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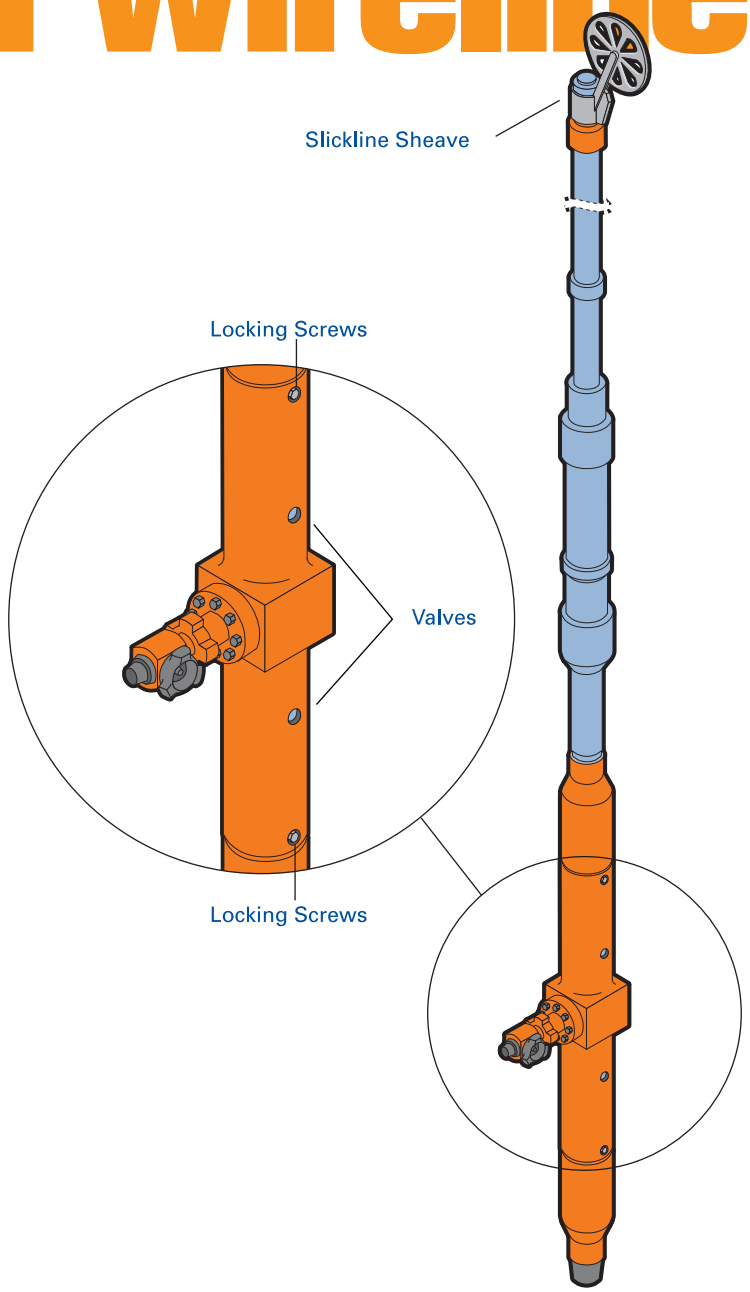
The dual that changed wireline history.



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OIL&GAS JOURNAL®

Mar. 2, 2009
Volume 107.9

PRACTICAL DRILLING TECHNOLOGY

REGULAR FEATURES

COVER

The Noble George Sauvageau jack up batch drilled and completed seven wells on the A12 central production platform, off the Netherlands. The Chevron Exploration & Production Netherlands BV-operated field produces gas from shallow sands previously considered drilling hazards, as discussed in an article in this week's special report on Practical Drilling Technology starting on p. 39. The other article in the report discusses a nonaqueous drilling fluid with a low-viscosity synthetic internal olefin base that resolved operational problems in drilling tight gas wells in Western Canada. The cover photo and the photo above are from Chevron.

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General Interest — Quick Takes

Salazar cancels oil shale lease solicitation

The US Department of the Interior will offer another round of oil shale leases in Colorado and Utah and withdraw the former Bush administration's proposal for expanded offerings, Interior Secretary Ken Salazar said on Feb. 25.

"We need to push forward aggressively with research, development, and demonstration [RD&D] of oil shale technologies to see if we can find a safe and economically viable way to unlock these resources on a commercial scale. The [RD&D] leases we will offer can help answer critical questions about oil shale, including about the viability of emerging technologies on a commercial scale, how water and power would be required, and what impact commercial development would have on land, water, wildlife, and communities," he said.

Salazar said he was withdrawing the previous oil shale RD&D lease solicitation because it contained several flaws, including locking in low royalty rates that would shortchange taxpayers.

"The previous administration offered their RD&D oil shale leases just days before leaving office, made the parcels four times the size of the current six RD&D leases, and then locked in low royalty rates and a premature regulatory framework for those leases. If oil shale technology proves to be viable on a commercial scale, taxpayers should get a fair rate of return from their resource," he said.

Offering leases for 640 acres instead of 160 acres was likelier to provide sufficient reserves to support a commercial operation, BLM said on Jan. 14 when it announced the proposal that Salazar withdrew. The new lease would go to applicants not using technologies used in the first round of oil shale leases, it said at the time.

Salazar said DOI has submitted a notice, which will appear in the Feb. 27 Federal Register, asking the oil and gas industry, local communities, states, and other stakeholders for their advice on what the terms and conditions of the second round of oil shale RD&D leases should be. Comments will be accepted for 90 days.

"Following that, the department will move ahead with a solicitation for RD&D leases, based on sound policy and public input. This will help us restore order to a process that, under the previous administration was turned upside down. We look forward to hearing from the public, industry, and local communities as we move toward offering a second round of [RD&D] leases," the secretary said.

NEB: LNG demand grows in world market

The LNG industry will capture a growing segment of the global market as demand for natural gas increases, said Canada's National Energy Board (NEB).

The current global recession should not bear too heavily on the growing demand for natural gas in the long run. Countries are scrambling to secure new sources of gas, "and LNG is definitely in the running," NEB reported in a recent energy market assessment.

"LNG provides an option to diversify and enhance the reliability of natural gas supply, but ultimately it's the market conditions, stakeholder involvement, and contractual arrangements that will set the extent of LNG imports," said Gaetan Caron, NEB chair and chief executive. "In North America alone, the supply of LNG is projected to exceed 5% (5 bcfd) of the total natural gas requirement by 2020."

LNG was once considered the most likely source to offset the continued decline in production of conventional gas, but the expected increase in LNG imports has not yet materialized, said NEB. In North America, shale gas and other unconventional gas resources have filled part of the gap.

The only Canadian facility equipped to import LNG is the Canaport regasification terminal in St. John, NB. It is expected to become operational this year and will serve markets in Atlantic Canada and New England, where LNG has historically provided up to 25% (184 bcf) of the annual gas requirement.

Indonesian watchdog urges LNG contracts review

Indonesia Corruption Watch (ICW) has urged Indonesia to review contracts on Tangguh as well as Senoro LNG sales and expose the price formulas transparently, according to a press report.

Bisnis Indonesia said a review by ICW shows that the state received 440.44 trillion rupiahs ($37.4 billion) from LNG sales in 2000-08, while ICW calculates the amount should have reached 515.04 trillion rupiahs, a 17% difference.

The state has incurred the losses due to the lack of transparency and accountability in the management of the extractive industries, especially the oil and gas industry, according to Firdaus Ilyas, coordinator of ICW's data and analysis division.

"The government has never been transparent in explaining their formulas to calculate prices in the closed sales contracts," Firdaus told reporters in Jakarta.

"The prices have also been below the market prices. Contracts on LNG sales from Tangguh and Senoro really incur losses to the state. This should be reported to the public," Firdaus said.

He said the profit split is 65% for the state and 35% for the partner contractors, some 5% lower for the state than "the usual" 70%. ✦

Exploration & Development — Quick Takes

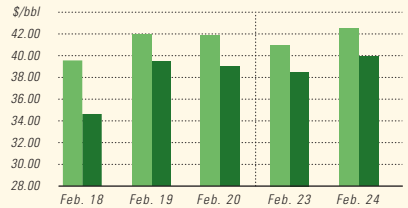
Woodside has gas find in Greater Pluto area

Woodside Petroleum Ltd. has made a natural gas discovery with the first well of its 2009 gas exploration drilling campaign in the Greater Pluto region off Western Australia.

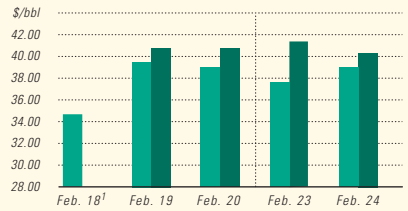
Pressure testing of the Martell-1 wildcat on permit WA-404-P in the Carnarvon basin has confirmed a gross gas column of about

Industry Scoreboard

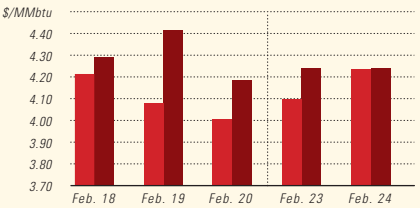
IPE BRENT / NYMEX LIGHT SWEET CRUDE



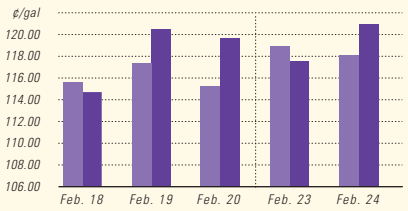
WTI CUSHING / BRENT SPOT



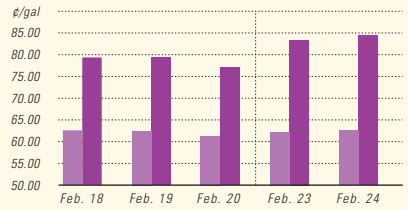
NYMEX NATURAL GAS / SPOT GAS - HENRY HUB



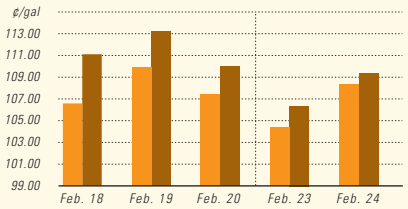
IPE GAS OIL / NYMEX HEATING OIL



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.

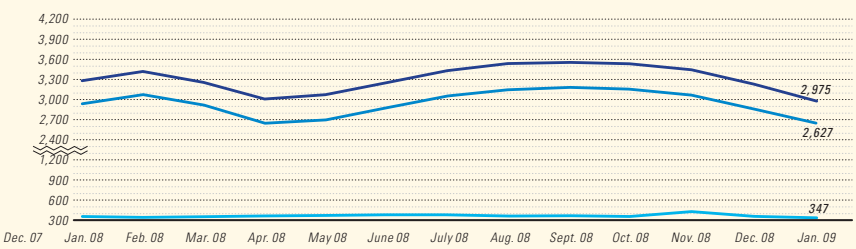
US INDUSTRY SCOREBOARD — 3/2

Latest week 2/13	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	8,895	8,826	0.8	8,853	8,828	0.3
Distillate	4,238	4,227	0.3	4,144	4,209	–1.6
Jet fuel	1,302	1,542	–15.6	1,335	1,546	–13.6
Residual	672	621	8.2	633	672	–5.9
Other products	4,845	4,756	1.9	4,662	4,736	–1.6
TOTAL DEMAND	19,952	19,972	–0.1	19,626	19,991	–1.8
Supply, 1,000 b/d						
Crude production	5,233	5,102	2.6	5,119	5,103	0.3
NGL production[2]	2,064	2,159	–4.4	2,197	2,164	1.5
Crude imports	9,548	9,831	–2.9	9,753	9,810	–0.6
Product imports	3,141	3,280	–4.2	3,213	3,253	–1.2
Other supply[3]	1,619	1,471	10.1	1,492	1,012	47.5
TOTAL SUPPLY	21,605	21,843	–1.1	21,774	21,341	2.0
Refining, 1,000 b/d						
Crude runs to stills	14,286	14,492	–1.4	14,286	14,715	–2.9
Input to crude stills	14,670	15,023	–2.3	14,670	15,018	–2.3
% utilization	83.3	85.4	—	83.3	85.4	—

Latest week 2/13	Latest week	Previous week[1]	Change	Same week year ago[1]	Change	Change, %
Stocks, 1,000 bbl						
Crude oil	350,630	350,768	–138	305,274	45,356	14.9
Motor gasoline	218,664	217,559	1,105	230,264	–11,600	–5.0
Distillate	140,752	141,565	–813	122,527	18,225	14.9
Jet fuel–kerosine	40,957	41,000	–43	39,803	1,154	2.9
Residual	36,320	35,050	1,270	36,915	–595	–1.6
Stock cover (days)[4]			Change, %		Change, %	
Crude	24.7	24.7	0.0	21.0	17.6	
Motor gasoline	24.6	24.6	0.0	25.6	–3.9	
Distillate	33.2	34.0	–2.4	28.2	17.7	
Propane	24.2	26.2	–7.6	20.5	18.0	
Futures prices[5] 2/20			Change		Change	%
Light sweet crude ($/bbl)	36.99	36.91	0.08	94.12	–57.13	–60.7
Natural gas, $/MMbtu	4.13	4.56	–0.44	8.56	–4.43	–51.8

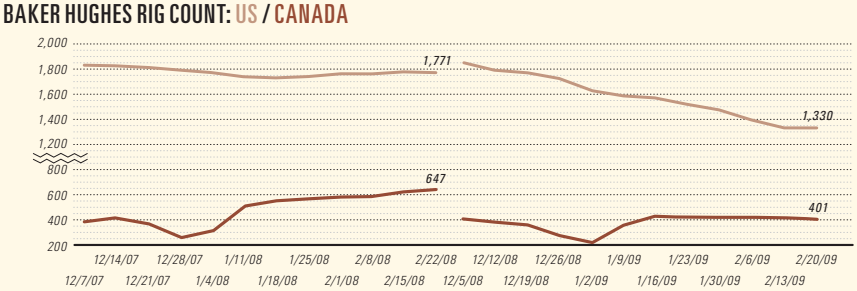
[1]Based on revised figures. [2]Includes adjustments for fuel ethanol and motor gasoline blending components. [3]Includes other hydrocarbons and alcohol, refinery processing gain, and unaccounted for crude oil. [4]Stocks divided by average daily product supplied for the prior 4 weeks. [5]Weekly average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

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



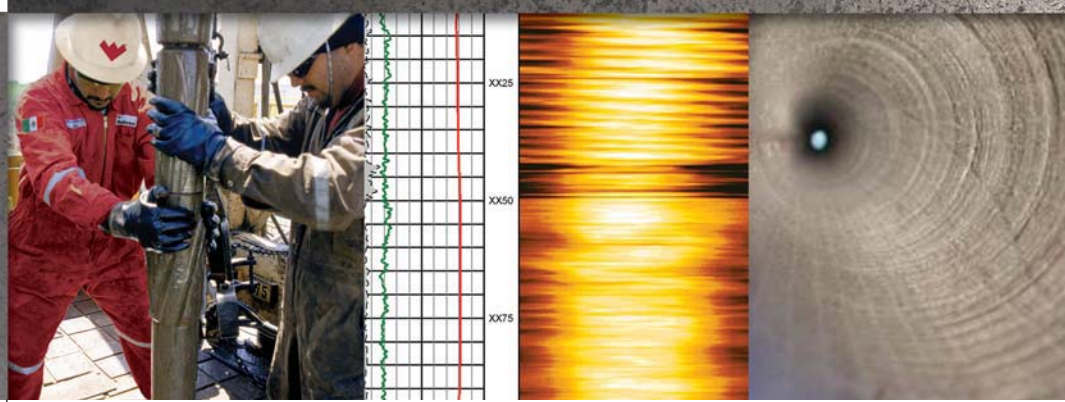
Note: Monthly average count

BAKER HUGHES RIG COUNT: US / CANADA



Note: End of week average count

Build better boreholes.



Weatherford's Revolution Rotary-Steerable Service helped BP Indonesia achieve better than anticipated production, incident-free, from a multi-well, shallow-gas, extended-reach project while saving more than $1.25 million.

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110 m thickness and the presence of a gas-water contact.

Woodside requires the extra gas to secure its proposed second LNG train at the Pluto project and roll over the construction workforce currently constructing the project's first train on the Burrup Peninsula near Karratha.

Martell-1 was drilled with the Atwood Eagle semisubmersible to 3,330 m TD. The find is 100 km northwest of Pluto field. It will be followed up with further drilling on this structural trend later in 2009.

Woodside is operator of WA-404 and has a 50% interest in it. Hess Exploration holds the remaining 50%.

Chevron says Wheatstone can support LNG

Chevron Australia's wholly owned Wheatstone LNG project off Western Australia has moved a step closer to commercialization following the company's announcement that the Wheatstone and nearby Iago fields hold sufficient gas resources to support a two-train export LNG development onshore and a domestic gas component.

This assessment comes after a successful seven-well exploration and appraisal program. Chevron declined to put a figure on the reserve estimates.

Wheatstone field is on offshore permit WA-253-P and retention lease WA-17-R and lies about 200 km north of the Pilbara town of Onslow, Western Australian. The field was found in 2004.

Iago field spans two retention permits WA-17-R, owned 100% by Chevron, and WA-16-R, in which Shell Development Australia has a one-third share. This field was discovered in 2000.

Late in 2008, Chevron announced plans to locate the Wheatstone LNG plant at Ashburton North near Onslow. The company expects to begin front-end engineering and design for the project during the second half of this year.

In the meantime, Chevron says that, in support of the Wheatstone and Gorgon projects, it will use two drilling rigs to drill multiple exploration wells in its operated acreage in 2009. One of the rigs is the large Ensco 7500 ultradeepwater semisubmersible, which has been contracted until the end of August 2010 at a day rate of $550,000. The contract includes options to extend by 1-2 years.

Husky proves Liwan as giant field off China

A delineation well has confirmed the giant nature of Husky Oil China Ltd.'s 2006 deepwater Liwan 3-1-1 gas discovery in the South China Sea.

Husky Oil China, which has secured the West Hercules semisubmersible for 3 years with extension options, is preparing front end engineering and design work for the Liwan development project for tender after it obtains results from the next appraisal well on Block 29/26. Then the rig will drill other exploration wells.

The company previously said it could recover 4-6 tcf of gas at Liwan, which it said opened a new hydrocarbon province in the southwestern Pearl River Mouth basin. Husky Oil China didn't indicate when Liwan production might begin.

The first appraisal well, drilled and tested in 1,345 m of water 350 km southeast of Hong Kong, was drilled to 3,887 m true vertical depth below sea level.

The Liwan 3-1-2 well, which cut 36 m of net gas pay in the main reservoir zone, flowed at an equipment-restricted rate of 53 MMcfd, indicating that deliverability could exceed 150 MMcfd.

The predrill 3D seismic interpretation indicated a direct hydrocarbon response at the Liwan 3-1-2 location, which the company's analysis indicated was present over a majority of the 55 sq km closure.

Block 29/26 covers 3,965 sq km and is one of six held by Husky Oil China in the South China Sea. China National Offshore Oil Corp. has the right to participate in the Liwan development with up to a 51% working interest. Husky Oil China also holds one exploration block in the East China Sea.

Liwan is 330 km east of Hainan Island and 195 km east of Husky's Wenchang oil development (see map, OGJ, Dec. 17, 2001, p. 62).

Firms press Utica shale gas work in Quebec

Operators reported progress in unlocking gas from fractured Ordovician Utica shale in the St. Lawrence Lowlands area of Quebec.

Forest Oil Corp., Denver, completed three wells at rates of 100-800 Mcfd each in spite of being unable to fully recover frac fluids because the area lacks a coiled tubing unit. The company tested each well, on a farmout from Junex Inc., Quebec City, in a different section of the Utica shale to gather data for future completions.

"Although sustained rates were not as high as anticipated, the tests have allowed Forest to identify the section of the shale it intends to target in future test wells," Forest Oil said.

Forest Oil, which plans to continue tests after winter, said it "proved the ability to successfully drill the wells horizontally and pump multistage slickwater frac jobs without major operational issues."

Farmor Junex plans to drill two wells to Utica shale on its Nicolet land block in 2009 and frac the St-Augustin-de-Desmaures well drilled near Quebec City in 2008.

Junex also participated in the Champlain 1H horizontal well on its Becancour-Champlain acreage in 2008 but didn't reveal the results. The well has a 900-m lateral in the Utica shale. ✦

Drilling & Production — *Quick Takes*

Iraq allows higher stakes in drilling projects

In an effort to attract investment, Iraq has reversed earlier plans and will let international oil companies hold as much as 75% stakes in oil drilling projects.

"There is no option for us but to do that in order to attract [IOCs] to start developing these fields," said an official of the Iraqi oil ministry, marking a change in plans unveiled last October.

At the time, government plans for the country's first oil licensing round since the end of the US-led war in 2003 would have allowed IOCs' minority stakes of up to 49% in any joint venture

with the government.

However, even under the new dispensation, IOCs still will not be allowed to book oil reserves—a sign the government intends to reserve close control over the nation's oil and gas.

The change of policy came after a 3-day meeting last week in Istanbul between Iraq oil ministry officials and executives of 32 IOCs, among them Chevron Corp., Royal Dutch Shell PLC, and BP PLC.

The meeting came amid Iraqi government hopes of having several agreements with IOCs in place by June for the development of six oil fields and two gas fields, with work to start by yearend.

The policy reversal also coincided with an announcement by Norway's DNO that it is preparing for increased production as tie-in operations near completion on the link between Tawke oil field, in Iraq's Kurdistan region, and the country's northern pipeline system.

"As a result of the good progress made on the Tawke development during 2008, we are now preparing for increased production at low cost from a substantial reserve base, without further investments," said DNO managing director Helge Eide.

The Kurdistan Regional Government (KRG), following talks with the Iraqi oil ministry last year, informed DNO that oil exports from Tawke oil field could begin during the first quarter.

That decision also represented a change of policy by Baghdad, which previously had said contracts awarded by KRG without federal government approval were illegal.

DNO holds a 55% stake in Tawke field in a production-sharing agreement with KRG.

PTTEP unit lets contract for Montara project

Thai state company PTTEP Australasia has awarded a $116 million (Aus.) contract to Perth-based engineering and construction firm Clough Australia for the installation of the Montara oil facilities in the Timor Sea.

Clough will transport and install the 750-tonne Montara wellhead platform deck and the 285-tonne mooring buoy with nine associated mooring legs, about 26 km of infield pipelines, and the 100-tonne Swift field subsea manifold.

The Montara project includes development of the main Montara field along with the outlying Swift and Skua fields all lying about 690 km west of Darwin in the Ashmore-Cartier region of the Timor Sea. They lie in 80 m of water in the AC/L7 and AC/L8 production licenses.

Clough will use its upgraded Java Constructor vessel for the assignment. Work is scheduled to begin towards the end of June, and the vessel will be employed for about 4 months, Clough said.

PTTEP expects the Montara to start producing crude and gas in the fourth quarter.

PTTEP bought the previous 100% owner of Montara fields—private company Coogee Resources Ltd.—in late 2008 for $170 million [$248.4 million (Aus.)] (OGJ Online, Dec. 30, 2008). ✦

Processing — *Quick Takes*

Total chemical unit's explosion trial begins

Trial began Feb. 23 against Total SA's fertilizer affiliate Grande Paroisse and the manager of the company's Toulouse plant where a workshop containing waste ammonitrates exploded in 2001. The company and manager are accused of homicide, causing injury to workers, and involuntary destruction.

In what is considered one of the worst industrial catastrophes in France since World War II, the Sept. 21, 2001, explosion killed 31 people, injured 2,400, damaged 30,000 buildings, and destroyed 1,000 jobs. While denying blame, Total and its insurance companies have distributed €2 billion in compensation.

The crux of the proceedings will be to determine the cause of the explosion. Total and Grande Paroisse employees deny responsibility, rejecting the premise that chlorine got mixed in with the ammonitrates, causing the explosion. A number of other possibilities have emerged, including that it may have been an act of terrorism.

The trial is scheduled to last 4 months.

BP reports small fire at Carson refinery

BP PLC experienced a small fire on the conveyer belt in its coke barn at the Carson, Calif., refinery, a company spokesman told OGJ. No injuries were reported.

The fire happened late on Feb. 23, the spokesman said. "There was no damage to the coker and the refinery continues to produce coke. We don't know what caused the fire, [but] an investigation is under way."

The refinery has a capacity of 275,000 b/d and produces gasoline, diesel, jet fuel, and petroleum coke. The coker can process 70,000 b/d. The refinery, which is on more than 630 acres of land, supplies about 25% of the Los Angeles gasoline market.

Doosan lets contract for S. Korean coal gas plant

Doosan Heavy Industries & Construction Co. Ltd. has let a contract to Foster Wheeler Italiana SPA for the front-end engineering design and technical services for a coal gasification island in South Korea. The value of the contract was not disclosed.

Foster Wheeler will also help to secure long-lead items, develop a capital cost estimate, and provide technical training on gasification and technical support during the engineering, procurement, and construction phase.

This subcontract underpins a coal-based integrated gasification combined cycle (IGCC) plant, which will be operational from the end of 2014. Foster Wheeler will use Royal Dutch Shell PLC's technology for the gasification plant to produce electricity from a solid or liquid fuel.

"First, the fuel through gasification is converted to syngas, which is a mixture mainly of hydrogen and carbon monoxide. Second, the syngas is cleaned to remove sulfur compounds and finally is converted to electricity in a combined cycle power block consisting of a gas turbine, a heat recovery steam generator, and a steam turbine" said Foster Wheeler.

Doosan is the EPC contractor for the IGCC plant. The project is partially supported by the Korean government as a part of national research, development, and demonstration projects.

YPF lets contract for delayed coking unit

YPF SA has let a contract to Foster Wheeler Iberia to design a new fractionation unit and gas plant for the delayed coking unit at the 189,000 b/d La Plata refinery in the province of Buenos Aires.

The two-drum delayed coker, which can process 27,925 b/sd, will replace an old one. The fractionation section and gas plant is expected to be completed by the end of the third quarter.

The delayed coker will use Foster Wheeler's SYDECSM delayed coking technology, which is a thermal conversion process that converts heavy residue feed into high-value transport fuels.

La Plata refinery has a conversion rate of 69%.

Nigeria's Capital Oil plans Lagos refinery

Nigeria's Capital Oil & Gas Industries Ltd. plans to build a refinery in Lagos with the state government.

The partners want to form a joint venture and are carrying out an environmental impact assessment for the 100,000-200,000 b/d refinery. They hope to lay the foundation stone by yearend. Construction is expected to take 4 years.

Capital Oil, a private company, focuses on Nigerian downstream activities and the importation, local sourcing, storage, marketing, and distribution of petroleum products.

If the refinery is built, it would be a major initiative for Nigeria as the nation has a total installed state-owned refinery capacity of 445,000 b/d. However, the refineries have not run at full utilization due to sabotage, infrequent power supplies, fire, poor management, and maintenance turnarounds. Consequently, Nigeria imports most of its fuel products.

Nigeria National Petroleum Corp. is carrying out a turnaround and maintenance program to restart the 100,000 b/sd Kaduna refinery in March, a delay of 2 months on its revised deadline due to congestion at the port in Lagos and to clearance of materials for imported equipment. Kaduna's program was expected to be finished last August.

The Warri refinery was restarted in February 2008 after being idle for 2 years following militant's sabotage. NNPC's subsidiaries operating the refineries have struggled to maintain them as they have limited funds to do so. In addition, authorization for work that exceeds this threshold requires separate negotiations with NNPC. ✦

Transportation — *Quick Takes*

Golar, LNG Ltd. agree on Gladstone LNG project

Golar LNG Ltd. has signed a heads of agreement with Liquefied Natural Gas Ltd. (LNG Ltd.) that outlines covering joint development of a 1.5 million tonne/year LNG liquefaction plant at Gladstone, Queensland.

The plant will produce LNG from coalbed methane produced from Arrow Energy Ltd.'s gas fields in Central Queensland.

Gladstone LNG Pty. Ltd. will build the plant, and Golar and LNG Ltd. agreed to each take an equity position of 40% in the joint venture. Arrow Energy has an option to take the final 20%. The estimated development cost for the LNG facility is $500 million.

The LNG will be loaded onto LNG carriers for export markets. First production is currently scheduled for late 2012. The project also offers expansion opportunities.

Under terms of the HOA, Golar will purchase the full LNG output from the project on a fob basis. Deliveries will employ at least two of Golar's existing LNG carriers, the company said.

Golar anticipates that, in addition to financing raised at the project level, it also will be able to raise financing in connection with the offtake arrangements.

Shenzhen LNG terminal could cost $1 billion

A proposed LNG regasification terminal in China's western Shenzhen province, designed to supply Hong Kong's CLP Holdings Ltd., may require an investment of as much as $8 billion (HK) ($1 billion), according to local media.

The South China Morning Post, citing unidentified sources, said CLP, which will own 24.5% of the project, would have to invest about $2 billion (HK), while PetroChina Co. would put in $4 billion for its 51% controlling stake and Shenzhen Gas Corp., $2 billion for its 24.5% interest.

The cost is slightly lower than the $10 billion LNG receiving terminal CLP proposed for South Soko Island off Lantau Island that the company scrapped in August 2008 after the Hong Kong and central Chinese governments agreed to source the fuel from Shenzhen.

