



GLOBAL METHANE INITIATIVE COAL SUBCOMMITTEE MEETING

12th Session of the Coal Subcommittee
21 October 2010
Landmark Hotel
Beijing, China

FINAL MINUTES

China Coal Information Institute (CCII) 10th International Symposium on Coalbed Methane (CBM)/Coal Mine Methane (CMM): 19-20 October 2010

The 10th International Symposium on CBM/CMM in China was held on 19-21 October 2010 in Beijing, China. It was co-sponsored by U.S. Environmental Protection Agency (U.S. EPA) and the China State Administration of Work Safety, and organized by CCII. The Symposium provided a platform for promoting the development of the CBM/CMM industry in China and abroad.

Topics covered included:

- Potential and prospective CBM/CMM projects in China
- Opportunities and challenges for CBM industrialization in China
- New technologies and applications for CBM development
- CBM/CMM drainage and utilization technologies
- Ventilation air methane (VAM) utilization technologies
- Policies, regulations, and financing issues for CBM/CMM projects
- Aids from international organization and financing channels
- Methane to Markets Partnership

Global Methane Initiative Coal Subcommittee Meeting – 21 October 2010

Summary

The Coal Subcommittee held its 12th session on 21 October 2010 in Beijing, China, following CCII's 10th International Symposium on CBM/CMM. Attendees discussed the outcomes from the Ministerial Meeting and the Steering Committee meeting held in Mexico City, Mexico, in early October 2010, including discussion on the new Terms of Reference. Representatives from Partner countries as well as the Project Network shared updates relating to CMM activities. The Subcommittee also discussed the role of methane abatement in the coal sector, the development of country-specific action plans, and the Subcommittee's leadership.

The following sections provide more details of the meeting discussions.

Opening Remarks and Introduction

The Coal Subcommittee meeting took place the day after the end of CCII's 10th International Symposium on CBM/CMM. The meeting was attended by Global Methane Initiative Partner country delegates, Project Network members, and Administrative Support Group (ASG) staff, as well as other Symposium

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participants and observers. About 25 people, representing 10 countries, were present. A list of attendees is included as Annex 1 to these minutes. The meeting was opened at 9:00 am.

Presiding over the meeting was:

- Co-chair Dr. Pamela Franklin, team leader of the Coalbed Methane Outreach Program (CMOP) at the U.S. EPA.
- Co-chair Dr. Huang Shengchu, President of CCII.
- Acting Co-chair Mr. Pravat Ranjan Mandal, Managing Director of the Central Mine Planning and Design Institute (CMPDI) in India.

Dr. Franklin opened the meeting by expressing her appreciation for everyone's continued dedication to the Methane to Markets Partnership over the past five years. She indicated that the Subcommittee would be moving forward under a new name and framework, the Global Methane Initiative (GMI). The Coal Subcommittee meeting is the first re-branded Subcommittee meeting being held as part of the Global Methane Initiative. Under this new framework, the Subcommittee will be able to revitalize its work and be even more effective, accomplishing more and encouraging participation from more countries. Subcommittee meetings often involve updating other Subcommittee members on CMM activities, and Dr. Franklin expressed her hope that the Subcommittee will continue to make progress on its goals and ongoing projects between meetings. She thanked the CCII for its gracious hospitality in hosting this meeting and allowing the Global Methane Initiative to be a part of the 10th International Symposium on CBM/CMM. She then invited Co-chair Huang Shengchu and acting Co-chair P.R. Mandal to give opening remarks.

Mr. Mandal noted that last year India produced more than 550 million tons of coal and the largest single coal production company is located in India. Capturing and reusing methane is a big issue in India, and the country is proud to have participated in the Methane to Markets Partnership and the Coal Subcommittee for the past five years. India's focus is to reduce areas prone to methane emissions, while also focusing on mine safety. He thanked the United States for its continued support of India.

Dr. Huang expressed his pleasure in being present for this 12th session of the Coal Subcommittee. He indicated that China is a large coal producer and it has been capturing methane over the last few decades, and it has seen the benefits of the Methane to Markets Partnership. He is looking forward to more productive cooperation within the Subcommittee under the new Global Methane Initiative framework.

Introductions of country delegates, Project Network members, and other attendees followed. Attendees unanimously adopted the agenda. A copy of the final agenda is included as Annex 2 of these minutes.

Update from the Administrative Support Group

On behalf of Mr. Henry Ferland, Co-Director of the Administrative Support Group (ASG) for the Global Methane Initiative, Dr. Franklin presented the summary of the outcomes from the Ministerial Meeting held in Mexico City, Mexico, on 1 October 2010 and the Steering Committee Meeting held on 30 September 2010.

- The new Global Methane Initiative was launched.
 - Mexico's Environment Minister, Juan Elvira, and U.S. EPA's Assistant Administrator Gina McCarthy led Mexican and U.S. delegations in launching the expanded effort to accelerate global methane reductions.
 - The United States and Mexico asked for new financial commitments from Partner countries in a position to do so.
 - The United States pledged at least \$50 million over five years.

