Week of Feb. 12, 2007/US$10.00

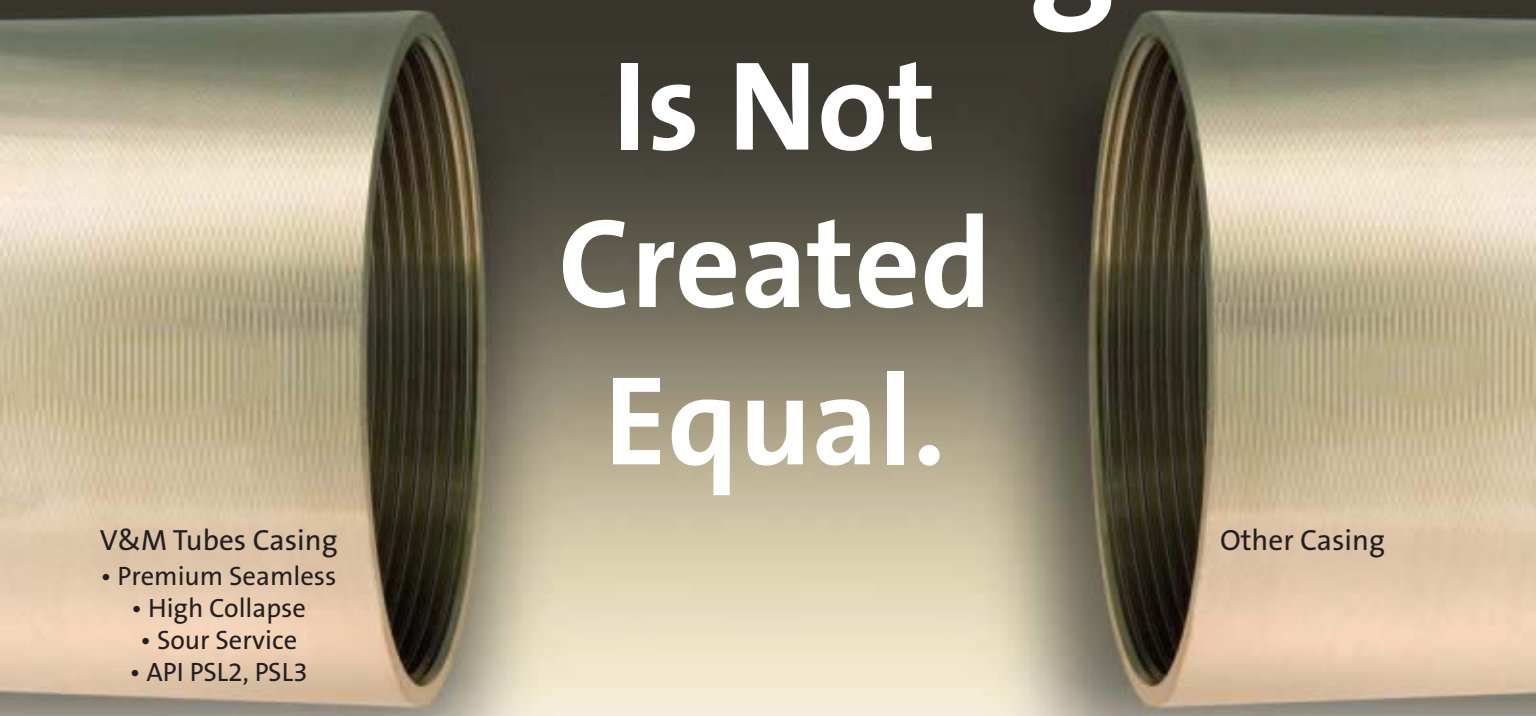
PennWell

OIL&GAS JOURNAL

International Petroleum News and Technology / www.ogjonline.com

Practical Drilling Technology

All Casing Is Not Created Equal.



V&M Tubes - Seamless Tubulars That Exceed Exacting Specifications.

Vallourec & Mannesmann Tubes is the leading producer of seamless OCTG in the world, with the most comprehensive range of ODs, walls and grades available. V&M Tubes manufactures seamless heat-treated and carbon tubulars in sizes ranging from 2-3/8" to 26", with plain end, API and premium threads.

V&M Tubes not only provides seamless pipe, but also seamless processes to include:

- Best-in-class innovation in tubular and thread design.
- USA domestic producer ***and*** global supplier.
- Entirely dedicated to seamless pipe.

For your next tubular order, specify casing from V&M Tubes — world leader in seamless tubulars.

www.vmtubes.com
www.vmstar.com

V&M
VALLOUREC & MANNESMANN TUBES
O&G Division

OIL&GAS JOURNAL®

Feb. 12, 2007
Volume 105.6

PRACTICAL DRILLING TECHNOLOGY

REGULAR FEATURES

COVER

Solar panels power lights atop the front leg of GlobalSantaFe Corp.'s GSF Constellation I jack up working off Trinidad & Tobago (cover). Delivered in 2003 by the PPL shipyard in Singapore, the independent leg cantilever rig is Friede & Goldman's JU 2000 design. Oil & Gas Journal's special report on practical drilling technology begins on p. 43 with details of a new particle impact drilling system being tested in the US through hard rock intervals in different regions. A report on the first successful run of an expandable monobore liner extension system, from BP PLC and Baker Hughes, follows on p. 49. The image above shows pipe and machinery at a drillsite in Washington state's Columbia River basin. Photos by Nina M. Rach.

OIL&GAS JOURNAL online research center™

The full text of Oil & Gas Journal is available through OGJ Online, Oil & Gas Journal's internet-based energy information service, at http://www.ogjonline.com. For information, send an e-mail message to webmaster@ogjonline.com.

Engineering Your Competitive Edge

We found a way to keep oil rigs drilling 10 times longer.
Will anyone else? Don't hold your breath.

What problem can we solve for you? One drilling operation was tired of bringing up nothing but worn bearings. So they asked us to extend the life of these critical components. Today they average 300 hours of uninterrupted operation, up from just 30. Our metallurgical engineers can find similarly innovative solutions to the problems you're facing, then deploy and support them globally. Find out more at kennametal.com.

KENNAMETAL

General Interest

Exploration & Development

Drilling & Production

Processing

Transportation

Copyright 2007 by PennWell Corporation (Registered in U.S. Patent & Trademark Office). All rights reserved. Oil & Gas Journal or any part thereof may not be reproduced, stored in a retrieval system, or transcribed in any form or by any means, electronic or mechanical, including photocopying and recording, without the prior written permission of the Editor. Permission, however, is granted for employees of corporations licensed under the Annual Authorization Service offered by the Copyright Clearance Center Inc. (CCC), 222 Rosewood Drive, Danvers, Mass. 01923, or by calling CCC's Customer Relations Department at 978-750-8400 prior to copying. Requests for bulk orders should be addressed to the Editor. **Oil & Gas Journal (ISSN 0030-1388)** is published 48 times per year by PennWell Corporation, 1421 S. Sheridan Rd., Tulsa, Okla., Box 1260, 74101. Periodicals postage paid at Tulsa, Okla., and at additional mailing offices. Oil & Gas Journal and OGJ are registered trademarks of PennWell Corporation. **POSTMASTER:** send address changes, letters about subscription service, or subscription orders to P.O. Box 3497, Northbrook, IL 60065, or telephone (800) 633-1656. Change of address notices should be sent promptly with old as well as new address and with ZIP code or postal zone. Allow 30 days for change of address. Oil & Gas Journal is available for electronic retrieval on Oil & Gas Journal Online (www.ogjonline.com) or the NEXIS® Service, Box 933, Dayton, Ohio 45401, (937) 865-6800. **SUBSCRIPTION RATES** in the US: 1 yr. $60, 2 yr. $85, 3 yr. $109; Latin America and Canada: 1 yr. $64, 2 yr. $100, 3 yr. $135; Russia and republics of the former USSR, 1 yr. 1,200 rubles; all other countries: 1 yr. $109, 2 yr. $175, 3 yr. $250, 1 yr. premium digital $59 worldwide. These rates apply only to individuals holding responsible positions in the petroleum industry. Single copies are $10 each except for 100th Anniversary issue which is $20. Publisher reserves the right to refuse non-qualified subscriptions. Oil & Gas Journal is available on the Internet at http://www.ogjonline.com. (Vol. 105, No. 6) Printed in the US. GST No. 126813153. Publications Mail Agreement Number 602914. Return Undeliverable Canadian Addresses to: P.O. Box 1632, Windsor, ON N9A 7C9.

PennWell, Houston office
1700 West Loop South, Suite 1000, Houston, TX 77027
Telephone 713.621.9720/Fax 713.963.6285/Web site www.ogjonline.com
Editor Bob Tippee, bobt@ogjonline.com
Chief Editor-Exploration G. Alan Petzet, alanp@ogjonline.com
Chief Technology Editor-LNG/Gas Processing Warren R. True, warrent@ogjonline.com
Production Editor Guntis Moritis, guntism@ogjonline.com
Drilling Editor Nina M. Rach, ninar@ogjonline.com
Refining/Petrochemical Editor David N. Nakamura, davidn@ogjonline.com
Pipeline Editor Christopher E. Smith, chriss@ogjonline.com
Senior Editor-Economics Marilyn Radler, marilynr@ogjonline.com
Senior Editor Steven Poruban, stevenp@ogjonline.com
Senior Associate Editor Judy R. Clark, judyrc@ogjonline.com
Senior Writer Sam Fletcher, samf@ogjonline.com
Senior Staff Writer Paula Dittrick, paulad@ogjonline.com
Survey Editor Leena Koottungal, lkoottungal@ogjonline.com
Associate Editor Angel White, angelw@pennwell.com
Editorial Assistant Linda Barzar, lbarzar@pennwell.com

Petroleum Group President Michael Silber, msilber@pennwell.com
Vice-President/Group Publisher Bill Wageneck, billw@pennwell.com
Vice-President/Custom Publishing Roy Markum, roym@pennwell.com

PennWell, Tulsa office
1421 S. Sheridan Rd., Tulsa, OK 74112
PO Box 1260, Tulsa, OK 74101
Telephone 918.835.3161 / Fax 918.832.9290
Presentation/Equipment Editor Jim Stilwell, jims@ogjonline.com
Associate Presentation Editor Michelle Gourd, michelleg@pennwell.com
Statistics Editor Laura Bell, laurab@ogjonline.com
Illustrators Alana Herron, Kermit Mulkins, Mike Reeder, Kay Wayne
Editorial Assistant Donna Barnett, donnab@ogjonline.com
Production Director Charlie Cole

London
Tel +44 (0)208.880.0800
International Editor Uchenna Izundu, uchennai@pennwell.com

Washington
Tel 703.963.7707
Washington Correspondent Nick Snow, nsnow@cox.net

Los Angeles
Tel 310.595.5657
Senior Correspondent Eric Watkins, hippalus@yahoo.com

OGJ News
Please submit press releases via e-mail to: news@ogjonline.com

Subscriber Service
P.O. Box 2002, Tulsa OK 74101
Tel 1.800.633.1656 / 918.831.9423 / Fax 918.831.9482
E-mail ogjsub@pennwell.com
Circulation Manager Tommie Grigg, tommieg@pennwell.com

PennWell Corporate Headquarters
1421 S. Sheridan Rd., Tulsa, OK 74112

P.C. Lauinger, 1900-1988
Chairman Frank T. Lauinger
President/Chief Executive Officer Robert F. Biolchini

Member Audit Bureau of Circulations & American Business Media

Sealed junction multilateral systems.

Inspired by nature, perfected by Sperry Drilling Services.

With the greatest number of successful installations worldwide, Sperry Drilling Services' highly reliable sealed junction systems offer customers increased productivity without the cost, time or risk from drilling additional wells.

These robust sealed junction multilateral systems have it all: minimum installation trips, highest reliability, highest pressure rating, highest flow volume and tubing right through the junction.

For complete sealed junction multilateral system details, contact us at sperry@halliburton.com.

Unleash the energy.™

HALLIBURTON

Drilling, Evaluation and Digital Solutions

© 2007 Halliburton. All rights reserved.

OGJ Newsletter

Feb. 12, 2007

International news for oil and gas professionals
For up-to-the-minute news, visit www.ogjonline.com

General Interest — Quick Takes

Shell, Repsol may face probe over S. Pars deal

Repsol YFP SA and Royal Dutch Shell PLC may come under investigation by US authorities for an agreement the companies signed with National Iranian Oil Co.

"If there's an investment greater than a certain amount, as specified in US law, then our lawyers take a look at it and the policymakers take a look at it, and see if there's any further steps that we, as a government, take," said US Department of State spokesman Sean McCormack.

On Jan. 30, Iran reported the completion of a preliminary $10 billion deal with Repsol YPF and Shell to produce 16 million tonnes/year of LNG from Iran's South Pars field (OGJ Online, Jan. 30, 2007). Shell and Repsol YPF would each have 25% of the project, with NIOC holding 50%.

McCormack did not discuss any sanctions Repsol YPF and Shell might face if they went through with their agreement, but he suggested that a final decision on whether to proceed is expected in first quarter 2008.

Kurds say Iraq draft oil law not yet finalized

Kurdish officials have dismissed the idea that Iraq's main political factions have overcome their differences on a draft oil law and said a final agreement could be some time away.

The Kurdistan Regional Government (KRG) issued a statement saying the draft law has not been unanimously finalized and that statements to the contrary—attributed to an oil ministry spokesman—were inaccurate and misleading.

KRG attributed the remarks to a Jan. 17 article published by Reuters news service that quoted the ministry spokesman as saying, "The committee finalized the draft of the law last night [Jan. 16]. It was approved unanimously, and it will go before the cabinet early next week."

The Kurdish group acknowledged that the process of drafting the oil law is nearing completion but said important annexes to the law are still pending and that three associated laws must be drafted and approved before the whole package can be considered final.

KRG identified the additional laws as the revenue-sharing law, the Iraq National Oil Co. charter law, and a law to define the oil ministry's new role.

Under the draft law, KRG would be allowed to negotiate and sign new contracts within its region and to receive its share of Iraq's oil revenue, to be guaranteed and regulated by law.

The draft law also acknowledges that KRG is the competent authority to review its own previous contracts and make them consistent with the law.

KRG's announcement coincided with reports that South Korea will send a joint business-government delegation to Kurdistan to discuss future oil field developments.

The South Korean Ministry of Commerce, Industry, and Energy announced the trip, saying the delegation plans to meet with KRG's head and the minister of natural resources.

A ministry spokesman said the team is expected to review future oil field development endeavors and security conditions in the region.

Officials from the Ministry of Commerce, Industry, and Energy, the Ministry of Foreign Affairs and Trade, Korea National Oil Corp., GS-Caltex Corp., and SK Corp. will be in the 14-person delegation to Kurdistan Jan. 22-25.

Japan's Middle East oil imports fell 1% in 2006

Japanese imports of Middle East crude fell in 2006, dropping by 1% from 2005, when they represented 90.2% of the country's consumption.

The decline is attributed to efforts of government officials and domestic oil distributors that are eyeing new supply sources outside the Middle East, including Angola, Sudan, Russia, Azerbaijan, and Central Asia.

Nippon Oil Corp. and five other companies began sourcing supplies from the Sakhalin-1 oil and natural gas development project in Russia, while Idemitsu Kosan Co. recently signed an agreement to purchase crude oil from Azerbaijan.

In Angola, Japanese firms hold stakes in 13 different concessions, while in Sudan, reports say Japanese agencies have been negotiating for rights to oil concessions in the southern region of the country since 2005.

Last August, former Prime Minister Junichiro Koizumi took a 4-day trip to Kazakhstan and Uzbekistan with the aim of securing energy resources and boosting his country's presence in the two oil-producing Central Asian countries.

Russia, Algeria agree to energy cooperation

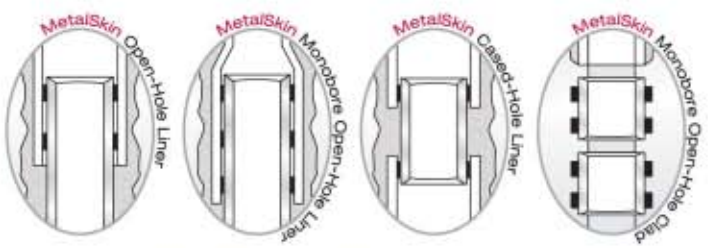
State oil firm Sonatrach is interested in exploring four Russian gas fields after discussing energy cooperation with representatives from OAO Gazprom in Algeria Jan 21.

According to Russian reports, Russia's Industry and Energy Minister Viktor Khristenko said that under an energy cooperation agreement signed last August, Gazprom had offered Sonatrach a variety of exploration rights for eight hydrocarbon fields. Khristenko said, "Gazprom has made its offer of assets exchange. Algeria has selected four fields and is working out its offers."

Algeria, in turn, is preparing a number of asset proposals for Gazprom to evaluate in an asset swap.

Russia and Algeria signed another energy cooperation accord Jan. 21 that will cover the entire petroleum chain from exploration to marketing. The reports added that Russia's OAO Rosneft and the

We put expandables in your comfort zone



THE SOLID CHOICE™

Drilling | Evaluation | Completion | Production | Intervention

© 2007 Weatherford International Ltd. All rights reserved.

MetalSkin® solid expandable systems reduce installation risks and well construction costs.

The full potential of solid expandable technology to revolutionize well construction is now being realized with new-generation *MetalSkin* open-hole and cased-hole solid expandables.

Greater peace of mind

- More running clearance to avoid ECD problems and differential sticking
- Collapsible expansion cones for easy contingency retrieval
- Fully qualified premium metal-to-metal connectors for high reliability
- Direct connection between work string and shoe for prevention of premature expansion
- Elastomer sealing elements for more positive zonal isolation
- Hydraulically assisted backup expansion system for reduced contingency costs
- Lower expansion pressure requirement and high-integrity circulation valve for enhanced expansion reliability

Custom-built around your needs

We custom-build *MetalSkin* expandables for your particular application. Our global expandables network includes two world-class manufacturing facilities and the industry's largest R&D, testing and training facilities.

