



U-Gas News Report

Unconventional Gas Activities in the World

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COALBED METHANE

EXPLORATION - DISCOVERIES

BOTSWANA: Planned project – Partnership agreement. — UG62-1

Sasol announced recently the signing of a joint venture agreement with **Origin Energy Limited** for the purposes of **exploring for coal bed methane in Botswana**. The joint venture, through Sasol Petroleum International Pty Limited (SPI) the wholly-owned upstream oil and gas subsidiary of Sasol Limited, will be known as **Kubu Energy Resources (Pty) Ltd**. Sasol and Origin, via the Kubu Joint Venture, have signed an agreement to jointly acquire three prospecting licences in Botswana namely PL134/2010, PL135/2010, PL136/2010 from Sekaname (Pty) Ltd, a local CBM exploration company, based in Gaborone. The transaction is subject to final approval by the Botswana government. **The three prospecting licences cover an area of approximately 3,000 km² and are located in the Central province of Botswana**. The joint venture partners plan to conduct a number of exploration activities in the licence area during the next two years to determine the quantity of natural gas available and the feasibility for future commercial development. (November 1, 2011)

PRODUCTION

AUSTRALIA: Planned project – Production water. — UG62-2

Coal seam gas producer **QGC** recently entered into an agreement with **GE and Penrice Consortium to build a brine pilot plant** at Penrice's chemical works at Osborne, South Australia. Expected to be operational in early 2012, the plant will provide new opportunities for the management of coal seam gas water. **The plant will extract salts from CSG water to**

produce commercial grades of sodium bicarbonate, soda ash and sodium chloride. The GE Penrice BPP is part of a wider initiative by the coal seam gas industry to investigate the technical and commercial viability of producing products like table salt and soda ash from brine, a by-product of CSG water treatment. (November 1, 2011)

FRANCE: Planned project – Production test. — UG62-3

European Gas Limited (EGL) announced recently that it will resume its **production testing of the Folschviller-2 well in the Lorraine region** of France. The coal-bed methane well is the first of its type in France and utilises **two separate horizontal drains** in two disparate thick coal seams. The testing will operate under the Bleue Lorraine Permit granted to the company in November 2004. The production testing will seek to determine the parameters and lateral extent of the coal beds. The testing will encompass a dewatering period, followed by testing for flow and quality testing of the resulting gas. The testing will enable EGL to ascertain **the commercial viability of the gas in the Lorraine basin**, as well as inform the company's future activities in the area. The work has not been impeded by the recent changes to French legislation banning hydraulic fracturing in hydrocarbon excavation projects. (October 9, 2011)

UNITED STATES: Ongoing project – Field reactivation. — UG62-4

High Plains Gas, Inc. announced recently field crews have returned the **Fitch coal bed methane field** to production. **The wells in the field have been re-activated** at a minimal cost to the company. Historically the Fitch

CBM field produced approximately **800 million cubic feet per day**. The Company expects it can improve this production over time as further maintenance is performed on wells in the field. (September 29, 2011)

The 2nd Annual Unconventional Gas Asia Summit 2011



December 6-9, 2011, Beijing, China

Who should attend?

- ◆ Coal Mining Companies
- ◆ Natural Gas Producers & Operators
- ◆ International Gas Producers & Operators
- ◆ Independent, Mid caps Operators
- ◆ Junior Gas Producers & Operators
- ◆ Oil Services Companies
- ◆ Financial service and Law Firms & Consultancy
- ◆ Drilling Companies
- ◆ Technology Providers
- ◆ Seismic Equipment Service Providers

Main topics

- ◆ China's Regulation Environment & Commercial Viability-Updating new PSC and 8 Shale gas blocks for bidding
- ◆ The Global Perspectives on Unconventional Gas: Major Projects Updating & Experience Sharing
- ◆ The Latest Technologies about 3D Seismic, Drilling and Fracturing
- ◆ China CBM E&P and Production Commercialization China Shale Gas & CBM Projects Updating
- ◆ International Operators in China: Cooperation with China Domestic Players
- ◆ Legal and Financial Issues: Technical Transfer Agreement & Risk Management
- ◆ Environment Issues: Water, Climate and Healthy
- ◆ The Next Step: The Utilization of CBM & Shale Gas Production

