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Unconventional Gas Activities in the World

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COALBED METHANE & COAL SEAM GAS

EXPLORATION DISCOVERIES

AUSTRALIA : Mustang and Fyfe sign collaboration agreement on coal bed methane projects. — UG₃₂₋₃₃₋₁

Mustang, part of international energy services company John Wood Group PLC, announced recently that its Australian affiliate, Mustang Engineering Pty Limited, signed a Memorandum of Understanding with Fyfe Pty Ltd to jointly support coal seam gas/coal seam methane projects.

Mustang and Fyfe provide complementary skills to the energy market. Fyfe has significant expertise in land surveying, surface facilities and pipelines in the CSG sector while Mustang can deliver the process and facilities expertise to support clients in engineering, procurement, construction management for CSM production. (Oilvoice, June 18, 2009)

CANADA : Canada Energy Partners provides update on Shallow Rights exploration programs. — UG₃₂₋₃₃₋₂

Canada Energy Partners Inc. provided recently an update on its Shallow Rights exploration programs in northeast British Columbia. The exploration programs included the Moosebar Shale horizontal well on the Peace River Project and the CBM horizontal well on the farm-in lands adjacent to its Monias Prospect. The Company drilled its Portage a-C100-D/94-B-1 well on the Peace River Project as a horizontal exploration well in the Moosebar Shale. The well reached the targeted 1,000 metres of horizontal displacement. The well is currently shut-in pending a future fracture stimulation test. Canada Energy drilled the

A9-23-81-22 CBM well on the farm-in lands adjacent to its Monias Prospect as a horizontal exploration well in the Gething formation. Drilling problems were encountered during the drilling of this well which prevented reaching the targeted horizontal lengths. Nevertheless, the well was completed and production tested from February to mid-May 2009 and further evaluated. The test rates have been deemed uneconomic in the current natural gas pricing environment. The well has been shut-in for possible future utility pending increased gas prices. (Oilvoice, June 24, 2009)

INDIA : Government to re-launch NELP-VIII license round. — UG₃₂₋₃₃₋₃

The Indian government will reopen the sale of oil and gas blocks under the eighth edition of new exploration licensing policy (NELP) as Finance Minister; Pranab Mukherjee restores tax breaks for natural gas. The deadline for submitting bids is likely to be extended. Promotional roadshows for 70 blocks and 10 coal bed methane region were to start on April 20, 2009 but the programme has been delayed over uncertainty on accessibility of tax holidays for natural gas.

Oil regulator, DGH head V K Sibal said there was a probability of extending the August 10, 2009 bid deadline as more than three months had been already lost. (Oil and Gas Journal, July 7, 2009)

PRODUCTION

AUSTRALIA : Gatar Exploration reports initial production from multi-lateral production pilot in New South Wales. — UG₃₂₋₃₃₋₄

Gatar Exploration Ltd. announced recently that the aggregate rate of gas production from the Bibblewindi multi-lateral production pilots in its coal seam gas project in New South Wales, Australia has reached 250,000 standard cubic feet per day. Water production continues at approximately 3,500 to 4,000 barrels per day.

Gatar holds a 35 percent working interest in the project with the balance held by its joint development operating partner, Eastern Star Gas. J. Russell Porter, Gatar's President and Chief Executive Officer, said "This confirms the Bohena coal seam is fully saturated and based on results we have seen so far, we expect the gas content to be approximately 15 standard cubic metres per ton of coal". (PRNewswire, June 18, 2009)

AUSTRALIA : RG Global signs commercial deal to process CSG discharge water. —

— UG₃₂₋₃₃₋₅

RG Global announced recently that it has signed a deal with World Environmental Solutions of Australia for exclusive representation in the coal bed methane industry and utilization of RG Global's proprietary DynIX™ technology. Traditionally Australian gas producers have been allowed to dispose of water cheaply in large evaporation ponds. Long droughts in Australia and environment concerns have meant employing other treatment systems such as reverse osmosis (RO) plants. Water recovery in these plants is an expensive process and is limited to a 70% recovery rate. Regulations have also been submitted requiring gas producers to treat the CSG water for a variety of agricultural

purposes, in addition to augmenting local municipal water supplies. Much of the associated expense to process the CSG discharge water will be borne by the CSG producers. RG Global's DynIX™ technology can be used as a standalone process or as a pre-treatment in optimizing economic and operational viability of existing RO facilities.