"The project won't be cheaper, because gas storage tanks will have to utilize imported materials even though construction and land costs may be lower in Shenzhen," one source told SCMP.

The preliminary cost estimate of $8 billion marked another step forward for the LNG project after the parties settled their stake sizes and construction began 2 weeks ago on the 2,472-km West-East gas transmission pipeline that will transmit gas to Shenzhen from Central Asia.

Discussions were continuing on which party would be responsible for building a separate 16-km gas pipeline to transmit the fuel to CLP's gas-fired Black Point power plant in Tuen Mun from the planned LNG processing plant in Dachan Bay west of Shenzhen, sources said.

The processing plant will receive gas from Xinjiang in the northwest through the West-East pipeline and from LNG shipments from overseas oilfields. PetroChina owns the 93 billion yuan ($13 billion) pipeline as well as its interest in the LNG terminal project.

A CLP spokeswoman told SCMP that details of the LNG project such as gas pricing, volume, and timetable were still being discussed. PetroChina declined to comment.

A source estimated that CLP would likely source gas from the planned LNG terminal and from smaller gas fields of mainland offshore oil and gas supplier China National Offshore Oil Corp., whose existing supplies to CLP from Yacheng, Hainan, would run out by 2013.

CLP's Black Point power station consumes 3.4 bcm/year of gas.

Under an agreement between the Hong Kong and central Chinese governments, Hong Kong has been promised a supply of at least 1 bcm/year by 2013 when the pipeline will come online. ✦

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

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.

✦Pipeline Simulation Interest Group (PSIG) Meeting, Galveston, Tex., + 966 3 873 0139, + 966 3 873 7886 (fax), e-mail: info@psig.org, website: www.psig.org. 12-15.

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.

Latin American Meeting on Energy Economics,

Santiago, 56 2 3541411, 56 2 5521608 (fax), e-mail: info@elaee.org, website: www.elaee.org. 22-24.

NPRA Annual Meeting, San Antonio, (202) 457-0480, (202) 457-0486 (fax), e-mail: info@npra.org, website: www.npra.org. 22-24.

ACS Spring National Meeting & Exposition, Salt Lake City, (202) 872-4600, e-mail: service@acs.org, website: www.acs.org. 22-26.

NACE Corrosion Conference & Expo, Atlanta, (281) 228-6200, (281) 228-6300 (fax), website: www.nace.org/c2009. 22-26.

SPE Americas E&P Environmental and Safety Conference, San Antonio, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 23-25.

API Spring Petroleum Measurement Standards Meeting, Dallas, (202) 682-8000, (202) 682-8222 (fax), website: www.api.org. 23-26.

Asian Biofuels Roundtable, Kuala Lumpur, +44 (0) 207 067 1800, +44 207 430 0552 (fax), e-mail: a.ward@theenergyexchange.co.uk, website: www.wraconferences.com/FS1/AB1register.html. 24-25.

SPE Western Regional Meeting, San Jose, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 24-26.

Offshore Mediterranean Conference & Exhibition (OMC), Ravenna, +39 0544 219418, +39 0544 39347 (fax), e-mail: conference@omc.it, website: www.omc2009.it. 25-27.

NPRA International Petrochemical Conference, San Antonio, (202) 457-0480, (202) 457-0486 (fax), e-mail: info@npra.org, website: www.npra.org. 29-31.

Petroleum Geology Conference, London, +44 (0)20 7434 9944, +44 (0)20 7494 0579 (fax), e-mail: georgina.worrall@geolsoc.org.uk, website: www.geolsoc.org.uk. Mar. 30-Apr. 2.

SPE/ICoTA Coiled Tubing & Well Intervention Conference & Exhibition, The Woodlands, Tex., (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. Mar. 31-Apr. 1.

Offshore Asia/Multiphase Pumping & Technologies Conference & Exhibition, Bangkok, 918) 831-9160, (918) 831-9161 (fax), e-mail: attendingOA@pennwell.com, website: www.offshoreasiaevent.com. Mar. 31-Apr. 2.

APRIL

Georgian International Oil, Gas, Energy and Infrastructure Conference & Showcase (GIOGIE), Tbilisi, +44 (0) 207 596 5233, +44 (0) 207 596 5106 (fax), e-mail: oilgas@ite-exhibitions.com, website: www.oilgas-events.com. 2-3.

SPE Production and Operations Symposium, Oklahoma City, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 4-8.

SPE Digital Energy Conference, Houston, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 7-8.

ATYRAU Regional Oil & Gas Exhibition & OilTech Kazakhstan Petroleum Technology Conference, Atyrau, +44 (0) 207 596 5233, +44 (0) 207 596 5106 (fax), e-mail: oilgas@ite-exhibitions.com, website: www.oilgas-events.com. 7-9.

Rocky Mountain Unconventional Resources Conference & Exhibition, Denver, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.RMURconference.com. 14-16.

GPA Mid-continent Annual Meeting, Oklahoma City, (918) 493-3872, (918) 493-3875 (fax), website: www.gasprocessors.com. 16.

Middle East Petroleum & Gas Conference, Dubai, 65 6338 0064, 65 6338 4090 (fax), e-mail: info@cconnection.org, website: www.cconnection.org. 19-21.

ERTC Coking & Gasification Conference, Budapest, 44 1737 365100, +44 1737 365101 (fax), e-mail: events@gtforum.com, website: www.gtforum.com. 20-22.

Hannover Messe Pipeline Technology Conference, Hannover, +49 511 89 31240, +49 511 89 32626 (fax), website: www.hannovermesse.de. 20-24.

IADC Drilling HSE Middle East Conference & Exhibition, Abu Dhabi, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 21-22.

API Pipeline Conference, Fort Worth, Tex., (202) 682-8000, (202) 682-8222 (fax), website: www.api.org. 21-22.

Pipeline Transport Conference & Exhibition, Moscow, +43 1 230 85 35 33, website: www.expopipeline.com. 21-23.

Base Oils and Lubricants in Russia & CIS Conference, Moscow, +44 (0) 1242 529 090, +44 (0) 1242 529 060 (fax), e-mail: wra@theenergyexchange.co.uk, website: www.wraconferences.com. 22-23.

Instrumentation Systems Automation Show & Conference, (ISA), Calgary, Alta., (403) 209-3555, (403) 245-8649 (fax), website: www.petroleumshow.com. 22-23.

CPS/SEG International Geophysical Conference & Exposition, Beijing, (918) 497-5500, (918) 497-5557 (fax), e-mail: semery@seg.org, website: www.seg.org. 24-27.

AIChE Spring National Meeting, Tampa, (203) 702-7660, (203) 775-5177 (fax), website: www.aiche.org. 26-30.

API Spring Refining and Equipment Standards Meeting, Denver, (202) 682-8000, (202) 682-8222 (fax), website: www.api.org. 27-29.

EAGE European Symposium on Improved Oil Recovery, Paris, +31 88 995 5055, +31 30 6343524 (fax), e-mail: eage@eage.org, website: www.eage.org. 27-29.

ENTELEC Conference & Expo, Houston, (972) 929-3169, (972) 915-6040 (fax), e-mail: blaine@entelec.org, website: www.entelec.org. Apr. 29-May 1.

MAY

EAGE International Petroleum Conference & Exhibition, Shiraz, +31 88 995 5055, +31 30 6343524 (fax), e-mail: eage@eage.org, website: www.eage.org. 4-6.

Offshore Technology Conference (OTC), Houston, (972) 952-9494, (972) 952-9435 (fax), e-mail: service@otcnet.org, website: www.otcnet.org. 4-7.

Calendar

GPA Permian Basin Annual Meeting, Austin, (918) 493-3872, (918) 493-3875 (fax), website: www.gasprocessors.com. 5.

Interstate Oil and Gas Compact Commission Midyear Meeting (IOGCC), Anchorage, (405) 525-3556, (405) 525-3592 (fax), e-mail: iogcc@iogcc.state.ok.us, website: www.iogcc.state.ok.us. 10-12.

ERTC Asset Maximisation Conference, Prague, 44 1737 365100, +44 1737 365101 (fax), e-mail: events@gtforum.com, website: www.gtforum.com. 11-13.

ACHEMA International Exhibition Congress, Frankfurt, +1 5 168690220, +1 5 168690325 (fax), e-mail: amorris77@optonline.net, website: http://achemaworldwide.dechema.de. 11-15.

IADC Environmental Conference & Exhibition, Stavanger, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 12-13.

North American Unconventional Oil & Gas Conference & Exposition, Denver, (403) 209-3555, (403) 245-8649 (fax), website: www.petroleumshow.com. 12-13.

NPRA National Safety Conference, Grapevine, Tex., (202) 457-0480, (202) 457-0486 (fax), e-mail: info@npra.org, website: www.npra.org. 12-13.

International School of Hydrocarbon Measurement, Norman, Okla., (405) 325-1217, (405) 325-1388 (fax), e-mail: lcrowley@ou.edu. Website: www.ishm.info. 12-14.

Uzbekistan International Oil & Gas Exhibition & Conference, Tashkent, +44 (0) 207 596 5233, +44 (0) 207 596 5106 (fax), e-mail: oilgas@ite-exhibitions.com, website: www.oilgas-events.com. 12-14.

✦Pipeline Simulation Interest Group (PSIG) Meeting, Galveston, Tex., + 966 3 873 0139, + 966 3 873 7886 (fax), e-mail: info@psig.org, website: www.psig.org. 12-15.

NPRA Reliability & Maintenance Conference, Grapevine, Tex., (202) 457-0480, (202) 457-0486 (fax), e-mail: info@npra.org, website: www.npra.org. 19-22.

IADC Drilling Onshore Conference & Exhibition, Houston, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 21.

Gastech International Conference & Exhibition, Abu Dhabi, +44 (0) 1737 855000, +44 (0) 1737 855482 (fax), website: www.gastech.co.uk. 25-28.

APPEA Conference & Exhibition, Darwin, +61 7 3802 2208, e-mail: jhood@appea.com.au. website: www.appea2009.com.au. May 31-Jun. 3.

SPE Latin American and Caribbean Petroleum Engineering Conference, Cartagena, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. May 31-Jun. 3.

JUNE

Caspian International Oil & Gas/Refining & Petrochemicals Exhibition & Conference, Baku, +44 (0) 207 596 5233, +44 (0) 207 596 5106 (fax), e-mail: oilgas@ite-exhibitions.com, website: www.oilgas-events.com. 2-5.

Asia Oil & Gas Conference, Kuala Lumpur, 65 62220230, 65 62220121 (fax), e-mail: info@cconnection.org, website: www.cconnection.org. 7-9.

AAPG Annual Meeting, Denver, (918) 560-2679, (918) 560-2684 (fax), e-mail: convene@aapg.org, website: www.aapg.org. 7-10.

PIRA Scenario Planning Conference, Houston, (212) 686-6808, (212) 686-6628 (fax), e-mail: sales@pira.com, website: www.pira.com. 8.

ILTA Annual International Operating Conference & Trade Show, Houston, (202) 842-9200, (202) 326-8660 (fax), e-mail: info@ilta.org, website: www.ilta.org. 8-10.

International Oil Shale Symposium, Tallinn, Estonia, +372 71 52859, e-mail: Rikki.Hrenko@energia.ee, website: www.oilshalesymposium.com. 8-11.

SPE EUROPEC/EAGE Conference and Exhibition, Amsterdam, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 8-11.

PIRA Understanding Global Oil Markets Seminar, Houston, (212) 686-6808, (212) 686-6628 (fax), website: www.pira.com. 9-10.

GO-EXPO Gas and Oil Exposition, Calgary, Alta., (403) 209-3555, (403) 245-8649 (fax), website: www.petroleumshow.com. 9-11.

Petro.t.ex Africa Exhibition & Conference, Johannesburg, +27 21 713 3360, +27 21 713 3366 (fax), website: www.fairconsultants.com. 9-11.

Oil and Gas Asia Exhibition (OGA), Kuala Lumpur, +60 (0) 3 4041 0311, +60 (0) 3 4043 7241 (fax), e-mail: oga@oesallworld.com, website: www.allworldexhibitions.com/oil. 10-12.

ASME Turbo Expo, Orlando, (973) 882-1170, (973) 882-1717 (fax), e-mail: infocentral@asme.org, website: www.asme.org. 13-17.

Society of Petroleum Evaluation Engineers (SPEE) Annual Meeting, Santa Fe, NM, (713) 286-5930, (713) 265-8812 (fax), website: www.spee.org. 14-16.

PIRA London Energy Conference, London, (212) 686-6808, (212) 686-6628 (fax), e-mail: sales@pira.com, website: www.pira.com. 15.

IPAA Midyear Meeting, Dana Point, Calif., (202) 857-4722, (202) 857-4799 (fax), website: www.ipaa.org. 15-17.

PIRA Scenario Planning Conference, London, (212) 686-6808, (212) 686-6628 (fax), e-mail: sales@pira.com, website: www.pira.com. 16.

Atlantic Canada Petroleum Show, St. John's, Newfoundland & Labrador, 403) 209-3555, (403) 245-8649 (fax), website: www.petroleumshow.com. 16-17.

IADC World Drilling Conference & Exhibition, Dublin, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 17-18.

PIRA Understanding Global Oil Markets Seminar, London, 44 1493 751 316, e-mail: miles@pira.com, website: www.pira.com. 17-18.

AAPL Annual Meeting, Clearwater Beach, Fla., (817) 847-7700, (817) 847-7704 (fax). e-mail: aapl@landman.org, website: www.landman.org. 17-20.

IAEE International Conference, San Francisco, (216) 464-2785, (216) 464-2768 (fax), website: www.usaee.org. 21-24.

Society of Professional Well Log Analysts Annual Symposium (SPWLA), The Woodlands, Tex., (713) 947-8727, (713) 947-7181 (fax), website: www.spwla.org. 21-24.

SPWLA Annual Symposium, The Woodlands, Tex., (713) 947-8727, (713) 947-7181 (fax), e-mail: webmaster@spwla.org, website: www.spwla.org. 21-24.

International Offshore and Polar Engineering Conference (ISOPE), Osaka, (650) 254-1871, (650) 254-2038 (fax), e-mail: meetings@isope.org, website: www.isope.org. 21-26.

Asia LPG Seminar, Singapore, (713) 331-4000. (713) 236-8490 (fax), website: www.purvingertz.com. 22-25.

API Exploration & Production Standards Oilfield Equipment and Materials Conference, Westminister, Colo., (202) 682-8000, (202) 682-8222 (fax), website: www.api.org. 22-26.

Moscow International Oil & Gas Exhibition (MIOGE) & Russian Petroleum & Gas Congress, Moscow, +44 (0) 207 596 5233, +44 (0) 207 596 5106 (fax), e-mail: oilgas@ite-exhibitions.com, website: www.oilgas-events.com. 23-26.

JULY

Rocky Mountain Energy Epicenter Conference, Denver, (303) 228-8000, e-mail: conference@epicenter2008.org, website: www.denverconvention.com. 7-9.

API Offshore Crane Operations and Safety Conference, Houston, (202) 682-8000, (202) 682-8222 (fax), website: www.api.org. 14-15.

Oil Sands and Heavy Oil Technologies Conference & Exhibition, Calgary, Alta., (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: http://oshot09.events.pennnet.com/fl/index.cfm. 14-16.

AUGUST

SPE Asia Pacific Health, Safety, Security and Environment Conference and Exhibition, Jakarta, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 4-6.

SPE Asia Pacific Oil and Gas Conference and Exhibition, Jakarta, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 4-6.

EnerCom's The Oil & Gas Conference, Denver, (303) 296-8834, email: kgrover@enercominc.com, website: www.theoilandgasconference.com. 9-13.

ACS Fall National Meeting & Exposition, Washington, (202) 872-4600, e-mail: service@acs.org, website: www.acs.org. 16-20.

IADC Well Control Conference of the Americas & Exhibition, Denver, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 25-26.

Summer NAPE, Houston, (817) 847-7700, (817) 847-7704 (fax), e-mail: info@napeexpo.com, website: www.napeonline.com. 27-28.

SEPTEMBER

Oil & Gas Maintenance Technology North America Conference, New Orleans, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.ogmtna.com. 1-3.

EAGE Near Surface European Meeting, Dublin, +31 88 995 5055, +31 30 6343524 (fax), e-mail: eage@eage.org, website: www.eage.org. 7-9.

IAEE European Conference, Vienna, (216) 464-5365, e-mail: iaee@iaee.org, website: www.iaee.org. 7-10.

Offshore Europe Conference, Aberdeen, +44 (0) 20 7299 3300, e-mail: nbradbury@spe.org, website: www.offshore-europe.co.uk. 8-11.

GITA's GIS Annual Oil & Gas Conference, Houston, (303) 337-0513, (303) 337-1001 (fax), e-mail: info@gita.org, website: www.gita.org/ogca. 14-16.

Polar Petroleum Potential 3P Conference, Moscow, (918) 584-2555, (918) 560-2665 (fax), website: www.aapg.org. 16-18.

ADC Drilling HSE Europe Conference & Exhibition, Amsterdam, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 23-24.

SPE Eastern Regional Meeting, Charleston, W.Va., (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 23-25.

ERTC Sustainable Refining Conference, Brussels, 44 1737 365100, +44 1737 365101 (fax), e-mail: events@gtforum.com, website: www.gtforum.com. 28-30.

DGMK Production and Use of Light Olefins Conference, Dresden, 040 639004 0, 040 639004 50, website: www.dgmk.de. 28-30.

IADC Advanced Rig Technology Conference, Houston, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 29.

Unconventional Gas International Conference & Exhibition, Fort Worth, Tex., (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.unconventional-gas.net. Sept. 29-Oct. 1.

ERTC Biofuels+ Conference, Brussels, 44 1737 365100, +44 1737 365101 (fax), e-mail: events@gtforum.com, website: www.gtforum.com. Sept. 30-Oct. 2.

OCTOBER

Interstate Oil and Gas Compact Commission Annual Meeting (IOGCC), Biloxi, Miss., (405) 525-3556, (405) 525-3592 (fax), e-mail: iogcc@iogcc.state.ok.us, website: www.iogcc.state.ok.us. 4-6.

SPE Annual Technical Conference and Exhibition, New Orleans, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 4-7.

World Gas Conference, Buenos Aires, +54 11 5252 9801, e-mail: registration@wgc2009.com, website: www.wgc2009.com. 5-9.

ISA EXPO, Houston, (919) 549-8411, (919) 549-8288 (fax), e-mail: info@isa.org, website: www.isa.org. 6-8.

Kazakhstan International Oil & Gas Exhibition & Conference (KIOGE), Almaty, +44 (0) 207 596 5233, +44 (0) 207 596 5106 (fax), e-mail: oilgas@ite-exhibitions.com, website: www.oilgas-events.com. 6-9.

NPRA Q&A and Technology Forum, Ft. Worth, Tex., (202) 457-0480, (202) 457-0486 (fax), e-mail: info@npra.org, website: www.npra.org. 11-14.

API Fall Petroleum Measurement Standards Meeting, Calgary, Alta., (202) 682-8000, (202) 682-8222 (fax), website: www.api.org. 12-15.

International Oil & Gas Exploration, Production & Refining Exhibition, Jakarta, +44 (0)20 7840 2100, +44 (0)20 7840 2111 (fax), e-mail: ogti@oesallworld.com, website: www.allworldexhibitions.com. 14-17.

Build it, but will they come?

Sam Fletcher
Senior Writer

In a recent program with transportation technology expert Daniel Sperling on US television program The Daily Show, host Jon Stewart suggested the US government take some of the stimulus funds and "start building stations across the country" for electric and other alternative-fuel vehicles. That could be the nation's "Manhattan project" over the next decade—the idea being that US drivers would buy less-polluting vehicles if only they had somewhere to refuel them.

That almost sounds like a good idea for a few seconds before it falls apart under the weight of any serious thought. For instance, would the government build refueling stations and then operate them in competition with those selling other fuels? Or should the government lease or sell to private owners stations built at public expense—likely with the usual cost overruns?

High pressure can quickly put CNG and LNG into fuel tanks. But how long does it take to recharge an electric car? "It depends on the size and number of batteries and whether they are totally drained of power or only partially run down," one alternative-power expert told OGJ. But what would be a fair mark-up for electricity at a roadside station, and would prices vary in hours of peak and low demand?

Proponents talk of plugging electric cars into household outlets to recharge overnight. That's more like having to power one's digital camera ahead of a holiday instead of today's practice of pulling into a conventional station for a tank of gas, potty breaks for the kids and the dog, a case of cold drinks, a bag of burgers, and back on the freeway in less than 30 min.

A surge of electric cars on the roads might create a market for "plug-in" motels where motorists pull off the road at sunset, rent a room and outlet, then hit the road again at dawn. If an intrepid driver decided to press on after dark, would his headlights fade as the battery drained, rendering him a road hazard? When an electric car runs out of fuel on the roadside, the driver can't walk to the next station with the equivalent of a gas can for more fuel.

Cars hit the grid

One also must wonder what will happen when millions of electric cars plug into what some say is an already overloaded electric grid system. It certainly will take more coal and gas-fired power plants to generate more electricity, along with thousands more windmills across the plains and along picturesque coastlines.

Mining and processing plants will ramp up as demand for lithium in batteries outstrips current supplies, especially with the continued boom in handheld electronics. Lithium is flammable and potentially explosive, as indicated by the history of laptops catching fire. Would the bigger batteries of electric cars be safer or would the fires just be bigger?

Nevertheless, Sperling said, "The electric car has a promising future." The technology is advancing, but the idea of electric cars still must be sold to consumers. Sperling suggested a price floor of $1.75-2/gal for gasoline to encourage development of cheaper alternative fuels, but there's not a snowball's chance Congress will endorse that.

Perhaps the hardest selling point is that many if not most electric cars available are small vehicles that can carry only one or two people. They don't look like something a tall or obese person could squeeze into. Most seem to have a limited range of 100 miles or less and top speeds well under 60 mph. However, in California Telsa makes an electric sports car that does 0-60 mph in less than 4 sec, a top speed of 125 mph and a 221-mile range for $109,000. The Lightening Car Co. in the UK has a sports car that accelerates equally fast with a 250-mile range and a 2008 price of £120,000.

But even the most impressive electric car would likely be a hard sell to anyone who has lived through the aftermath of a Gulf Coast hurricane. When one is sitting in the dark with a freezer-full of rotting meat, nothing to open cans of food in the pantry, no electric stove to cook food if available, no air conditioning, no television, no electric fans, windows open to sweltering heat and mosquitoes, what is one to do with the electric car plugged into the useless outlet of what's left of the garage? ✦

Editorial

Energy transparency

The US government has new plans to spend tens of billions of dollars on energy. Taxpayers deserve to know how much energy this investment yields.

The American Recovery and Reinvestment Act of 2009 (ARRA) directs at least $65 billion to energy through 2019. Of that total, $22 billion is tax relief. President Barack Obama wants to spend $15 billion/year on wind and solar power, clean coal, advanced biofuels, and vehicle fuel efficiency.

The outlays will add to existing spending programs targeting a wide range of energy sources and uses. In 2007, according to an Energy Information Administration study conducted that year, US tax expenditures on energy totaled $10.444 billion. Big items on EIA's list of special tax treatment in 2007 were the alternative fuel tax credit, $2.37 billion, and alcohol fuel exemption, $2.99 billion.

Oil, gas breaks

For oil and gas in 2007, the biggest tax breaks were the expensing of exploration and development costs, $860 million, and the excess of percentage over cost depletion, $790 million. The value of those breaks topped out at $10.9 billion (2007 dollars) in 1981, a feverish drilling year. Since then, tax-law changes have restricted use of percentage depletion.

Well before the current spate of energy spending, therefore, the US was increasing governmental outlays on energy and conservation overall, with a tilt toward noncommercial energy. Recently enacted laws will amplify the effect.

The Energy Policy Act of 2005, according to government estimates, added about $14.5 billion in tax expenditures on energy over 11 years, including $4.5 billion for renewables, $3 billion each for coal and electricity, and $2.6 billion for oil and gas. The act also set a mandate for ethanol in gasoline, which the Energy Independence and Security Act of 2007 expanded to a peak of 36 billion gal in 2022. Because ethanol blenders receive a tax credit of 45¢/gal, the growing mandate will raise tax expenditures if Congress continues to renew the subsidy.

So the ARRA's preferential spending on energy is nothing new. It's just more—much more. The government has been spending tax dollars on energy for a long time and lately has favored sources other than oil and gas.

Promoters of ethanol and other energy from renewable sources argue that new energy forms deserve favorable treatment similar to past subsidies for oil and gas. The proposition is fair, as far as it goes. But recent treatment is anything but similar.

In their peak year for tax breaks, oil and gas contributed the equivalent of 38.1 quadrillion btu to US energy supply. The $10.9 billion in tax breaks thus were worth 29¢/MMbtu. In 2007, according to EIA, tax expenditures for alcohol fuels totaled $3.2 billion, and ethanol production represented 550 trillion btu of energy, making alcohol tax breaks worth $5.82/MMbtu. So a unit of alcohol energy in 2007 cost taxpayers 20 times what a unit of oil and gas energy did in an aberrant year when tax breaks were at their highest level in at least 3 decades.

There's nothing inherently wrong with spending by the government on energy. The US needs new supply from diverse, domestic sources, which characteristically need help in their early years. As the comparison between alcohol and oil and gas tax breaks shows, however, it's possible to spend a lot of money on relatively small increments of energy supply.

Dollars and supply

Taxpayers should know how much—or little—their investment in energy contributes to total supply. Most of them would be disappointed by the record. Most taxpayers have no idea how much their government spends on energy or how little usable energy results from the expenditure. This condition makes energy fertile ground for waste, at best, and corruption, at worst.

In his push for an economic stimulus law with energy spending at its core, Obama emphasized transparency. He's right. Americans deserve a regular accounting of what unprecedented government outlays really achieve. The accounting should relate dollars to real supply of usable supply for every politically favored energy source. It also should say who gets the money. Anything less straightforward isn't transparent enough. ✦

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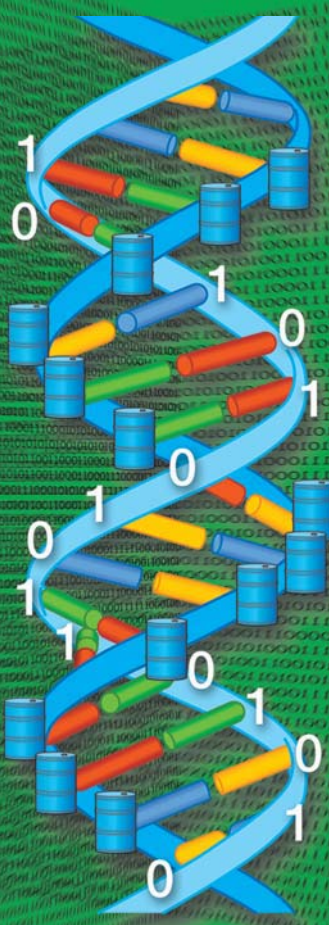

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Slump trims forecasts for Canadian oil sands

Expectations are falling for bitumen production from the Canadian oil sands as the international price of crude oil languishes around $40/bbl, far below levels required by new investments in production and upgrading.

While once-stratospheric operating costs have fallen in the major oil-sands producing regions of Alberta, their slide hasn't matched that of oil prices, which peaked last July above $140/bbl.

Companies have delayed, suspended, or canceled dozens of upgrading and extraction projects (see table). Many of them have announced layoffs. Investment expectations are plunging.

With layoff announcements frequent, the unemployment rate in Alberta is increasing. After several years of booming activity and labor shortage, however, it remains relatively low. The provincial government said the unemployment rate in January rose to a seasonally adjusted 4.4% from 4.1% in December and 3.2% in January 2008. The new figure for Alberta was still well below the average unemployment rate for all of Canada of 7.2%.

