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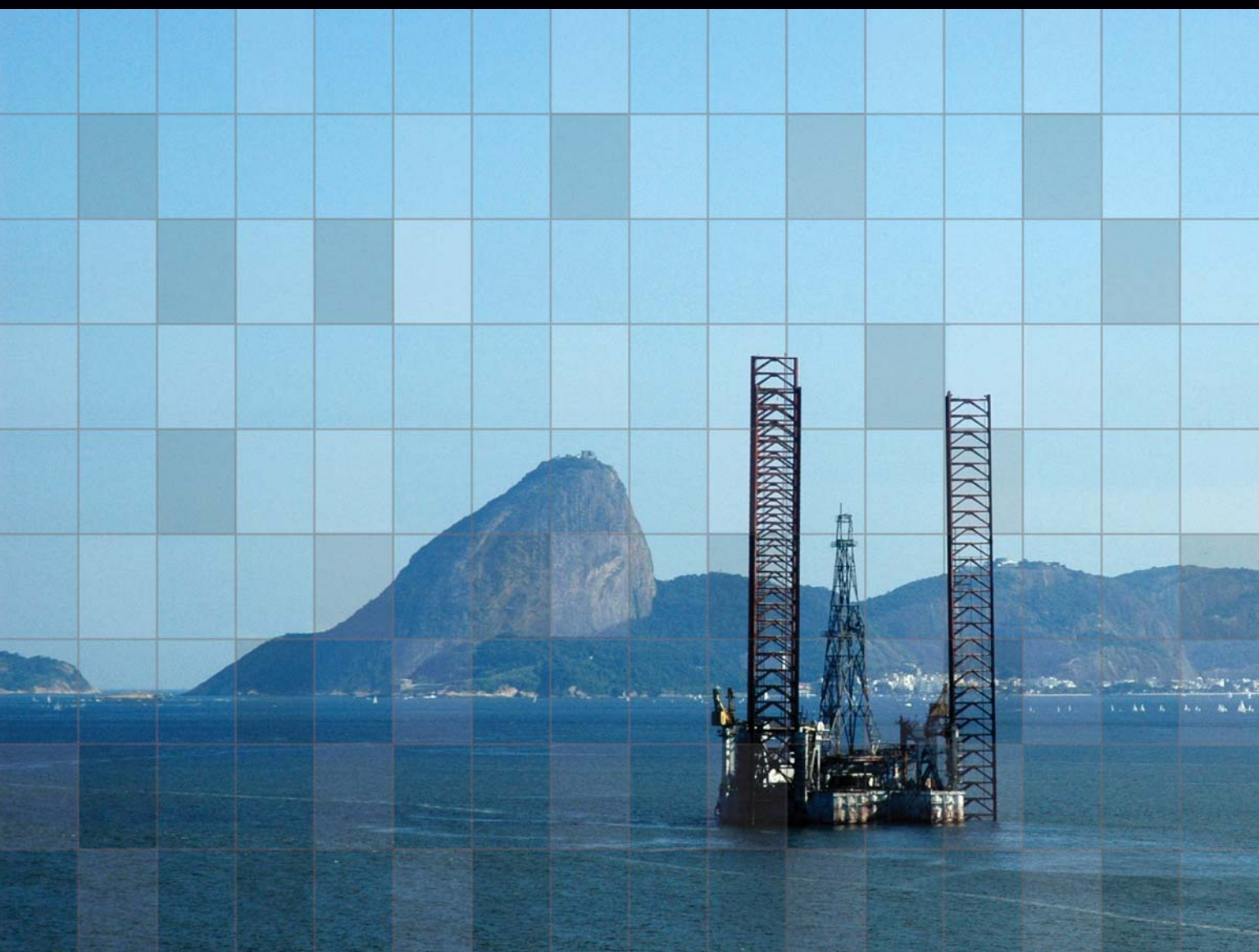
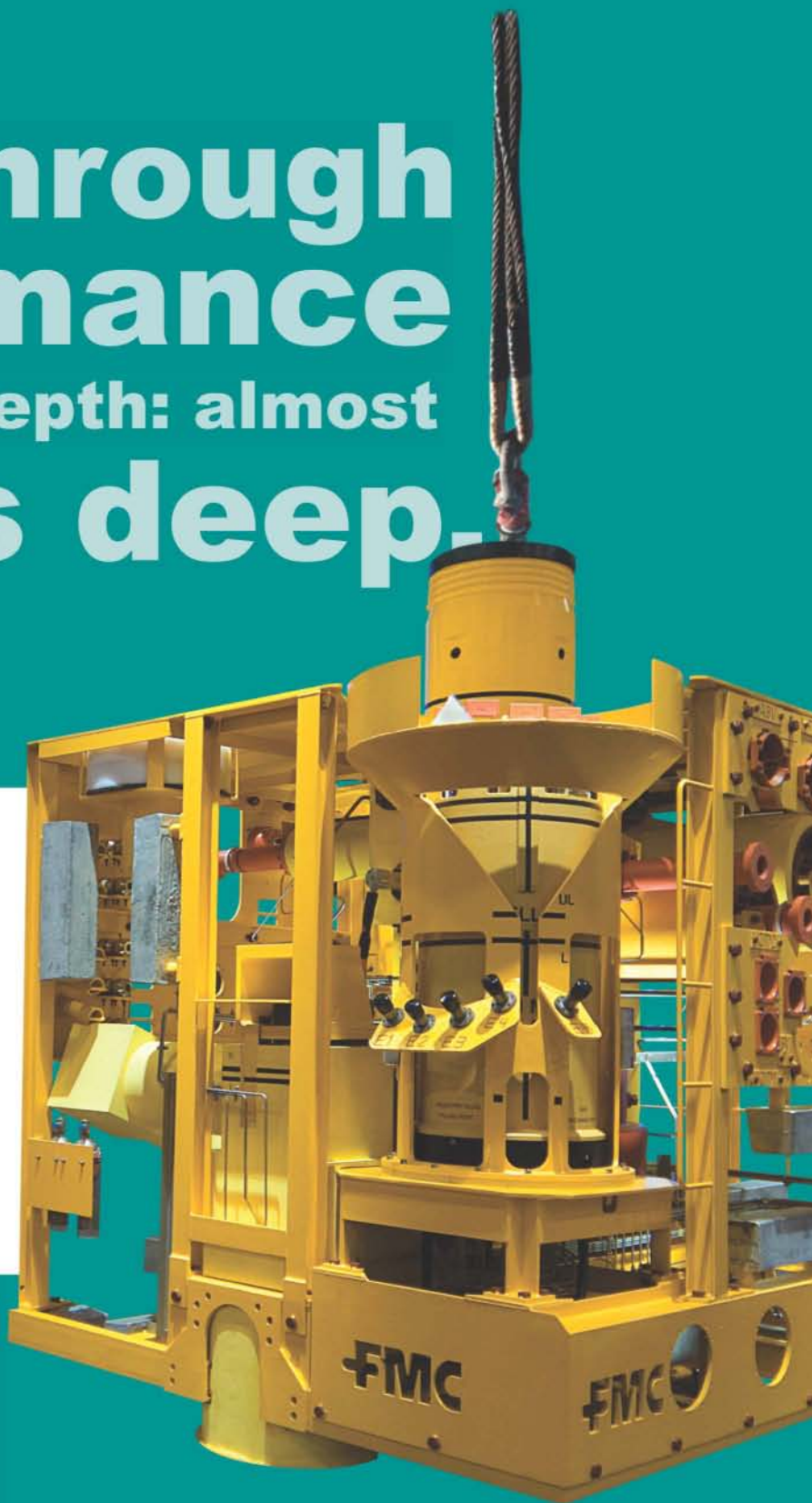


Brazilian Drilling and Production

Unconventional resources to keep pivotal supply role
Impediments abound to exploiting Iraq's petroleum resource
Statoil assays Volve crude
New Caspian oil production will bypass Russian transport

FMC Technologies

Breakthrough performance at a record depth: almost 2 miles deep.



FMC's new Enhanced Vertical Deepwater Tree (EVDT) just set a new depth record at Shell's Perdido project in the Gulf of Mexico: 9,356 feet (2,852 m). That's impressive, but so is EVDT's performance: It combines the advantages of slimbore design with large bore production capacity. It's versatile – you can land the tubing hanger in the subsea wellhead or in the tubing head. And you can install it with a conventional rig equipped with a surface BOP, for big savings. Which makes EVDT a great choice at any depth.

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BRAZILIAN DRILLING AND PRODUCTION

REGULAR FEATURES

COVER

This week's special report on Brazilian Drilling and Production begins on p. 39. A symbol of Brazil's booming offshore oil and gas industry, a jack up sits in Guanabara Bay, south of the 8¼-mile-long Rio-Niteroi box girder bridge. The header photo, above, shows part of Niteroi, on the east side of the bay, home to several shipyards that serve the inudstry; the cover provides a view of the west side of the bay, including Rio de Janeiro's famous Sugar Loaf (photos by Nina M. Rach).

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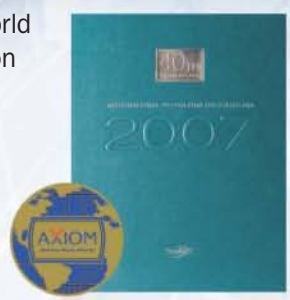

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General Interest — Quick Takes

Marcellus coming of age, says Range Resources

The initial rate averaged 7.3 MMcfd of gas equivalent for 10 horizontal Devonian Marcellus shale wells brought online since October 2008 into a new gas processing plant in western Pennsylvania, said Range Resources Corp., Fort Worth.

The Marcellus, a hindrance to overall capital efficiency in the past few years, will be "highly accretive to our capital efficiency in 2009," the company said.

Seven of the 10 wells had initial rates of 3.5 MMcfd of gas equivalent or more, and three flowed 9 MMcfd of gas equivalent or more. The best well made 24.5 MMcfd of gas equivalent.

The company is producing 35 MMcfd of gas equivalent from the Marcellus and is constrained by processing capacity. Eight of the wells have been on line for more than 30 days, and their 30-day average rate is 4.3 MMcfd of gas equivalent. The highest volume well averaged 9.6 MMcfd of gas equivalent.

Processing capacity is expected to expand to 60 MMcfd in late March or early April and to 180 MMcfd by late 2009-early 2010. Target 2009 exit rate is 80-100 MMcfd net to Range.

A built-for-purpose rig is to arrive later in January, the first of six that will replace existing rigs, and Range plans to exit 2009 with six rigs running in the play.

Range, which has cut more than 20 days and $800,000 from its drilling costs in recent wells, believes horizontal well costs will average $3-4 million in 2009.

Taking advantage of a streamlined permitting process, the company has a majority of its 2009 drilling permits in hand and has secured water withdrawal and disposal capacity for several years.

Baker Hughes reported 23 rigs active in Pennsylvania in the week ended Jan. 16, compared with averages of 16 in 2007 and 23 in 2008, when the state's count peaked at 30 in the week ended Nov. 7.

Future demand buoys Canadian shale, LNG projects

The US Energy Information Administration sees Canadian gas shale formations as an increasingly important part of US natural gas imports in 2009. In its "US Natural Gas Imports and Exports: 2007" special report published this month, EIA cited renewed interest and optimism regarding unconventional gas recovery in Canada following the successes seen in the northeast Texas Barnett shale and other formations in the Lower 48 states.

EIA estimated 2007 production in the Upper Montney region of British Columbia at 80 MMcfd of gas and expects this to rise rapidly in 2009. The report listed Encana Corp., Apache Corp., and EOG Resources Inc. as having listed reserves in the area. Wood Mackenzie Ltd., however, forecast recently that the market could be adequately supplied without developing "expensive or challenging" shales such the neighboring Horn River (OGJ, Dec. 8, 2008, p. 32).

EIA also cited other Canadian efforts toward meeting future increases in North American demand, including Irving Oil Ltd. and Repsol-YPF SA's Canaport LNG terminal in New Brunswick. The terminal is Canada's first and will be used to meet demand in the US northeast and eastern Canada starting early 2009. Construction of three 2.5 bcf storage tanks is complete. Total sendout capacity is 1.2 bcfd, with the first phase of operations using existing and expanded capacity on the Maritimes & Northeast Pipeline to move gas into the US.

DOE makes first direct oil buys for SPR since '94

The US Department of Energy awarded contracts on Jan. 16 to purchase nearly 10.7 million bbl of oil for the Strategic Petroleum Reserve. The awards were the first direct purchases of crude for the reserve since 1994, it said.

DOE said it awarded the contracts to Shell Trading Co. and to Vitol Inc. to deliver oil to the SPR from February to April. It said that it used revenues from the emergency sale of crude from the reserve following Hurricane Katrina in 2005 to pay for the purchase.

DOE also announced contracts using the royalty-in-kind transfer program with the US Department of the Interior to Shell Trading and Glencore Ltd. for 26,000 b/d of oil.

These awards will result in the addition of nearly 6.16 million bbl of oil to the SPR's inventory from May 2009 through January 2010, DOE said.

It said both sets of awards resulted from separate contract solicitations on Jan. 2. DOE said it decided to solicit the oil following sharp price declines during second-half 2008, which made the purchases more economically favorable. ✦

Exploration & Development — Quick Takes

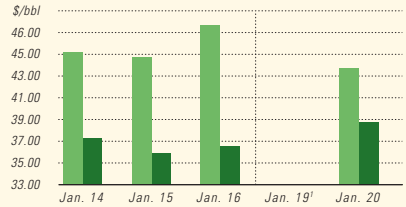
ExxonMobil finds oil in Brazil's presalt layer

ExxonMobil Corp. has notified Brazil's hydrocarbons regulator Agencia Nacional do Petroleo (ANP) that it has discovered oil on offshore Block BM-S-22 in the presalt layer of the Santos basin.

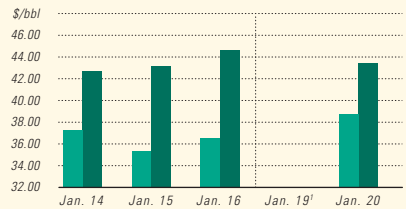
Traces of oil were found in a well drilled on the block, according to ExxonMobil, operator, which holds a 40% stake, while Hess Corp. holds 40% and Petroleo Brasileiro SA (Petrobras) 20%.

In November, David Rosenthal, vice-president, investor relations, said in a conference call that the West Polaris deepwater rig

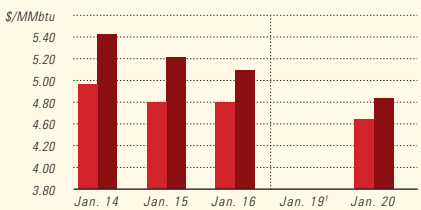
IPE BRENT / NYMEX LIGHT SWEET CRUDE



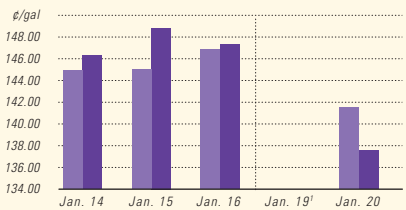
WTI CUSHING / BRENT SPOT



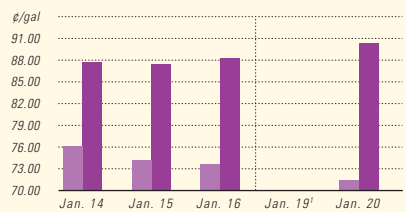
NYMEX NATURAL GAS / SPOT GAS - HENRY HUB



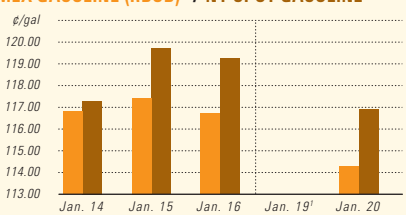
IPE GAS OIL / NYMEX HEATING OIL



PROPANE - MT. BELVIEU / BUTANE - MT. BELVIEU



NYMEX GASOLINE (RBOB)[2] / NY SPOT GASOLINE[3]



[1]Not available [2]Reformulated gasoline blendstock for oxygen blending.
[3]Nonoxygenated regular unleaded.

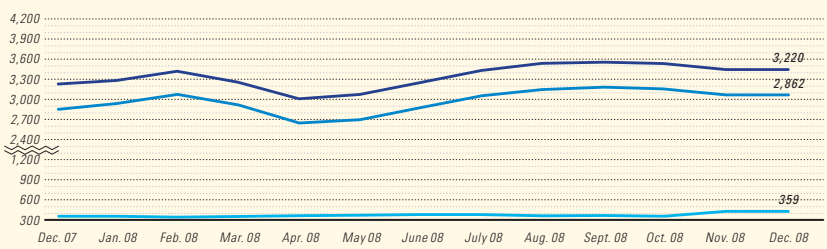
US INDUSTRY SCOREBOARD — 1/26

Latest week 1/9	4 wk. average	4 wk. avg. year ago[1]	Change, %	YTD average[1]	YTD avg. year ago[1]	Change, %
Demand, 1,000 b/d						
Motor gasoline	8,930	9,126	–2.1	8,874	8,814	0.7
Distillate	4,096	4,198	–2.4	3,986	4,209	–5.3
Jet fuel	1,412	1,587	–11.0	1,413	1,546	–8.6
Residual	711	667	6.6	631	672	–6.2
Other products	4,571	4,968	–8.0	4,335	4,873	–11.0
TOTAL DEMAND	19,720	20,546	–4.0	19,238	20,114	–4.4
Supply, 1,000 b/d						
Crude production	4,951	5,067	–2.3	4,926	5,093	–3.3
NGL production[2]	2,291	2,366	–3.2	2,385	2,123	12.3
Crude imports	9,645	9,882	–2.4	10,107	10,000	1.1
Product imports	3,254	3,166	2.8	3,107	3,492	–11.0
Other supply[3]	1,371	1,204	13.9	1,241	1,056	17.5
TOTAL SUPPLY	21,512	21,685	–0.8	21,766	21,765	—
Refining, 1,000 b/d						
Crude runs to stills	14,554	15,231	–4.4	14,554	14,799	–1.7
Input to crude stills	14,955	15,348	–2.6	14,955	15,086	–0.9
% utilization	84.9	87.8	—	84.9	85.8	—

Latest week 1/9	Latest week	Previous week[1]	Change	Same week year ago[1]	Change	Change, %
Stocks, 1,000 bbl						
Crude oil	326,563	325,419	1,144	287,100	39,463	13.7
Motor gasoline	213,505	211,437	2,068	215,256	–1,751	–0.8
Distillate	144,167	137,821	6,346	129,845	14,322	11.0
Jet fuel–kerosine	37,973	37,374	599	40,052	–2,079	–5.2
Residual	34,742	33,878	864	37,902	–3,160	–8.3
Stock cover (days)[4]			Change, %		Change, %	
Crude	22.6	22.5	0.4	18.7	20.9	
Motor gasoline	23.9	23.4	2.1	23.2	3.0	
Distillate	35.2	32.8	7.3	29.8	18.1	
Propane	39.8	40.8	–2.5	29.9	33.1	
Futures prices[5] **1/16**			**Change**		**Change**	**%**
Light sweet crude ($/bbl)	36.91	44.51	–7.60	94.70	–57.79	–61.0
Natural gas, $/MMbtu	5.07	5.81	–0.74	8.08	–3.02	–37.3

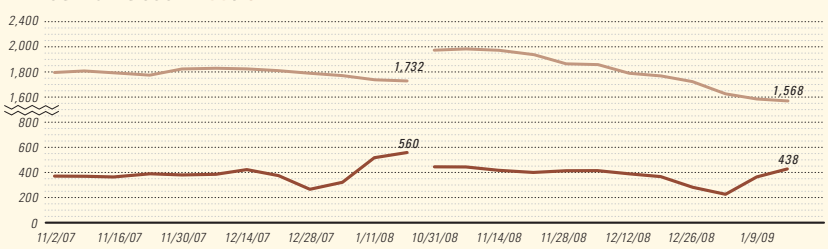
[1]Based on revised figures. [2]Includes adjustments for fuel ethanol and motor gasoline blending components. [3]Includes other hydrocarbons and alcohol, refinery processing gain, and unaccounted for crude oil. [4]Stocks divided by average daily product supplied for the prior 4 weeks. [5]Weekly average of daily closing futures prices.
Sources: Energy Information Administration, Wall Street Journal

BAKER HUGHES INTERNATIONAL RIG COUNT: TOTAL WORLD / TOTAL ONSHORE / TOTAL OFFSHORE

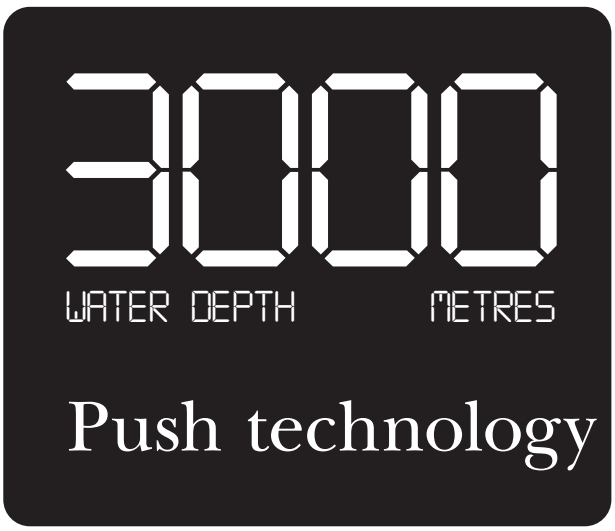


Note: Monthly average count

BAKER HUGHES RIG COUNT: US / CANADA



Note: End of week average count



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arrived in Brazilian waters in late September 2008 and began drilling the Azulao well on Block BM-S-22. He said ExxonMobil chartered the rig for 3 years and expected to have its first results on BM-S-22 by yearend 2008 or early 2009.

"Plans to drill a second well on the block are under way and will follow immediately upon completion of the first well," Rosenthal said, confirming earlier reports that the firm would drill two wells at the site.

The ExxonMobil discovery follows one by Repsol YPF SA, which last week said it discovered hydrocarbons on Block BM-S-48 in the Santos basin, 185 km off Sao Paulo state (OGJ Online, Jan. 15, 2009).

Shelf's Flatrock at 200 MMcfd and growing

Flatrock field in the Gulf of Mexico shelf is producing 200 MMcfd of gas from four wells, has more than 350 bcf of proved reserves by independent estimate, and has the potential to grow, said McMoRan Exploration Co., New Orleans.

Individual well rates vary depending on porosity, permeability, pressures, and hydrocarbon column, but the primary Miocene Rob-L reservoir has achieved the highest output at more than 100 MMcfd.

The No. 4 well, which tested at 124 MMcfd in October 2008, is making 60 MMcfd with a targeted gross rate of 90 MMcfd. The field's Operc section is producing in two wells and being completed in a third well, and the No. 6 well might penetrate the upper Gyro section sands.

The No. 5 development well logged 155 net ft of Rob-L and Operc pay, is being completed in Operc, and is due on line in this year's first quarter. The No. 6 delineation well on SMI 217 is drilling below 16,000 ft towards 19,700 ft. It logged 40 net ft of Rob-L pay.

The field was a July 2007 discovery in 10 ft of water on South Marsh Island Block 212.

Wintershall wins six Norwegian North Sea licenses

Wintershall will operate another five licenses in the Norwegian North Sea under Norway's 2008 licensing round awards in predefined areas (APA).

The APA licensing rounds focus on mature areas of the Norwegian continental shelf. The government is keen to encourage development of smaller discoveries, which can be tied in to existing platforms and pipelines.

Norway's energy ministry awarded 34 production licenses to 40 companies under the APA licensing round. It gave 21 licenses in the Norwegian North Sea, 11 licenses for the Norwegian Sea, and two for the Barents Sea off the coast of northern Norway.

Of the licenses awarded, Wintershall's latest acquisition, Revus Energy ASA, received three, and Wintershall was awarded three, bringing its total award to six.

"The company is now one of the largest license holders on the Norwegian continental shelf and operates a total of 21 licenses," said Harald Vabo, general manager of Wintershall Norge ASA. "We already plan to start with seismic activities on the new acreage in the next few months."

PTTEP writes off Janaka-2 well off Myanmar

PTT Exploration & Production PLC's recent probe for hydrocarbons in Myanmar's Gulf of Martaban was a disappointment.

Although natural gas was found with Janaka-2, the first exploration well drilled on Block M3, the discovery was commercially insufficient, said the Thai state-controlled company.

Spudded on Sept. 28, 2008, the well was drilled to 3,351 m TD and encountered one 4-m petroleum-bearing formation.

The tubing stem test was not performed, and PTTEP wrote off $27.35 million, the cost of the well.

The results raised questions about the potential of the 7,770-sq-km acreage, especially as a previous well, Janaka-1 in PTTEP-operated Block M7, was abandoned earlier, although traces of gas were discovered (OGJ Online, Jan. 2, 2009).

However, PTTEP Chief Executive Anon Sirisaengtaksin vowed to continue studies on Block M3 and plans to evaluate the petroleum potential soon for additional exploration. Earlier last year, PTTEP acquired 500 line km of 2D seismic on M3.

PTTEP operates M3 and owns an 80% stake in it, with China National Offshore Oil Corp. holding the remaining 20% interest.

MGM to test Mackenzie Delta gas discovery

MGM Energy Corp., Calgary, plans in February to test a discovery on Ellice Island in northern Canada's Mackenzie Delta that encountered four zones containing natural gas.

The deviated Ellice J-27 exploration well went to 2,102 m, 1,999 m true vertical depth, cut 57 m of gas-bearing sandstones in the four intervals. The company will test two of the zones and expects test rates to be sufficient to gain regulatory approval of a significant discovery license to encompass all prospective reservoirs.

MGM planned the well, first in this season's three-well program, to test the Tertiary Lower Taglu and Aklak reservoirs in the footwall or southern part of the Ellice Island anticline.

MGM will move the Akita-Equitak 64 rig to the Ellice J-17 location where it expects to spud by Feb. 1. Ellice J-17 is planned to test a stratigraphic play on the west side of Langley Island.

The well locations are 80 miles northwest of Inuvik, NWT.

Nippon Oil farms into four PNG oil, gas fields

Nippon Oil Corp. subsidiary Nippon Oil Exploration Ltd. has acquired from Oil Search Ltd. (OSL) percentages in four exploration licenses for potential natural gas and oil fields in Papua New Guinea.

The Nippon unit, which will hold a 10% or 20% interest in each of the four licenses, hopes to begin joint exploration with OSL in 2009-11. It believes production at some of the fields could begin as early as 2010.

The farm-out agreements with OSL relate to the four exploration licenses: 20% of PPL219 and PPL239, both onshore; 20% of PPL234, offshore; and 10% of PPL244, offshore.

Analyst Global Insight said the farmouts will help OSL "monetize some of its assets and reduce its expenditure commitments in the fields, allowing the company to direct more capital towards a planned exploratory drilling program due to commence in late 2009."

Nippon's purchase is its second investment in Papua New Guin-

ea since December when its affiliate, Merlin Petroleum Co., paid $800 million to AGL Energy Ltd. to triple its interest in a proposed $10 billion LNG project, led by ExxonMobil Corp., to 5.4% from 1.8% (OGJ Online, Dec. 20, 2008).

The fields to be explored by Nippon Oil Exploration and OSL could help generate feedstock for the proposed LNG facility, which is to be constructed near Port Moresby.

The facility, the first for Papua New Guinea, is expected to export 6.3 million tonnes/year of LNG starting in third-quarter 2013 (OGJ Online, Dec. 18, 2008). Sales negotiations with Japanese utilities are said to be under way.

The December agreement with AGL Energy also increased Nippon Oil's interest in two central PNG producing oil fields, increasing the Japanese firm's share of output to 8,000 b/d from its earlier 2,000 b/d.

Late last year, parent Nippon Oil and Nippon Mining Holdings Inc., faced with sluggish demand for gasoline in Japan, announced plans to merge their operations under a single holding company to be established in October 2009 (OGJ Online, Dec. 5, 2008). ✦

Drilling & Production — *Quick Takes*

StatoilHydro prepares Gudrun field development

StatoilHydro plans to develop Gudrun oil and gas field in the Norwegian Sea using a fixed platform with seven production wells tied back to existing facilities in the Sleipner area and the Karsto processing plant north of Stavanger.

The company and its partners are designing the platform that will incorporate a subsea system in Sigrun field connecting to the future Gudrun platform. Later this year, the consortium will make a final decision on the development concept.

Gudrun lies 55 km north of Sleipner in 110 m of water. The high-pressure field has estimated reserves of 150 million boe.

The field was proved in 1974, and StatoilHydro became operator in 1997. "New technology, more information about the area, and the existing infrastructure have led to the field development now being realized," the company said.

StatoilHydro has a 46.8% interest in the license. Marathon Norge holds 28.2%, and GDF Suez E&P Norge has 25%.

The Sleipner area contains Sleipner East and Sleipner West gas and condensate fields as well as satellite fields Gungne, Loke, and Alpha North.

BP awards Angolan subsea equipment contract

BP PLC and Sonangol Sinopec Ltd. have let a $140 million contract to FMC Technologies Inc. to manufacture and supply subsea equipment for Block 18 off Angola. Deliveries will start this year.