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- Key new elements of the Global Methane Initiative include the following:
 - Expanded scope to include abatement and avoidance from wastewater treatment, landfills, and agriculture.
 - All Partner countries are requested to develop national methane action plans and for developed countries to help developing countries do so.
 - New resource commitments are requested from those in a position to do so.
- All existing Partners and activities of Methane to Markets will become part of the Global Methane Initiative.
- A new Global Methane Initiative “brand” will be developed.
- Steering Committee Meeting Outcomes:
 - Approved Nicaragua and Turkey’s request to join the Global Methane Initiative.
 - Turkey plans to join the Coal Subcommittee.
 - Adopted revised Terms of Reference for the Global Methane Initiative, which includes:
 - Country-level methane action plans and reporting,
 - Methane abatement (as well as recovery and use),
 - A new wastewater sector, and
 - Review of leadership.
 - Agreed to hold a third Expo and asked for Partners to contact the ASG if they are interested in hosting.
 - The next Expo likely will not take place until 2012 at the earliest.
 - It will hold the same structure as the past two Expos.
- Charges to Subcommittees:
 - Develop country-wide strategic action plans, focusing on the country’s plans to reduce methane emissions from all sectors.
 - The ASG will develop a list of question to help countries develop strategic action plans.
 - The ASG will identify possible recommendations for streamlining reporting and developing reporting templates and are interested in feedback; reporting will help all Partners understand the work that is being done and build on successes.
 - The ASG is soliciting feedback on the current online tracking system.
 - Developed countries should help developing countries.
 - Initial drafts are encouraged by the end of 2011.
 - Determine the role of methane abatement in each Subcommittee’s sector and update the Subcommittee’s action plan, if necessary.
 - Review current leadership and determine if there are other Partners interested in serving.

The floor was opened for questions and comments.

- Mr. Richard Mattus (MEGTEC Systems) expressed support for the expanded Global Methane Initiative. He indicated that the change may encourage more countries to join. The Methane to Markets Partnership started with only 14 Partner countries and has grown to 37 Partner countries plus the European Commission, and that the Global Methane Initiative will likely encourage more growth.
- Dr. M. Ashraf Tahir (Professor of Chemical Engineering at the National University of Sciences and Technology in Pakistan) asked for more explanation behind the Partnership’s name change. Dr. Franklin responded that the Partnership has expanded from a U.S.-led initiative with 14 Partner countries to a true international partnership with 38 Partners . The scope is being expanded to include more sectors and more financial commitments outside of the United States, making the mission more of a global initiative.

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- Dr. Hua Guo [Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO)] asked for more background on expanding the scope to include the wastewater sector. Dr. Franklin indicated that adding the wastewater sector has been discussed for a number of years. It was not clear whether it would be more appropriate to host the new sector within either the existing landfill or agriculture Subcommittees. Because the experts and stakeholders are different than either of those sectors, it may (eventually) become its own distinct Subcommittee.
- Mr. Liu Wenge (CCII) noted that the Terms of Reference are like a five-year plan. He asked if the Global Methane Initiative has thought about the next stage after these new Terms of Reference expire and how long the Terms of Reference will last. Dr. Franklin indicated that the new Terms of Reference were chartered for five years.
- Dr. Guo asked if any countries other than the United States have made financial contributions. He also asked what areas the United States would target as a priority for its committed \$50 million. Dr. Franklin indicated that the United States is the only country to verbally commit to a dollar figure at this time. From the U.S. perspective, all four sectors are important and robust programs have been in place for 15 years to address each. She noted that funding is planned on a yearly basis, so she could not indicate what the U.S.'s priorities may be in the future.

Dr. Franklin informed the Subcommittee that they could find more information regarding the new Global Methane Initiative at www.globalmethane.org/gmi and reminded the Subcommittee that they should contact the ASG (asg@methanetomarkets.org) if they have questions after further review of the Ministerial Declaration and the new Terms of Reference.

Partner Country and Project Network Updates

Following the discussion on the ASG's presentation, country representatives were asked to provide the Subcommittee with updates on their countries' progress with respect to CMM policy and project development. Additionally, participating Project Network members were invited to present technology or project development updates for the private sector. Presentations submitted by country representatives and Project Network members to accompany their discussions can be found on the Global Methane Initiative website, at: www.globalmethane.org/news-events/event_detailsByEventId.aspx?eventId=306. Brief summaries of each update are provided below.

Australia

Mr. Michael Alder (Australia's Department of Resources, Energy and Tourism) explained that Australia is a large coal exporter and it is expecting more growth in the coal mining industry in the coming months. A large portion of Australia's greenhouse gas (GHG) emissions are comprised of methane from the coal sector. However, as coal mining production increases, emissions per 1,000 tons of coal produced decreases because of Australia is focused on mining less gassy coal mines and recovering and reusing methane. Part of Australia's primary focus is on mine safety, so gas drainage and gas control are critical. Australia is working on a project with the Chinese government to develop a range of technologies and initiatives to improve mine safety and thus increase gas drainage.