The operational slowdown comes

ANNOUNCED DELAYS IN OIL SANDS PROJECTS*

Project	Bitumen production rate, 1,000 b/d	Originally stated in-service date	Report
BA Upgrader Phase 1-3	70 x 3	2009, 2010, 2013	Construction has been halted
CNRL Horizon			Cutting spending
Imperial Oil Kearl Phase 1	100	2010	Investment decision in 2009
Korea National Oil Co. Phase 1	10	2010	Delayed for a year
Laricina Energy Ltd.: Germain	1.8	2Q 2009	Delayed 12-18 months; cap changed to 600 b/d
Saleski	1.8	4Q 2009	Delayed 6-9 months; cap changed to 1,200 b/d
Opti Long Lake Phase 2	72	2013	Sanctioning subject to various factors
Patch International – Ells River	10	2011	Project on hold
Petro-Can Fort Hills Mine:			
Phase 1	190	4Q 2011	Design for go-ahead will be deferred until some time in 2009
Phase 2	130	2015	
Petro-Can Fort Hills Upgrader 1	165	2012	Decision on go-ahead deferred indefinitely
Petro-Can Fort Hills Upgrader 2/3	175	2014	
Shell Jackpine 1B	100	2012	Suspending expansions for now
Shell Carmon Creek (in-situ) Phase 1-2	50 x 2	2008; 2017	Withdrawn application due to potential changes in design; more info to be provided in early 2009
StatoilHydro Upgrader	250	2014	Withdrawing application; project canceled
Suncor Voyager Upgrader	300 (orig. 350)	2012	Completion delayed by 1 year
Suncor Firebag			
Phase 5	68	1Q 2012	Schedule flexible to market conditions
Phase 6	68	3Q 2012	Schedule flexible to market conditions
Syncrude Stage 4 Expansion	140	2015	Reevaluating plans
Total Joslyn Mine	100	2013	May 2008 onstream date moved to 2014

*As of the end of December 2008. Since compilation of this list, Suncor has suspended its Voyager upgrader and Firebags Phase 3 projects.
Source: Canadian Association of Petroleum Producers

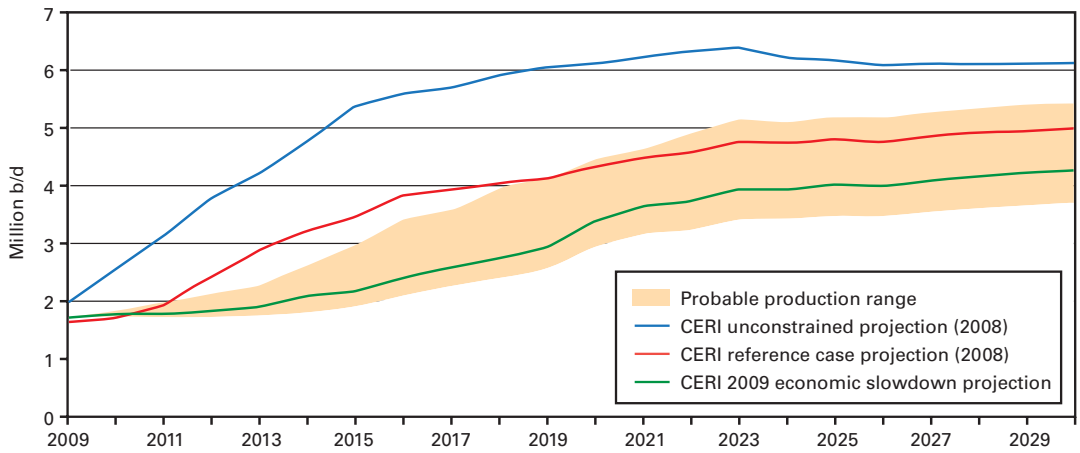
as worry grows about the environmental consequences of oil sands production and upgrading, which require more water and energy than conventional production and emit more greenhouse gases (GHG) and, in the case of mining projects, extensive surface disturbance. A major uncertainty for oil sands project operators is the cost of future measures enacted to control GHG emissions.

Last month the Alberta government published a 20-year strategy for oil sands development that it said seeks, among other things, to balance economic growth, environmental values, and land-use concerns of aboriginal peoples. Environmental groups criticized the strategy for lacking details.

Also in February, the Energy Resources Conservation Board and Alberta Environment sought comments on a draft directive that would reduce water use in thermal in situ operations and

CERI'S NEW OUTLOOK FOR CANADIAN BITUMEN PRODUCTION

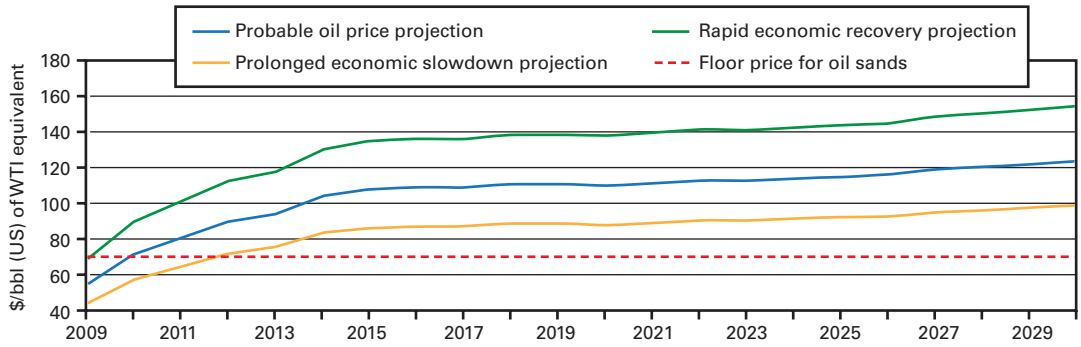
Fig. 1



Source: Canadian Energy Research Institute

CERI'S VIEW OF FUTURE CRUDE OIL PRICES

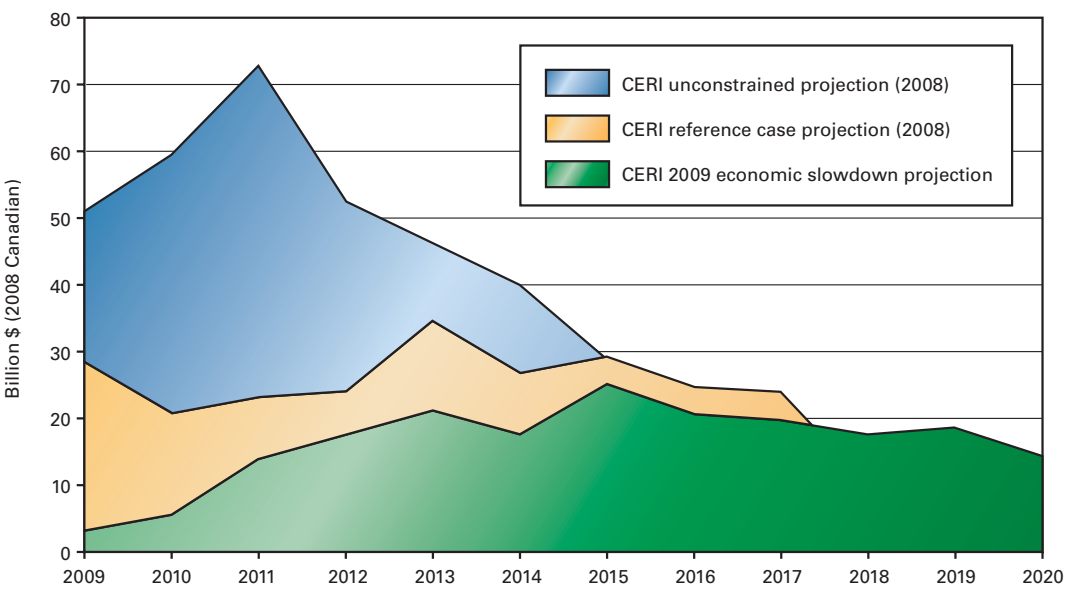
Fig. 2



Source: Canadian Energy Research Institute

CERI'S NEW OUTLOOK FOR CANADIAN OIL SANDS INVESTMENT

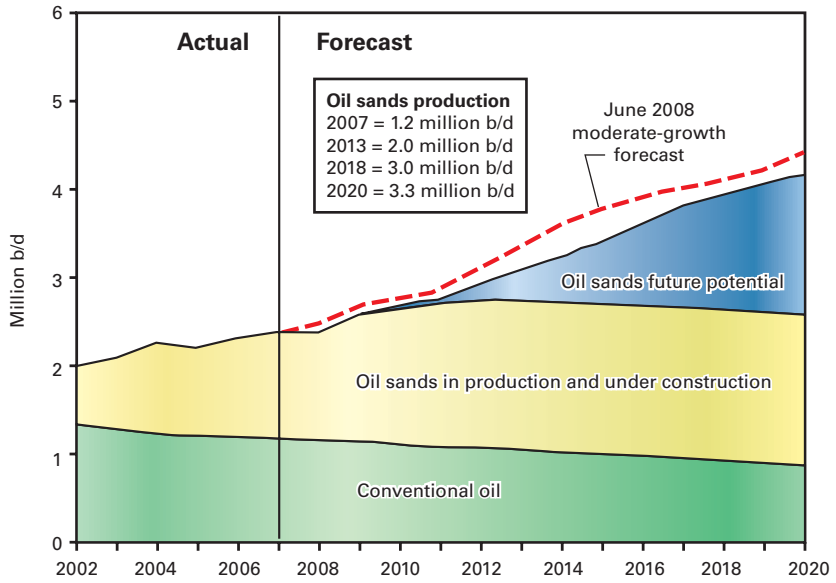
Fig. 3



Source: Canadian Energy Research Institute

CAPP'S PROJECTION OF WESTERN CANADIAN OIL PRODUCTION*

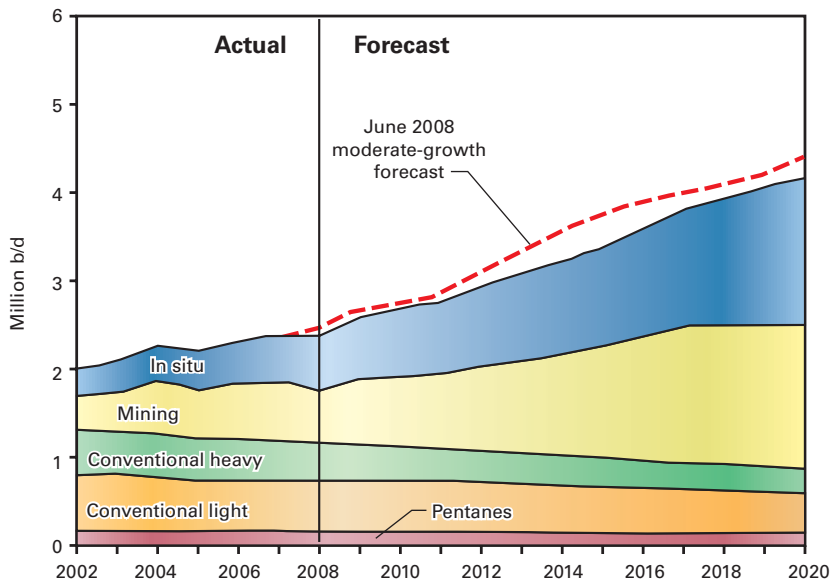
Fig. 4



*Base case; assumes moderate growth.
Source: Canadian Association of Petroleum Producers

CAPP: SOURCES OF WESTERN CANADIAN OIL PRODUCTION*

Fig. 5



*Base case; assumes moderate growth.
Source: Canadian Association of Petroleum Producers

increase water recycling.

And with rising costs of environmental remediation ever looming, the royalty rate on oil sands production increased at the beginning of the year under Alberta's "New Royalty Framework," which was approved while oil prices were high and rising (OGJ, Nov. 5, 2007, p. 34).

Weakening economics

All these trends weaken the economics of an industry crucial to Alberta and increasingly important to the Canadian economy and global oil supply.

Inevitably, the weakening is taking its toll on expected production.

Last month the Canadian Energy Research Institute (CERI) cut forecasts it made only last November for oil sands production through 2030 (OGJ, Feb. 16, 2009, Newsletter; Fig. 1).

Senior Economist David McColl, author of the outlook, said the new projection uses a CERI database of mining, in situ, and upgrader projects current as of Jan. 25. The forecast assumes the industry requires a West Texas Intermediate crude price above $70/bbl (US) to resume growth. It also assumes construction and operating costs rise in step with the oil price, exceeding the $70/bbl threshold in 2010 (Fig. 2).

The price projections follow forecasts by the US Energy Information Administration, with "rapid economic recovery" and "prolonged economic slowdown" projections reflecting a 25% rise or fall in the price of crude delivered to the US relative to the "probable" projection.

McColl's study says oil sands projects now in operation should be able to withstand oil prices below $50/bbl for a while.

Lower growth

In its 2008 project, CERI saw potential for oil sands production to exceed 5 million b/d by 2015 and 6 million b/d by 2030 ("unconstrained projection" line in Fig. 1). Its 2008 reference case, however, was lower, projecting output of 3.4 million b/d of bitumen by 2015 and 5 million b/d by 2030.

Its new projection (labeled "2009 economic slowdown" in Fig. 2) assumes the WTI oil price stays below $60/bbl for most of 2009 and credit markets continue to lack liquidity. Economic recovery begins in early 2010, and liquidity returns slowly.

Oil sands production in this scenario stalls until 2013 and shows no major growth until 2015. At first, output

growth resumes only for established projects and those with financing in place before the credit collapse of 2008. Many projects will face a period of reassessment and refinancing that might last several years.

The new CERI forecast projects a range of oil sands production: 1.9-2.9 million b/d in 2015, rising to 3.7-5.4 million b/d by 2030.

The projection calls for "modest" spending on oil sands, McColl says, "at a level that CERI believes the Canadian economy can easily absorb."

Labor and equipment availability have combined with the economic slowdown to trim $97 billion (Can.) of expected spending from the 2008 reference case and $241 billion from the "unconstrained projection" case (Fig. 3).

McCall says the oil sands production outlook for 2030 won't be known with more certainty for "well over a decade."

He adds: "What is clear to us is that, over the next few years, oil sands production growth will be almost at a standstill, and new capital investment will collapse to levels not seen since before the turn of the century."

In 2000, he notes, oil sands investment was "just over $4 billion."

CAPP's adjustment

Like CERI, the Canadian Association of Petroleum Producers has trimmed its expectations for oil sands production (OGJ, Jan. 12, 2009, p. 39).

In December, the group updated a June 2008 forecast to reflect announced changes to project schedules, reducing its "moderate-growth" case to show continued but slower growth in total crude oil production for western Canada (Figs. 4, 5).

It now sees minimal production change from the 2008 projection in 2008-12 but as much as 300,000 b/d less in 2012-17.

Deferrals in upgrader projects, it adds, will result in more output of heavier blends and less upgraded, lighter oil. ✦

Obama: Energy vital to nation's economic future

Nick Snow
Washington Editor

US President Barack Obama listed energy as one of three critical areas to the nation's economic future in his first State of the Union address Feb. 24.

"We know the country that harnesses the power of clean, renewable energy will lead the 21st century," Obama said, adding, "Yet it is China that has launched the largest effort in history to make its economy energy efficient. We invented solar technology, but we've

WATCHING GOVERNMENT

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Obama, Harper, and oil sands

When US President Barack Obama and Canadian Prime Minister Stephen Harper met Feb. 18 in Ottawa, they pledged to work together on economic recovery, international security, and clean energy.

Their announcement of a "clean energy dialogue" did not mention Alberta's oil sands, which increasingly supply oil to the US and also have come under attack from environmentalists and some US congressional leaders.

Obama acknowledged the problem in a Feb. 17 interview with the Canadian Broadcasting Corp. "What we know is that oil sands create a big carbon footprint," he said, adding, "So the dilemma that Canada, the United States, China, and the entire world face is how we obtain the energy that we need to grow our economies in a way that is not rapidly accelerating climate change."

No country will be able to solve the problem by itself, Obama said. "So Canada, the United States, China, India, the European Union, all of us are going to have to work together in an effective way to figure out how do we balance the imperatives of economic growth with very real concerns about the effect we're having on our planet," he said.

'Clean energy mechanisms'

Obama said, "I think that it is possible for us to create a set of clean energy mechanisms that allow us to use things not just like oil sands, but also coal. The more that we can develop technologies that tap alternative sources of energy but also contain the environmental damage of fossil fuels, the better off we're going to be."

Harper also did not duck the issue when CNN's Wolf Blitzer asked him a question about it on Feb. 18: "The fact is that there are high emissions from oil sands extraction. We're involved, as is the government of the United States, in funding technological development, looking at things like carbon capture and storage [CCS] as a way of minimizing or cutting down on some of those emissions."

Weyburn example

His joint announcement with Obama specifically mentioned the two countries coordinating CCS demonstrations. It said this would build on their experience with pumping carbon dioxide from a North Dakota coal gasification plant for enhanced recovery operations at EnCana Corp.'s Weyburn oil field in Saskatchewan.

Harper said he expects CCS projects to be very important for the world from now on. Canada has been wrestling for the past 10 years with its desire to have a regulatory regime which would reduce its carbon emissions, he noted.

"But we've been trying to do so in an integrated economy when the United States has not been willing to do so. I think quite frankly the fact that we have a president [and] administration that want to see some kind of regulation on this is an encouragement. I'm convinced that our energy sector will respond," Harper said. ✦

fallen behind countries like German and Japan in producing it. New plug-in hybrids roll off our assembly lines, but they will run on batteries made in Korea."

Obama told the joint session of the 111th Congress: "Well, I do not accept a future where the jobs and industries of tomorrow take root beyond our borders, and I know you don't either. It is time for America to lead again."

The nation would double its supply of renewable energy within the next 3 years thanks to the recently enacted economic recovery plan, Obama said. "We have also made the largest investment in basic research funding in American history, an investment that will spur not only new discoveries in energy, but breakthroughs in medicine, science, and technology," he said.

Thousands of miles of new power lines will be built to carry electricity from alternative and renewable sources to consumers, and thousands of people will go to work to make US homes and businesses more energy-efficient, Obama said.

Seeking carbon cap

The president said, "But to truly transform our economy, protect our security, and save our planet from the ravages of climate change, we need to ultimately make clean, renewable energy the profitable kind of energy. So I ask this Congress to send me legislation that places a market-based cap on carbon pollution and drives the production of more renewable energy in America. And to support this innovation, we will invest $15 billion/year to develop technologies like wind power and solar power, advanced biofuels, clean coal and more fuel-efficient cars and trucks built right here in America."

His call for a carbon cap produced different responses from the two leaders of the US Senate Environment and Public Works Committee. Chairman Barbara Boxer (D-Calif.) applauded it. "President Obama has it exactly right: We must 'transform our economy, protect our security and save our planet from

the ravages of climate change.' We will work with the president and answer his call," she said after the president's speech.

The committee's ranking minority member, James M. Inhofe (R-Okla.), did not approve of the idea. "Climate proposals should not be concealed under the guise of a deficit reduction tool. We learned last year during the Lieberman-Warner global warming cap-and-trade debate that the massive proposal represented the largest redistribution of wealth in the government's history and predetermined winners and losers," Inhofe said.

While Obama's remarks covered several topics, his general theme was that it was time for the US to make tough, necessary decisions to rebuild its economy after years of making the easy choices.

Obama said, "The fact is, our economy did not fall into decline overnight, nor did all of our problems begin when the housing market collapsed or the stock market sank. We have known for decades that our survival depends on finding new sources of energy. Yet we import more oil today than ever before. The cost of health care eats up more and more of our savings each year, yet we keep delaying reform. Our children will compete for jobs in a global economy that too many of our schools do not prepare them for."

'Our responsibility'

Obama said the recovery and financial stability plans he proposed are immediate short-term steps to revive the US economy. "But the only way to fully restore America's economic strength is to make the long-term investments that will lead to new jobs, new industries, and a renewed ability to compete with the rest of the world. The only way this century will be another American century is if we confront at last the price of our dependence on oil and the high cost of health care; the schools that aren't preparing our children and the mountain of debt they stand to inherit. That is our responsibility," he stated.

Other congressional leaders responded following Obama's speech. House Speaker Nancy Pelosi (D-Calif.) said she understood that the US first needs to get out of its recession and make its economy grow again, and that she has already worked with Congress to create and save millions of jobs with the American Economy and Reinvestment Act.

"Now as we move forward to further

strengthen the economy, it is essential that we make key investments to expand access and make health care more affordable, make America energy-independent, and ensure a strong education for all children. These investments will help make certain America is a world leader for generations to come," she maintained.

House Majority Leader Steny H. Hoyer (D-Md.) said Congress would follow through on the rest of Obama's agenda that he outlined in his remarks now that the initial economic recovery legislation has been passed. "I am also pleased that he emphasized how important it is that our nation return to budgetary sanity," he said.

"I thought the president gave a great speech," said US Senate Energy and Natural Resources Committee Chairman Jeff Bingaman (D-NM). "Clearly he has a plan for how to solve our short-term economic challenges, but he also has a plan for getting our economic house in order for the long term as well."

'Back up our promises'

Republicans said they generally agreed with Obama's main goals but questioned his methods. "Middle-class families and small businesses across our nation are making sacrifices and tough budget decisions. It's time for Washington to do the same," said House Minority Leader John A. Boehner, adding, "We cannot afford to pile mountains more in debt on our children and grandchildren in order to pay for a spending spree that we simply cannot afford. It is time for both parties in Washington to back up our promises of fiscal responsibility with real action."

Lisa Murkowski (R-Alas.), the Senate Energy and Natural Resources Committee's ranking minority member, said she agreed with the president that energy is a top national priority and believes that developing a comprehensive and balanced energy policy is imperative to a strong economy.

"We can change our energy economy, but under the most optimistic scenarios we will be dependent on traditional energy sources during our transition," Murkowski said, adding, "We need to develop alternative and renewable energy sources, but we also must make sure that any national energy policy includes provisions that encourage increased domestic production of the resources that we currently rely upon to heat our homes, power our vehicles, and grow our economy."

Rep. Rob Bishop (R-Utah), a member of the House Natural Resources Committee, said, "There is plenty to agree with, as President Obama spoke in broad strokes of general policy. But one legitimate concern is whether or not Democratic leaders in Congress, like Nancy Pelosi, can produce legislation that actually promotes solutions instead of preventing them. The president certainly got one thing right: America is strong and we can get through this. History has shown that we have been through rougher times, even recently, and come out all right, mostly because of the strength and resolve of individual Americans. We should remember that real and permanent solutions come from American families and businesses, not from government."

Richard G. Lugar (R-Ind.), ranking minority member of the Senate Foreign Relations Committee, said the US must solve problems in four increasingly interconnected areas: nuclear proliferation, global energy security, global food security, and climate change. "In these times," he said, "it is important that our great nation does many important things well, that we lead and do not default to only reacting to the latest crisis. We need to dedicate our leadership to significant issues and not be distracted by petty differences or inconsequential matters." ✦

Murkowski urges directional drilling for ANWR

Nick Snow
Washington Editor

US Sen. Lisa Murkowski (R-Alas.) said on Feb. 19 that she plans to propose using directional drilling on state land and waters in initial Arctic National Wildlife Refuge (ANWR) oil and gas resources development, with no surface occupancy.

That approach means there would be no occupancy, pipelines, construction, or facilities that would impact the refuge or its wildlife, she said in her annual address to Alaska's legislature in Juneau.

"America will get the energy it needs, and those concerned about the impact to wilderness will be able to enjoy and preserve the refuge exactly as it is today. It is the best of both worlds," she maintained.

Murkowski said her bill would take advantage of technological improvements in underground oil development to allow state land-based production platforms to siphon crude oil and gas from beneath the refuge.

Current directional drilling technology would permit only about 10% of ANWR's estimated oil and 80% of its gas to be produced, she conceded. But future subsurface production technology could increase those percentages substantially, she added.

According to Murkowski, the advantage of her proposal is that drilling from state lands would allow production to begin sooner. Congress already has set a "no surface occupancy" precedent of development in a wilderness area when it approved the 2007 Wyoming Range Legacy Act, the first bill to permit underground oil development from beneath a wilderness area, she said.

She urged US President Barack H. Obama's administration to approach her idea with an open mind. "We have

FERC submits seventh report on Alaska natural gas pipeline

Nick Snow
Washington Editor

Two proposals for a natural gas pipeline from Alaska's North Slope (ANS) into Canada have advanced to the detailed planning and project development stage, the Federal Energy Regulatory Commission told Congress on Feb. 20. A third project has dropped out.

"At this point in project development, both Denali and TC Alaska are now fully working towards obtaining quality information to conduct their respective open seasons to obtain shippers for their pipeline," FERC said in its seventh report to federal lawmakers on the project.

The agency said since it submitted its last report Aug. 29, the Denali partnership, which is comprised of BP and ConocoPhillips, continued with the prefiling process for its project with FERC, performed some field work, and hired a contractor to evaluate a major gas treatment plant planned on the ANS. Denali formally applied to the US Bureau of Land Management on Oct. 17 for a right-of-way across federal land in Alaska, the report noted.

At the same time, the State of Alaska completed the selection of TC Alaska, which is comprised of two TransCanada Pipelines Ltd. affiliates, as the licensee under its Alaska Gas Line Inducement Act program, FERC said. It said this qualifies TC Alaska to receive up to $500 million in matching contributions to cover costs of preparing a federal application and obtaining related permits and access to streamlined state administrative permitting procedures.

The Alaska Northwest Natural Gas Transportation Co., which received approval to construct a gas pipeline from Alaska during the administration of President Jimmy Carter, notified FERC in December that its sponsors concluded that their project was no longer viable, the report continued. The company has dissolved and surrendered the last of its permits and approvals, according to FERC.

It said that during the open seasons in 2010, "both Denali and TC Alaska are expected to keep most of their information and decisions internal, yet they will also continue to work with, and inform various levels of government, other stakeholders, and the public about their projects.

"The commission stands ready to do its part and reminds all stakeholders that construction and operation of an Alaska natural gas pipeline is the ultimate goal," it added.

an innovative, brand new approach to energy production. I urge those opposed to development in ANWR to take a close look at my proposal: It will not harm ANWR's tundra or ecosystem, or the Porcupine caribou herd, which does not travel on state lands," Murkowski said.

Gas pipeline warning

While there is still opposition in Washington to opening ANWR's coastal plain to oil and gas leasing, the new administration strongly supports efforts to construct a gas pipeline from Alaska to markets in the Lower 48 states, she continued. But she warned that the rest of the country won't wait forever for Alaska's gas.

"Shale gas production is growing by leaps and bounds. America will purchase its gas from the sources that are ready to deliver it. If that's not Alaska, America will buy elsewhere. That will really strand our gas, and it may do so for an awfully long time," Murkowski said.

Two steps are necessary to get the project moving, she maintained. The first is to reach a consensus on a single pipeline project now and not wait for an uncertain open season next year. "In order to arrive at that point, we will need to bring the competing pipeline proponents (the producers who own the gas, and the state and federal governments) to the same table," Murkowski said. The second step would be to unite around fiscal terms related to North Slope gas production, she said.

This is one case where Alaskans can't blame the federal government for delays in a major capital project in the state, Murkowski said. Whether it has been to mitigate the project's financial risk, to streamline permitting, or to open a federal coordinator's office, the federal government has stepped up when it has been asked to, she indicated.

She also called for a resolution of the impasse over prices for Cook Inlet gas and construction of a new pipeline to deliver gas to people who live in the 49th State. Both gas pipelines need to move forward, said Murkowski. "If additional federal legislation is necessary to push this project across the finish line, I stand ready to press for it," she declared.

The Alaska Wilderness League immediately blasted Murkowski's ANWR proposal. "It's just Big Oil's latest scheme to get its hands on pristine, untouched lands that millions of Americans have fought for years to protect. No matter how you dress it up, the goal is still to develop one of the few truly wild places we have left," said Karen Miller, the group's government affairs director. ✦

Clean energy strategy must include commitment to NGVs

Nick Snow
Washington Editor

A new national clean energy strategy that emphasizes electricity production from renewable sources must also include a strong natural gas vehicle commitment, said two speakers who later participated in a clean energy forum on Feb. 23.

"We have a significant fuel source for vehicles in natural gas that we need to develop," said US Senate Majority Leader Harry M. Reid (D-Nev.) during a press teleconference on Feb. 18. "We want to start by fueling almost 400,000 18-wheelers immediately. This would cut [oil] imports significantly," he said.

Energy investor T. Boone Pickens said wind and solar energy development and construction of a smart power grid are important first steps, but more needs to be done.

"We need to work hard to use more domestic energy in our transportation and rely less on foreign oil. Natural gas is the only way to make a difference now," Pickens said, adding that it could replace diesel fuel in large trucks.

Gas is cleaner, with 30% less carbon and 93% fewer toxic emissions than diesel, according to the US Environmental Protection Agency, and it costs only the equivalent of $1.59/gal, Pickens said during a teleconference with Reid and others who participated in the Feb. 23 clean energy forum hosted by the Center for American Progress Action Fund.

The US has plenty of natural gas onshore in shale basins, Pickens continued. "We are absolutely overwhelmed with natural gas. It's so abundant. Remember this: Natural gas is the only [alternate] fuel that can move an 18-wheeler. You can't move it with a battery," he said.

US Energy Secretary Stephen Chu and Interior Secretary Ken Salazar also participated in the teleconference with reporters. The Feb. 23 forum discussed modernizing and expanding the US electricity grid, integrating energy efficiency and distributed generation into operations and regulations, and reducing US dependence on foreign oil by developing new domestic sources of transportation fuel, organizers said. Former US President Bill Clinton and Vice-President Al Gore also were on the conference program, they added.

Challenge, opportunity

"This is a signature challenge and opportunity," Salazar said. "We all recognize that our national and environmental security and economic strength are closely tied to developing this new energy economy." The US Department of the Interior can contribute in two ways, he continued: "First, with its control over so much land, we can provide sites onshore and offshore for solar, wind, and other renewable energy production sites. Second, we also can provide routes for transmission lines.

"President [Barack] Obama has made it starkly clear that it's a new day in America. We no longer look at simply drilling to produce new energy. It's a very different time now," Salazar maintained.

He also said that producing more gas to meet additional demand if more gas vehicles are built will not necessarily require leasing more of the US Outer Continental Shelf. "There are natural gas resources being developed all over the country," the secretary said.

Reid and Pickens separately said that one commercial trucking company's chief executive, Jerry C. Moyes of Swift Transportation Co. in Phoenix, has expressed interest already in buying trucks that run on natural gas. "He orders 23 Kenworth trucks a day, which translates into more than 8,000 yearly," Pickens said.

He conceded that financial incentives will be needed initially because a large truck engine that uses natural gas instead of diesel costs $75,000-80,000 more. "But if we provide that and do the 14,000 18-wheelers that Sen. Reid is talking about, it will create thousands of jobs and reduce our dependence on foreign oil," the former oil and gas executive said.

