

U - Gas News Report

Unconventional Gas Activities in the World

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COALBED METHANE

PRODUCTION

INDIA: Planned project – Production forecast - UG 77-1

Essar Energy gets environmental nod for Raniganj CBM block

Essar Energy announced recently that it has been granted phase 3 environmental clearance for its coal bed methane (CBM) gas field at Raniganj, West Bengal, allowing it to increase drilling to 650 wells. "This environmental clearance allows the full field development of the Raniganj block, excluding forest area, and will enable Essar Energy to increase production to the targeted level of **around 3 million standard cubic metres of gas per day** (scmd), up from around 60,000scmd currently," the company said. So far, 135 wells have been drilled at Raniganj, of which 57 are in production and Essar wants accelerate the drilling programme.

Raniganj, in which Essar Energy has a 100% interest, is a 500 sq. km. block with **total proven and probable reserves of 113 billion cubic feet** (bcf) gross, or 18.8 million barrels of oil equivalent. There are also best estimate contingent resources of 445bcf gross and 297bcf gross of current best estimate prospective resources. The company is awaiting a government decision on an appropriate commercial sales price for Raniganj, but in the meantime will continue to sell gas from the block at the approved test sales price.

Essar has already contracted gas sales from Raniganj to local industrial customers. The majority of the gas sold from the project is being sold to a new fertiliser plant being built approximately 30km from the Raniganj field. (March 4, 2013)

PROCESSING

AUSTRALIA: Planned project – Approval – UG 77-2

GE awarded US\$620 million services contract in Australia for QGC

GE Oil & Gas, a leading supplier of equipment and services for LNG projects worldwide, has received a **US\$620 million, 22-year contractual service agreement (CSA) to provide a broad range of advanced technology services** for QGC's Queensland Curtis LNG plant off the east coast of Australia.

One of Australia's largest infrastructure projects, the QCLNG plant will be the world's **first facility to turn coal seam gas into LNG**. Coal seam gas

is plentiful in Australia and will form the basis for the growing Australian LNG industry. **The QGC plant is the first of four LNG projects** scheduled for Curtis Island and is expected to begin production in 2014, with the LNG produced **primarily targeted for export including to China, Japan and Singapore**.

The GE scope of work will include planned and unplanned maintenance of the GE equipment being installed at the QCLNG plant. The agreement also includes monitoring and diagnostic services, as well as reliability guarantees on the equipment. (March 19, 2013)

ENVIRONMENT

AUSTRALIA: Regulation - UG 77-3

Australian government to assess coalseam gas projects' impact on water

Australian Environment Minister Tony Burke plans to introduce amendments to national **environmental law requiring federal government assessment and approval of coalseam gas developments that have significant impact on water resources**. The move, which drew criticism from local gas producers, comes in response to concerns raised by communities around Australia about the impact of coalseam gas on ground water and surface water resources, Burke said recently. "The proposed amendments will ensure that coalseam gas and large coal mining developments must be assessed and approved under national environment law, if they are likely to have a significant impact on a water resource," the minister said in a statement.

Although developers would now be required to provide more information, the government was not seeking to needlessly delay projects, according to Burke. "The additional information required in many instances will involve data that has already been collected in the state approval process". The change means projects will come under the scrutiny of the federal government's Independent Expert Scientific Committee.

"The coalseam gas industry provides a third of eastern Australia's natural gas, and is one of the most heavily regulated industries in the country due to existing state government processes," Australian Petroleum Production & Exploration Association Chief Executive David Byers said. "**Today's intervention by the**

federal government adds duplication and inefficiency at a time when clarity and investor certainty are what is required.” (March 12, 2013)

SHALE GAS

EXPLORATION – DISCOVERY

AUSTRALIA: Planned project – Expansion - UG 77-4

Chevron move boosts Cooper Basin prospect

Hopes of tapping vast quantities of shale and tight gas in the Cooper Basin have taken a step forward with oil company Chevron committing up to US\$349 million to an exploration joint venture with local players Beach Energy and Icon Energy. Chevron is the first oil major to invest in an unconventional play in the Cooper Basin, which the US EIA has estimated may contain **85 trillion cubic feet of recoverable shale gas**.

Chevron is already the largest single investor in Australia's LNG boom with almost US\$90 billion of construction under way at its Gorgon and Wheatstone projects in Western Australia, where it is struggling to contain costs.