The Australian government is committed to reducing GHG emissions. It ratified the Kyoto Protocol in 2007 and committed to emission reduction targets under the Copenhagen Accord. Australia played a leadership role in the Global Carbon Capture and Storage Institute (CCS) proposal, which is now funded (in part by a U.S. grant) and underway and will act as a clearinghouse for research of new technologies and as a vehicle to streamline funding. Australia has seven waste coal mine gas power stations connected to the grid that are using drainage gases with a combined capacity of nearly 215 MW. Australia could potentially double that capacity over the next decade. Another power station, WestVAMP, is not yet connected to the grid and has a capacity of 6 MW.

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The Australian government's Carbon Pollution Reduction Scheme, introduced to Parliament this year, was rejected due to a combination of the opposition (opposing an emission trading system and the proposed targets) and the green party (wanting more ambitious targets). Following the rejection, the government established a climate change committee to examine options for placing a price on carbon, which may include a direct carbon tax, a revised emission trading reduction scheme, or another proposal. The committee is chaired by the Prime Minister and co-chaired by the Minister for Climate Change and a Green Party Senator. Mr. Alder indicated that it is unclear how, if at all, the new proposal will address fugitive emissions from coal mines. The committee will provide recommendations and the Australian government will decide how to move forward with a proposal sometime in 2011. The government is holding a parallel discussion with businesses who want to know what policy changes may take place before they make investments.

The states have GHG abatement programs in place, and they contribute financially to CMM/CBM projects at the state level. The Commonwealth government will provide funding (i.e. the Coal Sector Abatement Fund) to assist states in developing CMM/CBM projects. Australia has explored many technologies to make effective use of fugitive methane emissions, but it is facing challenges in the deployment of technology and in setting a clear policy framework.

China

Mr. Liu Wenge began by thanking the Partner countries for their contributions to methane reduction efforts in China. He indicated that this year marks the end of China's 11th five-year economic and industry development plan. The government will summarize the achievements of the last five years and make a plan for the next five years. The last five-year plan for CMM/CBM introduced preferential policies to encourage CMM/CBM utilization in China, including tax and regulatory incentives. Mr. Liu believes that the next (12th) five-year plan for CMM/CBM, under discussion and expected by the end of the year, will also include incentives to encourage and improve the recovery of methane from the coal mine sector. Mr. Liu highlighted some achievements in the coal mine sector in the past five years: the death toll from mines has decreased because of coal mine safety improvements, including methane capture and recovery; many new CBM wells were drilled within the last five years and the coal mines will be mined within the next few; CCII became very active and involved in the Methane to Markets Partnership.

Mr. Liu noted that CCII has undertaken three new projects in the past several years. They did a technical assessment of coal mine gas recovery and utilization in China and built a model to assess options for coal mine drainage and utilization. The model can be disseminated to coal mines in China, and CCII estimates that at least 10 mines will adopt the model and employ CMM/CBM drainage and utilization. A project to demonstrate power generation using low quality CMM is under construction, and this supports a new policy in China to encourage more low concentration methane transport and use. Mr. Liu indicated that there is great potential in China for VAM projects; many projects are ongoing, but they would also like to attract companies to conduct more feasibility studies. Feasibility studies that have been conducted in China are published on CCII's website, and they look forward to initiating more feasibility studies and undertaking more projects in the future. CCII looks forward to support the new Global Methane Initiative and strengthening the global initiative.

Mr. Felix Chan, of AES Corporation, based in China, asked Mr. Liu what kind of support is needed to initiate more project implementation in China beyond the feasibility studies. Mr. Liu indicated that China needs financial and technical support from CCII and other companies, both domestic and foreign, to implement new projects.

Germany

Mr. Thomas Imgrund (DMT GmbH & Co. KG) indicated that Germany is producing less than 15 million tons of coal per year from five coal mines. German coal mines are gassy. Both working and closed coal

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mines together are producing approximately 180 million tons of methane emissions per year. Germany has been utilizing gas for 70 years; gas is utilized at three coal mines at a capacity of 40 MW. In the future, Germany expects an increase in coal exports and increasing gas utilization. Forty abandoned mine production sites could produce capacities of 190 MW. Pipelines can drain the gas from the abandoned mines. The water table in Germany is rising, however, so gas production from coal mines is decreasing. In the last 15 years there were some efforts to develop a CBM program in Germany, and some CBM projects are underway.

European Commission

Though representatives from the European Commission could not be present at the Subcommittee meeting, they submitted a PowerPoint presentation to update Subcommittee members on their activities. The presentation can be found with the rest of the Subcommittee meeting proceedings on the Global Methane Initiative website, at: <www.globalmethane.org/news-events/event_detailsByEventId.aspx?eventId=306>.

India

Mr. B.N. Prasad (CMPDI) indicated that India expects its gross domestic product to grow in the near future and expects an increased demand for energy. India plans to utilize energy from all sources to meet this target, noting that coal is currently the main sources of energy and will likely continue to be.