Salazar said that it's time for a new energy approach. "We need to have a different mind-set to open our eyes and create new opportunities to fulfill the environmental, energy, and economic needs of America," he declared. ✦

Energy transmission debate should include gas

Nick Snow
Washington Editor

US lawmakers should consider correcting defects in current interstate gas pipeline regulations as they draft new interstate electricity transmission legislation, said the president of the Interstate Natural Gas Association of America on Feb. 23.

"INGAA agrees that the statutory framework for siting interstate natural gas pipelines should be instructive as Congress considers a remedy for the inability to modernize and expand the electric transmission grid," INGAA Pres. Donald F. Santa Jr. said in a letter to US Senate Majority Leader Harry M. Reid (D-Nev.) and four congressional energy leaders.

He noted that the Natural Gas Act of 1938 gave the Federal Power Commission and its successor, the Federal Energy Regulatory Commission, preemptive authority to authorize new gas pipeline construction and

rate certainty, once a pipeline is built, which helps gas pipeline companies raise billions of dollars in private capital for new gas transmission infrastructure.

"While the NGA provides a good model, even it is incomplete, however, as a comprehensive scheme for ensuring that energy infrastructure can be constructed on a timely basis to the needs of energy consumers," Santa said.

He said that despite FERC's well-established authority under the law, states and other federal agencies "retain the ability to delay, deny, or unreasonably condition other permits required under federal law. Therefore, even though FERC may authorize the construction of an interstate pipeline based on a finding that it meets 'the public convenience and necessity,' an individual state can still veto a multistate pipeline project by denying or withholding certain permits."

Notwithstanding the interstate commerce implications of this abuse of authority granted by federal law, the current statutory framework provides no process for resolving such conflicts, according to Santa.

"Consequently, we urge you to develop an effective remedy as part of electric transmission siting legislation that also can be applied to interstate natural gas pipeline siting," he said.

INGAA sent copies of the letter to Senate Energy and Natural Resources Committee Chairman Jeff Bingaman (D-NM), ranking minority member Lisa Murkowski (R-Alas.), House Energy and Commerce Committee Chairman Henry A. Waxman (D-Calif.), and ranking minority member Joe Barton (R-Tex.). ✦

California US House members offer differing OCS views

Nick Snow
Washington Editor

Two US House members from California presented dramatically different viewpoints as the Natural Resources Committee focused on state perspectives in its second 2009 Outer Continental Shelf hearing on Feb. 24.

Democrat Sam Farr, whose district includes the Monterey Peninsula, said moratoriums should be reinstated while Congress develops a comprehensive ocean resources management strategy. Republican Dana Rohrabacher, whose district farther south includes parts of Long Beach, said domestic offshore energy resources could significantly contribute to a US economic recovery.

Their remarks opened the committee's second of three scheduled hearings on the OCS. The first on Feb. 11 heard from witnesses representing environmental organizations and coastal tourism groups. A final hearing on Feb. 25 will present the oil and gas industry's perspective.

Natural Resources Committee Chairman Nick J. Rahall (D-W.Va.) said in his opening statement that the hearings were designed to give all sides a chance to present their viewpoints as the committee begins working to determine the best way to accommodate oil and gas drilling while ensuring that offshore resources are managed in an environmentally and fiscally responsible manner.

"Our coastal states are critical to this discussion. They are literally on the front lines of the offshore drilling debate, and their needs and challenges are vitally important considerations for us all," he maintained.

"As I stressed at our last hearing, I am not opposed to drilling. I understand the benefits of domestic oil and gas production. But I am also aware of the risks. This ongoing discussion is designed to examine the trade-offs that would be involved in expanding offshore oil and gas drilling, and I look forward to working with members on both sides of the aisle as we determine the best way to move forward," Rahall continued.

Oceans greatest resource

Farr said that since the waters off his district's coast are protected by legislation authorizing the Monterey Bay National Marine Sanctuary, he was testifying on behalf of the oceans, "perhaps the greatest natural resource on earth, and one that we all share." He said that while offshore oil and gas technology may have improved, it still poses risks from exploration, extraction, and transportation.

"Further, the debate on fossil fuel extraction seems almost archaic given our understanding of the adverse effects of their consumption on our atmosphere. Granted, our economy is still oil-addicted, but if alternative, renewable energy sources received the same level of investment as fossil fuel-based sources, surely we would make more substantial progress in weaning our oil dependency," Farr continued.

"If the US goal of reducing carbon emissions is to be realized, we might as well acquaint ourselves with the idea that drilling is not the solution, especially when clean, renewable energy sources are within our grasp," he said.

Rohrabacher disagreed that offshore oil and gas activity poses unacceptable risks. Technology has improved dramatically since the 1969 crude oil spill in the Santa Barbara Channel, he said.

"Even with the old technology, the chance of an oil spill was greater from a tanker than from offshore drilling. The more environmental radicals say we can't drill, the more oil we've had to 'drill' by tanker. They've ironically made oil spills more likely. Furthermore, by making us more dependent on foreign production, which is not encumbered

by the same standards, the outcome has been a total disservice for environmental concerns," he declared.

Stuck in the 1960s

The same environmental activists who oppose offshore oil and gas activity also are fighting alternative energy development on the OCS and in the southwestern US deserts, according to Rohrabacher. "I think activists control policy in America. Many of them are very sincere, but they're stuck in the '60s. We have technology now that is better. We haven't had one new hydroelectric dam, nuclear power plant, or refinery in 30 years. That's been at least $1 trillion out of our economy that would have been there otherwise. We're in serious times now, and people need to look at all the options," he said.

The two House members agreed that federal revenue from offshore energy production should be shared with coastal states, but they disagreed on the way it should be handled. Farr said that a portion should go directly into an ocean trust fund based in Washington that would "support the focused efforts of coastal states, territories, and agencies in addressing the critical ocean and coastal science, management, and protection needs of our nation and is essential to implement the many other recommendations of the national ocean commissions." Rohrabacher said the money should go directly to coastal states and communities which feel the impacts of offshore energy development.

Officials from five states also presented widely varying views. Ted Diers, the coastal program manager in New Hampshire's Department of Environmental Services, who also chairs the Coastal States Organization, said it is essential that any offshore energy plan that is formulated retain provisions that protect state sovereignty, include both renewable and traditional energy sources, and direct portions of federal revenue to both coastal states and to an ocean management research fund.

Robert G. Marvinney, director of Maine's geological survey, said the state has the highest per capita dependence on No. 2 heating oil of any in the nation. "The past several winters have been particularly difficult for low and middle-income and elderly [residents] who are making very difficult choices between home heating and other vital expenditures. Energy costs have grown from 5% to 20% of a typical Maine family's budget in just the past 10 years," he told the committee.

The state has responded by focusing on renewable and alternative energy sources, including cellulosic ethanol from its extensive forests and potential wind and tidal power in the Gulf of Maine, Marvinney said. The area immediately off its coast is geologically unsuitable for oil and gas development, but the Georges Bank fishing area farther out has potential and was leased during the 1970s, he continued. Any new oil and gas activity there will need to recognize the area's vital role as a commercial fishing resource, he said.

Rig construction

"The proximity of the Georges Bank is such that any support base for exploration and development activities there would likely be situated in Massachusetts or Rhode Island. That said, Maine has a track record of benefiting from petroleum exploration. One Maine corporation recently constructed two semisubmersible platforms for petroleum development; [its] work would certainly be enhanced by Georges Bank development. However, this corporation has also demonstrated that [it] can compete globally since those two rigs were deployed in waters off Brazil," Marvinney said in his written testimony.

Frank W. Wagner, a Virginia state senator, noted that the Old Dominion has taken the lead in asking the federal government to resume leasing off the East Coast. The state's official policy is to request that the federal government allow for exploration of natural gas only and no closer than 50 miles from the shoreline, he said. "However, there are many in Virginia, including myself that, consistent with Navy training requirements and environmental review, would take a much broader approach," he said, referring to the concentration of military bases around Norfolk.

"We in Virginia were pushing this policy long before $4/gal gasoline and prior to the current large-scale recession in which we find ourselves. During peak energy prices last summer, it was estimated that this nation was spending nearly $700 billion/year importing hydrocarbon energy from outside the borders of this country. This dollar figure is surprisingly similar to the [Troubled Assets Relief Program] package and the economic stimulus package that this Congress passed within the last few months," Wagner said.

Mike Chrisman, California's natural resources secretary, said that while California has a long history of offshore oil and gas development, the 1969 Santa Barbara Channel spill had major ramifications for both the state and the nation. "While the risks of such an event can be reduced today because of new technologies, for California the adverse environmental and economic impacts of new oil and gas leasing and development off our coast (from oil spills, air quality, water quality, and visual impacts) far outweigh the benefits generated from these activities," he said.

The state and its residents have become leaders in energy efficiency and the development of renewable energy, Chrisman told the committee. "California uses less electricity per person than any other state in the nation. Indeed, over the last 25 years, California's per capita electricity use has remained nearly flat while nationwide demand has increased 50%. This has occurred despite the fact that homes are bigger and our population tends to have more appliances, televisions and other electronic equipment. Whether we are talking about electricity, natural gas, or transportation fuels, gains in energy efficiency can temper energy demand, hold down consumer prices, and reduce the environmental impact associated with traditional energy sources," he said.

Other businesses thrive

Garret Graves, director of Louisiana's Office of Coastal Activities, said other businesses in the state have benefited from the oil and gas exploration and production off its coast. "After several decades of production, we're one of the top tourist destinations in the world. More than 24 million tourists visited our state last year. Tourism in the New Orleans area, including this week's Mardis Gras celebration, provides a $5 billion economic impact yearly. It's one of the state's largest economic sectors and generates an estimated $10 billion annually," he said.

In his written testimony, Graves noted that MMS reported that spills represent less than one thousandth of 1% of the more than 4.7 billion bbl of oil which have been produced since 1980. The DOI agency also found that there has not been an oil spill of more than 1,000 bbl in the last 15 years from a US offshore platform, and that during Hurricanes Katrina and Rita in 2005, there were no identified environmental impacts from any OCS spills.

"As we look at our economic challenges, we should continue to look at oil and gas as a source of our energy. We have extraordinary resources out in the ocean, which could be recovered, and significant revenue that could be generated. I urge the committee to look at all the tools that are available and not say 'no' to offshore production," he told the committee.

Several committee members expressed their own views. "I agree with Mr. Farr that we should have smart use of the oceans. There are critical habitats there. But as I've traveled my district in East Texas, farmers tell me they looked for a Prius tractor and couldn't find one. They also couldn't afford diesel fuel and gasoline," said Louie Gohmert (R-Tex.).

"Listening to the discussion here, we seem to agree on some basic concepts. We need a comprehensive energy policy. We need to be less reliant on foreign sources. Where we disagree is how we develop that energy policy. No one has developed a credible road map using all the tools in our energy toolbox because they try to eliminate certain options such as leasing more federal lands to generate revenues. I think the American public is frustrated that we can't do this," observed Jim Costa (D-Calif.), who chairs the committee's Energy and Mineral Resources subcommittee. ✦

Business group blasts Western Climate Initiative

Paula Dittrick
Senior Staff Writer

A carbon-trading plan promoted by several Western governors could prolong the economic recession and weaken already overburdened power grids, according to a report commissioned by the Western Business Roundtable (WBR).

The Western Climate Initiative (WCI) was outlined last year by seven US governors and four Canadian provincial premiers.

WCI seeks to cut regional greenhouse gas (GHG) emissions in coming years. Its members are Arizona, California, Montana, New Mexico, Oregon, Utah, Washington, British Columbia, Manitoba, Ontario, and Quebec.

The WBR, a Colorado-based business group, told reporters on Feb. 18 that the WCI would be ineffective and would discourage investment. A study commissioned by the roundtable concluded that WCI could "chase away tens of billions of dollars in high technology investment from the West to other regions."

Jim Sims, WBR president and chief executive officer, said analysis indicates the initiative would impose new costs on consumers, retard job creation, and offer no scientifically measurable benefit in terms of reduced global climate temperatures through 2100.

WCI's plan is based on an economic model that precludes installation of new electric power capacity in the region except for highly intermittent wind and solar power generation said Sims. He doubts that Western politicians fully realize WCI's sole emphasis on renewable energy and its lack of support for fossil fuels.

"Between now and 2020, we are going to need more power plants of all kinds," Sims said, adding that he hopes conclusions of the roundtable's study will "help awaken political leaders in the West that WCI is not the way to go."

WCI disagrees

The study was incorrect in its conclusion that WCI does not want to use the diverse sources of energy supply in the West, said Janice Adair, WCI's US cochair from the state of Washington.

"Our economic analysis assumed only the new energy sources that were currently on the books for development," Adair said. "We felt it would be imprudent to include new coal plants with CCS (carbon capture and storage) technology or new nuclear facilities to be on line by 2020 given the need for further research and development, or the time to permit."

She also suggested that the study's author did not understand the Renewable Portfolio Standards adopted by all the WCI states.

"The level of renewable energy generation reflected in the WCI modeling is a reflection of these standards," Adair said. "It is not that we intend to rely solely on renewable energy and thus weaken the grid."

Study conclusions about WCI

Roger H. Bezdek, president of Management Information Services Inc., analyzed WCI for WBR. He said WCI largely would preclude building gas,

hydropower, coal, and nuclear power plants in states signing the initiative.

States and provinces must enact legislation to participate in WCI. California adopted a state climate plan in December 2008 and is leading the way among WCI advocates in legislative efforts to formally adopt WCI's regional plan.

WBR includes executives of all types of businesses operating in the West, Sims said. The roundtable has widespread opinions on what Congress should do regarding GHGs, he said.

Bezdek concluded it is not feasible to implement WCI. His analysis also warned that the WCI plan could result in negative consequences, including the following:

- Increase energy costs that could disproportionately harm low-income and minority families, particularly minority families, who are among the most vulnerable to price shocks.
- Require the establishment of a large and powerful new government bureaucracy to set and monitor emissions caps.

"WCI should not be implemented by any state in the US, given the grave economic problems that the US and the West currently face," Bezdek said.

Adair disputed Bezdek's finding that WCI "is insensitive to low-income communities." ✦

EPA outlines BP Texas City refinery settlement

Paula Dittrick
Senior Staff Writer

BP Products North America Inc. agreed to spend more than $161 million on pollution controls, and enhanced maintenance and monitoring to resolve Clean Air Act violations at its Texas City, Tex., refinery.

The US Department of Justice and the US Environmental Protection Agency announced a proposed settlement Feb. 20 in which BP also would pay a $12 million civil penalty and spend $6 million on a supplemental project to reduce air pollution in Texas City.

EPA identified the violations during a series of inspections of the Texas City refinery initiated after a Mar. 23, 2005, explosion and fire killed 15 people and injured more than 170 others at the 446,500 b/cd refinery.

Since then, BP has increased its health, safety, and environment staff, expanded safety and operations training, and spent more than $1 billion over 5 years to rebuild key gasoline production units, update control systems, and implement other recommendations.

The proposed settlement is subject to a 30-day public comment period and final court approval. The settlement announced by the DOJ and EPA does not address any claims arising from the March 2005 explosion.

"BP failed to fulfill its obligations under the law, putting air quality and public health at risk," said Catherine R. McCabe, acting assistant administrator for EPA's Office of Enforcement and Compliance Assurance. "Today's settlement will benefit the people living in and around Texas City, many of whom come from minority and low-income backgrounds."

Background

The settlement addresses the company's noncompliance with a 2001 consent decree and CAA regulations requiring strict controls on benzene and benzene-containing wastes generated during petroleum refining operations.

"Since 1993, BP has invested well over $100 million on benzene emissions controls for Texas City refinery wastewater streams," said Daren Beaudo, a BP spokesman in Houston.

Beaudo said the government's announcement "builds upon our actions taken over the last several years to control benzene in waste streams," adding, "We are pleased to have achieved this settlement and will work to continue reducing emissions and to ensure regulatory compliance at Texas City."

The proposed settlement would require BP to upgrade control equipment and processes and conduct in-depth audits to ensure compliance and minimize the amount of benzene-containing wastes generated at the refinery. It is estimated that these actions will reduce emissions of benzene and other volatile organic compounds by 6,000 lb/year.

In October 2007, BP pleaded guilty to a felony violation of the CAA and agreed to pay a $50 million fine for violations related to the explosion, the largest criminal fine ever assessed against a corporation for CAA violations.

The plea remains under review by the US District Court for the Southern District of Texas (OGJ, Sept. 8, 2008, p. 20).

The settlement requires that BP address violations of CAA requirements limiting emissions of stratospheric ozone-depleting hydrochlorofluorocarbons (HCFCs) from leaking cooling appliances. BP will eliminate 51,000 lb of HCFCs by retrofitting industrial and commercial cooling appliances at Texas City to use nonozone-depleting refrigerants. The company also agreed to improve its oversight and management of asbestos-containing wastes generated at the Texas City refinery.

In addition, BP will spend $6 million to reduce air pollution from diesel vehicle emissions in Texas City and the surrounding area. BP agreed to convert 100 diesel municipal vehicles, including several dozen school buses, to operate on CNG or LNG and will construct four refueling stations for the converted vehicles.

As a result, emissions of particulate matter, nitrogen oxides, and hydrocarbons from these vehicles will be substantially reduced. ✦

Bolivian president accuses CIA of corrupting state oil firm

Eric Watkins
Oil Diplomacy Editor

The investigation into corruption at Bolivia's state-run oil company has taken a bizarre turn, with the Bolivian president and other government officials now claiming involvement by the US Central Intelligence Agency.

"Unfortunately there has been a CIA presence in Yacimientos Petroliferos Fiscales Bolivianos [YPFB], and some of our colleagues have been caught by this foreign infiltration," said Morales, referring to the arrest of his friend and former YPFB president, Santos Ramirez.

Local media said Morales gave no evidence of the involvement of the CIA, but quoted him as saying he could give details and names.

In his speech, Morales also said he would speak out against "how from overseas, from the United States" legal protection is being provided to the "corrupt people who were inside YPFB" with lawyers who are experts "in defending criminals."

"It's the group that represents the savage capitalism, which represents the large transnationals. They were not interested in poverty, no interest for life or humanity, but how to accommodate the capital in few hands," Morales said.

Separately, Bolivian Interior Minister Alfredo Rada accused Rodrigo Carrasco Jhansen, a former national marketing manager for YPFB, of being a member of Bolivia's Comando de Operaciones Especiales (Copes) and an informer for the CIA.

"Rodrigo Carrasco Jhansen was a member of Copes, a former policeman. You draw your own conclusions. But I can tell you that there is going to be no cover-up here," said Rada.

"We, as the state, are going to continue the investigations to determine

WATCHING THE WORLD

Eric Watkins, Oil Diplomacy Editor

Blog at www.ogjonline.com

Storing oil in Orkney

The UK's Orkney Islands, which lie just a stone's throw off Scotland's northern end, seem far away indeed from any major contact with the global oil and gas industry. But that's just an illusion.

In fact, the Orkney Islands are playing a role, whether major or minor remains to be seen, in helping to stabilize the global price of oil these days.

While the Organization of Petroleum Exporting Countries is trying to boost oil prices by implementing production cuts, its efforts are being stymied by inventories of 80 million bbl held on ships in the North Sea, the US Gulf of Mexico, the Mediterranean, off West Africa…

…and in the Orkney Islands, where a ship-to-ship transfer of North Sea Forties oil from one very large crude carrier (VLCC) to three receiving vessels started last week in Scapa Flow.

Stored oil

According to the Orkney Islands Council Department of Harbours (CDH), the VLCC Eagle Vienna, which has been on long-term storage anchorage in Scapa Flow since Dec. 14, 2008, started transferring 1.8 million bbl of Forties oil on Feb. 23.

"The three receiving vessels the British Falcon, the Nordic Jupiter, and the Hero 1 will all receive crude oil cargo over the next 6 days," commencing with the British Falcon Monday afternoon, the CDH said.

CDH didn't identify the parties taking part in the transfer, but earlier this month, traders said that BP PLC, which chartered the Eagle Vienna, sold three Forties cargoes from the supertanker.

Just a week earlier, ConocoPhillips was set to load a supertanker with 1.8 million bbl of Norwegian Ekofisk oil, combining three cargoes, probably for storage and sale later, ship brokers said.

CDH said the 300,000-dwt Malaysian VLCC Bunga Kasturi Dua would arrive in Scapa Flow and load two cargoes of Ekofisk in a ship-to-ship transfer from one of its own vessels and one cargo from an Italian Aframax.

Softens the market

The VLCC, which brokers said has been chartered to ConocoPhillips on a 2-year time charter, would complete loading and would then probably stay in Scapa Flow for longer-term storage.

Oil stored in Scapa Flow is part of 20 million bbl of North Sea oil currently stored in Europe on supertankers, creating a readily available source of supply that has helped keep a lid on North Sea crude benchmark prices.

As soon as oil prices rise, some of this floating inventory is sold off to take advantage of the rise, causing prices to fall again.

According to Michael Wittner, head of global oil market research at Societe Generale: "Whenever you see a bit of firming in the physical market, some of that (stored) physical crude is sold to the market, which then softens up the physical market again."

That's how the distant Orkney Islands fit into the current picture of global supply and demand. ✦

what this gentleman, Rodrigo Carrasco…was doing in YPFB," Rada said.

Carrasco was arrested last week on charges of concealing and "making off with information" together with Julio Anagua, the former director of administration for YPFB.

"Rodrigo Carrasco was caught red-handed, trying to remove information from a computer…. In the second case, manager Julio Anagua was caught red-handed tearing up a sheet of paper (documents)," said YPFB Pres. Carlos Villegas.

Corruption charges

Last week, Villegas said YPFB would file a complaint against Ramirez and 16 of his associates on corruption charges in connection with the signing of an agreement between YPFB and Catler Uniservice for the construction of an $86.4 million gas liquids separation plant in Rio Grande.

According to YPFB, the other defendants include: Julio Anagua Chumacero, Esther Carmona Nogales, Daniel Alvarez Gantier, Javier Guzman Navarro, Diego Argandona Aramayo, Linneth Sclink Ontiveros, Marco Antonio Vega del Carpio, Elizabeth Morales Troncoso, Ivan Garcia Coca, Federico Galan Laime, Richard Aguilera Montesinos, Maria Cecilia Palacios Jimenez, Pablo Valeriano Barroso, Ramiro Lizarazu Orellana, Mauricio Ochoa Urioste, and Juan Carlos Arellano Paz.

The complaint presented by YPFB to Edward Mollinedo, head of the special commission investigating the case, includes accusations of misconduct, abuse of power, signing of contracts harmful to the state, and other wrongdoings.

The scandal over corruption at YPFP emerged in early February with the murder of Jorge O'Connor D'Arlach, head of Catler Uniservice, the firm that last year won the $86 million contract from YPFP for the construction of the natural gas liquid separation plant in Rio Grande (OGJ Online, Feb. 7, 2009).

O'Connor was killed when entering the house of some of Ramirez's in-laws with $450,000 in cash, alleged to be kickbacks to the now former president of YPFB.

The case has been a major political embarrassment for Morales, as Ramirez, once described as one of the president's closest collaborators, was founder of the party that currently rules Bolivia—the Movement Toward Socialism. ✦

Russia prepares for OPEC session in March

Eric Watkins
Oil Diplomacy Editor

Russia's Vice-Premier Igor Sechin said his country is planning to discuss a proposed memorandum on cooperation with the Organization of Petroleum Exporting Countries at the group's mid-March session.

"We submitted our proposals and are going to discuss them," Sechin said of the draft memorandum submitted by Russia last October which contains proposals on joint monitoring, market analysis, data exchange, and energy market security.

Sechin, who said he had received an invitation from OPEC Sec. Gen. Abdallah El-Badri to attend the group's Mar. 15 session, reiterated earlier statements that Russia does not seek membership in OPEC but just "closer cooperation and coordination of efforts" for the moment.

"They have invited us to join in, but we believe that at the first stage, when we haven't mastered all details of OPEC's operation yet, it would be better to have something of an observer status," Sechin said.

"Coordinating efforts with the OPEC's secretariat might prove one of the options. That's practically the same thing," he said.

"The OPEC countries have been very active in supporting the market, and we believe that they make a contribution to fair pricing," Sechin said.

"We are most of all interested in market situation forecasts—current, online, and long-term forecasting; energy security studies; and access to new technologies," he said, adding, "The OPEC countries have all that."

Sechin's remarks were echoed by Russian foreign minister Sergei Lavrov, just back from a tour of the Middle East and the Persian Gulf, who said, in particular, that Russia and OPEC will coordinate their steps towards stabilization of the market.

"We are not OPEC members but see great benefits in regular exchanges of information and ideas," Lavrov said. He said it is especially important to make the market "really stable and unsusceptible to sharp zigzag-like fluctuations that are in many ways triggered by speculative activity."

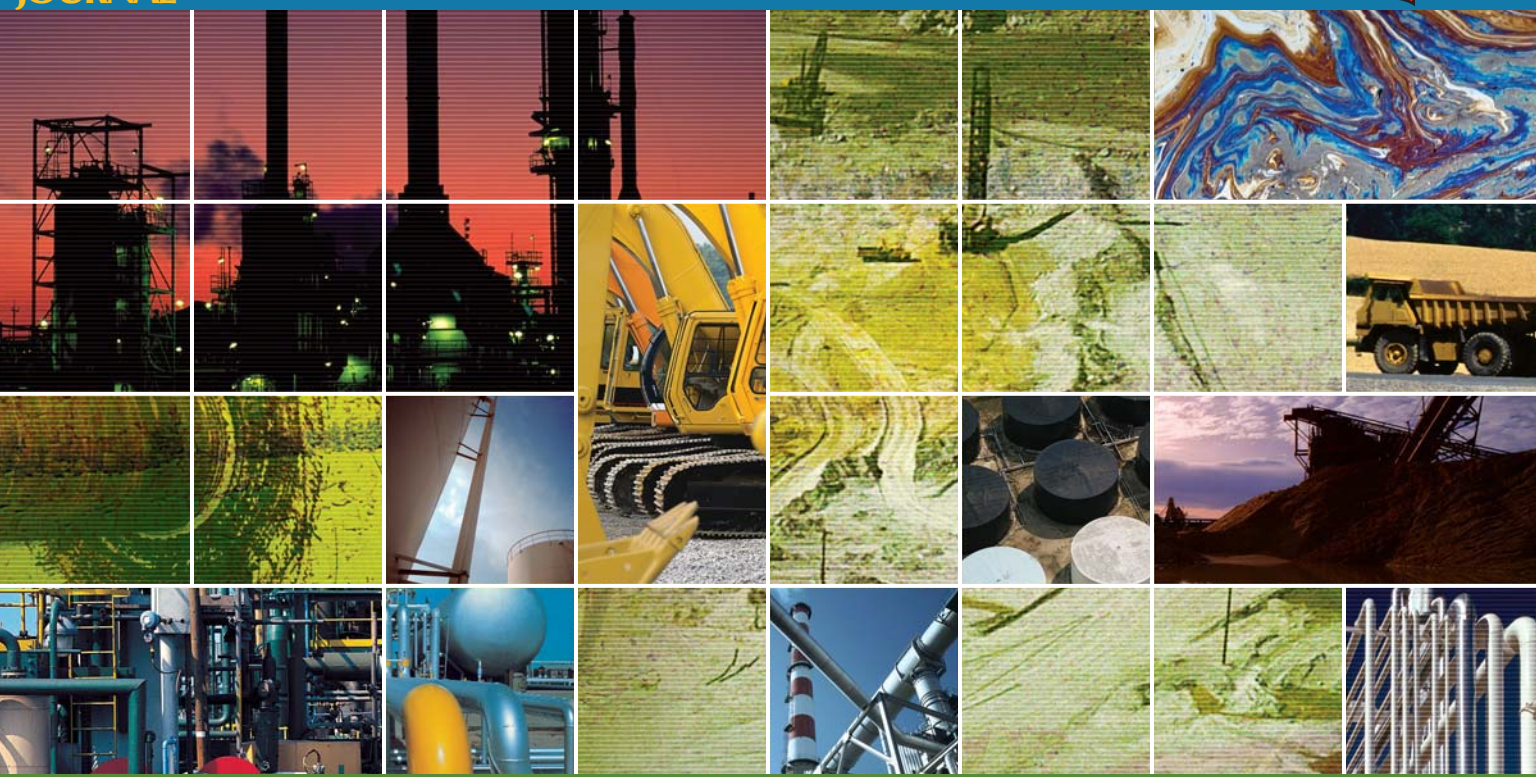
"Our interests are fully identical in this sphere," said Lavrov, who added, "We'll continue coordinating our actions in a variety of formats."

Russia's attendance at the March OPEC meeting will be something of a fence-mending gesture following earlier criticism it received from members of the group for failing to support them by reining in its production.

Last December, while attending a conference on gas in Moscow, OPEC Pres. Chekib Khelil said that Russia had enjoyed the benefit of OPEC's cuts without sharing the pain.

"If there was no OPEC reductions in September and October, I think we would have seen prices today at maybe $20[/bbl]. So it was because of OPEC that revenues for Russia were at $40 now, not at $20," Khelil said.

Shokri Ghanem, who heads Libya's National Oil Co., had similar remarks at the conference, saying, "We are still waiting for a declaration from the Russian Federation that they are cutting their [oil] production not only to support the [oil] market, but also to support the gas market." ✦



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South Falkland basin prospects high-graded

Borders & Southern Petroleum PLC has identified three key play fairways and two prioritized prospects from initial review of 1,492 sq km of 3D seismic survey shot in 2008 on its Falkland Islands acreage.