The vast majority of coal seam gas in Australia is located in the Surat and Bowen Basins in Queensland. It has been estimated that as many as 25,000 wells will be drilled in these areas. The expected annual rate of CSG water production in the Surat Basin alone is 25 gegalitres. (PRNewswire, June 2, 2009)

CHINA : Authorities promote CBM extraction in a safety campaign. — UG₃₂₋₃₃₋₆

China has extended a safety campaign to address the hidden dangers of coalbed methane (CBM) from small mines to medium and large-sized coal mines, the country's top economic planner said recently. The campaign aims to prevent fatal gas explosions, and increasing the extraction and use of CBM. "By end of 2010, 18 mining areas with annual gas extraction of over 100 million cubic metres should be established," indicated a NDRC statement. (Upstream, June 23, 2009)

INDIA : Essar set to start CBM production in Ranigunj. — UG₃₂₋₃₃₋₇

Essar is set to begin coal bed methane production at Ranigunj (East) block in West Bengal. The company has completed drilling 15 production wells. The initial production is estimated to be 0.05 to 0.1 mmscmd million standard cubic metres a day, to be ramped up to 2.5-3 mmscmd from a total of 700 wells to be drilled in six years. "We plan to market CBM as a cheaper alternative to fuel oil. We will also explore the possibility of marketing CNG as auto fuel in Durgapur and its

adjoining area,” said Prem Sawhney, Chief Operating Officer of Essar Exploration and Production India Ltd. He indicated “Most of our 15 production wells have started producing gas which is currently flared. We are now setting two gas gathering stations and linking the same with production wells. We are hopeful that each well will produce between 10-15,000 scmd of gas on an average after six month to two years of dewatering. However, we have set a conservative target to produce a total of 50,000 to 100,000 scmd gas by December 2009”. Essar will add at least 45 wells this fiscal and set a steep target of drilling 100 wells beginning 2010-2011. (Sify, June 25, 2009)

INDONESIA : CBM Asia submits another PSC application for CBM production in the Kutai Basin of East Kalimantan. — UG₃₂₋₃₃₋₈

CBM Asia Development Corp. announced recently that it has submitted an application for a second coalbed methane Production Sharing Contract in the Kutai Basin of East Kalimantan, Indonesia, estimated to contain 80 TCF of coalbed methane. This application covers an area of 56,300 hectares that is adjacent to, and contiguous with, the area of our existing Kutai West PSC.

Once completed, the Company will retain a 40% interest in this new PSC. The company continues to work through the BP Migas bidding process for services on its Kutai West PSC. The bidding process includes

services relating to the environment, drilling, logging, cementing, coring, laboratory analysis and construction. The Company expects to have equipment moving to its locations this summer in preparation to execute its initial drill program.

Gases in place resource estimates make no allowance for recovery of the gas. The volumes of gas which may be recoverable will depend on the reservoir characteristics encountered and future economic conditions. (Marketwire, June 25, 2009)

UNITED STATES : Anadarko's coalbed methane development plan in Wyoming receives approval. — UG₃₂₋₃₃₋₉

The Bureau of Land Management determined recently that proposed coalbed methane development within the Fortification Creek elk range in northeast Wyoming would not cause significant environmental effects. The proposed CBM development by Anadarko Petroleum Corp. involves 134 wells on 10,220 acres in parts of Campbell and Johnson counties. Anadarko spokesman John Christiansen said it is difficult to determine when activity would start because of the number of steps in the regulatory process, but he doesn't expect any work to begin in summer 2009. (Associated Press, June 23, 2009)

RESERVES

AUSTRALIA : Bow Energy announces certified 2P reserves on the Don Juan CSG Project. — UG₃₂₋₃₃₋₁₀

Bow Energy Limited announced recently the milestone of its first 2P coal seam gas reserves certified on the Don Juan CSG Project near Roma, Queensland. Bow's CEO - Commercial, John De Stefani, said "34PJ of gross 2P certified reserves have been independently verified from the Juandah Coal Measures, upgraded from the 192PJ of gross 3P reserves announced on March 4 from both the Juandah and Taroom Coal Measures. Further 2P certified reserve upgrades are expected from both coal measures in the September quarter 2009".