Find out how you can mitigate the risks of drilling through trouble zones, install extra casing strings while conserving hole size, reduce well construction costs using less steel and cement, and much more.

Visit **www.weatherford.com/metalskin**, or contact your Weatherford representative.

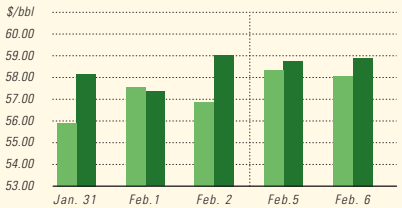
Our business is built **All Around You.**

For more information, please visit us at IADC in Amsterdam, stand number 9.

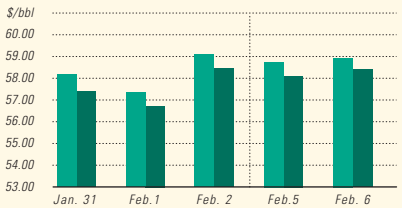
Weatherford®

Industry Scoreboard

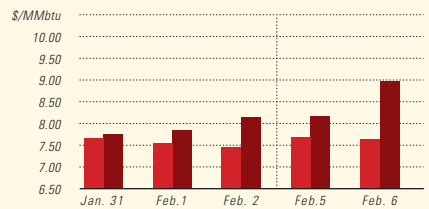
IPE BRENT / NYMEX LIGHT SWEET CRUDE



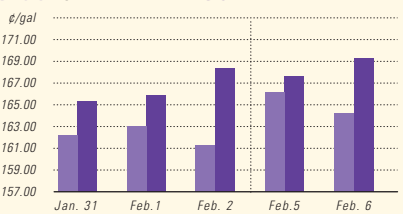
WTI CUSHING / BRENT SPOT



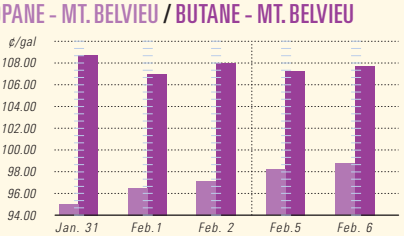
NYMEX NATURAL GAS / SPOT GAS - HENRY HUB



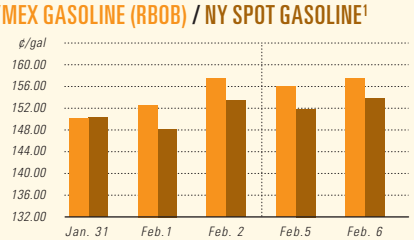
IPE GAS OIL / NYMEX HEATING OIL



PROPANE - MT. BELVIEU / BUTANE - MT. BELVIEU



NYMEX GASOLINE (RBOB) / NY SPOT GASOLINE[1]



[1]Nonoxygenated regular unleaded.

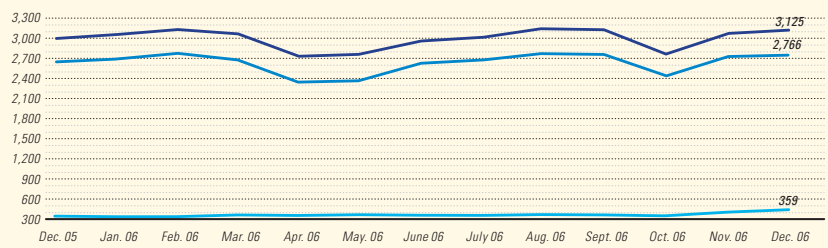
US INDUSTRY SCOREBOARD — 2/12

Latest week 2/2	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	8,983	8,735	2.8	9,013	8,781	2.6
Distillate	4,265	4,172	2.2	4,398	4,240	3.7
Jet fuel	1,608	1,530	5.1	1,620	1,534	5.6
Residual	599	854	–29.8	577	817	–29.4
Other products	4,761	4,834	–1.5	4,817	4,841	–0.5
TOTAL DEMAND	20,217	20,125	0.5	20,425	20,213	1.1
Supply, 1,000 b/d						
Crude production	5,308	5,047	5.2	5,316	5,048	5.3
NGL production	2,395	1,684	42.2	2,412	1,681	43.5
Crude imports	9,715	9,725	–0.1	9,576	9,794	–2.2
Product imports	3,281	3,831	–14.4	3,151	3,654	–13.8
Other supply[2]	1,008	1,264	–20.3	1,020	1,399	–27.1
TOTAL SUPPLY	21,706	21,552	0.7	21,476	21,575	–0.5
Refining, 1,000 b/d						
Crude runs to stills	14,914	14,789	0.8	14,854	14,698	1.1
Input to crude stills	15,353	15,074	1.8	15,279	15,039	1.6
% utilization	88.6	87.0	—	88.1	86.8	—

Latest week 2/2	Latest week	Previous week[1]	Change	Same week year ago[1]	Change	Change, %
Stocks, 1,000 bbl						
Crude oil	328,618	327,150	1,468	320,904	7,714	2.4
Motor gasoline	216,033	219,106	–3,073	219,499	–3,466	–1.6
Distillate	135,490	142,372	–6,882	136,276	–786	–0.6
Jet fuel	40,530	40,818	–288	43,490	–2,960	–6.8
Residual	45,093	45,839	–746	39,856	5,237	13.1
Stock cover (days)[3] **1/26**			**Change, %**		**Change, %**	
Crude	21.5	21.1	1.9	21.6	–0.5	
Motor gasoline	24.7	24.2	2.1	24.7	—	
Distillate	33.7	35.2	–4.3	32.9	2.4	
Propane	31.8	33.0	–3.6	31.6	—	
Futures prices[4] **2/2**			**Change**		**Change**	**Change, %**
Light sweet crude, $/bbl	57.86	55.02	2.84	66.58	–8.72	–13.1
Natural gas, $/MMbtu	7.47	7.28	0.19	8.88	–1.41	–15.9

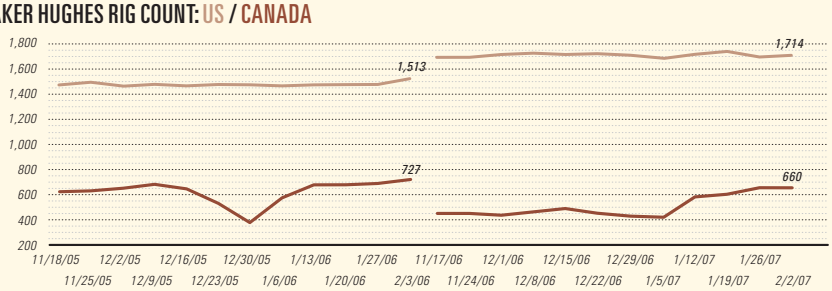
[1]Based on revised figures. [2]Includes other hydrocarbons and alcohol, refinery processing gain, and unaccounted for crude oil. [3]Stocks divided by average daily product supplied for the prior 4 weeks. [4]Weekly average of daily closing futures prices.
Sources: Energy Information Administration, American Petroleum Institute, 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

country's pipeline firm Stroytransgaz plan to invest $1.3 billion in Algerian oil production.

Rosneft and Stroytransgaz are joint partners with a 60% stake in Block 245 South exploration project in Algeria; Sonatrach has the other 40%. The Russian companies plan to apply for a production license for two fields that have reserves of 26.8 million bbl.

The European Union has expressed concern about a closer partnership between Russia and Algeria, as they are the biggest gas suppliers to the EU. Senior officials from both countries sought to reassure the EU that there was no need for alarm. "Russia and Algeria are reliable suppliers of energy," Khristenko said in the state-run Algerie Presse Service. ✦

Exploration & Development — *Quick Takes*

ExxonMobil to start exploration in Sirte basin

ExxonMobil Corp., under an exploration and production-sharing agreement with Libya's National Oil Co., will carry out exploration over four blocks in the Sirte basin, 100 miles off Libya.

The blocks are in Contract Area 20, which covers 2.5 million acres and was awarded to ExxonMobil in the third round of EPSA-IV licensing in December. The contract area lies in 4,000-6,500 ft of water.

ExxonMobil said it has completed an environmental impact assessment and has met with local stakeholders. The company also is shooting a 2D seismic survey in Contract Area 44 in the Cyrenaica basin off Libya.

Murphy has Sabah deepwater gas discovery

Murphy Oil Corp. said its Rotan-1 deepwater exploration well off Sabah, Malaysia, "encountered significant natural gas pay" in a single zone.

It is the company's first discovery in four exploration wells on the block (OGJ, Dec. 11, 2006, p. 15).

Subsurface details were scant, but the well went to TD 7,024 ft in 3,773 ft of water 80 km from shore and 50 km from the nearest producing field to the southeast. Petronas operates that field.

The well encountered sweet, dry gas, Murphy said. It gave no specific appraisal plan or timing but said a rig could return before the end of 2007.

Block H interests are Murphy 80% and Petronas 20%.

NE British Columbia find has gas in two zones

Wyn Developments Inc., Vancouver, BC, participated in a Mississippian Debolt gas discovery at Prophet River 75 miles south of Fort Nelson, BC.

The Prophet River d-60-E/94-G-15 exploratory well, operated by EnCana Corp., flowed gas at an initial unstabilized rate of up to 7.943 MMcfd from 4,440 ft. The wellsite is 11 miles northwest of Tommy Lakes Halfway gas field.

Pressures and gas returns, coupled with known seismic and geological data, suggest likely communication with wells drilled by other operators 5 km southeast and 24 km south, Wyn Developments said. Seismic data also suggest that the gas reservoir extends to the northwest.

The d-60-E well also encountered 75 ft of prospective pay in the Triassic Halfway formation at 1,870 ft. The gas shows, log analysis, and seismic data suggest that the Halfway formation extends northwest and also 7 km southeast to the c-97-D well that tested gas. Approximate TD is 8,530 ft.

The company sees the potential of seven more Mississippian and seven more Triassic Halfway development wells on 21 sq miles of Prophet River lands. Potential exists to dually produce from the zones.

If a summer development program is successful, production facilities could be in place in early 2008.

UK awards 150 licenses in 24th licensing round

The UK's Department for Trade and Industry (DTI) has named Maersk Oil North Sea UK Ltd., EnCore Oil PLC, and Ithaca Energy recipients of exploration and production licenses in the UK North Sea under the nation's 24th licensing round.

DTI had invited 104 companies, 17 of which are new to the UK continental shelf, to develop 246 blocks—continuing the record number of licences issued last year. DTI awarded 150 exploration and production licenses to the winners.

EnCore won 7 licenses covering 12 blocks and part blocks in the Central North Sea, East Irish Sea, Northern North Sea, and Southern North Sea. It expects to operate three of the licenses.

On Blocks 28/9 and 28/10b (split), the operator, Oilexco North Sea Ltd. will drill a well within 12 months, paying a small part of EnCore's well costs. EnCore will operate Block 14/30a and could drill a well, depending on what it learns from the nearby 14/30a-2 heavy oil discovery. On Blocks 113/29c and 113/30, Nautical Petroleum PLC and EnCore have a "drill or drop" option on a sizable offshore prospect that could be drilled from an onshore location.

Ithaca Energy secured 7 blocks, including Blocks 14/17(part) and 14/18c, which are adjacent to its Athena project in the Outer Moray Firth area. Block 14/18c contains a satellite discovery previously made by well 14/18-1, Athena East (formerly known as Bordeaux) that tested 1,250 b/d of oil in Upper Jurassic. "A water contact has not yet been established, which leads management to believe the project has upside potential. Block 14/18c may also contain upside with the extension of the Athena Lower Cretaceous discovery tested by well 14/18-15 drilled by Ithaca in 2006. Block 14/17(part) is immediately west and on trend with Athena," Ithaca said.

Maersk Oil was granted 15 licenses and will work with Eni SPA, Noble Energy Inc., BG Group, Nippon Oil Co., Chevron Corp., and Talisman Energy UK Group in different consortiums for different blocks.

Alistair Darling, secretary of state for DTI, said, "There are potentially more than 20 billion bbl of oil and gas still available to be produced, which is good news for industry, our economy, and energy supply."

However, DTI has delayed offering four blocks in Cardigan Bay (106/30, 107/21, and 107/22) and the Moray Firth to potential winners because it has received environmental challenges about

them as habitat areas for dolphins. DTI will carry out further checks before it takes any decision on them.

Results from the 24th licensing round have been delayed by over 3 months following environmental checks against some of the applications to comply with European environmental directives.

In 2006 at least 500,000 bbl were discovered in the North Sea, which the government said was the highest number of finds since 2001. "Around 40% of exploration wells have found potentially commercial oil and gas accumulations," it added. ✦

Drilling & Production — *Quick Takes*

Uzbekistan, oil firms ink PSA for Aral Sea section

Uzbekistan, along with a consortium of state-owned Uzbekneftegaz, Lukoil Overseas, Petronas, China National Petroleum Corp., and Korea National Oil Co., have signed a production-sharing agreement for the Uzbek section of the Aral Sea.

In a statement Lukoil said a 35-year PSA for the project was signed in Tashkent on Aug. 30, 2006, and that all members of the consortium have equal shares in the project.

A tender was issued in January for a 2D seismic survey of Uzbekistan's section of the Aral Sea, which covers 2,300 linear km—50% onshore and 50% offshore, including the tidelands and waters as deep as 40 m.

In addition to the seismic survey, the PSA calls for the drilling of two exploration wells over a 3-year period at a cost of $100 million.

Petrobras begins output from Cottonwood field

Petrobras America Inc. on Feb. 4 began producing from the first well in the Cottonwood gas-condensate field in the Gulf of Mexico—the first deepwater field outside of Brazil that Petrobras, as operator, has developed and put into production.

The field lies in 2,300 ft of water on Garden Banks Block 244 about 138 miles off Texas.

Gas production from the well is being increased initially to 40 MMscfd.

Petrobras has plans to put a second well on stream this month. This well is expected to raise the field's gas production to 70 MMscfd, combined with oil-condensate production that will boost field production to 20,000 boe/d.

OMV raises flow from Pakistan's Sawan gas field

OMV AG has increased gas production from its Sawan field in Pakistan to 400 MMscfd from 340 MMscfd under a $350 million investment plan. Pakistan's Sui Northern Pipelines Ltd. and Sui Southern Gas Co. intend to take the additional gas.

OMV, which operates the field, drilled additional wells in Sawan and modified the gas processing plant to boost production. OMV's share of output from Sawan and nearby Miano field is now 120 MMscfd of its previous 110 MMscfd.

Sawan is in Sindh Province in the central Indus basin, about 500 km from the port city of Karachi.

OMV is the largest international gas operator in Pakistan and supplies 16% of the country's gas.

Partners in Sawan field are OMV 19.74%, Pakistan Petroleum Ltd. 26.18%, Eni AEP Ltd. 23.68%, Government Holdings Private Ltd. 22.5%, and Moravske Naftove Doly AS 7.9%.

S. Texas gas productivity declining, report says

South Texas natural gas wells examined in a recent study are losing productivity, and rising costs of materials and labor are driving up operating costs, according to Ziff Energy Group.

The average well productivity of the fields studied fell by 25% during 2000-05. The 2005 average operating expense was 98¢/Mcf equivalent vs. 59¢/Mcf in 2000.

Ziff's South Texas benchmarking study included production primarily in Texas Railroad Commission Districts 2 and 4. Seven operating companies provided data on 25 fields in the study.

The fields analyzed produced 1 bcfd from more than 2,400 wells. Total annual operating costs of the fields came to $250 million.

AGR, Helix Energy awarded FPSO conversion job

AGR Group and Helix Energy Solutions Group Inc. will convert the 34,000 dwt Westralia fuel-supply ship into a floating production, storage, and offloading vessel. The partners bought the ship from the Australian government; its new name will be Shiraz.

The FPSO will be used in Southeast Asia as an early-production system or as an extended-production test vessel.

The partners have carried out an extensive feasibility study and front-end engineering design for the conversion will start immediately. ✦

Processing — *Quick Takes*

US petrochem production up, inventories down

US production of 15 petrochemicals in fourth quarter 2006 increased 14% to 48.2 billion lb, compared with production in fourth quarter 2005 of 42.4 billion lb of the same petrochemicals, said the National Petrochemical & Refiners Association in a recent report.

The fourth quarter 2006 production figure also represents a 3% decrease over third quarter 2006 production of 49.7 billion lb of the same 15 petrochemicals, said NPRA in its "Survey of Production and Inventory Report for Fourth Quarter 2006." The petrochemicals surveyed include olefins and aromatics.

From third quarter 2006 to fourth quarter 2006, production of two of the 15 petrochemicals increased.

Concerning petrochemical inventories, total fourth quarter 2006 inventories of seven petrochemicals was 5.7 billion lb, a 3% decrease compared with same quarter 2005 inventories of 5.9 billion lb, yet was an increase of 6% over third quarter 2006 inventories of 5.4 billion lb of the same petrochemicals.

Contracts let for Al-Jubail petrochemical complex

Saudi Kayan Petrochemical Co. (Saudi Kayan) on Jan. 24 let separate contracts to two companies for the construction of a polypropylene (PP) and a low-density polyethylene (LDPE) plant at its petrochemical complex, for which construction is slated to begin this month in Al-Jubail Industrial City, Saudi Arabia (OGJ Online, Dec. 11, 2006, Newsletter).

Samsung Engineering was awarded the contract to build the 350,000-tonne/year PP plant, and Simon Carves Ltd., UK, received the contract to build a 300,000-tonne/year LDPE plant.

The $2.2 billion complex, expected to be operational in December 2009, will have a capacity exceeding 4 million tonnes/year.

Saudi Kayan is a joint venture of Saudi Basic Industries Corp. 35% and Kayan Petrochemical Co. 20%. The remaining 45% will be offered for public subscription. ✦

Transportation — *Quick Takes*

IGI gas line to become operational in 2011

Italy and Greece are planning to build a 220-km pipeline that will transport 8 billion cu m/year of gas from the Caspian Sea to Europe via Turkey from 2011.

The protocol of intent was signed Jan. 31 in Athens by Greek Development Minister Dimitris Sioufas and his Italian counterpart, Pierluigi Bersani.