FMC will provide one gas export regulation manifold, foundations and controls, a high-integrity pressure protection system, chokes, and two pipeline end manifolds. The equipment will be manufactured in Angola and at FMC's Kongsberg, Norway, facility.

The Greater Plutonio development on Block 18, BP's first operated project in Angola, came on stream in 2007. It consists of 43 wells: 20 producers, 20 water injectors, and 3 gas injectors.

Petrobras cancels Papa-Terra platform bid process

Petroleo Brasilerio SA (Petrobras), citing uncertain market conditions, suspended the tenders for building the P-61 tension-leg well platform and P-63 floating production, storage, and offloading vessel for the Papa-Terra field, which lies in the Campos basin off Brazil.

The company noted that proposals received had an excessive cost.

Petrobras had expected the Papa-Terra field, discovered in 2003, to go on stream in 2011.

The company has formed an internal working group to analyze alternatives for developing the field that holds an estimated 700 million bbl of 14-17° gravity oil. Water depth is about 1,200 m.

Chevron Overseas of Brazil Ltd. is a partner in the field and holds a 37.5% interest.

BP lets $100 million subsea production contract

BP PLC has ordered engineering and project management services and subsea production systems valued at $100 million from Cameron for tieback projects and other operations in the Gulf of Mexico.

The equipment includes four subsea trees, production control systems, a manifold, flowline connection systems, and related equipment.

"Engineering work and procurement of materials began in the second quarter of 2008, and [equipment] deliveries are scheduled to begin in the fourth quarter of 2009 and continue throughout 2010," Cameron said.

This is the first in a series of orders to be placed under a 2006 Gulf of Mexico framework agreement with BP, reflecting their joint standardization and engineering effort over the past 2 years. ✦

Processing — *Quick Takes*

Pemex delays refinery construction to yearend

Mexico's Petroleos Mexicanos will delay construction of a refinery until yearend while the state firm studies the best location for the plant.

Pemex Chief Executive Officer Jesus Reyes Heroles said the 300,000 b/d refinery will cost $9-10 billion to build, but he noted that costs could fall due to reduced demand for services and equipment.

Pemex announced the refinery plan in mid-2008, and planned to begin preparing the refinery site before yearend 2008.

The company is eyeing nine possible sites for the proposed facility, including Cadereyta, Campeche, Dos Bocas, La Cangrejera, Lazaro Cardenas, Manzanillo, Salina Cruz, Tula and Tuxpan.

Governors of 15 states have been lobbying Pemex to make the investment in their states. The most recent is Tlaxcala state governor Hector Ortiz, who met with Heroles regarding the proposed new refinery, and presented a feasibility study to site the facility in his state.

Last October, President Felipe Calderon said his government would use 12 billion pesos ($853 million) from the country's stabilization fund for investment in Pemex to begin building a new refinery in 2009, the first in nearly 30 years.

Increased refining capacity is considered urgent, as the country has spent almost $12 billion on petroleum product imports in 2000-07 due to a shortage of refining capacity, Pemex said. ✦

Transportation — *Quick Takes*

FERC OKs Sparrows Point LNG terminal, line

The US Federal Energy Regulatory Commission has approved, with conditions, an LNG import terminal and connecting interstate pipeline proposed by AES Sparrows Point LNG LLC and Mid-Atlantic Express LLC. If built, the terminal will bring 1.5 bcfd to the US Northeast. FERC will impose 169 mitigation conditions, incorporating all mitigation conditions recommended by FERC's environmental staff in the December 2008 final environmental impact statement.

Staff concluded that the Sparrows Point LNG terminal and pipeline project, with appropriate recommended mitigating measures, would have mostly limited adverse environmental impacts. FERC's staff said in the final EIS that the US Coast Guard's waterway suitability report for the project has "preliminarily determined" that additional recommended mitigation measures would be needed to make the Patapsco River, Chesapeake Bay, and territorial seas suitable for LNG marine traffic to the proposed terminal site and responsibly manage marine and safety risks (OGJ, Dec, 15, 2008, p. 22).

FERC also adopted the staff's recommended pipeline route variations, addressing conflicts in congested areas through the northern portion of the pipeline route in Pennsylvania where significant residential growth had occurred. FERC will require site-specific residential plans for about 160 residences located within 50 ft of the construction site.

AES plans to construct and operate the import terminal and related facilities at an industrial port setting at Sparrows Point, southeast of Baltimore in Baltimore County, Maryland. Sparrows Point will increase the number of ships transiting as commercial marine traffic in Chesapeake Bay by 5-7%.

The project includes facilities capable of unloading LNG ships, storing up to 480,000 cu m of LNG, vaporizing the LNG, and sending out natural gas at a base-load rate of 1.5 bcfd.

FERC also authorized Mid-Atlantic Express to construct and operate an estimated 88 miles of 30-in. OD natural gas pipeline, 48 miles of which would be in Baltimore, Harford, and Cecil counties, Maryland, with the other 40 miles in Lancaster and Chester counties, Pennsylvania, ending in Eagle, Pa.

Inpex awards contract for Ichthys LNG plant

Japanese company Inpex Australia and its JV partner Total SA have awarded the front-end engineering and design contract for their proposed Ichthys LNG plant in Darwin to a consortium of JGC Corp., Chiyoda Corp., and Kellog Brown & Root—collectively known as JKC joint venture.

The FEED services, which will be carried out during 2009, mark a key milestone in the $20 billion (Aus.) Ichthys project. Gas from Ichthys field, in the Browse basin off Western Australia, will be piped 800 km to the LNG plant planned for Blaydin Point in Darwin Harbour in the Northern Territory.

The two-train project is expected to begin with production of 8 million tonnes/year of LNG along with 1.6 million tonnes/year of liquid petroleum gas and 100,000 b/d of condensate.

The first LNG shipments are scheduled for late 2014 or early 2015.

Operator Inpex says it remains firmly committed to the project despite the current global financial environment.

A separate FEED contract will be awarded for the offshore facilities shortly, Inpex said.

Woodside shelves OceanWay LNG terminal

Woodside Petroleum Ltd., Perth, has suspended its proposed OceanWay LNG import terminal off the Californian coast near Los Angeles just over a month after saying it was continuing the project, but at reduced size.

Woodside still believes in the long-term value of LNG as a source of clean, reliable energy for Los Angeles, according to Steve Larson, Woodside natural gas president. However, Larson said the impact of the current market conditions had led to a withdrawal of the application to Californian authorities "for the time being." The decision was taken in the face of rising US domestic gas production and lower gas prices.

The regulatory authorities have been notified.

In December 2008 Woodside reduced the number of regasification tankers for the project from two to one, citing community and regulatory concerns as well as a perceived fall in customer demand.

The plan involved bringing LNG from Woodside's Australian gas projects, converting the LNG back to natural gas in regasification tankers and unloading the gas through underwater buoys 45 km off Los Angeles. The gas was to be piped into the southern Californian network via a hub at Los Angeles International Airport.

Larson said the permitting process in California was challenging, but Woodside had been confident that its design was safe and environmentally sound and would ultimately have succeeded.

Australian analysts say withdrawal from the project is not particularly significant for Woodside and is unlikely to have much impact on the company's share valuation or its planned workload in Australia. ✦

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Letters

The warming joust

Regarding your editorial entitled "Obama and climate change," thank you for a bit of sanity (OGJ, Dec. 8, 2008, p. 24)! I also believe that people should not be bullied out of questioning. Your phrase "joust between believers and infidels" says it all.

The Warmists really do speak as if they are medieval evangelical preachers and we have to have faith. Right. Here in England we've had freezing weather, the coldest winter in 30 years. Harbors in warm Cornwall have been icing over. There has been snow in Marseilles, bitterly cold weather in northern France, etc. Remember the ice storms last year in the US? The worst storms in living memory in China? I mention this to a friend who is a Believer. "Ah, yes", he says. "It will get colder before it gets hotter." Again, have faith.

As well, there is a real risk of power cuts starting in the UK in the next couple of years. Why? The European Union has decided that many of the older, polluting, coal-fired power stations have to be closed down, and the global warming crew (by the way, this is a huge industry in Europe) are bringing lawsuits to prevent replacements being built.

If you question the Warmist line, you are put down.

Julie Woods
London

Calendar

✦ Denotes new listing or a change in previously published information.

OIL&GAS JOURNAL online

Additional information on upcoming seminars and conferences is available through OGJ Online, Oil & Gas Journal's Internet-based electronic information source at http://www.ogjonline.com.

2009

JANUARY

Global E&P Summit, Madrid, +44 (0)20 7202 7500, +44 (0)20 7202 7600 (fax), e-mail: info@wtgevents.com, website: www.epsummit.com. 26-28.

Offshore West Africa Conference, Abuja, (918) 831-9160, (918) 831-9161 (fax), e-mail: attendOWA@pennwell.com, website: www.offshorewestafrica.com. 27-29.

The European Gas Conference, Vienna, +44 (0) 1242 529 090, +44 (0) 1242 529 060 (fax), e-mail: wra@theenergyexchange.co.uk, website: www.theenergyexchange.co.uk. 27-29.

SIHGAZ International Hydrocarbon & Gas Fair, Hassi Messaoud, + 213 21 21 58 74, + 213 21 21 58 72/76

(fax), e-mail: contact@foirex.com, website: www.sihgaz2009.com. 28-31.

FEBRUARY

SPE Reservoir Simulation Symposium, The Woodlands, Tex., (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website; www.spe.org. 2-4.

IADC Health, Safety, Environment & Training Conference & Exhibition, Houston, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 3-4.

Deep Offshore Technology International Conference & Exhibition (DOT), New Orleans, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.dotinternational.net. 3-5.

Global Petrochemicals Conference & Annual Meeting, Cologne, +44 (0) 1242 529 090. +44 (0) 1242 529 060 (fax), e-mail: wra@theenergyexchange.co.uk, website: www.wraconferences.com. 3-5.

Russia Offshore Annual Meeting, Moscow, +44 (0) 1242 529 090, +44 (0) 1242 529 060 (fax), e-mail: wra@theenergyexchange.co.uk, website: www.theenergyexchange.co.uk. 4-6.

NAPE Expo, Houston, (817) 847-7700, (817) 847-7704 (fax), e-mail: info@napeexpo.com, website: www.napeonline.com. 5-6.

Pipeline Pigging & Integrity Management Conference, Houston, (713) 521-5929, (713) 521-9255 (fax), e-mail: clarion@clarion.org, website: www.clarion.org. 9-12.

CERAWeek, Houston, (617) 966-5992, e-mail: info@cera.com, website: www.cera.com. 9-13.

SPE Unconventional Fields Conference, Margarita Island, Venezuela, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 10-12.

Pipe Line Contractors Association Annual Conference (PLCA), Carlsbad, Calif., (214) 969-2700, e-mail: plca@plca.org, website: www.plca.org. 11-15.

IADC/SPE Managed Pressure Drilling & Underbalanced Operations Conference & Exhibition, San Antonio, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 12-13.

Annual Petroleum Coke Conference, San Francisco, (832) 351-7828, e-mail: petcoke.conference@jacobs.com, website: www.petcokes.com. 13-14.

International Petrochemicals Technology Conference & Exhibition, London, +44 (0) 20 7357 8394, +44 (0) 20 7357 8395 (fax), e-mail: enquiries@europetro.com, website: www.europetro.com. 16-17.

IP Week, London, +44 (0)20 8561 6030, +44 (0)20 8561-0131 (fax), e-mail: events@energyinst.org.uk, website: www.energyinst.org.uk. 16-19.

EnerCom's The Oil & Services Conference, San Francisco, (303) 296-8834, e-mail: kgrover@enercominc.com, website: www.theoilandservicesconference.com/index.html. 18-19.

International Downstream Technology & Catalyst Conference & Exhibition, London, +44 (0) 20 7357 8394, +44 (0) 20 7357 8395 (fax), e-mail: enquiries@europetro.com, website: www.europetro.com. 18-19.

ASEG/PESA International Geophysical Conference & Exhibition, Adelaide, +61 8 8352 7099, +61 8 8352 7088 (fax), e-mail: ASEG2009@sapro.com.au, website: www.sapro.com.au/aseg.htm. 22-25.

Laurance Reid Gas Conditioning Conference, Norman, Okla., (405) 325-2248, (405) 325-7164 (fax), e-mail: bettyk@ou.edu, website: www.engr.outreach.ou.edu. 22-25.

Nitrogen + Syngas International Conference and Exhibition, Rome, +44 20 7903 2167, +44 20 7903 2432 (fax), e-mail: conferences@crugroup.com, website: http://crugroup.com. 22-25.

CERI Natural Gas Conference, Calgary, (403) 282-1231, (403) 284-4181 (fax), e-mail: conference@ceri.ca, website: www.ceri.ca. 23-24.

International Pump Users Symposium, Houston, (979) 845-7417, (979) 847-9500 (fax), e-mail: inquiry@turbo-lab.tamu.edu, website: http://turbolab.tamu.edu. 23-26.

MARCH

EAGE North African/Mediterranean Petroleum and Geosciences Conference & Exhibition, Tunis, +31 88 995 5055, +31 30 6343524 (fax), e-mail: eage@eage.org, website: www.eage.org. 2-4.

SPE Research & Development Conference, Lisbon, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 3-4.

APPEX Prospect and Property Expo, London, (918) 560-2616, (918) 560-2684 (fax), e-mail: convene@aapg.org, website: www.aapg.org. 3-5.

Subsea Tieback Forum & Exhibition, San Antonio, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.subseatiebackforum.com. 3-5.

GPA Annual Convention, San Antonio, (918) 493-3872, (918) 493-3875 (fax), e-mail: pmirkin@gasprocessors.com, website: www.gasprocessors.com. 8-11.

Doha Natural Gas Conference & Exhibition, Doha, e-mail: gascon@qp.com.qa, website: www.dohagascon.com.qa. 9-12.

ARTC Annual Meeting, Kuala Lumpur, +44 1737 365100, +44 1737 365101 (fax), e-mail: events@gtforum.com, website: www.gtforum.com. 10-12.

European Fuels Conference, Paris, +44 (0) 1242 529 090. +44 (0) 1242 529 060 (fax), e-mail: wra@theenergyexchange.co.uk, website: www.wraconferences.com. 10-12.

Turkish International Oil & Gas Conference & Showcase (TUROGE), Ankara, +44 (0) 207 596 5233, +44 (0) 207 596 5106 (fax), e-mail: oilgas@ite-exhibitions.com, website: www.oilgas-events.com. 10-12.

Middle East Oil & Gas Show & Conference (MEOS), Manama, +973 17 550033, +973 17 553288 (fax), e-mail: aeminfo@batelco.com.bh, website: www.allworldexhibitions.com/oil. 15-18.

Purvin & Gertz Annual International LPG Seminar, The Woodlands, Tex., (281) 367-9797, website: www.purvingertz.com. 16-19.

Gas Asia, Kuala Lumpur, +44 (0) 1242 529 090, +44 (0) 1242 529 060 (fax), e-mail: wra@theenergyexchange.co.uk, website: www.theenergyexchange.co.uk. 17-18.

SPE/IADC Drilling Conference & Exhibition, Amsterdam, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website; www.spe.org. 17-19.

A peek inside OGJ news

Leena Koottungal
Survey Editor/
News Writer

Oil & Gas Journal editors supply the latest industry news, statistical studies, special reports, and technical information to the oil and gas industry through its weekly print and online magazines, daily electronic newsletter and web site formats, webcasts, conferences, and other information outlets.

Conducting OGJ's intensive subscriber surveys is a procedure that requires months of data-gathering, consistent communication with industry contacts, and meeting several deadlines for each project. The compiling of such information has taught this editor OGJ style, accuracy, consistency—and patience. It also has enhanced this editor's knowledge of the industry by focusing on projects such as oil and gas facilities construction, gas processing, refining, ethylene, enhanced oil recovery, financial aspects, and other areas.

These varying survey assignments have provided a foundation for becoming a new member of OGJ's news team. In addition to presenting information from surveys, this editor now composes OGJ news stories as well, enabling the dissemination of information in an entirely different way.

Writing news stories differs greatly from conducting reader surveys. It is faster paced— almost a completely different world.

Story steps

OGJ's multiskilled, international news team and correspondents gather information from many sources, directly covering news events, conferences, speeches, and interviews. News also comes from various newswires and other OGJ staff members, among other sources. Many stories start with news releases, often requiring follow-up to fill in missing information readers will need or want.

The transition from original press release to finished OGJ product is smooth. The assignment desk identifies the industry category for each item, slugging it as general interest, drilling-production, exploration, transportation, or company-personnel news and assigns the stories to various team members for write-up.

After all information is gathered and the item written to OGJ style, it is posted to the daily web site, prepared for the print magazine, and filed. Ten items are selected for the free daily electronic newsletter.

In a team effort somewhat resembling an assembly line, this flow of work makes the life of an editor easier, gets the news to the reader quickly, and allows a newbie to the team to learn the ropes efficiently.

A structured system determines the future location of the final, edited article. Stories are filed into specific folders, enabling any news editor to effortlessly refer back to the article if necessary.

OGJ's unique style

A news team member completes a story by strictly following OGJ's style rules as presented in full detail in the OGJ style manual. There are few exceptions to the style rules. Editors organize stories in a clear and concise format and use the manual as a guide to making them consistent.

Many style rules are consistent with those most journalists use, but others are unique to OGJ. Some that readers may have noticed include:

- OGJ style calls for the use of an ampersand (&) to represent "and" in a company's name. It also calls for the omission of commas in company names, as when used before "Inc." And Company and Corporation in company names are always abbreviated as Co. and Corp.
- If a date line occurs in the current year, the year itself is dropped. For example, Jan. 26, 2009, would be written as simply Jan. 26.
- Measurement words used frequently, such as barrels per day, are abbreviated (b/d) consistently.

There are many others. This editor uses the stylebook as a reference when compiling the surveys but has become more acquainted with it as a member of the news team.

Articles then move to the next stage where they are edited. In preparing stories for posting to ogjonline.com, editors also must be familiar with and use required coding. For example, — represents an "em dash" and <sub> is used before subscript numbers.

The end results are concise and informative articles for OGJ readers.

The news staff adheres to daily deadlines for each phase such as submitting the electronic newsletter. Every week, they also proofread the general interest section after layout, ensuring that the copy contains no errors and remains clear to readers. In addition, the news staff puts together the magazine's OGJ Newsletter-Quick Takes section, which is about 3,500 words combining stories in all the categories.

OGJ's efficient daily and weekly cycles have provided a smooth learning venue for making this editor's transition from survey editor to also news writer easier and enabled a new OGJ editor to perfect her news techniques. ✦

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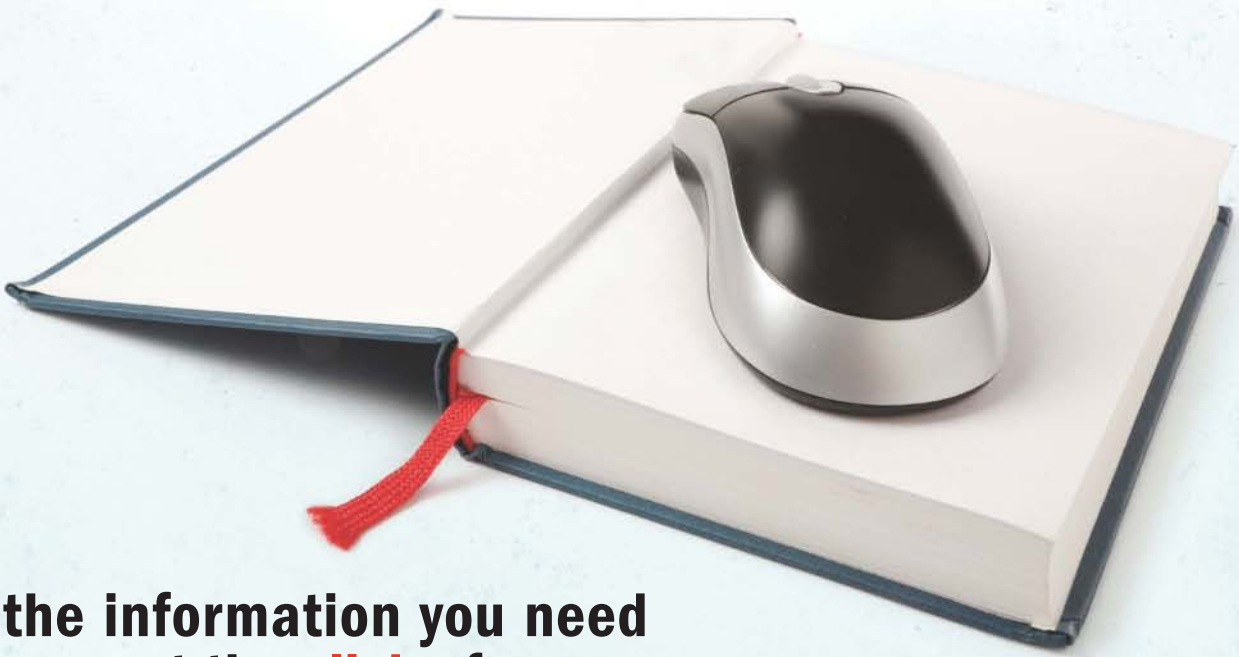

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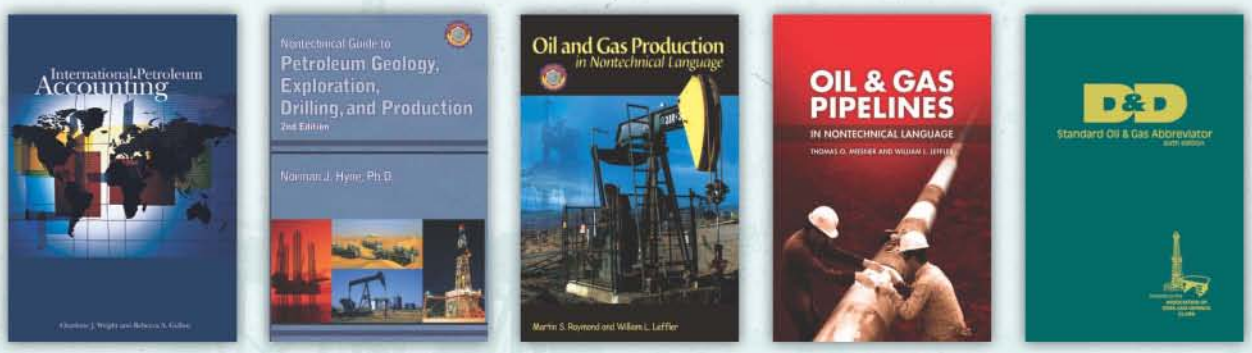

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Risky loans and ethanol

Before making any more fuel choices, Congress and the new administration of Barack Obama should compare a past governmental foray into the energy market with the mortgage industry's disastrous unraveling.

The mortgage catastrophe, which has crushed credit markets in general and catalyzed global recession, has roots in governmental activism. As a source of economic distortion wrought by exuberant governance, it's analogous to the ever-worsening problems associated with fuel ethanol.

The mortgage market collapsed at least partly because the government encouraged lending to home buyers who couldn't afford the loans. The motives seemed beneficent: promoting home ownership; boosting construction; and ending geographic discrimination in lending decisions. Yet the consequences are widespread and dire.

Forms of encouragement

Pressure to make low-quality loans took several forms, described in a November 2008 report by Lawrence H. White, professor of economic history at the University of Missouri-St. Louis and adjunct scholar of the libertarian Cato Institute. White lists:

- *A lowering of down-payment standards on mortgages guaranteed by the Federal Housing Administration.*
- *Strengthening of the Community Reinvestment Act (CRA), which promotes lending in low-income areas.*
- *Pressure by the Department of Housing and Urban Development on lenders to make risky mortgages.*
- *Subsidization, through implicit taxpayer guarantees, of the expansion of Fannie Mae and Freddie Mac, mortgage buyers sponsored by the federal government.*
- *Refusal to moderate the "moral hazard" of implicit guarantees—that is, the incentive on lenders to take undue risk—or to curb the growth of Fannie Mae and Freddie Mac.*
- *Pressuring Fannie Mae and Freddie Mac to promote "affordable housing" by expanding their purchases of high-risk loans made to low-income applicants.*

Observers wanting to blame deregulation for the mortgage crisis try to steer attention away from these developments. Some, for example, argue that loans certified by the CRA represent a fraction of troublesome lending and that no evidence exists that they contributed to the mortgage meltdown. What form that evidence might take is unclear. What is clear is that the CRA was one in a series of steps the government took to expand risky lending on a scale the market would not have done alone. Most of those steps occurred well after the deregulation of financial institutions.

Fuel ethanol, too, has followed a sequence of self-reinforcing moves characterized by deviant consequences. Bewitched by corn growers and distillers, past Congresses and administrations plus a number of states have decided that adding ethanol to gasoline yields benefits justifying generous tax credits. The benefits, mainly having to do with air quality and supply extension, fall subject to habitual exaggeration. And the perverse consequences are too frequently ignored.

It wasn't enough for Congress to create a fuel market for ethanol with tax credits for blenders. Politicians felt obliged to enlarge the market with volume mandates. When the mandates spawned a gold rush as another gasoline oxygenate fled the market for legal reasons that Congress wouldn't fix, lawmakers expanded the market again to sop up the excess supply.

Meanwhile, corn prices predictably jumped, pushing up food prices worldwide and feedstock costs for ethanol plant operators. Yes, other forces acted on grain prices at the same time. But to deny that the mandates had meaningful influence on food prices, as the ethanol lobby does, is ridiculous. And the mandates grow each year.

More problems

Other problems have developed. Falling gasoline prices have further damaged ethanol plant economics. Falling fuel consumption and low sales of 85% ethanol blends have placed in question the ability of the gasoline market to absorb ethanol in mandated amounts. Ethanol supporters therefore want Congress to raise the blending level beyond the 10% level considered safe for vehicle engines not made to accommodate the corrosive additive. They must hope consumers don't notice the btu-adjusted premium at which ethanol has been selling to wholesale gasoline.

One costly intrusion thus leads to another as government responds to problems it created with market activism it never should have undertaken. It happened in the mortgage business. It's happening in the fuels business. The cycle needs to stop. ✦

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For the past several years, leading major oil companies and independent producers have believed unconventional resources to be key elements of future energy supply. As a result, they've poured investment capital into heavy oil, shale gas, tight gas, and coalbed methane. However, the economic crisis and subsequent reduction in financial liquidity in companies worldwide threaten the growth prospects for North America's unconventional hydrocarbon resources.

In light of the economic climate, leading unconventional gas producers are reducing their capital budgets and, in some instances, shutting in production entirely. For example, Chesapeake Energy, citing wellhead prices "substantially below industry break-even costs," curtailed a portion of its unhedged Midcontinent production. In just the past few weeks, oil sands producers such as Suncor, Petro-Canada, Nexen, and BA Energy have announced project delays or cancellations.

So, as Canada's Globe and Mail newspaper has queried, will unconventional projects and jobs be incinerated by the crisis? We believe not. Oil sands and shale gas in particular have become pivotal sources of North American supply growth. A number of elements support the continued development of these resources: the underlying fundamentals of supply and demand dynamics (i.e., as the price decreases, more resources will be consumed); the benefits of gas vs. other fuels for power generation; and the potential for governments to pursue greater energy security.

> *"Unconventional resources have the potential to redefine the competitive landscape."*

The recent decline in activity stems from the capital-intensive nature of unconventional developments and the pace at which companies sought to exploit the resources. For example, the Canadian Energy Research Institute's latest study estimates that capital expenditures of over $300 billion (Can.) will be required during the next 20 years to realize the full potential of oil sands resources. As another example, a Booz & Co. analysis of 10 middle-size natural gas producers found the median company had outspent its operational cash flow by 130% during the past 12 months. Clearly, access to capital is a must-have for unconventional producers.

Now that capital is not readily available, the financial crisis is restructuring the competitive landscape. We hear companies say they need to live within their cash flow as there is little capital available. Because of this cash crunch, it is likely that some of today's producers of unconventional oil and gas will not be around to benefit from long-term growth. We believe those companies with the foresight to cut spending while identifying and acting on ways to capitalize on market opportunities can secure competitive advantage and prosper.

The potential

Over the past 3 years, strong global demand, robust commodity prices, improved technologies, and readily available capital led some companies to expand production from North America's unconventional oil and gas reservoirs. Canadian oil sands production reached 1.2 million b/d during 2007, and recent forecasts indicate production will increase to 2 million b/d by 2012.

Unconventional gas production also has shown a surprising increase, especially in light of recent dire predictions regarding North America's imminent dependence on imported liquefied natural gas. For example, the Barnett shale alone contributed almost 900 bcf to domestic supply during 2007. Based on growth from the Fayetteville

and Woodford shales, as well as several tight gas plays in the Rocky Mountains, the Energy Information Administration (EIA) projects unconventional natural gas will represent almost 50% of total US production by 2012.

New uncertainty

Declines in global demand growth and in commodity prices related to the economy represent major hurdles. From a global supply perspective, unconventional resources hold a marginal position. In addition, oil prices have already dipped below the most recent break-even price estimates of $80-115/bbl for new integrated oil sands developments. The story for gas is no different: The projected break-even costs of many emerging basins exceed current prices, as evidenced by several producers' recent plans to curtail production and capital expenditures.

So is the promise of unconventional resources now a historical fallacy?

