Equipment will be purchased in four areas: (1) surface drilling, completion and production; (2) underground drilling; (3) gas collection, and ; (4) laboratory analysis. It is anticipated that the full tender offer will be issued in March/April. The United Nations Industrial Development Organization (www.unido.org) is the implementing agency for the project.



UPCOMING EVENTS

2nd Annual Coalbed and Coal Mine Methane Conference- Meeting the Energy Needs of a New Century CBM Conference March 27-28, 2001

This annual conference, presented by the Strategic Research Institute, will bring together industry and government representatives to discuss crucial questions of coalbed and coal mine methane development and use. Topics to be addressed are reservoir assessments, news in completion technology, environmental considerations, regulations issues, and economic advantages of CBM/CMM production. The conference will present several case studies of projects in the U.S. and abroad, and also offer first-hand insights in sound project development for coalbed and coal mine methane. For further information or to request a brochure, please contact Heidi Aigler, Strategic Research Institute, by mail at 333 7th Avenue, 9th Floor, New York, NY 10001-5004; by phone at 212-967-0095, ext. 271; by fax at 212-967-7973 or 7974, or by email at haigler@srinstitute.com or visit www.srinstitute.com/cr190.

Investment Opportunities in Coalbed Methane The Hatton, London March 28-29, 2001

This conference will discuss why CBM offers a growing opportunity

for investors by examining how it can be effectively commercially exploited. The conference will focus on identifying new opportunities for using CBM/CMM and examine new and existing technologies for extracting and utilizing CBM/CMM from unmined, mined, and abandoned coal seams. For more information, please contact Mr. Paul Rose of SMI at +44 20 7827 6732 or via e-mail at prose@smi-online.co.uk. You may also register online by visiting SMI's website www.smi-online.co.uk/coalbedmethane3.asp or call + 44 (0) 20 7827 6134.

The 2001 International Coalbed Methane Symposium Tuscaloosa, Alabama, USA May 14 - 18, 2001

The University of Alabama will host the 2001 Coalbed Methane Symposium this coming May. Topics to be addressed include international projects, resource assessment, reservoir characterization and modeling, drilling technology, and legal and regulatory issues.

In conjunction with the meeting, EPA will be hosting a workshop on International Opportunities in CMM. The workshop has been presented at the last several symposiums and has proven to be a popular event. For further information and to obtain a registration form, contact Ms. Gwendolyn Hood by e-mail at ghood@ccs.ua.edu.

Seventh International Mine Ventilation Congress Krakow, Poland June 17-22, 2001

This conference, sponsored by the Mining Committee of the Polish Academy of Sciences, will bring mining engineers, scientists, and researchers together to discuss current and emerging mine ventilation issues. In addition to technical presentations, equipment and product exhibitors will be present, and there will be site visit opportunities. For more information, contact Wacław Trutwin, Strata Mechanics Research Institute, Polish Academy of Sciences, 30-059 Krakow, ul. Reymonta 27, Poland (e-mail: trutwin@img-pan.krakow.pl), or visit the conference website at www.emag.katowice.pl/IMVC.

North American Coalbed Methane Forum Holiday Inn, The Meadowlands Washington, PA April 25 - 26, 2001

For more information on the topics for this meeting, please contact Dr. K. Aminian at (304) 293-7682.



Clark Talkington

CMOP is pleased to announce that Clark Talkington has joined the staff of the Coalbed Methane Outreach Program. CMOP is very excited to have Clark on-board and Clark is looking forward to working closely with members of the coal industry to productively use their coal mine methane and reduce methane emissions. Clark comes to the program from the EOP Group, Inc., a environmental and energy policy consulting firm in Washington, D.C where he worked on an array of issues. Before moving to Washington, he was as a staff member at the Texas Natural Resource Conservation Commission and a consultant to electric and gas utilities. Clark can be reached at talkington.clark@epa.gov or at (202) 564-8969.

Address inquiries about Coalbed Methane Extra contents or about the US EPA Coalbed Methane Outreach Program to:

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 Washington, DC 20460

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

UPCOMING EVENTS

(Continued)

Modern Management of Mine Producing, Geology and Environment Protection Varna, Bulgaria June 3-9, 2001

The Ministry of Environment and Waters, Republic of Bulgaria, will be hosting a conference entitled "Modern Management of Mine Producing, Geology and Environment" in Varna, Bulgaria, June 3-9, 2001. The conference will address mining technologies and methods that are environmentally friendly and sustainable. As part of the conference, a session will be devoted to technologies for managing methane emissions in mining operations.

Deadline for submission of abstracts: April 15, 2001.
 Deadline for submission of full manuscripts: May 1, 2001.
 Deadline for submission of Registration Form and payment of Participant Fee: May 1, 2001. Deadline for submission of applications for Exhibition and/or Demonstration Stall: May 20, 2001.

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