Beach Energy will remain the operator. Existing pipeline infrastructure can bring gas from the Cooper Basin to east coast domestic markets. Managing director Reg Nelson said if there was enough gas it could also be sold for export, potentially supplying the three new LNG plants under construction at Gladstone, where there are fears of a shortfall in coal seam gas supplies. (February 26, 2013)

CHINA: Technical cooperation - UG 77-5

Progress in Shale Gas Extraction

The use of shale gas extraction technology developed at home could allow China to exploit domestic energy sources without the constraints that come with working with foreign partners. China's state-run oil company, PetroChina, announced March 13 that domestically developed technology successfully extracted shale gas during testing in the Changning- Weiyuan demonstration zone in the greater Sichuan Basin. The development of its shale reserves could help China in its quest to meet growing demand with domestic sources. **Moreover, the exploitation of shale reserves, most of which are located in inland China, could help Beijing accomplish its goal of developing the interior provinces.**

In the initial development of its unconventional fields, **China required technological capability and capital from international energy companies.** Beijing opted to open up shale gas development in the once rather limited energy sector by encouraging domestic firms to **cooperate with foreign firms.**

Initial shale gas exploration in China has focused on the greater Sichuan Basin. **China's shale deposits differ from those found in the United States,** in that they are typically found at greater

depth. The basic technology required to access the shale gas is the same -- horizontal drilling and fracturing are necessary to efficiently release the natural gas. But drilling becomes more difficult as the depth increases, in part due to increases in temperature and pressure. Drilling in such conditions necessitates more durable materials and can increase the energy requirement, along with the costs and risks of a drilling operation. **PetroChina has made advancements in its hydraulic fracturing capabilities** alongside successes with horizontal drilling techniques.

Chinese firms interested in shale gas extraction, including PetroChina, have entered into numerous joint ventures and other collaborations with major companies such as Royal Dutch/Shell. These relationships will continue and have likely helped Chinese firms acquire relevant technology, but it appears that PetroChina has been acting mostly alone within the demonstration zone.

The local governments in Sichuan and Chongqing, alongside PetroChina, all have an **incentive to promote the development of shale basins.** Development could mean greater support from the central government in terms of preferential policies or cash, and a breakthrough in shale gas development could raise the status of associated provinces. (March 19, 2013)

GERMANY: Regulation - UG 77-6

Germany to allow fracking for shale gas

The German government has finally agreed on draft regulation to allow the tapping of shale gas via hydraulic fracturing to continue. It will **outlaw fracking in “water-protection areas and near drinking-water wells” and will make environmental impact studies mandatory for new projects.** Environment Minister Peter

Altmaier and Economy Minister Philipp Roesler said in a joint letter that “this offers a good perspective for the future, even if we will have to wait to see the actual progress.”

Fracking is a political and environmental ‘hot potato’ in Germany, as federal elections take place later this year (22 September). The main opposition party, the Social Democrats, have called for a temporary ban on the practice, while their Green Party allies want to outlaw it altogether. The Green Party’s Oliver Krischer said that “excluding drinking water protection areas is just for show. It means that fracking is allowed on more than 80% of Germany’s land-mass.”. Chancellor Angela Merkel is said to be keen on the technology, as a way of countering the effects of closing all Germany’s nuclear plants by 2022. Mrs Merkel said that a successful drilling campaign would “redraw the energy map across Europe; we would no longer be a continent reliant on Russia for about a quarter of our gas.”

Gas prices in Germany are now four times those in the USA, where support for shale gas is reducing costs. Germany is believed to sit on as much as **81 billion cubic feet of shale gas**, “enough to boost the current output of natural gas 100-fold”, according to Volker Steinbach, the head of the natural resources department of the Federal Institute for Geosciences and Natural Resources. (March 12, 2013)

SAUDI ARABIA: Planned project – Delay – UG 77-7

Saudi Arabia’s shale plans may be slowed by lack of water

Saudi Arabia may need at least a decade to develop shale-gas production to a scale comparable to the U.S. because of the desert kingdom’s short supplies of water, state oil company officials said. Finding the necessary amount of water in the regions where Saudi Arabian Oil Co. is exploring for shale gas will be difficult, according to Amin Nasser, senior vice president of upstream at the company known as Saudi Aramco.

Saudi Arabia may hold as much as **645 trillion cubic feet of technically recoverable shale gas**, the world’s fifth-largest deposits, behind China, the U.S., Argentina and Mexico, according to estimates by Baker Hughes Inc. (BHI) The kingdom also has about **282.6 trillion cubic feet of proven conventional gas reserves**, according to Aramco’s 2011 annual report.