"The Don Juan Project in the Surat Basin is where Bow achieved its first independent gas reserves certification, and we are confident of reaching our target of 100PJ of 2P gross certified reserves on that project," added Mr De Stefani. The Don Juan CSG Project is a joint venture between Bow, as Operator with a 55% interest (Walloon Coal Measures only, including the Juandah and Taroom coal seams), and Victoria Petroleum having a 45% interest.

The Don Juan CSG field includes ATP 771P and ATP 593P and is located about 40 kilometres north of Roma, adjacent to and west of BG Group's Lacerta CSG field. "Bow Energy has strategically located CSG projects and with the further drilling planned for Don Juan along with

the current drilling program underway in the Comet and Norwich Park Blocks located in the Bowen Basin, we expect to exceed our end 2010 reserves targets of 450PJ of 2P and 1,900PJ of 3P reserves,” Mr De Stefani said. (Bow Energy press release, June 25, 2009)

AUSTRALIA : Santos acquires more acreage in Gunnedah Basin. — UG32-33-11

Santos announced recently the acquisition of significant additional acreage in the Gunnedah Basin in northern New South Wales and an investment in leading local CSG Company, Eastern Star Gas Limited. Santos and ESG’s combination of operated CSG permits in the Gunnedah Basin will cover a total area of around 63,000 square kilometres. The resource potential of this area is estimated to exceed 50 trillion cubic feet. (Santos press release, July 2, 2009)

AUSTRALIA : WestSide Corporation books gas reserves in Bowen Basin. — UG32-33-12

WestSide Corporation Limited announced recently the certification of its first coal seam gas reserves at its Tilbrook and Paranoi pilots in Queensland’s Bowen Basin. WestSide’s 50 per cent share of certified Proved, Probable and Possible (3P) gas reserves in the tenements amounts to 211 Petajoules (PJ), consistent with earlier estimates of gas in place. WestSide’s

drilling program will continue, with emphasis now turning to testing production from its first dual-lateral horizontal well at the Tilbrook pilot.

This well will aim to convert some of the existing 3P reserves into Proved and Probable (2P) reserves during the fourth-quarter of 2009. (WestSide Corporation press release, July 1, 2009)

AUSTRALIA : Shell acquires more Arrow’s CBM assets. — UG32-33-13

Shell recently indicated plans to exercise its preemptive right to take up a share of the Australian Tipton West coalbed methane assets Arrow Energy has acquired from Beach Petroleum. Shell will own 30% interest in Tipton West, with Arrow holding 70% after the transaction is complete.

Tipton West holds up to 703 petajoules of gross gas reserves. The development of the coalbed methane tenement is underpinned by two gas sales contracts to supply 9.5 PJ and 3.5 PJ per annum of gas respectively to Braemar 1 and Braemar 2 power stations. Tipton West lies in the Surat basin, 20 kilometres south of Dalby in southeast Queensland Australia. (Upstream, July 20, 2009)

SHALE GAS

EXPLORATION - DISCOVERIES

CANADA : Taqa North invests in Horn River shale play. — UG32-33-14

Taqa North, a subsidiary of Abu Dhabi National Energy Co. recently bought 10,000 hectares near Fort Nelson, in the province’s remote Northeastern corner. The land, it estimated to contain more than 1.2 trillion cubic feet of recoverable natural gas. Horn River could serve as a beachhead for the company as it looks to other North American shale plays. Extracting shale gas requires significant technological expertise, which Taqa is hoping to build in B.C., Mr. Lesage said. (Globe and Mail, July 6, 2009)