The government of India developed a CBM policy in 1997 to award CBM development blocks through an open international bidding system. Thirty-three blocks have been allotted and production has started from three blocks, with three more expected for production by 2013. The production potential from all of the allotted blocks is 38 million cubic meters per day, which can support power generation of 6,700 MW.

Mr. Prasad noted that CBM recovery and utilization was successfully implemented in the demonstration project at Moonidih mines. The successful implementation of this project proved that CMM extraction technology works in Indian geo-mining conditions. So far, more than 1.1 million units of electricity have been generated. CBM projects are underway at Jharia and Raniganj CBM blocks with production expected to start in 2010. Mr. Prasad explained that VAM development is also a priority in India; the CMPDI generated VAM-specific data for several mines. A document listing commercial VAM projects is being finalized. India is seeking expert input on how to mix CMM with VAM so that it can be used, since the methane concentration in VAM is below 0.3 percent.

Mr. Prasad then summarized the opportunities and challenges involved in the development of CMM in India. Substantial coal is available in virgin coal seams below worked out seams. Five CMM development blocks have been identified, and India is pursuing a suitable partner and service provider for developing CMM in those blocks. India is facing challenges technically and needs help from Partner countries and international experts. They are also facing regulatory challenges; a regulatory framework is being formed by the government of India for simultaneous and harmonious exploitation of CMB and coal mining.

Finally, Mr. Prasad noted that the CBM/CMM Clearinghouse has been established and a website is functioning which highlights the opportunities of CBM/CMM development in India.

Mongolia

Dr. Badarch Mendbayar [Mongolian Nature and Environment Consortium (MNEC)] stated that Mongolia is rich in natural resources, particularly coal. Total coal resources are estimated at approximately 150 billion tons. High quality coal is exported to China, Russian, and western countries. Mongolia recently completed building a road from a coal mine to China 200 kilometers long that cost \$350 million. Mongolia is interested in develop of CBM/CMM utilization to reduce GHG emissions, increase gas utilization, and improve mining safety. Sixty percent of the GHG emissions in Mongolia are from coal.

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Coal production is expected to increase over the next 20 years, increasing from 14 million tons to almost 50 million tons by 2020. Methane leakage will also increase during that time.

Dr. Badarch noted that the main barrier to recovery and utilization of CBM/CMM in Mongolia is a lack of technology and technical knowledge. He thanked the U.S. EPA for sponsoring a CMM project development workshop in Mongolia in August 2010. The workshop was a success, and it brought interested companies to Mongolia's Nalaikh mine to discuss CMM resources, CMM end uses, policy and ownership issues, the needs of Mongolian mining companies, and the Mongolian government's plans for large-scale development of coal resources policies impacting methane recovery.

A pre-feasibility study at the Nalaikh mine, funded by the U.S. EPA, helped Mongolia better understand resource assessment and technology selection. A power generation and heating project proposal has been prepared based on the pre-feasibility study. Drilling in the Nalaikh mine has begun and is being funded by the Korean Gas Company of the Republic of Korea. Dr. Badarch expressed his hope that the U.S. EPA would continue to help finance feasibility and pre-feasibility studies in Mongolia.

Dr. Badarch also noted that a key barrier is a lack of funding to send people to workshops, seminars, and conferences so they can learn how to implement technologies. Mongolia is looking for donors to help finance this technical training. Mongolia also hopes that demonstration projects can be developed and implemented to assess CMM resources and identify the best technology for CMM utilization. In 2011 and 2012, Mongolia hopes to collect geological data from each coal mining basin to improve the CMM emission inventory for each region.

Dr. Badarch indicated that Mongolia does not have laws about CBM procedures, so the Ministry of Mineral Resources and Energy is creating a working group to develop procedures and identify ownership. He hopes that there will be a first draft of the law and procedures out next year.

Dr. Badarch opened the floor for questions and comments:

- Mr. Mandal suggested that Mongolia consider rail transportation rather than road transportation if coal production and export is supposed to increase significantly in Mongolia in the next 10 years. He noted that rail transportation provides less of a carbon footprint than roadway transportation. Dr. Badarch responded that Mongolia performed an environmental impact assessment that resulted in a suggestion to discontinue coal transport by road. If exports increase significantly and Mongolia has the resources, they would like to connect to the trains that travel through Russia to Europe and also export by rail to Korea and Japan.
- Dr. Guo asked how Mongolia developed the CMM emissions projections from open cast mines and if Mongolia has any standards to make those projections. Dr. Badarch indicated that Mongolia used Intergovernmental Panel on Climate Change (IPCC) guidelines to develop the projections. The projections will be improved in the future, and Dr. Badarch indicated that Mongolia would be interested in any feedback on how to improve the projections. Dr. Franklin indicated that IPCC guidelines for surface mine emissions are based on default emission factors which are developed at a basic level depending on the rank of coal. Where there is more information about a coal mine, more specific factors can be used.
- Dr. Huang asked about the thickness of the overburden of the open cast mine and the depth of the coal seam. Mr. Pilcher responded that it depends which area of the open cast mining is taking place. There are several planned mines at this point and the overburden varies from a few tens of meters to 300-350 meters. There is potential for recovery because the coal seams are thick and there are multiple seams, and the rank of coal is high and very gassy. Dr. Badarch indicated that the Ministry of Mineral Resources and Energy has a website which provides information on each of the mine sites, including the depth.