Halliburton Co. (HAL), the world’s largest provider of hydraulic- fracturing services, and fellow oil and gas service companies Baker Hughes Inc. and Schlumberger Ltd. (SLB) are all operating research centers in Saudi Arabia to develop technology to help the country unlock its unconventional hydrocarbon resources. “We are trying to find solutions to produce shale gas in Saudi Arabia with the least amount of water,” said Aaron Gatt, characterization group president at Schlumberger. (March 12, 2013)

UNITED KINGDOM: Reserves estimates – UG 77-8

Cuadrilla confirms Lancashire shale

Cuadrilla Resources said recently it believes there are **200 trillion cubic feet of shale natural gas in a play below Lancashire**. Cuadrilla Chief Executive Officer Francis Egan said the next step for the Bowland shale basin in Lancashire was to determine how much gas is feasibly recoverable. The company said it was **waiting until 2014**,

however, to continue work in Lancashire, first finishing **environmental impact assessments** at existing and planned sites for hydraulic fracturing. “We recognize that within the complex U.K. regulatory framework governing planning this process can prove lengthy but we are determined to spare no effort in meeting our exploration targets in an environmentally and socially sustainable manner,” Egan said in a statement. (March 14, 2013)

RESERVES

GERMANY: Resources estimates - UG 77-9

Germany could meet domestic demand with unconventional gas

Germany, which currently produces 13% of its gas demand from domestic reservoirs, could meet this proportion of its energy consumption from unconventional resources for 100 years, German oil and gas producer Wintershall said recently. Wintershall said around **10 billion cubic meters (about 3.5 Tcf) of recoverable natural gas** is presumed to exist in a so-called “tight gas” reservoir at a depth of over 4,000 meters in Barnstorf, which the company is looking to develop. According to the US Energy Information Administration, Germany holds an **estimated 8 Tcf of technically recoverable shale gas resources**.

Wintershall, in its statement, also welcomed the German government’s current draft regulation to allow the extraction of shale gas using hydraulic fracturing, or fracking. The energy arm of BASF, Wintershall, which

hopes to develop shale oil and gas acreage in Argentina, is also participating in the scientific exploration in two licenses in North Rhine-Westphalia to assess if production could be environmentally friendly and economically viable. (March 12, 2013)

SPAIN: Reserves estimates - UG 77-10
Spain gas resources estimated at 70 years domestic demand

Spain, which imports about 99% of its natural gas, has enough prospective resources of the fuel to satisfy current demand for 70 years if shale is developed, according to a trade group for oil and gas companies. In what it called the most comprehensive study to date, the association said today in Madrid that preliminary estimates show about 80% of that gas can be found in shale rock. A total of **2.05 trillion cubic meters are discoverable** and could be pumped commercially at a value of about 700 million euros (\$900 million) based on current market prices, according to the Spanish Association of Companies in

Investigation, Exploration & Production of Hydrocarbons and Underground Storage.

International oil and gas companies such as Canada's BNK Petroleum Inc. are seeking to produce the commodity in three regions of Spain, primarily by using hydraulic fracturing. They're promoting shale gas development as a way to cut Spain's dependence on imports and lower local prices.

About 27 investigation permits were requested in 2012 and 19 were granted, most seeking to produce gas using fracking, according to a report from Spain's Council of Mining Engineers. (March 14, 2013)

TRANSPORT-DISTRIBUTION

UNITED STATES: Partnership agreement - UG 77-11

Pipe planned from Utica, Marcellus shale U.S. energy

Energy company Williams and Boardwalk Pipeline Partners announced plans for a joint venture to **move Midwest shale natural gas to the southern coast**. The companies announced plans to send natural gas from the Marcellus and Utica plays to facilities along the Louisiana and Texas coast for possible exports. The Bluegrass pipeline would include construction of a new pipeline from West Virginia and Ohio and conversion of existing pipe from Kentucky to Louisiana. The pipeline is designed for **200,000 barrels of natural gas liquids per day**, which could eventually double to meet market demand.

Williams President Alan Armstrong said the **lack of export infrastructure is limiting shale developments in the region**. "The current infrastructure challenge with natural gas liquids in the Northeast is slowing drilling and isolating liquids supplies from the robust markets in the gulf that are poised to grow substantially over the next five years," he said in a statement. Investment bank FBR Capital Markets in November warned that production in the Marcellus shale play will decline from 2.3 billion cubic feet per day to 1.3 billion cfd because of the lack of export capacity. (March 8, 2013)

TIGHT GAS

PRODUCTION

ARGENTINA: Partnership modification - UG 77-12

Argentina's YPF to continue tight gas project without Vale

Argentina's state-run energy company YPF said recently it plans to push forward with a tight natural gas project even after the departure of its Brazilian partner Vale. YPF and Vale, a diversified metals and mining company, last year agreed to develop tight gas resources in south-western Argentina to feed a \$6 billion potassium mine the Rio de Janeiro-based company had planned to build in Mendoza. But Vale announced recently it had suspended the project, saying in a statement that in **"the current macroeconomic environment, the economics of the project are not in line with Vale's commitment to discipline in capital allocation and value creation."** Vale said it will evaluate the possibility of resuming the mining and tight gas project if alternatives are found to "enhance the economics of the project."