Policy Updating

- ◆ CNPC-New Block for Bidding
- ◆ Dynamic PSC Strategy



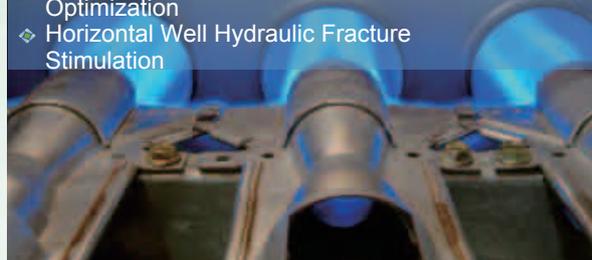
Experience Sharing

- ◆ China Current Projects Updating
- ◆ Principal Countries Experience Sharing



Advanced Technology

- ◆ Hydraulic Fracturing Technology and Optimization
- ◆ Horizontal Well Hydraulic Fracture Stimulation



China & International Operators



Event at a Glance

December 6 Tuesday	Preconference Workshop	Water management: <i>How to address the relationship between Water, Climate & Health</i>	Advanced Technologies Boom- drilling technology impact the Unconventional Gas Developing
December 6 Tuesday	China Regulation Environment & Commercial Viability: Regulations	unconventional gas: <i>Principal Regions Experience Impact China Unconventional Gas Developing</i>	Panel Discussion: <i>Flexible Policy & Technical Innovation</i>
December 7 Wednesday	Unconventional Gas in China: <i>The Characteristics & Current Project Updating</i>	The New economic circle- <i>rives up China unconventional gas technical innovation</i>	Panel Discussion: <i>New Energy Circle</i>
December 8 Thursday		Site Visit	

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SHALE GAS

EXPLORATION - DISCOVERIES

BULGARIA: Planned project - Regulation. — UG62-5

Environment Minister Nona Karadzhova gave recently assurances that Bulgaria will examine carefully the **impact of shale gas drilling** before giving the green light to the activities. Bulgaria has asked the European Commission to allow an additional in-depth environmental impact study to be carried out before the launch of shale gas drilling in the country, according to Environment Minister Nona Karadzhova. **Current Bulgarian legislation only requires assessments for the compatibility of the exploration works with the Biodiversity Act and the Protection of Waters and Soil**

against Pollution Act, Karadzhova explained. She claimed that although these two tests were sufficiently reliable, Bulgaria would call for an environmental impact assessment (EIA) to be carried out as well. The Environment Minister assured that no proceedings had been launched because the Environment Ministry had not yet received any shale gas drilling projects. Traicho Trailkov, Minister of Economy, Energy and Tourism, said that Bulgaria was about to negotiate the final details of the shale gas exploration contract with US Chevron. (November 11, 2011)

CHINA: Planned project – Blocks auction. — UG62-6

China will hold a **second auction of shale gas exploration blocks** in the fourth quarter of 2011. More **domestic companies will be invited to participate** compared with the first auction in June 2011, Zhang Dawei, deputy director of oil and gas strategy research at the Ministry of Land and Resources. China, have **1,275 trillion cubic feet of shale gas**, 48 percent more than the U.S., the Washington-based Energy Information Administration said in a report. China Petroleum & Chemical Corp. and Henan Provincial Coal Seam Gas Development and Utilization Co. won exploration rights in the country's first auction of shale-gas blocks, the Ministry of Land and Resources said in July 2011. Foreign companies were barred from bidding. China National Petroleum Corp. agreed in June to form a venture with Royal Dutch Shell Plc to improve its drilling efficiency after taking 11 months to complete the country's first shale well. (October 11, 2011)

FRANCE: Regulation – Permit withdrawal. — UG62-7

The **French government withdrew recently three permits for shale gas exploration**. Two permits had been issued to Schuepbach, and the third to Total. All three sites were in the southwest. French lawmakers voted in June to **ban tapping gas from shale rock using a technique called hydraulic fracturing** which has raised concerns about spills, leaks and contamination of groundwater. The companies had failed to submit within a two-month deadline convincing plans for exploratory drilling using alternative techniques, Ecology Minister Nathalie Kosciusko-Morizet said. "In the two Schuepbach reports, **the use of hydraulic fracturing was explicitly mentioned**," she said. Total had said it would continue searching for "classic sources" of energy but this is a region where the potential for such finds was very limited, according to the minister. (October 3, 2011)

GREECE: Planned project – Gas potential. — UG62-8

The **Ministry for the Environment, Energy and Climate Change** announced recently a special preparatory research project to be awarded to the Greek state-owned Institute for Geology and Mineral Exploration (IGME), in order to **explore potential shale gas reserves** in the territory.