The survey, which covered less than 8% of the company's licensed area, led to identification of a seismic amplitude-supported Lower Cretaceous play fairway, an Upper Cretaceous-Lower Tertiary structural play fairway, and a Tertiary seismic amplitude-supported play fairway. Multiple prospects have been generated in the fairways.

The company said, "The 3D has revealed plenty of evidence for hydrocarbon generation and migration in the area. This includes a chain of five anticlines with gas hydrates located above the crests or slightly displaced on the asymmetric limb of the folds. Additionally, there are many seismic amplitude anomalies throughout the survey area."

Borders & Southern is operator with 100% interest in six licenses in the South Atlantic Ocean 150 km southeast of the islands. The frontier licenses are in 200 to 3,000 m of water.

Lower Cretaceous fairway

The Lower Cretaceous play fairway comprises sandstone reservoirs in tilted fault blocks and submarine fans.

The prospects are enhanced by seismic amplitude anomalies that display a strong AVO response that could be indicative of hydrocarbons.

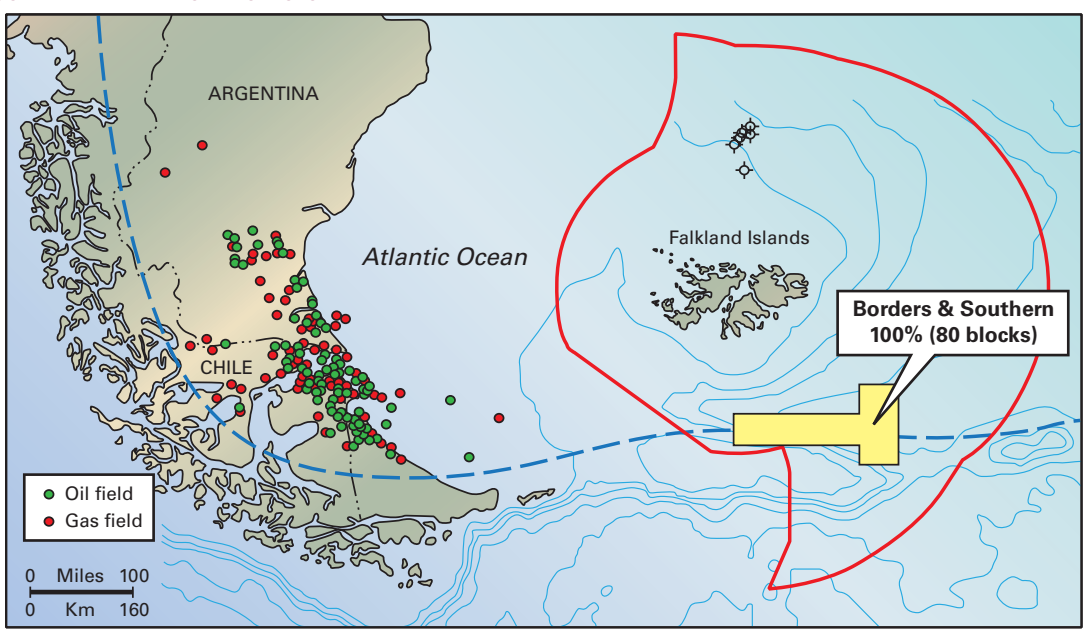
"Our prioritized prospect within this play fairway is the Darwin prospect," the company said. "In detail, it comprises two separate tilted fault blocks which may be joined as one large accumulation. This prospect is located updip of a regional migration pathway to a large source kitchen. Downdip of the prospect location, the source rock is modeled to be currently sitting in the oil generation window, and therefore oil is the most likely hydrocarbon phase to be encountered."

The prospect is structurally robust, partly fault and dip closed. A strong AVO anomaly is associated with the target reservoir that clearly switches off at the bounding faults and at a closing contour on the dipping surface.

The total measured area for the AVO anomalies is 26 sq km. Potential P50 recoverable volumes estimated for the area defined by these AVO anomalies alone are 300 million bbl. However, if the accumulation extends down to the mapped closing contour then the accumulation would be significantly larger.

This prospect also has potentially deeper reservoir targets that fall within structural closure,

SOUTH FALKLAND BASIN LICENSES



Source: Borders & Southern Petroleum PLC

leading to the possibility of stacked reservoirs.

Structural play fairway

The Upper Cretaceous-Lower Tertiary structural play fairway comprises sandstone reservoirs in major structural closures measuring up to 150 sq km.

The company's prioritized prospect in this play fairway is the Stebbing prospect with 85 sq km of structural closure. The structure is a simple fold with four-way dip closure with a thrust located in its core.

A well-developed gas hydrate lies above the crest of the fold a few hundred meters below the seabed. Potential P50 recoverable reserves for the Upper Cretaceous-Lower Tertiary reservoir are 570 million bbl of oil.

Additional recoverable volumes related to the possibility of stacked reservoirs occur deeper within the structure. If this play fairway is successful, there are numerous robust structural closures within the portfolio that could deliver very large volumes of hydrocarbons, Borders & Southern said.

Tertiary play fairway

The Tertiary seismic amplitude-supported play fairway comprises Tertiary deepwater distributary sandstone reservoirs partly stratigraphically trapped in structural closures.

The play is marked by strong seismic AVO anomalies that could be indicative of hydrocarbons. The play extends over several structural culminations including the Stebbing prospect.

Potential P50 recoverable volumes estimated for the Tertiary reservoirs in the Stebbing structure are 710 million bbl of oil.

Prioritized prospects

Borders & Southern said the Darwin prospect has been prioritized due to its robust structure, its location at a migration focus in the basin, and the strong AVO support.

There are good analogs for this prospect in the Magallanes basin a few hundred kilometres to the west, where reported recoveries are about 6 billion bbl of oil equivalent.

The Stebbing prospect is prioritized due to the ability to test two separate play fairways, strong AVO anomalies at one reservoir level, and the presence of a gas hydrate above the structure.

The Darwin and Stebbing prospects are assessed as having the best chance of success and will be progressed to drill-ready status. Other than sharing the same source rock, they are completely independent, allowing different-aged rocks and different trapping configurations to be tested.

While these two prospects are currently the preferred first tests, the prospect inventory now has significant depth and with additional work alternative prospects may be high-graded, Borders & Southern said.

If success is achieved during the initial drilling program, there is plenty of scope for developing the prospect inventory outside the current 3D area. The mapped play fairways extend outside of the survey area and leads have already been identified.

With the initial interpretation phase completed, it is the directors' intention to seek partners to help finance drilling. This effort will start in the first quarter of 2009. ✦

Lag to 'production effect' seen in Rockies

A substantial lag could occur in Rocky Mountain basins between the time operators idle drilling rigs until flush gas production from newer wells begins to decline, one operator said.

Some in the US have forecast that the sharp drop in the rig count since fall 2008 might lead to the completion of fewer new wells, releasing less gas into pipelines and allowing gas prices to strengthen eventually at equivalent demand levels.

Joseph N. Jaggers, president and chief operating officer, Bill Barrett Corp., Denver, said Rocky Mountain gas production could remain strong through 2010.

Jaggers told an early February conference call that the "production effect" could lag the rig count substantially, especially in the Rocky Mountain states even though the rig count there is off by a greater margin than in the US as a whole.

Through January, rig counts in Colorado, New Mexico, Utah, and Wyoming are down 35% from a peak of 339 in the fall of 2008, compared with a drop of 28% nationally.

Much gas development in the Rockies is on pads with as many as 24 wells, Jaggers noted.

It takes a week to demobilize a rig, then 1-2 weeks to build pits for water and move in tanks, and if a frac crew is to run 7 frac stages/well on 20 wells that's 140 stages to be pumped. The crew can pump five to six stages/day and is permitted to pump only 5-6 days/week.

That indicates weeks of completion work per pad, implying that it may take the rest of the first quarter to work through the inventory of completion operations from the high rig counts experienced last fall, Jaggers said. ✦

Chesapeake unconventional gas stake deep

Chesapeake Energy Corp., Oklahoma City, reported an 11% increase in proved reserves to 12.1 tcf of gas equivalent in 2008 and detailed the depth of the company's commitment to US unconventional gas.

Chesapeake, which is operating 112 drilling rigs in the US, replaced 239% of its 2008 production.

The company said it has leading positions in the four largest US shale gas plays—Haynesville, Marcellus, Barnett,

and Fayetteville—in which it holds 2.44 million net acres and is producing a combined 870 MMcfd of gas.

Further, Chesapeake holds 8.16 million net acres in other unspecified unconventional plays, from which it is producing 780 MMcfd.

The company drilled 1,819 gross operated wells, 1,491 net wells with an 82% average working interest, in 2008 and participated in another 1,857 wells operated by other companies with 13% average working interest.

Since 2000, Chesapeake has acquired $12.6 billion in acreage and 3D seismic and owns the largest combined inventories of onshore leasehold at 15.2 million net acres and 3D seismic at 21.6 million acres in the US.

The company plans to direct 75% of its gross drilling capital expenditure in 2009-10 to the four main shale plays.

Chesapeake plans to average 26 rigs in the Haynesville in 2009 to develop its 460,000 net acres, and its joint venture partner Plains Exploration & Production Co. will pay 50% or $975 million of Chesapeake's drilling costs in 2009-10 in the play. Chesapeake estimates reaching 300 MMcfd net from the Haynesville at the end of 2009 compared with 70 MMcfd at present.

Chesapeake plans to greatly accelerate Marcellus shale drilling in 2009-10. It will average 14 rigs in 2009 to further develop its 1.25 million net acres, the play's largest holding. The company expects to end 2009 as the play's most active driller and largest gas producer. It is in joint venture there with Statoil-Hydro, which will carry 75% or $650 million of Chesapeake's drilling costs in 2009-10.

Chesapeake expects to reach a net 725 MMcfed from the North Texas Barnett shale play by the end of 2009 compared with 610 Mmcfed at present, the play's second largest, and 570 MMcfed in the last quarter of 2008.

Chesapeake will average 25 rigs in 2009 to further develop its 310,000 net acres in the Barnett, where it is discussing joint ventures with several large international energy companies.

The company plans to exit 2009 producing a net 235 MMcfed from the Fayetteville shale in Arkansas, where at 420,000 net acres it is the second largest lease owner in the core and top tier areas of the play. Current net output is 180 MMcfed.

Chesapeake expects to average 20 rigs in 2009, when its partner BP PLC will pick up $535 million or nearly all of its drilling costs. ✦

Iraq

Niko Resources Ltd., Calgary, began shooting seismic on the 846 sq km Qara Dagh block southeast of Sulaymaniya in Iraqi Kurdistan, said partner Vast Exploration Inc., Calgary.

The 4-5 month program is for a minimum of 350 line-km of 2D seismic using a combination of vibrator and dynamite sources. It could be extended to 390 line-km if more data are required.

Somaliland

The ministry of water and mineral resources in Hargeisa launched Somaliland's first hydrocarbon bid round on Feb. 19, 2009.

On offer are eight land and offshore blocks totaling more than 89,624 sq km.

The ministry noted striking geological similarities between Yemen's Balhaf graben basin and Somaliland's Berbera basin. Other indicators of hydrocarbon potential are oil and gas seeps at Dagah Shabel, and most historical wells in the area contain multiple zones with shows.

In preparation for the round, TGS-NOPEC Geophysical Co. ASA shot 5,300 line-km of seismic, gravity, and magnetic data offshore and 34,700 line-km of high resolution aeromagnetic data over all known petroleum basins. This is the first new geophysical data acquired in almost 30 years.

Bids are due Aug. 15, and concessions are to be awarded on Dec. 15, 2009.

Northwest Territories

MGM Energy Corp., Calgary, is moving to drill the Ellice A-25 well after reporting a dry hole at its North Ellice J-17 well and better than expected test results from the Ellice J-27 discovery in Canada's western Mackenzie Delta.

North Ellice J-17 found poor quality reservoir sections in Eocene Taglu, and no hydrocarbons were present. Ellice A-25 will test a prospect on the Ellice Island anticline.

Ellice J-27's second test, in Taglu at 1,369-73 m MD, flowed at a maximum restricted 22.4 MMcfd on a 1.75-in. choke at 8,218 kPa flowing tubing pressure with 16% calculated drawdown. CAOF is 81 MMcfd. The zone had 9 m of net pay with 22% average porosity and 33% average water saturation using a 10% porosity cutoff.

On the previously reported first test, J-27 flowed at a maximum restricted 38.2 MMcfd on a 1.5-in. choke. CAOF is 314 MMcfd.

Gulf of Mexico

Noble Energy Inc. said it is acquiring more seismic and preparing to appraise its Gunflint oil discovery in Mississippi Canyon Block 948 in the Gulf of Mexico.

Drilled to 29,280 ft in 6,100 ft of water, Gunflint cut more than 550 ft of net pay, twice as thick as expected, in a Miocene subsalt fourway closure in October 2008. The company's largest discovery to date in the gulf, it is four blocks south of the Kodiak and Devil's Tower discoveries.

After BP PLC operated the discovery well, Noble Energy became operator with 37.5% interest. BP and Samson Offshore have 25%, and Marathon Oil Corp. has 12.5%.

Sand control unlocks shallow gas formerly regarded as drilling hazard

Guntis Moritis
Production Editor

New expandable sand screens with a close weave have made drilling and completing shallow, unconsolidated gas sands off the Netherlands commercial. In the past, companies often considered these sands drilling hazards and not targets for exploitation.

The Chevron Exploration and Production Netherlands BV operated A12 field is a prime example (Fig. 1).

Fraser Martin, Chevron senior completions engineer, and Mark Nicol, Weatherford regional business unit leader, well screen technologies, provided OGJ with some details regarding the successful development of the field, which Nederlandse Aardolie Maatsschappij BV had discovered in the 1970s while drilling for deeper targets.

Chevron became operator of the field when it merged with Unocal Corp. in 2005. Unocal drilled several test wells, but these wells plugged off with sand during attempts to flow gas from the shallow Pleistocene sands, Martin said.

Chevron's joint venture partners in the A12 development are Dyas BV, DSM Energie BV, and Energie Beheer Nederland BV (EBN).

A12 field

A12 field is one of five that Chevron has mapped in its A and B blocks. Chevron describes the fields as shallow low-relief anticline structures with the seismic definition obscured by gas chimneys and glacial features.

The fields contain six to seven sands with total pay thickness of 80-125 ft. Sands in the A12 field are at a 1,500-2,200 ft subsea depth with some sands having a gas-water contact (Fig. 2).

The fields are in relatively shallow 90-150 ft of water.

A12 is the first field development for Chevron in A and B blocks and the company has plans to commence in 2010 a second phase with a similar design and well numbers. A12 is about 280 km north of Den Helder.

Chevron used batch drilling from the Noble George Sauvageau jack up to drill and complete the wells on the A12 central production platform (Fig. 3). The batch-drilling process involved drilling all 12¼-in. holes for the seven wells and

setting 9⅝-in. casing at the top of the sands before drilling and completing the productive intervals in each well.

Martin said that the jack up drilled and completed the seven production wells in a fast 150 days.

The four-pile production platform is in 98 ft of water and includes three-stage compression for moving the low-pressure gas from the wells into a pipeline connected to the A6-F3 pipeline that connects to the Northern Offshore Gas Transport (Nogat) pipeline. Nogat also transports gas from Norway to Den Helder.

Martin said the bottomhole pressure of the lower sands of A12 is about 960 psi at 1,400 ft.

Completions in five of the wells have 8¼-in., 1,000-ft horizontal laterals with 5½-in. expandable 120-µm screens, while two of the wells are deviated completions that allow zonal isolation of commingled zones through 7-in. expandable 120-µm screens in an 8½-in. hole (Fig. 4).

Production from the wells started on Dec. 20, 2007, and Martin said that all the wells are producing and operators have detected sand in only one zone of the 7-in. completed well, which has sanded up. The test separator on the platform has a 10-µm filter for monitoring sand production from the wells.

The seven wells currently produce a maximum 120 MMscfd. During 2008, available NOGAT pipeline capacity limited production from A12 to 111 MMscfd, but Martin said projections are that available capacity in NOGAT will increase in the future and allow more gas production from A12 wells. For 2009, Chevron estimates production will be 125 MMscfd.

Martin said each well is capable of producing 20-25 MMscfd with a 45-psi

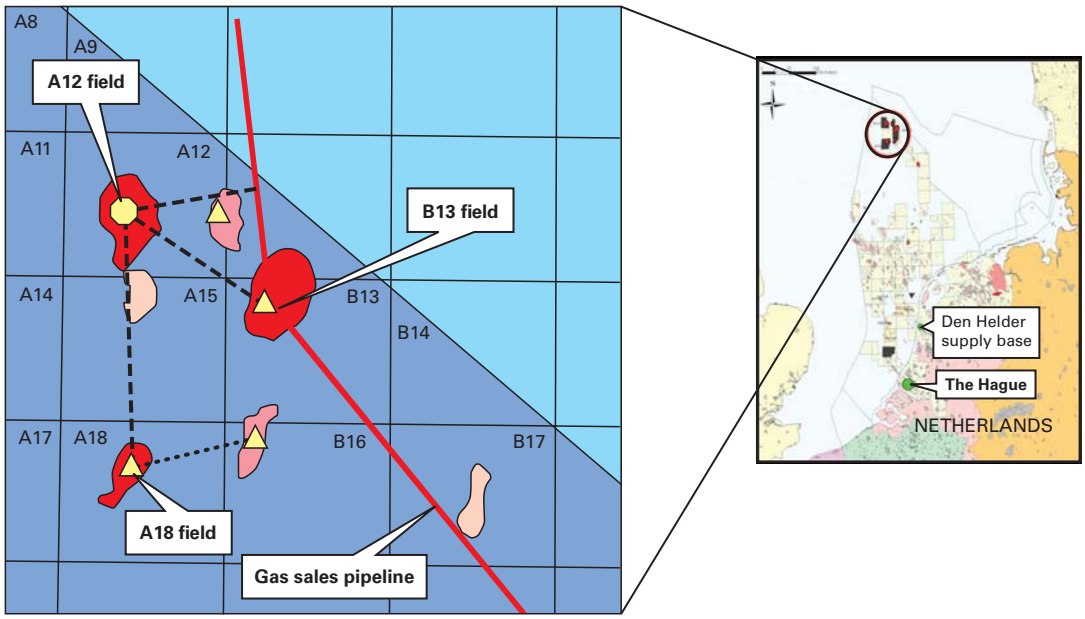
drawdown and Chevron estimates that the field contains about 280 bcf of recoverable gas. The produced gas is about 98% methane.

Screen selection

Martin said that that A12 was the first North Sea field in which Chevron has used expandable screens and that the company went through an extensive selection process before running them. Two rejected

A12 FIELD OFF NETHERLANDS

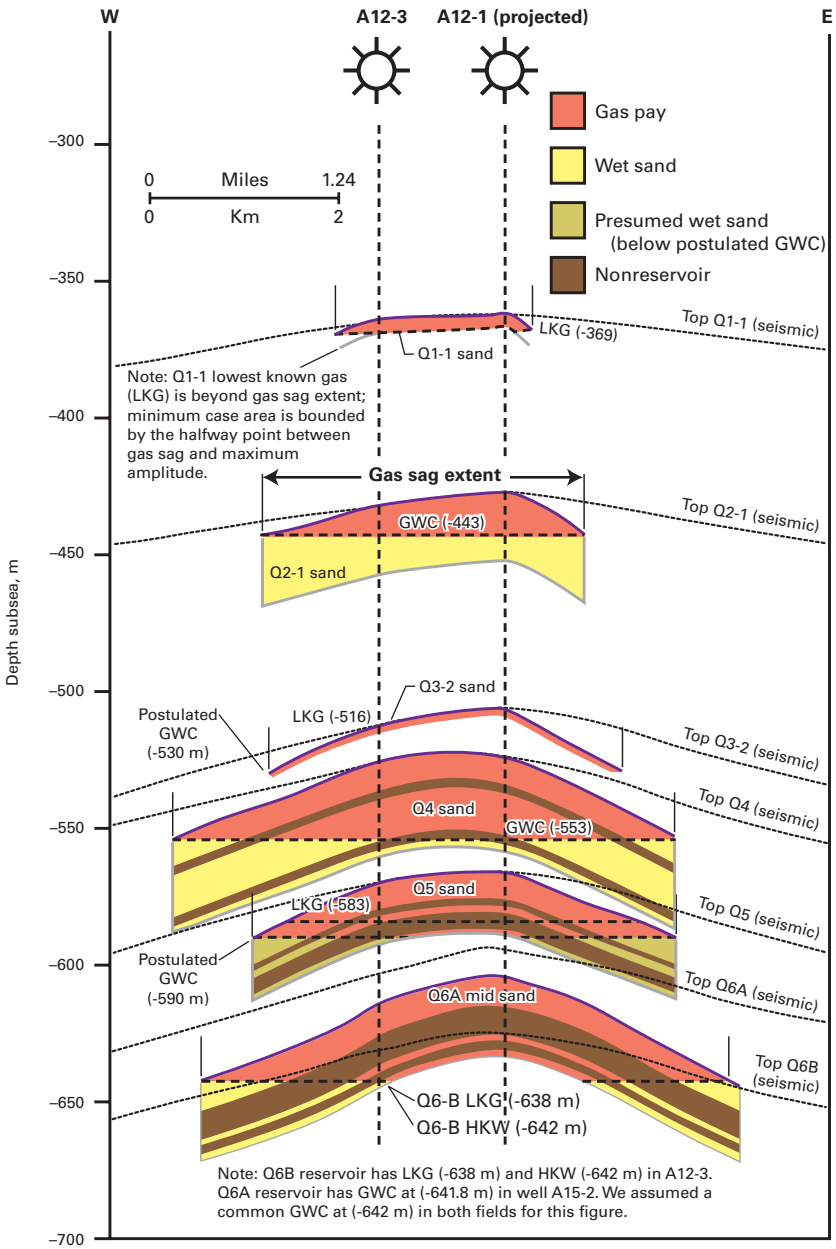
Fig. 1



Source: Chevron

A12 FIELD STRUCTURAL CROSS-SECTION

Fig. 2



Note: A12-1 well petrophysical analysis is inconclusive due to insufficient log suite (IES/GR/Sonic only) run in 17 1/2-in. hole over zone of interest.
Note: Minimum case assumes that accumulation limit is coincident with gas sag outline.
Source: Chevron

technologies were frac-packs and gravel packs, deemed not appropriate for the shallow depths and low pressure of A12 sands, Martin said.

As Nicol explained, industry has had expandable screens available for several years but Weatherford's recently developed 120-µm were the ones that proved effective for A12 wells.

Nicol said that Weatherford has installed more than 550 expandable screens worldwide but most had larger 150-200-µm weaves.

He added, "The small size of the sand grains in the formation made this one of the most aggressive sand-control applications yet performed using expandable sand screens." The formation is a very fine sand with an average grain size (D50) of about 63 µm. About 30% of the sand consists of fines less than 45 µm in diameter. Applications at this extreme end of the scale accounts for less than 5% of all expandable screen jobs performed by Weatherford, Nicol said.

Nicol explained "The small sand particle sizes and unconsolidated nature of the formation makes it very difficult to control sand production. Doing so requires finding a balance between the screen's weave size and acceptable solids production—screens must control the sand without becoming plugged by smaller size fines or producing too many of these fines to the surface."

For these sands, Nicol said expandable screens were superior to gravel packs because, as a surface filter-vs.-a gravel-pack depth filter, there is less chance of formation damage from fluid invasion and less risk of sand control plugging.

Martin added "The primary limitation of openhole gravel packing in the A12 project was the low frac gradient in the reservoirs, which increased risk of fracturing the formation during pumping operations." Logistics for gravel packing also concerned Chevron because of the long distance to the shore base. Gravel packing would have required intensive operations for its downhole components and surface equipment, Martin said.

Logistics also were a concern for batch drilling and completing the wells, he said.

Nicol explained that expandable screens mitigated these logistic concerns in that the screens expand against the formation to retain hole integrity and control sand so that the operation does not require pumping to place gravel.

He added, "Weatherford's experience and data suggest expandable-screen completions have low skin, typically less than one, compared with gravel pack damage that can exceed a skin of five. Weatherford believes the expandable

The Noble George Sauvageau jack up drilled and completed the wells on the A12 central production platform (Fig. 3). Photo from Chevron.

systems should offer equivalent sand control with higher well productivity."

Martin said that Chevron rigorously tested various alternatives before determining to use the 120-µm screens. The testing included slurry tests that pumped sand systems through various screen samples to examine retention and plugging tendencies.

Martin said "These tests showed significant plugging of the screens and the potential for severely limited well production and longevity. As a result, it was determined that sand control would benefit from the borehole support provided by a formation-compliant screen."

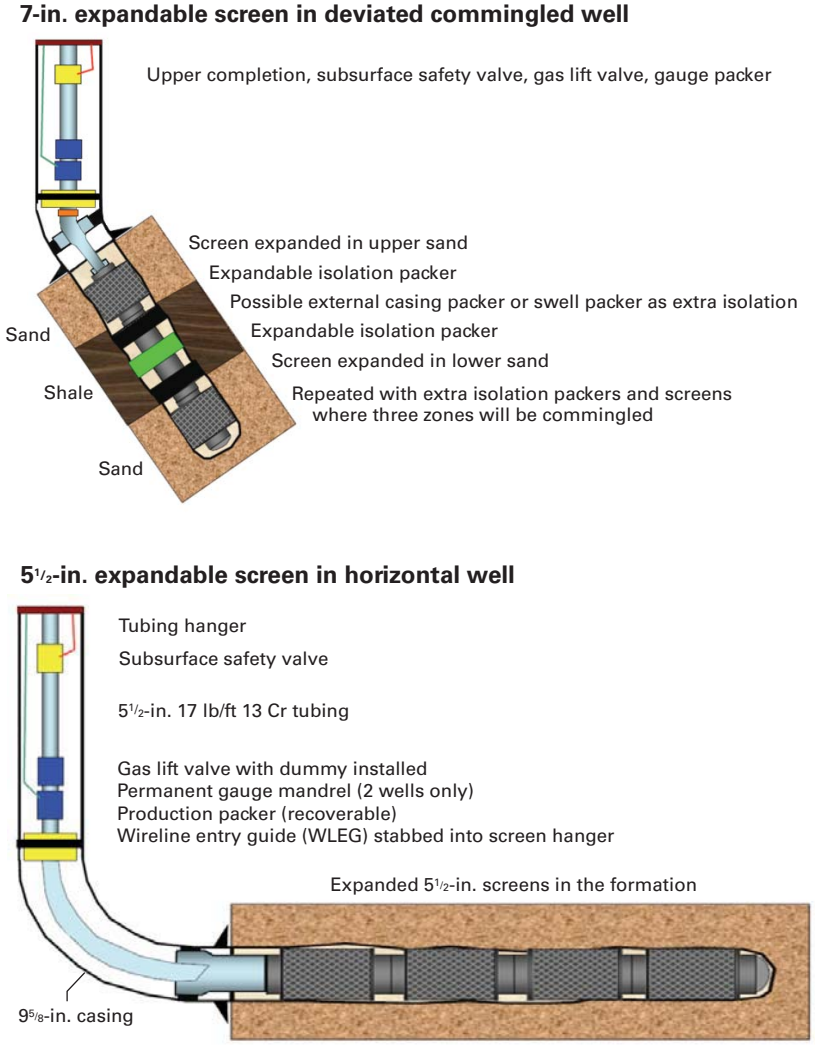
Martin noted that conformance testing on a range of screen types and sizes showed the wellbore support improved success, with 93-98% of the formation sand retained. "This testing validated the importance of compliant screens in preventing formation failure and the remixing or resorting of sand particles that could lead to plugging," he added.

Nicol explained that compliant expandable screen systems are designed to directly retain 10% of the formation sand (the D_{10} designation) and use larger size particles to retain smaller sizes by creating a stable arch. "This provides excellent sand retention capability without adversely effecting performance as the result of plugging by the small particles," he said

Chevron also tested products with different weaves from several vendors but found that Weatherford's 120-µm screen, the only expandable screen with this weave size commercially available, exhibited the best performance, Martin said. ✦

A12 WELL COMPLETIONS

Fig. 4



Source: Chevron

New olefin-based drilling fluid improves operational, environmental profile

Eric van Oort
Shell Exploration and Production
Houston

Jim Friedheim
John Lee
Kayli Clements
M-I SWACO
Houston

Drilling

A nonaqueous drilling fluid system engineered with a low-viscosity synthetic internal olefin base resolved operational problems in drilling tight gas wells in the Basin Center area in Western Canada.

Compared to previously used conventional drilling fluids that contained a high kinematic viscosity base fluid, the new system based on C_{14} internal olefins (IO) provided a lower rheological profile and improved downhole pressure management. Accordingly, by eliminating the repeated gas influx and mud losses on trips caused by the severe well ballooning encountered in the area, the operator met both drilling and postdrilling objectives.

The high rheologies and equivalent circulating densities (ECD) associated with the predecessor system prevented the operator from meeting logging and other objectives, as well as causing troublesome, yet manageable drilling concerns.