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- Dr. Guo commented that estimating methane emissions from open cast is a complex matter, and Australians are working to recommend a standard. Mr. Pilcher asked if the standard being developed is a public document that is available now. He also commented that relative to open cast mines and the rest of the world, the revision to the CDM methodology ACM0008 is based on gas that is recovered rather than actual methane emissions from surface mines. As projects get underway, the information will add to the overall understanding the complex issues. One of the most complicated issues Mr. Pilcher has seen is that, as mines undergo dewatering, emissions increase dramatically. Even the open pits in Mongolia that are not deep have gas bubble up through water in the bottom of the pits. There is a lot to learn about the relationship between hydrodynamics and open cast mining in the future.
- Dr. Franklin noted that the Subcommittee may want to further discuss surface mines and open cast mines in order to collaborate and resolve some of the issues.

Pakistan

Dr. Tahir indicated that Pakistan is a leader among the methane producing countries. CBM and CMM are new topics in Pakistan. Pakistan has a couple dozen mines. A 175 billion ton deposit was found, and Pakistan is planning for exploitation. They hope to do something with CBM and CMM during this process.

United States

Ms. Felicia Ruiz (U.S. EPA - CMOP) described U.S. EPA's support for development of the United Nations Economic Commission for Europe (UNECE)/Methane to Markets *Best Practices Guidance on Effective Methane Drainage and Use in Coal Mines* (hereafter referred to as *Best Practices*), and announced the document's availability online in English and with the Symposium proceedings in Chinese. She indicated that the U.S. EPA is funding a series of workshops that UNECE plans to hold to disseminate the *Best Practices* findings in China, Ukraine, and Kazakhstan in 2011.

The United States recently updated the *Global Overview of Coal Mine Methane Opportunities*. It profiles 37 coal producing countries globally, including their current activities and potential for CMM projects. The International CMM Projects Database, which can be found online, was updated to include user-friendly search and export functions. A GHG emission reduction calculation was added for all projects and a default emission reduction is provided if project data were limited.

U.S. EPA is working on capacity building efforts in China, India, Mongolia, Poland, and Ukraine. Pre-feasibility studies, technology demonstrations, and assessments are completed or underway in China, Mongolia, Poland, and Ukraine. Through the Methane to Markets Partnership EPA has funded seventeen grants for work in the coal sector since 2007; the 2011 awardees will be announced soon.

In China, the U.S. EPA has conducted five full-scale project feasibility assessments. One of these projects has led to a privately funded \$70 million joint venture to build the world's largest CMM to liquefied natural gas (LNG) facility, based on the study results from the Songzao mines. Studies were also completed at Liuzhuang and Hebi mines, and studies are near completion at Tai Xi and Linhua mines.

In India, the U.S. EPA has been supporting the CBM/CMM Clearinghouse for three years.

In Mongolia, as Dr. Badarch described, the United States funded a pre-feasibility study of a potential CMM project at the Nalaikh mine. Based on the findings, the Korean and Mongolian governments are sponsoring core drilling and evaluating CBM or CMM projects. The United States also sponsored a technical workshop on CMM in Mongolia in August 2010.

In Ukraine, the United States held a successful CMM Investment Forum in Donetsk in May 2010, and assisted policymakers with development of its strategy on CMM promotion and implementation of a new

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CMM law. The United States plans to conduct more pre-feasibility studies in Ukraine and plans to hold a seminar focused on drainage, degasification, and air ventilation mitigation, potentially in conjunction with the UNECE *Best Practices* workshop in 2011.

In the United States, the U.S. EPA finalized requirements for reporting GHG emissions from key sources, including gassy underground mines, including VAM and drained gas emissions.

Mr. Mandal asked what reporting system the United States is using for reporting GHG emissions. Ms. Ruiz clarified that emissions must be reported to the U.S. EPA. Dr. Franklin indicated that gassy mines must still comply with all appropriate health and safety requirements issued by the Mine Safety and Health Administration, including any mine ventilation measurements that MSHA requires. The new requirements are the first time that overall greenhouse gas emissions from fugitive methane emitted at underground coal mines must reported directly to U.S. EPA.

Input from the Private Sector

In addition to updates from Partner country delegates, the Subcommittee welcomed input from the Project Network.