PRODUCTION

CANADA : Alberta government wants to compete against British Columbia and United States shale gas production. — UG32-33-15

The government of Alberta is trying to resuscitate drilling and compete against massive supplies of shale gas from British Columbia and the United States. Premier Ed Stelmach's government is expected to extend royalty breaks on natural gas production. A spokesman for the provincial Energy Minister said the government would not announce new incentives but rather extend a program related to existing breaks, allowing drillers to plan. "The world has changed dramatically because of new technology and shale gas, and also the world economic situation was totally unpredictable and there may be more to

come," Mr. Stelmach said. The key change for industry would be a permanent ultra-low royalty rate on a gas well's first year of production.

The Canadian Association of Petroleum Producers, the industry lobbyist, worked closely with the government and said it expects a "formal" recognition of the competition from shale gas in other jurisdictions. The organization expects the changes will establish "some more stability and the ability to more confidently invest in the long term," spokesman Roman Cooney said. (The Globe and Mail, June 25, 2009)

CANADA : Exxon Mobil estimates Horn River as a major gas find. — UG32-33-16

Exxon Mobil Corp. said recently it may have a world-class natural gas find in the Horn River shale rock basin in British Columbia. Tim Cejka, Exxon's head of global exploration, said results from the first four wells lead the company to conclude that each well will produce between 16 million and 18 million cubic feet of gas a day. Horn River has an estimated 250 trillion cubic feet of natural gas in the formation. Experts predict up to 20 per cent of it is recoverable. (Oilweek, July 9, 2009)

UNITED STATES : BG Group and EXCO Resources in partnership to develop shale gas in Texas and Louisiana. — UG32-33-17

BG Group entered recently into an alliance with EXCO Resources to develop US shale gas. BG Group acquired a 50 per cent interest in 120 000 net acres in east Texas and north Louisiana. Of these, 84 000 net acres cover the Haynesville shale gas formation. BG Group and EXCO will enter into a joint development agreement to cooperate in the further development and

production of shale gas in east Texas and north Louisiana.

The upstream acquisition and the joint development agreement are conditional on the acquisition by BG Group of the 50 per cent interest in EXCO's midstream assets and relevant regulatory approvals. EXCO will operate the jointly held upstream acreage. (EnergyME, June 30, 2009)

RESERVES

NETHERLANDS : Unconventional gas potential estimated. — UG32-33-18

A report "Focus on Dutch Gas 2009" has been recently published by Energie Beheer Nederland, the energy management agency that coordinates the oil and gas extraction for the Dutch government. The organisation made an inventory of the so-called unconventional gas potential in the Netherlands, both onshore and offshore. The Dutch soil has an estimated 500,000 billion cubic metres of unconventional gas hidden, according to EBN. Berend Scheffers of EBN said he thinks about ten percent of the unconventional gas underneath the Netherlands can be recovered. (NRC Handelsblad, June 24, 2009)

Report available at: http://www.ebn.nl/files/focus_on_dutch_gas_2009.pdf

NETHERLANDS : More resources than expected in the Slochteren field. — UG32-33-19

According to Exxon Mobil Corp, the Slochteren natural-gas field may be productive for at least 50 more years because it contains “enormous” resources. “Our expectations are that we are going to achieve a very high recovery level in that field,” Chief Executive Officer Rex Tillerson said during a recent conference in Groningen province. Output from Slochteren, set to decline after 2025, is capped to extend the life of the field, which contains about a third of the European

Union’s proven gas resources. “That’s why you are talking about 50 years or more and a lot of it will depend on the decline curve and how rapidly you will pull it down,” Tillerson said.

Exxon operates the field with Royal Dutch Shell Plc, through Nederlandse Aardolie Maatschappij. The world has the equivalent of about 320 Slochteren fields in unconventional gas resources that are technically recoverable, Texas University’s Holditch said. (Bloomberg, June 17, 2009)

UNITED STATES : New reserves of Marcellus Shale estimated at nearly 500 trillion cubic feet. — UG32-33-20

Penn State University geosciences Professor Terry Engelder projected recently nearly 500 trillion cubic feet of natural gas could be produced from the Marcellus Shale formation. “If the natural gas from the Marcellus could be extracted on demand, the Marcellus alone would last the U.S.A. more than 19 years, producing 489 trillion cubic feet of gas,” Engelder said. Engelder’s latest projection was included in a Penn State study touting possible economic activity, job creation and taxes generated by a fully

developed Marcellus Shale industry in Pennsylvania. Engelder said the estimates are based on natural gas flow rates from wells drilled by major Marcellus Shale developers.