No. The underlying fundamentals support continued development of unconventional resources in three ways: First, global supply and demand balances, albeit less aggressively, require continued production growth in the face of maturing and declining traditional supply sources.

Second, major oil companies have fewer opportunities for new developments, as challenging international environments have limited access or unfavorable terms; therefore, the incentive is high through technology and other means to ensure cost, recovery, and other factors keep unconventional resources economically viable.

We expect that rig rates, service costs, and the cost of oil-country tubular goods will decrease during 2009 as activity levels slow down. Other analyst reports suggest that these costs could come down as much as 30% from the 2008 peak. Such a cost reduction would improve the economics of any new investments, including exploration drilling.

Finally, declining oil prices will decrease inflationary cost pressures that have plagued development investment over the past several years and work to offset the impact of declining commodity prices on project economics.

Competitive advantage

Methods of attaining competitive advantage, on the other hand, have changed. Traditionally, access to resources coupled with access to capital drove success in production from unconventional oil and gas reserves. This fact is illustrated by the number of small and medium-size companies that accumulated large leaseholdings and employed leverage to generate short-term success in production growth as well as valuation and share-price performance.

"Oil sands and shale gas … have become pivotal sources of North American supply growth."

However, it takes more than just a large land position and aggressive drilling to create shareholder value in the face of an economic slowdown. Now that capital is not as readily available, high-quality resources, lower operating costs, and technological advantage will determine which companies have the staying power to capitalize on the long-term opportunity offered by unconventional resources.

There are three steps that companies can take during the downturn to improve their positions over time. These steps are applicable equally to well-capitalized companies and those facing liquidity problems and may actually generate incremental capital or improve liquidity:

"It is likely that some of today's unconventional participants will not survive—at least not in their current form."

1. *Companies should look for opportunities to expand their unconventional portfolios through mergers and acquisitions.* Large companies with healthy balance sheets will likely find a multitude of opportunities, as some small and middle-size producers will be unable to raise additional debt or equity capital and will be forced to divest assets or consider selling their companies. In recent work with an oil sands producer, Booz & Co. identified a number of attractive takeover prospects whose current market values did not appropriately reflect the inherent value of their project portfolios.

Inorganic growth isn't just for the cash-rich. Perhaps a wave of mergers of equals akin to what we saw in the late 1990s, when like-sized companies combined operations to form larger entities, is just what the industry needs. This will allow smaller companies to improve their capital positions, increase potential cost savings, and position themselves for market turnaround.

2. *Unconventional producers should focus their capital spending on opportunities to advance or create competitive advantage.* The nature of unconventional assets vs. conventional resources, including differences in capital requirements, reserves life, and interdependence between midstream and downstream assets, suggests there are unique opportunities for competitive advantage in unconventional developments.

Market leaders will continue, and possibly accelerate, investments that establish and sustain these benefits. Moving forward with the construction of an oil sands upgrader could force a competitor to cancel its plans for a similar project. Expanding gas-gathering and processing facilities in a particular basin could allow a company to dictate the future development of that area. Such forward-thinking initiatives can overhaul competitive conditions.

To make such decisions, companies must examine the near-term potential and long-term option value of their capital portfolios. This will help them set priorities for their investment decisions. Limited capital availability may

require divestments, as well.

3. *Future unconventional winners will distinguish themselves by demonstrating superior operational and technical capabilities.* Unconventional resources benefit from a tailored business model, one that separates simple, easily repeated activities from more complex, customized efforts, in order to realize economies of scale in unconventional plays.[1]

> *"Economies of scale in unconventional projects can best be realized through the use of tailored business models."*

Based on recent assignments with unconventional gas producers, we have found that reviewing the surface access process and addressing existing bottlenecks may reduce a producer's cycle time by 20-30% through relatively simple process revisions. Those companies pursuing such an advantaged model to its full extent—for example, segmenting rig lines by complexity—will ultimately enjoy lower finding, development, and lease operating expenses, all of which will provide incremental capital for reinvestment in production growth.

Here to stay

Production from unconventional resources is here to stay. It is required to meet future demand growth. In addition, the economic fundamentals of unconventional resources, such as the relationship in realized price vs.costs, will adjust to allow unconventional production to participate meaningfully and economically in global supply. Yet not everyone will survive the current crisis. The lack of liquidity among many unconventional producers, as well as the fact that lower prices will spotlight economic disadvantages, will force many companies to exit the market.

Such discontinuities represent opportunity for those who exploit them. Companies pursuing inorganic expansion through mergers and acquisitions can use capital to build advantaged assets and capabilities while instituting operational and technological advantages. Companies that seize the opportunity to expand their unconventional portfolios while improving their operating costs will position themselves for sustained long-term growth. ✦

Reference

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Obama's energy, environment strategies to be 'mixed bag'

Nick Snow
Washington Editor

As Barack H. Obama was sworn in Jan. 20 as the 44th US president, his administration announced an energy and environment program with provisions directly affecting the oil and gas industry in several areas.

The strategy aims to save more oil than the US imports from Venezuela and the Middle East combined within 10 years by promoting "the responsible domestic production" of oil and gas, according to information posted on the White House web site. It also embraces a "Use it or lose it" approach to existing leases.

Proposals to reduce US oil imports also include enacting higher fuel economy standards, putting 1 million plug-in hybrid cars on the road by 2015, creating a $7,000 tax credit for purchasing advanced fuel vehicles and establishing a national low-carbon fuel standard.

Under what is called the Obama-Biden Comprehensive New Energy

for America plan, the White House also includes prioritized construction of a natural gas pipeline from Alaska as part of a program to create 5 million "green" jobs by investing $150 billion over the next 10 years.

The jobs creation portion also proposes clean coal technology development and deployment; greater energy efficiency, including weatherization of 1 million homes annually, and ensuring that 10% of the nation's electricity come from renewable sources by 2012 and 25% by 2025.

In an effort to provide short-term relief to consumers, the plan calls for swapping oil from the Strategic Petroleum Reserve to cut prices and cracking down on excessive energy speculation. Democrats in Congress proposed both actions as oil prices approached $150/bbl and retail gasoline prices broke the $4/gal barrier early last summer.

Obama's inaugural address included references to excessive financial speculation, which several federal lawmakers believe played a greater part in 2008's record-high oil prices than supply and demand. "This crisis has reminded us that without a watchful eye, the market can spin out of control," the president said.

Finally, the incoming administration's energy and environmental strategy calls for implementation of an economy-wide cap-and-trade program to reduce greenhouse gas emissions by 80% by 2050. It also pledges to make the US a global leader in addressing climate change. ✦

BLM's Utah plans

Organizations opposing the US Bureau of Land Management's latest Utah oil and gas lease sale were elated when a federal district court judge issued a temporary restraining order Jan. 17 preventing BLM from moving forward with the leases.

The ruling by Judge Ricardo M. Urbina of the US District Court for Washington, DC, will keep BLM from cashing checks issued for contested tracts until the merits of their Dec. 17 lawsuit can be argued, the groups said in a joint press release.

They reiterated charges that acreage near Arches and Canyonlands National Parks, Dinosaur National Monument, and Nine-Mile Canyon in eastern Utah was included in the lease sale after Utah's BLM state office "hastily" approved new resource management plans (RMPs).

"Under the Bush administration, [BLM] pushed through [RMPs] that treated some of America's most sensitive and spectacular public lands as the private playgrounds of the oil and gas companies," said Bill Hedden, executive director of the Grand Canyon Trust.

'No corners were cut'

That idea doesn't square with what Utah BLM employees told me a few days earlier. "Every plan followed a full process. No corners were cut. Some of these plans took 7-8 years to complete, while others took 4-5 years, the more typical arc," said Don Ogaard, BLM's state planning leader in Utah.

RMPs contain broad goals, objectives, and management prescriptions and goals, he said in a Jan. 12 telephone interview. They also follow the multiple use concept mandated in the 1976 Federal Land Policy and Management Act under which activities are supposed to coexist to the greatest extent possible, Ogaard said.

"Under the new plans, most of the new areas opened to oil and gas leasing would carry some form of protective stipulation," he said. "Many leases will carry stipulations with respect to seasonally important wildlife habitat. Only about 35% of the land would be open to leasing under the standard terms and conditions."

Some key differences

A look at BLM's Utah website shows the differences between the old and new RMPs. Acreage available for oil and gas leasing was reduced by about 100,000 acres. Land available for leasing under standard terms dropped to 3.6 million acres from nearly 5.2 million, while land for leasing subject to controlled surface use or timing stipulations rose to 4 million acres from 3 million.

Acreage for leasing under no surface occupancy stipulations nearly doubled to 890,277 acres in the new plans from 464,166 acres in the old ones. Land unavailable for oil and gas leasing rose to more than 2.1 million acres from nearly 1.9 million acres.

"We're always glad to address perceptions that vast new areas are being opened to drilling or that we're conducting fire sales. Virtually all the land that is being opened to leasing under new plans was opened previously under old plans. The difference is that the new RMPs put better plans in place," Ogaard said. ✦

Senate confirms Salazar, Chu as DOI, DOE secretaries

Nick Snow
Washington Editor

The US Senate confirmed Ken Salazar's nomination as Interior secretary and Steven Chu's nomination as Energy secretary on Jan. 20.

Five more of President Barack H. Obama's key nominees also were approved: Thomas J. Vilsack as Agriculture secretary, Arne Duncan as Education secretary, Janet A. Napolitano as Homeland Security secretary, Eric K. Shinseki as Veterans Affairs secretary, and Peter K. Orszag as White House Office of Management and Budget director.

Salazar said in a statement following his confirmation that his first priority will be to lead the department with open decision-making, high ethical standards, and respect for scientific integrity. "I will work for a more proactive and balanced stewardship to protect our national parks and open spaces, restore our nation's rivers, resolve our water supply challenges and address the challenges faced by our Native American communities," he said.

Salazar called Obama's energy and environment strategy "our moon shot" for energy independence. "A national energy policy that includes conservation, expanded renewable sources, and wise responsible use of conventional fuels such as coal, oil, and natural gas will create jobs here in America, protect our national security by reducing America's dangerous dependence on foreign oil, and confront the dangers of global warming," he said.

At his Jan. 13 confirmation hearing before the Senate Energy and Natural Resources Committee, Chu said the nation faces both global climate change and energy security threats. "Last year's rapid spike in oil and gasoline prices not only contributed to the recession we are now experiencing, it also put a huge strain on the budgets of families all across America," he said in his opening statement.

"Although prices are now lower, we know that our economy remains vulnerable to future price swings. We must make a greater, more committed push toward energy independence and with it a more secure energy system," Chu continued. He said Obama's energy plan is aggressive, but achievable, and that it would put the US on a course to a better energy and environmental future, create new jobs and industries, restore US energy technology leadership, and help form the foundation for future economic prosperity. ✦

MMS to publish initial 2010-15 OCS leasing draft

Nick Snow
Washington Editor

The US Minerals Management Service on Jan. 16 announced a draft of the proposed 2010-15 US Outer Continental Shelf oil and gas leasing program and preliminary plans for an Atlantic Coast environmental impact study.

Oil and gas producers have been asking the US Department of Interior agency to conduct geological and geophysical studies off the Atlantic Coast since congressional and presidential bans on OCS leasing ended last year, MMS said. It said that it must conduct environmental reviews under the National Environmental Protection Act before such evaluations can begin.

MMS said that US Interior Secretary Dirk A. Kempthorne proposed 31 sales in 12 of the 26 planning areas during the 2010-15 period. Four of the planning areas are off Alaska, three are off the Atlantic Coast, three are in the Gulf of Mexico and two are off the Pacific Coast, it noted. The agency said that it received more than 150,000 comments in response to an Aug. 1, 2008, request for information.

The draft proposed 2010-15 OCS leasing program and a notice that a study of its potential environmental impacts will be conducted is scheduled to appear in the Jan. 21 Federal Register, MMS said. A 60-day public comment period will begin at that time, it indicated.

"In order to move forward with expanded exploration and development reasonably, we need current data. That is why we are also announcing today our intent to prepare a programmatic environmental impact statement to evaluate potential environmental impacts of multiple geological and geophysical studies in the Atlantic OCS planning areas," MMS Director Randall B. Luthi said.

'2-year head start'

"We're basically giving the next administration a 2-year head start. This is a multistep, multiyear process with a full environmental review and several opportunities for input from the states, other government agencies and interested parties, and the general public," he added.

Comments are specifically being sought on the size, timing and location of lease sales, and on buffer zones, revenue-sharing and the use of unitization to limit the number of structures, according to MMS.

It said that the OCS contains an estimated 86 billion bbl of crude oil and 420 tcf of gas in yet-to-be-discovered fields. The numbers are conservative because little exploration has taken place

in areas which congressional moratoriums and presidential withdrawals placed off-limits for the past quarter century, it said.

MMS also announced that it completed a final environmental impact statement for the proposed Cape Wind energy project off Massachusetts. The agency said that it submitted the final EIS for the 130-turbine wind farm to the US Environmental Protection Agency.

Responding to the OCS oil and gas announcement, US Senate Energy and Natural Resources Committee Chairman Jeff Bingaman (D-NM) said on Jan. 16 that he expects the draft for a proposed 5-year leasing plan to raise concerns in some coastal states.

'A thoughtful approach'

He noted that Sen. Ken Salazar (D-Colo.), President-elect Barack H. Obama's nominee to succeed Kempthorne as Interior secretary, said in a Jan. 15 confirmation hearing before the committee that he would take "a thoughtful approach toward this issue that would feature close collaboration with coastal states."

Three groups applauded the new 5-year OCS leasing plan's introduction. "With natural gas demand projected to increase by more than 40% by 2025, supplies must be increased in order for American Gas Association member companies to deliver gas to their nearly 70 million customers at a fair and equitable price," said Rick Shelby, AGA's executive vice-president of public affairs.

Thomas J. Pyle, president of the Institute for Energy Research, said that MMS's announcement means the federal government is taking the "first meaningful steps toward delivering our country and its people a secure, affordable energy future.

"As lawmakers on Capitol Hill continue to work on a government-directed 'green jobs' plan to stimulate our economy, today's announcement presents our country with two very different choices: Either we can spend massive amounts of taxpayer money on energy that's less reliable, less affordable, and less powerful, or we can generate massive new revenues for the taxpayer by producing energy that's more reliable, much more affordable, and significantly more powerful," he continued.

News that the federal government intends to deliver energy resources consumers need is a welcome development as the US economy begins a long road back to recovery, according to David Holt, president of the Consumer Energy Alliance in Houston. "For far too long, access to affordable energy was considered a given. The events of this summer taught us differently, and today's announcement by the Interior Department provides the first real indication that we've learned our lesson and are finally prepared to act on it," he said. ✦

IEA slashes 1 million b/d from 2009 oil demand outlook

Marilyn Radler
Senior Editor-Economics

In its most recent monthly Oil Market Report (OMR), the International Energy Agency slashed its oil demand outlook for 2009, and updated its demand figures for the fourth quarter of 2008.

The agency has lowered this year's oil demand forecast based on a revised picture of the world's economic weakness and now assumes 2009 global real gross domestic product growth of 1.2%.

A month ago, IEA based its outlook on an International Monetary Fund estimate of 2.1% GDP growth for the year.

The January OMR shows that oil demand in the Organization for Economic Cooperation and Development has been cut by 500,000 b/d from estimates in the IEA's December OMR report. Meanwhile, oil demand in non-OECD countries has also been reduced by the same amount.

Worldwide demand for 2008 is down 100,000 b/d from previous estimates to average 85.8 million b/d, as demand in the final quarter was 300,000 b/d lower than previously estimated.

IEA also lowered its outlook for 2009 non-OECD supply, with a 100,000 b/d reduction in 2009 output from the former Soviet Union based on less-optimistic company forecasts, as well as the slower than anticipated Sakhalin-2 ramp-up. However, IEA said, declining Russian output would appear to be due more to a punitive fiscal and regulatory regime, which is impeding investment.

The Paris-based agency's 2009 total Russian supply figure now stands at 9.7 million b/d, implying a decline of 280,000 b/d from last year.

Estimates of supplies of natural gas liquids from the Organization of Petroleum Exporting Countries in the first half of this year also have been mildly cut from a month ago. But IEA still expects OPEC NGL output to average 5.6 million b/d this year. ✦

WORLDWIDE SUPPLY AND DEMAND

	2008					2009				
	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	Year	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	Year
	Million b/d									
Demand										
OECD										
North America	24.8	24.5	23.7	24.2	24.3	23.7	23.6	23.8	23.6	23.7
Europe	15.2	14.9	15.4	15.2	15.2	14.9	14.6	15.1	14.9	14.9
Pacific	8.9	7.8	7.5	8.0	8.0	8.4	7.5	7.4	7.9	7.8
Total OECD	**48.9**	**47.2**	**46.6**	**47.4**	**47.5**	**46.9**	**45.7**	**46.3**	**46.4**	**46.3**
Non-OECD										
FSU	4.1	4.1	4.4	4.4	4.3	4.2	4.2	4.4	4.5	4.3
Europe	0.8	0.8	0.7	0.8	0.8	0.8	0.8	0.7	0.8	0.8
China	7.9	8.0	8.1	7.6	7.9	7.9	8.1	8.0	7.8	8.0
Other Asia	9.6	9.6	9.1	9.2	9.4	9.6	9.7	9.3	9.4	9.5
Latin America	5.7	5.9	6.0	5.8	5.8	5.8	6.0	6.1	6.0	6.0
Middle East	6.7	7.0	7.3	6.9	7.0	7.0	7.2	7.6	7.1	7.2
Africa	3.1	3.2	3.0	3.2	3.1	3.2	3.2	3.1	3.2	3.2
Total non-OECD	**37.9**	**38.5**	**38.6**	**37.9**	**38.2**	**38.5**	**39.2**	**39.2**	**38.8**	**38.9**
Total demand	**86.9**	**85.7**	**85.3**	**85.3**	**85.8**	**85.4**	**84.9**	**85.5**	**85.3**	**85.3**
Supply										
OECD										
North America	14.2	14.1	13.6	13.9	13.9	14.2	13.9	13.9	14.2	14.0
Europe	4.9	4.8	4.5	4.7	4.7	4.5	4.2	4.0	4.2	4.2
Pacific	0.6	0.6	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.7
Total OECD	**19.7**	**19.5**	**18.8**	**19.3**	**19.3**	**19.4**	**18.8**	**18.6**	**19.1**	**19.0**
Non-OECD										
FSU	12.8	12.9	12.6	12.7	12.7	12.9	13.0	12.8	12.8	12.9
Europe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
China	3.8	3.8	3.8	3.9	3.8	3.9	4.0	4.0	3.9	3.9
Other Asia	2.7	2.6	2.6	2.7	2.6	2.7	2.7	2.7	2.7	2.7
Latin America	3.9	4.0	4.1	4.1	4.0	4.3	4.3	4.3	4.3	4.3
Middle East	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5
Africa	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.7	2.7	2.6
Total non-OECD	**27.6**	**27.6**	**27.4**	**27.6**	**27.5**	**28.2**	**28.3**	**28.1**	**28.1**	**28.2**
Processing gains	2.2	2.2	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3
Other biofuels	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6
Total non-OPEC	**49.8**	**49.7**	**48.9**	**49.7**	**49.5**	**50.4**	**50.0**	**49.6**	**50.1**	**50.0**
OPEC										
Crude	32.4	32.2	32.4	31.4	32.1					
NGL	4.8	4.9	5.0	5.1	5.0	5.2	5.4	5.7	5.9	5.6
Total OPEC	**37.2**	**37.1**	**37.4**	**36.6**	**37.1**					
Total supply	**87.1**	**86.8**	**86.3**	**86.2**	**86.6**					
Stock change	0.2	1.1	1.0	1.0	0.8					

Totals may not add due to rounding.
Source: International Energy Agency.

Oil companies focus on liquidity, efficiency, analysts say

Paula Dittrick
Senior Staff Writer

Oil and gas companies report that their immediate focus is on maintaining liquidity and promoting operational efficiency in preparation for an eventual economic upswing, consultants and analysts said.

James Metcalfe of UBS Investment Bank told a Jan. 14 Black & Veatch LLP energy briefing that chief executive officers have changed their discussion topics during recent conference calls with analysts.

"A CEO says, 'I'm not going to be talking about growth, I'm going to be talking about liquidity and how we're still going to be here,'" after the economy improves, said Metcalfe, who directs global power banking for UBS and advises utilities, nonregulated power companies, and alternative energy companies.

In its 2009 Energy Industry Outlook, Deloitte LLP said companies need to address "the longer-term, two-sided issue of increasing demand and constrained supply," while also managing the immediate fallout from volatile commodities prices.

The economic downturn and continuing credit crisis are pushing down energy prices because of near-term slowing demand. Meanwhile, industry faces likely accelerated regulatory activity at state and federal levels.

FBR Capital Markets analysts expect Congress will pursue long-term green energy financing in climate law. This comes when the oil industry "has few natural defenders left on Capitol Hill as a result of industry consolidation, retirements of senior oil-state lawmakers, and the change in [congressional] party leadership" FBR said.

Ernst & Young LLP suggests oil and gas companies go into a disciplined capital allocation mode based on a long-term view of pricing and demand. Deloitte agrees with a long-term view despite the current economy.

Deloitte advises companies to consider how they might use assets to finance new programs, partnerships, and acquisitions that decrease US dependence on oil imports, support increased domestic production, reduce energy requirements, promote efficiency, and spur development of alternative and renewable energy sources.

Long-term demand climbing

World demand for energy is increasing at an ever-faster pace. The International Energy Agency projects total world consumption for marketed energy will increase by 50% through 2030. If this projection holds true, the world would use more energy during the next 50 years than in all of recorded history, Deloitte said.

Fossil-based energy is expected to remain the dominant energy source through the predictable future but supply is not keeping pace with demand. Oil and gas are getting harder and more costly to find and produce, with accessible reserves being in deep water and arctic regions.

In addition, countries such as Saudi Arabia, Russia, China, Venezuela, Brazil, and Malaysia—which own the world's largest reserves of oil and gas—continue to limit or restrict access to international oil companies.

Finally, natural disasters or geopolitical conflicts also could jeopardize energy prices and supply levels.

"The price of energy is expected to lead the economic turnaround, although it is difficult to tell when that will happen," Deloitte said, adding that companies having solid balance sheets will be in the best position to take advantage of future acquisition opportunities.

The credit collapse has created liquidity challenges for oil companies and contributed to fewer merger and acquisition transactions.

E&Y's Energy Center notes the number and dollar value of transactions declined in 2008 compared with 2007. First-half 2008 saw a decline of 2-5% in transaction activity compared with the same period a year earlier, while second-half 2008 experienced a 30% decline from year-earlier levels, E&Y reported.

In an E&Y webcast on Dec. 9, 2008, more than 70% of nearly 600 respondents said they believe it will be more than 12 months before the oil and gas mergers and acquisitions market resumes significant activity levels.

"Credit will start flowing again," said Charles Swanson, E&Y Houston area managing partner. "When it does, companies will be subject to much greater scrutiny. Those who are successful at raising capital should be the companies with their financial houses in order." ✦

Federal judge blocks oil and gas leases in Utah

The Independent Petroleum Association of Mountain States expressed disappointment that a federal judge blocked the US Bureau of Land Management from issuing oil and gas leases in Utah.

US District Judge Richardo M. Urbina in Washington, DC, issued a temporary restraining order (TRO) on Jan. 17, saying that the Department of the Interior had not done enough environmental analysis on how oil and gas operations would affect air quality.

The Southern Utah Wilderness Alliance and six other environmental groups had requested the TRO. These groups initially called for the sale's cancellation, saying the lease sale included tracts around Arches and Canyonlands National Parks (OGJ, Jan. 5, 2009, p. 27; p. 21 this issue).

The TRO blocks leases on about 110,000 acres of federal land in Carbon, Duchesne, Emery, Garfield, Grand, San Juan, and Uintah counties.

Kathleen Sgamma, IPAMS government affairs director in Denver, said, "We are obviously very disappointed that the issuance of the leases will be held up. This is a setback for energy security and reducing greenhouse gas emissions."

Natural gas emits just more than half the carbon dioxide of coal when burned for electric power generation, Sgamma said.

Oil and gas companies bought the leases on Dec. 19, 2008. The earliest that BLM could have cashed the checks from winning bidders and finalized the leases would have been Jan. 19.

Sgamma commented: "The purchase of a lease is not a 'green light' to drill. A lease is only the first step in a long, expensive process, which can take many years no guarantee of production. Those protesting the sale often forget that natural gas and oil activity in Utah occupies much less than 1% of public land. With current technology and industry practices, producers are able to develop vital energy resources now, and reclaim the land to its original condition soon afterwards." ✦

Groups sue BLM over New Mexico oil, gas operations

The Western Environmental Law Center and other groups filed a lawsuit against the US Bureau of Land Management, claiming the agency violated federal law in granting oil and gas leases on public land in New Mexico.

The lawsuit, filed Jan. 14 in US District Court in Albuquerque, claims that BLM issued 92 oil and gas leases last year that fail to address greenhouse gas (GHG) pollution resulting from oil and gas operations.

The lawsuit asked the court to suspend the leases pending full compliance with federal law. The leases are in San Juan basin near Farmington and Carlsbad. A BLM spokesman said he doubted any production had started on those leases.

WELC said oil and gas operations in New Mexico are conservatively estimated to account for 23% of the state's GHG emissions, second only to transportation.

"BLM failed to provide the public with sufficient environmental information regarding the lease sales," said the lawsuit, which also said BLM has not adopted policies aimed at more efficient drilling practices.

Tony Herrell, BLM New Mexico deputy state director, minerals, said the agency has worked for years with industry to minimize emissions and make operations more efficient.

"We've taken a pretty hard look at this," Herrell said of reducing emissions from oil and gas operations. "It's a process of continual improvement."

He noted US oil and gas production contributed to lower GHG emissions than does much of the oil and gas production outside the US.

Other plaintiffs in the lawsuit were Amigo Bravos, Common Ground United, Natural Resources Defense Council, Oil and Gas Accountability Project, San Juan Citizens Alliance, and the Southwest Environmental Center. The Oil and Gas Accountability project is part of the Earthworks organization.

Amigo Bravos is a nonprofit organization that works to preserve and restore water quality and natural waterway in New Mexico. ✦

WoodMac: N. America to import more LNG

Eric Watkins
Oil Diplomacy Editor

Imports of LNG into North America are set to increase to 4.2 bcfd in 2014 from 1.7 bcfd in 2009, according to a report by consultants Wood Mackenzie Ltd.

The report forecasts North American LNG imports will rise despite increased domestic production of shale gas and the current recession that has reduced demand growth.

"In light of recent history, and the longer term outlook for growth in domestic US shale gas, many industry analysts and commentators have been suggesting that the outlook for LNG imports into North America is bleak," said WoodMac North American LNG analyst Murray Douglas.

Although regasification capacity has been overbuilt, Douglas said, "The medium-term outlook for LNG in North America is not as dire as other commentators are suggesting, despite the success in developing shale gas."

Favorable factors

In 2008, despite lower gas prices in North America than in Europe or Asia, baseload volumes of 1 bcfd flowed to the Everett, Elba Island, and Altamira LNG regas facilities. WoodMac forecast baseload imports into these terminals will continue into 2009 and beyond.

With a significant proportion of the 82 million tonnes/year of new liquefaction capacity coming on stream already dedicated to Asian markets, there is not a huge requirement for additional uncontracted volume in the Pacific Basin, especially given the economic downturn on demand levels.

"The result is a surplus of LNG that will flow to the more liquid Atlantic Ba-

sin markets, which have available regas capacity and the means to accept uncontracted volume," WoodMac forecasts.

A 'global sink' for LNG

The report describes the US as the "global sink" for LNG as the largest and most liquid markets. "Some of this relatively low-cost new liquefaction capacity will compete with domestic shale gas," Douglas said. "This will suppress price and in turn delay some higher cost domestic developments."

WoodMac said the North American gas market will prove more attractive to LNG suppliers as the oil-linked gas prices in European markets soften and Asian buyers switch from gas to oil, resulting in more LNG on the market. With the softening of global gas demand, the LNG market could be oversupplied in the near term. ✦

Petrobras to present 5-year strategic plan to investors

Eric Watkins
Oil Diplomacy Editor

Brazil's Petroleo Brasilerio SA (Petrobras), pending approval of its board, will present its latest 5-year strategic plan to investors and analysts on Jan. 26, the company said.

Petrobras e-mailed analysts and investors invitations for the presentation of the company's 2008-12 strategic plan "in case the plan is approved by the company's board of directors."

Petrobras has repeatedly delayed the announcement of its investment plans—which are usually announced in September—amid the global financial crisis and its impact on oil prices (OGJ Online, Jan. 19, 2009).

Comperj project on track

Meanwhile, Petrobras's downstream director Paulo Roberto Costa, reversing earlier concerns, said the firm's $8.5 billion planned investment in the Rio de Janeiro petrochemical complex, known as Comperj, will be maintained in the strategic plan.

The Comperj project, one of several energy projects included in Petrobras's earlier strategic plans, is part of Brazil's Program for Accelerated Growth (PAC), an economic expansion program

Obama puts Chavez on watch

If anyone in the oil and gas industry imagined the administration of US President Barack H. Obama would be soft on Venezuela, they will have to readjust their imaginings.