- Dr. Guo provided an update on CSIRO's research agenda in China. He indicated that the work in China focused on two aspects: CMM capture and VAM utilization. In the CMM area, they are working on two projects. The projects involve low capture rates and low concentrations, and they are trying to determine how to integrate the methane capture plan with mining activities. In the past two years, they have implemented several measures that have been useful for methane capture. They installed a drainage pipeline for rich gas to minimize dilution. They also installed a gas sharing pipeline so the rich gas can be moved between coal mines to maximize the utilization. Infrastructure, gas transport, gas sharing, and gas drilling monitoring are important. The VAM demonstration to run one catalytic oxidizer will be completed onsite following a lab test by the end of the year.
- Mr. Pilcher provided an update on the Group of Expert's activities to disseminate the results of the *Best Practices*. Mr. Pilcher noted that the document is now available in English, Russian, and French and an advanced copy is available in Chinese. He requested any feedback on the translated documents to enhance the translation. He also noted that it is a living document, and welcomed input on more case studies for projects developed using the *Best Practices*. UNECE will award contracts to technical experts to conduct workshops on the *Best Practices*, similar to the one conducted in China this week. Workshops are being planned in Ukraine and Kazakhstan. Technical experts will be selected to conduct the workshop based on that information. The Group of Experts hopes that the *Best Practices* will be broadly adopted. Some practices that are common now may not be best practices, so the group would like to seek financial backing to further evaluate these practices. Mr. Pilcher reminded the group that the Group of Experts is an open group and that attendance to meetings is welcomed and encouraged.

Ms. Carlotta Segre, with the UNECE, requested that if anyone wants to reference the *Best Practices* document on their own website, to please link it to the UNECE website since it is an official, copyrighted document.

Mr. Alder asked about the objective of the publication, the target audience, and how the Group of Experts plans to assess how valuable the document is (i.e., performance indicators identified, such as if people read and adopt it). Mr. Pilcher replied that the document was developed for decision makers, policy makers, and management so they could have enough information to understand the topic and ask appropriate questions. He indicated that there aren't any specific

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performance indicators identified, but if people suggest improvements or ask for workshops it will be considered a success.

Dr. Badarch indicated that he was very impressed with the workshop held this week in China and would like to have one in Mongolia and/or in conjunction with a Coal Subcommittee meeting.

A representative from the United Nations Framework Convention on Climate Change (UNFCCC), indicated that he would appreciate if UNECE would present this document to the UNFCCC so it can become official and so there aren't multiple policies and guidelines being produced by different groups. Mr. Pilcher responded that UNECE is collaborating with UNFCCC and policymakers. Ms. Segre also commented that the Group of Experts was created to provide advice to member countries and provide support on technical issues. It will be good for UNECE and UNFCCC to work together on GHG emissions reductions, coal mine methane capture, and mine safety.

- Mr. Mattus provided an update on the global milestones and status of VAM mitigation projects. He indicated that VAM abatement installations have been announced worldwide, including demonstrations in the U.K., Australia, and the United States. Commercial installations have taken place in Australia, China, and the United States. The VAM Power Plant (at WestVAMP in Australia) has already generated more than 100,000 MWh of electricity. There is a major VAM mitigation project under construction in China. It is important to ensure that there is a sufficient methane concentration in a VAM project because the amount of carbon credits received and the amount of energy generated is directly related to VAM concentration. If VAM concentration is consistently high (>0.5 percent), adding drained methane can keep the methane concentration steady and it is therefore more suited to generate electricity. For large units, conversion efficiency from thermal to electrical energy is around 30 percent; efficiencies are lower for smaller plants. Carbon credits generated from a project vary based primarily on the volume of VAM processed; the profitability of VAM projects in turn depends primarily on the value of carbon credits. Carbon credits after 2012 are uncertain, and the present values of carbon credits do not support the feasibility of some VAM projects. In preparation for decisions regarding carbon credits post 2012, operators and governments should promote demonstration installations to become familiar with VAM processing, investors should take positions in larger installations, and equipment suppliers should gain experiences with VAM applications before the market takes off.

Mr. Alder asked how much oxidizer technologies cost without the power generation step, and whether economics favored abatement or utilization. Mr. Mattus responded that the simple payback of the oxidizer system could be 15 years and may reduce to 6 to 8 years if the value of carbon credits are included in the simple payback calculation. Comparing to pure abatement, the technology is three times more expensive but does not necessarily generate three times as much energy. Purely from an emissions reductions standpoint, abatement may be the best option. Many VAM projects depend on what can be utilized locally. If heat can be used locally for hot water systems, VAM may be more feasible. Methane concentrations in VAM must be high to consider producing electricity.

Dr. Guo asked Mr. Mattus to elaborate on why the Zhengzhou mine is only using thermal energy for local use. Mr. Mattus replied that Zhengzhou mine's methane concentration is relatively high for China (0.5-0.6 percent methane), but not high enough to consider an electricity power plant. Since the concentration doesn't support power generation, they chose to use thermal energy locally; otherwise, there would be no revenue. In China, a project cannot be designed for only abatement. Dr. Guo asked why they did not choose to mix the VAM with drainage gas to increase

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the methane concentration. Mr. Chan responded that there was no drainage gas available for this project. Since VAM concentration can fluctuate at this mine, power generation was not feasible.

Mr. Clark Talkington, with Sindicatum Carbon Capital (SCC), asked what power cost was used to create the carbon credit value versus rate of return curves. Mr. Mattus indicated that the curves are purely indicative and exact numbers were not used.