Despite Vale's exit, YPF plans to continue developing the area. YPF CEO Miguel Galuccio added that there is pipeline capacity to get the output to other consumers because the development is in Loma La Lata, a region with large gas infrastructure and production capacity. Galuccio said Sierra Barrosa is "encouraging" in its potential, thanks to a **government decision late last year to boost the wellhead price of gas to**

\$7.50/MMBtu for supplies from new developments. That price is up from an average of \$2.65-82/MMBtu for YPF's gas output in 2012."We have all the conditions to accelerate the development of the area," Galuccio said.

Argentina is estimated to have 774 Tcf of shale gas resources, far more than its 12 Tcf of proved reserves. (March 12, 2013)

**OMAN: Planned project – Agreement - UG 77-13
BP hopes to agree on Oman tight gas deal soon**

Oman and BP are expected to reach an agreement within weeks on the price the British firm would get for gas produced from the Khazzan tight gas project, Reuters reported. The British energy giants has invested \$700 million in the

project in Khazzan in central Oman but has been haggling over the price it will get for selling the gas produced to Oman on its tightly controlled domestic market, Reuters said. The Omani government wants the gas to be sold in the domestic market, where prices are tightly controlled. (March 3, 2013)

GAS HYDRATES

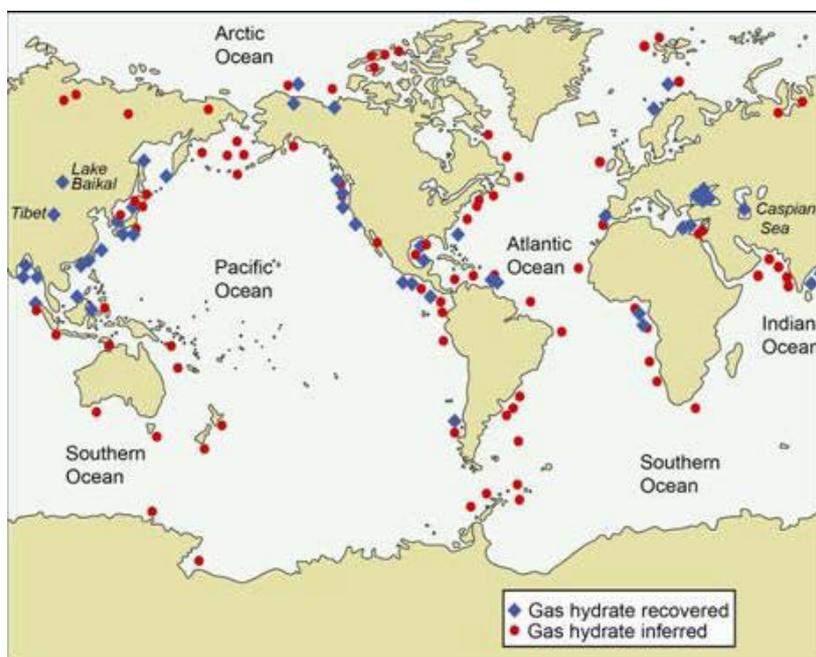
EXPLORATION – DISCOVERY

JAPAN: Planned project – Feasibility - UG 77-14

Will methane hydrates fuel another gas boom?

In a move to get closer to developing its own domestic fossil fuel, Japan is extracting natural gas from an offshore deposit of methane hydrates. The tests that are set to run until the end of March mark the first time such production methods have been tested in a deep-sea formation.

Methane hydrates are thought to be abundant. Worldwide, such deposits contain about 35% more gas than other reserves and are the world's largest source of untapped fossil energy. They are widely distributed across the world, as indicated on the map from the US Geological Survey (USGS) below



In Japan, offshore deposits could supply the country with 100 years of natural gas, say researchers. The state-backed Japan, Oil, Gas and Metals National Corporation (JOGMEC), which is running the test, says there is enough natural gas in the eastern Nankai trough near Japan to displace 11 years of liquefied natural gas imports. **JOGMEC estimates it can commercially extract methane from its offshore resources by 2019.** But it's still not clear that methane hydrates can be tapped economically and in an environmentally safe manner.

Releasing the methane trapped in the lattice-like structures of gas hydrates requires lowering the pressure or increasing the temperature. In their offshore test, Japanese engineers used the depressurization method, where a well is drilled into a formation and water is pumped out. The difference in pressure between the underground deposit and the well causes the methane to break free, says Ray Boswell, the methane hydrates technology manager at the National Energy Technology Laboratory.

Beyond technical issues, there are a number of economic and logistical barriers. Arctic locations are the most likely to be drilled first because there is already a drilling infrastructure there, say experts. But many

locations with gas hydrates, including offshore Japan, lack a natural gas pipeline, says Ruppel. Government-funded researchers will need to perform a test that lasts several months before commercial oil and gas companies will invest money for exploration, she says. But such a demonstration would be expensive. (March 15, 2013)

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