Obama's administration is now on watch and has made clear its will stand no nonsense—something that emerged last week when the US issued new restrictions for ships visiting the US after Venezuela.

"The Coast Guard announces that it will impose conditions of entry on vessels arriving from the country of Venezuela," said a notice by the Department of Homeland Security in the US Official Register published on Jan. 16.

That, of course, was a few days before the Jan. 20 inauguration of the new president. Yet, unlike one or two other directives of the former administration that were rescinded, this one remains on the books.

"The Coast Guard has determined that ports in Venezuela are not maintaining effective antiterrorism measures," the note added.

Special security

Under the latest restrictions, starting Jan. 23, all ships that have visited Venezuela during their last five ports of call will have to implement a special security plan, known as Security Level 2, while in US ports.

The ships' access points must also remain guarded while in port, a measure that means "additional crewmembers should be placed on the ship if necessary."

The USCG can also proceed to examine the ships, the notice says, to make sure that "the number and position of the guards" is acceptable.

It remains unclear how this measure could affect the cost of shipping oil from Venezuela to the US, but it clearly could have considerable effect.

After all, Venezuela, a founding member of the Organization of Petroleum Exporting Countries, remains one of the top oil suppliers to the US despite all of the anti-American rhetoric coming from Venezuelan President Hugo Chavez over the years.

Concerns over FARC

Still, if you are planning on shipments of oil via Venezuela, you might want to reconsider.

The restrictions were justified by long-standing US concerns over terrorism. That's reasonable enough, given that the Chavez regime has long been accused by the US and others of supporting the terrorist Fuerzas Armadas Revolucionarias de Colombia (FARC).

In fact, when Colombian forces killed Raul Reyes, FARC's second most senior rebel commander last year, documents recovered from his captured laptop computer revealed significant support for the rebels from the governments of Venezuela and Ecuador (OGJ, July 14, 2008, p. 48).

So, there is certainly potential for FARC rebels to board oil ships bound from Venezuela for the US, where they could cause untold damage.

Obama is aware of that potential coming out of Venezuela, having recently accused Chavez of blocking progress in Latin America and "exporting terrorist activities."

As for Chavez, expect no change. "No one here holds any illusions," he said, referring to the new Obama government. "This is the US Empire we're talking about." ✦

outlined by the country's President Luiz Inacio Lula da Silva (OGJ, June 11, 2007, p. 31).

In 2007, Petrobras selected WorleyParsons to perform integration and project management services, execute front-end engineering design for utilities and offsites, and provide other technical services for the Comperj project.

In November 2008, however, as a result of the mounting global financial crisis, the facility was reported to be facing "major obstacles" in the country, with Petrobras having difficulty finding partners for the project.

According to one analyst, the scenario of a Brazilian gross domestic product growth of roughly 5% and very robust demand, which were included in the original financial model of the Comperj project, was rendered uncertain due to declining commodity prices.

Shaw Group wins commission

Despite those concerns, however, Petrobras commissioned Shaw Group Inc.'s energy and chemicals group in November 2008 to supply its proprietary ethylene technology for its ethylene facility at the Comperj project.

Under the contract, Shaw will also provide conversion furnace equipment, basic engineering, and technical services. Shaw will provide the same services to the recovery section of a petrochemical fluidized catalytic cracking plant.

Construction on the 150,000 b/d refinery began in late March 2008 and the facility, which will include first and second-generation plants, is due to come online in 2012.

The facility's first generation units are expected to manufacture 1.3 million tonnes/year (tpy) of ethane, 880,000 tpy of propane, 600,000 tpy of benzene, 700,000 tpy of paraxylene, and 157,000 tpy of butadiene.

Its second generation units will produce 500,000 tpy of styrene, 600,000 tpy of glycol, 800,000 tpy of polyethylene, 850,000 tpy of polypropylene, 500,000 tpy of purified terephthalic acid, and 600,000 tpy of polyethylene terephthalate. ✦

LyondellBasell Industries files Chapter 11 bankruptcy

LyondellBasell Industries has filed for reorganizational bankruptcy for its US operations and Basell Germany Holdings. The filing does not include LyondellBasell's other companies outside the US.

The US companies filed for Chapter 11 protection in the Southern District of New York in Manhattan on Jan. 6.

In other recent company news:

• The UK High Court has named Ernst & Young LLP as administrators of Oilexco North Sea Ltd. The company is seeking buyers for the business and its assets because banks refused to grant loans to carry out its drilling and development program (OGJ Online, Jan. 4, 2009).

• France's Total SA plans to help commercialize Colorado oil shale by acquiring a 50% interest in IDT Corp.'s American Shale Oil LLC (Amso). The transaction is expected to close during the first quarter. The transaction's value was not immediately disclosed.

• A "battle of the minnows" is shaping up as Sydney-based Drillsearch Energy Ltd. has made an all-share, off-market takeover bid for Melbourne junior 3D Oil Ltd. Drillsearch is offering four of its shares for each share of 3D Oil.

• Repsol YPF SA, repeating announcements it made last fall, has told an investors' conference it will spend €500 million in 2008-12 to develop the Carioca discovery in Brazil's presalt region.

LyondellBasell bankruptcy

During Jan. 8 court proceedings, executives said LyondellBasell needed immediate funds to pay more than $1 billion in debt and had run out of cash to finance operations.

US Bankruptcy Judge Robert Gerber approved the company's request to access $2.167 billion in interim debtor-in-possession financing from a group of lenders and also approved a separate $100 million super priority emergency loan being provided by Citibank.

"During the past two quarters, we have seen a dramatic softening in demand for our products and unprecedented volatility in raw materials costs," Volker Trautz, LyondellBasell chief executive officer, said in a company news release.

Trautz called December "particularly difficult, as many of our customers postponed orders to reduce their inventories." LyondellBasell expects its economic crunch will be short term and expects customers to increase their purchasing in 2009.

He called LyondellBasell's core businesses of fuels, chemicals, plastics, and technology "fundamental to the global economy."

LyondellBasell Industries is based in The Netherlands and privately owned by Access Industries, founded in 1986 by US industrialist Leonard Blavatnik.

Basell International Holdings paid $12.7 billion for Houston-based Lyondell Chemical last year.

E&Y seeks Oilexco buyers

Oilexco has fields in the UK North Sea with proven oil reserves, which produce 16,000 b/d. Some of its key operations are the Brenda and Nicol fields. The Shelley field is being drilled and is expected to produce more than 30,000 b/d.

E&Y said it received enquiries from several interested parties that wished to buy the whole or part of the company's business and assets. In the interim, it plans to continue with existing operations.

RBC Capital Markets said the company's administration process would probably mean reduced rig commitments and cash for shareholders, assuming a price of $50/bbl and bids for its assets. It warned that potential buyers could snap up the assets cheaply as sources of capital have dried up and potential bidders are hoarding cash.

"Any sale proceeds would go first to the banks that have lent some $700 million to the company. The administrator would then look to settle the company's outstanding unsecured liabilities, some $200 million," RBC Capital Markets added.

Oilexco Inc., Calgary, the parent company, will be delisted from the Toronto Stock Exchange at the close of market on Feb. 9, "for failure to meet the continued listing requirements."

Total's Colorado shale stake

Total's agreement calls for the French company and IDT, a multinational holding company, to jointly develop, produce, and commercialize shale oil using a new in-situ technology on Amso's federal research lease acreage in western Colorado.

Total will provide funding during the research, development, and demonstration phase of the project, and technical assistance throughout the life of the project.

Amso is going to manage operations during the RD&D phase, and then Total will assume management responsibilities during the subsequent commercial phase.

"Our investment in Amso furthers our commitment to developing unconventional hydrocarbons," said Yves-Louis Darricarrere, Total's E&P president.

Drillsearch moves on 3D Oil

3D Oil immediately responded by telling shareholders to reject the offer, which it said does not reflect the company's true value.

3D Oil has a strong asset in yet-to-be developed West Seahorse oil field in

the Bass Strait as well as cash reserves of about $12 million (Aus.).

Drillsearch has an extensive portfolio of exploration and production assets in Australia, Papua New Guinea, and Canada. Key production comes from the Surat and Cooper basins, and it has yet-to-be developed fields in the offshore Bonaparte basin off northern Australia. The company moved to a 19.9% holding in 3D Oil prior to the takeover announcement.

Repsol YPF's Brazil plans

Repsol YPF has a 25% stake in the Santos basin BM-S-9 Block that contains the Carioca find, while Brazil's mixed capital Petroleo Brasilerio SA (Petrobras) holds 45%, and BG Group holds the remaining 30%.

The investment announcement follows Repsol YPF's report last week to Brazil's hydrocarbons regulator Agencia Nacional do Petroleo (ANP) that it discovered hydrocarbons on BM-S-48 Block, 185 km off Sao Paulo state (OGJ Online, Jan. 15, 2009).

The consortium hasn't yet made an official reserves estimate for Carioca, but the head of ANP in April said the find could contain 33 billion boe, possibly making it one of the biggest oil finds ever.

Repsol YPF in its 2008-12 capital expenditure plan has earmarked €12.3 billion in investments in key growth projects in its upstream, downstream, and LNG areas.

Last September, Brazil's Expansion newspaper reported that Repsol YPF would invest €500 million in Brazil as part of a strategic plan intended to almost treble the firm's annual profits during 2008-12.

The report said the group had begun drilling at a number of sites in Santos oil field off Brazil, described as "one of the regions with the greatest potential oil reserves in the world."

In early October, Repsol YPF began drilling wells in the Santos basin, using the Sovereign Explorer semisubmersible rig, which was to be deployed on the BM-S-48 Block, in 5,000 m of water, 120 km off Ilha Bela, Sao Paulo. ✦

Apache founder, longtime chairman retires

Raymond Plank, founder and longtime chairman of Apache Corp., Houston, retired Jan. 15 after 54 years with the firm that he grew from a pioneer public drilling program to one of the largest publicly traded independent oil and gas producers in the industry, with international operations and a market value of $25 billion.


Plank

Plank's plain-spoken, in-your-face style as an industry maverick has left its imprint on Apache's corporate culture. When one industry association tabled a proposal calling for an import tax to set a floor for domestic oil in the 1980s, Plank led a floor fight and the subsequent walkout by a large segment of the members to stage a rump-session attended by most of the news reporters who had been covering the convention.

In the mid-1990s, he led a nationwide group of independent producers, state trade organizations, the Independent Producers Association of America, and royalty owners in an effort to secure limited exemption from antitrust laws so natural gas producers could form marketing cooperatives. Plank was a vocal and persistent critic of megamarketers of crude, natural gas, and electricity years before the fall of Enron Corp.

While many independents were satisfied to operate only in the US, Apache in the 1990s became one of the largest leaseholders off Western Australia and a major participant in Egypt.

A graduate of Yale University, Plank never lost the brashness and nerve he exhibited as a bomber pilot in the South Pacific during World War II. He and two partners founded the company in 1954 in Minneapolis, Minn., with $250,000 initial seed capital. Plank won a coin toss to become president of the firm and held that position to 1979. He was chief executive officer of Apache in 1966-2002, and chairman since 1979.

Apache diversified into real estate in 1959 and into agriculture in 1970. It went public in 1969. In 1981 Apache created Apache Petroleum Co., the first US master limited partnership.

The company moved to Denver in 1987 when the industry was in the midst of its greatest depression. In 1988, Apache sold the last of its non-oil and gas subsidiaries, exited the business of managing oil and gas investments, and restructured as a pure exploration and production company.

Its 1991 acquisition of the MW Petroleum Corp. subsidiary from Amoco Corp. for $545 million was a critical event in Apache's history. It doubled the company's size, obtained a position in the Permian basin of West Texas, and shifted the center of Apache's geographical mass to the Gulf Coast, precipitating its move to Houston in 1992. That investment still contributes to Apache's bottom line. But in his characteristic manner, the irascible Plank publicly said he made the move because "this is where the industry is circling its wagons."

Inscribed on a fountain outside the company's Houston headquarters, is a 1964 quote from Plank: "The capacity of the individual is infinite. Limitations are largely of habit, convention, acceptance of things as they are, fear or lack of self-confidence." G. Steven Farris, Apache's president, chief executive officer, and chief operating officer since 2002, succeeds Plank as chairman. He said, "Raymond Plank is Apache. His commitment and drive are embedded in the fabric of Apache's culture."

IRAQ'S E&D FUTURE—2

Impediments abound to exploiting Iraq's vast petroleum resource

Tariq Shafiq
Petrolog & Associates
London

The traditional go-slow approach of the Iraq Petroleum Co. and its associated companies, its ability to shift exploration and production to where it best served its interests and to strengthen its negotiating power; as well as Iraq's politically-driven, confrontational oil policy, unnecessary and destructive wars, and years of sanctions, have proven to be serious impediments to the development of Iraq's oil industry.

Today, there are further serious obstacles that limit the Iraqi government's ability to govern effectively and to promote cooperative and coordinated policies by the different components within any ministry or between ministries. These involve failed state impediments, ethnosectarian divisions, widespread corruption, and the near absence of functioning institutions and proficient human resources.

This is demonstrated, for example, in the Kurdistan Regional Government's unilateral decision to manage oil and gas resources within the region and so called "contested territories" without reference to the Iraqi national government, parliament, or the central Ministry of Oil, forcing the ministry to pursue its own development policy.

Both are disadvantaged by the absence of a national petroleum law and the benefits of approved regulated oil policy and plans. There is a risk, indeed for both, that such contracts be judged illegal as long as they have not been passed by the national parliament.

Provided that Iraq's development and exploration policy can be implemented in an era free from current impediments, Iraq's large oil resource base and its low finding and development costs should put Iraq's oil industry on track for a major contribution to the world's energy requirements in the 21st century.

The Petroleum Law

The central Ministry of Oil's initial Petroleum Law draft aimed at a uniformity of policy and plans throughout the country.

It provides prior consultation with the provinces. Decisions taken at the center involve provincial participation. The supervision of oil and gas operations is shared between the provinces and ministry. The decisionmaking process has checks and balances to enhance transparency and anticorruption practices.

The overall objective is to optimize the oil and gas exploitation, maximize the return, and unite the country. It is based on Articles 111 and 112 seen in the light of Articles 2, 49, 109, and 110 of the constitution which broadly define the authorities and responsibilities of the federal and provincial authorities in the petroleum sector.

To achieve its objective, the draft petroleum law sets the authorities for existing and future organizational structures as given below.

Iraq's large oil resource base and its low finding and development costs should put Iraq's oil industry on track for a major contribution to the world's energy requirements in the 21st century.

Council of Representatives

- The Council of Representatives shall enact all federal legislation related to the crude oil and natural gas sectors.
- The Council of Representatives shall be the competent authority to sanction all international petroleum treaties related to petroleum operations that Iraq is a party to.

Council of Ministers

- Shall be responsible for proposing legislation to the Council of Representatives on the management of the management of the oil and gas resource.
- Shall formulate federal petroleum

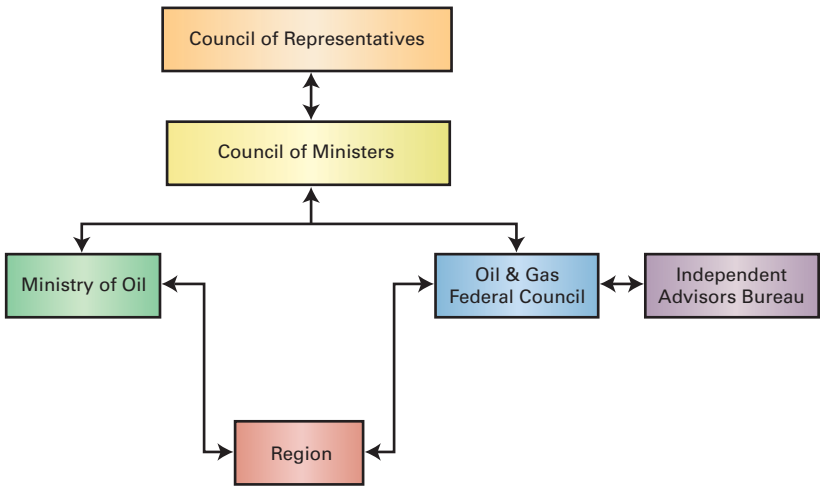
plans and policy and ensure its implementation.

• Shall administer the overall petroleum operations including the approving the federal policy, including exploration, development, and marketing, the proposal and the approval of relevant regulations.

• The Council of Ministers shall ensure that the Federal Oil and Gas Council and the Ministry of Oil adopt appropriate and effective mechanisms for consultation and coordination with the regional and producing governorate authorities.

Organizational structure

Fig. 4



Ministry of Oil

The ministry shall no longer carry out explorations or development and related operation. Its functions and responsibilities, however, will generally remain the same as previously but on advisory basis for the O&GFC approval and decision as shown below.

• Shall be the competent authority for proposing federal policy and legislation as well as issuing regulations and guidelines and undertaking the necessary monitoring, supervisory, regulatory, and administrative actions required to ensure the proper implementation thereof in accordance to the plans and policy of the O&GFC.

• Shall optimize the geographical distribution and timing of exploration and production programs and overall production and export level on the basis of proposals from the regions and producing governorates for the approval of the O&GFC.

• Shall prequalify IOCs, issue bids, and negotiate contracts based on the O&GFC models and policy and carry out technical accounting audits and other appropriate actions to verify conformance with legislation, regulations, contract terms, and internationally recognized practices.

Federal Oil & Gas Council

• The O&GFC shall decide on petroleum plans and policy for the exploration and development grant of rights and all proposals of the Ministry of Oil and ensure their proper implementation.

• Shall decide on model contracts and the exploration and development grant of rights among the national and international entities.

• Shall found the "Oil & Gas Federal Council," O&GFC, which shall be chaired by the prime minister, and appoint its members as set out by the petroleum law.

• Shall found a think-tank and appoint its members to advise on all petroleum matters referred to it.

Independent Advisory Bureau

• Shall examine and provide comments and recommendations on matters referred to it by the O&GFC on the petroleum plans and strategic policy; grant of rights; development policy as well as key projects.

• Shall assess and provide recommendations on the grant of rights by the KRG prior to the enactment of the constitution in 2005 and assess all negotiated contracts by the region and the Ministry of Oil.

The regions

The regions, of which there is only KRG for the time being, shall have the authority highlighted below.

• Propose to the federal authorities activities and plans for the region to be included in the country's plan for petroleum operations.

• Assist and participate with the federal authorities in discussions leading to the finalization of the federal plans and policies.

• Prequalify IOCs, organize their tendering process, negotiate, and initial oil and gas contracts for exploration and development blocks in areas under their jurisdiction using O&GFC model contracts for the approval of the latter.

• Approve the development plan of discovered fields and supervise its implementation, among other regulatory and supervisory roles.

• Be represented in the O&GFC.

Iraq National Oil Co.

The Council of Ministers shall submit a proposal for a law to establish the Iraqi National Oil Co. as an upstream holding company fully owned by the government and administratively and financially independent commercial company. INOC shall be authorized to:

• Enter directly into service and management contracts with qualified IOCs or service companies, if required.

• Operate some 26 currently producing fields, subject to the allocation by the O&GFC.

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currently producing fields, subject to the allocation by the O&GFC.

• Participate, singly or jointly with others, in exploration and development government tenders for fields other than those mentioned above.

• Manage and operate the main oil and gas pipeline system and export terminals.

• Establish fully owned subsidiary companies, among which there are already three operating companies.

• Establish operating companies with others or own shares in companies inside and outside Iraq subject to the approval of the council of ministers.

• Enter into service and management contracts with qualified companies for the development of its oil and gas.

The Iraq Ministry of Oil and the Kurdistan Regional Government are disadvantaged by the absence of a national petroleum law and the benefits of approved regulated oil policy and plans.

Need for INOC

Instituting INOC has proven a success in the past.

It built production capacity to over 3.5 million b/d from 1.5 million b/d in a few years and added oil reserves at the rate of more than 6 billion bbl/year in the 1970s.

As long as Iraq's economy remains dependent on oil income, it is absolutely necessary to establish a national state-owned oil industry, which should be given the administrative and financial independence to command a pivotal role in the development of the country's oil industry. It would ensure orderly exploration and developments (E&D) operations, decisions based on technical and commercial priorities, and optimum flow of income to the treasury.

• Large investment capital for future oil and gas development should not give credence to substituting national operation by IOCs. To build a production capacity of 1 b/d (365 bbl/year) costs around $5,000-10,000. The oil industry elsewhere was built by the IOCs through loans to the extent of 80-90% of the required investment capital. A borrowed capital of $5,000-10,000 to build a rate of 1 b/d of oil could be paid in less than 100-200 days of production in today's market price. A bridge loan under such circumstances would be fairly easily obtained. And, the case would not be far different under a market of $35-40/bbl under such price eventuality. Thus, while capital investment for fast-track oil development coming from IOCs has credence, its benefit should not be exaggerated.

• Partnership on service contract with local content between the INOC holding a controlling interest and the IOCs is the best balanced policy option for expediting the building of Iraq's oil industry to dimensions commensurate with its huge resource base. This is preferable to the disadvantages of sole operations of IOCs, regardless of contractual form. It provides transfer of technology and management and ensures orderly development and marketing oil export.

• Today, Iraq's oil industry limitations inhibiting fast-track oil field capacity development (clearly, apart from the lack of security, instability, and absence of a government in full control of the country), are caused by insufficient oil experienced management personnel and the lack of up-to-date, state-of-the-art technology. An active INOC working jointly with IOCs on oil field development provides a solution to technology and management limitations and a balanced approach between total state oil monopoly and a free market controlled by IOCs.

• Growing dependence on IOCs, in a diminishing or absent role for INOC, deprives the state of economic independence and puts it at serious risk during circumstances when the IOCs' obligations toward its shareholders or nationality might have to override Iraq's national interest.

The stalled petroleum law

The Ministry of Oil presented its draft petroleum law to the Council of Ministers in September 2006. The council in turn formed a ministerial committee to examine the draft.

Ethnosectarian interests, expressed mainly by the KRG, not unsupported by sectarian interests, stretched out the negotiations for over a year and resulted in three revisions by the ministerial committee, with each in turn rejected by the KRG's political leaders for one reason or another. It had made the enactment of the petroleum law subject to their agreement on the draft laws for the INOC, the organization of the Ministry of Oil, and the distribution of oil and gas.

Model upstream contracts

The Ministry of Oil is adopting four model upstream contracts that are based on the service-type contract formula, in exclusion of all the earlier PSA and buyback versions.

The draft models were recently used as a basis for discussions with ONGC Videsh, China National Petroleum Co., and Petrovietnam. The "Oilfield Service Development and Production Contract" (OSDPC) model was in fact adopted as the basis for the recent contract with CNPC. The four standard models are:

• Service Exploration and Production Contract (SEPC)

• Oilfield Service Development and Production Contract (OSDPC)

• Gas Field Service Development and Production Contract (GSDPC)

• Producing Field Technical Service Contract (PFTSC)

Bidding parameters

For PFTSC, there are three parameters:

1. Maintenance remuneration fee in US$ per barrel.
2. Incremental remuneration fee in US$ per barrel.
3. Enhanced Production Target in US$ per thousand barrels per day above a Baseline Production Rate.

For GSDPC, there are two parameters:

1. Remuneration fee as per R-factor table in US$ (x) per barrel of oil equivalent.
2. Final Production Target in MMscfd.

Cultural impact

Historically, the major international oil companies in the Middle East had established the largest industry, and at times the only industry, in any one oil-producing country.

They demonstrated a high degree of efficiency, unmatched in any one country. They became the largest provider of revenue to the state and gained great economic and political power. However, they formed distinctive enclaves, foreign and privileged and, thus, the terms 'concession' and 'concessionaire' developed controversial implications.

As a result, they became further associated with the colonial era, as the Middle East major oil producing countries were under direct or indirect foreign influence. Nationalization, therefore, was inevitable.

By the early 1970s the major producers of the Middle East pursued state monopolies over the exploration and development of their oil resources, while only a few were permitted partnerships with international oil companies. The return of the IOCs in Saudi Arabia has been limited to the E&P of gas, not oil, in Iran only under service contract of buyback terms, while in Iraq invitation to the IOCs, during the Saddam era in the 90s, took the form of production-sharing agreements and buyback contracts.

Iraq was no different from the majority in this respect as it established a national oil company (INOC) in 1964 and nationalized its oil industry in the early 1970s. Since nationalization, Iraq generally has known no mode of operation other than by INOC and-or its operating oil companies, occasioned by management service contracts.

Grant of rights: PSA vs. SC

Production-sharing agreements have wide and more favorable acceptance by most international oil companies and some host countries but have had a bad press in connection to their applicability in Iraq.

The PSA is generally very detailed, covering almost every aspect of the technical, fiscal, company role, and government regulatory and supervisory functions. It leaves little room for the state's petroleum law to apply. Its term stretches to 30-40 years, without review. With such comprehensive details as decision-sharing, allocated production stream, and frozen terms, critics say it encroaches on the sovereignty of the state.

Partnership, as joint venture, on a service contract basis between the NOCs and IOCs is viewed in Iraq as the best balanced policy option. It provides the transfer of technology and management, eases capital investment requirement, and ensures orderly exploration and-or development and marketing, while it provides the option for IOCs to be paid in-kind.

Without a central unified policy there will be disharmony and competition between INOC and the regions and governorates.

A service contract, as the name implies, leaves the state's sovereignty intact. It generally pays remuneration in cash, though crude oil purchase entitlement provides an option. As such, it is applicable to exploration and-or development. Provided it takes a joint venture model and integrate into the national interest through serious application of "local content," it would no longer create an economic enclave isolated from the people and their economic interest.

Local content

The petroleum law views the petroleum resource as the inalienable and imperceptible property of the state.

In other words, petroleum is a nonrenewable depleting asset, meriting conservation, optimum fiscal reward, as well as, amongst others, providing a major role for the national oil company and requiring the adoption of a "local content."

The draft petroleum law has not made the local content, in its wide context, a mandatory condition. However, the fact that other major producing countries such as Iran and Russia require 51%, which is on the increase, and Norway 70%, its adoption by IOCs should prove to be a rewarding policy.

Concluding remarks

As cited above, serious impediments take the shape of the manifestations of a failed state, insecurity and poor law and order, a weak and ineffective government, compounded by ethnosectarian politics, the absence of institutions and effective human resources, corruption, and lack of clarity in the constitution, contributing to the stalling the draft petroleum law, and the unilateral acts of the KRG in managing the oil and gas resource within the region without reference to the national government.

Provided that Iraq's development and exploration policy can be implemented in an era free from current impediments, Iraq's large oil resource base and its low finding and development costs provide sufficient incentive to override the present instability. It should put Iraq's oil industry on a fast development track for a major contribution to today's world energy requirements.

However, without a central unified policy there will be disharmony and competition between INOC—operating on production and marketing its export oil to provide the state's income—and the regions and governorates—operating on exploration for unnecessary additional reserves—and among the various regions and governorates, with increasing disparity between the haves and have-nots.

While the draft petroleum law remains stalled, sound policy suggests that the Ministry of Oil should adopt its original draft petroleum law and abide by its articles, in particular the decision-making processes and the checks and balances therein.

This requires a high level decision to create the managerial and administrative entities mentioned above, or, if this is not possible, the Ministry of Oil should simulate such entities in order to gain credibility and support from the country's oil industry unions and professionals, thinkers, and national politicians. The Ministry of Oil aims to pursue such route but has not achieved it yet.

For the Ministry of Oil, however, to carry on acting beyond an interim stopgap period and to continue with the grant of rights and vital projects on long-term execution of plans would be to commit the same mistake as that of the KRG, and to justify the KRG's current policy.

The return by the KRG and other players to the principles of a united nation governed in peace and stability and adopting a federal model which enjoys the advantages of decentralization without the disadvantages of divisive ethno-sectarian politics, would expedite the chances of moving towards a healthy state where the government is capable of managing effectively the affairs of the country and the nation.

Only then would Iraq's petroleum law have the chance of a revival, provided that professional amendments are made and in the light of a positive constitutional revision.

Iraq's deep-rooted civilization and the resilience of its people over many centuries remains the real assurance for the country's eventual return to normality.

The serious impediments of the concessionary era ought to be eradicated. Old timers of the oil industry have learned their lesson from the concessionary period as economic enclaves isolated instead of being integrated in the community by way of joint participation and local content in service model contracts.

The national oil companies of this era have the bulk of the world's reserves. They are the majors of the day whose contribution to their countries and to the global community is much enhanced through state-of-the-art of technology and management. The IOCs have and can provide both as services in exchange for cash or crude, which could well be the better model, under a culture which no longer should need IOCs or NOCs to replace either. ✦

The author

Tariq Ehsan Shafiq is managing director of Petrolog & Associates, a petroleum consulting group since 1970, and chair of Fertile Crescent Oil Fields Development Co. (FOC), an Iraqi registered and Baghdad-based company since 2004. He is the coordinator and a member of a three-man consulting team entrusted with drafting a petroleum law for the Iraq Ministry of Oil. He has been working in the oil and gas industry worldwide and in various capacities for over 50 years and as a consultant for 37 years. He was a founder and director of Iraq National Oil Co. As the leading researcher at Petrolog & Associates, he coordinated preparation of four volumes on Iraq's exploration potential, production capacity, and economics in a joint venture five-volume study, "Oil Production Capacity, Iraq," with the Centre for Global Energy Studies (CGES). He has a BS in petroleum engineering from the University of California, Berkeley and was granted an honorary masters degree from Oxford University in 1980. He is a founding member and a trustee of the Oxford Islamic Centre and a fellow of St. Cross College, University of Oxford.