More importantly, by eliminating or minimizing several environmentally suspect components, the new base fluid and its linear structure also exhibited comparably faster biodegradation, thus providing a smaller environmental footprint that encourages composting and other attractive disposal technologies. Further, because of its lower polycyclic aromatic hydrocarbons (PAH) content and associated higher flash point, the new system delivers an enhanced health and safety profile.

Drilling fluid drivers

Companies select a drilling fluid based on the technical demands of a specific application and local health, safety, and environmental (HSE) regulations. From a performance standpoint, the nonaqueous or invert-emulsion drilling fluids compared with their water-based counterparts have well-documented advantages.

While aqueous systems offer some environmental advantages, invert-emulsion systems enhance overall stability and possess the capacity to drill reactive shales with minimal wellbore destabilizing chemical interactions. Further, the use of a nonaqueous fluid (NAF) results in a tight or low fluid loss, a thin filter cake, a high degree of lubricity, and increased penetration rates compared

COMMONLY USED NONAQUEOUS BASE FLUIDS IN CANADA

Table 1

Product	Viscosity, cst at 40° C.	Pour point, °C.	Flash point, °C.	Density, kg/cu m at 15° C.
C_{14} LAO	1.87	–18	116	775
C_{14} IO	1.90	–34	116	775
Mineral oil A	3.4	–20	>85	830-835
Mineral oil B	3.5	–33	124	845
Mineral oil C	<5	–30 - –35	>100	835-840
Diesel-mineral oil	<5.7		>94	884

Note: LAO—linear alpha-olefin, IO—synthetic internal olefin.

MUD FORMULATION

Table 2

Base fluid, bbl	0.603
Organoclay, lb/bbl	5.25
Lime, lb/bbl	5.25
Emulsifier, lb/bbl	4.88
Fluid-loss control, lb/bbl	3.5
30% $CaCl_2$ brine, bbl	0.042
Mud weight with barite, ppg	15.0
Drilled solids (rev dust), lb/bbl	45

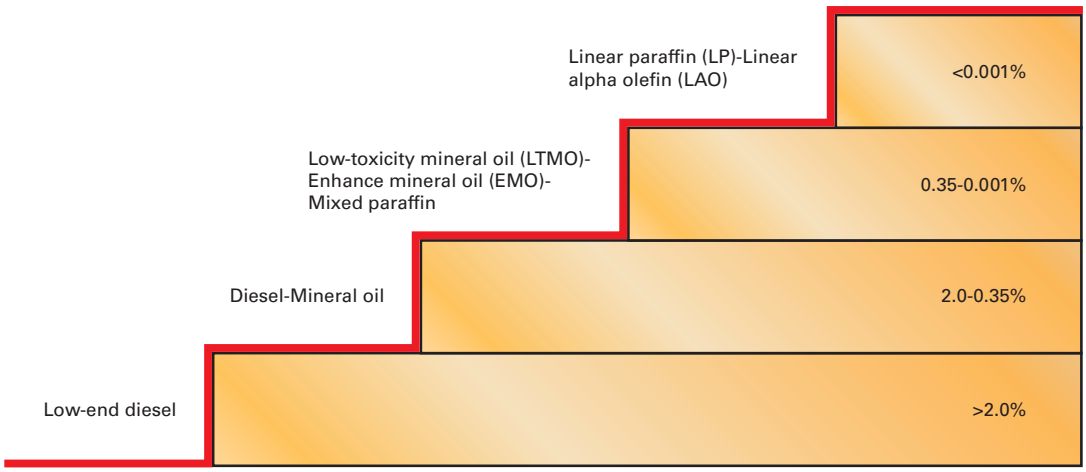
Note: Formulation used to compare the effects of different base fluids on rheological and fluid-loss properties.

with conventional water-based drilling fluids.

Instead of the direct emulsion of oil in water that characterize water-based fluids, NAFs have an inverted nonaqueous external or continuous phase, while an emulsified brine or aqueous fluid comprises the internal phase. The external phase can include one of several base fluids, including diesel, mineral oil, highly refined mineral oil, and synthetic fluids. Aside from their respective operational advantages in certain applications, from an occupational health and safety perspective, NAFs differ from one another based on their polynuclear aromatic hydrocarbon content (Fig. 1).

PAH CONTENT IN NONAQUEOUS-BASE FLUID

Fig. 1



Note: PAH - Polycyclic aromatic hydrocarbon.

The downside of using an NAF centers on the compressibility of oils and other nonaqueous base fluids that can cause density fluctuations. Furthermore, owing to the natural wettability of some basic drilling fluid components such as barite and other weighting materials, NAFs require wetting agents and other surfactants to suspend and maintain these materials in the continuous nonaqueous phase.

Often, these factors in tandem with the choice of the base fluid, emulsifiers, and viscosifiers can cause problems with respect to excessive viscosities and gel strengths. These problems can lead to difficulties in managing downhole densities and equivalent circulating density (ECD) that frequently result in whole fluid losses, stuck pipe, logging problems, and overall wellbore instability.

While NAFs were the ideal option for addressing the operational challenges of Western Canadian wells, problems arose related to high viscosity caused from an inappropriate base fluid selection. For example, while one 12,500-ft Basin Center gas well reached TD with some manageable issues, such as seepage losses, gas influx, surge-swab, and ECD concerns, the problems occurred when the rig attempted to log the well at TD. Severe well ballooning with repeated gas influx and mud losses on trips forced the operator to case and cement the well, forgoing the logging operation.

An end-of-well review traced the main causes of the problems to high rheology and high ECD, which the review attributed to the base fluid. As logging the well was one of the critical objectives, a solution to the high viscosity and gelation problem required an investigation into an alternative base fluid.

Laboratory investigation

Because ECD and lost-circulation management were the main technical drivers, the first approach looked at the effects of different base fluids on rheological properties. Typically, base fluids with a low kinematic viscosity provide a lower rheological profile that minimizes ECD effects more than fluids with high kinematic viscosity. Table 1 lists the kinematic viscosity and other physical properties such as pour point, flash point, and density of certain common base fluids found in Canada.

The laboratory work compared three potential base fluids: Mineral Oil B, C_{14} IO, and Mineral Oil A, formulated to the 15 ppg used on an offset well in Alberta (Table 2).

To ensure fluid homogeneity, the testing involved mixing each fluid on a single spindle mixer and shearing them for 5 min at 6,000 rpm. Afterwards, the procedure hot rolled the test fluids overnight at 250° F. with 200-psi N_2 confining pressure. A Fann 35A viscometers at 120° F. determined the rheological properties before and after heat aging.

TEST FLUID PROPERTIES

Table 3

Rheology at 120° F.	Mineral oil A	Mineral oil B	C_{14} IO
600, rpm	109	99	65
300, rpm	67	57	37
200, rpm	52	43	29
100, rpm	38	28	20
6, rpm	20	14	12
3, rpm	19	13	11
PV, cp	42	42	28
YP, lb/100 sq ft	25	15	9
10-sec gel, lb/100 sq ft	35	30	26
10-min gel, lb/100 sq ft	48	76	49
30-min gel, lb/100 sq ft	61	88	49

Note: Properties of 15.0 ppg test fluids after hot rolling at 250 ° F. with 45 lb/bbl of simulated drill solids (rev dust).

EFFECT OF BASE FLUID

Fig. 2

Fig. 2a

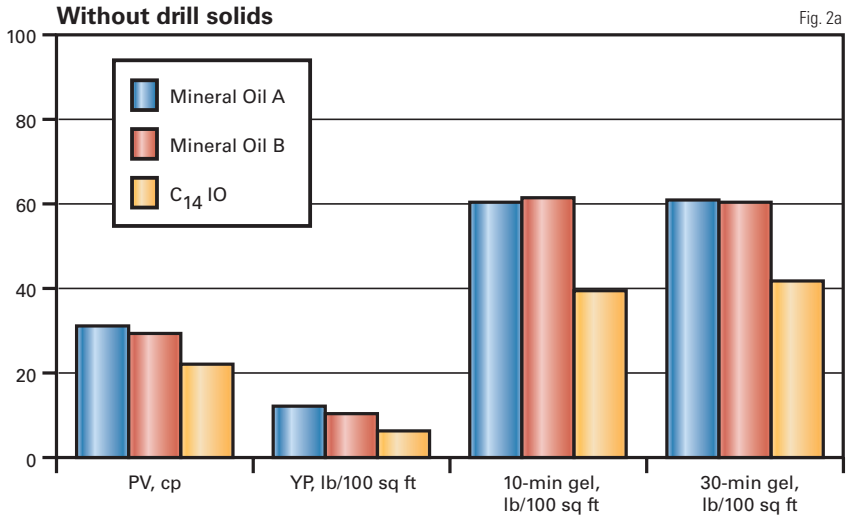
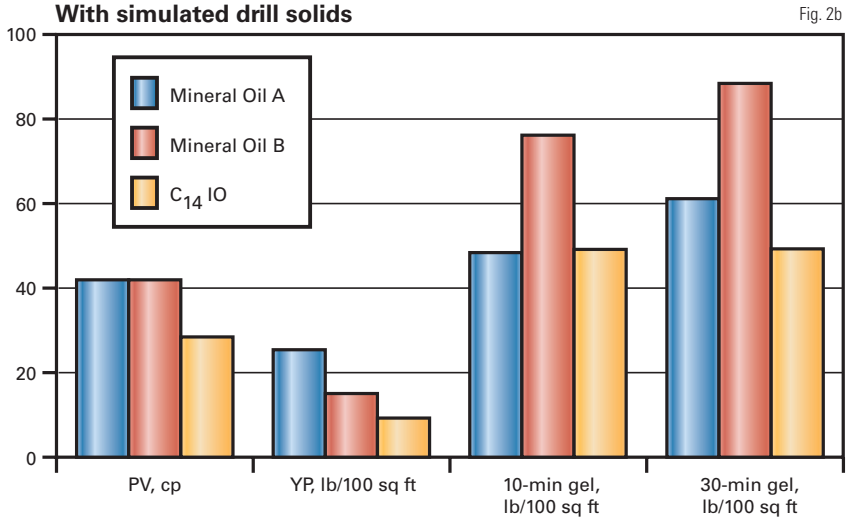


Fig. 2b



DRILLING FLUID RECOMMENDED FOR FIELD TRIAL

Table 4

Composition		Properties	Base mud	Base mud + rev dust
C_{14} IO (Amodrill 1400), g	162	PV, cp	22	27
Organoclay, g	3.5	YP, lb/100 sq ft	6	7
Lime, g	5.25	10-sec gel, lb/100 sq ft	11	12
Emulsifier, g	4.75	10-min gel, lb/100 sq ft	21	29
Wetting agent, g	5	30-min gel, lb/100 sq ft	21	33
Fluid-loss control, g	7			
30% $CaCl_2$ brine, g	32.96	Electric stability of emulsion (ES) at 120° F., v	1,710	810
Barite, g	409	HTHP fluid loss at 250° F., ml	1.0	1.8
Rev dust, g	(45)			

Note: Composition and properties of 15 ppg drilling fluid with C_{14} IO base fluid recommended for field trial in attempt to minimize equivalent circulating density (ECD) and lost circulation.

The tests measured the high-temperature, high-pressure (HTHP) fluid loss at 250° F. on API filter paper with 500-psi N_2 differential pressure. Further, the testing evaluated the effects of low-gravity solids on mud properties by treating each test mud with 45 lb/bbl of simulated drill solids (Table 3).

A comparison of the rheological properties indicated that differences in kinematic viscosity and chemistry of the base fluid can have a large effect on plastic viscosity (PV), yield point (YP), and gel strength (Fig. 2). For example, C_{14} IO with a low kinematic viscosity (1.9 cst) resulted in low PV, YP, and gels, whereas Mineral Oil A and Mineral Oil B, having similarly higher kinematic viscosity (3.4-3.5 cst), resulted in a higher PV with slightly different YP and gels.

In addition, the PAH content of the base fluids may account for the difference in YP and gels observed between Mineral Oil A and Mineral Oil B. The former, having a high PAH content (10,000 ppm), seems to enhance the yield of organoclay more efficiently than Mineral Oil B, which has a PAH content of 600 ppm. By comparison, the C_{14} internal olefin contains no PAH.

For fluids without the simulated drill solids, the effect of the base fluid on rheology was similar to those with drill solids. The lab testing indicated C_{14} IO as better technically compared with other base fluids for management of ECD and lost circulation because of its low kinematic viscosity and rheological profile. Mud formulation, product, and product concentration, however, also may affect rheological properties, thereby requiring further modification of the C_{14} IO base fluid before engineering a final formulation for the targeted field application.

Compared with the original formulation used in the initial testing, the final formulation contains less organoclay but a higher volume of wetting agent and fluid-loss control additive. This formulation helps reduce further low-end rheology and gel strengths while maintaining sufficient fluid-loss control and solids tolerance.

Table 4 shows the final fluid formulation and its properties after heat aging with solids contamination.

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Field trial

Basin Center gas wells typically involve the drilling of the 12¼-in. top hole with unweighted gel slurry to about 1,800 ft before setting the casing. Next, the drilling of the 8¾-in. intermediate section generally uses an unweighted oil-based mud (OBM) to about 8,000 ft, at which point the next casing string is set. Drilling of the main 6⅛-in. interval usually is with unweighted OBM, but at TD the driller may increase mud density to 15 ppg or higher. The last section often has logging and coring operations as required.

The offset well drilled before the C_{14} IO field trials suffered minor problems during drilling but severe problems during logging attempts. The operator deemed that the better rheological profile of the C_{14} IO system was a technical solution to this problem on subsequent wells. The solution led to lower ECD, reduced swab and surge pressures, and more manageable nonprogressive gels.

A high yield organoclay used during premixing enhanced and ensured rheology, thus the fluid did not require a polymeric rheological modifier. The system had an 85:15 oil-water ratio.

The operator has completed two field trial wells with a third underway as of this writing. Table 5 compares the parameters from the two field trials against the offset drilled with the Mineral Oil A-based system.

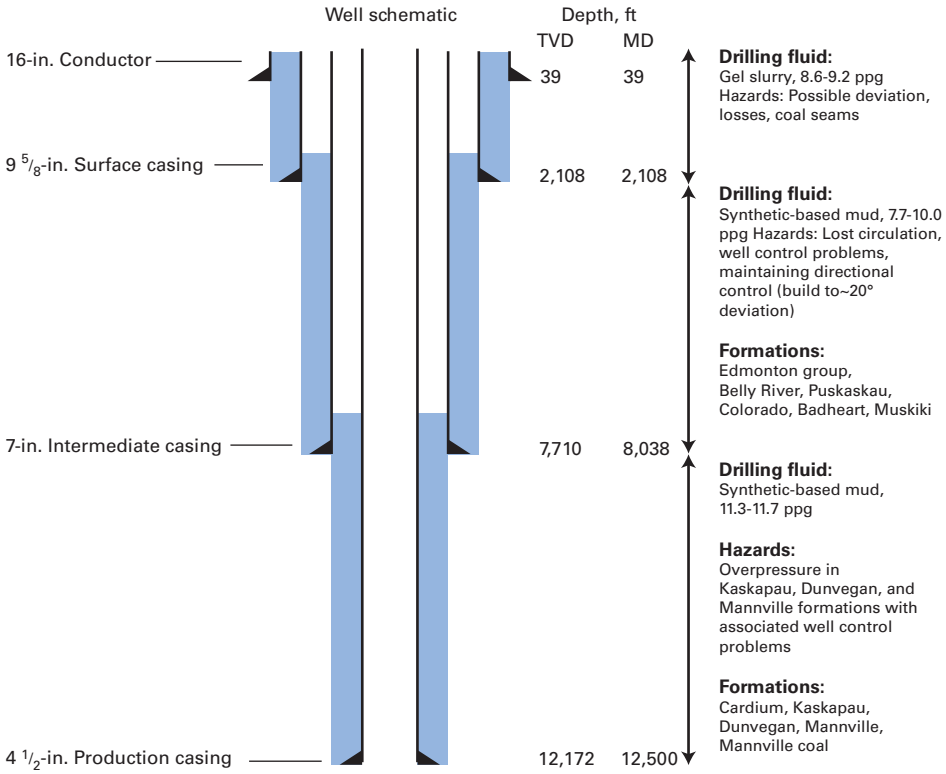
The first field trial involved drilling and casing the intermediate section with a conventional unweighted 8.7-ppg Mineral Oil A-based OBM. Drilling out of the casing shoe used the same drilling fluid. For the main section C_{14} IO-based fluid, displaced the fluid for drilling out the shoe. The fresh fluid sheared through the bit homogenized fluid properties and once drilling commenced, the driller increased mud density rapidly to 11.7 ppg to contain gas influx. To enhance hole cleaning, the fluid needed occasional treatments with organoclay during directional drilling.

The well reached TD with no major problems and the mud weight at TD increased to 13.6 ppg (Fig. 3). Compared to the offset, the overall rheological properties and HTHP fluid loss were noticeably lower, which the operator attributed partly to the lower mud weight and change of base fluid (Table 6).

The field trial successfully collected full-size cores from several intervals

TEST WELL

Fig. 3



PROPERTY OF FLUIDS USED ON TWO FIELD TRIAL WELLS

Table 5

	Offset well	Field trial 1	Field trial 2
Mud weight, ppg	8.8-15.7	8.8-13.6	9.7-16.2
Hole section	Main	Main	Main
Hole diameter, in.	6⅛	6⅛	6⅛
Starting depth, ft	8,108	8,728	9,030
TD, ft	12,447	13,353	12,559
Hole angle, degrees	0	5.6	10
Oil-water ratio (OWR)	89/11-91/9	85/15-87/13	88/12-91/9
Operation issues	Solids control, seepage losses, ballooning, surge-swab	No major problems	Minor seepage losses
Consequence	Unable to log	Full-size cores, sidewall cores, logged on wireline	Logged on drill pipe and wireline

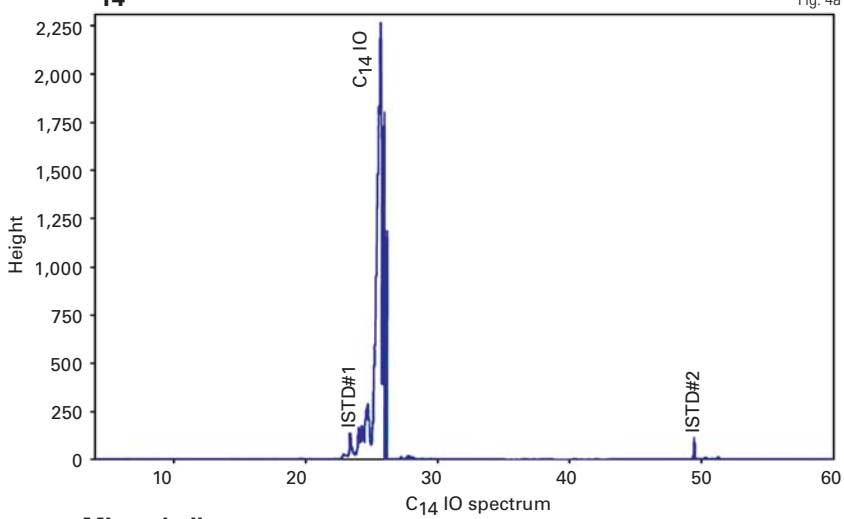
Note: Comparison of fluids used on two field trial wells drilled with C_{14} IO based fluid and an offset well drilled with mineral oil-A based fluid. All the wells used similar products, including organoclays, emulsifiers, wetting agent, and fluid-loss control additives except the base fluid.

Gas chromatography scans

Fig. 4

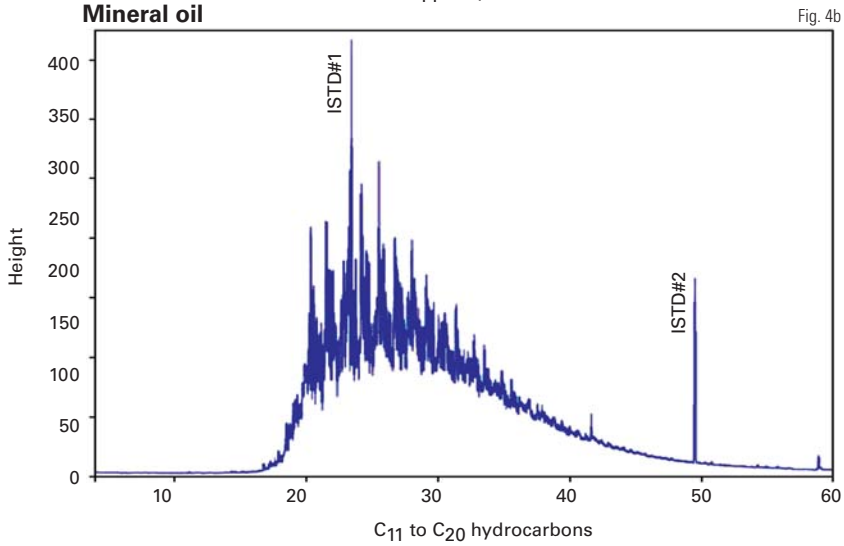
C_{14} IO

Fig. 4a



Mineral oil

Fig. 4b



towards the bottom of the well. Unlike the previous well, the drilling operation successfully obtained sidewall cores and wireline logs at TD. Consequently, the operator considered the first field trial a success by meeting the objectives set before the trial.

At the end of the well, the mud company returned the drilling fluid to the mud plant and centrifuged it to reduce mud weight for the next well.

The drilling of the intermediate section to 9,030 ft in the second field trial used the Mineral Oil A-based OBM from the previous well. An openhole displacement at this point placed in the hole the previous well's reconditioned C_{14} IO-based fluid. A rapid mud weight adjustment increased the weight to 11.7 ppg.

Because of repeated high-connection gas, the driller raised the mud density incrementally to as high as 16.2 ppg half way through the section. The driller later reduced the mud weight to around 15.8 ppg to TD to combat seepage losses, which lost-circulation material alleviated. Two logging runs were problem free at TD.

The higher density used on the second field trial made the comparison with the offset well more realistic and clearly revealed the performance advantages of a low kinematic viscosity, low-PAH olefin compared with the conventional base fluid with high kinematic viscosity and high PAH. The rheological properties observed with the field trials are also in good agreement with the lab findings.

Environmental advantages

Improved drilling performance aside, C_{14} IOs also have inherent quality and HSE advantages compared with the traditional nonaqueous base fluids used in Western Canada. Environmental benefits include an optimized occupational health and safety profile with regards to the composition and quantity of vapors and faster and more complete degradation due to the chemical structure that provides more disposal options.

From a rig safety standpoint, the flash point of a base fluid is an important aspect. The industry considers fluids as flammable if their flashpoints are below 100° F. and combustible if they are between 100° F. and 200° F. Conversely, fluids with a flashpoint of more than 200° F. have become an unofficial standard for improved HSE. Moreover, a high flashpoint correlates with lower vapor pressures reducing personnel exposure. The C_{14} synthetic olefin has a flash point of 241° F., thus exceeding the unofficial standard.

The PAH content also is an important consideration, strictly from an environmental perspective. These carbon compounds have two or more fused aromatic rings. Although PAHs may constitute only a minor fraction of total hydrocarbons, these substances tend to persist and bioaccumulate. As a result, PAHs may remain in soils or sediments even when they were only a small fraction of the original mixture introduced to the soil.

Companies manufacture synthetic olefins from purified feedstock (ethylene). Synthetic olefins contain less than 0.001% PAH content by weight,[1] which is the lowest level attained by any base fluid on the market. Disposal of this fluid has a relatively low effect on the environment, thereby effectively elimi-

RHEOLOGICAL PROPERTIES OF FIELD TRIAL MUD

Table 6

	Offset well	Field trial 1	Field trial 2
Mud weight, ppg	11.0	11.7	11.0
PV, cp	22	15	17
YP, lb/100 sq ft	14	12	11
10-sec/10-min gel, lb/100 sq ft	16/26	7/11	10/24
30-sec gel, lb/100 sq ft	26	11	24
HTHP fluid loss, ml	12.5	4.0	6.0
Solids, %	16	18	16
Oil-water ratio (OWR)	90/10	85/15	86/14
Electric stability of emulsion (ES), v	2,000	1,050	1,158
Mud weight, ppg	15.6	13.6	15.6
PV, cp	54	24	40
YP, lb/100 sq ft	36	13	13
10-sec/10-min gel, lb/100 sq ft	32/38	11/20	10/16
30-sec gel, lb/100 sq ft	38	20	16
HTHP fluid loss, ml	9.0	3.5	2.2
Solids, %	30	26	33
Oil-water ratio (OWR)	90/10	85/15	91/9
Electric stability of emulsion (ES), v	2,000	1,477	1,979

Note: Comparison of rheological properties of field trial mud against offset mud of similar fluid density. Bearing in mind that oil-water ratio and solids content can also affect the PV and gels of the fluid system.

nating present and future PAH-related liability.

Thus, C_{14} synthetic olefins degrade faster and more completely than many other nonaqueous base fluids, according to the results of several tests performed in a greenhouse lab.[2] Fig. 4 shows gas chromatography scans of C_{14} hydrocarbons, containing 98% IO. The chemistry of these base fluids allows for degradation to nondetectable levels through volatilization and bioremediation.

Laboratory tests simulated the degradation of the base fluid applied to drill cuttings. The beginning concentration was 10% total petroleum hydrocarbons (TPH) by weight, which is a typical value for TPH retained on cuttings that shakers at the drilling rig remove.

The tests involved mixing the cuttings and fluid with peat moss and bacteria provided by the native soil from the area. The experiment maintained the mound moisture content at 70% field capacity. The tests included turning and aerating the mound once a week and keeping the nutrients in the appropriate range and ratio to ensure most efficient growth and reproduction of bacteria.

Because of these efforts, the temperature remained high throughout the experiment. Decreases in temperature correlate to lower than normal degradation rates and the consumption of the food source, thus proving the relationship between temperature and growth of the bacterial colony. The experiment lasted about 35 days, at which time only 0.49% hydrocarbons remained on the cuttings. This trace amount eventually degraded to undetectable levels.

A recent study determined the toxicity of six different base fluids ranging from diesel to olefins. The study involved initially applying each base fluid to clay soil at 2% by weight and bioremediating it for 90 days. Tests of the resulting material on various plant and animal species determined its residual toxicity. C_{14} IO showed no toxicity to barley, canola, or alfalfa in either categories of emergence or root elongation. This is true also for earthworm survival; furthermore, C_{14} IO was the only fluid to demonstrate no toxic effect in springtail survival.

Other fluids did not have the same favorable effects on each of these species, proving that C_{14} IO-based fluid is better in the category of nontoxic effects.

Accordingly, complete degradation and low toxicity make C_{14} IO fluids and other fluids of similar chemistry better suited for alternative methods of disposal, such as composting, land farming, vermiculture, and the use of bioreactors. In the past, companies considered attempts to bioremediate other types of nonaqueous base fluids unsuccessful due to excessively long treatment periods and incomplete degradation.

Fluids containing branched and

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cyclic hydrocarbon structures are not available as readily to bacterial degradation as linear molecules. Thus, one can attribute the failure of bioremediation projects mostly to unfavorable hydrocarbon chemistry.[3]

Fig. 4 compares the hydrocarbon fingerprint of C_{14} IO with that of a typical mineral oil. Notice that the mineral oil spectrum contains a large hump that represents the aromatic, branched, and cyclic components. Switching to linear C_{14} IO improves the probability that all residuals will degrade by the end of the bioremdiation process. Eliminating haul off and disposal will introduce additional cost savings to any land-based project. ✦

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Table, correlation give water solubility, Henry's Law constant for alkanes in crude

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Water solubility and Henry's law constant in alkanes found in crude oil have been calculated and set in an easy-to-use table.

In addition, we have developed a new correlation for solubility of water in crude oil that provides reliable solubility values down to very low concentrations (ppm). The correlation is based on boiling-point temperature of the hydrocarbon. Correlation values and experimental data are in agreement.

The results are usable in engineering applications involving processing, safety, hazard, and environmental considerations.

Water solubility

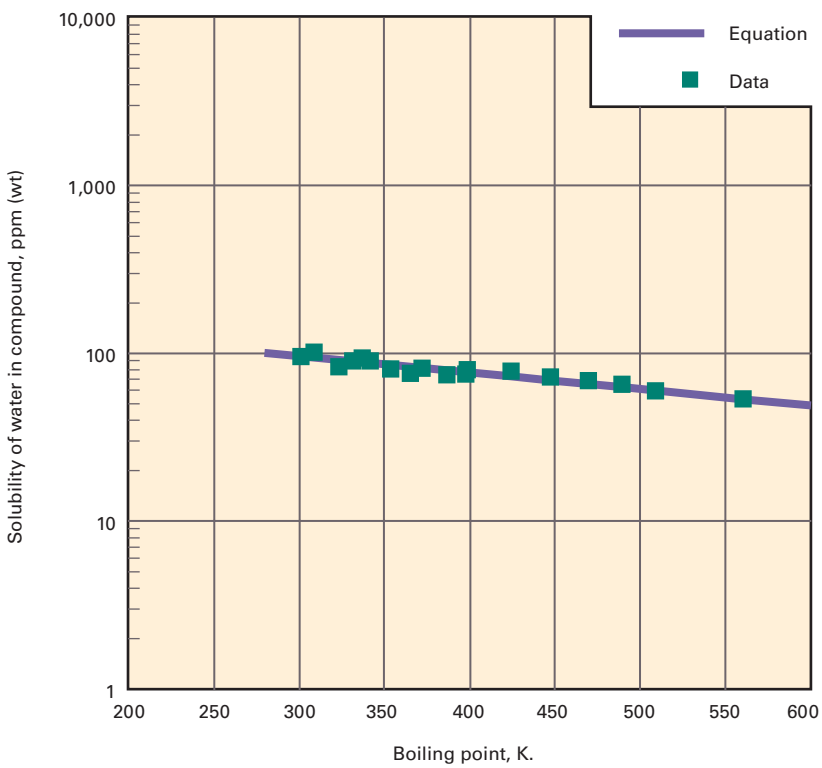
The importance of the solubility of water in crude oil will increase in view of processing, safety, hazard, and environmental considerations focusing on product quality and equipment sustainability. The following brief discussion illustrates that importance.