Next year both countries will start building the subsea underwater pipeline between Greece's west coast and southern Italy. Italy's Edison SPA and Greece's Depa will have a respective 80-20 transmission capacity in the pipeline, which has been dubbed the Italy Greece Interconnector (IGI). IGI will be linked to an existing pipeline connecting Turkey and Greece, which is to start operations later this year.

Third parties also will gain access to some incremental IGI capacity. The companies agreed to swap larger amounts of gas at the virtual Italian Swap Point, contributing to the establishment of a gas exchange.

Edison and Depa have already started negotiations for gas supplies from some producing countries in the Caspian Sea basin and with those that will cross the pipeline.

Edison said that the commitment from the governments would fast-track construction of the pipeline because of its strategic importance to the European Union in diversifying its gas supplies. Russia supplies about 25% of western Europe's gas needs.

RWE proposes Czech Republic-Belgium pipeline

RWE Energy AG plans to construct a 5 billion cu m/year gas pipeline that will extend from the Czech Republic to Belgium. It would start operations in 2011 and reduce Germany's reliance on Russian gas imports.

Plans call for a 560-km line to originate in Sayda on the Czech border and cross through Werne in Germany and a 200-km section extending to the Belgian system in the Aachen area.

"The pipeline would form a direct link between the Czech and the German gas transport grids of RWE Energy," RWE said. Germany, Great Britain, and the BeNeLux countries are the proposed customers for gas supplies from the Caspian Sea area, the Middle East, and Egypt.

The $1.3 billion project is another European route intended to diversify its significant reliance on Russia, however RWE did not rule out sourcing Russian gas supplies.

An RWE spokeswoman told OGJ the pipeline would bring in regasified LNG from its proposed 7.3 million tonne/year Adriatic terminal in Croatia, which will start operations in 2011. She said the Czech pipeline could link to other pipelines that could connect to OMV AG's proposed 8 billion cu m/year Nabucco pipeline through southeastern Europe (see map, OGJ, June 13, 2005, p. 60). She emphasized that the project was in the early stages and that nothing has been finalized.

RWE has invited third parties to take up capacity on a nondiscriminatory basis in the Czech pipeline to determine if it should increase its capacity of 5 billion cu m.

To more quickly launch the project, RWE is seeking an exemption from the German Federal Grid Agency and the European Commission's rules on grid regulation, stressing that the infrastructure improves supply security and increases competition.

Berthold Bonekamp, CEO of RWE Energy AG, said, "We want to invest in new capacities. Additional gas procurement options in Europe promote competition."

CenterPoint, Spectra pull plug on gas pipeline

CenterPoint Energy Gas Transmission Co. and Spectra Energy have agreed to call off development of a joint Midcontinent Crossing (MCX) pipeline, which proposed to move natural gas from basins in the Midcontinent to interconnects serving the US Northeast and Southeast (OGJ Online, June 12, 2006, Newsletter).

"Market and economic analyses do not support the construction of the proposed pipeline at this time," the companies said in a joint statement.

CenterPoint and Spectra plan to continue to "independently evaluate opportunities for building infrastructure to transport Midcontinent natural gas supplies including projects in the vicinity of the proposed MCX pipeline," adding, "Should the appropriate project present itself, we would be willing to look at it jointly."

BP reports 600,000 b/d throughput for BTC line

BP PLC reported that throughput at the Baku-Tbilisi-Ceyhan crude pipeline has reached 600,000 b/d, but it plans eventually to increase that to 1 million b/d.

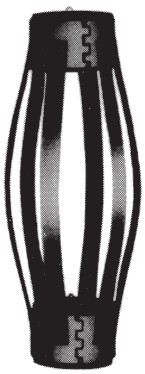
Initially the line transported oil only from the Azeri-Chirag-Gunashli fields, but in January BP added production from the offshore Shah Deniz gas-condensate field.

BP said it expects future increased volumes will "include those from across the Caspian, possibly commencing by the end of 2007." ✦

Everything for Oilwell Cementing

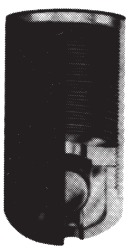
Everything *but the Cement!*

HINGE-TYPE CENTRALIZERS

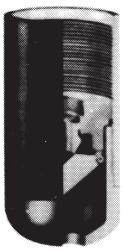


Industrial Rubber's Hinge-Type Centralizers feature channel-formed collar rings with hinges placed within the channel to eliminate hinge damage. This construction assures that hinges will not rupture while casing is being run regardless of hole direction or irregularities in formations and that the centralizer will provide effective centering down hole.

The design of the split collars and narrow bow springs provide maximum effective centralizing of the casing with minimum obstruction to annular flow. Industrial Rubber Hinge-Type Centralizers are available in sizes 2⅜″ through 20″.



Regular Float Shoe



Automatic Fill-up Float Shoe

FLOAT EQUIPMENT

Regular Ball-Type
Flapper Type
Automatic Fill-up

Industrial Rubber's three types of float shoes and float collars are engineered for rugged dependability. Drillable parts are made from high strength aluminum alloy formulated for ease of drilling. All three types of float equipment are designed to provide adequate flow passage and to withstand the abrasive action of large volumes of fluids. Write or call for details on rugged and dependable float equipment from Industrial Rubber, Inc.

WRITE FOR NEW CATALOG

EVERYTHING FOR OILWELL CEMENTING.

Plugs, casing centralizers, baskets, float equipment, stage cementing tools,

EVERYTHING BUT THE CEMENT.

CALL TOLL-FREE 800-457-4851 FOR PRICE AND DELIVERY

PRIVATELY OWNED -ESTABLISHED IN 1965

MasterCard
Now accepting MasterCard and VISA
VISA

INDUSTRIAL RUBBER, INC.
OIL TOOL DIVISION

P. O. Box 95389 Oklahoma City, Ok. 73143-5389
Phone 405/632-9783 Fax 405/634-9637
Visit our website at www.iri-oiltool.com

97-4

Calendar

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

OIL&GAS JOURNAL online research center

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.

2007

FEBRUARY

International Petrochemicals & Gas Technology Conference & Exhibition, London, +44 (0) 20 7357 8394, e-mail: Conference@EuroPetro.com, website: www.europetro.com. 12-13.

IP Week, London, +44(0)20 7467 7100, +44(0)20 7580 2230 (fax); e-mail: events@energyinst.org.uk, website: www.ipweek.co.uk. 12-15.

Pipeline Pigging & Integrity Management Conference, Houston, (713) 521-5929, (713) 521-9255 (fax), e-mail: info@clarion.org, website: www.clarion.org. 12-15.

CERA Week, Houston, (800) 597-4793, (617) 866-5901, (fax), e-mail: register@cera.com, website: www.cera.com/ceraweek. 12-16.

International Downstream Technology & Catalyst Conference & Exhibition, London, +44 (0) 20 7357 8394, e-mail: Conference@EuroPetro.com, website: www.europetro.com. 14-15.

Pakistan Oil & Gas Conference, Islamabad, (92-21) 6634795, (92-21) 6634795 (fax), website: www.pakoil-gas.com. 18-20.

SPE/IADC Drilling Conference and Exhibition, Amsterdam, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 20-22.

AustralAsian Oil Gas Conference and Exhibition, Perth, (704) 365-0041, (704) 365-8426 (fax), e-mail: sarahv@imexmgt.com, website: www.imexmgt.com. 21-23.

Pipe Line Contractors Association Annual Meeting, Aventura, Fla., (214) 969-2700, e-mail: plca@plca.org, website: www.plca.org. 21-25.

International Conference and Exhibition on Geo-Resources in the Middle East and North Africa, Cairo, 00202 3446411, 00202 3448573 (fax), e-mail: alisadek@mailer.eun.eg, website: www.grmena.com.eg. 24-28.

Laurance Reid Gas Conditioning Conference, Norman, Okla., (405) 325-3136, (405) 325-7329 (fax), e-mail: bettyk@ou.edu, website: www.lrgcc.org. 25-28.

CERA East Meets West Executive Conference, Istanbul, (800) 597-4793, (617) 866-5992 (fax), e-mail: register@cera.com, website: www.cera.com. 26-28.

SPE Reservoir Simulation Symposium, Houston, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 26-28.

Subsea Tieback Forum & Exhibition, Galveston, Tex., (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.subseatiebackforum.com. Feb. 27-Mar.1.

International Symposium on Oilfield Chemistry, Houston, (972) 952-9393, (972)

952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. Feb. 28-Mar. 2.

MARCH

Natural Gas Conference, Calgary, Alta., (403) 220-2380, (403) 284-4181 (fax), e-mail: jstaple@ceri.ca, website: www.ceri.ca. 5-6.

Gas Arabia International Conference, Abu Dhabi, +44 (0) 1242 529 090, +44 (0) 1242 060 (fax), e-mail: wra@theenergyexchange.co.uk, website: www.theenergyexchange.co.uk. 5-7.

SPE E&P Environmental and Safety Conference, Galveston, Tex., (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 5-7.

International Pump Users Symposium, Houston, (979) 845-7417, (979) 847-9500 (fax), website: http://turbolab.tamu.edu. 5-8.

Purvin & Gertz International LPG Seminar, Houston, (713) 236-0318 x229, (713) 331 4000 (fax), website: www.purvingertz.com. 5-8.

African Refiners Week, Cape Town, +44 (0)20 7343 0014, +44 (0)20 7343 0015 (fax), website: www.afrra.org. 5-9.

Power-Gen Renewable Energy & Fuel Conference, Las Vegas, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.pennwell.com. 6-8.

Annual Fuels & Lubes Asia Conference, Bangkok, +632 772 4731, +632 772 4735 (fax), e-mail: conference@flasia.info, website: www.flasia.info. 7-9.

Plant Maintenance, Tooling & Safety Equipment, Technology & Service Conference, Bankok, +44 (0)20 7840 2100, +44 (0)20 7840 2111 (fax), e-mail: rowen@oesallworld.com, website: www.allworldexhibitions.com.8-10.

GPA Annual Convention, San Antonio, (918) 493-3872, (918) 493-3875 (fax), website: www.gasprocessors.com. 11-14.

SPE Middle East Oil & Gas Show & Conference (MEOS), Bahrain, +44 20 7840 2139, +44 20 7840 2119 (fax), e-mail: meos@oesallworld.com, website: www.allworldexhibitions.com. 11-14.

NACE Annual Conference & Exposition, Nashville, (281) 228-6200, (281) 228-6300, e-mail: Jennifer.OReilly@nace.org, website: www.nace.org/nace/content/conferences/c2007/welcome.asp. 11-15.

NPRA Security Conference, The Woodlands, Tex., (202) 457-0480, (202) 457-0486 (fax), e-mail: info@npra.org, website: www.npra.org. 12-14.

China Offshore Expo, Tianjin, 84 8 9634388, 84 8 9635112 (fax), e-mail: cp-info@hcm.vnn.vn, website: www.cpexhibition.com. 15-17.

NPRA Annual Meeting, San Antonio, (202) 457-0480, (202) 457-0486 (fax), e-mail: info@npra.org, website: www.npra.org. 18-20.

SPE/ICoTA Coiled Tubing and Well Intervention Conference and Exhibition, The Woodlands, Tex., (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 20-21.

ARTC Refining & Petrochemical Annual Meeting, Bangkok, +44 1737 365100, +44 1737 365101 (fax), e-mail: events@gtforum.com, website: www.gtforum.com. 20-22.

Offshore West Africa Conference & Exhibition, Abuja, (918) 831-9160, (918) 831-9161 (fax), e-mail: owaconference@pennwell.com, website: www.offshorewestafrica.com. 20-22.

Georgian International Oil, Gas, Energy and Infrastructure Conference & Showcase, Tbilisi, +44 (0) 207 596 5233, +44 (0) 207 596 5106 (fax), e-mail: oilgas@ite-exhibitions.com, website: www.ite-exhibitions.com. 22-23.

NPRA International Petrochemical Conference, San Antonio, (202) 457-0480, (202) 457-0486 (fax), e-

The Oil & Gas Asset CLEARINGHOUSE

SPECIALIZING IN CUSTOMIZED MARKETING OF PRODUCING AND NON-PRODUCING OIL AND GAS PROPERTIES NATIONWIDE

The Oil & Gas Asset Clearinghouse, L.P.
P.O. Box 671787
Houston, Texas 77267-1787
(281) 873-4600
www.ogclearinghouse.com

HOUSTON • DALLAS • DENVER • OKLAHOMA CITY

Listen...

SoundPLAN makes it easy to predict noise from transportation, industry and leisure sources.

Special features include:
- ◆Superior Graphics
- ◆Full Documentation
- ◆Cost vs Benefit

Other Highlights:
- ◆Twelve languages
- ◆Local Distributors

SoundPLAN includes all major international noise standards. Engineers worldwide use it to accurately map all types and sizes of noise projects.

The benchmark noise planning software for 20 years!

Call +1 360 432 9840
www.soundplan.com

...No Other Noise Planning Software Does More!

SoundPLAN
Designing a sound environment

Calendar

mail: info@npra.org, website: www.npra.org. 25-27.

American Chemical Society National Meeting & Exposition, Chicago, (202) 872-4600, (202) 872-4615 (fax), e-mail: natlmtgs@acs.org, website: www.acs.org. 25-29.

Turkish Oil & Gas Exhibition and Conference, Ankara, +44 (0) 207 596 5233, +44 (0) 207 596 5106 (fax), e-mail: oilgas@ite-exhibitions.com, website: www.ite-exhibitions.com. 27-29.

Offshore Mediterranean Conference, Ravenna, +39 0544 219418, +39 0544 39347 (fax), e-mail: conference@omc.it, website: www.omc.it. 28-30.

SPE Production and Operations Symposium, Oklahoma City, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. Mar. 31-Apr. 3.

APRIL

SPE Hydrocarbon Economics and Evaluation Symposium, Dallas, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 1-3.

AAPG Annual Convention and Exhibition, Long Beach (918) 584-2555, (918) 560-2694 (fax), e-mail: postmaster@aapg.org, website: www.aapg.org. 1-4.

PIRA Natural Gas and LNG Markets Conference, Houston, 212-686-6808, 212-686-6628 (Fax), e-mail: sales@pira.com, website: www.pira.com. 2-3.

China International Oil & Gas Conference, Beijing, +44 (0) 207 596 5233, +44 (0) 207 596 5106 (fax), e-mail: oilgas@ite-exhibitions.com, website: www.ite-exhibitions.com. 3-4.

IADC/SPE Managed Pressure Drilling & Underbalanced Operations Conference, Galveston, Tex., (713) 292-1945, (713) 292-1946 (fax), e-mail: info@iadc.org, website: www.iadc.org. 3-4.

IADC Environmental Conference & Exhibition, Amsterdam, (713) 292-1945, (713) 292-1946 (fax); e-mail: info@iadc.org, website: www.iadc.org. 3-4.

Instrumentation Systems Automation Show & Conference, Calgary, Alta., (403) 209-3555, (403) 245-8649 (fax), website: www.petroleumshow.com. 11-12.

SPE Digital Energy Conference and Exhibition, Houston, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 11-12.

ENTELEC Annual Conference & Expo, Houston, (888) 503-8700, e-mail: blaine@entelec.org, website: www.entelec.org. 11-13.

Kazakhstan Petroleum Technology Conference, Atyrau, +44 (0) 207 596 5233, +44 (0) 207 596 5106 (fax), e-mail: oilgas@ite-exhibitions.com, website: www.ite-exhibitions.com. 11-13.

Molecular Structure of Heavy Oils and Coal Liquefaction Products International Conference, Lyon, +33 1 47 52 67 13, +33 1 47 52 70 96 (fax), e-mail: frederique.leandri@ifp.fr, website: www.events.ifp.fr. 12-13.

Middle East Petroleum & Gas Conference, Dubai, 65 62220230, 65 62220121 (fax), e-mail: info@cconnection.org, website: www.cconnection.org. 15-17.

SPE Latin American & Caribbean Petroleum Engineering Conference, Buenos Aires, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 15-18.

Society of Petrophysicists and Well Log Analysts (SPWLA) Middle East Regional Symposium, Abu Dhabi, (713) 947-8727, (713) 947-7181 (fax), e-mail: info@spwla.org, website: www.spwla.org. 15-19.

International Pipeline Conference & Exhibition, Moscow, +43 1 402 89 54 12, +43 1 402 89 54 54 (fax), e-mail: pipeline@msi-fairs.com, website: www.msi-fairs.com. 16-17.

Russia & CIS Refining & Petrochemicals Equipment Conference & Exhibition, Moscow, +44 (0) 20 7357 8394, e-mail: Conference@EuroPetro.com, website: www.europetro.com. 16-17.

API Spring Refining and Equipment Standards Meeting, Seattle, (202) 682-8000, (202) 682-8222 (fax), website: www.api.org. 16-18.

ERTC Coking and Gasification Conference, Paris, 44 1737 365100, +44 1737 365101 (fax), e-mail: events@gtforum.com, website: www.gtforum.com. 16-18.

SPE Rocky Mountain Oil & Gas Technology Symposium, Denver, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 16-18.

Pipeline Technology Conference & Exhibition, Hannover, +49 511 89 31240, +49 511 89 32626 (fax), e-mail: info@messe.de, website: www.hannovermesse.de. 16-20.

API/NPRA Spring Operating Practices Symposium, Seattle, (202) 682-8000, (202) 682-8222 (fax), website: www.api.org. 17.

IADC Drilling HSE Middle East Conference & Exhibition, Bahrain, (713) 292-1945, (713) 292-1946 (fax); e-mail: info@iadc.org, website: www.iadc.org. 17-18.

API Annual Pipeline Conference, Albuquerque, (202) 682-8000, (202) 682-8222 (fax), website: www.api.org. 17-18.

Russia & CIS Bottom of the Barrel Technology Conference & Exhibition, Moscow, +44 (0) 20 7357 8394, e-mail: Conference@EuroPetro.com, website: www.europetro.com. 18-19.

GPA Midcontinent Annual Meeting, Oklahoma City, (918) 493-3872, (918) 493-3875 (fax), website: www.gasprocessors.com. 19.