Egypt

A group led by Vegas Oil & Gas SA, Athens, found oil and gas in Miocene Kareem sandstone at the Al Amir SE-2X appraisal well on the Northwest Gemsa Concession in Egypt's Gulf of Suez onshore.

The well sustained 5,785 b/d of 41° gravity oil and 7.8 MMscfd of gas on a 1-in. choke from the lower of two identified pay zones.

Logs indicate a combined 42 ft of net thickness in the two pay zones. The upper zone, 22 ft thick, is to be tested later. Development planning is under way.

The 400 sq km concession lies 300 km southeast of Cairo.

Vegas Oil & Gas is operator with 50% interest. Circle Oil PLC has 40%, and Premier Oil PLC has 10%.

India

A group led by Quest Petroleum Pvt. Ltd. plans to explore onshore Block CB-ONN-2005/11 in the Cambay basin in India.

The 4-year exploration period calls for shooting 3D seismic and other geophysical surveys and drilling 15 exploration wells.

Block interests are Quest 20%, Quippo Oil & Gas Infrastructure Ltd. 40%, SRIE Infrastructure Finance Ltd. 20%, and Vectra Investment Pvt. Ltd. and Primera Energy Resources Ltd. 10% each.

Arrow Energy Ltd., Brisbane, signed a memorandum of understanding with state ONGC Ltd. of India to cooperate in coalbed methane.

At issue is potential cooperation on existing ONGC blocks from previous CBM license rounds in India and possible collaboration on Australian acreage. Commercial agreements are to be worked out.

ONGC provides more than 78% of India's oil and gas production and holds the country's largest hydrocarbon acreage.

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Kenya

Origin Energy Kenya Pty. Ltd. will carry Pancontinental Oil & Gas NL, Perth, through a 3D seismic survey over the main prospects on Block L8 off Kenya under changes made to the L8 and L9 project status.

The L9 license will be relinquished, and as part of the revised exploration program accepted by the Kenyan government as a basis for granting a second additional exploration period on the L8 production sharing contract, the area of Block L8 will be reduced.

The retained portion will contain the main prospects, including the Mbawa feature sized at more than 5 billion bbl of recoverable oil or 7 tcf of gas, Pancontinental said.

By funding the seismic survey and all other project costs for the 2 years starting Jan. 22, 2009, Origin will earn 75% interest in L8 and Pancontinental will retain 25%.

Mbawa is 80 km off northern Kenya in 800 m of water.

Tajikistan

Tethys Petroleum Ltd., Guernsey, Channel Islands, UK, began delivering gas to the town of Kulob, Tajikistan, from Khoja-Sartez gas-condensate field under a 1-year contract at $2.44/Mcf.

Initial volume is as much as 2.3 MMcfd. The gas is flowing through a 7.5 mile pipeline, and work on upgrading the gas delivery system is being considered.

Tethys is also working on three existing gas wells in Komsomolsk gas field near Dushanbe and plans to conclude a similar contract at a higher price due to greater demand. Gas for Dushanbe is currently shipped from Uzbekistan at $6.80/Mcf.

British Columbia

Progress Energy Resources Corp., Calgary, combined in January 2009 from the former ProEx Energy Ltd. and Progress Energy Trust, set a budget of $340-360 million for the year, 40% of which is to be spent in the first half.

Progress plans to drill 30-35 wells in the Alberta Deep Basin in 2009, run four to six rigs in the Foothills of Northeast British Columbia, and drill four vertical and two horizontal Devonian Montney shale wells in British Columbia in the first half.

Gulf of Mexico

The Raton gas well in Mississippi Canyon Block 248 went on production near the end of 2008, said Energy Partners Ltd., New Orleans.

Flow has increased to 32 MMcfd of gas and 440 b/d of condensate. Noble Energy Inc., Houston, is operator of Raton and the nearby Redrock discovery in Block 204. The finds are in 3,300-3,400 ft of water.

Raton working interests are Noble Energy 67% and EPL 33%.

Louisiana

Dune Energy Inc., Houston, deferred drilling a fourth 2008 well in Garden Island Bay field in Plaquemines Parish, La., to reevaluate the risk-reward ranking of each prospect.

Dune signed an agreement with an undisclosed private oil and gas company. That firm, using its recently completed reverse time migrated 3D data set, will offer industry partners a 75% working interest in a 20,000-ft subsalt exploration prospect in a 4,900-acre area of mutual interest. Dune will keep the right to participate with up to a 15% interest.

Dune retained rights to all shallow potential, estimated at 130 bcfe in 15 prospects, and intends to drill three to five of the prospects in 2009.

Dune Energy is seeking an industry partner to participate in drilling a 13,400-ft prospect on the south flank of the salt dome at Bayou Couba field, St. Charles Parish, La.

Dune would keep a 25-40% working interest in the prospect. Drilling would take place in the first half of 2009.

Further work is planned on depth migrating the 3D data set to further define a subsalt exploratory prospect slated for drilling in late 2009.

Texas-West

SandRidge Energy Inc., Oklahoma City, is negotiating to sell its midstream assets in Pinon gas field in the West Texas overthrust.

The transaction is valued at $500 million in cash proceeds and reduction in midstream capital spending, the company said. With the planned asset sale and a private placement, the company plans to hike its 2009 capital budget to $700 million from $500 million.

Production guidance for 2009 would rise to 115-120 bcfe from the previous 110 bcfe, and the company expects the planned increase will allow it to load the first phase of its Century carbon dioxide separation plant in 2010 (OGJ, Nov. 28, 2008, p. 34).

Production averaged 274 MMcfed of production in 2008 and ended the year at 325 MMcfed.

Wyoming

American Oil & Gas Inc., Denver, reported a completion in Cretaceous Frontier of a well in Fetter field in Converse County, Wyo., and said it may recomplete this and other wells from the Frontier and Niobrara formations.

Sims 7-25, in 25-33n-71w, flowed to sales at the rate of 1.427 MMcfd of gas and 86.7 b/d of oil on a 24-hr test with 2,540 psi flowing tubing pressure on a $^{12}/_{64}$-in. choke.

Drilled and completed for $2.9 million, it underwent different completion and frac design than earlier vertical wells in the field, the company said.

American's working interest in the well is 69.375%. ✦

Petrobras, IOCs continue to invest heavily in Brazil

Nina M. Rach
Drilling Editor

Brazil's large reserves, stable economy, and non-OPEC status have attracted the interest and investments of international oil companies and national oil companies alike. The country's oil production has soared since the sector was opened in 1997 and is still growing.

In 1997, Brazilian fields produced about 700,000 b/d and state-owned Petroleo Brasileiro SA was the sole player In 2008, production was more than 2 million b/d, and dozens of operators were involved.

Recent news is dominated by deepwater fields (400-1,500 m water depth), particularly the presalt play. By 1998, deepwater production accounted for 50% of Brazil's oil production. Ten years later, in 2008, deepwater and ultradeepwater (>1,500 m) production contributed 80% of the country's total oil production.[1]

A new fleet of floating production, storage, and offloading vessels (FPSOs) is the key to the rapid development of the Brazilian offshore (OGJ, Feb. 4, 2008, p. 41).

Deepwater developments are pricey and international oil companies such as Royal Dutch Shell, Devon Energy Corp., and ExxonMobil Corp. have invested billions in Brazil. IOCs in nonoperating positions have limited control. Petrobras has a large portfolio of upstream projects, all subject to budgetary and scheduling constraints. There are justifiable concerns about bottlenecks in the company's project pipeline.

Development time scales are dictated by Petrobras; IOC partners will be interested in new revelations in the revised 5-year plan. (Fig. 1)

At the end of December, Petrobras's director for international operations, Jorge Zelada, announced that the company had no plans to make new downstream acquisitions in 2009. Petrobras aggressively pursed international acquisitions in 2008 but may be holding back to finance domestic projects in 2009.

Budgets

Industry expected Petrobras's revised budget on Dec. 19, but the board of directors's discussions were inconclusive. The company said that changing market conditions required further evaluation of projects, and the budget would be announced in January. Industry speculates that Petrobras will spend $112 billion through its revised 5-year strategic plan for 2008-12.

Analysts at Barclays Capital Resources in New York estimated Petrobras's 2009 budget would be reduced 6% and expect global spending for exploration and production to decline 12% to $400 billion (OGJ Online, Dec. 20, 2008).

The Brazilian national oil company is not alone in reevaluating capital expenditure plans in the wake of the global financial crisis and slumping commodity prices. Falling oil and gas prices have prompted other NOCs to reexamine operations and recast their 2009 budgets.

China's offshore exploration and

production company, CNOOC Ltd., said in late December that it was looking again at project economics. "Some projects under construction or in the pipeline could be delayed or slowed due to the price slump."[2]

CNOOC's 2009 budget is down 13%, according to Barclays Capital, joined by Pertamina (down 11%), PTT E&P (down 16%), Reliance Industries (down 15%), and Petroleos de Venezuela SA (PDVSA) (down 15%). The analysts expect Lukoil to reduce its 2009 capex by 50%, and Surgutneftegaz, Gazprom Neft, Rosneft, and TNK by 20-26%.

Economy

Brazil was quickly affected by the global financial crisis, which reduced access to bank loan and capital markets. Brazil has 38 companies quoted on Wall Street, the largest number of any Latin American nation.[3] Larger infrastructure projects, such as those offshore, may be the first to suffer, resulting in slower economic growth in Brazil through 2009, around 3%, down from 4.5% in 2008.[3]

Projections

A large number of major worldwide projects will reach first production 2008-13. Simmons & Co. analysts reported that in a study of 55 major projects, average production reaches only 55% of design capacity.[4] Their survey of major projects in Brazil appears in the accompanying table.

The company's revised 5-year plan is expected this month from Petrobras headquarters in Rio de Janeiro (Fig. 1; photo by Nina M. Rach).

Matthew Shaw, senior analyst in Latin American energy for Wood Mackenzie in Edinburgh, spoke with OGJ about Brazil.

Among non-OPEC states, Brazil is ranked seventh behind Norway, and Shaw says it will rise to fifth by 2015. Brazil is second in non-OPEC production growth modeled through 2012, expected to add nearly 800,000 b/d, compared with Russia's 1 billion b/d increase.[1]

Petrobras controls 60% of the subsalt prospects in an 11,646 sq km "cluster area" in the Santos basin. Other operators include BG Group (12%), GALP Energia (9%), Hess Corp. (5%), ExxonMobil (5%), Shell (4%), Repsol YPF (4%), and Portugese independant Partex Oil and Gas (1%).[1]

Although the presalt play in Brazil is characterized as an exciting new world-class exploration province with multi-billion barrel potential, Shaw points out that there are still many uncertainties:

- Water depths are at or beyond today's production technologies.
- Waxy (Tupi, Carioca) and heavy (BC-10) crudes require special equipment.
- High CO_2 content at Tupi and other fields will require corrosion-resistant equipment.
- Carbonate reservoirs are heterogeneous, and quality is difficult to predict.
- Pressure-support, secondary recovery mechanism to be deployed is a major unknown.
- Monetizing gas will require pipelines, LNG, or CNG infrastructure.
- A retroactive windfall tax is possible.

Expanding work

Several companies are betting on new opportunities in Brazil.

MAJOR BRAZILIAN OFFSHORE PROJECTS

Project	Operator	Water depth, ft	First full production	Peak production month, 1,000 b/d
Albacora Leste	Petrobras	2,620-6,560	2006	Feb 2007, 170
Golfinho	Petrobras	4,260-5,380	2006	Dec. 2007, 80
Espadarte expansion	Petrobras	2,625-3,085	Jan. 2007	Dec. 2007, 75
Piranema	Petrobras	3,900-5,300	Oct. 2007	Steady, 6-7
Roncador expansion	Petrobras	4,900-6,600	Nov. 2007 (renewed production with P-52)	Mar. 2008, 183
Polvo	Devon Energy	340	Aug. 2007	Steady, average 5. Expect 50 in mid-2009
Marlim Sul expansion	Petrobras	2,360-8,530	June 2004	Jan. 2006, 2008 Expect 180 with P-51 in 2009 and 100 from P-56 in 2011
Marlim Leste	Petrobras	3,513	2009	Aug. 2009, reach 280?
Frade	Chevron	3,700	2009	2011, reach 90?
Jubarte	Petrobras	3,280-4,920	2002-06; P-Dec. 2006 (renewed production with P-34)	Aug 2007, 56; expansion planned for 2011
Tupi	Petrobras	4,920-9,840	Dec. 2010	2020, reach 500?

Source: Simmons & Co. International energy research report, July 7, 2008

Drilling and production require a lot of power. American Electric Technologies Inc., Houston, supplies M&I Electric power distribution and control products to the industry worldwide.

In December, AETI announced two new strategic alliances in Brazil, with Five Star Services Ltda., in Macae, and with Lifting Services Ltda., in Niteroi. The new AETI Alliance Group will provide full power distribution and control system design, manufacturing, and offshore services in the Brazilian drilling and marine markets. The alliance will manufacture electrical switch gear and drives in Brazil (Fig. 2).

This AETI DC SCR drive system is typical of equipment used on drilling rigs to power drawworks, mud pumps, rotary, or top drives. This power gear is similar to what will be manufactured through the new AETI alliance in Brazil (Fig. 2; photo from American Electric Technologies Inc.).

American Bureau of Shipping recognized its 60th year of classification services in Brazil in 2008. In November, ABS Chairman and CEO Robert D. Somerville noted the significant expansion in offshore, shipbuilding, and ship owning sectors currently taking place in Brazil. He described Brazilian shipyards as "resurgent, busily planning to meet the expected influx of new orders."

ABS increased its staff and now has about 50 surveyors and engineers based in country. Somerville said nearly 60% of classed offshore units operating off Brazil have been built to or are being maintained to ABS Rule standards.

Drilling

Drilling programs are driven by work commitments and rig availability, and 58 mobile offshore drilling units are now based in Brazil. This includes about 14% of the world's drillships and semisubmersible drilling units (43 of 311).

As of Dec. 30, there were 9 drillships, 34 semisubmersibles, 8 jack ups, and 7 platform rigs working off Brazil, according to Rigzone.

In 2008, Petrobras announced it would build 28 new drilling rigs and 122 production service vessels (PSVs) as it expanded deepwater operations. It said most of these would be built in country, initiating greater international interest in partnering with Brazilian engineering firms and developing local construction facilities.

Local construction is nothing new; the first jack up platform was built in Brazil in 1968. Petrobras 31 was the first VLCC converted to an FPSO in Brazil.

On Dec. 23, Petrobras exploration and production director Guilherme Estrella spoke to journalists at a press conference in Rio, saying that the company would increase production in Campos basin's Parque das Baleias presalt field. Petrobras estimates the field holds 1.5-2 billion bbl recoverable reserves, although the company has drilled and completed only one well and is completing two others. The Seillean FPSO is already handling 16,000 b/d postsalt production in the field.[5]

Other Santos basin exploration wells are slated to be drilled on Ogum, Iguaçu and Corcovado fields. Petrobras will drill appraisal wells on Tupi.

Polvo field

Devon Energy Corp. operates the Polvo oil field in block BM-C-8, in the Campos basin off Rio de Janeiro state (OGJ, Feb. 19, 2007, p. 34). The field was discovered in 2004; Devon holds 60% and Korea's SK Corp. holds the remaining 40%. First production began in July 2007 and Devon estimates Polvo to hold 50 million bbl recoverable resources.

Devon installed a fixed drilling and

Petrobras pipelines such as this one in Salesopolis, near Sao Paulo, run across the coastal states and are a constant, visible reminder of the country's widespread production and refining capabilities (Fig. 3; photo by Nina M. Rach).

production platform, 3,000-hp Deal 1 (ENSCO 26), connected to FPSO Polvo, leased from Norway's Prosafe Production Public Ltd.

Prosafe converted the FPSO at Keppel FELS' Singapore shipyard in 2005-07. It arrived in Brazil in April 2007 and began a 7-year contract with Devon. Devon has the right to extend the contract an additional 8 years, through mid-2022. It's Prosafe's first Brazilian FPSO.

FPSO Polvo can produce 90,000 bo/d, 135,000 b/d of water, and 150,000 b/d of fluid, with a storage capacity of 1.6 million bbl. The vessel is moored in 105 m water above Polvo field, block BM-C-8, in the Campos basin, off Rio de Janeiro state.

FPSO Cidade de São Mateus

On Dec. 29, Prosafe Production announced that FPSO Cidade de São Mateus left Keppel FELS shipyard in Singapore on Dec. 24, en route to Brazil.

After a 40-day sail, acceptance, and approval by Brazilian authorities, the vessel will work a 9-year charter contract with Petrobras at Camarupim field off Espirito Santo. Petrobras has the right to extend the contract 6 additional years.

This FPSO is one of the world's largest and most complex converted FPSOs, according to Prosafe, with the capacity to produce 353 MMscfd of gas as well as 35,000 b/d of fluids. Produced gas will flow directly into pipelines. Produced oil will be stored in the hull (storage capacity of 700,000 bbl) and transported to shore by shuttle tankers. The FPSO's topside weight is about 20,000 tonnes.

The conversion of the FPSO began at the end of 2006.

More FPSOs?

In a November 2008 presentation, Prosafe Production Pres. and Chief Executive Officer Bjorn Henriksen said turmoil in the financial markets will affect the FPSO market. The higher cost of capital will end speculative building, and investment programs that are not fully financed may struggle, he said. In particular, "the competitive situation may ease." Lower commodity prices and activity may push costs down.

Henriksen said there are several immediate prospects for new Petrobras FPSOs off Brazil:

- Pipa III.
- Caratai (O-Oil 2).
- Tupi FPSOs.
- Carioca FPSOs.
- Papa Terra.

FPSO P-57

Keppel Shipyard in Singapore is upgrading and converting the FPSO P-57 for SBM Offshore. The FPSO will leave the shipyard for Brazil in fourth-quarter 2009.

In late November 2008, Keppel Offshore & Marine announced a contract to fabricate, install, and integrate topside process modules for the FPSO P-57 at the Keppel FELS Brasil yard.

The scope of work for SBM Offshore includes fabricating and erecting topsides modules, piping, electrical equipment, instruments, as well as precommissioning and assisting with commissioning. Keppel FELS expects to deliver the modules at the end of 2009, followed by commissioning and integration in third-quarter 2010.

Keppel Shipyard and Keppel FELS Brasil are wholly owned subsidiaries of Keppel Corp., through Keppel O&M.

Shallow water

Smaller operators have access to shallow water plays off Brazil, where investment requirements are lower. A presentation at the Rio Oil & Gas Conference discussed the hurdles to monetizing a typical offshore asset.[6] Patricia Brunet, Anadarko Petroleo Ltda., and coauthors

from Petrobras, BG Group, Terra, and the ANP collaborated assessed the cost of developing oil and gas from a near-shore asset in Espirito Santo state.

A difficulty across much of the Brazilian coast is access to pipelines and markets (Fig. 3).

10th round auction

Brazil's hydrocarbon regulator, Agencia Nacional do Petroleo (ANP) qualified 47 companies to participate in the country's 10th round auction for exploration and production concessions, including 30 Brazilian companies and 17 foreign companies.

The auction took place on Dec. 18-19, 2008, and included 130 blocks in seven onshore sedimentary basins (OGJ Online, Dec. 5, 2008).

The first day of the auction brought in $37.9 million for 54 blocks; Petrobras bought rights for 27 (mainly in the Amazon sedimentary basin) and Royal Dutch Shell bought rights to explore 5 blocks in the Sao Francisco basin in Minas Gerais state (OGJ Online, Dec. 19, 2008). ✦

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New approaches overcome past technical issues

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OIL SHALE—2

Building on past lessons in the US and successful efforts in Estonia, China, and Brazil, developers of oil shale technology are defining, testing, and demonstrating new approaches that overcome past technical issues such as energy use, thermal efficiency, oil yield, gas richness, water use, spent-shale management, emissions controls, and groundwater protection.

These new technologies also take into account the complications posed by global climate change.

More thermally efficient technologies require less energy input, produce higher yields, improve produced shale oil and gas quality, reduce and manage carbon emissions, and protect the environment. These and other innovations promise to improve operability and reliability, while maintaining capital and operating costs that will be competitive with conventional oil and gas.

This article, the second of four, describes the proven and emerging technologies for producing oil and gas from the shale. Part 1 covered the resource base (OGJ, Jan. 19, 2009, p. 56).

In future issues, the third part will discuss the economic viability of the oil shale industry, and the final article will cover the environmental effects of developing oil shale.

Technology development

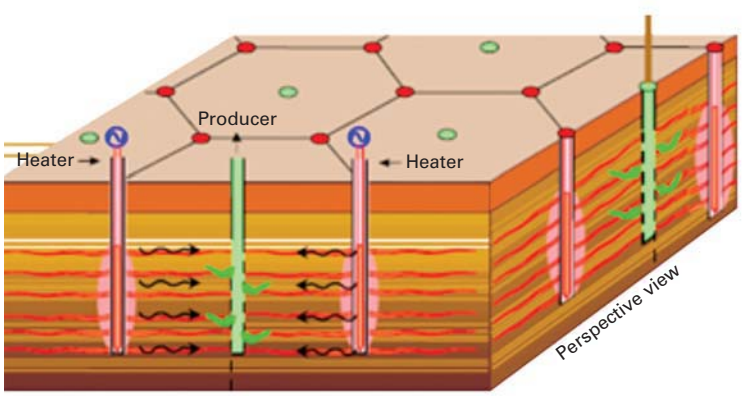
Industry is making major investments in technology research development and demonstration to advance oil shale technologies and innovations from bench and pilot scale to commercial scale.

Development of US oil shale resources has regained attention in the past few years. Several factors have contributed to this, including high oil prices, emerging recovery technologies, increasing world demand for liquid hydrocarbons, and the continued decline in US conventional oil production.

Numerous companies in the world are developing oil shale technologies. One US Department of Energy report identified more than 30 US companies actively engaged in oil shale technology, resource, or project development.[1]

SHELL'S IN SITU CONVERSION PROCESS

Fig. 1



Source: Reference 1

Freeze wall test

Some companies already are applying new technology at small scale (less than 5,000 b/d) in Estonia, Brazil, and China, but little global oil shale production remains at commercial scale; none is in the US.

Numerous approaches during more than 100 years have attempted to develop oil shale resources. These approaches fall into three broad categories: surface, in situ, or hybrid processes.

Surface processes are the most tested and most commonly used. These processes entail three major steps:

1. Oil shale mining and ore preparation.
2. Pyrolysis of oil shale in kilns or retorts to produce kerogen oil.
3. Upgrading kerogen oil to produce refinery feedstocks and high-value chemicals.

Shale for surface retorting may come from either surface or underground mines. The major difficulties for surface processes have involved materials handling, process energy efficiency, and spent-shale disposal.

For deeper, thicker deposits, not as amenable to surface or deep-mining methods, various technologies can produce kerogen oil in situ. In situ processes, by heating the resource in its natural depositional setting, minimize or eliminate the need for mining and surface pyrolysis.

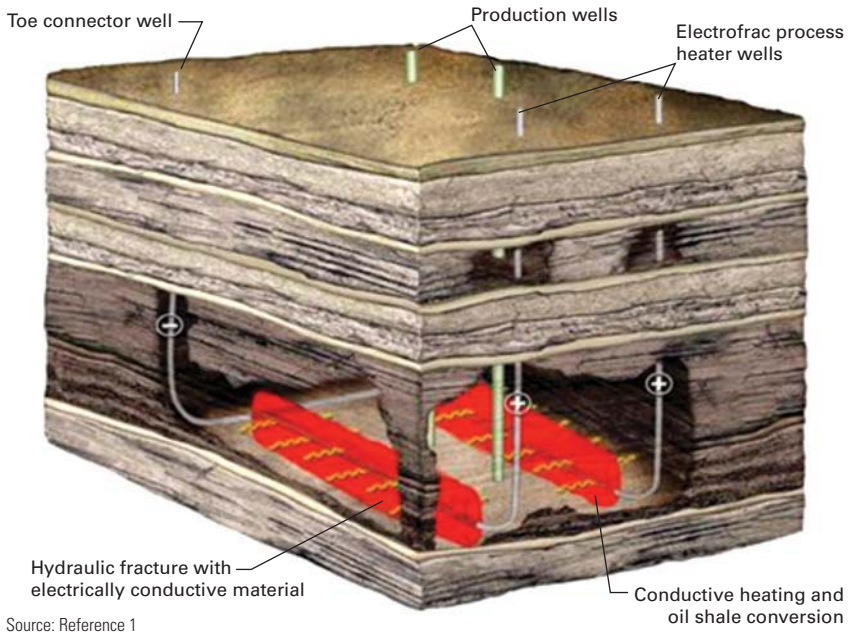
True in situ processes apply heat to the subsurface oil shale resource without mining, and modified in situ processes attempt to improve pyrolysis and recovery efficiency by fracturing or rubblizing some or all of the resource to improve heat transfer and fluid flow through the shale.

The hybrid process is a recent concept that combines surface and in situ approaches. This approach slowly heats oil shale mined from near-surface deposits in a sealed impoundment constructed in the void space created by ore excavation.

Recent advances in oil shale technology are both numerous and groundbreaking. These new variations on the traditional approaches may offer improvements in efficiency, reductions in energy use, reductions in net water use, more efficient capture of regulated emissions, effective carbon management, higher production yields, and-or improved product quality as measured by oil gravity and other standard measures.

EXXONMOBIL'S ELECTROFRAC PROCESS

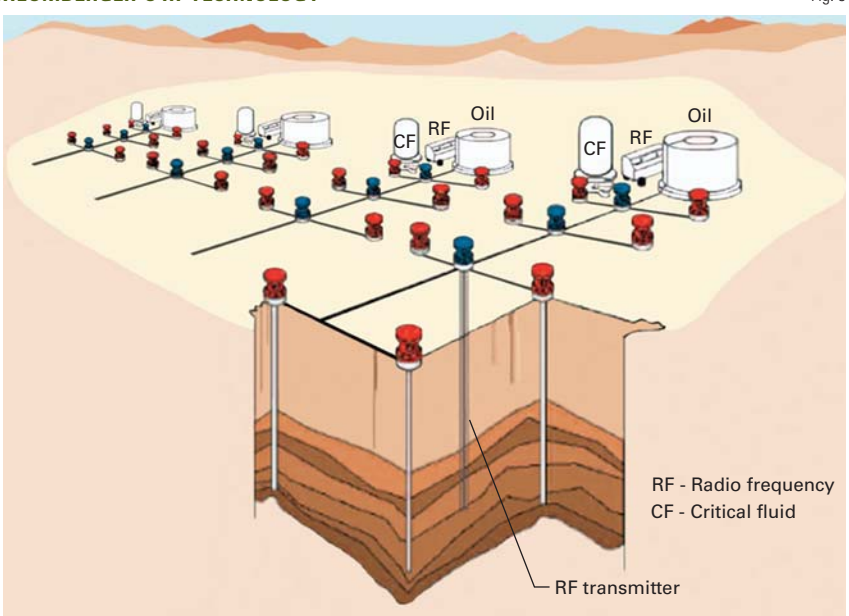
Fig. 2



Source: Reference 1

SCHLUMBERGER'S RF TECHNOLOGY

Fig. 3



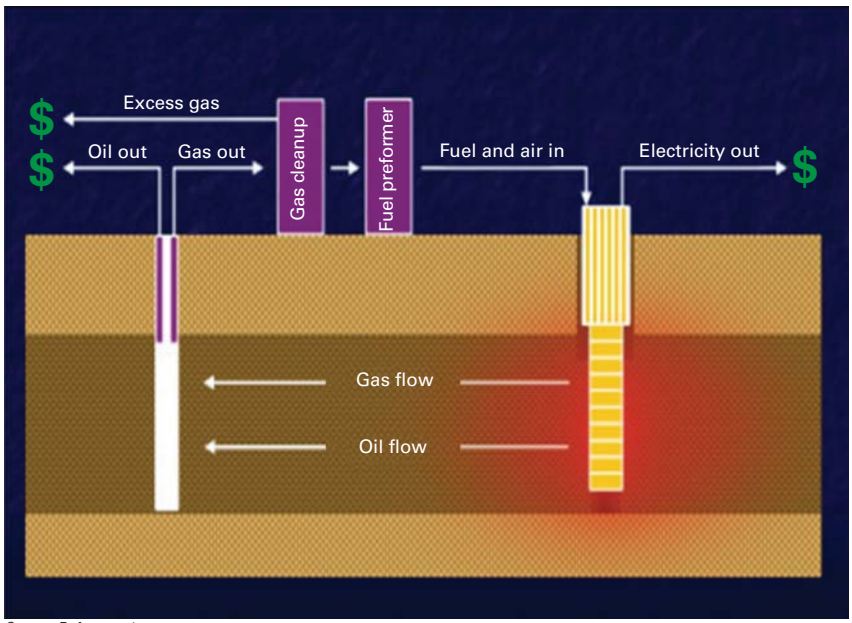
Source: Reference 1

Shell's in situ conversion[1]

For more than a quarter of a century, Shell Oil Co. in its Mahogany research project has tested an in situ conversion

IEP'S GEOTHERMIC FUEL CELL

Fig. 4



Source: Reference 1

process (ICP) in Colorado. Shell's technique inserts heaters underground to convert kerogen in oil shale into high-quality transportation fuels, generating more oil and gas from a smaller surface area than previous oil shale processes.