The Greek Ministry released a report examining best practices in other countries

and concluding that the present day technology can be of use regarding the potential Greek reserves. IGME, responsible for state-directed geological research in the country and the outlook for the shale gas, will survey for a three-month period beginning in early 2012, before any initial findings are announced. (November 9, 2011)

POLAND: Regulation. — UG62-9

PGNiG SA bought recently full-page ads showing its shale gas flare in northern Poland and urging readers to go to a website to **express their support for shale gas**. "In relation to a debate that's going on, Poles are appealing to Members of the European Parliament to abstain from action aimed at stopping exploration and production of gas from shale rock. Don't put out the flame of hope," said the ad. Officials said **Poland would veto any European Union legislation regulating the shale gas sector** that would bind all of the bloc's members. A number of Polish and U.S. companies drill for shale gas under exploration licenses, but will need new licenses to produce commercially. The opposition Law and Justice Party **would like the state to hold shares in all the companies producing shale gas in Poland**, the party's leader, Jaroslaw Kaczynski said. "The basic rules are: a Polish firm is created by the Treasury and it will have shares in special purpose vehicles created by the companies with licenses," Mr. Kaczynski said. (September 29, 2011)

POLAND: On going project – Drilling campaign. — UG62-10

Chevron started recently drilling its **first shale gas exploration well** on one of its four licenses in **south-eastern Poland**. Chevron's country manager for Poland, John Claussen said "While we still have a significant evaluation program to complete before we can fully assess the potential in our license areas, we are optimistic about our opportunity here". Chevron plans further drills in the spring of 2012. (November 2, 2011)

POLAND: Ongoing project - Update. — UG62-11

LNG Energy announced that hydraulic stimulations were performed on both the Cambrian and Ordovician intervals in the **Lebork S-1 well** following LNG's Performanced Based Reservoir Characterization Plan. The stimulations and subsequent flow back resulted in gas being flared from each interval, although only a small percentage of the designed proppant quantity and concentration was placed. Approximately 43% and 50% of the stimulation fluid was eventually recovered from the Alum (Cambrian) and Ordovician shales respectively. **As predicted, the reservoir was over pressured but will require higher pressures to hydraulically stimulate the shales than initially designed.**

It appears that both the Ordovician and Alum shales have complex fracture matrices, which were predominantly responsible for the reduced amount of proppant placed. Although a comprehensive test of each zone was not realized at this time, **LNG is encouraged by the flared volumes** and presence of methane, ethane and propane in the gas samples. In order to properly test the shales in the Lebork S-1 well, an optimized hydraulic stimulation program design across

the same intervals is underway and may require a higher pressure stimulation utilizing a high pressure tubing string.

Consequently, through the winter, **additional testing and simulation will be undertaken** with in-house and industry specialists to design a stimulation program that will further **refine the stimulation parameters** to provide effective conductivity. In addition, due to similar cold weather concerns, it has decided to postpone the Wytowno S-1 and Starogard S-1 hydraulic stimulations to the spring of 2012. (October 31, 2011)

RUSSIA: Planned project – Gas potential. — UG62-12

A recent statement indicates that **Lukoil Holdings** is examining **development of unconventional shale gas** in Russia. The oil producer "will evaluate the possibilities of shale gas production in Russia, taking into account the risks associated with the development of shale gas in Eastern Europe". (October 27, 2011)

UNITED KINGDOM: Ongoing project - Tremor. — UG62-13

Cuadrilla Resources, which is drilling for gas in **northwestern England**, said recently that independent experts concluded that the **earth tremors** occurred in April and May 2011 were due to an unusual combination of geology and operations, and were unlikely to happen again. The company said local geology would limit any future seismic events to around magnitude 3 on the Richter scale. The tremor on April 1 measured **2.3 on the Richter scale**. (November 2, 2011)