American Institute of Chemical Engineers Spring National Meeting, Houston, (212) 591-8100, (212) 591-8888 (fax), website: www.aiche.org. 22-26.

EnviroArabia Environmental Progress in Oil & Petrochemical Conference, Bahrain, +973 17 729819, +973 17 729819 (fax), e-mail: bseng@batelco.com.bh, website: www.mohandis.org. 23-25.

IPAA OGIS East, New York, (202) 857-4722, (202) 857-4799 (fax), website: www.ipaa.org/meetings. 23-25.

International Conference & Exhibition on Liquefied Natural Gas, Barcelona, +34 93 417 28 04, +34 93 418 62 19 (fax), e-mail: lng15@lng15.com, website: www.lng15.com. 24-27.

Pipeline Pigging and Integrity Management Conference, Kuala Lumpur, +44 (0) 1494 675139, +44 (0) 1494 670155 (fax), e-mail: jtiratsoo@pipemag.com. 25-26.

SPE Research and Development Conference, San Antonio, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 26-27.

Williston Basin Petroleum Conference & Prospect Expo, Regina, (306) 787-0169, (306) 787-4608 (fax), e-mail: enickel@ir.gov.sk.ca, website: www.wbpc.ca. Apr. 29-May 1.

Offshore Technology Conference (OTC), Houston, (972) 952-9494, (972) 952-9435 (fax), e-mail: service@otcnet.org, website: www.otcnet.org. Apr. 30-May 3.

MAY

PIRA Canadian Energy Conference, Calgary, 212-686-6808, 212-686-6628 (fax), e-mail: sales@pira.com, website: www.pira.com. 2.

NPRA National Safety Conference, The Woodlands, Tex., (202) 457-0480, (202) 457-0486 (fax), e-mail: info@npra.org, website: www.npra.org. 2-3.

IOGCC Midyear Meeting, Point Clear, Ala., (405) 525-3556, (405) 525-3592 (fax), e-mail: iogcc@iogcc.state.ok.us, website: www.iogcc.state.ok.us. 6-8.

GPA Permian Basin Annual Meeting, Midland, Tex., (918) 493-3872, (918) 493-3875 (fax), website: www.gasprocessors.com. 8.

Annual Oil and Gas Pipelines in the Middle East Conference, Abu Dhabi, +44 (0) 1242 529 090, +44 (0) 1242 060 (fax), e-mail: wra@theenergyexchange.co.uk, website: www.theenergyexchange.co.uk. 14-15.

AchemAsia Exhibition and Conference, Beijing, +49 (0) 69 7564 249, +49 (0) 69 7564 201 (fax), e-mail: achemasia@dechema.de, website: www.achemasia.de. 14-18.

International School of Hydrocarbon Measurement, Norman, Okla., (405) 325-1217, (405) 325-1388 (fax), e-mail: lcrowley@ou.edu, website: www.ishm.info. 15-17.

INTERGAS IV International Oil & Gas Conference & Exhibition, Cairo, +44 20 7978 0081, +44 20 7978 0099, e-mail: erenshaw@thecwcgroup.com, website: www.intergasegypt.com. 15-17.

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.ite-exhibitions.com. 15-17.

IADC Drilling Onshore America Conference & Exhibition, Houston, (713) 292-1945, (713) 292-1946 (fax); e-mail: info@iadc.org, website: www.iadc.org. 17.

ERTC Asset Maximization Computing and Reliability Conference, Rome, 44 1737 365100, +44 1737 365101 (fax), e-mail: events@gtforum.com, website: www.gtforum.com. 21-23.

✦Libya Oil & Gas Conference and Exhibition, Tripoli, +44 20 7978 0083, +44 20 7978 0099 (fax), e-mail: sshelton@thecwcgroup.com, website: www.cwclog.com. 21-24.

✦Asia Bottom of the Barrel Technology Conference & Exhibition, Kuala Lumpur, +44 (0) 20 7357 8394, +44 (0) 20 7357 8395 (fax), e-mail: conferences@europetro.com, website: www.EuroPetro.com. 22-23.

Kuwait

World Energy & Chemicals Exhibition and Conference

22-25 October 2007

Official Sponsors

Conference Sponsors

Official Media Support

Official Airline

Official Decorator

Official Housing Bureau

Official Car Rental

THE ENERGY AND CHEMICALS INDUSTRY CONVERGES ON KUWAIT IN 2007

Kuwait International Fair: Halls 5-6-7

Kuwait will proudly host the first World Energy & Chemicals Exhibition and Conference from 22 to 25 October 2007. Kuwait has great plans for future development and investment in its Oil- Gas- Chemical- and Power- Industries. It has already begun implementing this ambitious plan by doubling its oil production level, vastly increasing and modernizing its refining capacity and constructing the largest grass roots refinery in the world.

The Kuwait 2007 - Energy & Chemicals Exhibition and Conference will link investor companies with a variety of specialized companies providing services, support, technology, engineering, manufacturing, equipment, transport, as well as educational institutions, creating great value for all. This event will offer not only a professional exhibition, but an inspiring conference and an efficient matchmaking programme.

International delegates, participants and visitors from a wide variety of backgrounds and regions of the world are being personally invited by the Kuwait Petroleum Corporation.

For further information, please visit

www.wecec-kuwait.com

With the official support of:

مؤسسة البترول الكويتية
Kuwait Petroleum Corporation

BRUSSELS EXPO

Tel. +32 2 474 84 29
Fax +32 2 474 83 93
E-mail: infowecec@brusselsexpo.be

Organized by

KUWAIT INTERNATIONAL FAIR

Tel. +965 538 7100
Fax +965 539 3872
E-mail: info@kif.net

BASRA INTERNATONAL FAIR

Megaprojects:

Building the World's Critical Infrastructure

Coming in June 2007, a PennWell Exclusive Supplement Highlighting the World's Leading E&C and Finance Companies.

Megaprojects to build the world's critical infrastructure are booming, and only the best E&C and finance companies will be chosen to help meet the demand.

Don't miss this unique chance to tell the world – in a company-sponsored profile written exclusively for this supplement – how your company will help meet the growing global need for industrial water and energy.

We'll help you tell your story and then distribute it to more than 168,000 PennWell management-level subscribers of our energy and water publications.

PennWell®

PennWell offers a rare opportunity for leading finance, engineering, and construction companies to showcase their capabilities to over 168,000 decision-makers in the petroleum, power, and water infrastructure industries.

Don't Miss Out!

- **Three Interrelated Industries**
- **Eight Industry-Leading Global Publications**
- **Over 168,000 Industry Decision-Makers**
- **And, One Invaluable Supplement.**

All profiles will be digitally archived for one year, with links to company websites!

OIL&GAS JOURNAL

Offshore MAGAZINE

OIL&GAS FINANCIAL JOURNAL

POWER Engineering

UTILITY T&D Automation & Engineering

ELECTRIC LIGHT&POWER

WaterWorld

Industrial WaterWorld

Deadline for company profiles is: **March 28, 2007.**

Cost is $20,000 per page.

To participate in this project, contact:
Shawn Sejera at 918.831.9731 or ShawnS@PennWell.com, or call your local PennWell representative.

Comparing alternatives

Steve Poruban
Senior Editor

Whether written about in an industry trade publication such as Oil & Gas Journal or a consumer magazine such as Popular Mechanics (PM), the discussion about what fuel will power the world's increasing transportation needs—and how well it will do it and at what cost—is important.

Regardless of where the information is presented and to what audience it is presented, what matters most is that the information is being placed before the eyes of those who will use it to make informed decisions about the world's energy future—and transportation fuel's role in that future.

Arguments have been presented in OGJ's pages as recently as last week weighing the pros and cons of alternative fuels (OGJ, Feb. 5, 2007, p. 25). Last week's comment piece on biofuels as well as this writing on transportation fuels will be far from the last time OGJ readers are informed on such matters. For so long as consumers clamor for cheaper fuel, the market will seek out from further research and development less-expensive ways to get commuters from here to there.

The public was presented information about alternative transportation fuels in the May 2006 issue of PM. An article by Mike Allen entitled "Crunching the Numbers on Alternative Fuels" compared seven vehicles using seven different types of fuel: gasoline, E85 ethanol, M85 methanol, B100 biodiesel, compressed natural gas, electricity, and hydrogen fuel cell. All seven cars were driven on the same trip across the US: from New York to California.

For the cross-country jaunt, PM chose cars as close as possible in size and weight. When comparing alternative fuels to gasoline, PM in some cases measured the fuel's energy content in gallons of gas equivalent (GGE), or the amount of fuel with the same energy content as a gallon of gasoline.

PM's findings

PM found:

- It would take roughly 4.5 bbl of crude to produce enough gasoline—about 97 gal—to power a 2006 Honda Civic from New York to California. At a fuel cost of $2.34/gal and an economy rating of 33 mpg, total fuel cost for the trip would be $212.70.
- For the 2005 Taurus FFV, a car fueled by E85 ethanol, the same trip would require 53 bushels of corn and 0.5 bbl of crude to produce 176 gal of fuel. At a 17 mpg economy rating, about $225 would be needed to fund the trip, at a cost of $2.41/gal.
- About 18.19 Mcf of natural gas and 0.5 bbl of oil could be used to make the 214 gal of M85 methanol to transport the 1998 Taurus M85 FFV across the country. The trip would cost $619 at a fuel cost of $2.89/gal, the car getting about 14 mpg.
- About 16 5-gal containers of vegetable oil could produce the 68.2 gal of B100 biodiesel fuel needed to drive the 2006 Volkswagen Golf TDI across the US. At an impressive 44 mpg economy rating, the $3.40/gal fuel would cost a total of $231.
- The 2005 Civic GX, running on compressed natural gas, would require 88 GGE of fuel for the trip produced from 10.65 Mcf of gas. At a cost of $1.25/GGE for the fuel and an economy rating of 34 miles/GGE, the CNG vehicle's total trip cost would be $110.
- About 1 ton of coal could generate the 16.4 GGE of electricity needed to power the 1997 Honda EV Plus across the country. At a cost of $3.66/GGE and getting an incredible 202 miles/GGE, the driver would spend a mere $60 on the trip.
- About 16 Mcf of hydrogen could be used to make 73 GGE for the GM Hy-wire vehicle to travel cross-country. At a cost of $11/GGE—the highest fuel cost in the report—the trip would cost $804 despite the 41 miles/GGE economy rating.

What matters most

For purposes of presenting straightforward data, PM based its fuel findings solely on cost. In doing so, it stripped away any environmental or human factors that might have come into play.

For example, the inexpensive drive across the country in the electric-powered car did not take into account how many stops might be needed, and therefore how long the trip might take. Nor did it consider the ton of coal that was burned to do it.

What seems to matter most in this price-based analysis is that cost still carries a majority of the weight in our transportation-oriented world. ✦

Upstream / Downstream / Oil & Gas

8th OFFSHORE MEDITERRANEAN CONFERENCE & EXHIBITION

OMC 2007

OFFSHORE MEDITERRANEAN CONFERENCE

RAVENNA

March 28-30, 2007

RAVENNA

THE MEDITERRANEAN:

A SEA FOR THREE CONTINENTS

ESTABLISHED BY

SUPPORTED BY

Italian Petroleum and Mining Industry Association

Ravenna Oil & Gas Contractors Associations

OFFICIAL MAGAZINE

OE

SPONSORED BY

SPE ITALIAN SECTION

ISA

OGP

ENDORSED BY

OMF

safe

AIEE

CONFERENCE

OMC Scrl
Viale L.C. Farini 14 • 48100 Ravenna, Italy
Tel. +39 0544 219418 • Fax +39 0544 39347
www.omc.it • E-mail: conference@omc.it

EXHIBITION

IES srl - INTERNATIONAL EXHIBITION SERVICES
Via Cassia Km 36,400
Z.I. Settevene • 01036 Nepi (VT), Italy
Tel. +39 0761 527976 • Fax. +39 0761 527945
www.omc.it • E-mail:exhibition@omc.it

Associates

Eni Snamprogetti

Schlumberger

ROSETTI MARINO S.p.A.

EDISON

Total

ava

Eni Saipem

Editorial

Furnishing crisis

The story often is told that in 1897 William Randolph Hearst, publisher of the New York Journal, sent artist Frederic S. Remington to Cuba to record a developing war between the US and Spain. Remington sent a telegram from Havana reporting, "Everything is quiet. There is no trouble here. There will be no war. I wish to return." Hearst replied: "Please remain. You furnish the pictures, and I'll furnish the war."

This possibly fictitious exchange resembles controversy over climate change. Ever since the 1988 hearing that then-Democratic Sen. Al Gore of Tennessee held about an atmospheric build-up of greenhouse gases and the implications for global average temperature, the public has feared a crisis, and a cadre of provocateurs has strained to furnish one.

IPCC summary

Into the nasty war of opinion that has ensued, the Intergovernmental Panel on Climate Change this month delivered another of its analogs of the incendiary graphics Hearst wanted from Remington. The "Summary for Policymakers" from Working Group I of IPCC's Fourth Assessment Report sounds familiar alarms: carbon dioxide is accumulating in the atmosphere; global average temperature has increased; certainty is growing that the gas build-up caused some warming; and human activity deserves blame.

If the summary is accurate, the IPCC's Fourth Assessment, due in May, will reflect greater knowledge about observed planetary warming and associated phenomena than was available to the Third Assessment Report, published in 2001. Among other things, it will document increased certainty about the human role in observed warming.

But does it furnish a crisis?

"The understanding of anthropogenic warming and cooling influences on climate has improved since the Third Assessment Report, leading to very high confidence that the globally averaged net effect of human activities since 1750 has been one of warming, with a radiative forcing of +1.6 [+0.6 to +2.4] w/sq m," the summary says. Proponents of mandatory cuts in CO_2 emissions have seized on that and other such statements to argue that there's no need for further debate, that the science is "settled," and that opposition to urgent precaution bespeaks immoral obstructionism.

But they've always said those things. Their costly political agenda needs a crisis, and they rely on the IPCC to furnish it. Gore has made a career of this. Indeed, he seems to have been right when he asserted, before science could be conclusive about it, that human activity has contributed to observed warming of the past half-century. But is this the crisis that Gore insists creates a moral imperative to overhaul energy use?

The new IPCC assessment provides reason to think not. Climate change skeptic Christopher Monckton, who served as a special adviser to former UK Prime Minister Margaret Thatcher, points out that the new report has halved its projection to 2100 of a prominent warming fear: sea level rise. He also notes that the IPCC's estimate of human-induced radiative forcing is down from the 2001 estimate of 2.43 w/sq m. And of the IPCC's six modeled temperature scenarios, Monckton argues, three are "extreme exaggerations," two of which are based on population forecasts far above general expectations. Temperature-increase projections of the Fourth Assessment aren't directly comparable with those of the Third Assessment, where the top-of-range figure was 5.8° C. by 2100. But excluding the top three scenarios on the basis of Monckton's observation would keep the maximum temperature rise seen by the new assessment at no more than 4°.

Abating crisis

By this reading of the IPCC summary, science is more certain than before about the human link to observed warming, but the effect in terms of radiative forcing is smaller than was thought 6 years ago, as are maximum warming by 2100 and sea-level rise. So the crisis—if that's what it is—seems to be abating. This news should comfort anyone wondering what response may be appropriate. The new report makes clear that the warming and sea-level rise will continue for a very long time even if emissions of greenhouse gas concentrations somehow stabilize.

Had Hearst learned something comparable about Cuba, he might have called Remington home. ✦

Part 1: Russia seeks global influence by exploiting energy geopolitics

David Wood
David Wood & Associates
Lincoln, UK

Russia is blessed with a significant share of the world's energy resources. It is among the top five producing countries worldwide for all three fossil fuels: natural gas, crude oil, and coal (see table). Russia holds the largest proved gas reserves of any country in the world and holds the seventh largest proved reserves of crude, ranking just behind the six top Organization of Petroleum Exporting Countries oil producers. In addition, it holds the second largest proved reserves of coal of any country worldwide (see figure).

Russia seems to be banking on energy exploitation and appropriations of these resources to reestablish its status as a world power. In doing so, however, it is showing few signs of avoiding several main pitfalls that have befallen other petroeconomies:

- It is taking few measures to avoid "Dutch disease," the deindustrialization of a nation's economy that occurs when the discovery of a natural resource raises the value of that nation's currency, making manufactured goods less competitive with other nations, increasing imports and decreasing exports.[1] The term originated in Holland after the discovery of North Sea gas.
- It has neglected to develop a progressive and stable taxation system that would prevent operating companies' being forced out of business in adverse economic conditions.
- It has not restrained predatory nationalistic instincts to appropriate assets and frighten away foreign investment in the medium-term.

In Russia, energy resources seem to be considered more as weapons of political leverage and a means of enriching favored elites than as opportunities to benefit and develop wider Russian society.

President Vladimir Putin continues to exploit Russia's strategic oil and gas export supply chains to extend its international diplomatic influence and power. Its control over key infrastructure supplying oil and gas into Western Europe provides it with more power in the prevailing global environment of booming commodity prices responding to perceived long-term tight supply.

Times have changed for this petroeconomy since the dark days of 1998, when oil prices were about $10/ bbl and gas prices were less than half what they are today, forcing Russia to default on its international debts. It now has the potential to achieve economic prosperity and to command the attention and respect of major energy consumers of both the Organization for European Cooperation and Development (OECD) and the developing world.

The increased petrorevenues and global influence that Russia now enjoys have maintained Putin's popularity in Russia, even though he continues to recentralize power, erode Russia's democratic institutions, and take privately held assets into state ownership at every opportunity.