In the ICP process, electric heaters gradually heat shale located 1,000-2,000 ft subsurface, to 650-750° F. The heat changes the kerogen in oil shale into oil and gas. Traditional recovery methods then pump the oil to surface.

Shell expects this slow, lower temperature process to generate lower carbon emissions than traditional surface retorting. The process yields high-quality feedstocks (greater than 30° gravity) with estimated yields in the thickest and richest deposits from 100,000 to 1 million boe/acre.

The tests also include freezewall technology for protecting the heating zone from groundwater intrusion and for protecting the groundwater from potential contamination. After the production area has been cleaned, the freezewall is terminated allowing resumption of groundwater flow.

Fig. 1 displays both the ICP technology and the freeze-wall concept.

ExxonMobil's Electrofrac[1]

ExxonMobil Corp.'s Electrofrac process for in situ oil shale conversion involves hydraulically fracturing the shale and filling the fractures with an electrically conductive material, forming a heating element.

Exxon expects the use of vertical fractures created from horizontal wells will produce a conductive zone that when heated to pyrolysis temperature will produce liquids and gases that conventional recovery technologies can produce (Fig. 2).

Petro Probe's superheated air[1]

Petro Probe Inc. has licensed an in situ process that can gasify and recover products from oil shale deposits deeper than 3,000 ft. The process begins by drilling into the oil shale and locating a processing inlet conduit within the hole. An effluent conduit is anchored around the opening at surface.

The process then introduces pressurized air to an aboveground combustor, superheating the air and directing it underground into the oil shale through the inlet conduit to heat the rock and convert the kerogen to a gaseous state.

Radiant heat in the inlet conduit produces a nonburning thermal energy front of predictable radius in the oil shale surrounding the hole. High temperatures and correct pressures cause the porous marlstone to gasify. Four products result: hydrogen, 45° gravity condensate; 1,000-btu methane gas, and water.

This is a self-sustaining system with gas being condensed and recycled. In addition, the process includes compressing produced CO_2 and pumping it back into the oil shale formation where it remains.

The process has a minimal surface footprint. Each complete plant will cover about 1 acre of land and will deplete the oil shale body in 10-20 years. Subsurface, the formation retains 94% to 99% of its original structural integrity once the kerogen has been gasified.

Schlumberger's RF technology[1]

Raytheon Co. and CF Technology Inc. developed an extraction methodology involving radio frequency (RF) and critical fluids. In 2007, the companies sold the integrated technology to Schlumberger Ltd., which plans to commercialize the technology and facilitate its application in heavy oil and oil shale projects.

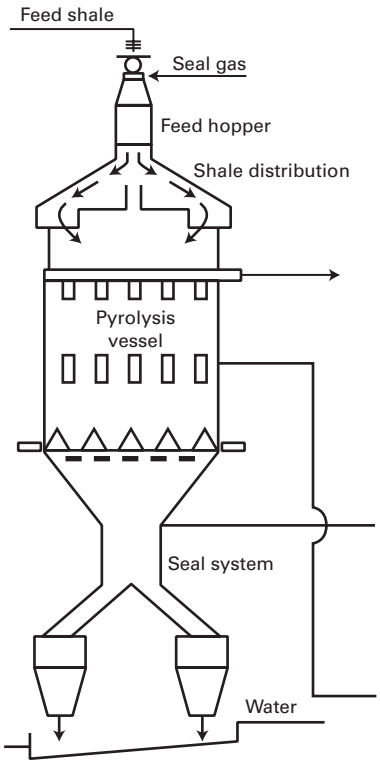
This in situ technology uses radio frequencies to heat the shale to pyrolysis temperatures and supercritical CO_2 to sweep the produced liquids and gases to production wells.

This extraction method uses standard oil industry equipment to drill the wells into the shale strata. Then RF antennas lowered to the shale zone transmit RF energy to heat the shale. Supercritical CO_2 pumped into the oil shale extracts the kerogen oil and carries it to an extraction well.

Surface facilities separate out the CO_2 and pump it back into injection wells. When refined, the oil and gas become gasoline, heating oil, and other products. Ultimately, the company expects

PETROBRAS'S PETROSIX

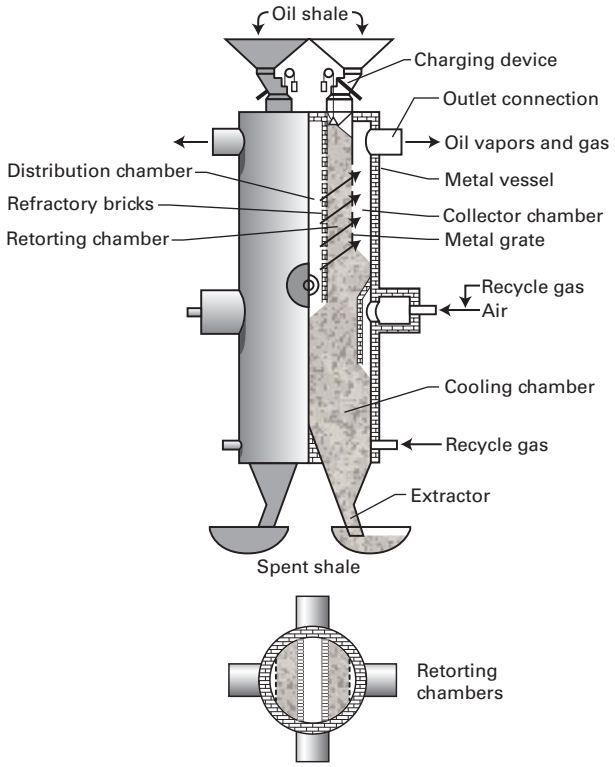
Fig. 5



Source: Reference 3

KIVITER VERTICAL RETORT

Fig. 6



Source: Reference 4

that this self-sequestration approach will yield a neutral carbon footprint for process operations.

This extraction technology can start producing oil and gas within only a few months compared to years of heating required by other in situ processes. The process is tunable in that it allows directing the heat consistently to the desired target and facilitates production of various products.

According to Raytheon, the process may recover 4-5 boe/bbl consumed (Fig. 3). As with the Shell and other approaches, this process requires large quantities of input energy to produce the RF waves.

IEP's geothermic fuel cell[1]

Independent Energy Partners (IEP) has developed a heating technology that uses geothermic fuel cell (GFC) to convert kerogen to shale oil, in situ, while using minimal external energy sources. The process involves placement of a high-temperature fuel cell stack in the formation to heat the formation.

As the formation heats, it releases hydrocarbon liquids and gases into collection wells. A portion of the gases are processed and returned to the fuel cell stack, with the rest available for sale.

After an initial warm up period during which the cells are fueled with an external source of natural gas, the process becomes self-fueling from gases liberated by its own waste heat. The system, in steady-state operation, produces oil, electricity, and natural gases.

IEP has designed the GFC to produce a net energy ratio of about 18 units of energy produced/energy unit used. The calculated ratio combines primary recovery with residual char gasification and resulting syntheses gas (Fig. 4).

According to IEP, GFCs heating from solid-to-solid conduction is more efficient than nonconductive applications. GFCs produce heat at a uniform rate along their length and heat the formation uniformly from top to bottom, leading to far greater yields and simplified production cycles.

Raising the formation temperature increases fluid pressure in the heated zone by 100-200 psi over native pressure, which can be enough to fracture oil shale. Alternatively, the operator can prefracture the formation to enhance the hydrocarbon flow and communication between heating and producing wells.

Petrobras's Petrosix retort

In the 1960s, Petroleo Brasilerio SA (Petrobras) started developing a process to extract oil from pyrobituminous shales, a process it calls Petrosix. This technology is an adaptation of the gas combustion retort (GCR) developed by Cameron Engineers. The Petrosix vertical shaft GCR produces 3,870 b/d of liquids and is the world's largest operational surface oil shale pyrolysis reactor.

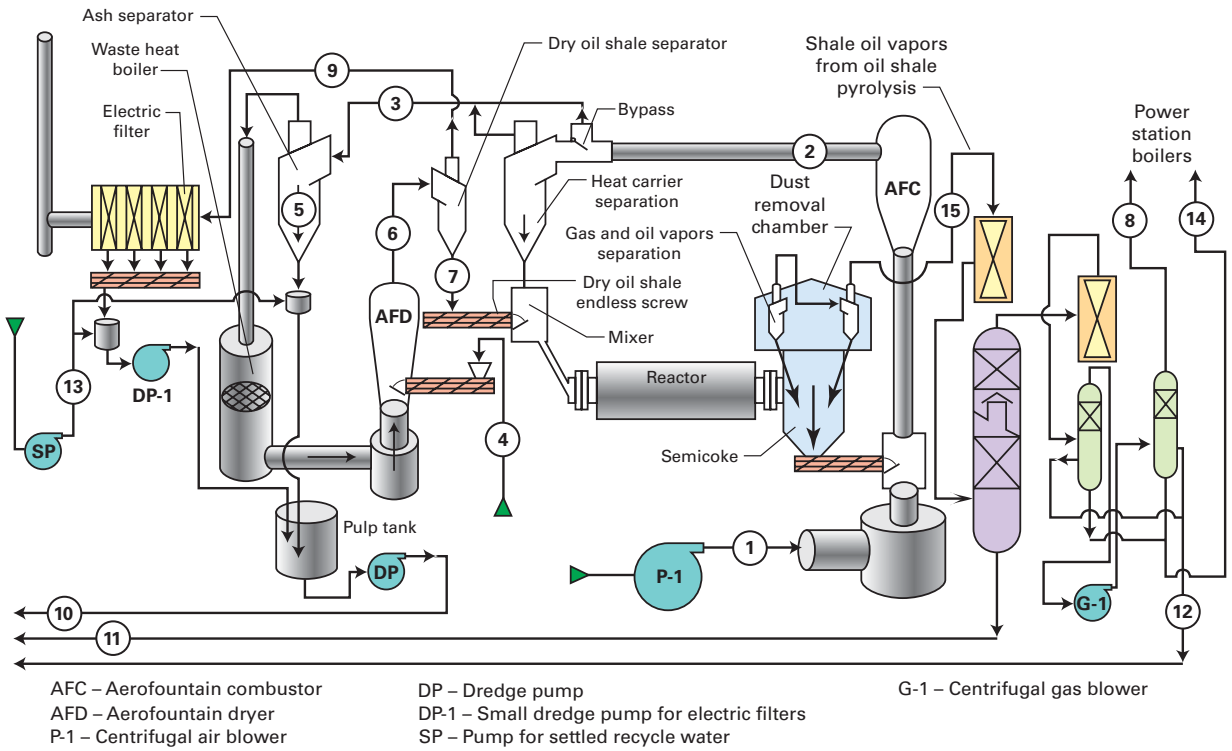
The Petrosix process involves first crushing the mined shale. The crushed shale is then transported to the retort and heated to high temperatures in the top chamber of the GCR. The heated shale releases organic matter in the form of oil and gas vapor.

The next stage cools the vapor allowing it to condense and produce liquids and hydrocarbon gases. Shale gases undergo another cleaning process for light oil extraction (Fig. 5).

The Petrosix process has low water consumption during operation, high thermal efficiency, high operational factor (about 94%), high recovery efficiency (85-90% of Fisher assay),

GALOTER LATERAL RETORT

Fig. 7



Source: Reference 3

and minimal environmental and health effects.[2]

The current process operations generate 3,870 b/d of shale oil, 120 tonnes of fuel gas, 45 tonnes of LPG, and 75 tonnes of sulfur from 7,800 tons of shale.[1]

Fushun retorts

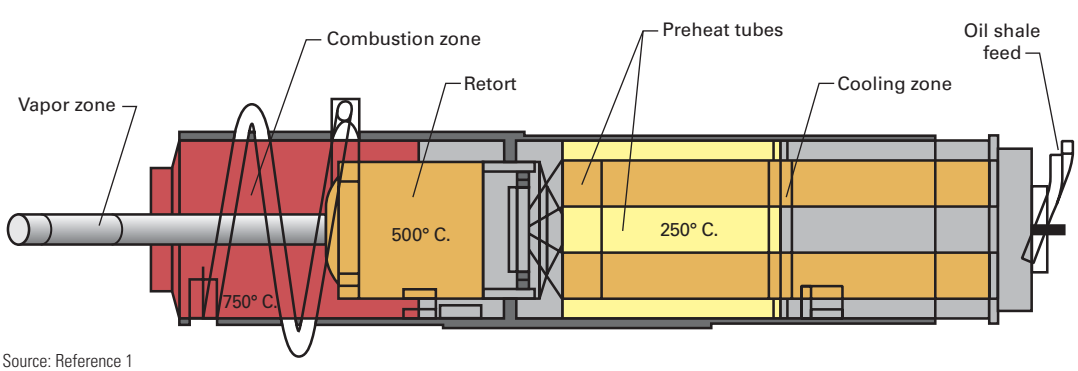
China has expanded shale oil production by increasing the number of small vertical retorts operating at its processing facilities. In 2005, the Fushun facility employed more than 120 retort units, each having a daily throughput capacity of 100 tonnes of oil shale. Grouping the low capacity retorts allows 20 retorts to share a single condenser system.

Like the Petrosix retort, the design allows the use of pyrolized residual carbon to obtain high thermal efficiency. The Fushun design, however, allows introduction of nitrogen in the pyrolysis gas resulting in a produced gas with low calorific value. Introduction of oxygen in the upper chamber makes the pyrolysis less efficient, resulting in oil yields of only about 65% of Fisher assay.[2]

Expansion of production requires construction of additional batteries of Fushun retorts or adoption of other oil shale technologies. China currently has under evaluation the Petrosix and Alberta Taciuk processes.

ALBERTA TACIUK PROCESS

Fig. 8



Source: Reference 1

Kiviter, Galoter retorts

The Estonian oil shale industry has used two types of retorts (Figs. 6 and 7). The older Kiviter retorts are vertical, lump shale, gas combustion processors, suitable for medium-scale pro-

duction capacities (1,000 tonnes/day of oil shale) and have oil yields of 75-80% of Fisher assay. The Viru Keemia Group (VKG) has operated two 1,000 tonne/day (tpd) retorts with good results for producing fuels and chemicals.[1]

The newer Galoter retort design is a horizontal fluidized bed retort with a throughput capacity of about 3,000 tpd (roughly half the capacity of the Petrosix 11-m retort and three times the capacity of the Kiviter). Using shale ash as a solid heat carrier, the process is more thermally efficient, reducing energy inputs, and achieves a higher yield of about 85-90% of Fisher assay. The design also delivers higher quality produced gases.

Although the process is more complex than the Kiviter, plant availability has steadily improved, recently reaching 6,200 hr/year of operating up time.

These designs currently are in use in Estonia and EESTI Energia may consider them for use in Jordan.

Alberta Taciuk process

The Alberta Taciuk process (ATP) involves a horizontal rotating kiln with high thermal efficiency and high production efficiency. It can obtain shale oil production of 90% or greater of Fisher assay.

The process, originally developed in 1976 for treating Alberta oil sands, was later refined for use in oil shale and contaminated waste treatment. A scaled-up commercial version of the process operated in the Stuart deposit in Queensland Australia and produced more than 1.5 million bbl shale oil.

The process combines gas recirculation and direct and indirect heat transfer from circulated hot solids in a rotating kiln. It is largely energy self-sufficient because some of the hot processed shale recirculates in the retort with fresh shale to provide pyrolysis heat by direct, solid-to-solid heat transfer.

ATP has been reported to increase kerogen oil and gas yields, improve thermal efficiency, reduce process water needs, and minimize residual coke on spent shale, enabling environmentally safe disposal (Fig. 8). ✦

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Khosrow Biglarbigi's and James Killen's photos and biographies appeared in Part 1 of this series.

GUIDE TO WORLD CRUDES

Statoil assays Volve crude

StatoilHydro has conducted a crude assay for its Volve field, which lies 200 km west of Stavanger (Fig. 1).

The field at the southern end of the Norwegian sector came on stream Feb. 12, 2008. The company published the assay on Oct. 13, 2008.

StatoilHydro estimates recoverable reserves of 78.6 million bbl of oil and 1.5 billion cu m of gas. Volve will produce about 50,000 b/d at its peak. Gas is piped to the Sleipner A platform for final processing and export.

Partners in the field include StatoilHydro, 59.6%, ExxonMobil Corp., 30.4%, and PA Resources, 10%.

Fig. 2 shows a true boiling point (TBP) curve for the whole crude. These data are from StatoilHydro.

Whole crude

Density at 15° C., kg/l.: 0.8768
Specific gravity: 0.8772
Gravity, °API: 29.8
Dry oil density at 15° C., kg/l.: 0.8767
Sulfur, mass %: 1.72
Total acid number, mg KOH/g: 0.04
rvp, kPa: 31.4
Pour point, °C.: 0
Kinematic viscosity at 20° C., cst: 19.2
Kinematic viscosity at 40° C., cst: 9.41
Nitrogen, mg/kg: 2,340
Vanadium, mg/kg: 28
Nickel, mg/kg: 4.2
Sodium, mg/kg: 1.2
Salt as NaCl, mg/l.: 6.41
Wax content, mass %: 8.8
Flash point, °C.: <10
Water content, mass %: 0.05

Pentanes to 65° C.

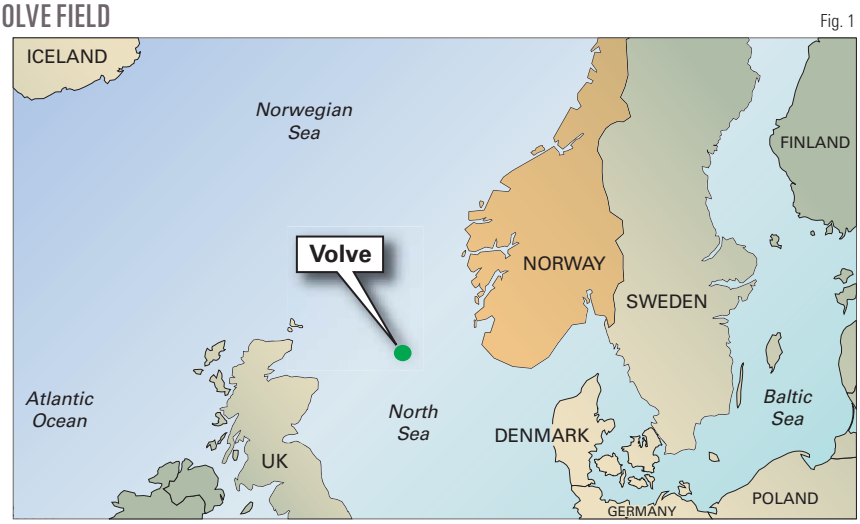
Yield, mass %: 2.46
Yield, vol %: 3.26
Density at 15° C, kg/l.: 0.6447
Specific gravity: 0.6447
Gravity, °API: 88.0
Mercaptan sulfur, mg/kg: <3
n-Paraffins, mass %: 55.9
i-Paraffins, mass %: 34.3
Naphthenes, mass %: 7.4
Aromatics, mass %: 2.4
n-Paraffins, vol %: 57.3
i-Paraffins, vol %: 34.7
Naphthenes, vol %: 6.3
Aromatics, vol %: 1.7
Vapor pressure, kPa: 127.9
RON: 75.3
MON: 74.3

65-90° C.

Yield, mass %: 2.76
Yield, vol %: 3.30
Density at 15° C., kg/l.: 0.7157
Specific gravity: 0.7158
Gravity, °API: 66.2
Sulfur, mass %: <0.001
Mercaptan sulfur, mg/kg: <3
n-Paraffins, mass %: 31.6
i-Paraffins, mass %: 25.4
Naphthenes, mass %: 30.8
Aromatics, mass %: 12.2
Benzene, mass %: 10.6
n-Paraffins, vol %: 34.1
i-Paraffins, vol %: 27.1
Naphthenes, vol %: 28.9
Aromatics, vol %: 9.9
Benzene, vol %: 8.6
Vapor pressure, kPa: 39.6
RON: 64.8
MON: 62.8

VOLVE FIELD

Fig. 1



90-150° C.

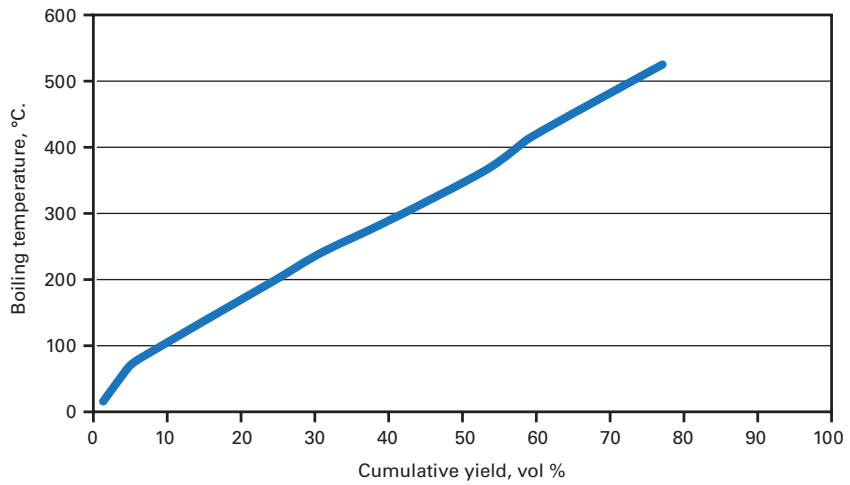
Yield, mass %: 8.10
Yield, vol %: 9.18
Density at 15° C., kg/l.: 0.7537
Specific gravity: 0.7539
Gravity, °API: 56.2
Sulfur, mass %: 0.002
Mercaptan sulfur, mg/kg: <3
n-Paraffins, mass %: 23.2
i-Paraffins, mass %: 23.5
Naphthenes, mass %: 35.0
Aromatics, mass %: 18.3
Benzene, mass %: 1.3
n-Paraffins, vol %: 25.1
i-Paraffins, vol %: 24.9
Naphthenes, vol %: 34.1
Aromatics, vol %: 15.9
Benzene, vol %: 1.1
Flash point, °C.: <10

150-180° C.

Yield, mass %: 4.24
Yield, vol %: 4.76
Density at 15° C., kg/l.: 0.7817
Specific gravity: 0.7820
Gravity, °API: 49.5
Sulfur, mass %: 0.039
Mercaptan sulfur, mg/kg: <3
Total acid number, mg KOH/g: 0.02
n-Paraffins, mass %: 20.6
i-Paraffins, mass %: 26.4
Naphthenes, mass %: 31.4
Aromatics, mass %: 21.6
n-Paraffins, vol %: 22.2
i-Paraffins, vol %: 27.7
Naphthenes, vol %: 30.6
Aromatics, vol %: 19.4
Total aromatics, mass %: 19.7
Monoaromatics, mass %: 19.7
Diaromatics, mass %: <0.1
Polycyclic aromatics, mass %: <0.1
Naphtalenes, vol %: 0.05
Aniline point, °C.: 51.0
Smoke point, mm: 25.0
Flash point, °C.: 35.0
Freezing point, °C.: <–60.0
Cetane index, D-976: 31.9
CCI, D-4737: 36.7
Kinematic viscosity at 20° C., cst: 1.08
Kinematic viscosity at 50° C., cst: 0.80
Nitrogen, mg/kg: <1

Simulated distillation

Fig. 2



180-240° C.

Yield, mass %: 8.46
Yield, vol %: 9.14
Density at 15° C., kg/l.: 0.8120
Specific gravity: 0.8123
Gravity, °API: 42.7
Sulfur, mass %: 0.213
Mercaptan sulfur, mg/kg: <3
Total acid number, mg KOH/g: 0.03
Total aromatics, mass %: 26.7
Monoaromatics, mass %: 23.2
Diaromatics, mass %: 3.5
Polycyclic aromatics, mass %: <0.1
Naphtalenes, vol %: 2.32
Aniline point, °C.: 55.8
Smoke point, mm: 22.0
Freezing point, °C.: -55.0
Cloud point, °C.: –43
Cold filter plugging point, °C.: <–45
Pour point, °C.: <–45
Cetane number: 48.1
Cetane index, D-976: 41.7
CCI, D-4737: 42.5
Kinematic viscosity at 20° C., cst: 1.82
Kinematic viscosity at 50° C., cst: 1.16
Nitrogen, mg/kg: <1

240-320° C.

Yield, mass %: 14.06
Yield, vol %: 14.54
Density at 15° C., kg/l.: 0.8479
Specific gravity: 0.8483
Gravity, °API: 35.3
Sulfur, mass %: 0.937
Total acid number, mg KOH/g: 0.03
Total aromatics, mass %: 34.0
Monoaromatics, mass %: 22.9
Diaromatics, mass %: 10.9
Polycyclic aromatics, mass %: 0.2
Aniline point, °C.: 64.8
Cloud point, °C.: –18
Cold filter plugging point, °C.: –20
Pour point, °C.: –18
Cetane number: 55.1
Cetane index, D-976: 49.2
CCI, D-4737: 52.1
Kinematic viscosity at 20° C., cst: 4.91
Kinematic viscosity at 50° C., cst: 2.51
Nitrogen, mg/kg: 43
Basic nitrogen, mass %: 0.003

320-375° C.

Yield, mass %: 9.00
Yield, vol %: 8.94
Density at 15° C., kg/l: 0.8827
Specific gravity: 0.8832
Gravity, °API: 28.7
Sulfur, mass %: 1.79
Total acid number, mg KOH/g: 0.04
Total aromatics, mass %: 41.8
Monoaromatics, mass %: 26.1
Diaromatics, mass %: 13.5
Polycyclic aromatics, mass %: 2.2
Aniline point, °C.: 68.9
Watson K-factor: 11.7
Cloud point, °C.: 9

Cold filter plugging point, °C.: 9
Pour point, °C.: 9
Cetane number: 59.0
Cetane index, D-976: 47.4
CCI, D-4737: 56.4
Conradson carbon residue, mass %: <0.1
Kinematic viscosity at 20° C., cst: 17.1
Kinematic viscosity at 50° C., cst: 6.27
Kinematic viscosity at 100° C., cst: 2.28
Nitrogen, mg/kg: 560
Basic nitrogen, mass %: 0.021
Refractive index at 67° C.: 1.473

375-420° C.

Yield, mass %: 5.87
Yield, vol %: 5.65
Density at 15° C., kg/l.: 0.9109
Specific gravity: 0.9114
Gravity, °API: 23.8
Sulfur, mass %: 2.03
Total acid number, mg KOH/g: 0.02
Aniline point, °C.: 74.2
Watson K-factor: 11.7
Pour point, °C.: 27
Conradson carbon residue, mass %: <0.1
Kinematic viscosity at 50° C., cst: 19.9
Kinematic viscosity at 100° C., cst: 4.89
Vanadium, mg/kg: <0.1
Nickel, mg/kg: <0.1
Nitrogen, mg/kg: 1,370
Basic nitrogen, mass %: 0.045
Refractive index at 67° C.: 1.489

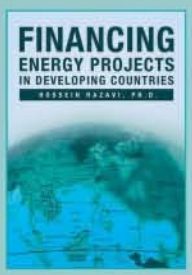
420-525° C.

Yield, mass %: 18.00
Yield, vol %: 16.96
Density at 15° C., kg/l.: 0.9304
Specific gravity: 0.9309
Gravity, °API: 20.5
Sulfur, mass %: 2.25
Total acid number, mg KOH/g: 0.02
Aniline point, °C.: 77.0
Watson K-factor: 11.7
Pour point, °C.: 36
Conradson carbon residue, mass %: 0.22
Kinematic viscosity at 50° C., cst: 58.2
Kinematic viscosity at 100° C., cst: 9.52
Vanadium, mg/kg: <0.1
Nickel, mg/kg: <0.1
Nitrogen, mg/kg: 2,150
Basic nitrogen, mass %: 0.066
Refractive index at 67° C.: 1.5

525+° C.

Yield, mass %: 26.09
Yield, vol %: 22.84
Density at 15° C., kg/l.: 1.0016
Specific gravity: 1.0023
Gravity, °API: 9.7
Sulfur, mass %: 3.25
Aniline point, °C.: 79.8
Watson K-factor: 11.5
Pour point, °C.: 33
Conradson carbon residue, mass %: 13.2
Asphaltenes, mass %: 1.6
n-Pentane insolubles, mass %: 5.5
Ash, mass %: 0.052
Kinematic viscosity at 100° C., cst: 549
Kinematic viscosity at 135° C., cst: 104
Vanadium, mg/kg: 110
Nickel, mg/kg: 16
Nitrogen, mg/kg: 6,970
Basic nitrogen, mass %: 0.177
Penetration at 25° C., 0.1 mm: 195 ✦

If you haven't shopped PennWell Books lately, *here's what you've been missing!*



FINANCING ENERGY PROJECTS IN DEVELOPING COUNTRIES

Hossein Razavi, Ph.D.