Any processing that lowers temperatures to near the freezing point of water may result in formation of solids (freezing of water or hydrate formation). Such formation will affect both fluid flows in piping and operational characteristics of equipment. For catalytic reactions, any water in the hydrocarbon may poison the catalyst that promotes the hydrocarbon reaction.

For reactions in general, any water in the reaction species may result in formation of undesirable by-products issuing from the hydrocarbon reaction. The presence of water in the product may degrade quality and, if sufficient water is in the product, it may prove to

SOLUBILITY OF WATER IN ALKANES

Fig. 1



SOLUBILITY AND HENRY'S LAW CONSTANT FOR WATER IN HYDROCARBONS

Table 1

No.	ID	Formula	Name	Case no.	TB, K	Solubility of water (S), ppm — S @ 25° C. — ppm (wt)	ppm (mol)	Code*	Henry's Law constant (H) — H @ 25° C. — atm/mol frac	atm/mol/cu m	Code*
1	6210	C_5H_{12}	pentane	109-66-0	309.22	100.97	404.40	1	77.50	1.3950E-03	1,2
2	6211	C_5H_{12}	isopentane	78-78-4	300.99	95.98	384.40	1	81.53	1.4676E-03	1,2
3	6212	C_5H_{12}	neopentane	463-82-1	282.65	99.96	400.34	2	78.28	1.4091E-03	1,2
4	9358	C_6H_{14}	hexane	110-54-3	341.88	89.97	430.40	1	72.82	1.3107E-03	1,2
5	9359	C_6H_{14}	2,2-dimethylbutane	75-83-2	322.88	83.97	401.70	1	78.02	1.4044E-03	1,2
6	9360	C_6H_{14}	2,3-dimethylbutane	79-29-8	331.13	89.97	430.40	1	72.82	1.3107E-03	1,2
7	9361	C_6H_{14}	2-methylpentane	107-83-5	333.41	89.97	430.40	1	72.82	1.3107E-03	1,2
8	9362	C_6H_{14}	3-methylpentane	96-14-0	336.42	93.97	449.50	1	69.72	1.2550E-03	1,2
9	12631	C_7H_{16}	heptane	142-82-5	371.58	81.98	456.00	1	68.73	1.2371E-03	1,2
10	12632	C_7H_{16}	2-methylhexane	591-76-4	363.20	83.50	464.46	2	67.48	1.2146E-03	1,2
11	12633	C_7H_{16}	3-methylhexane	589-34-4	365.00	73.98	411.50	1	76.16	1.3709E-03	1,2
12	12634	C_7H_{16}	3-ethylpentane	617-78-7	366.62	82.87	460.92	2	68.00	1.2239E-03	1,2
13	12635	C_7H_{16}	2,2-dimethylpentane	590-35-2	352.34	85.55	475.86	2	65.86	1.1855E-03	1,2
14	12636	C_7H_{16}	2,3-dimethylpentane	565-59-3	362.93	83.55	464.74	2	67.44	1.2139E-03	1,2
15	12637	C_7H_{16}	2,4-dimethylpentane	108-08-7	353.64	80.97	450.40	1	69.58	1.2525E-03	1,2
16	12638	C_7H_{16}	3,3-dimethylpentane	562-49-2	359.21	84.25	468.62	2	66.88	1.2038E-03	1,2
17	12639	C_7H_{16}	2,2,3-trimethylbutane	464-06-2	354.03	85.23	474.07	2	66.11	1.1900E-03	1,2
18	12640	C_7H_{16}	3-methylhexane, (S)-	6131-24-4	365.15	83.14	462.44	2	67.77	1.2199E-03	1,2
19	15925	C_8H_{18}	octane	111-65-9	398.83	78.96	500.70	1	62.59	1.1267E-03	1,2
20	15926	C_8H_{18}	2-methylheptane	592-27-8	390.80	78.51	497.82	2	62.96	1.1332E-03	1,2
21	15927	C_8H_{18}	3-methylheptane	589-81-1	392.08	78.29	496.40	2	63.14	1.1364E-03	1,2
22	15928	C_8H_{18}	4-methylheptane	589-53-7	390.86	78.50	497.75	2	62.96	1.1333E-03	1,2
23	15929	C_8H_{18}	3-methyl-3-ethylpentane	1067-08-9	391.42	78.40	497.13	2	63.04	1.1348E-03	1,2
24	15930	C_8H_{18}	3-ethylhexane	619-99-8	391.69	78.35	496.83	2	63.08	1.1355E-03	1,2
25	15931	C_8H_{18}	3-ethyl-2-methylpentane	609-26-7	388.80	78.86	500.05	2	62.68	1.1281E-03	1,2
26	15932	C_8H_{18}	2,2-dimethylhexane	590-73-8	379.99	80.43	509.99	2	61.45	1.1062E-03	1,2
27	15933	C_8H_{18}	2,3-dimethylhexane	584-94-1	388.76	78.87	500.09	2	62.67	1.1280E-03	1,2
28	15934	C_8H_{18}	2,4-dimethylhexane	589-43-5	382.58	79.96	507.05	2	61.81	1.1126E-03	1,2
29	15935	C_8H_{18}	2,5-dimethylhexane	592-13-2	382.26	80.02	507.41	2	61.77	1.1118E-03	1,2
30	15936	C_8H_{18}	3,3-dimethylhexane	563-16-6	385.12	79.51	504.18	2	62.16	1.1189E-03	1,2
31	15937	C_8H_{18}	3,4-dimethylhexane	583-48-2	390.88	78.50	497.73	2	62.97	1.1334E-03	1,2
32	15938	C_8H_{18}	2,2,3-trimethylpentane	564-02-3	382.99	79.89	506.58	2	61.87	1.1136E-03	1,2
33	15939	C_8H_{18}	2,2,4-trimethylpentane	540-84-1	372.39	79.96	507.00	1	61.82	1.1127E-03	1,2
34	15940	C_8H_{18}	2,3,3-trimethylpentane	560-21-4	387.92	79.02	501.03	2	62.55	1.1259E-03	1,2
35	15941	C_8H_{18}	2,3,4-trimethylpentane	565-75-3	386.62	73.96	469.00	1	66.82	1.2028E-03	1,2
36	15942	C_8H_{18}	2,2,3,3-tetramethylbutane	594-82-1	379.44	80.53	510.61	2	61.38	1.1048E-03	1,2
37	18788	C_9H_{20}	nonane	111-84-2	423.97	78.97	562.20	1	55.75	1.0034E-03	1,2
38	18789	C_9H_{20}	2-methyloctane	3221-61-2	416.43	74.14	527.85	2	59.37	1.0687E-03	1,2
39	18790	C_9H_{20}	3-methyloctane	2216-33-3	417.38	73.98	526.73	2	59.50	1.0710E-03	1,2
40	18791	C_9H_{20}	4-methyloctane	2216-34-4	415.59	74.28	528.84	2	59.26	1.0667E-03	1,2
41	18792	C_9H_{20}	3-ethylheptane	15869-80-4	416.35	74.16	527.95	2	59.36	1.0685E-03	1,2
42	18793	C_9H_{20}	4-ethylheptane	2216-32-2	414.36	74.49	530.30	2	59.10	1.0638E-03	1,2
43	21774	$C_{10}H_{22}$	decane	124-18-5	447.30	71.97	568.40	1	55.14	9.9249E-04	1,2
44	21775	$C_{10}H_{22}$	2-methylnonane	871-83-0	440.15	70.32	555.36	2	56.43	1.0158E-03	1,2
45	21776	$C_{10}H_{22}$	3-methylnonane	5911-04-6	440.95	70.19	554.37	2	56.53	1.0176E-03	1,2
46	21777	$C_{10}H_{22}$	4-methylnonane	17301-94-9	438.85	70.52	556.98	2	56.27	1.0128E-03	1,2
47	21778	$C_{10}H_{22}$	5-methylnonane	15869-85-9	438.30	70.61	557.66	2	56.20	1.0116E-03	1,2
48	23546	$C_{11}H_{24}$	undecane	1120-21-4	469.08	68.97	598.40	1	52.37	9.4273E-04	1,2
49	23547	$C_{11}H_{24}$	2-methyldecane	6975-98-0	462.34	66.92	580.61	2	53.98	9.7161E-04	1,2
50	23548	$C_{11}H_{24}$	3-methyldecane	13151-34-3	463.15	66.80	579.56	2	54.08	9.7337E-04	1,2
51	23549	$C_{11}H_{24}$	4-methyldecane	2847-72-5	461.05	67.11	582.29	2	53.82	9.6881E-04	1,2
52	23550	$C_{11}H_{24}$	5-methyldecane	13151-35-4	459.15	67.39	584.76	2	53.60	9.6471E-04	1,2
53	25607	$C_{12}H_{26}$	dodecane	112-40-3	489.47	64.97	614.30	1	51.02	9.1833E-04	1,2
54	25608	$C_{12}H_{26}$	3-methylundecane	1002-43-3	483.95	63.76	602.90	2	51.98	9.3569E-04	1,2
55	25609	$C_{12}H_{26}$	4-methylundecane	2980-69-0	482.15	64.02	605.33	2	51.77	9.3194E-04	1,2
56	25610	$C_{12}H_{26}$	5-methylundecane	1632-70-8	479.15	64.45	609.40	2	51.43	9.2571E-04	1,2
57	25611	$C_{12}H_{26}$	6-methylundecane	17302-33-9	479.15	64.45	609.40	2	51.43	9.2571E-04	1,2
58	27234	$C_{13}H_{28}$	tridecane	629-50-5	508.62	59.97	613.70	1	51.07	9.1923E-04	1,2
59	27235	$C_{13}H_{28}$	2-methyldodecane	1560-97-0	502.65	61.15	625.86	2	50.08	9.0137E-04	1,2
60	27236	$C_{13}H_{28}$	3-methyldodecane	17312-57-1	503.45	61.05	624.74	2	50.17	9.0298E-04	1,2
61	27237	$C_{13}H_{28}$	4-methyldodecane	6117-97-1	500.82	61.41	628.42	2	49.87	8.9769E-04	1,2
62	27238	$C_{13}H_{28}$	5-methyldodecane	17453-93-9	499.69	61.56	630.00	2	49.75	8.9544E-04	1,2
63	28645	$C_{14}H_{30}$	tetradecane	629-59-4	526.73	57.95	638.21	2	49.11	8.8393E-04	1,2
64	28646	$C_{14}H_{30}$	2-methyltridecane	1560-96-9	521.05	58.69	646.36	2	48.49	8.7278E-04	1,2
65	28647	$C_{14}H_{30}$	3-methyltridecane	6418-41-3	521.85	58.59	645.20	2	48.58	8.7435E-04	1,2
66	28648	$C_{14}H_{30}$	4-methyltridecane	26730-12-1	519.75	58.86	648.23	2	48.35	8.7026E-04	1,2
67	28649	$C_{14}H_{30}$	5-methyltridecane	25117-31-1	518.22	59.06	650.44	2	48.18	8.6731E-04	1,2
68	28650	$C_{14}H_{30}$	7-methyltridecane	26730-14-3	518.35	59.05	650.26	2	48.20	8.6755E-04	1,2
69	29652	$C_{15}H_{32}$	pentadecane	629-62-9	543.83	55.78	657.72	2	47.65	8.5770E-04	1,2
70	29653	$C_{15}H_{32}$	2-methyltetradecane	1560-95-8	538.35	56.47	665.82	2	47.07	8.4726E-04	1,2
71	29654	$C_{15}H_{32}$	3-methyltetradecane	18435-22-8	539.45	56.33	664.19	2	47.19	8.4935E-04	1,2
72	29655	$C_{15}H_{32}$	4-methyltetradecane	25117-24-2	535.93	56.77	669.43	2	46.82	8.4270E-04	1,2
73	29656	$C_{15}H_{32}$	5-methyltetradecane	25117-32-2	535.01	56.89	670.80	2	46.72	8.4099E-04	1,2
74	30518	$C_{16}H_{34}$	hexadecane	544-76-3	560.01	53.97	678.40	1	46.20	8.3156E-04	1,2
75	30519	$C_{16}H_{34}$	2-methylpentadecane	1560-93-6	554.75	54.44	684.26	2	45.80	8.2443E-04	1,2
76	30520	$C_{16}H_{34}$	3-methylpentadecane	2882-96-4	555.15	54.39	683.65	2	45.84	8.2517E-04	1,2
77	30521	$C_{16}H_{34}$	4-methylpentadecane	2801-87-8	552.89	54.66	687.10	2	45.61	8.2103E-04	1,2
78	30522	$C_{16}H_{34}$	5-methylpentadecane	25117-33-3	550.42	54.97	690.90	2	45.36	8.1652E-04	1,2
79	31117	$C_{17}H_{36}$	heptadecane	629-78-7	575.30	51.99	694.05	2	45.16	8.1281E-04	1,2
80	31917	$C_{18}H_{38}$	octadecane	593-45-3	589.86	50.33	711.03	2	44.08	7.9340E-04	1,2

*1-data, 2-estimate; TB = boiling point temperature, K.

be unusable by the customer.

This brief discussion indicates that solubility of water in hydrocarbons contained in crude oil is important in engineering applications involving processing, safety, hazard, and environmental considerations.

Correlation

Earlier works correlated the solubility of hydrocarbons and other chemical types in water as a function of the boiling point of the compound.[9 11] In this work, we determined that the boiling point method was also applicable for correlation of solubility of water in alkanes:

$\log_{10}(S) = A + B*T_B$ (1)

where: S = solubility of water in compound at 25° C., ppm (wt)

TB = boiling point temperature of compound, K.

A = 2.2740

B = –9.70 E-04

The correlation applies to a range for boiling-point temperatures of about 280 K. to 590 K.

The coefficients (A and B) for the correlation were determined from regression of the available data. In preparing the correlation, we conducted a literature search to identify data source publications.[1-11] The compilations by Polak and Lu,[4] Schatzberg,[5] Sorensen and Artl,[6] and Yaws[10] were utilized for solubility of water and boiling point temperature.

We screened the publications and copied appropriate data. These data were then keyed into the computer to provide a data base for which experimental data are available. The data base also served as a basis to check the accuracy of the correlation.

The accompanying diagram shows the solubility of water vs. boiling-point temperature of alkanes. The graph discloses favorable agreement of correlation values and experimental data.

Solubility; Henry's Law constant

The accompanying table gives the results for solubility of water and Henry's law constant. In the tabulation, the results for Henry's law constant are based on water solubility and vapor pressure at ambient conditions with appropriate thermodynamic relationships.[10] The presented values are applicable for water in a wide variety of alkanes (normal and branching).

The results in an easy-to-use tabular format are especially applicable for rapid engineering use with a personal computer or hand calculator. The tabulation is arranged by carbon number (C_1, C_2, C_3, so forth). This provides ease of use in quickly locating data using the chemical formula.

NELSON-FARRAR COST INDEXES

Refinery construction (1946 Basis)
(Explained on p.145 of the Dec. 30, 1985, issue)

	1962	1980	2005	2006	2007	Nov. 2007	Oct. 2008	Nov. 2008
Pumps, compressors, etc.	222.5	777.3	1,685.5	1,758.2	1,844.4	1,862.6	1,989.2	2,003.4
Electrical machinery	189.5	394.7	513.6	520.2	517.3	511.9	518.2	516.4
Internal-comb. engines	183.4	512.6	931.1	959.7	974.6	977.7	993.5	1,007.3
Instruments	214.8	587.3	1,108.0	1,166.0	1,267.9	1,281.4	1,362.8	1,365.0
Heat exchangers	183.6	618.7	1,072.3	1,162.7	1,342.2	1,374.7	1,374.7	1,253.8
Misc. equip. average	198.8	578.1	1,062.1	1,113.3	1,189.3	1,201.6	1,247.7	1,229.2
Materials component	205.9	629.2	1,179.8	1,273.5	1,364.8	1,356.9	1,566.5	1,436.7
Labor component	258.8	951.9	2,411.6	2,497.8	2,601.4	2,661.3	2,768.0	2,781.7
Refinery (Inflation) Index	237.6	822.8	1,918.8	2,008.1	2,106.7	2,139.5	2,287.4	2,243.7

Refinery operating (1956 Basis)
(Explained on p.145 of the Dec. 30, 1985, issue)

	1962	1980	2005	2006	2007	Nov. 2007	Oct. 2008	Nov. 2008
Fuel cost	100.9	810.5	1,360.2	1,569.0	1,530.7	1,647.5	1,419.3	1,173.9
Labor cost	93.9	200.5	201.9	204.2	215.8	230.5	260.7	255.0
Wages	123.9	439.9	1,007.4	1,015.4	1,042.8	1,106.9	1,182.0	1,167.6
Productivity	131.8	226.3	501.1	497.5	483.4	480.3	453.3	457.9
Invest., maint., etc.	121.7	324.8	716.0	743.7	777.4	789.5	844.1	827.9
Chemical costs	96.7	229.2	310.5	365.4	385.9	415.1	496.1	455.7
Operating indexes								
Refinery	103.7	312.7	542.1	579.0	596.5	620.6	642.8	607.8
*Process units**	103.6	457.5	787.2	870.7	872.6	922.1	870.4	777.1

**Add separate index(es) for chemicals, if any are used. See current Quarterly Costimating, first issue, months of January, April, July, and October.*

These indexes are published in the first issue of each month. They are compiled by Gary Farrar, Journal Contributing Editor.

Indexes of selected individual items of equipment and materials are also published on the Costimating page in the first issue of the months of January, April, July, and October.

Examples

The results for solubility and Henry's law constant are useful in engineering applications involving water in alkanes, per the following examples:

• *Example 1.* In hydrocarbon processing, hexane (C_6H_{14}) comes into contact with water at ambient conditions (25° C., 1 atm). The organic and aqueous phases are subsequently separated. Estimate the concentration of water at saturation in the hexane after separation.

Substitution of the coefficients and boiling point temperature into the correlation equation yields:

$\log_{10}(S) = 2.2740 - 9.70$ E-04*341.88 = 1.9423

S = 87.57 ppm (wt)

• *Example 2.* A hydrocarbon spill of hexane (C_6H_{14}) into a body of water at ambient conditions (25° C., 1 atm). After separation, the concentration of water in the hexane at the surface is 0.00033 mol fraction ($x_i = 0.00033$). Estimate the concentration of water in the vapor at the surface.

From thermodynamics at low pressure, the vapor concentration is given by $y_i = H_i/P_t * x_i$

Substitution of Henry's law constant from the table, total pressure ($P_t = 1$ atm), and liquid concentration into the above equation provides y_i =72.82/1 * 0.00033 = 0.0240 = 2.40% (mol). ✦

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Scheduling software aids pipeline design

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Applying scheduling software to the design stages of a complex multiproduct pipeline helps make the finished line safer, more reliable, and more economic. Such software allows verification and modification of preliminary design to ensure the full functionality of the final plans, including pump selection, before construction.

The long distance, large diameter, multiple delivery points, and variable hydraulic states of China's planned Lan-Zheng-Chang multiproduct pipeline complicate the process of pump selection.

Designers based delivery plans and dimensions of the LZCPP on expected 2015 market demand for products along the pipeline, using scheduling software to verify pump configuration. Using the scheduling software in design exposed irrationalities in pump selection, prompting adjustments.

Background

China University of Petroleum–Beijing developed scheduling software used in design of LZCPP. Operators can schedule virtual shipments on the software platform by inputting profile data of the pipeline (diameter, distance, wall thickness, etc.), properties of the products, the pipeline's initial line pack, the transportation plan, and flow rates at the line's point of origin. The software also uses start time, delivery flow rate, and volume at all delivering stations to draw a delivery plan.

LZCPP represents the first use of the software in a design application, although it has been successfully applied to operating a number of multiproduct pipelines in China, including the Lan-Cheng-Yu pipeline,[1,2] the Lu-Wan pipeline, the Gang-Zao pipeline, the South-West pipeline,[3] and the Western pipeline.

CUPB developers designed the software so that operators already familiar with it in a scheduling context would easily be able to use it in a design context as well. Simple pipeline technology is easy to schedule, and pump units selected during preliminary design adapt well to actual operation. Schedulers can use Excel or many other software options to complete their tasks.

The hydraulic state of a pipeline with multiple input and delivery points, however, is far harder to manage and requires more advanced tools to address. Proper design of such pipelines also requires use of these tools to avoid expensive retrofitting of pump stations. CUPB's software improves multiproduct pipeline design

LZCPP DELIVERY PLAN

Table 1

Station	Volume — Batch 1, cu m — 90-octane gasoline	Diesel	Batch 2, cu m — 93-octane gasoline	90-octane gasoline	Diesel	Flow rate, cu m/hr
WXP	1,628	6,145	1,628	1,628	6,145	150
DX	1,628	6,145	1,628	1,628	6,145	150
ZJC	1,783	6,731	1,783	1,783	6,731	150
FX	2,451	8,615	2,451	2,451	8,615	150
WN	2,533	8,903	2,533	2,533	8,903	150
SMX	2,322	8,391	2,322	2,322	8,391	150
LY	2,322	8,391	2,322	2,322	8,391	150
ZZ	—	40,041	—	—	26,043	Undetermined
XC	6,384	21,882	4,951	7,817	22,994	300
XP	4,643	15,914	3,601	5,685	16,724	300
XY(H)	2,419	8,447	1,866	2,972	8,869	150
YC	4,878	14,180	3,945	5,811	15,030	200
WH	29,632	96,461	23,305	35,959	101,625	200-1,200
XN	2,439	7,090	1,973	2,905	7,516	150
CT	2,850	8,285	2,305	3,395	8,781	150
CS	27,077	78,703	21,899	32,255	83,423	Undetermined
XC thru CS	80,322	250,962	63,845	96,799	264,962	

INPUT STATION INJECTION PLAN

Table 2

Station	Volume — Batch 1, cu m — 90-octane gasoline	Diesel	Batch 2, cu m — 93-octane gasoline	90-octane gasoline	Diesel	Injection rate, cu m/hr
LZ	21,404	142,152	21,404	21,404	142,152	622
XY(S)	57,042	202,173	57,042	57,042	202,173	420-1,200
ZZ	33,089	—	—	33,089	—	490-1,400

and increases the efficiency of both construction and operation.

CUPB software provides functionality not provided by other simulators, allowing scheduling of virtual shipments rather than simply modeling dynamic flow. It guarantees a transport schedule before construction and determining the actual hydraulic conditions of the line, improving design efficiency and reducing the need for post-construction corrections.

LZCPP

The 2,148.4-km LZCPP consists of one origination station, five delivery points, eight combination delivery-pumping stations, one injection station, and one terminal station (Fig. 1). The pipeline's OD starts at 610 mm before growing to 660 mm and subsequently shrinking to 508 mm. Designed operating pressure of the trunk line is 8-10 MPa. It is longer, wider, and has more delivery points and hydraulic states than most products pipelines.

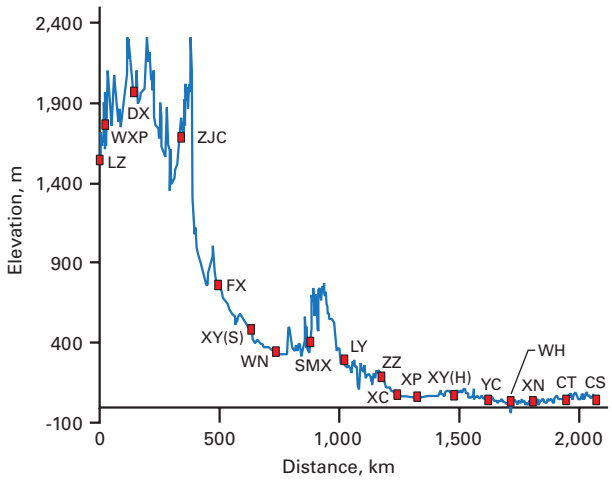
LZCPP's planned Batch 1 consists of 90-octane gasoline and diesel, while Batch 2 is 93-octane gasoline, 90-octane gasoline and diesel.

Table 1 shows LZCPP's cyclic delivery plan, derived from annual product market demand and annual refinery capacity. Table 2 shows the injection schedules for LZ, XY(S), and ZZ stations.

Initial pump unit data and configuration allow calculation of each pumping station's maximum discharge flow rate based on experimental data under specific conditions. The conventional minimum discharge flow rate is 70% of a given pump's rated flow rate. Table 3 shows flow ranges for each pump station, including delivery pump stations.

Applying the software to the design process generates potential pump schedules of complexity beyond what is required for the project.

LZCPP PROFILE Fig. 1



Transport schedule

Designers input these primary design data into the software to generate the scheduling shown in Fig. 2

The abscissa in Fig. 2 refers to time and vertical axis distance. The names of all delivery stations, injecting station, and originating station run down the left of the diagram, while the positions of these stations are on the right. The short bold bars represent the process of delivering and injecting. The oblique lines represent the trajectory of the contamination segment between two adjacent products.

PUMP STATION FLOW RANGE Table 3

Station	Minimum cu m/hr	Maximum cu m/hr
LZ	525	1,400
DX	980	1,400
ZJC	980	1,400
WN	1,610	2,300
SMX	525	2,300
LY	1,610	2,300
ZZ	980	1,400
XY(H)	980	1,400
WH	490	700

GASOLINE PASSING ZZ STATION Table 4

Type, batch no.	Discharge volume, cu m	Duration, hr	Average discharge rate, cu m/hr	Allowable maximum discharge rate, cu m/hr
93-octane, 1	63,845	45.7	1,397.1	
90-octane, 3	96,799	42.6	2,272.3	
90-octane, 4	80,322	46.6	1,723.7	
93-octane, 2	63,845	45.7	1,397.1	
90-octane, 5	96,799	42.6	2,272.3	
90-octane, 6	80,322	46.6	1,723.7	1,400
93-octane, 3	63,845	45.7	1,397.1	
90-octane, 7	96,799	42.6	2,272.3	
90-octane, 8	80,322	46.6	1,723.7	
93-octane, 4	63,845	45.7	1,397.1	
90-octane, 9	96,799	42.6	2,272.3	

Initial problems

While developing the transport schedule, designers found that the pump units in ZZ station and XY(S) station needed adjustment to avoid creating delivery bottlenecks.

- *ZZ station.* ZZ station both delivers and injects products. The station's discharge flow rate equals the sum of the upstream flow rate and injection rate. Discharge flow rates must be constant to ensure the stable hydraulic operation of the pipeline.

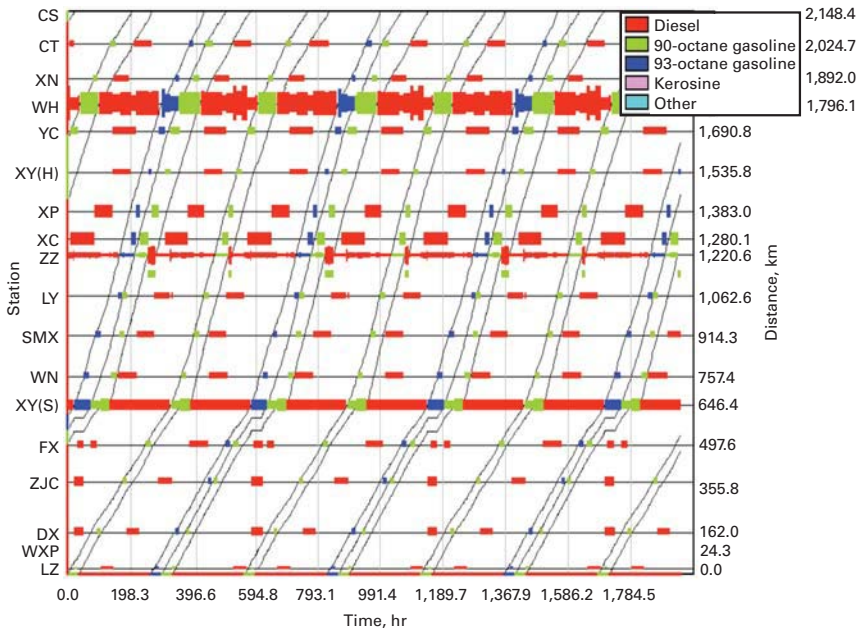
Small upstream gasoline batches pass ZZ station quickly but are too small to meet downstream demand, requiring that the flow rate leaving ZZ be increased. Downstream demand for each gasoline batch and the rate at which gasoline passes ZZ allow calculation of the station's average discharge rate (Table 4).

Table 4 shows an average discharge flow rate for 90-octane gasoline greater than ZZ's maximum discharge flow rate of 1,400 cu m/hr. Failure to modify the pump configuration will require construction of floating-roof tankage to allow downstream demand for 90-octane gasoline to be met; such tanks allowing diesel to be discharged and stored while additional gasoline is input. The right lateral shift of the oblique lines in Fig. 3 at the batch interface of 90-octane gas and diesel shows the presence of the floating-roof tank at ZZ.