However, there is international concern about the unsubtle policies that Russia and state-owned energy institutions such as OAO Gazprom now pursue to extend their sphere of influence internationally. These policies have been referred to aptly as "Russian Energy Imperialism."[2]

TOP FIVE FOSSIL FUEL PRODUCING COUNTRIES, 2005

Natural gas			Oil			Coal		
Country	Tcf	Global %	Country	Billion bbl	Global %	Country	Million tonnes	Global %
Russia ←	21.1	21.7	Saudi Arabia	4.1	13.5	China	2,190	37.4
US	18.2	18.7	Russia ←	3.5	12.1	US	1,028	17.6
Canada	6.5	6.7	US	2.5	8.0	India	426	7.3
Algeria	3.1	3.2	Iran	1.5	5.1	Australia	369	6.3
UK	3.1	3.2	Mexico	1.4	4.8	Russia ←	298	5.1
Total top 5	**52**	**53**		**13**	**44**		**4,312**	**74**
Total world	**97.2**	**100**		**29.6**	**100**		**5,853**	**100**

Sources: BP Statistical Review, June 2006, David Wood & Associates

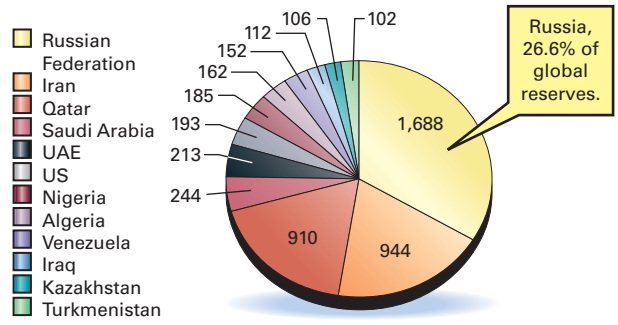
If Putin stands down as president in 2008, he can claim as his legacy that he has reestablished state control of Russia's energy resources. To do this, he has had to accept international condemnation at the dismantlement of Yukos. But in doing so he has positioned state-controlled Gazprom and OAO Rosneft firmly at the center of Russia's petroleum sector.

Indeed in recent years Putin's focus on diplomatic business overseas has been mainly related to Gazprom's interests and expanding energy export infrastructure. It is not surprising that he has placed state management of natural resources at the center of Russia's foreign policy. Since 1990, Russia has greatly diminished as a military power and has struggled to maintain its international image.

Putin was quick to recognize that energy resources offer a short-term opportunity to bolster Russia's power on the world stage. However, the unsubtle tactics he has employed to pursue that strategy have taken the world's energy consumers by surprise and raised alarms about becoming even partially dependent on Russian energy supplies. Hence, it remains uncertain whether this strategy will be effective in the longer term. Putting the export of energy resources at the core of Russia's foreign policy now means that political, rather than market or commercial, issues determine decisions made on investments and alliances with international corporations.

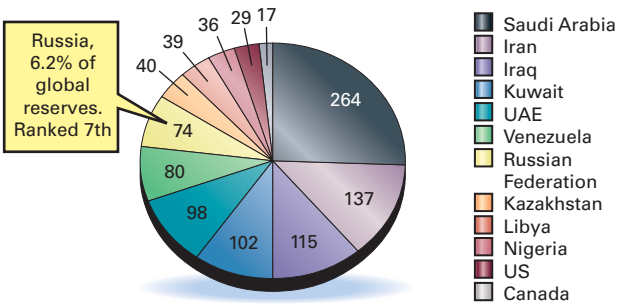
Proved reserves, top 12 countries

Gas*- tcf



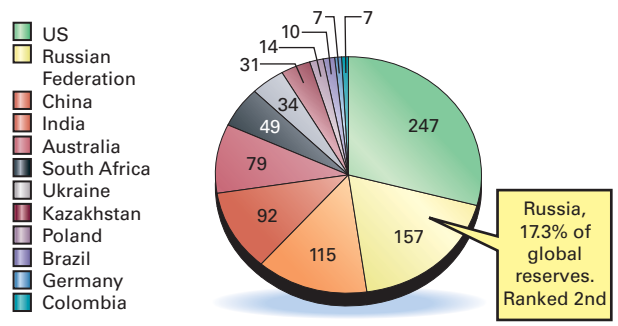
*Proved reserves as of Jan. 1, 2006. These countries hold 78.9% of global proved reserves of 6,348 tcf.

Oil*- billion bbl



*Proved reserves as of Jan. 1, 2006. These countries hold 85.9% of global proved reserves of 1,201 billion bbl.

Coal*- billion tonnes



*As of Jan.1, 2006. These 12 countries hold 92.5% of global proved reserves of 909 billion tonnes.

Source: BP Statistical Review, June 2006, David Wood & Associates

Powerhouse Gazprom

Russia's largest company, Gazprom, is the world's largest gas producer, generating some 95% of the country's gas and controlling more than 25% of the world's gas reserves. Its barrel-of-oil-equivalent (boe) reserves are the third largest in the world, slightly behind Saudi Arabia and Iran and ahead of Iraq and Kuwait. Gazprom's daily production is equivalent to 10.3 million bbl of oil, compared with Russia's daily crude and petroleum product liquids exports of some 7 million bbl.

However, domestic efficiency is an issue for this institutional monolith. The gas prices Gazprom can charge its Russian customers remain below commercial thresholds due to the government's longstanding subsidy policies. Gazprom's gas prices are kept artificially low for their home market in order to bolster domestic support for the government. This policy depresses domestic profits and distorts commercial decisions for the company.

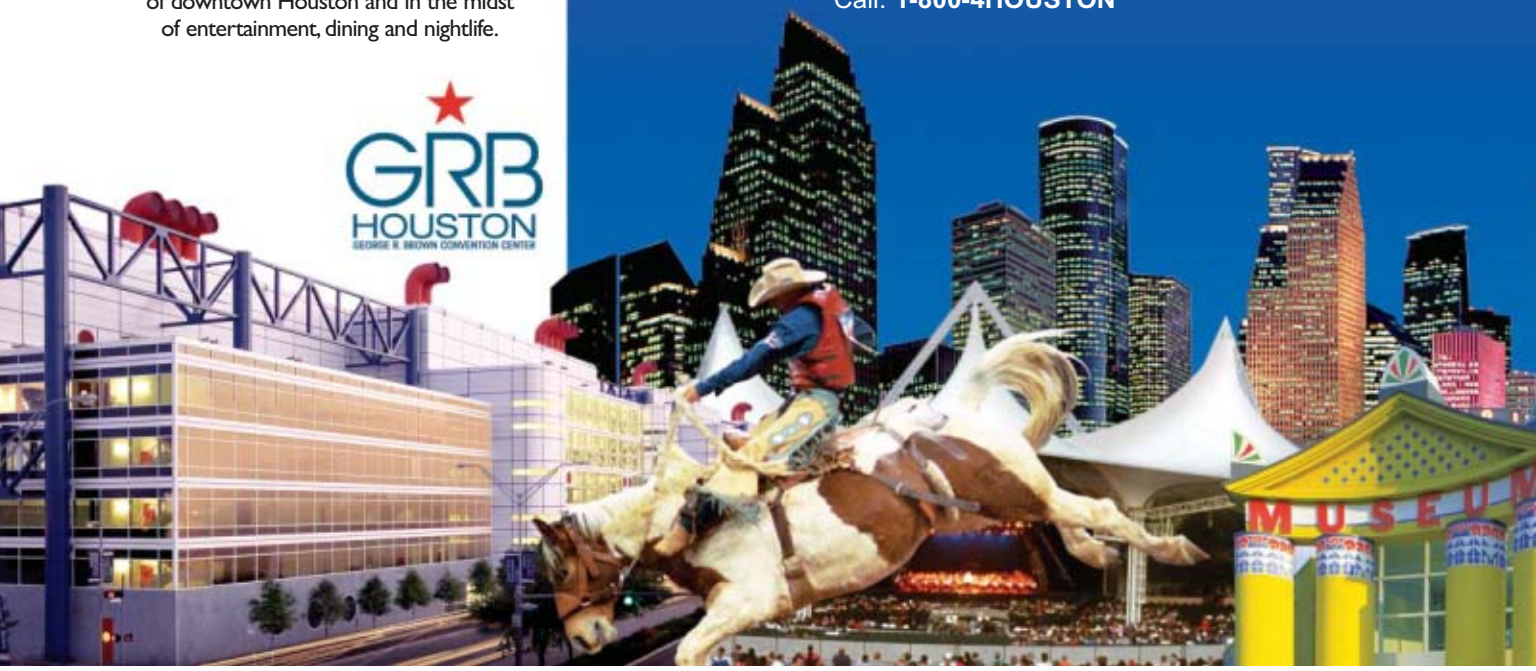
Notwithstanding such price benefits, many domestic customers fail to pay their bills, requiring Gazprom to subsidize its domestic commitments from revenues received from export customers, mainly in Western Europe. Hence Gazprom's strategic focus remains very much on its exports.

The high level of government and corporate corruption throughout Russia is another key factor influencing Russia's energy sector. Decisions often are based on how much they will enrich individual oligarchs, senior managers, or state officials rather than what makes commercial sense. What is more disconcerting is that Russians seem prepared to continue accepting staggering levels of corruption, extortion, and civil rights restrictions as a normal way of doing business. This system reduces reinvestment in Russia's aging energy infrastructure, as powerful individuals—for personal and often frivolous use—remit huge amounts of the profits out of the country. Instead, Russia looks to foreign companies to make infrastructure investments in exchange for access, albeit on dubious terms, to energy resources.

George R. Brown Convention Center
At 1.85 million gross square feet, 639,000 square feet contiguous meeting space, the GRBCC now ranks among the 10 largest convention centers in America, located in the heart of downtown Houston and in the midst of entertainment, dining and nightlife.

There's never been a better time to choose Houston. With a revitalized downtown plus new hotels, Houston has it all. Over 5,000 restaurants serve up award-winning cuisine. Enjoy professional sports, extraordinary museums, theater and all connected by METRORail. The beach just a short drive away.

Click: **www.VisitHoustonTexas.com**
Call: **1-800-4HOUSTON**



Russian muscle-flexing as an energy superpower manifests itself in the form of hegemony over adjacent European and Asian markets and the Former Soviet Union states that this country's export infrastructure transits. In particular, Russia seeks to manipulate and control countries—Ukraine, Belarus, and Poland—that have transit pipelines to Europe and to restrict the ability of Caspian states to export petroleum outside its sphere of influence.

Ukraine, Caspian states

Ukraine and the Caspian states seem to be caught between a bear and a rabbit. Over the course of the past year Russia has openly engaged in a "cold energy war" against Ukraine, with both political and commercial goals. It is attempting to wrest control of existing gas and oil pipelines transiting Ukraine as well as to dominate Ukraine's domestic energy sector. It also is keen to block the development of pipelines from Azerbaijan, Kazakhstan, Turkmenistan, and Uzbekistan in Central Asia to Europe, and particularly routes through Ukraine.

These Soviet-style aggressive tactics are not limited to Ukraine. Georgia in late September 2006 expelled a number of Russian diplomats amid accusations of spying and attempts to precipitate a coup. Georgia also has great strategic significance as a transit country from the Caspian region to Turkey. With the newly commissioned Baku-Tbilisi-Ceyhan (BTC) crude oil pipeline and the recently completed 42-in. South Caucasus Pipeline, it now has the ability to offer export routes for Caspian gas that bypass Russia.

Gazprom, negotiating from a position of strength, is reported to have offered gas price stability to Ukraine in return for a share in the country's assets and control over its main gas pipelines. This harsh proposal implies that Russia will punish Ukraine with sharp gas price increases if it does not accede. Ukrainian President Viktor Yushchenko in response reaffirmed the country's energy strategy seeking alternative gas deliveries from the Caspian states and participation in a project (initially from Azerbaijan) to deliver Caspian gas to Europe via a pipeline system that would bypass Russia.

Europe, itself short of gas supplies, is keen to bring in new supplies and diversify from Russian dependence but cannot afford disputes with Russia that could lead to supply interruptions.

Russia, in response to Ukraine-European plans to cut it out of new supply routes, is using its commercial and political influence in the gas-rich Caspian states to buy gas at prices above those offered by Ukraine. Gazprom commenced purchase of Turkmen gas for $100/thousand cu m in October 2006, commenting that it would not prevent Ukraine from being able to purchase its gas for $95/thousand cu m, provided it grants Russia control over Ukraine's

major gas pipeline infrastructure.

In May 2006, Russia offered to buy gas from Kazakhstan and Turkmenistan at prices exceeding $100/thousand cu m—much more than the prevailing price—in exchange for reassurances that the country would not build or send its gas through pipelines that would cut Russia out of its delivery network.

In September 2006 Gazprom signed a deal with Turkmenistan to buy 162 billion cu m of gas for $100/thousand cu m in 2006-09 with assurances that all gas exported will be delivered through Russia and that Turkmenistan is not interested in a trans-Caspian gas pipeline.

The US and Europe support a pipeline bypassing Russia, with countries such as Poland key to diversification from Russian gas supplies. Finance for this project could be raised in Europe and the US, as it was for the BTC line that has bypassed Russia in oil exports from Azerbaijan to Europe and beyond. It probably would require more than $10 billion.

The question is whether Russia's political and economic grip over key Caspian states, beyond Azerbaijan where most of the gas reserves lie, is strong enough to prevent them from participating in the project. Russia has demonstrated that it will do all it can to destabilize countries along the pipeline route with divide-and-rule tactics.

International companies

International oil companies (IOCs) seem to be displaying a lemming-like mentality.

Russia is in the process of seducing key current and future gas markets, such as Germany, UK, China, Japan, and Korea, with strategic new pipeline links that have limited transit countries involved and that can provide gas consumers with long-term supply security.

Russia already has successfully seduced many major IOCs with the offer of access to huge reserves in return for capital investment in Russia and, more importantly, equity interests in key assets outside of Russia. It is positioning itself to control sufficient energy infrastructure in Europe to be able to reward or punish its gas customers, depending on the degree of their concessions and acquiescence.

The IOCs are attracted by access to reserves that will resolve their short-term reserves-to-production ratio problems, thereby being able to provide investors with impressive reserves reports. BP jumped in during 2002 through TNK-BP, and Total SA, Statoil ASA, Norsk Hydro ASA, and many US companies are competing to offer Gazprom assets to join in the apparent bonanza. It all unfortunately comes with strings attached and the growing suspicion that the Russian government ultimately will manipulate the taxation mechanisms to ensure that the IOCs make little or no profit from their investments.

Shell and ExxonMobil's experiences

in various phases of the Sakhalin field development, extending over the past decade, offer salutary tales for would-be investors.

Sakhalin Island lies in an excellent position to export oil and gas to Japan, Korea, China, and the US West Coast. LNG customers are already signed up in those markets for Shell-led Sakhalin-II LNG. However, the strategic importance of these reserves to Russia is such that Gazprom and Rosneft are manipulating themselves back into controlling positions. Gazprom now owns 50% plus one share interest in the project.[3] Shell also faces court action and fines for alleged environmental infractions and has lost a $300 million second bank loan for the project.

Putin has managed to manipulate rules on foreign investment in "strategic companies" to secure state control. On the other hand, IOCs holding attractive infrastructure and customer bases in Russia's markets remain vulnerable to takeovers from the Russian state-owned giants. Rumors of Gazprom's interest in UK gas distribution and marketing group Centrica have persisted since 2005. European and national governments in Europe will find it hard to resist such moves on legal grounds. This makes Western European companies vulnerable to Russian energy expansionism even if they do not hold assets in Russia.

US strategy frustrated

As a superpower, the US is becoming weaker in the global energy sector. Even if more reserves in giant deepwater fields can be found in North America, they remain eye-wateringly expensive to develop and produce compared with oil and gas reserves in OPEC countries and Russia. This provides Russia with a tool to exploit in its efforts to redress the international power balance, which has so firmly swung in favor of the US, and Russia has not been slow to use it.

US tolerance of Russia's recent lurch towards undemocratic behavior and business practices, particularly with respect to free market enterprises, is in itself a recognition that Russia can play a pivotal role in global energy supply and future energy security for the US. Having Russia's energy resources available, to act as a foil against potential supply interruptions precipitated by OPEC policies as several of its members harden their anti-US-OECD stance, is a good reason for OECD countries to establish and maintain good relations with Russia.

In 2006 across the Middle East region, sectarian violence persisted in Iraq; Iran continued to pursue its nuclear ambitions; open hostilities erupted between Israel and Lebanon and between Israel and the Palestinians; and Taliban offensives, launched from Pakistan, were renewed in Afghanistan. These heightened tensions across the Middle East, where some 60% of the world's proved petroleum reserves reside, suggest that the US is unlikely to precipitate further instability in world energy supplies by confronting Russia's expansionist and bullying energy strategy in the near future.

And in the current geopolitical environment, it is difficult for OECD countries to put diplomatic pressure on Russia by exposing its imperialistic tactics. When OECD politicians make comments about deteriorating democracy, corruption, and human rights directly to Putin, his response is usually a shrug and, avoiding a direct response, to make reference to Abu Ghraib prison in Iraq, the Guantánamo Bay detention center in Cuba, and incidents such as the "cash for peerages" scandal and poor ethical standards displayed by some UK government ministers. His point is that the US, UK, and other G8 economies should put their own houses in order before dictating to Russia how it should behave.

However, US resistance to Russian accession to the World Trade Organization and sanctions on two Russian arms companies for alleged supply of arms to Iran have raised tension between Russia and the US. Russian responses in September 2006 were to imply that such actions would lead to restrictions of access to mineral resources by US companies. Russian authorities recently cancelled environmental approval for the Sakhalin-2 LNG project, the $22 billion Shell-led project already more than 100% over budget, and failed to accept Exxon's cost revision for the Sakhalin-1 project. Both of these are projects operated under production-sharing terms, which the Russian authorities wish to modify into standard Russian taxation terms now that billions of dollars of investment have been sunk into the projects.

Other major IOCs are suffering obstacles and problems raised once initial investments have been made; Total and TNK-BP also are facing the threat of withdrawn environmental permits. Last month Russia alleged environmental violations in huge Kvoykta gas field, raising fears that BP might lose control of that project (see Part 2). These maneuverings by Russian authorities are focused on either improving the government take from the projects or outright assets appropriation.

This month Russia and Iran, together holding 41.5% of the world's gas reserves, discussed how to create an OPEC-like cartel for gas, a move sure to unsettle global gas consumers.