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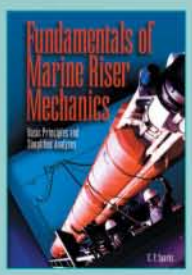

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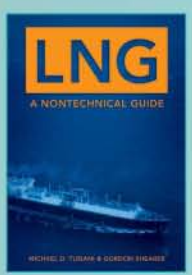

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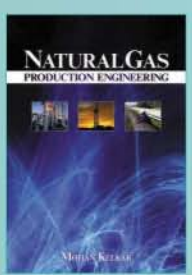

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New Caspian oil production will bypass Russian transport

Paata Tsagareishvili
Gogita Gvenetadze
Ministry of Economic Development, Georgia
Tbilisi

Most of the Caspian region's new oil production will be transported to international markets via pipelines in Azerbaijan and Georgia, reducing Russia's share of the regional oil transport market.

Caspian region oil production will increase from 80.4 million tons in 2005 to between 135 and 205.3 million tons in 2015.

Increases in output from Tengiz field in Kazakhstan, Kashagan field in the northern Caspian Sea just off the coast of Kazakhstan, and ACG field in the southern Caspian Sea just off the coast of Azerbaijan will key this rise in production.

Limited expansion potential on the Russian-operated Caspian Pipeline Consortium (CPC) line and a desire by the region's shippers to avoid additional use of Russian lines, will lead most of this new production to be carried by the Baku-Tbilisi-Ceyhan (BTC) pipeline instead.

Azerbaijan and Georgia's share of the transportation market for Caspian oil will increase to 55% in 2015 from 22% in 2005, while the transportation market share of systems in Russia will decline to as little as 34% in 2015 from 66% in 2005 (Table 1).

Background

Russian Transneft aspires to maximize oil flows through its territory and take full control of the region's transport systems. The Caspian nations do not support these aspirations.

Russian capacity is fully used. Russia's major oil pipeline in the Caspian region also ends at the Black Sea, requiring ships to transit the heavily trafficked Bosporus and Dardanelles straights. Despite these limitations Russia strongly opposed development of the Baku-Tbilisi-Ceyhan pipeline and continues to oppose its expansion.

Two key factors will determine the competitiveness of any Caspian region oil transportation corridor:

- The ability to transport oil from Kazakhstan.
- The ability to effectively reduce dependence on Russia.

The World Bank predicts increases in oil transportation capacity through Azerbaijan and Georgia to parallel growth in Caspian oil exports between 2005 and 2015, establishing secure transportation corridors outside of Russia.

This article will examine factors guiding the path oil follows out of the region and detail Caspian transportation infrastructure, including pipelines, ships, seaports, and terminals.

Change drivers

Existing oil transportation systems in the Caspian region do not have sufficient capacity to satisfy future demand for Caspian oil. Exports of Caspian oil will increase to 152 million tons by 2010 (from 80 million tons in 2005) and will reach as much as 205.3 million tons by 2015, requiring expansion of the region's transport systems.

Transportation choices will depend in part

CASPIAN REGION OIL SHIPMENTS, 2005-15

Table 1

Route	2005	2007	2010	2015 Low	2015 High
	Million tons				
China	6.2	9.3	9.7	6.7	21.2
Iran	3.5	7.9	5.3	3.0	8.0
Russia	53.4	53.5	62.0	51.0	69.0
Georgia-Azerbaijan	17.4	33.9	75.1	74.3	107.1
Total	**80.5**	**104.6**	**152.1**	**135.0**	**205.3**
	%				
China	8	9	6	5	10
Iran	4	8	3	2	4
Russia	66	51	41	38	34
Georgia-Azerbaijan	22	32	49	55	52

on the capacity of the region's two major pipelines, Baku-Tbilisi-Ceyhan (BTC) and Caspian Pipeline Consortium (CPC).

Full use of the BTC's already large capacity and expansion of the CPC can satisfy most of the expected demand for oil transportation through 2015. Failure to expand CPC's capacity, however, will require development of other transport systems, including pipelines, rail systems, and location swaps.

CPC's capacity limitations increase the likelihood that at least part of new Kazakh production from Tengiz field will travel through the BTC pipeline instead. But gas price disputes between Azerbaijan and Russia and similar incidents involving other countries have accelerated Azerbaijan's efforts to develop alternative routes.

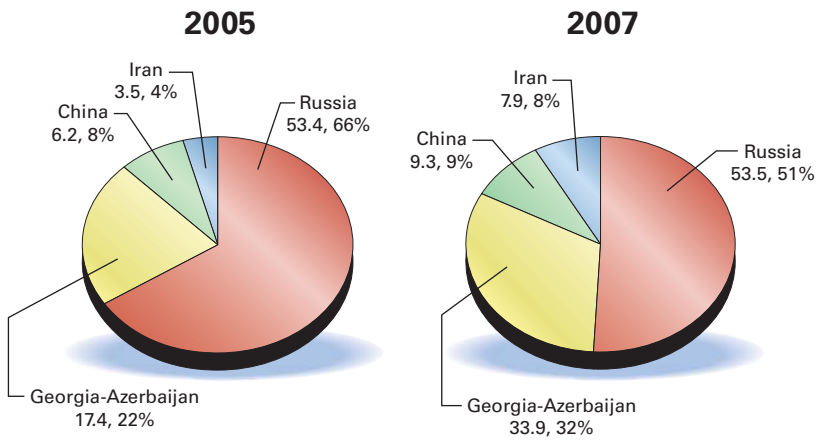
Kazakhstan reached agreement in principle in 2007 to export Tengiz oil by tanker to Baku and then through the BTC pipeline. Kazakhstan also signed a memorandum of understanding in 2007 creating the Kazakhstan Caspian Transport System (KCTS). KCTS would transport around 50 million tons of Kashagan crude oil once the field is developed, probably some time after 2010.

KCTS consists of a pipeline from Atyrau, where Kashagan crude comes ashore and is processed, to the new port of Kuryk, located just south of Aqtau and designed to handle tankers up to 60,000 dwt. From Kuryk the crude oil will move by tanker to Baku. From Baku most of the crude will flow into BTC for delivery to Ceyhan, Turkey. Small amounts might also move by rail to Georgian ports or through the Baku-Supsa or Baku-Novorossiysk pipelines.

The final development and ownership of the three Georgian ports on the Black Sea and the capacity and structure of the other transport links in Georgia and Azerbaijan will also affect the level and pattern of rail traffic through the Caucasus. KazMunaiGaz (KMG) owns Batumi Port and intends to reopen its oil refinery. SOCAR plans to begin operating a new port at Kulevi and wants to develop railway infrastructure.

Caspian oil distribution*

Fig. 1



*Volumes in million tons/yr.

Flow changes

The routes for transporting oil from the Caspian comprise a complex network of pipelines, ports, ships, and railways. Fig. 1 shows the distribution of oil transportation by corridor in 2005 and 2007.

About two-thirds of total oil exports from the Caspian transited through Russia in 2005, with nearly a quarter traveling through Georgia and Azerbaijan and the remainder moving to Iran via swap, or to China. About 71% moved by pipeline and 25% by rail. The remainder (Iran swaps) was transported by tanker and rail.

Roughly one half of the Caspian region's export oil moved through Russia in 2007 and one-third through Azerbaijan and Georgia. Rail's share shrank to 17% from 25%.

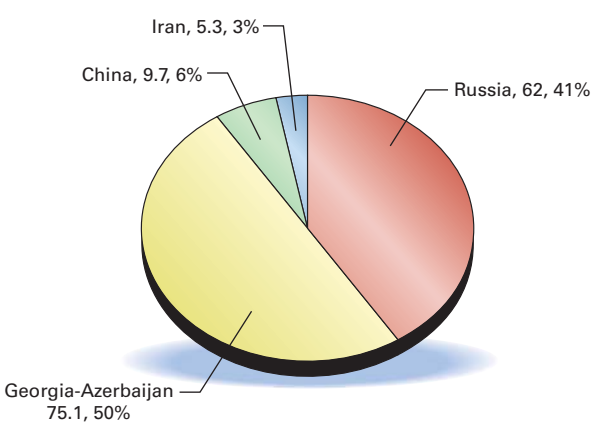
The total volume of oil exported from the region in 2010 will increase by as much as 50 million tons/year; or 40-50%. About 70% of this growth will come from the ACG field in the southern Caspian Sea and most of the remainder from Kazakhstan's Tengiz field.

Failure to increase the capacity of the already-full CPC pipeline by 2010 will force incremental Tengiz production to find alternative routes. BTC will transport much of the additional crude oil, reducing Russia's share of Caspian transport volumes to 41%, with the Caucasus share increasing to half (Fig. 2).

The low forecast for 2015 assumes a reduction in oil

Caspian oil distribution, 2010*

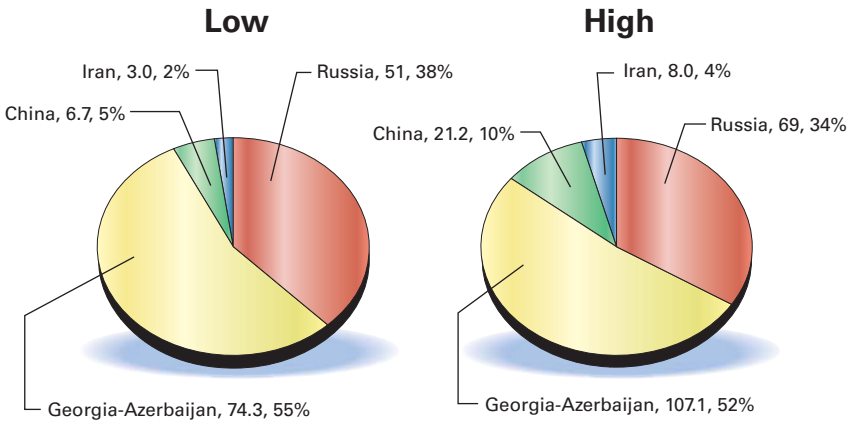
Fig. 2



*Volume in million tons/year.

CASPIAN OIL DISTRIBUTION, 2015*

Fig. 3



*Volumes in million tons/yr.

production from oil fields in Azerbaijan offset by growth of production in Kazakhstan's Kashagan field, with little change occurring in the overall transportation pattern. BTC volumes would remain stable at about 60 million tons/year. Instead of Azeri crude representing 90% of BTC's volume, however, about half of its volume would come from Kazakhstan, causing Russia's share of exports to slip slightly to 38% (Fig. 3).

The high forecast poses a greater test for the transport network. An additional 45 million tons/year from Kazakhstan and 17 million tons/year from Azerbaijan will use all available capacity on both BTC and CPC. Some additional capacity is available in the Transneft system and on minor rail routes through Russia and the Caucasus, but such a large increase will require a major new pipeline.

This scenario diverts even greater volumes from Russia, with barely a third of regional exports crossing the country while half move through the Caucasus and 10% to China (Fig. 3).

Expanding the CPC will reduce strain on the transport network under the high forecast. The extra CPC capacity would move north Caspian production, reducing pressure on the other routes and making future expansion of the Kazakhstan-China pipeline unnecessary (Fig. 4).

Current routes

Caspian oil and oil products exports follow four main routes (Fig. 5, Table 2):

- North and west through the Russian pipeline and rail network, including the CPC pipeline. Volume on this route equaled 66 % of the Caspian region's total exports in 2005.
- West through Azerbaijan and Georgian Black Sea ports. Volume on this route equaled 22% of the Caspian region's total exports in 2005.
- South through Iran. Volume on this route equaled 4% of the region's total exports in 2005.
- East to China by rail. Volume on this route equaled 8% of the region's total exports in 2005.

Northern pipelines

Three pipelines operate from the northern Caspian Region:

- Atyrau-Samara.
- Kenkiyak-Orsk.
- CPC.

Most of Kazakhstan's oil exports enter Russia through Transneft's 20 million ton/year Atyrau-Samara pipeline. Kazakhstan's exports via this route are limited by Kazakhstan's annual oil export quota through the Russian pipeline system. Although no longer Kazakhstan's main export route, Transneft, under an inter-governmental agreement, has been guaranteed 17.5 million tons/year of Kazakh oil for the next 15 years.

A second group of export pipelines includes the Kenkiyak-Orsk line, carrying oil from Aktyubinsk fields to the Orsk refinery in Russia and the Karachaganak-Orenburg pipeline, carrying condensate to Orenburg. The pipeline group moves 6.5 million tons/year. It acts as part of an oil swap arrangement supplying Kazakh oil to the Orsk refinery in Russia, while Russian oil transits the Omsk-Pavlodar pipeline in eastern Kazakhstan for use in Kazakhstan's Pavlodar refinery.

The 1,580-km CPC links Kazakh oil fields to a Russian Black Sea terminal north of Novorossiysk. CPC operates outside the immediate control of Transneft. CPC's initial capacity measured a nominal 28 million tons/year. Two independently constructed feeder pipelines from Kenkiyak and Karachaganak increased throughput in 2005 to 31 million tons/year. Throughput has increased since to around 35 million tons/year in 2007.

CPC's owners hope to increase the pipeline's capacity to 65 million tons/year by 2012, but expansion of the pipeline is proving difficult. Russia is trying to assert control over the CPC pipeline through various licensing efforts and is keen to increase its tariff to at least $30.73/ton from the current $28.25/ton. Russia has also taken steps to transfer its shares in CPC to Transneft, CPC's direct competitor.

Other factors working against expansion of the CPC pipeline include its estimated $3.5 billion cost. BP seeks to sell its 6.6% share in the CPC pipeline at least in part due to the costs. Oman sold its 7% share to Russia in 2008.

Kazakhstan, the prime supplier of oil transported through the CPC pipeline, is also increasingly wary of having its oil transported through a pipeline potentially controlled by a Russian monopoly and is trying to make it possible to export via the BTC pipeline instead.

If capacity of the CPC pipeline is not increased, transportation of Caspian oil to world markets will use a combina-

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CASPIAN OIL PIPELINES

Table 2

Pipeline	Route	Length, km	2006 estimated traffic	Current capacity	Low 2015 capacity	High 2015 capacity
			Million tons/year			
Atyrau-Samara	Uzen in southwestern Kazakhstan to Caspian port of Atyrau, linking to Russian pipeline system at Samara	695	15.5	20	25	25
Baku-Novorossiysk (AIOC Northern Route)	Baku via Chechnya to Novorossiysk, terminating at Black Sea oil terminal	1,400	4.4	6	6	6
Baku-Novorossiysk (Chechnya bypass, link to Makhachkala)	Baku via Dagestan to Tikhoretsk, terminating at Novorossiysk Black Sea oil terminal	283	—	—	—	—
Baku-Supsa (AIOC Western Route)	Baku (Azerbaijan) to Supsa (Georgia), terminating at Black Sea port	885	5.6	7	7	7
BTC	Baku via Tbilisi (Georgia) to Ceyhan (Turkey), terminating at Mediterranean Sea port	1,780	7.7	50	80	80
CPC	Tengiz (Kazakhstan) to Russian Black Sea oil port at Novorossiysk	1,580	32.3	30	32	67
Iran oil swap	Caspian tankers deliver to Iranian port at Neka, pipeline shipment to Tehran	335	5.2	12.5	18	20
Karachaganak-Atyrau	Karachaganak field to Atyrau, connecting to Atyrau-Samara and CPC	635	7	7	7	7
Kazakhstan-China (Atashu-Alashanko-Dushanzi section)	South Turgay fields to Chinese refineries	987	10	10	20	20
Kenkiyak-Orsk	Abtyubinsk fields (Kazakhstan) to Orsk refinery (Russia)	400	6.5	6.5	6.5	6.5
Kenkiyak-Atyrau	Aktobe fields to rest of system	448	12	12	12	12
Total		**9,428**	**106.2**	**161**	**213.5**	**250.5**

Sources: BP Statistical Review of World Energy, British Petroleum, 2007; World Energy Outlook 2006, International Energy Agency (IEA), OECD/IEA 2006; Aqtau Port Development, Master Planning and Feasibility Study, Traffic Forecasts, October 2007.

tion of alternative pipeline routes and other resources already in-place or under development.

Oil companies in Kazakhstan and Azerbaijan are already developing such alternatives. KazMunaiGaz has invested $200 million to purchase Georgia's Batumi oil terminal, while Azerbaijan has built a new Black Sea port in Georgia at Kulevi. Besides moving additional future volumes, these facilities will help if geopolitical problems prevent movement of oil through Iran or Turkey.

Georgia's Black Sea ports Batumi, Kulevi, and Supsa also have sufficient transshipment capacity to handle increased oil flows. Kulevi's original 4-5 million ton/year capacity increased to 10 million tons/year in 2008. Plans exist for further expansion of Kulevi to 20 million tons/year and Batumi to 25 million tons/year from 15 million/tons year.

Southern pipelines

Three pipelines operate from the Caspian's western shore:

- Baku–Novorossiysk.
- Baku-Supsa.
- BTC.

The Baku–Novorossiysk pipeline carries 6 million tons/year 1,400 km and could be expanded to around 15 million tons/year by adding pumping stations at a cost of about $300 million. The pipeline's tariffs are competitive, but its small capacity will limit its viability as an export route.

The Baku-Supsa pipeline, known as the Western route, entered service in 1998 using refurbished sections of a partially constructed product pipeline in Azerbaijan and connecting it to an unused crude oil pipeline running from northwest of Tbilisi to Batumi. A subsequent branch of the pipeline connected it to the port of Supsa, where an offshore loading facility was constructed. The 530-mm OD pipeline has a capacity of 7 million tons/year. Additional pumping stations can increase its capacity to about 10 million tons/year at an estimated cost of $100 million.

The Baku-Tbilisi-Ceyhan pipeline crosses Azerbaijan, Georgia, and Turkey. The pipeline starts near Baku at the Sangachal terminal, which receives oil from Azeri, Chirag, and Gunashli (ACG) offshore oilfields in the Caspian Sea. The pipeline ends at a marine terminal on the Mediterranean Sea in the Turkish port of Ceyhan, where crude tankers are loaded. BTC construction sought to create a route not under Russian control.

BTC cost an estimated $3.7 billion. BP holds a 30% stake in the BTC Co. consortium running the pipeline. Other consortium members include Azerbaijan's state oil company SOCAR (25%), Amerada Hess (2.36%), ConocoPhillips (2.5%), Eni (5%), Inpex (2.5%), Itochu (3.4%), Statoil (8.71%), TotalFinaElf (5%), TPAO (6.53%), and Unocal (8.9%).

BTC can move 1 million b/d (50 million tons/year) across 1,780 km. Additional pump stations could increase capacity to 60-65 million tons/year. The pipeline's OD through Azerbaijan measures 1,070 mm, increasing to 1,170 mm as it rises from the plains into the Caucasus Mountains and Georgia. The pipeline reverts to 1,070 mm for the portion across Turkish Anatolia and shrinks to 865 mm as it nears Ceyhan.

Kazakhstan-China pipeline

The 962-km eastern section of the Kazakhstan-China Pipeline provides the first direct link between oilfields

in central Kazakhstan and the Chinese market. The pipeline links Kazakhstan's South Turgay basin and the Russian pipeline system to refineries in western China. Deliveries to Dushanzi refinery began in July 2006. Initial capacity (and throughput) of the line measures 10 million tons/year, with oil coming from both Kazakhstan and Russia.

Beyond transporting oil from Kumkol fields in South Turgay (now majority owned by China National Petroleum Corp.), the pipeline transports Kazakh oil delivered to the pipeline by rail from other oil fields being developed by CNPC in Aktobe, in the northwest part of the country.

Black Sea

A Mar. 15, 2007, memorandum of understanding between Bulgaria, Greece, and Russia set up the framework for construction of a Burgas-Alexandropolis pipeline, a Russia-controlled pipeline between the Bulgarian Black Sea port of Burgas and the Greek port of Alexandropolis. Such a pipeline could facilitate transport of Caspian oil to world markets via the Black Sea without passing through the crowded Bosporus and Dardanelles straits.

The pipeline would transport 35-50 million tons/year as an extension of the CPC route connecting Kazakh oil fields to a Russian Black Sea terminal north of Novorossiysk. The MoU had construction beginning in October 2009 with the pipeline entering service in 2011. To date, however, neither a strategic impact assessment nor an environmental impact assessment has been completed.

The pipeline is also not yet funded. The two most likely sources of financing for the project are the Interstate Oil and Gas Transport to Europe (INOGATE) program and the European Investment Bank. Other economic concerns include limited financial benefits to transit countries and possible damage to tourist revenues.

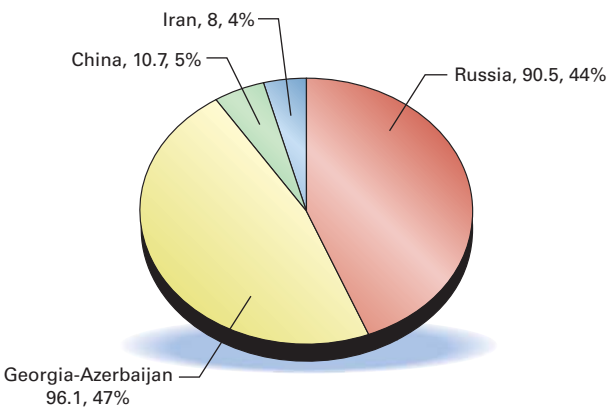
Bulgaria would receive an estimated $35-50 million/year in transit fees. Additional tax revenues for both Bulgaria and Greece would be limited. At the same time, the Burgas region is the main tourist area on the Black Sea coast of Bulgaria. Construction and operation of the pipeline could threaten tourism, not just by the direct environmental damage of possible oil spills, but also by reducing the area's visual appeal.

The question of who will bear the cost of recovering from pipeline accidents also still requires clarification. The memorandum of understanding did not provide guidance on this issue. Russia holds 51% of the company and Bulgaria is considering selling its minority share to foreign companies, further complicating progress on the pipeline.

CASPIAN OIL DISTRIBUTION, 2015 WITH CPC*

Fig. 4

High forecast, expanded CPC



*Volume in million tons/year.

Caspian shipping

The break-up of the former Soviet Union assigned the Caspian Sea fleet to the country of its home port. The Caspian Shipping Co. (CASPAR) registered its ships in Baku, assigning these ships to Azerbaijan and leaving Kazakhstan and Turkmenistan without a fleet. CASPAR remains the largest shipping company in the region.

The CASPAR fleet has an average age of more than 20 years. Many of the vessels are in poor condition. CASPAR has contracted Meridian Shipping, owned by Middle East Petroleum (MEP), to operate the fleet. CASPAR until recently handled around 90% of all cross-Caspian oil shipments, resulting in such comparatively high freight rates as: Aqtau–Makhachkala, $7-9/ton; Aqtau–Baku, $7-8/ton; and Aqtau–Neka, $12-12.5/ton.

The arrival of three Russian-affiliated shipping companies serving non-Azeri ports has increased competition in the Caspian market.

- Palmali is a Turkish company operating a total of about 100,000 dwt of modern tankers under the Russian flag with the support of Lukoil.
- Volgotanker operates 10 tankers totalling 50,000 dwt in the Caspian in winter, transferring most of them to the Russian river trade during the summer. The ships are small and more than 20 years old, but the company is unlikely to replace them with larger vessels designed for the Caspian since its core business lies in the Russian river trade.
- Safinet NJ is the shipping subsidiary of Makhachkala port. It operates five 6,000-dwt tankers on bareboat charter between Makhachkala and Aqtau.

Aqtau is Kazakhstan's principal seaport, located on the Caspian Sea in southwestern Kazakhstan. Aqtau International Sea Commercial Port owns the facility. Aqtau has five oil berths (with a sixth under construction), three general cargo berths, a grain terminal, a rail ferry berth accessible to oil tankers, and a small basin for port craft and other small boats. KazMorTransFlot has leased the five oil berths for 49 years. Aqtau's end-2005 oil terminal capacity measured 13.5 million tons/year: 10-11 million oil and 2.5 million products.

The approach channels and oil

CASPIAN OIL TRANSPORT ROUTES

Fig. 5

Source: Caucasus Transport Corridors for Oil and Oil Products—Draft, ECSSD World Bank, June 2008

berths have 6-m drafts, limiting tankers to 12,000 dwt. The port handled 10.7 million tons of oil in 2007.

Turkmenistan has oil terminals at Okarem and Adjala and a major port at Turkmenbashi. State Turkmen Maritime and River Lines, which has ministry status, owns the facilities. Turkmen terminals handled about 4.1 million tons of oil and oil products in 2007, but plan to expand.

Iran has several sea ports, but only Neka handles oil. Pipelines transport oil from Neka to refineries near Tehran. Iran makes an equivalent amount of its own oil available at the Persian Gulf in exchange for the Caspian imports. Iran has upgraded Neka and its domestic pipelines to increase route capacity to 7.5 million tons/year. This route offers basis advantages over Black Sea routes for marketing Caspian oil to East and South Asia. Caspian crude shipments to Neka have tripled in the past 2 years.

Azerbaijan has one major port, Baku, and four oil terminals—Baku, Sangachal, Dubendi, and Garadagh— the last of which is still under construction. The state owns Baku International Sea Port. It has a general terminal in the center of the city, and two rail-connected oil terminals. The port has rail-ferry links with Turkmenbashi and Aqtau, but does not have pipeline access.

State SOCAR owns the 10-million ton/year Dubendi oil terminal, located 40 km northeast of Baku. The terminal has rail and pipeline connections. The rail loading facility can simultaneously load 78 rail tank wagons with crude and 32 with product.

Dubendi also has a connection to the Northern pipeline. This connection has not been used for many years and would require rehabilitation before it could be used again. A new pipeline to the AIOC terminal at Sangachal, considered for several years, will likely be constructed if the Dubendi terminal is expanded to receive Kazakh oil.

The Sangachal area has two terminals 12 km apart and connected by two pipelines, one flowing each direction. Sangachal port lies 45 km south of Baku. It has two moorings for 10,000-12,000 dwt tankers. The terminal can transship 13 million tons/year and has 172,000 tons of storage. Owner AzerTrans is building four more 17,200-ton tanks. This terminal, operated by MEP, also has a rail loading facility.

A separate Sangachal onshore terminal receives oil by pipeline from the offshore ACG field for shipment through connections to the BTC, Northern, and Western pipelines. AIOC owns this terminal.

Ocean Energy, in association with MEP, is building a new oil terminal at Garadagh, 40 km south of Baku. Completion of this project will lead to closure of the Baku terminals. The new terminal, designed for trans-Caspian shipping of new Kazakh production, will handle 60,000 dwt tankers and have a capacity of 10-20 million tons/year. ✦

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Imports of crude and products

	Districts 1–4 1-9 2009	Districts 1–4 1-2 2009	District 5 1-9 2009	District 5 1-2 2009	Total US 1-9 2009	Total US 1-2 2009	Total US *1-11 2008
	1,000 b/d						
Total motor gasoline	791	785	6	67	797	852	938
Mo. gas. blending comp.	673	582	6	67	679	649	501
Distillate	215	257	0	50	215	307	309
Residual	431	322	0	0	431	322	215
Jet fuel–kerosine	10	51	0	5	10	56	85
Propane–propylene	131	243	29	16	160	259	186
Other	626	772	82	(4)	708	768	915
Total products	**2,877**	**3,012**	**123**	**201**	**3,000**	**3,213**	**3,149**
Total crude	**8,627**	**9,384**	**1,102**	**1,101**	**9,729**	**10,485**	**10,389**
Total imports	**11,504**	**12,396**	**1,225**	**1,302**	**12,729**	**13,698**	**13,538**

*Revised.
Source: US Energy Information Administration
Data available in OGJ Online Research Center.

Purvin & Gertz LNG netbacks—Jan. 16, 2009

Receiving terminal	Liquefaction plant: Algeria	Malaysia	Nigeria	Austr. NW Shelf	Qatar	Trinidad
	$/MMbtu					
Barcelona	11.46	9.46	10.69	9.36	10.01	10.61
Everett	6.33	4.47	6.01	4.57	4.95	6.58
Isle of Grain	7.19	5.27	6.64	5.18	5.78	6.66
Lake Charles	3.68	2.08	3.49	2.22	2.37	4.19
Sodegaura	7.09	9.09	7.36	8.83	8.20	4.89
Zeebrugge	9.57	6.80	8.99	6.60	7.90	8.99

Definitions, see OGJ Apr. 9, 2007, p. 57.
Source: Purvin & Gertz Inc.
Data available in OGJ Online Research Center.

Crude and product stocks

District	Crude oil	Motor gasoline: Total	Motor gasoline: Blending comp.[1]	Jet fuel, kerosine	Fuel oils: Distillate	Fuel oils: Residual	Propane-propylene
	1,000 bbl						
PADD 1	12,660	61,191	36,742	8,191	54,858	12,683	3,365
PADD 2	80,857	48,904	18,953	6,686	34,140	1,192	17,735
PADD 3	165,934	69,197	36,756	12,814	38,252	15,845	30,961
PADD 4	14,040	6,720	2,133	348	3,023	294	[1]1,949
PADD 5	53,072	27,493	22,728	9,934	13,894	4,728	—
Jan. 9, 2009	**326,563**	**213,505**	**117,312**	**37,973**	**144,167**	**34,742**	**54,010**
Jan. 2, 2009	**325,419**	**211,437**	**115,480**	**37,374**	**137,821**	**33,878**	**56,333**
Jan. 11, 2008[2]	**287,100**	**215,256**	**106,183**	**40,052**	**129,845**	**37,902**	**48,668**

[1]Includes PADD 5. [2]Revised.
Source: US Energy Information Administration
Data available in OGJ Online Research Center.