- *XY(S) station.* The duration of 93-octane gasoline passing XY(S) station is very

LZCPP BATCH MOVEMENT

Fig. 2



short and the injection pumping capacity used in preliminary design is small, requiring flow upstream of the station be stopped to allow completion of injection. This interruption may increase contamination costs due to the great topographic difference between FX and XY(S) stations (Fig. 1).[4,5] Limited injection pumping capacity also requires establishing a storage operation similar to that at ZZ station, for use when 90-octane gasoline passes the station.

Design improvement

Scheduling analysis allowed designers to adjust the initial design. They first reevaluated their choice of pump units, increasing capacity at ZZ station, avoiding the need to build new floating top storage facilities, and decreasing the overall storage volume of the station.

They also decided to upgrade the injection pumps at XY(S) station, increasing that station's input to the pipeline and producing the same net storage benefits as those found at ZZ station.

These pump unit adjustments satisfied the variable hydraulic state of the pipeline and met its design requirements.

Acknowledgment

The authors acknowledge the engineers of China Petroleum Pipeline Engineering Corp. and various pipeline companies for their suggestions. ✦

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Source: **Emerson Process Management,** 8000 W. Florissant Ave., St. Louis, MO 63136.

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Source: **Gateway Safety Inc.,** 11111 Memphis Ave., Cleveland, OH 44144.

Services/Suppliers

Baker Hughes Inc.,

Houston, has appointed Russell J. Cancilla vice-president of HS&E and security. Previously, he served as chief security officer for Baker Hughes since June 2006. Prior to joining Baker Hughes, Cancilla worked for Innovene as vice-president and chief security officer. Before joining Innovene, he worked at BP PLC as vice-president, resources and capabilities for health, safety, security, and environment; and vice-president, real estate and management services. In 1991, Russ worked at the White House as the military aide (executive assistant) to the President. This was followed by his appointment as principal deputy assistant secretary for the US Department of Commerce's Foreign Commercial Service. Cancilla has a bachelor's degree in criminology and a graduate degree in operations management. He is a graduate of the FBI National Academy Executive Program.

Cancilla

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Aker Solutions,

Oslo, has acquired the remaining 50% of shares in WIRTH Maschinen & Bohrgeräte Fabrik GmbH, bringing its ownership to 100%, pending antitrust clearance. In August 2007, Aker Solutions acquired 50% of the shares in WIRTH, with an option to buy the remainder.

WIRTH, Erkelenz, Germany, is a privately held supplier of drilling equipment.

Aker Solutions is a unit of Aker Solutions ASA, a leading global provider of engineering and construction services, technology products, and integrated solutions to the oil and gas, refining and chemicals, mining and metals, and power generation industries.

GEP,

Paris, has elected Jean Ropers president of the French oil and service and supply company association. He is a graduate of Lyon-based INSA and Rennes-based IAE. Ropers spent most of his career in Total SA's E&P division. He was director of Total's drilling/well operations department in the 1980s. Ropers was expatriated several times (Indonesia, Abu Dhabi) and was also seconded to ADCO, to a Total subsidiary, and to Sonatrach. He rounded off his Total career at the end of 2004 as senior vice-president of operations in its development/production division. In 2005, Ropers was appointed president of CEP&M (Committee for Offshore Oil Studies). He then was named vice-president of GEP in 2007 and president of the GEP-led CITEPH Program that funds technological innovation in oil E&P.

Ropers

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Imports of crude and products

	Districts 1–4		District 5		Total US		
	2-13 2009	2-6 2009	2-13 2009	2-6 2009	2-13 2009	2-6 2009	*2-15 2008
	1,000 b/d						
Total motor gasoline	811	1,174	15	144	826	1,318	827
Mo. gas. blending comp.	670	866	15	144	685	1,010	394
Distillate	477	146	0	0	477	146	381
Residual	325	460	139	0	464	460	404
Jet fuel–kerosine	16	111	7	0	23	111	71
Propane–propylene	154	254	47	12	201	266	174
Other	83	(100)	(55)	(24)	28	(124)	1,319
Total products	**2,536**	**2,911**	**168**	**276**	**2,704**	**3,187**	**3,570**
Total crude	**7,761**	**8,682**	**1,032**	**970**	**8,793**	**9,652**	**10,102**
Total imports	**10,297**	**11,593**	**1,200**	**1,246**	**11,497**	**12,839**	**13,672**

*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

	*2-20-09	*2-22-08	Change	Change, %
	$/bbl			
SPOT PRICES				
Product value	48.64	109.83	–61.19	–55.7
Brent crude	41.40	98.76	–57.36	–58.1
Crack spread	7.25	11.07	–3.82	–34.5
FUTURES MARKET PRICES				
One month				
Product value	47.29	110.81	–63.52	–57.3
Light sweet crude	36.99	99.45	–62.46	–62.8
Crack spread	10.30	11.36	–1.06	–9.4
Six month				
Product value	51.76	112.04	–60.28	–53.8
Light sweet crude	45.29	97.41	–52.12	–53.5
Crack spread	6.46	14.63	–8.17	–55.8

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

Purvin & Gertz LNG netbacks—Feb. 20, 2009

Receiving terminal	Liquefaction plant					
	Algeria	Malaysia	Nigeria	Austr. NW Shelf	Qatar	Trinidad
	$/MMbtu					
Barcelona	11.05	9.07	10.28	8.97	9.61	10.21
Everett	4.12	2.33	3.83	2.45	2.80	4.35
Isle of Grain	4.54	2.44	4.03	2.33	3.07	4.05
Lake Charles	2.05	0.49	1.87	0.62	0.75	2.54
Sodegaura	5.27	7.67	5.56	7.42	6.81	4.10
Zeebrugge	8.28	4.92	7.69	4.81	6.01	7.75

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		Jet fuel, kerosine	Fuel oils		Propane–propylene
		Total	Blending comp.[1]		Distillate	Residual	
	1,000 bbl						
PADD 1	13,145	59,953	38,074	9,851	51,207	13,170	2,259
PADD 2	84,026	54,489	21,379	8,064	34,793	1,136	12,473
PADD 3	183,507	69,231	39,557	13,091	38,275	16,052	24,435
PADD 4	14,797	6,854	2,392	419	3,394	275	[1]1,263
PADD 5	55,155	28,137	23,793	9,532	13,083	5,687	—
Feb. 13, 2009	**350,630**	**218,664**	**125,195**	**40,957**	**140,752**	**36,320**	**40,430**
Feb. 6, 2009	**350,768**	**217,559**	**123,107**	**41,000**	**141,565**	**35,050**	**43,209**
Feb. 15, 2008[2]	**305,274**	**230,264**	**114,486**	**39,803**	**122,527**	**36,915**	**33,987**

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

Refinery report—Feb. 13, 2009

District	REFINERY OPERATIONS		REFINERY OUTPUT				
	Gross inputs	Crude oil inputs	Total motor gasoline	Jet fuel, kerosine	Fuel oils		Propane–propylene
					Distillate	Residual	
	1,000 b/d						
PADD 1	1,328	1,357	2,314	82	437	84	72
PADD 2	3,256	3,226	2,176	223	944	51	203
PADD 3	6,686	6,527	2,502	581	2,102	229	654
PADD 4	541	534	298	30	171	10	[1]148
PADD 5	2,686	2,499	1,475	380	493	145	—
Feb. 13, 2009	**14,497**	**14,143**	**8,765**	**1,296**	**4,147**	**519**	**1,077**
Feb. 6, 2009	**14,370**	**14,127**	**8,492**	**1,367**	**4,142**	**513**	**1,034**
Feb. 15, 2008[2]	**14,562**	**14,464**	**8,840**	**1,448**	**4,010**	**610**	**1,080**
	17,621 Operable capacity		**82.3% utilization rate**				

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

OGJ GASOLINE PRICES

	Price ex tax 2-18-09	Pump price* 2-18-09	Pump price 2-20-08
	¢/gal		
(Approx. prices for self-service unleaded gasoline)			
Atlanta	144.8	191.3	308.0
Baltimore	147.4	189.3	294.5
Boston	145.6	187.5	304.2
Buffalo	132.4	193.3	328.6
Miami	138.9	190.5	322.8
Newark	149.7	182.3	289.6
New York	123.2	184.1	304.2
Norfolk	143.9	182.3	287.0
Philadelphia	145.8	196.5	309.9
Pittsburgh	155.6	206.3	306.1
Wash., DC	167.4	205.8	306.0
PAD I avg	145.0	191.7	305.5
Chicago	151.3	215.7	338.2
Cleveland	152.4	198.8	297.2
Des Moines	150.3	190.7	295.1
Detroit	138.4	197.8	302.9
Indianapolis	137.4	196.8	300.0
Kansas City	148.7	184.7	287.1
Louisville	152.7	193.6	301.9
Memphis	143.0	182.8	287.4
Milwaukee	143.5	194.8	298.1
Minn.-St. Paul	144.7	188.7	294.1
Oklahoma City	138.2	173.6	283.7
Omaha	139.4	184.7	299.5
St. Louis	145.8	181.8	276.8
Tulsa	141.3	176.7	283.3
Wichita	137.4	180.8	281.2
PAD II avg	144.3	189.5	295.1
Albuquerque	148.2	184.6	290.2
Birmingham	143.3	182.6	295.7
Dallas-Fort Worth	141.3	179.7	287.9
Houston	137.2	175.6	291.7
Little Rock	146.8	187.0	287.8
New Orleans	144.6	183.0	292.2
San Antonio	142.9	181.3	287.0
PAD III avg	143.5	182.0	290.4
Cheyenne	137.4	169.8	276.2
Denver	143.8	184.2	288.2
Salt Lake City	141.9	184.8	297.7
PAD IV avg	141.1	179.6	287.4
Los Angeles	145.5	212.6	307.8
Phoenix	158.8	196.2	286.1
Portland	177.8	221.2	298.4
San Diego	160.1	227.2	314.7
San Francisco	165.1	232.2	340.3
Seattle	164.9	220.8	309.3
PAD V avg	162.0	218.4	309.4
Week's avg.	**146.6**	**192.2**	**298.5**
Jan. avg.	**131.5**	**177.1**	**304.5**
Dec. avg.	**125.5**	**171.1**	**300.6**
2009 to date	**136.6**	**182.2**	—
2008 to date	**259.3**	**302.8**	—

*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

	2-13-09 ¢/gal		2-13-09 ¢/gal
Spot market product prices			
Motor gasoline (Conventional-regular)		Heating oil No. 2	
New York Harbor	125.60	New York Harbor	131.13
Gulf Coast	122.20	Gulf Coast	124.50
Los Angeles	170.10	Gas oil	
Amsterdam-Rotterdam-Antwerp (ARA)	116.85	ARA	129.77
Singapore	155.33	Singapore	117.14
Motor gasoline (Reformulated-regular)		Residual fuel oil	
New York Harbor	121.35	New York Harbor	89.00
Gulf Coast	123.85	Gulf Coast	103.29
Los Angeles	176.10	Los Angeles	113.07
		ARA	88.11
		Singapore	98.59

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

BAKER HUGHES RIG COUNT

	2-20-09	2-22-08
Alabama	2	3
Alaska	7	11
Arkansas	49	43
California	24	33
Land	23	32
Offshore	1	1
Colorado	69	112
Florida	0	0
Illinois	1	0
Indiana	1	1
Kansas	17	10
Kentucky	11	8
Louisiana	151	143
N. Land	76	48
S. Inland waters	5	19
S. Land	23	28
Offshore	47	48
Maryland	0	0
Michigan	0	1
Mississippi	12	9
Montana	4	10
Nebraska	0	0
New Mexico	46	65
New York	3	7
North Dakota	62	57
Ohio	8	12
Oklahoma	130	201
Pennsylvania	24	19
South Dakota	0	1
Texas	564	866
Offshore	5	5
Inland waters	0	3
Dist. 1	8	21
Dist. 2	30	34
Dist. 3	44	64
Dist. 4	45	90
Dist. 5	126	178
Dist. 6	92	128
Dist. 7B	14	30
Dist. 7C	40	43
Dist. 8	69	131
Dist. 8A	20	16
Dist. 9	24	44
Dist. 10	47	79
Utah	25	42
West Virginia	25	28
Wyoming	51	74
Others—NV-5; TN-4; VA-4; WA-1	14	14
Total US	**1,300**	**1,771**
Total Canada	**401**	**647**
Grand total	**1,701**	**2,418**
US Oil rigs	269	333
US Gas rigs	118	1,430
Total US offshore	54	54
Total US cum. avg. YTD	**1,623**	**1,757**

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	2-20-09 Percent footage*	Rig count	2-22-08 Percent footage*
0-2,500	50	—	73	5.4
2,501-5,000	67	49.2	109	52.2
5,001-7,500	171	21.6	213	21.1
7,501-10,000	276	3.6	446	4.4
10,001-12,500	260	2.6	436	4.3
12,501-15,000	251	0.3	307	0.3
15,001-17,500	136	—	94	—
17,501-20,000	77	—	74	—
20,001-over	41	—	38	—
Total	**1,329**	**6.6**	**1,790**	**8.1**
INLAND	15		32	
LAND	1,262		1,706	
OFFSHORE	52		52	

*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]2-20-09	[2]2-22-08
	1,000 b/d	
(Crude oil and lease condensate)		
Alabama	21	22
Alaska	730	707
California	662	661
Colorado	63	67
Florida	6	6
Illinois	28	24
Kansas	108	106
Louisiana	1,360	1,271
Michigan	16	16
Mississippi	60	58
Montana	91	86
New Mexico	164	161
North Dakota	190	137
Oklahoma	174	171
Texas	1,355	1,330
Utah	58	55
Wyoming	147	144
All others	69	70
Total	**5,302**	**5,092**

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

US CRUDE PRICES

	2-20-09 $/bbl*
Alaska-North Slope 27°	33.47
South Louisiana Sweet	38.75
California-Kern River 13°	29.65
Lost Hills 30°	39.25
Wyoming Sweet	24.94
East Texas Sweet	34.75
West Texas Sour 34°	27.50
West Texas Intermediate	35.25
Oklahoma Sweet	35.25
Texas Upper Gulf Coast	29.25
Michigan Sour	27.25
Kansas Common	34.50
North Dakota Sweet	27.00

*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]	2-13-09
United Kingdom-Brent 38°	45.17
Russia-Urals 32°	44.47
Saudi Light 34°	40.31
Dubai Fateh 32°	45.07
Algeria Saharan 44°	46.63
Nigeria-Bonny Light 37°	48.79
Indonesia-Minas 34°	47.54
Venezuela-Tia Juana Light 31°	39.21
Mexico-Isthmus 33°	39.10
OPEC basket	44.00
Total OPEC[2]	42.99
Total non-OPEC[2]	43.09
Total world[2]	43.04
US imports[3]	40.48

[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]

	2-13-09	2-6-09	2-13-08	Change, %
	bcf			
Producing region	737	721	617	**19.4**
Consuming region east	947	972	986	**-4.0**
Consuming region west	312	327	216	**44.4**
Total US	**1,996**	**2,020**	**1,819**	**9.7**
	Nov. 08	**Nov. 07**	**Change, %**	
Total US[2]	**3,346**	**3,442**	**–2.8**	

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

Statistics

PACE REFINING MARGINS

	Dec. 2008	Jan. 2009	Feb. 2009	Feb. 2008	– 2009 vs. 2008 – Change	Change, %
			$/bbl			
US Gulf Coast						
West Texas Sour	5.77	10.08	12.10	12.06	0.04	0.5
Composite US Gulf Refinery	6.68	10.33	9.69	12.27	–2.59	–26.0
Arabian Light	7.37	12.68	11.94	9.17	2.77	27.6
Bonny Light	–0.94	2.93	2.32	4.04	–1.73	–95.2
US PADD II						
Chicago (WTI)	11.15	16.08	14.52	4.33	10.19	220.5
US East Coast						
NY Harbor (Arab Med)	8.88	17.17	15.30	8.00	7.31	70.9
East Coast Comp-RFG	4.82	11.88	12.54	6.51	6.03	89.8
US West Coast						
Los Angeles (ANS)	9.30	14.32	9.78	11.64	–1.87	–35.4
NW Europe						
Rotterdam (Brent)	3.34	4.30	4.69	1.46	3.23	747.9
Mediterranean						
Italy (Urals)	3.49	5.47	4.47	5.35	–0.87	–30.7
Far East						
Singapore (Dubai)	–0.29	2.09	4.28	5.22	–0.94	–30.9

Source: Jacobs Consultancy Inc.
Data available in OGJ Online Research Center.

US NATURAL GAS BALANCE DEMAND/SUPPLY SCOREBOARD

	Nov. 2008	Oct. 2008	Nov. 2007	Nov. 2008-2007 change	Total YTD 2008	Total YTD 2007	YTD 2008-2007 change
				bcf			
DEMAND							
Consumption	1,866	1,634	1,828	38	20,869	20,655	214
Addition to storage	194	334	141	53	3,226	3,343	–117
Exports	82	68	87	–5	878	721	157
Canada	50	36	58	–8	492	411	81
Mexico	28	28	26	2	340	266	74
LNG	4	4	3	1	46	44	2
Total demand	**2,142**	**2,036**	**2,056**	**86**	**24,973**	**24,719**	**254**
SUPPLY							
Production (dry gas)	1,726	1,727	1,619	107	18,769	17,401	1,368
Supplemental gas	5	5	6	–1	49	59	–10
Storage withdrawal	251	91	262	–11	2,752	2,692	60
Imports	311	320	341	–30	3,587	4,211	–624
Canada	282	287	311	–29	3,230	3,411	–181
Mexico	6	6	3	3	36	50	–14
LNG	23	27	27	–4	321	750	–429
Total supply	**2,293**	**2,143**	**2,228**	**65**	**25,157**	**24,363**	**794**

NATURAL GAS IN UNDERGROUND STORAGE

	Nov. 2008	Oct. 2008	Sept. 2008	Nov. 2007	Change
			bcf		
Base gas	4,231	4,235	4,231	4,238	–7
Working gas	3,346	3,399	3,163	3,442	–96
Total gas	**7,577**	**7,634**	**7,394**	**7,680**	**–103**

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

WORLDWIDE NGL PRODUCTION

	Nov. 2008	Oct. 2008	11 month average production 2008	11 month average production 2007	Change vs. previous year Volume	Change vs. previous year %
			1,000 b/d			
Brazil	84	85	87	84	2	2.7
Canada	620	628	638	687	–49	–7.2
Mexico	349	362	365	397	–32	–8.0
United States	1,734	1,745	1,797	1,772	26	1.4
Venezuela	200	200	200	200	—	—
Other Western Hemisphere	189	201	195	204	–9	–4.5
Western Hemisphere	**3,176**	**3,221**	**3,282**	**3,344**	**–62**	**–1.9**
Norway	286	270	275	283	–9	–3.1
United Kingdom	162	188	164	142	22	15.4
Other Western Europe	9	8	10	10	–1	–6.1
Western Europe	**457**	**467**	**448**	**436**	**12**	**2.9**
Russia	421	424	422	426	–4	–1.0
Other FSU	150	150	150	160	–10	–6.3
Other Eastern Europe	15	15	15	15	1	3.7
Eastern Europe	**586**	**589**	**587**	**601**	**–14**	**–2.3**
Algeria	365	363	358	341	16	4.8
Egypt	70	70	70	70	—	—
Libya	80	80	80	80	—	—
Other Africa	120	118	127	127	1	0.6
Africa	**635**	**631**	**635**	**618**	**17**	**2.8**
Saudi Arabia	1,453	1,440	1,441	1,440	1	0.1
United Arab Emirates	250	250	250	250	—	—
Other Middle East	886	886	881	870	10	1.2
Middle East	**2,589**	**2,576**	**2,572**	**2,560**	**12**	**0.5**
Australia	64	66	66	74	–8	–11.3
China	650	650	634	614	20	3.2
India	—	—	—	3	–3	–100.0
Other Asia-Pacific	178	179	179	177	3	1.4
Asia-Pacific	**892**	**895**	**879**	**868**	**10**	**1.2**
TOTAL WORLD	**8,335**	**8,379**	**8,402**	**8,427**	**–25**	**–0.3**

Totals may not add due to rounding.
Source: Oil & Gas Journal.
Data available in OGJ Online Research Center.

OXYGENATES

	Nov. 2008	Oct. 2008	Change	YTD 2008	YTD 2007	Change
			1,000 bbl			
Fuel ethanol						
Production	20,054	20,048	6	199,585	139,255	60,330
Stocks	15,227	15,192	35	15,227	11,194	4,033
MTBE						
Production	1,236	1,539	–303	16,056	21,024	–4,968
Stocks	649	762	–113	649	1,216	–567

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

US HEATING DEGREE-DAYS

	Jan. 2009	Jan. 2008	Normal	2009 % change from normal	Total degree-days July 1 through Jan. 31 2009	Total degree-days July 1 through Jan. 31 2008	Total degree-days July 1 through Jan. 31 Normal	% change from normal
New England	1,417	1,131	1,246	13.7	3,898	3,504	3,708	5.1
Middle Atlantic	1,288	1,024	1,158	11.2	3,459	2,964	3,349	3.3
East North Central	1,468	1,217	1,302	12.7	4,042	3,478	3,774	7.1
West North Central	1,456	1,365	1,390	4.7	4,218	3,899	4,085	3.3
South Atlantic	669	609	643	4.0	1,774	1,504	1,726	2.8
East South Central	822	825	820	0.2	2,272	1,991	2,230	1.9
West South Central	527	582	593	–11.1	1,414	1,365	1,498	–5.6
Mountain	849	1,009	951	–10.7	2,768	2,938	3,098	–10.7
Pacific	477	626	564	–15.4	1,571	1,848	1,817	–13.5
US average*	**953**	**883**	**917**	**3.9**	**2,676**	**2,455**	**2,656**	**0.8**

*Excludes Alaska and Hawaii.
Source: DOE Monthly Energy Review.
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Hasty taxes might not be what people of the future need

Raising taxes to fund uncertain benefits far in the future can be worse than rising sea levels.

The politics of global warming largely assumes that people have a moral duty to act on behalf of future generations, which obviously have no way now to express their wishes.

Yet acting now presupposes knowledge about those wishes. It also denies people

The Editor's Perspective

by Bob Tippee, Editor

of the future options and wherewithal that might make future environmental responses more efficient that anything undertaken immediately.

In a report distributed by the National Center for Policy Analysis, David R. Henderson, a research fellow at the Hoover Institution, says immediate action relies on technology inferior to what should become available in the future.

Furthermore, money spent on immediate responses might instead be invested so as to increase national wealth. The forgone return represents opportunity cost.

"Investments people make today are likely to increase the wealth of their descendants, giving future generations greater resources to exercise their preferences regarding environmental protection," Henderson says. "The higher the rate of return that can be earned by investing a dollar today, the more wealth future generations are deprived of if the money is spent now."

If the social cost 100 years from now of carbon dioxide emitted into the atmosphere is $300/ton, Henderson says, citing data from Kevin Murphy of the University of Chicago, the appropriate immediate tax, if the prevailing interest rate is 6%/year, is 88¢/ton. If the prevailing interest rate is 4%/year, the appropriate tax now is $5.94/ton.

Those values equate to 0.3¢/gal and 2¢/gal of gasoline, the federal tax on which is 18.4¢/gal.

Modern politics won't find much use for the suggestion that US motorists already pay fuel taxes sufficient to cover a generous assumption about the social costs of carbon dioxide emissions a century in the future.

But Henderson doesn't stop there in his challenge to political orthodoxy.

Noting that generations tend to be wealthier than their forebears, he says, "If the government taxes people today explicitly or through regulation to reduce climate change 200 years from now, the government will be taxing the poor to help the rich."

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

Market Journal

by Sam Fletcher, Senior Writer

Crude makes biggest gain of year

Crude prices shot up Feb. 19 in the biggest 1-day gain since 2008, carrying petroleum products with it, but energy prices retreated in the next session as markets readjusted to continued low demand.

Benchmark US light, sweet crudes jumped by $4.86 to $39.48/bbl as the Energy Information Administration reported commercial US crude inventories dipped 200,000 bbl to 350.6 million bbl in the week ended Feb. 13. The Wall Street consensus was for an increase of 3.2 million bbl. "For the first time in months, we have seen positive inventory data for crude," said analysts at Pritchard Capital Partners LLC in New Orleans.

"This is the third time crude has tested the $35/bbl price level and bounced. The price action of crude and inventory data imply the [production cuts by the Organization of Petroleum Exporting Countries] are beginning to work" with oil prices at $35-45/bbl, they said.

The March crude contract expired Feb. 20 at $38.94/bbl while the new front-month April contract declined slightly to $40.03/bbl on the New York Mercantile Exchange.

In Houston, analysts with Raymond James & Associates Inc. predicted "a high level of volatility will persist in commodity prices" as economic problems continue to undercut demand, "which has dropped steeper and faster than supply has been removed." They said, "The unstable markets are a result of crude searching for a price where sufficient demand comes off the sidelines and absorbs enough supply to produce a true equilibrium price. Since we are uncertain on the timing of a global recovery that will ultimately translate into a rebounding level of gross domestic product on a worldwide basis, we believe that the existing, steep contango market will perpetuate as the front end of the curve is depressed by a lack of industrialized growth and an unknown amount of excess crude hovering over the market."

OPEC outlook

However, analysts at the Centre for Global Energy Studies (CGES), London, said, "Although global oil demand has fallen rapidly, OPEC supply fell even faster in recent months, removing the oversupply that emerged in the second half of 2008. It is still unclear, though, whether the organization has actually turned lifters away, or simply let its production follow falling demand from its customers."

Reduction of Saudi Arabia's crude production is nearing that country's imposed limit to satisfy its need for associated gas. Meanwhile, CGES analysts said, "Several other members have yet to make any significant cuts in their own production. By January, OPEC had implemented some 2.3 million b/d of its agreed 4.2 million b/d cut, with further reductions expected in February and March. Implementing the cuts in full could tighten the market, but any price recovery would likely be short-lived, triggering a further weakening of demand, at least until the global economy begins to pick up again."

CGES said it will be "almost impossible" for OPEC to raise oil prices "anywhere near its desired level of $75/bbl" in this economic climate. "It may be that the best it can do is to cut production in line with demand to prevent further falls in the oil price until the economy begins to recover," CGES analysts said.

Crude inventories at the key Cushing, Okla., delivery point remained flat Feb. 13 while oil stocks along the US Gulf Coast increased by 2.1 million bbl. "Keep in mind that the deliveries to the Strategic Petroleum Reserve will increase during March and should eat into either the US Gulf Coast stocks or the floating storage stocks," said Olivier Jakob at Petromatrix, Zug, Switzerland.

Meanwhile, he said data from various sources indicate that destruction of gasoline demand might be starting to bottom. According to EIA, the 4-week average US demand for gasoline average is now flat to last year (on the revised basis) and gasoline implied demand is up by 0.8%. The US Highway Administration indicated the amount of miles driven by US motorists during December was down only 1.6%, an improvement over the declines of 4-5% in recent months. The Northeast US was actually up 0.5% from a year ago. "This improvement comes despite the rough weather driving conditions and higher unemployment rate and needs to be taken as a warning flag that price does matter for gasoline demand," Jakob said.

The latest MasterCard [Spending Pulse] report showed gasoline sales at the pump to be up 1% in the 4 weeks to Feb. 13, providing a base case that the decline in US gasoline demand has bottomed, Jakob said.

(Online Feb. 23, 2009; author's e-mail: samf@ogjonline.com)

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Abstracts must have a title and list all authors. Please provide full contact information for the primary contact author (company affiliation, telephone, and email address). Please designate who will be the speaker. Presentations must be of interest and of practical value to executives, managers, engineers, and operations personnel engaged in the unconventional oil and gas industry. Presentations will be selected based on a review of abstracts by the Advisory Board. Abstracts must not be commercial in nature.

CONFERENCE FOCUS AREAS

- Reservoir Management
- Well Control
- Drilling Methods
- Field Geology
- Workforce and Demographics
- Market Dynamics
- Field Economics
- Shales
- Transportation and Logistics
- Risk and Reliability
- Regulatory Concerns
- Recovery Methods
- Coal Bed Methane
- Tight Gas Sands
- Field Development
- Frontier Areas
- Sustainability Issues
- Completion Technologies
- Technology Qualification and Implementation
- Well Stimulation
- Project Execution and Management
- Produced Water Handling
- Geological Methods

INFORMATION FOR PRESENTERS

1. Final selection of abstracts will be determined by the Emerging Unconventional Resources Conference & Exhibition 2009 Advisory Board. The abstracts should be completely original, and address issues as outlined in the conference focus areas. Presentations should avoid any commercialism.

2. You are allowed 20-minutes to present your presentation. A 10-minute discussion will follow each presentation.

3. Authors of abstracts selected for the Emerging Unconventional Resources Conference & Exhibition 2009 program will be notified by **mid May 2009**. Full speaker instructions and guidelines will be included in the notification of abstract acceptance.

4. Complimentary conference registration will be provided only for presentation speakers (One speaker per presentation). Emerging Unconventional Resources Conference & Exhibition 2009 assumes no obligation for expenses incurred by authors for travel, lodging, food, or other expenses.

FOR MORE INFORMATION CONTACT:

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