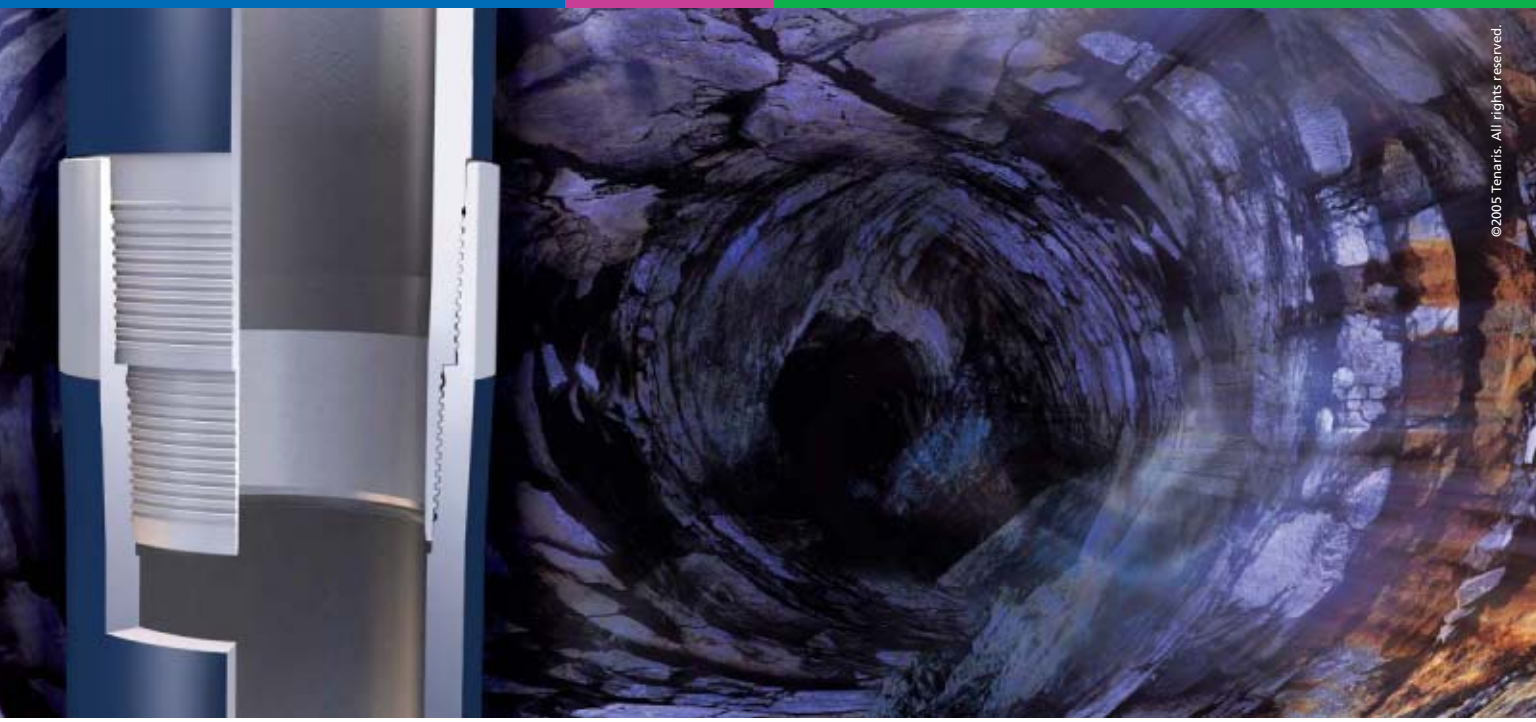
Part 2 of this article will appear in the Feb. 19, 2007, issue. ✦

References

1. OGJ, Nov. 6, 2006, p. 18.
2. Economides, M.J., energytribune.com, Sept. 13, 2006.
3. OGJ, Jan. 2, 2007, p. 29.

The author

David Wood (woodda@compuserve.com) is an international energy consultant specializing in the integration of technical, economic, risk, and strategic information to aid portfolio evaluation and management decisions. He holds a PhD from Imperial College, London. Key elements of his work are research and training concerning a wide range of energy-related topics, including project contracts, economics, natural gas, LNG, gas-to-liquids, and portfolio and risk analysis. He is based in Lincoln, UK, but operates worldwide (www.dwasolutions.com).



Introducing TenarisBlue® Near Flush.

Because 15,000 feet down, the rock isn't the only thing under pressure.

The new TenarisBlue connection takes performance in integral connections to a new level. It has a compression efficiency in excess of 50% of pipe body, outstanding structural integrity and maximum sealability. All have been tested to the rigorous standards of ISO 13679 CAL IV. Whether you are drilling slim wells, high pressure/high temperature or complex pore pressure reservoirs, the TenarisBlue Near Flush opens up a world of possibilities. It's another example of Tenaris innovation making your life easier.

Tubular technologies. **Innovative services.**

www.tenaris.com/connections

TenarisConnections

West should consider ramifications of its off-oil rhetoric

Gavin Longmuir
Consulting Petroleum Engineer
Stanley, NM

A.F. Alhajji
Ohio Northern University
Ada, Ohio

COMMENT

Environmental and political enthusiasm in the West for getting rid of oil as an energy source may have major unintended consequences through its impact on decisions by a handful of key oil exporters. Such consequences could paradoxically include increased Western dependence on oil and higher energy prices.

An energy crisis is imminent if oil-exporting countries believe Western rhetoric and decide to reduce their investment in capacity expansions at a time when the West is failing to find a suitable substitute. In this case, consumers will pay a dear price for the ill-considered statements of their leaders.

If, by contrast, oil producers attempt to counter a policy-induced decline in demand and kill oil substitutes by raising production to lower crude oil prices, or if demand actually declines, a different set of problems might emerge. Either scenario could wreak havoc on the economies in the Middle East, supposedly one of the least stable areas in the world. The cost of such political instability in terms of lives, money, and pollution will render all the positive results from weaning consuming countries off oil negligible.

If oil-consuming countries wish to lead the world safely to a future without fossil fuels, they will have to consider energy-market realities and how to meet the revenue needs of current oil exporters, as well as how to ensure adequate oil supplies during the transition and investment sufficient to develop new energy-supply technologies. The new energy vision must adhere to market realities. Otherwise, market forces will soon defeat these efforts.

Market realities

The main threat to sustainability of energy supplies is not a terrorist attack on energy facilities or the imposition of an oil embargo by an oil producing country. These threats are short-term events that can be dealt with quickly and effectively through various measures that include the use of the Strategic Petroleum Reserve, increased production, and diversion of oil shipments.

The main threat to sustainability of energy supplies in the medium term is the mismatch between investment in production capacity and energy infrastructure, on one hand, and growth in demand for energy, on the other. One of the most plausible scenarios is a relative decline in investment supporting additional production capacity in the oil-producing countries in response to calls around the world to reduce or even eliminate dependence on oil.

An energy crisis in this case is imminent if those who are calling for eliminating dependence on oil fail to provide the ultimate replacement in a timely manner. Most likely, these efforts will fail to replace oil within a reasonable time. Most of the efforts to replace oil are not market-driven and are heavily subsidized. They cannot sustain the pressure of markets in the long run.

Oil is still abundant. But much remaining conventional oil is in the hands of a very small number of governments, primarily in the Middle East. Will all the talk about reducing dependence on oil have an impact on the behavior of those governments?

Major oil exporters have tended to view their remaining oil in the ground as an appreciating asset, one which should be exploited at a measured pace so that some is left for future generations. To them, the call for security of demand becomes very attractive when the other side is exerting pressure on the producing countries to insure security of supply.

Talk about moving away from oil through coercive policies seriously challenges the sustainability of oil producers' societies. To add insult to injury (or injury to insult), much of this kind of talk comes from European governments that take a high share of the economic rent on the exporters' oil through extremely high taxes on end-consumers. Those consumer-country governments are thus claiming much of the current revenue stream from the oil producers' major asset while simultaneously planning to eliminate the demand for it.

Even hopes for a peaceful, democratic Iraq cannot come to fruition without oil revenues. Major oil exporters treat talk of eliminating dependence on fossil fuels as an existential threat to their societies, especially when the talk is based on hostile ideological agendas rather than market principles.

Possible responses

To these apparently hostile statements from across the political spectrum in oil-consuming countries, oil producers might react in a number of ways:

- Their simplest response would be to ignore escalating Western claims about weaning themselves off oil as some bizarre form of liar's poker among Western political classes. Oil exporters might look at the actual continuing growth in oil demand and conclude that oil consumers do not intend to follow through with the necessary hard choices. Additionally, oil exporters could sit and watch Western developments, comfortable in the knowledge

that currently popular carbon capture and storage is very energy-intensive and, if implemented, will substantially increase the demand for fossil fuels, thus rendering their oil resources even more valuable.

- Oil exporters could take Western commentators seriously and assume that oil importers will indeed reduce their demand for oil, leaving them with then-unmarketable oil in the ground. Their logical response to this threat would be to accelerate production of oil while their resources still have value. This would of course drive down the price of oil and undermine the economic feasibility of alternative energies. A collapse in the price of oil would kill several new energy technologies and ultimately increase demand for oil. In fact, the oil-producing countries might view increasing oil production and lowering prices as a logical policy to counter the antioil policies of the governments of consuming countries. Historical data from periods of oil price collapses support this point: Low oil prices increase oil demand, decrease efficiency improvements, choke alternative energy resources, and increase waste.
- Alternatively, expecting a decline in demand for their oil, oil-producing countries might decide to reduce their planned investments in production capacity expansion and maintenance and mothball some planned projects, which would shortly lead to declining oil supplies. If new technologies do not come on line by the time oil production starts declining, the world will face a serious energy crisis, probably unparalleled in history. Reversing such a trend of declining investments would take years, despite massive increases in oil prices. This alternative is not a mere possibility: Several major projects have been mothballed in the past when the oil-producing governments deemed these projects not needed.
- If oil-consuming countries do begin to reduce their dependence on oil, major oil exporters could seek to use their now less-valuable oil within their own borders as cheap fuel with which to expand heavy industries. Instead of exporting oil directly, they could export the energy from that oil embedded in metals, chemicals, and manufactured products at prices that far undercut Western products, constrained as Western manufacturers would be by having to use higher-cost alternative energy sources. The net result would be a loss of jobs and economic strength by the West without having any impact on the overall global consumption of fossil fuels.

Even if Western countries successfully replaced imported oil with indigenous alternative energy sources, they would still have to live on the same planet as oil-exporting countries, whose fragile societies would then face the loss of their main source of revenue. Energy independence for current oil importers, if somehow achieved, would aggravate political instability in oil-exporting countries.

In addition, it is unclear what will happen to the world monetary system without trade in oil and the associated recycling of petrodollars. A change to a world where most industrial countries depend on their own domestic energy resources would require a major change in the global financial system. Such a change would create its own difficulties, impacting even the industrial countries.

Possible responses

Major oil producers have several long-term, market-oriented, economically viable, and sustainable options to ensure their economic growth, prevent a worldwide energy crisis, and reduce emissions.

They might, for example, invest heavily in CO_2 sequestration and various emissions-reduction technologies. This investment might include CO_2 for enhanced oil recovery. This is a transitional option that guarantees the availability of energy supplies and a steady stream of oil revenues while it reduces emissions from fossil fuels. Oil exporters might reasonably expect importers to pay a higher price for this "greener" oil.

Oil-producing countries also might seek to become leaders in nonfossil fuels through direct investment in projects or by research funding. Oil-producing countries in North Africa and the Middle East, for example, have the large areas of vacant land and consistent sunshine required by two of the alternative energy sources most amenable to technological breakthrough: photovoltaics and biofuels. An interesting question is whether Western politicians now intolerant of oil from those regions might respond in the same manner to alternative energy from the same places.

In the shorter term, oil exporters might lobby consuming-nation governments for loopholes in antioil laws, invest in the downstream businesses of consuming countries to help meet oil demand and gain local political influence, or fund unconstrained scientific research into global climate processes. Some such activities obviously might strain ethics and, from the perspective of oil exporters, backfire.

Goals of cooperation

Politicians, environmentalists, and the public in oil-consuming countries should not ignore the valid interests of the oil exporters on which they currently depend. Oil consumers and producers will have to find ways to cooperate.

For oil-consuming countries wishing to reduce the global use of fossil fuels without provoking an economic depression, the objectives of cooperation should be ensuring adequate supplies of oil during the transition away from oil and keeping the oil price stable at a level high enough to encourage investments in alternative energy sources. For major oil-exporting countries, the objectives of cooperation should be maintaining national revenues as demand for oil is progressively reduced and replacing the asset underlying their economies as oil in the ground loses value.

Balancing these objectives will be challenging. It might require politically difficult sacrifices by oil-consuming countries, such as compensating exporting countries for their declining sales volumes or mothballing their own oil-production capacity.

The willingness to make such sacrifices and acceptance of such risks will be a test of how serious oil consumers are about weaning themselves off fossil fuels. If industrial countries are reluctant to incur the costs of mothballing their own sizable oil-production capacity or are unable to agree on an equitable sharing of the costs of this policy between themselves, they will have demonstrated that they are not serious about reducing global oil consumption. And OPEC countries can comfortably invest accordingly. ✦

The authors

Gavin Longmuir (LongmuirG@aol.com) is a Stanley, NM-based consulting petroleum engineer, affiliated with International Petroleum Consultants Association Inc. of Evergreen, Colo., with over 25 years of worldwide experience in the upstream oil and gas industry. He has worked in the appraisal and development of onshore and offshore oil and gas fields, economic evaluation of exploration and acquisition opportunities, assessment of new technologies, and the resolution of contractual and regulatory disputes. Prior to his association with IPCA, he worked in a variety of technical and commercial functions with BP, Sohio Petroleum, and Occidental Petroleum. He earned BS (First Class Honors) and PhD degrees at the University of Strathclyde in Scotland, and an MBA at the University of New Mexico.

A.F. Alhajji (a-alhajji@onu.edu) is an associate professor of economics at the University of Northern Ohio at Ada, Ohio. He was a research assistant professor and visiting assistant professor at Colorado School of Mines during 1997-2001. He taught for 3 years at the University of Oklahoma, where he received his PhD in petroleum economics in 1995. Alhajji has published more than 300 articles and columns.

White House again cuts oil, gas R&D from DOE budget

Nick Snow
Washington Correspondent

The administration of President George W. Bush increased its request for fossil fuels by 33% to $863 million as it released its fiscal 2008 budget proposals on Feb. 5. But the money would be directed toward doubling the Strategic Petroleum Reserve's size, developing technologies to significantly cut greenhouse gas emissions from power plants and industrial facilities, and proceeding with a plan to combine electricity and hydrogen production in a single plant.

Oil and gas technology research and development would be eliminated, as it was in the White House's fiscal 2007 budget request. The US Department of Energy said its oil and gas group would manage the ultradeep and unconventional gas research program mandated by the 2005 Energy Policy Act, but the administration would propose legislation to terminate the program, which is funded from federal oil and gas lease revenues.

Senate Energy and Natural Resources Committee Chairman Jeff Bingaman (D-NM) immediately protested that the budget proposal effectively leaves coal as the only fuel on which DOE now proposes to carry out research.

"Even though the price of oil and gas are near record highs, we won't be able to tap new domestic oil and gas resources without additional R&D," he said. "The key players for natural gas onshore in the United States are independent producers, they don't have R&D departments, and they are too small to be able to afford to start ones, regardless of the price of oil and gas," he added.

"If the government abandons the field of oil and gas research, where is the new technology going to come from to keep domestic natural gas flowing in an economic and environmentally responsible manner? This is a wrongheaded decision that I hope the Congress reverses," said Bingaman, who added that elements of the fiscal 2008 budget request for DOE, such as increases for biomass and biofuels R&D, are positive.

Strategic reserve

In his 2007 State of the Union address on Jan. 23, Bush said he would ask Congress to double the strategic reserve's size "to further protect America against severe disruptions to our oil supply." DOE's fiscal 2008 budget request includes $354.2 million to operate the nation's crude oil and heating oil reserves and increase the crude oil reserve's capacity to 1.5 billion bbl by 2027.

Specifically, the request includes $163.5 million to develop SPR facilities and adds $168.1 million to buy more crude for the reserve. The process would begin immediately by filling it to its current 727 million bbl capacity and continue in fiscal 2008 by adding capacity at current and new sites, DOE said.

Another $5.3 million would be used to operate the Northeast Home Heating Oil Reserve, and an additional $17.3 million would go to operations of the Naval Petroleum and Oil Shale reserves.

Bingaman questioned the administration's rationale for doubling the strategic reserve's capacity. "I am a strong supporter of the Strategic Petroleum Reserve, but the administration has never given us a clear idea of what—short of a total calamity like Hurricane Katrina—it would take to put it to use," he said.

"Also, the same budget undercuts domestic production of oil and gas by terminating the R&D programs that support our other strategic petroleum

Gas Storage & US LNG Imports: What's In Store?

The future of many North American LNG terminals may well depend on their access to underground natural gas storage.

LNG WEBCAST HIGHLIGHTS

On February 22, 2007, LNG Observer's Editor, Warren True, will lead a panel discussion on the importance and future of gas storage.

Hal Miller, of the widely respected consultancy Galway Group, will provide an overview of the current state of underground natural gas storage.

Ned Crady, with leading LNG law firm King & Spalding, will cover regulatory and legal issues that may affect development of storage.

Mark Cook, current Chairman of National Energy Services Association (NESA), will discuss how development of a specific storage project fits with planned LNG terminal projects along the US Gulf Coast.

The Panel of Industry Experts Includes:

H.J. "Hal" Miller
Mr. Miller is the Managing Director of Galway Group. His expertise spans technical, strategic planning, and financial areas in the energy industry. Galway's expertise in worldwide LNG matters is widely recognized in the industry.

George E. "Ned" Crady
Mr. Crady is a partner in the Houston office of King & Spalding and is a member of the firm's Global Transactions Practice Group and Latin America Practice Group. He has extensive experience in LNG export projects in Latin America; LNG import projects in the Atlantic Basin; and the negotiation of commodity supply contracts around the world.