Refinery report—Jan. 9, 2009

District	Refinery operations: Gross inputs	Refinery operations: Crude oil inputs	Refinery output: Total motor gasoline	Refinery output: Jet fuel, kerosine	Refinery output: Fuel oils: Distillate	Refinery output: Fuel oils: Residual	Refinery output: Propane-propylene
	1,000 b/d						
PADD 1	1,384	1,377	2,332	48	456	102	66
PADD 2	3,075	3,038	2,109	211	1,043	47	180
PADD 3	7,291	7,127	2,690	728	2,438	227	620
PADD 4	544	536	346	32	181	11	[1]128
PADD 5	2,724	2,508	1,336	449	548	163	—
Jan. 9, 2009	**15,018**	**14,586**	**8,813**	**1,468**	**4,666**	**550**	**994**
Jan. 2, 2009	**14,892**	**14,522**	**9,115**	**1,464**	**4,550**	**488**	**1,058**
Jan. 11, 2008[2]	**15,187**	**15,011**	**8,978**	**1,580**	**4,257**	**645**	**1,114**
	17,621 Operable capacity		**85.2% utilization rate**				

[1]Includes PADD 5. [2]Revised.
Source: US Energy Information Administration
Data available in OGJ Online Research Center.

Additional analysis of market trends is available through **OGJ Online**, *Oil & Gas Journal's* electronic information source, at http://www.ogjonline.com.

OIL&GAS JOURNAL online research center

OGJ crack spread

	*1-16-09	*1-18-08	Change	Change, %
	$/bbl			
SPOT PRICES				
Product value	54.05	99.85	–45.80	–45.9
Brent crude	42.99	91.52	–48.53	–53.0
Crack spread	11.06	8.33	2.73	32.7
FUTURES MARKET PRICES				
One month				
Product value	53.84	100.67	–46.83	–46.5
Light sweet crude	36.91	91.53	–54.62	–59.7
Crack spread	16.93	9.14	7.78	85.1
Six month				
Product value	60.38	103.20	–42.82	–41.5
Light sweet crude	53.34	89.68	–36.34	–40.5
Crack spread	7.05	13.52	–6.47	–47.9

*Average for week ending.
Source: Oil & Gas Journal
Data available in OGJ Online Research Center.

OGJ GASOLINE PRICES

	Price ex tax 1-14-09	Pump price* 1-14-09	Pump price 1-16-08
	¢/gal		
(Approx. prices for self-service unleaded gasoline)			
Atlanta	120.8	167.3	311.2
Baltimore	121.4	163.3	309.1
Boston	126.3	168.2	311.9
Buffalo	108.3	169.2	321.1
Miami	119.9	171.5	319.2
Newark	126.1	158.7	307.7
New York	117.3	178.2	310.9
Norfolk	120.2	158.6	314.6
Philadelphia	126.5	177.2	308.2
Pittsburgh	131.3	182.0	311.1
Wash., DC	148.4	186.8	309.0
PAD I avg	124.2	171.0	312.2
Chicago	139.0	203.4	344.5
Cleveland	143.4	189.8	305.2
Des Moines	140.6	181.0	302.0
Detroit	129.4	188.8	303.7
Indianapolis	128.4	187.8	305.2
Kansas City	139.0	175.0	293.1
Louisville	140.1	181.0	302.1
Memphis	133.3	173.1	303.1
Milwaukee	134.3	185.6	304.9
Minn.-St. Paul	135.0	179.0	301.9
Oklahoma City	127.2	162.6	282.3
Omaha	125.8	171.1	293.0
St. Louis	138.0	174.0	302.1
Tulsa	131.6	167.0	295.0
Wichita	128.8	172.2	290.2
PAD II avg	134.3	179.4	301.9
Albuquerque	129.1	165.5	300.4
Birmingham	124.1	163.4	293.3
Dallas-Fort Worth	126.6	165.0	288.3
Houston	119.3	157.7	289.3
Little Rock	126.3	166.5	293.4
New Orleans	125.0	163.4	302.2
San Antonio	122.7	161.1	291.0
PAD III avg	124.7	163.2	294.0
Cheyenne	115.1	147.5	286.4
Denver	121.6	162.0	297.5
Salt Lake City	118.5	161.4	295.2
PAD IV avg	118.4	157.0	293.0
Los Angeles	128.4	195.5	330.7
Phoenix	136.8	174.2	292.0
Portland	157.4	200.8	313.0
San Diego	139.3	206.4	336.7
San Francisco	141.0	208.1	351.7
Seattle	142.4	198.3	319.7
PAD V avg	140.9	197.2	324.0
Week's avg.	**129.9**	**175.5**	**305.8**
Dec. avg.	**125.5**	**171.1**	**300.6**
Nov. avg.	**169.9**	**215.5**	**307.6**
2009 to date	**125.9**	**171.5**	—
2008 to date	**262.1**	**305.7**	—

*Includes state and federal motor fuel taxes and state sales tax. Local governments may impose additional taxes.
Source: Oil & Gas Journal.
Data available in OGJ Online Research Center.

REFINED PRODUCT PRICES

	1-9-09 ¢/gal		1-9-09 ¢/gal
Spot market product prices			
Motor gasoline (Conventional-regular)		Heating oil No. 2	
New York Harbor	106.73	New York Harbor	148.70
Gulf Coast	107.98	Gulf Coast	142.20
Los Angeles	142.16	Gas oil	
Amsterdam-Rotterdam-Antwerp (ARA)	102.83	ARA	149.21
Singapore	113.81	Singapore	145.83
Motor gasoline (Reformulated-regular)		Residual fuel oil	
New York Harbor	104.98	New York Harbor	91.43
Gulf Coast	107.23	Gulf Coast	80.12
Los Angeles	148.91	Los Angeles	118.73
		ARA	82.49
		Singapore	95.00

Source: DOE Weekly Petroleum Status Report.
Data available in OGJ Online Research Center.

BAKER HUGHES RIG COUNT

	1-16-09	1-18-08
Alabama	3	2
Alaska	12	8
Arkansas	48	46
California	35	41
Land	34	39
Offshore	1	2
Colorado	95	94
Florida	1	0
Illinois	0	0
Indiana	3	1
Kansas	23	14
Kentucky	12	8
Louisiana	179	147
N. Land	89	50
S. Inland waters	10	21
S. Land	24	28
Offshore	56	48
Maryland	0	1
Michigan	0	1
Mississippi	13	8
Montana	4	12
Nebraska	0	0
New Mexico	58	68
New York	2	4
North Dakota	66	49
Ohio	8	10
Oklahoma	154	187
Pennsylvania	23	20
South Dakota	0	1
Texas	699	854
Offshore	5	9
Inland waters	1	4
Dist. 1	10	14
Dist. 2	32	31
Dist. 3	49	68
Dist. 4	60	86
Dist. 5	142	186
Dist. 6	116	113
Dist. 7B	20	31
Dist. 7C	52	50
Dist. 8	90	122
Dist. 8A	23	19
Dist. 9	44	47
Dist. 10	55	74
Utah	30	39
West Virginia	29	30
Wyoming	58	74
Others—NV-4; TN-4; VA-4; WA-1	13	13
Total US	**1,568**	**1,732**
Total Canada	**438**	**560**
Grand total	**2,006**	**2,292**
Oil rigs	324	323
Gas rigs	1,235	1,401
Total offshore	69	59
Total cum. avg. YTD	**1,623**	**1,750**

Rotary rigs from spudding in to total depth.
Definitions, see OGJ Sept. 18, 2006, p. 42.

Source: Baker Hughes Inc.
Data available in OGJ Online Research Center.

SMITH RIG COUNT

Proposed depth, ft	Rig count	1-16-09 Percent footage*	Rig count	1-18-08 Percent footage*
0-2,500	64	—	60	3.3
2,501-5,000	76	51.3	96	50.0
5,001-7,500	205	21.9	220	26.8
7,501-10,000	340	1.4	435	1.8
10,001-12,500	315	2.2	431	4.4
12,501-15,000	316	—	293	0.3
15,001-17,500	155	—	109	—
17,501-20,000	65	—	67	—
20,001-over	43	—	29	—
Total	**1,579**	**6.0**	**1,740**	**7.8**
INLAND	22		37	
LAND	1,504		1,652	
OFFSHORE	53		51	

*Rigs employed under footage contracts.
Definitions, see OGJ Sept. 18, 2006, p. 42.

Source: Smith International Inc.
Data available in OGJ Online Research Center.

OGJ PRODUCTION REPORT

	[1]1-16-09	[2]1-18-08
	1,000 b/d	
(Crude oil and lease condensate)		
Alabama	19	21
Alaska	682	715
California	645	650
Colorado	61	63
Florida	6	6
Illinois	26	26
Kansas	99	104
Louisiana	1,130	1,252
Michigan	14	15
Mississippi	60	58
Montana	94	88
New Mexico	165	162
North Dakota	174	135
Oklahoma	169	169
Texas	1,294	1,326
Utah	54	53
Wyoming	149	148
All others	65	70
Total	**4,906**	**5,061**

[1]OGJ estimate. [2]Revised.
Source: Oil & Gas Journal.
Data available in OGJ Online Research Center.

US CRUDE PRICES

	1-16-09 $/bbl*
Alaska-North Slope 27°	49.32
South Louisiana Sweet	34.50
California-Kern River 13°	22.80
Lost Hills 30°	31.75
Wyoming Sweet	22.01
East Texas Sweet	32.50
West Texas Sour 34°	25.25
West Texas Intermediate	33.00
Oklahoma Sweet	33.00
Texas Upper Gulf Coast	27.00
Michigan Sour	26.00
Kansas Common	31.75
North Dakota Sweet	18.75

*Current major refiner's posted prices except North Slope lags 2 months. 40° gravity crude unless differing gravity is shown.
Source: Oil & Gas Journal.
Data available in OGJ Online Research Center.

WORLD CRUDE PRICES

$/bbl[1]	1-9-09
United Kingdom-Brent 38°	44.52
Russia-Urals 32°	44.40
Saudi Light 34°	41.76
Dubai Fateh 32°	46.62
Algeria Saharan 44°	45.99
Nigeria-Bonny Light 37°	48.30
Indonesia-Minas 34°	45.18
Venezuela-Tia Juana Light 31°	43.13
Mexico-Isthmus 33°	43.02
OPEC basket	45.16
Total OPEC[2]	43.76
Total non-OPEC[2]	42.57
Total world[2]	43.24
US imports[3]	40.04

[1]Estimated contract prices. [2]Average price (FOB) weighted by estimated export volume. [3]Average price (FOB) weighted by estimated import volume.
Source: DOE Weekly Petroleum Status Report.
Data available in OGJ Online Research Center.

US NATURAL GAS STORAGE[1]

	1-9-09	1-2-09	1-9-08	Change, %
	bcf			
Producing region	899	902	860	**4.5**
Consuming region east	1,468	1,540	1,490	**–1.5**
Consuming region west	369	388	358	**3.1**
Total US	**2,736**	**2,830**	**2,708**	**1.0**
	Oct. 08	**Oct. 07**	**Change, %**	
Total US[2]	**3,399**	**3,567**	**–4.7**	

[1]Working gas. [2]At end of period.
Source: Energy Information Administration
Data available in OGJ Online Research Center.

World oil balance

	2008 3rd qtr.	2008 2nd qtr.	2008 1st qtr.	2007 4th qtr.	2007 3rd qtr.	2007 2nd qtr.
	Million b/d					
DEMAND						
OECD						
US & Territories	19.13	19.96	20.15	20.90	21.06	20.95
Canada	2.37	2.25	2.37	2.39	2.40	2.29
Mexico	2.11	2.16	2.10	2.16	2.06	2.14
Japan	4.30	4.59	5.41	5.25	4.70	4.64
South Korea	2.07	2.09	2.33	2.31	2.06	2.12
France	1.92	1.92	1.98	2.02	1.94	1.86
Italy	1.65	1.61	1.62	1.75	1.65	1.69
United Kingdom	1.64	1.72	1.72	1.73	1.73	1.73
Germany	2.72	2.41	2.47	2.54	2.55	2.37
Other OECD Europe	7.41	7.23	7.41	7.62	7.55	7.27
Australia & New Zealand	1.12	1.14	1.13	1.15	1.12	1.10
Total OECD	**46.44**	**47.08**	**48.69**	**49.82**	**48.82**	**48.16**
NON-OECD						
China	8.05	7.99	7.74	7.61	7.54	7.75
FSU	4.31	4.30	4.34	4.36	4.25	4.00
Non-OECD Europe	0.76	0.79	0.83	0.78	0.73	0.78
Other Asia	9.14	9.26	9.22	9.25	8.93	9.19
Other non-OECD	16.01	15.82	15.60	15.20	15.36	15.07
Total non–OECD	**38.27**	**38.16**	**37.73**	**37.20**	**36.81**	**36.79**
TOTAL DEMAND	**84.71**	**85.24**	**86.42**	**87.02**	**85.63**	**84.95**
SUPPLY						
OECD						
US	8.18	8.75	8.64	8.58	8.36	8.50
Canada	3.38	3.26	3.35	3.40	3.48	3.37
Mexico	3.15	3.20	3.31	3.35	3.47	3.61
North Sea	4.07	4.33	4.46	4.57	4.28	4.49
Other OECD	1.59	1.58	1.53	1.57	1.57	1.55
Total OECD	**20.37**	**21.12**	**21.29**	**21.47**	**21.16**	**21.52**
NON–OECD						
FSU	12.42	12.60	12.59	12.65	12.55	12.59
China	3.97	4.00	3.94	3.87	3.88	3.97
Other non-OECD	11.62	11.07	10.83	11.13	11.21	11.04
Total non-OECD, non-OPEC	**28.01**	**27.67**	**27.36**	**27.65**	**27.64**	**27.60**
OPEC*	**37.32**	**36.87**	**36.70**	**36.19**	**35.45**	**35.08**
TOTAL SUPPLY	**85.70**	**85.66**	**85.35**	**85.31**	**84.25**	**84.20**
Stock change	**0.99**	**0.42**	**–1.07**	**–1.71**	**–1.38**	**–0.75**

*Includes Angola.
Source: DOE International Petroleum Monthly
Data available in OGJ Online Research Center.

US petroleum imports from source country

	Sept. 2008	Aug. 2008	Average YTD 2008	Average YTD 2007	Chg. vs. previous year Volume	Chg. vs. previous year %
	1,000 b/d					
Algeria	657	530	539	732	–193	–26.4
Angola	416	495	511	542	–31	–5.7
Kuwait	115	203	197	190	7	3.7
Nigeria	591	1,166	1,015	1,087	–72	–6.6
Saudi Arabia	1,431	1,573	1,546	1,456	90	6.2
Venezuela	1,051	1,305	1,193	1,353	–160	–11.8
Other OPEC	867	1,118	1,014	648	366	56.5
Total OPEC	**5,128**	**6,390**	**6,015**	**6,008**	**7**	**0.1**
Canada	2,367	2,199	2,420	2,473	–53	–2.1
Mexico	1,003	1,400	1,281	1,564	–283	–18.1
Norway	74	84	107	154	–47	–30.5
United Kingdom	265	222	224	288	–64	–22.2
Virgin Islands	345	298	328	333	–5	–1.5
Other non–OPEC	2,330	2,466	2,491	2,803	–312	–11.1
Total non-OPEC	**6,384**	**6,669**	**6,851**	**7,615**	**–764**	**–10.0**
TOTAL IMPORTS	**11,512**	**13,059**	**12,866**	**13,623**	**–757**	**–5.6**

Source: DOE Monthly Energy Review
Data available in OGJ Online Research Center.

OECD total net oil imports

	Sept. 2008	Aug. 2008	July 2008	Sept. 2007	Chg. vs. previous year Volume	Chg. vs. previous year %
	Million b/d					
Canada	–1,366	–1,459	–1,048	–1,271	–95	7.5
US	10,174	10,992	10,995	12,285	–2,111	–17.2
Mexico	–805	–1,183	–1,007	–1,545	740	–47.9
France	1,733	1,701	1,841	1,692	41	2.4
Germany	2,563	2,437	2,425	2,249	314	14.0
Italy	1,471	1,214	1,491	1,531	–60	–3.9
Netherlands	939	931	1,057	1,092	–153	–14.0
Spain	1,530	1,483	1,524	1,700	–170	–10.0
Other importers	4,080	3,980	3,939	4,135	–55	–1.3
Norway	–1,567	–2,102	–1,387	–2,129	562	–26.4
United Kingdom	84	389	20	245	–161	–65.7
Total OECD Europe	**10,833**	**10,033**	**10,910**	**10,515**	**318**	**3.0**
Japan	4,533	4,868	4,793	4,503	30	0.7
South Korea	1,854	1,976	2,167	2,152	–298	–13.8
Other OECD	778	851	939	863	–85	–9.8
Total OECD	**26,001**	**26,078**	**27,749**	**27,502**	**–1,501**	**–5.5**

Source: DOE International Petroleum Monthly
Data available in OGJ Online Research Center.

OECD* total gross imports from OPEC

	Sept. 2008	Aug. 2008	July 2008	Sept. 2007	Chg. vs. previous year Volume	Chg. vs. previous year %
	Million b/d					
Canada	484	287	425	538	–54	–10.0
US	5,128	6,390	6,121	6,470	–1,342	–20.7
Mexico	28	21	45	40	–12	–30.0
France	1,102	891	864	848	254	30.0
Germany	501	442	560	448	53	11.8
Italy	1,329	1,235	1,157	1,210	119	9.8
Netherlands	685	664	516	772	–87	–11.3
Spain	847	777	594	732	115	15.7
Other importers	1,536	1,388	1,286	1,269	267	21.0
United Kingdom	275	379	289	244	31	12.7
Total OECD Europe	**6,275**	**5,776**	**5,266**	**5,523**	**752**	**13.6**
Japan	4,138	4,209	4,456	3,927	211	5.4
South Korea	2,365	2,352	2,605	2,321	44	1.9
Other OECD	586	628	629	739	–153	–20.7
Total OECD	**19,004**	**19,663**	**19,547**	**19,558**	**–554**	**–2.8**

*Organization for Economic Cooperation and Development.
Source: DOE International Petroleum Monthly
Data available in OGJ Online Research Center.

Oil stocks in OECD countries*

	Sept. 2008	Aug. 2008	July 2008	Sept. 2007	Chg. vs. previous year Volume	Chg. vs. previous year %
	Million bbl					
France	177	176	179	175	2	1.1
Germany	272	274	275	276	–4	–1.4
Italy	130	131	135	134	–4	–3.0
United Kingdom	96	96	95	90	6	6.7
Other OECD Europe	689	700	701	680	9	1.3
Total OECD Europe	**1,364**	**1,377**	**1,385**	**1,355**	**9**	**0.7**
Canada	192	196	202	195	–3	–1.5
US	1,705	1,710	1,699	1,717	–12	–0.7
Japan	646	643	627	630	16	2.5
South Korea	141	150	153	157	–16	–10.2
Other OECD	115	104	104	108	7	6.5
Total OECD	**4,163**	**4,180**	**4,170**	**4,162**	**1**	**—**

*End of period.
Source: DOE International Petroleum Monthly Report
Data available in OGJ Online Research Center.

Your marketplace for the oil and gas industry

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A lawsuit was filed by Fisher Controls International LLC in the United States District Court for the Southern District of Iowa against Dyna-Flo Control Valve Services, Ltd., and amicably settled. As part of the settlement, Dyna-Flo has removed the DF1 and DF2400 Control Valves from the marketplace in view of Fisher's United States Patents Nos. 4,986,300, 5,791,629, 6,866,244, 6,991,218, and 7,185,672. Dyna-Flo acknowledges the validity, and does not contest its infringement, of these patents.

EDUCATION

Introduction to Petroleum Refining, Technology and Economics: Colorado School of Mines. March 10-12 and August 11-13, 2009. Overview of the integrated fuels refinery of today, from the crude oil feed to the finished products. Emphasis is placed on transportation fuels production and the refinery process used. Contact: 303/273-3321, fax: 303/273-3314, email: space@mines.edu, www.mines.edu/outreach/cont_ed

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TV show targets wrong element of '08 oil price leap

An "investigation" by a popular US television news show has uncovered information about oil prices that anyone familiar with the market knew months ago.

Teasers by CBS News for the Jan. 11 edition of "60 Minutes" promised to surprise viewers with disclosure that last year's high oil prices were not, after all, the handiwork of ExxonMobil Corp. or Saudi Arabia.

Instead, "60 Minutes" concluded, the fault lies with oil speculators.

The show dredged up the usual evidence: the high share of futures positions held by speculative traders; the large multiple of paper barrels traded on futures exchanges over barrels of oil actually delivered; the inability of market fundamentals to explain a huge, single day's leap in the crude price.

Was manipulation involved? The program didn't exactly say.

It did suspiciously note that Goldman Sachs predicted the crude price would reach $200/bbl, as though a forecast destined to be proven wrong had been an attempt to excite trading and elevate prices.

The program pointed to Enron's support for free oil markets, suggesting that the discredited trading juggernaut wanted to manipulate oil prices the way it gamed electricity.

And it interlaced its observations with regret for the absence of "oversight" and implications of blame for "deregulation."

None of this required an investigation. An unusual rush of speculative money into futures markets for oil and other commodities is a matter of record. Investors were seeking shelter as the financial crisis developed and other assets lost value. The activity was thoroughly reported.

In the opinion of many observers, the surge did help push oil prices to levels market fundamentals could neither explain nor sustain.

Perhaps amplifying the effect of the capital influx was unusual weakness of the dollar. "60 Minutes" didn't mention currency effects.

The program seemed more intent on regretting deregulation than on fully explaining price pressures that were well recognized while in play and largely deemed ephemeral.

The problem last year wasn't deregulation, which happened long ago. The solution isn't more regulation.

To use a "60 Minutes" analogy, Enron's electricity mischief occurred along an arbitrage frontier created by overregulation in California.

(Online Jan. 16, 2009; author's e-mail: bobt@ogjonline.com)

The Editor's Perspective

by Bob Tippee, Editor

Market Journal

by Sam Fletcher, Senior Writer

'Vicious' loop in oil market

Escalating oil inventories have filled most storage at the Cushing, Okla., primary delivery point, undermining US crude prices to the point West Texas Intermediate is "about as useful as a chocolate oven-glove" in assessing world market conditions, said Paul Horsnell at Barclays Capital Inc., London.

With crude production outstripping demand, Cushing inventories were estimated in mid-January at 33 million bbl with a capacity of 47 million bbl. As a result, the oil futures market on the New York Mercantile Exchange "got stuck in a fairly vicious loop," Horsnell said, with traders competing to unload contracts rather than compete for storage.

In Paris, the International Energy Agency noted, "Crude prices rose to nearly $50/bbl in early January, supported by cold weather, the Russian-Ukrainian gas crisis, and fighting in Gaza. Subsequently, weak global refinery demand and an increasing crude overhang have pressured Brent futures to...$45/bbl, while WTI was at $35/bbl, distorted by record-high Cushing stocks."

The big story at mid-January was the price disparity between WTI and North Sea Brent. "While WTI is reflective of the price of oil in Cushing, Brent crude is more reflective of the international price of oil since it is used to price two thirds of the world's internationally traded oil," said analysts in the Houston office of Raymond James & Associates Inc.

Historically, the two crudes of similar composition have traded around the same pricing levels, with WTI usually priced a little higher. Front-month WTI closed at $36.51/bbl Jan. 16 compared with Brent at $46.57/bbl. "With inventories at record highs, oil tankers sitting idle at sea hoarding oil, and total US petroleum demand down 7% compared with last year, the price disparity between WTI and Brent could linger for months," Raymond James analysts said.

Horsnell pointed out, "The problem is that WTI prices are being used in a wider context: crude oil exporters link to them for the US market, derivatives are based on them, investment returns are affected by their time spreads, and policymakers in both consuming and producing countries use them as an indicator."

Although crude storage is at a record high in Cushing, that's "not true for the US as a whole," Horsnell said. He noted US crude inventories increased 18.4 million bbl over the past 3 months, including 18.1 million bbl at Cushing. "In other words, for the whole of the US outside of Cushing, crude inventories have risen by just 300,000 bbl over the past 3 months, (from 293.3 million bbl to 293.6 million bbl), and they currently stand almost 40 million bbl lower than as recently as mid-2007," he said.

Olivier Jakob at Petromatrix, Zug, Switzerland, said, "WTI is the most traded crude oil contract, but it would be wrong to extrapolate a Cushing supply and demand as the world's supply and demand."

Distillate fuels stocks

The US Energy Information Administration reported distillate fuels escalated 6.4 million bbl to 144.2 million bbl in the week ended Jan. 9, exceeding Wall Street's expectations of a 1 million bbl increase. Some analysts immediately questioned EIA's numbers, which included a 4.1 million bbl increase of low-sulfur diesel in Petroleum Administration Defense District (PADD) 2 in the Midwest, encompassing Cushing. That would be the largest-ever weekly change in distillate stock in that district, Jakob said.

Moreover, it "implies a 53% drop" in PADD 2 demand within 1 week—"a drop that we think is materially impossible," Jakob said. The large distillate spike likely includes undisclosed revisions to previous data, so EIA may have under-reported demand by 700,000 b/d, he said.

Meanwhile, Raymond James analysts surmised, "It looks as if 2008 global oil demand was negative on a year-over-year basis for the first time in over 20 years, which makes one wonder, 'How bad will 2009 get?'"

Paris-based IEA reduced its oil demand forecast by 1 million b/d to 85.3 million b/d for 2009, down 0.6% from 2008 levels. Its 2008 forecast was reduced by 70,000 b/d to 85.8 million b/d, down 0.3% from 2007 levels. That would be the first 2-year total contraction in global oil demand since 1982-83.

In Washington, EIA cut its 2009 oil price forecast another 15% to $43.25/bbl. But like most soothsayers, EIA has a poor record for accurate price predictions. Last July when the US driving season was at its peak and oil prices were soaring, it forecast the US spot price for WTI would average $127/bbl for 2008 and $133/bbl in 2009, up from an average $72/bbl for 2007.

(Online Jan. 19, 2009; author's e-mail: samf@ogjonline.com)

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- ✓ Characterize the reservoir to plan the field development
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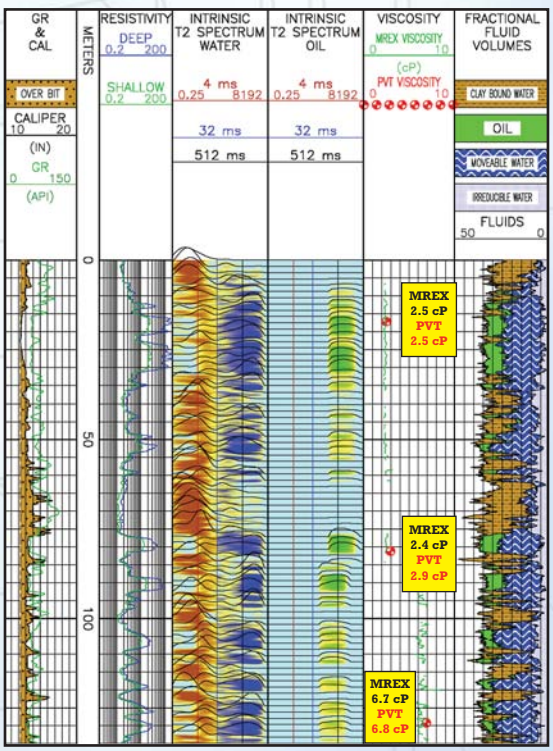

Dual ESP Systems Increase Revenues $13.2 Million from Marginal Offshore Field

Location: Brazil

Problem:

- ✓ Four wells experienced production declines, equipment failures with progressing cavity pump systems.
- ✓ Production fell from 754 bopd to 230 bopd.
- ✓ High operating cost

Solution:

- ✓ Centrilift replaced existing pumps with dual ESP systems
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Results:

- ✓ Production increased 526% to 1440 bopd
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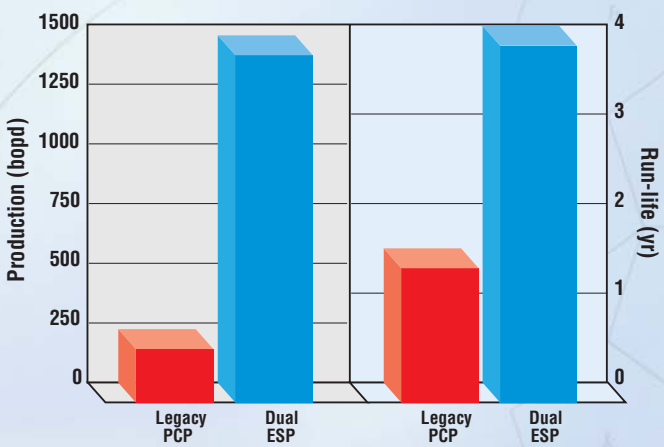

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