Responding to Steering Committee Charges

The Subcommittee next reviewed key items that the Steering Committee directed the Subcommittees to consider.

Methane Abatement

The newly adopted Terms of Reference for the Global Methane Initiative explicitly expand the Partnership's scope to include methane abatement and flaring. The original focus of the Methane to Markets Partnership at the time of its charter in 2004 was the development of projects that would recover and use captured methane while reducing its emissions. Now it has become important to consider other mechanisms for reducing methane (e.g., flaring) that don't necessarily have the benefit of energy production. The Steering Committee asked each Subcommittee to determine the role of methane abatement in its sector.

Dr. Franklin noted that the Subcommittee has historically supported VAM mitigation projects even though many of them are abatement only. She directed the Subcommittee's attention to a draft memorandum / thought piece on flaring of coal mine methane prepared by Project Network members Mr. Karl Schultz and Mr. Lee Schultz in May 2006. The memorandum's perspective was that flaring should be considered as a secondary option if utilization is not technically or economically viable. She asked if the Subcommittee would support the development of a more detailed white paper considering the role of methane abatement in the coal mining industry. If so, would the Subcommittee prefer to use the 2006 memorandum as a starting piece or start fresh?

Mr. Talkington provided background on the white paper, indicating that in 2006 the cheaper and easier option was to flare gas rather than recover and use it. The authors felt that power generation should be encouraged over flaring, noting that the end objective is climate mitigation.

Mr. Pilcher asked the group if they are aware of any project using flaring. Mr. Mandal responded that a private party CBM project is flaring because CBM is not producing enough gas to sell. Dr. Franklin noted that no U.S. projects flare. Dr. Guo noted that flaring is a key way to reduce emissions from coal mines, and he is aware of five to seven coal mines using it. The trend is to increase energy recovery by generating power; however, not all methane emissions can be utilized and flaring offers an alternative way to dispose of the methane. The ideal situation is to maximize the energy harvest and flare the rest.

Mr. Alder noted that Australia supports abatement and reuse. Since carbon credit policy is uncertain, abatement only is an economically feasible option that still benefits the environment.

Mr. David Creedy, of SCC, indicated that he is involved with VAM projects in China. Projects should be designed for climate mitigation, destroying all methane captured. Unless the project has high capacity, the only way to ensure destruction is to combine flaring and power generation.

Mr. Pilcher pointed out that if the group supports flaring as a best practice, there could be issues in the United States where there are prohibitions against flaring at coal mines. He also noted that many mines have small amounts of gas that cannot be used for energy generation because of its quality that could be flared or destroyed. He noted that the *Best Practices* addresses flaring and one of the case studies

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mentions it. Mr. Creedy confirmed that flaring is considered as a combined concept. If methane cannot be used, it should be flared, not vented.

Dr. Franklin noted that the Steering Committee directed the Subcommittees explicitly to consider avoidance and abatement. VAM has always been one of the primary mitigation opportunities for the coal sector although they are often not economically feasible especially without carbon credits. She suggested that the Subcommittee develop a new white paper to consider what flaring means from a best practices perspective. The Subcommittee could consider whether they want to actively promote flaring and/or if they would like to prioritize it as a less attractive option among a set of end uses and options.

Mr. Alder noted his agreement that flaring should be considered with respect to country-specific regulations and with respect to the *Best Practices* as well as from an environmental perspective. He indicated that flaring coal mine methane should be considered an option but not the top priority. Mr. Talkington suggested that the white paper include case studies of real world examples to show what flaring means in terms of real projects.

Dr. Franklin volunteered that the United States would develop a draft position paper on flaring (using information from the 2006 memorandum as appropriate), summarizing the key issues and addressing how and under what conditions the Subcommittee would support flaring as a CMM end use. The Subcommittee's feedback would be solicited before the next meeting, at which time the Subcommittee could discuss it further.

Creating, Updating, and Implementing Country-Specific Action Plans

Country-specific action plans would integrate the methane emissions reduction plans across all subsectors within one country-specific document. Sector-specific country delegates can coordinate with their Steering Committee delegate to produce the country-wide plan. The Steering Committee has suggested a target deadline of the end of 2011 for country-specific plan completion.

Dr. Franklin noted that Mexico has developed such an integrated methane plan that can be used as an example.

Mr. Alder noted that Australia intends to coordinate among colleagues to develop a country-specific action plan using the ASG-provided template. Dr. Franklin clarified that the ASG will be providing some questions to guide countries, not a specific template that they must follow when preparing the action plans.

Leadership Review

Dr. Franklin noted that in many Subcommittees, there has been a strong continuity of leadership and little turnover. She asked if any countries want to participate as part of the leadership and asked if there should be a process for rotating and reevaluating leadership.

Mr. Alder noted that this Subcommittee reviewed the leadership when they added Dr. Huang as a Co-chair. He noted that Australia is not interested in chairing the committee at this time, but may be interested in the future.

There were no further comments, and the Subcommittee agreed by assent to continue with the current leadership for the time being.