UNITED STATES: On going project - Technology. — UG62-14

Westmont announced recently that it has **successfully completed all five laboratory tests** required to begin field usage of "FracSolv™" all-natural 100% **biodegradable and environmentally safe fracturing solution**. FracSolv™ is a Surfactant based, Anionic Polyacrylamide (PAM) that acts as

a stable colloidal particle dispersion solution. The FracSolv™ solution has no systemic toxicity to any aquatic organisms or microorganisms and remains 100% biodegradable and environmentally safe throughout its useful product lifespan. (October 6, 2011)

UNITED STATES: Regulation. — UG62-15

Pennsylvania announced recently plans for **new levies and stricter rules for natural gas drilling**, which has been blamed for contaminating local water supplies. Governor Tom Corbett proposed to slap a potential \$160,000 "impact fee" on each well drilled, which would be used to improve infrastructure and promote the use of natural gas vehicles in the state. **Each well will be subject to a fee of up to \$40,000 in the first year, \$30,000 in the second year, \$20,000 in the third year and \$10,000 in the fourth through tenth years**, the statement said.

The proposals were put forward by the Marcellus Shale Advisory Commission, which was formed by Corbett in March 2011. Under the recommendations, the distance of drilling sites from private water wells will increase from 60 meters to 150 meters and to 300 meters from public water systems. The required distance from streams, rivers and ponds will increase to 90 meters from a current 30 meter). (October 3, 2011)

UNITED STATES: Regulation – Fracturation fluids. — UG62-16

According to draft rules recently released **Colorado would require energy companies to disclose substantially more information about the chemical ingredients of hydraulic fracturing fluid** used to crack underground rock formations to access oil and natural gas. The Colorado Oil & Gas Conservation Commission (COGCC) released the draft rules following weeks of stakeholder meetings involving representatives from energy companies and environmental groups. Colorado already requires oil and gas companies to maintain a list of ingredients used in drilling at the well sites. Those lists must be provided, upon request if an incident occurs. The rule was part of the 2008 overhaul of Colorado's oil and gas regulations. (November 1, 2011)

PRODUCTION

POLAND: Ongoing project – Drilling campaign. — UG62-17

The **Treasury Ministry's plan** assumed recently a maximization of the number of shale gas drillings by state-controlled companies such as PGNiG or PKN Orlen, which are scheduled to **carry out 65 drillings each until 2014**. Poland would be extracting 200-300 million cubic meters of shale gas in 2014 said deputy Treasury Minister Nikolaj Budzanowski. **The number of shale gas drillings in Poland should increase to 1,000 per year in 2020**, Budzanowski said, arguing that roughly such number of drillings is required to put yearly shale gas extraction at 300 million cubic meters. (November 3, 2011)

UNITED STATES: Regulation – Water demand. — UG62-18

An intensifying drought in Texas is prompting limits on water consumption that for the first time target oil and natural gas producers. The city of **Grand Prairie in the Barnett shale in North Texas** in August became the first municipality to **ban the use of city water for fracking**. Water officials for the Ogallala Aquifer in part of the Permian basin included fracking when they approved the district's first-ever restrictions on water use in July 2011. **Gas producers use fracking to develop about 85% of the wells drilled in Texas**, according to state regulators. The Texas restrictions represent a policy shift in a state that produces about one-third of the gas in the US. Landowners historically have been allowed to pump as much water as they want, and the energy industry has been exempt from many water conservation rules, said Ben Sebree, vice president for government affairs of the Texas Oil & Gas Association. **The new rules so far have not shut down any oil and gas drilling, and some companies have turned to alternative sources of water to keep operating**. Breitling recently trucked 3.5 million gallons of water 50 miles to a drilling site in North Texas' Hemphill County to avoid having to obtain water locally. The \$68,000 it paid was a fraction of the \$3.5 million it cost for fracking the well, Faulkner said. Chesapeake

Energy trucked water from a drilling site in one city to another in the Barnett shale field. Arlington, Texas, cited Chesapeake for a permit violation in August 2011 when the company used Arlington water to frack a well in Grand Prairie, which has banned water for fracking, said Jim Parajon, Arlington's planning director. Arlington does not limit the use of water for fracking, but its gas drilling ordinance does not allow companies to take city water from an individual drill site. Pioneer Natural Resources, based in Irving, Texas, is tapping water from salty, non-drinkable aquifers to develop its 900,000 acres in the Permian basin. Devon Energy has been using portable distilling plants since about 2007 to recycle water in the Barnett Shale and has a goal of recycling a third of the water it uses in the Granite Wash field in North Texas, said Tony Thornton, a spokesman for Devon. **In the Eagle Ford shale formation in South Texas, oil and gas companies are forecast to increase water consumption to 44,800 acre-feet of water in 2020, up from 5800 in 2010**, according to a study by the University of Texas' Bureau of Economic Geology. Water use in the Barnett shale is projected to increase to 40,300 acre-feet from 27,900 during the same period, the study said. (October 7, 2011)