Mark D. Cook
Mr. Cook is Principal of SGR Holdings, responsible for selling storage services and overall commercial development for the Southern Pines Energy Center in Greene County, Mississippi. Prior to SGRH, he served as Vice President with Aquila Energy and was instrumental in developing The Exchange Center, providing innovative solutions for natural gas storage and transportation.

February 22, 2007

1:00 pm CST
(2:00 pm EST)

Register free at:
www.ogjonline.com
(webcast section)

For Sponsorship Opportunities,
Contact Mike Moss at 713.963.6221 or mikem@pennwell.com

PennWell®

reserve, the onshore oil and gas formations that we will have to continue to produce. It does not look like there is a consistent policy here," he said.

US Sec. of Energy Samuel W. Bodman was scheduled to go before Bingaman's committee on Feb. 7 in DOE's first budget hearing before the 110th Congress. ✦

CERA: Rising gas production costs diminishing returns

Fewer natural gas reserves are being added for every dollar spent on exploration and production, and higher costs are undermining the economics of drilling more gas wells, Cambridge Energy Research Associates said in a recent report.

"Conventional wisdom is that all producers are enjoying a windfall from higher prices; however, the less-visible cost of gas production has moved up as dramatically as market prices," said J. Michael Bodell, CERA director, upstream gas strategies.

The report, "Diminishing Returns," analyzed full-cycle costs for wells drilled in 2005. The study also identified a shift toward unconventional gas production, now accounting for 25% of total US and Canadian gas production.

CERA used statistics from its parent, IHS, to analyze costs and production rates for 48,000 wells completed in 50 US and Canadian gas basins (232 individual plays) in 2005.

Researchers found capital costs (excluding operating costs, royalties, and return) were $1-6/Mcf.

The weighted average all-in cost was from less than $4/Mcf to more than $12/Mcf. Judged against record 2005 gas prices averaging $8.80/Mcf at Henry Hub, more than 6% of basins had high enough costs to prevent a 10% rate of return-on-investment.

More wells, flat production

"Record prices in 2005 triggered a tremendous response in drilling by gas producers, leading to nearly decade-high reserves additions of 26.4 tcf and added production of 14.7 bcf that year," Bodell said.

Yet production remained flat despite more rigs drilling during the past decade, he said. Meanwhile, the cost of new gas supply rose due to higher drilling and operating costs as well as declining average well productivity and initial production rates.

"The ultimate economic performance of the wells drilled in 2005 will depend on the trajectory of market prices and many other factors related to well production," Bodell said. "However, viewed in the context of the market and cost environment at the time of drilling, it is clear that rising service costs have begun to take away much of the margin in many wells and plays despite historically strong market prices."

Declining productivity

Record well completions are being totally offset by declining well productivity, and price expectations will be key to motivate continued strong drilling, Bodell said.

"The fundamental driver of the North American E&P challenge is the relative maturity of the natural gas resource base," he said. "Although gas resources are available—and some are off limits due to access issues—and new plays are being identified and developed, many of these resources are deeper, smaller, technically more challenging, or more distant from markets."

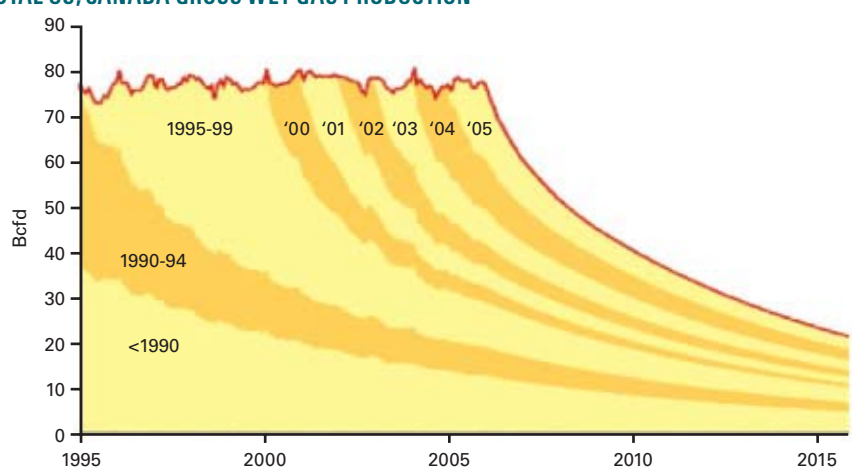
The study found E&P companies are developing smaller resources and facing higher costs, with the inevitable result of increased unit costs. Within this overall trend, many regions still reported strong margins and provide returns on equity of well above 10%.

"The E&P companies that have shifted their portfolios to include these lower-cost resources, particularly the early movers, are recognizing substantial cost advantages," Bodell added.

The study also said producers have heightened drilling levels to replace gas lost from production declines in wells drilled during previous years.

"If no further drilling occurred after 1999, North American wet gas production would have fallen to about 29 bcf

TOTAL US, CANADA GROSS WET GAS PRODUCTION



Source: Cambridge Energy Research Associates

INVITATION TO PREQUALIFY

Chevron

OLOKOLA GAS SUPPLY PROJECT (OKGS)
Pipelines - 30" Diameter and Below
CHEVRON NIGERIA LIMITED
(Operator of the NNPC/CNL Joint Venture)

Invitation to prequalify for inclusion on the bid list for the lump sum contract covering Engineering, Procurement, Installation and Commissioning (EPIC) of pipelines, 30" diameter and below, in association with the Olokola Gas Supply Facilities; offshore Bayelsa, Delta, Ondo, and Ogun states, Federal Republic of Nigeria

INTRODUCTION

Chevron Nigeria Limited (CNL), the operator of the Joint Venture between itself and the Nigerian National Petroleum Corporation (NNPC), intends, on behalf of the Joint Venture, to install pipelines as part of the Olokola Gas Supply (OKGS) Facilities. The pipelines are to be located in the offshore Bayelsa, Delta and Ondo states in Nigeria.

The NNPC/CNL Joint Venture is committed to providing opportunities for Nigerian companies and Nigerian labor to participate and develop their expertise in line with the Federal Government Policy on Local Content Development and consistent with the project objectives of safety, schedule, cost and quality. Accordingly, the pipe coating portion of this scope will be performed in Nigeria.

SCOPE OF WORK

Capable national engineering and construction firms and International EPIC contractors who are committed to including local Nigerian firms in their execution strategy are hereby invited to submit prequalification documentation for the OKGS pipelines (30" diameter and below) lump sum tender for Engineering, Procurement, Installation and Commissioning (EPIC) of the following preliminary scope of work. The line pipe will be free issued, uncoated, to the EPIC contractor.

Line	Diameter (in)	Length (km)	Typ. Water Depth (m)
Okan NWP 2 to Okan GPP	20	6.9	6 – 17
Okan NWP 1 to Okan GPP	24	7.4	17
Okan NWP 3 to Okan GPP	18	6.6	7 – 17
Okan NWP 4 to Okan GPP	18	6.6	6 – 17
Meji NWP 1 to Meji wye	24	1.0	8
Meji NWP 2 to Meji wye	24	2.0	7
Meji wye to Okan GPP	24	14.5	8 – 17
Sonam NWP 1 to Sonam wye	26	0.5	63
Sonam NWP 2 to Sonam wye	26	2.5	63
Sonam wye to Okan GPP	26	23.3	63 – 17
Apoi NWP - L to Funiwa GPP	20	12.3	8 – 18
Okubie NWP 1 to Funiwa GPP	20	23.5	16 – 18
Funiwa GPP to EA RPB	30	63.1	18 – 20
Okan GPP to 200 feet of depth	10	TBD	17 – 63
Funiwa GPP to 200 feet of depth	14	TBD	61.0

PREQUALIFICATION CRITERIA

Only qualified contractors and/or consortiums that have recent, relevant, and demonstrated experience in successfully managing EPIC pipeline contracts with values of at least US$100,000,000 will be considered to competitively tender for the scope of work described above. In addition, interested contractors are also required to submit information to establish their qualifications in areas including but not limited to the following:

- **Company Profile:** Provide full details of company profile (including but not limited to organizational structure, copy of certificate of incorporation, business locations, fabrication yards and/or installation equipment, holdings, Insurance agencies, contacts and resumes of key management personnel).
- **Business Registration and Documentation:** Provide copies of the current Nigerian Department of Petroleum Resources (DPR) certificate of registration, income Tax Clearance Certificate and VAT registration Number.
- **Company financial Status:** Submit copies of Certified Audited financial statement for the last three years, income Tax Clearance Certificate with minimum annual turnover of US$100 million, Bankers, funding information, evidence of credit limit that can be available within a year.
- **Previous work experience:** Evidence of relevant, verifiable and completed experience on similar work on turn key basis. Attach list of references with description, the scope, Value, Man-hours, responsibility, Service in Nigeria and other locations worldwide, Name of the client, contact representative with telephone numbers and E-mail addresses of each for reference purposes. Evidence of Equipment own or plans to lease.
- **HES Policies:** Submit detail summary of existing and proposed Health, Environment and Safety policy, program and management system. Evidence exemplary work site Safety performance.
- **QA/QC Policies:** Submit Company existing Quality Assurance and Quality Control Policies and program with ISO certification. This document shall be used as a primary tool for evaluation.
- **Subcontractors:** Provide list of any specific portions of the work which are intended to be subcontracted.
- **Community Relations:** Evidence of community affairs policy, Records and Program, including interfaces, social responsibilities and liabilities
- **Local Content Policy:** Evidence of existing and/or proposed local content policy and program, including all aspects of the work to be executed in Nigeria, utilizing Nigerian personnel and expatriate, facilities and Services, Demonstrate commitment to optimizing Nigerian content in the execution of the work to the extent of meeting and/or surpassing Nigerian Content target.
- **Power of Attorney:** provide a signed Power of Attorney for an officer that will lead and communicate with Chevron JV during the bid period.
- **Joint Venture Arrangement:** In the case of a Joint Venture or consortium arrangement, evidence of signed agreement of interest and memorandum of understanding (MOU) by the Partners will be required including each partners legal status, country of incorporation and residence for tax purpose. The Joint Venture shall provide evidence of joint and several liabilities among the Ventures or Consortium.
- **NOTE:** Preference will be given major companies which possess adequate experience in the Oil and Gas production facilities Engineering design, Procurement, Installation and Commissioning (EPIC) and are committed to including Nigerian/Local firms in their execution strategy. Companies that are structured as agencies will not be considered and foreign companies that are interested in the project must identify and indicate its local affiliate or partners showing the aspect of the work that will be executed in Nigeria.

Any incomplete information may disqualify a respondent. CNL may also disqualify any contractor which is delinquent in its payment of Nigerian taxes.

NIGERIAN CONTENT

In line with the Federal government of Nigeria directives on Nigerian content of targets of 45% and 70% by year end 2006 and 2010, interested Contractors and/or Consortiums are to include in their Prequalification Data Package submittal, a statement that if qualified and selected to submit a technical and/or commercial bid, their Nigerian content plan submission will comply with this directive. In addition, this statement shall confirm that if qualified and selected to submit a technical and commercial bid, then their bid submission will identify the Nigerian work scope and this identification will be in the form of a percentage of the overall work scope in monetary terms (commercial submission) of the value that will be created "in-country" and use of Nigerian resources (material and labor) on this project.

Any Interested Contractor and/or Consortium must include in the statement submitted in response to this Advertisement and "Prequalification Data Package Submittal" an acknowledgement and willingness to comply with the following:

- Domiciliation of 100% engineering activities Nigeria.
- Location of Project Management personnel and a procurement center in Nigeria.
- Fabrication works will be executed in Nigeria fabrication yards.
- Commitment to comply with Nigerian content directives along with plans for optimizing Nigerian content in the execution of this work.
- Acknowledge that, if qualified and selected to submit a technical and commercial bid, then the technical and/or commercial bid submission will contain the following information:
  - List of Nigerian subcontractors that will participate in the execution of the project.
  - Identify local equipment, material and goods that will be sourced on this project.
- Non compliance with Nigerian Content Directives may disqualify a bid submission.

PREQUALIFICATION DATA PACKAGE

To be considered, responses must be submitted in the format and level of detail required in the CNL OKGS EPIC Prequalification Data Package. This package may be obtained, between the hours 08:00 and 15:00 (Monday through Thursday), by calling at either of the following locations:

Chevron Nigeria Limited
Manager of Internal Controls
2 Chevron Drive, Lekki Peninsula
P.M.B. 12825, Lagos, Nigeria
Tel: +234 1 2600600

Chevron International Exploration and Production
CNL Gas Projects Contracts Advisor
25056C 1500 Louisiana Street
Houston, TX, USA, 77002
Tel: 832854.3553

The OKGS Pipeline Contract Prequalification Data Package will be available until February 16, 2007 at the locations specified above. Failure to obtain the prequalification package and provide all requested data within the specified time frame will automatically disqualify the applicant.

RESPONSES

Responses must be submitted in accordance with and demonstrate fulfillment of the requirements set forth in the CNL OKGS Pipelines, 30" diameter and below EPIC Contract Prequalification Data Package. Responses to this invitation shall be sealed and submitted in accordance with the prequalification data package instructions. Each response shall be marked "CONFIDENTIAL – OKGS Pipelines (less than 30") EPIC Invitation for Prequalification." The full name and address of the responding company or entity must be clearly marked on the submittals. Responses must reach the address given below not later than 14:00 hours on February 21, 2007.

Chevron Nigeria Limited
Manager of Internal Controls
2 Chevron Drive, Lekki Peninsula
P.M.B. 12825, Lagos, Nigeria
Tel: +234 1 2600600

This invitation does not obligate CNL to consider a responding company for prequalification, to include a responding company on a bid list, to award them a contract, or to inform them of any resultant action. CNL reserves the right to either accept or reject any submittal in part or in whole, at its sole discretion. All costs incurred as a result of this prequalification and any subsequent request for information shall be to the responding companies' accounts.

WATCHING THE WORLD

Eric Watkins, Senior Correspondent

Khodorkovsky's woes continue

Former Yukos head Mikhail Khodorkovsky knows where he stands in Vladimir Putin's Russia regarding new charges brought against him and business associate Platon Lebedev.

"It is absolutely clear what will happen next: Fake evidence, testimony from intimidated witnesses, and a quick guilty verdict," Khodorkovsky said last week in a statement written from his prison cell in Chita, eastern Siberia.

Khodorkovsky and Lebedev were charged on Feb. 5 with laundering more than $20 billion. If Khodorkovsky is found guilty of the charges, 10 years or more could be added to his sentence.

Once Russia's richest man, Khodorkovsky is serving 8 years on fraud and tax evasion charges, which he claims were fabricated by his enemies in the Kremlin to punish him for his political ambitions.

He rejected the new charges brought against him and has no doubts about the nature and purpose of the court.

No appeal

"The court, which has become a subservient part of the 'vertical power system,' will of course produce a guilty verdict," Khodorkovsky said, adding that the new charges and the verdict are aimed simply at extending his current term in prison.

"Those who devised the 'Khodorkovsky case' in a bid to steal Russia's most prospering oil company—Yukos—are afraid to see me free and want to make sure I am not released early," Khodorkovsky said.

He said he is not losing much sleep over the prospect of a new prison term.

"A new verdict does not scare me," he wrote. "What difference does it make how many years I get under trumped-up charges? Whatever the prospect, my persecutors—'the party seeking a second prison term for Khodorkovsky'—are not trusted by any decent person in the world."

Yes, one can certainly agree with him on that point. Who, after all, really does credit Putin with anything more than a naked power grab in his treatment of the former Yukos chief?

Future hopes

Considering that treatment, Khodorkovsky has come to accept his fate in the hope of something better when Putin eventually leaves office. "My future and that of Platon Lebedev will entirely depend on the future of our motherland and its image after the change of power in 2008," Khodorkovsky said.

He had better hope that Putin can be trusted not to handpick a successor—as did former President Boris Yeltsin—who would simply pursue the same policy of intimidation and slander into the distant future.

Meanwhile, Khodorkovsky has plans of his own regarding the trial.

"My goal in the upcoming trial is to use my example to demonstrate that there is a 'managed' judicial system in Russia, that the law enforcement system and international cooperation between law enforcement agencies are being used not only to fight crime, but also for the advancement of bureaucrats' selfish interests and personal political goals," Khodorkovsky wrote. ✦

by 2006, or less than half the production level in 1999," Bodell said.

Shift to unconventional gas

The CERA-IHS analysis found higher prices combined with improved drilling and rock fracture technology has accelerated development of unconventional resources, which accounted for 23% of total US and Canadian gas production in 2005. That compared with 11% in 1995.

Unconventional gas has been generally more costly to develop than conventional gas until recently. Because these resources have lower per-well flow rates and require more wells in a given area to maintain a given supply level, gas production rates for wells added in 2005 were about half that of wells drilled 10 years earlier.

However, because unconventional wells access larger deposits than their conventional counterparts, they accelerate reserve growth and provide higher production over a well's 20-year life.

"On the question of whether unconventional gas is cheaper or more expensive than conventional resources, we found there is no consistent answer," Bodell said. "Unconventional production basins are distributed throughout the cost spectrum among the lowest and the highest cost resources, and not overweighted on either the low or high end."

Industry is investing heavily in unconventional resources, moving from the easier plays and basins to more challenging opportunities, he said.

"These more challenging resources may come at a cost that has the potential to put them in direct competition with imported LNG," Bodell said. ✦

Reprints of any OGJ article or advertisement may be purchased from Reprint Dept., PennWell 1421 S. Sheridan, Tulsa, OK 74112, 1-800-216-2079 or 918-832-9379. Minimum order 100.

INVITATION TO PREQUALIFY

Chevron

OLOKOLA GAS SUPPLY PROJECT (OKGS)
Pipelines - 32" Diameter and Above
CHEVRON NIGERIA LIMITED
(Operator of the NNPC/CNL Joint Venture)

Invitation to prequalify for inclusion on the bid list for the lump sum contract covering Engineering, Procurement, Installation and Commissioning (EPIC) of pipelines, 32" and above in diameter, in association with the Olokola Gas Supply Facility; offshore Bayelsa, Delta, Ondo and Ogun states, Federal Republic of Nigeria

INTRODUCTION

Chevron Nigeria Limited (CNL), the operator of the Joint Venture between itself and the Nigerian National Petroleum Corporation (NNPC), intends, on behalf of the Joint Venture, to install pipelines as part of the Olokola Gas Supply (OKGS) Facility. The pipelines are to be located offshore Bayelsa, Delta, Ondo and Ogun states in Nigeria.