Addressing Technological Challenges in Commercial Development of CMM

At one of the prior Subcommittee meetings (c. 2005), development of a database was suggested to address technological challenges in commercial development of CMM. Subsequently, Australia

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developed the technology database, which is now posted on the Global Methane Initiative website. Given that several years have elapsed since its publication, Dr. Franklin suggested that the Subcommittee revise and update that database. The Subcommittee agreed.

Update on International CMM Projects Database

Dr. Franklin requested that the Subcommittee review the recently-updated International CMM Projects Database to ensure that the project list is comprehensive and the information provided is accurate. Subcommittee members can do so by creating a username and password on the database website.

Event Announcements and Plans for Next Subcommittee Meeting

The last agenda item for this Subcommittee meeting was to announce events that may be of interest to the Subcommittee members and identify a potential location and time of the next Subcommittee meeting.

Announcements of Upcoming Conferences and Workshops

The Global Methane Initiative website includes a listing of conferences, workshops, and other events that may be of interest to the coal sector. Dr. Franklin encouraged the group to email the ASG if they are aware of an event of interest that is not posted.

Mr. Alder indicated that the 2010 National Carbon Capture Storage Conference will take place 28-30 November 2010 in Melbourne, Australia.

Dr. Huang stated that CCII will hold another *Best Practices* workshop in early to mid-2011. The date and location are not yet set, but he will notify the group when the logistics are finalized.

Next Subcommittee Meeting

Dr. Franklin asked if any countries would be interested in hosting the next Coal Subcommittee meeting (usually announced four to six months in advance; e.g., mid-2011). She introduced a preliminary idea that the next Subcommittee meeting could possibly be in conjunction with a *Best Practices* workshop, which has not yet been scheduled but may be held in Ukraine in early to mid-2011. Dr. Franklin indicated that she would explore further options and report back to the Subcommittee.

Concluding Remarks and Adjournment

After brief concluding remarks from Dr. Franklin, Dr. Huang, and Mr. Mandal, the meeting was adjourned.

Annex 1 –Coal Subcommittee Meeting Registrants



GLOBAL METHANE INITIATIVE COAL SUBCOMMITTEE MEETING

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Annex 2 – Coal Subcommittee Meeting Agenda



GLOBAL METHANE INITIATIVE COAL SUBCOMMITTEE MEETING
Held in conjunction with CCII's 10th International Symposium on CBM/CMM
21 October 2010, Beijing, China

FINAL AGENDA

- 8:00 **Registration**
- 9:00 **Welcome Addresses**
- Co-Chair Pamela Franklin (USA), Acting Co-Chair P.R. Mandal (India), Co-Chair Huang Shengchu (China)
 - Brief introduction of all meeting participants
- 9:15 **Adoption of Agenda**
Subcommittee Chairs
- 9:20 **Update from the Administrative Support Group (ASG):
Partnership Steering Committee and Ministerial Meeting Outcomes**
Pamela Franklin, Co-Chair
- Ministerial Meeting Outcomes
 - Steering Committee Charge to Subcommittee
 - Discussion of new Terms of Reference
- 9:40 **Discussion about Ministerial Meeting**
- Questions about outcomes
 - Implications for Coal Subcommittee
- 9:50 **Updates from Partner Countries**
Brief updates (5- 10 minutes each) from Partner country delegates regarding status and implementation of country action plan and any new or planned activities in-country or in other Partner countries. Partner countries expected to participate if present:
- *Australia*
 - *China*
 - *Germany*
 - *India*
- 10:45 **TEA BREAK**

Annex 2 – Coal Subcommittee Meeting Agenda

- 11:00 **Updates from Partner Countries (Continued)**
- *Mongolia*
 - *Pakistan*
 - *United Kingdom*
 - *United States*
- 12:00 **Updates from Project Network**
- Updates on activities and new developments
 - Update from Hua Guo, CSIRO, on CSIRO’s research agenda in China
 - Update from Ray Pilcher, Chairman, UNECE Group of Experts on Coal Mine Methane, on Group of Expert activities to disseminate results of *Best Practice Guidance for Effective Methane Drainage and Use in Coal Mines*
- 12:30 **LUNCH BREAK**
- 1:30 **Updates from Project Network (Continued)**
- Updates on activities and new developments
 - Update from Richard Mattus, MEGTEC, on global milestones and status of VAM processing
- 2:00 **Subcommittee Discussion**
- Responding to the Steering Committee charges to the Subcommittee
 - The role of methane abatement (e.g., flaring, destruction only) in the Coal sector
 - Creating, updating, implementing country-specific action plans and strategies
 - Process for evaluating leadership roles in the Subcommittee
 - Addressing technological challenges in commercial development of CMM
 - Update on International CMM Projects Database
- 3:15 **Continuation of Discussion / Planning for Next Subcommittee Meeting and Other Events**
- Announcements of upcoming conferences / workshops / other events of interest to the Subcommittee
 - Proposal(s) for dates / locations / possible events tangential to next Subcommittee meeting (first half of 2011)
- 3:30 **ADJOURN**