UNITED STATES: Regulation – Production water. — UG62-19

The US Environmental Protection Agency announced recently that it will develop standards for handling wastewater generated during coalbed methane and shale gas production. No comprehensive set of national standards exists for such activities, and EPA will begin the process of developing a proposal with input from producers, public health officials, and other stakeholders, the agency said. Officials from oil and gas industry groups said they looked forward to reviewing EPA's proposals. Reid Porter, a spokesman for the American Petroleum Institute, said API has several water management guidelines among its industry-developed standards and practices. EPA said it is developing proposed regulation because recent production technology improvements, particularly for shale gas, have increased drilling nationwide. Production from shale formations has grown from a negligible amount a few years to 15% of total US gas production, and is expected to triple in coming decades, it indicated. **Wastewater from shale gas extraction is prohibited from being discharged directly into any US water body, according to EPA.** It said that while some is reinjected or reused, a significant amount still needs to be disposed. Coalbed methane wastewater is not subject to federal regulation surrounding its discharge into waterways or pretreatment requirements, the agency continued. Regulation is left to individual states, it said. **EPA said it will consider uniform national standards** because of information it has received, including state-supplied wastewater sampling data, of pollutants entering surface waters because of inadequate treatment at facilities. It said that it plans to gather data, consult with stakeholders, and seek public comments on a proposed rule for CBM water in 2013 and for shale gas in 2014. (October 21, 2011)

RESERVES

CHINA: Resources estimates. — UG62-20

Enviro Energy International Holdings Limited announced recently that TerraWest Energy Corp., a non wholly-owned subsidiary of the Company, has upgraded estimates for the total Undiscovered Original Gas-in-Place ("OGIP") in the Liuhuanguo Production Sharing Contract area situated in Xinjiang, China. The upgrade is the result of a report prepared by Netherland, Sewell & Associates, Inc. The Liuhuanguo PSC area covers approximately 653 square kilometers and is located adjacent to Urumqi, the capital city of Xinjiang. The NSAI Report covers the Xishanyao (J2X) and Badaowan (J1B) target coal seams outside TWE's discovered CBM area as well as prospective

shale and tight gas zones in these formations within the Liuhuanguo PSC on a gross (100%) basis and concludes with OGIP estimates for the Liuhuanguo PSC as follows:

- Total Best Estimate OGIP (J1B) Shale Gas of 10.503 trillion cubic feet ("Tcf");
- Total OGIP (J1B) Shale Gas: low estimate 6.658 Tcf and high estimate of 16.961 Tcf;
- Grand total Best Estimate OGIP all formations of 11.825 Tcf of natural gas; and
- Grand total OGIP all formations: low estimate of 7.179 Tcf; and high estimate of 19.185 Tcf.

The NSAI Report entitled: "Estimate of Gross (100 Percent) Prospective Resources for Coalbed Methane. (October 10, 2011)

MEXICO: Resources estimates. — UG62-21

According to the U.S. Energy Information Administration Mexico holds the world's fourth largest reserve of shale gas, **681 trillion cubic feet of technically recoverable resources.** Pemex has only drilled one exploratory shale gas well and spends a fraction of its budget on developing unconventional sources of fuel, the National Hydrocarbons Commission (CNH) said. "The world, and in particular the United States is making an important turn toward gas and Mexico needs to ask the question: 'How can we prepare ourselves today to take advantage?'" said the commission's president Juan Carlos Zepeda. Pemex is currently pumping only a small amount of shale gas but is investing 15 million to drill more wells in five different areas in northern Mexico. **The company thinks Mexico has between 150 and 459 tcf of potential shale gas resources.** That figure still far over reaches Mexico's current proven, probable and possible (3P) natural gas reserves, which are just 61 billion cubic feet, Zepeda said. (August 31, 2011)