The study said that Gov. Ed Rendell’s plan to impose a production tax on natural gas would cause a 30 percent drop in drilling activity and an estimated \$880 million loss in taxes between now and 2020. (Pittsburgh Tribune, July 28, 2009)

UNITED STATES : Report estimates a 39% increase in natural gas estimates since 2006. — UG32-33-21

The American Gas Association (AGA) recently held a press conference with the Potential Gas Committee to release its year-end 2008 biennial report: Potential Supply of Natural Gas in the United States. The assessment found that the United States possesses a total natural gas resource base of 1,836 trillion cubic feet and a total available future supply of 2,074 Tcf.

According to the PGC, domestic natural gas reserves and estimates of undiscovered resources have grown significantly, in great part due to the emergence of technologies that are able to unlock newly discovered reserves such as natural gas from shale in the Appalachian basin, as well as in the Mid-Continent, Gulf Coast and Rocky Mountain areas. (AGA press release, June 18, 2009)

To view the PGC’s press release with more detailed information

<http://www.mines.edu/Potential-Gas-Committee-reports-unprecedented-increase-in-magnitude-of-U.S.-natural-gas-resource-base>

TIGHT GAS

PRODUCTION

AUSTRALIA : APPEA approves West Australian Government decision to develop tight gas production. — UG32-33-22

The Australian Petroleum Production & Exploration Association recently welcomed the West Australian Government's decision to encourage the development of the tight gas industry by halving the royalty rate for 'tight' gas production.

The State Government announced that it will reduce the royalty rate applied to the value of tight gas at the wellhead from 10 to five per cent. APPEA director WA, Tom Baddeley, said "Unlocking the tight gas of

the Perth Basin has the potential to significantly boost domestic gas supply and government initiatives like this will help attract new entrants and diversity," While tight gas has been part of the North American energy supply for some time, the sector is still in its infancy in Western Australia, said APPEA. (Pace Today, July 28, 2009^o)

RESERVES

UNITED STATES : Half of gas may come from tight fields by 2020. — UG32-33-23

Royal Dutch Shell Plc recently estimates that the U.S. will get more than half of its natural gas supplies from tight reservoirs by 2020. New technology will allow tapping 500 trillion cubic feet of unconventional gas resources in North America, said Malcolm Brinded, executive director for the upstream business. Shell expects to more than triple tight gas output to more than 300,000 barrels of oil equivalent a day in 2020. Brinded said "Tight gas in North America has rapidly developed into a real game-changer". The world holds 3,000 trillion to 10,000 trillion cubic feet of technically recoverable tight gas, according to Shell. Shell is targeting 6 billion cubic feet of Canadian tight gas resources, which are difficult to access, after it acquired Duvernay Oil Corp. and bought nearby additional acreage in the Montney gas play, Chief Executive Officer Jeroen van der Veer said in October 2008. (Bloomberg, June 9, 2009)

GAS HYDRATE

EXPLORATION - DISCOVERIES

RUSSIA : Submersibles discover gas hydrate in Lake Baikal. — UG32-33-24

Submersibles involved in research in Siberia's Lake Baikal have recently brought to the surface some 5 kilograms of gas hydrates, an expedition participant said. The gas hydrates were found near the submerged St. Petersburg Volcano in Lake Baikal's southern basin. The Mir-1 and Mir-2 mini-submersibles resumed work in June 2009 to monitor the southern part of the lake, near Cape Tolsty. The expedition will then proceed to the north, with plans to conduct research in the lake's central part in July and in northern Baikal in August 2009. (RIA Novosti, July 17, 2009)

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