URUGUAY: Resources estimates. — UG62-22

A recent report from the U.S. government states that **Uruguay's north basin**, next to adjacent Brazilian fields, has a potential capacity of **368 billion cubic meters of "technically recoverable"** natural gas. **Schuepbach** has a two year contract to survey Uruguay's north basin with Uruguay's government owned oil corporation Administracion Nacional de Combustibles, Alcohol y Portland, or ANCAP. While the Schuepbach contract expires soon, ANCAP intends to begin exploratory drilling in the area before the first quarter of 2012. (October 8, 2011)

TIGHT GAS

EXPLORATION - DISCOVERIES

SLOVENIA: Planned project – Production test. — UG62-23

Ascent Resources PLC announced recently that it will place on production a gas-condensate well at its **Petisovci** Miocene redevelopment project in Slovenia. On initial tests following successful fracture stimulation and after cleaning out the three pumped stages, the Pg-IIA well stabilized at **2.1 MMscfd of gas and 50 b/d of condensate**.

Ascent Slovenia Ltd. has 75% interest in the project, and Geoenargo d.o.o., a Slovene company that is the concessionaire, has 25%. The project in eastern Slovenia targets the redevelopment of the major Middle Miocene Badenian tight gas reserves. (November 2, 2011)

PRODUCTION

OMAN: Planned project. — UG62-24

BP will decide in 2012 whether to **develop** Oman's **first major unconventional gas project**. BP began appraising the **Khazzan Makarem** gas project in Central Oman in 2007. "In 2012 we will take a decision whether to go ahead with full field development or abandon it," Robert Clark, senior petroleum engineer at BP Exploration in Oman said. **Field appraisals are ongoing, with eight wells drilled so far, but only two have flowed at commercial rates** with one still to drill, he said. Yousuf Mohammed Al-Ojaili, CEO of Oman Gas Company said "Oman is very serious about developing unconventional gas with good quantities of test gas being produced," adding there is more focus now on developing gas prospects for local use, rather than for export. (October 4, 2011)

OMAN: Planned project – Production forecast. — UG62-25

Oman's Oil Company for Exploration and Production (OOCEP) is set to commit to the further **development of the Abu Tubul tight gas field in Block 60 in central Oman and Block 42 in the Sharqiyah region**. Block 60 is the larger of the two fields, covering about 1,500 square kilometres. It includes the Abu Tubul field with gas and gas-condensate bearing formation. **OOCEP signed a Gas Sales Agreement covering initial output from the Abu Tubul field** with a view to commercial gas production in 2013 through the use of horizontal drilling and fracking techniques. Output is targeted at a

peak production rate of 90 million standard cubic feet per day. After producing from the known tight gas formations at Block 60, OOCEP plans to drill at least two new exploration wells in the northern half of the concession. Covering an area of about 25,600 sq kilometres, the Block 42 concession includes the northeast coastal range of the Oman Mountains and the basin immediately to the south under Ramlat Sharqiyah. OOCEP plans to acquire new data to appraise known structures in the block. (October 9, 2011)

GAS HYDRATE

EXPLORATION - DISCOVERIES

UNITED STATES: Ongoing project – Production test. — UG62-26

The US DOE is partnering with Conoco Phillips and the Japan Oil Gas and Metals National Corporation to test **technologies for producing methane hydrates** on Alaska's **North Slope**. The collaborative testing will take place under the auspices of a Statement of Intent for Cooperation in Methane Hydrates signed in 2008 and extended in 2011 by DOE and Japan's Ministry of Economy, Trade, and Industry. The production tests are the next step in both US and Japanese national efforts to evaluate the response of gas hydrate reservoirs to alternative gas hydrate production concepts. **The tests will provide information to inform potential future extended-duration tests.** The tests will utilize the Iñupiaq gas hydrate field trial well, a fully instrumented borehole that was installed in the Prudhoe Bay region by ConocoPhillips and the Office of Fossil Energy's National Energy Technology Laboratory earlier in 2011. **The current test plans call for roughly 100 days of continuous operations from January to March 2012.** Tests will include the initial field trial of a technology that involves injecting carbon dioxide into methane-hydrate-bearing sandstone formations, resulting in the swapping of CO₂ molecules for methane molecules in the solid-water hydrate lattice. Following the exchange tests, the team will conduct a 1-month evaluation of an alternative methane-production method called depressurization. Although some research has been carried out in the past, little is known about the location, formation, decomposition, or actual quantities of methane hydrates. (October 27, 2011)

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