The NNPC/CNL Joint Venture is committed to providing opportunities for Nigerian companies and Nigerian labor to participate and develop their expertise in line with the Federal Government Policy on Local Content Development and consistent with the project objectives of safety, schedule, cost and quality. Accordingly, the pipe coating portion of this scope will be performed in Nigeria.

SCOPE OF WORK

Capable national engineering and construction firms and International EPIC contractors who are committed to including local Nigerian firms in their execution strategy are hereby invited to submit prequalification documentation for the OKGS pipelines (32" and above) lump sum tender for Engineering, Procurement, Installation and Commissioning (EPIC) of the following preliminary scope of work. Item 1 scope includes two (2) access shore crossings. The line pipe will be free issued, uncoated, to the EPIC contractor.

Item No.	Line	Quantity	Diameter (in)	Length (km)	Typ. Water Depth (m)
1	Okan GPP to OKLNG	Two (2)	48	122	17
2	EA Hub to Okan GPP	One (1)	48	97	17-20

PREQUALIFICATION CRITERIA

- **Company Profile:** Provide full details of company profile (including but not limited to organizational structure, copy of certificate of incorporation, business locations, fabrication yards and/or installation equipment, holdings, Insurance agencies, contacts and resumes of key management personnel).
- **Business Registration and Documentation:** Provide copies of the current Nigerian Department of Petroleum Resources (DPR) certificate of registration, income Tax Clearance Certificate and VAT registration Number.
- **Company financial Status:** Submit copies of Certified Audited financial statement for the last three years, income Tax Clearance Certificate with minimum annual turnover of US$150 million, Bankers, funding information, evidence of credit limit that can be available within a year.
- **Previous work experience:** Evidence of relevant, verifiable and completed experience on similar work on turn key basis. Attach list of references with description, the scope, Value, Man-hours, responsibility, Service in Nigeria and other locations worldwide, Name of the client, contact representative with telephone numbers and E-mail addresses of each for reference purposes. Evidence of equipment owned or plans to lease and availability.
- **HES Policies:** Submit detail summary of existing and proposed Health, Environment and Safety policy, program and management system. Evidence exemplary work site Safety performance.
- **QA/QC Policies:** Submit Company existing Quality Assurance and Quality Control Policies and program with ISO certification. This document shall be used as a primary tool for evaluation.
- **Sub-Contractors:** Provide list of any specific portions of the work which are intended to be subcontracted.
- **Community Relations:** Evidence of community affairs policy, Records and Program, including interfaces, social responsibilities and liabilities
- **Local Content Policy:** Evidence of existing and/or proposed local content policy and program, including all aspects of the work to be executed in Nigeria, utilizing Nigerian personnel and expatriate, facilities and Services, Demonstrate commitment to optimizing Nigerian content in the execution of the work to the extent of meeting and/or surpassing Nigerian Content target.
- **Power of Attorney:** provide a signed Power of Attorney for an officer that will lead and communicate with Chevron JV during the bid period.
- **Joint Venture Arrangement:** In the case of a Joint Venture or consortium arrangement, evidence of signed agreement of interest and memorandum of understanding (MOU) by the Partners will be required including each partners legal status, country of incorporation and residence for tax purpose. The Joint Venture shall provide evidence of joint and several liabilities among the Ventures or Consortium.
- **NOTE:** Preference will be given major companies which possess adequate experience in the Oil and Gas production facilities Engineering design, Procurement, construction, Installation (EPCI) and are committed to including Nigerian/Local firms in their execution strategy. Companies that are structured as agencies will not be considered and foreign companies that are interested in the project must identify and indicate its local affiliate or partners showing the aspect of the work that will be executed in Nigeria.

Any incomplete information may disqualify a respondent. CNL may also disqualify any contractor which is delinquent in its payment of Nigerian taxes.

NIGERIAN CONTENT

In line with the Federal government of Nigeria directives on Nigerian content of targets of 45% and 70% by year end 2006 and 2010, interested Contractors and/or Consortiums are to include in their Prequalification Data Package submittal, a statement that if qualified and selected to submit a technical and/or commercial bid, their Nigerian content plan submission will comply with this directive. In addition, this statement shall confirm that if qualified and selected to submit a technical and commercial bid, then their bid submission will identify the Nigerian work scope and this identification will be in the form of a percentage of the overall work scope in monetary terms (commercial submission) of the value that will be created "in-country" and use of Nigerian resources (material and labor) on this project.

Any Interested Contractor and/or Consortium must include in the statement submitted in response to this Advertisement and "Prequalification Data Package Submittal" an acknowledgement and willingness to comply with the following:

- Domiciliation of 100% engineering activities Nigeria.
- Location of Project Management personnel and a procurement center in Nigeria.
- Fabrication works will be executed in Nigeria fabrication yards.
- Commitment to comply with Nigerian content directives along with plans for optimizing Nigerian content in the execution of this work.
- Acknowledge that, if qualified and selected to submit a technical and commercial bid, then the technical and/or commercial bid submission will contain the following information:
  - List of Nigerian subcontractors that will participate in the execution of the project.
  - Identify local equipment, material and goods that will be sourced on this project.
- Non compliance with Nigerian Content Directives may disqualify a bid submission.

PREQUALIFICATION DATA PACKAGE

To be considered, responses must be submitted in the format and level of detail required in the CNL OKGS EPIC Prequalification Data Package. This package may be obtained, between the hours 08:00 and 15:00 (Monday through Thursday), by calling at either of the following locations:

Chevron Nigeria Limited
Manager of Internal Controls
2 Chevron Drive, Lekki Peninsula
P.M.B. 12825, Lagos, Nigeria
Tel: +234 1 2600600

Chevron International Exploration and Production
CNL Gas Projects Contracts Advisor
25056C 1500 Louisiana Street
Houston, TX, USA, 77002
Tel: 832.854.3553

The OKGS Pipelines, 32" Diameter and above EPIC contract Prequalification Data Package will be available until February 16, 2007, at the locations specified above. Failure to obtain the prequalification package and provide all requested data within the specified time frame will automatically disqualify the applicant.

RESPONSES

Responses must be submitted in accordance with and demonstrate fulfillment of the requirements set forth in the CNL OKGS Pipelines (32" and above) EPIC Contract Prequalification Data Package. Responses to this invitation shall be sealed and submitted in accordance with the prequalification data package instructions. Each response shall be marked "CONFIDENTIAL – OKGS Pipelines (32" diameter and above) EPIC Invitation for Prequalification". The full name and address of the responding company or entity must be clearly marked on the submittals. Responses must reach the address given below not later than 14:00 hours on February 21, 2007.

Chevron Nigeria Limited
Manager of Internal Controls
2 Chevron Drive, Lekki Peninsula
P.M.B. 12825, Lagos, Nigeria
Tel: +234 1 2600600

This invitation does not obligate CNL to consider a responding company for prequalification, to include a responding company on a bid list, to award them a contract, or to inform them of any resultant action. CNL reserves the right to either accept or reject any submittal in part or in whole, at its sole discretion. All costs incurred as a result of this prequalification and any subsequent request for information shall be to the responding companies' accounts.

Senators told of alternative-fuel transport challenges

Nick Snow
Washington Correspondent

Congress should resist mandating higher volumes or quicker implementation of biofuels beyond the existing federal renewable fuels standard (RFS), a National Petrochemical & Refiners Association official told a US Senate committee Feb. 1.

"Biofuels should be allowed to develop without a mandate and with a full understanding of their impact on energy supplies and air quality," NPRA Executive Vice-Pres. Charles T. Drevna said during a Senate Energy and Natural Resources Committee workshop on transportation biofuels.

He was part of a panel discussing national infrastructure integration.

Drevna warned in a written statement that transportation and logistical problems could grow as relatively new biofuels enter the market. Ethanol, which can't be shipped through pipelines because of its water solubility and corrosive properties, must be blended with gasoline at terminals, he said.

"This makes the distribution and the delivery of ethanol expensive because it requires more-expensive transportation modes, such as trucks, rail cars, and ships. Therefore, any significant increase in the production of ethanol will result in more stress on the distribution system," Drevna said. He urged Congress to preempt biofuel mandates adopted by several states and some municipalities. "The existing federal RFS mandate with its credit-trading provision contains a degree of freedom that allows the distribution system to operate at a low-cost optimum by avoiding infrastructure bottlenecks, such as lack of storage or rail capacity," he said.

Air quality impacts

Biofuels should be developed with full realization of their impact on air quality, Drevna said. He noted that ethanol increases gasoline's Reid vapor pressure, increasing emissions of volatile organic compounds during summer.

"Also, given [that] the 8-hr ozone nonattainment national ambient air quality standards will result in many new nonattainment areas, it is unlikely that the mandated level of ethanol can be distributed in 9 [psi] rvp conventional gasoline areas without exacerbating ozone problems in nonattainment areas or creating new nonattainment areas," he said. "The expansion of nonattainment areas will impose constraints on the usage of ethanol that will result in increased costs because the distribution system will be pushed away from the low-cost solution. These additional costs will be borne by consumers."

Michael Mears, vice-president for transportation at Magellan Midstream Partners LLP noted that ethanol transportation poses operational, technical, and economic challenges for pipeline owners and operators. "These include the practices and equipment to minimize water content and impurities, compatibility of existing seals and gaskets used in the valves and pumps, and the potential for stress corrosion cracking of pipelines and tanks," he said.

"Substantial research into the causes of these items, particularly the stress corrosion cracking issue, is needed. It is our responsibility to prevent pipeline leaks and protect the environment, so a complete understanding of this issue will be necessary before we are comfortable in considering ethanol transportation by pipeline. Targeted industry research on this matter is under way," said Mears, who also is chairman of the Association of Oil Pipe Lines.

He said that while limited opportunities may emerge to transport 10% ethanol blends in existing pipelines due to its relatively low concentration, "we believe the most likely opportunity to transport fuel grade ethanol will be in a dedicated pipeline built for that specific purpose." He said a line from the Midwest to the East Coast could cost $2 billion or more. It also would require secure long-term commitments from ethanol producers or end-users, aggregation systems within the producing region since it could take "up to dozens of individual plants to baseload a pipeline," development of distribution systems at the pipeline's terminus, and designation of a regulator with ethanol pipeline oversight authority.

Mears suggested that Congress address these issues by funding a study of the technical concerns associated with transporting ethanol through pipelines and by passing the Ethanol Infrastructure Expansion Act of 2006 (S. 4003), which focuses attention on existing barriers, market risk, regulatory issues, and financial incentives using a range of ethanol production levels.

Not switching

Robert Brown, vehicle environmental engineering director at Ford Motor Co. said that while the three US automakers have committed to making more than 50% of their fleets capable of running on alternative fuels, consumers are not yet making the switch.

"To promote energy security initiatives, attention must be focused on addressing infrastructure deficiencies for alternative fuels. For today's most promising alternative fuel, E-85, Ford supports initiatives that encourage its production, expand retail access to it, and ensure that it is competitively priced," Brown said in a written response to one of the committee's questions.

He said major oil companies, who own or franchise most US retail fuel outlets, "indicate their business equation does not support the development of a truly competitive alternative fuel choice." He said over 95% of the fueling stations offering E-85 are independent retailers, mostly in the Midwest. ✦

OIL&GAS JOURNAL

Everybody's Talking About What Bob Said!

And, It's Not Too Late To Hear What Bob Said.

On January 25, 2007, Bob Tippee, Editor of Oil & Gas Journal, presented OGJ's Annual Forecast and Review. His webcast presentation included projections of oil and gas demand – worldwide and US – for the coming year; a comparison of the forecast estimates with actual numbers from last year; as well as a discussion of anticipated 2007 drilling activity for the US and Canada.

Log on to our website and you can review the entire presentation at your leisure.

Find out "what Bob said" at:
www.ogjonline.com (webcast section).

Watch for more exciting and informative PennWell Webcasts scheduled for the months ahead, including:

OGJ - Natural Gas Storage and US LNG Import Trade

Offshore - Subsea Tieback

OGJ - Mid-Year Update and Forecast

Offshore - FPSO's

SINCERE THANKS TO OUR SPONSORS:

HALLIBURTON

BAKER HUGHES

LISKOW&LEWIS

VEOLIA WATER

For information on future sponsorship opportunities, contact:
Mike Moss at 713.963.6221 or *mikem@pennwell.com*

PennWell®

Newark basin log data indicate big gas potential in Pennsylvania, New Jersey

Arthur J. Pyron
Pyron Consulting
Pottstown, Pa.

Exploration geologists have expressed an interest in the hydrocarbon potential of the Mesozoic basins of eastern North America in the last three decades.

The author has presented his arguments for the potential of the Newark basin of New Jersey and Pennsylvania.[1-6] Until recently, his arguments have been limited by the lack of subsurface data for the basin.

In the mid-1980s, two exploratory wells were drilled in the Pennsylvania portion of the Newark Basin.

The North Central Oil Corp. Cabot KBI No. 1 is located in Nockamixon Township, Bucks County, Pa., and was plugged and abandoned on June 26, 1985, at TD 10,490 ft. The second well drilled was the North Central Joseph Parestis No. 1; it is located in New Hanover Township, Montgomery County, Pa., and was plugged and abandoned in December 1987 at TD 6,718 ft.

In addition, reflection seismic data have become commercially available, and one processed line has appeared in a number of technical publications.

Recently, well information for the Cabot KBI No. 1 well, which was previously held tight, became available from a variety of governmental sources. The author had the opportunity to analyze the available data, and has found some answers to questions regarding the potential of this basin.

The purpose of this article is to update the information on the potential of the Newark basin that the author previously discussed in other papers. An offset to the Cabot KBI No. 1 well, 40 miles north of downtown Philadelphia near the Delaware River and New Jersey, may be drilled as soon as 2007 (OGJ Online, Apr. 5, 2006).

Regional geology

The Newark basin is an exposed, elongate basin of Mesozoic age (Late Triassic to Middle Jurassic) that extends from New Jersey to Maryland (Fig. 1).

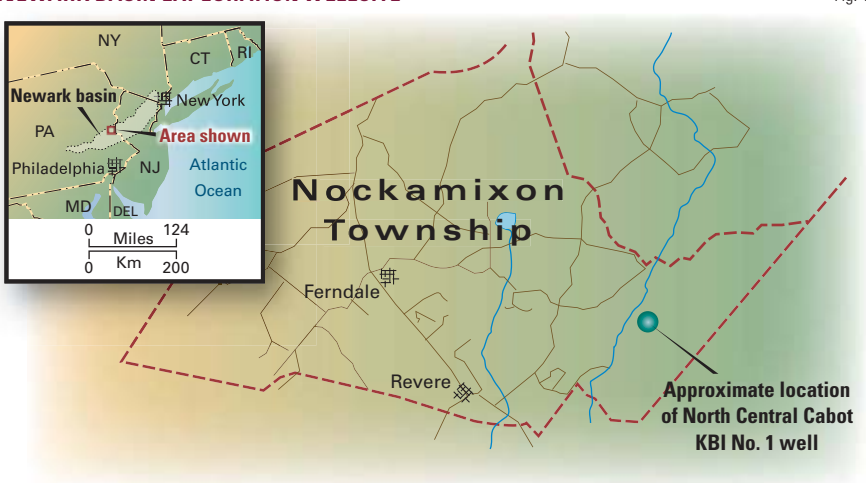
The basin is noted for its local exposures of red clastic rocks and diabase dikes. More current analysis suggests that the Newark basin is one of a series of half-graben structures that formed in North America, northwestern Africa, and western Europe in response to the breakup of the Pangaea supercontinent.

In the 1970s, a new interpretation of sedimentation in the basin suggested that lateral transitional facies from clastics along basin margins to organic shales in the basin center was a more accurate representation of basin sedimentation. Before this time, the interpretation of basin sedimentation was a simple "pancake layering" of fine-grained clastic sedimentary rocks.

The new interpretation is important because it suggests that sandstones

NEWARK BASIN EXPLORATION WELLSITE

Fig. 1

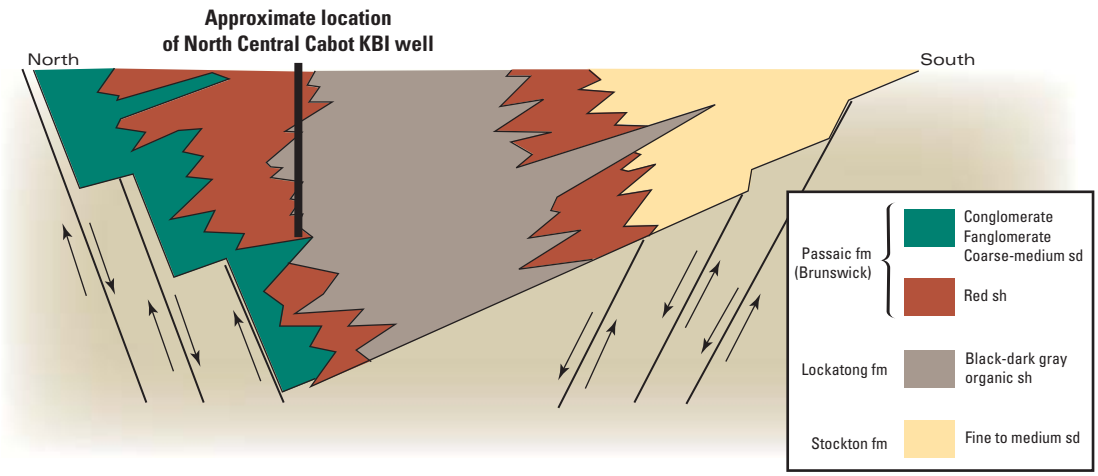


with porosity and permeability could lie adjacent to organic shale with a relatively high total organic carbon (TOC), forming significant reservoirs. A diagram showing this new model and its facies relationships is provided (Fig. 2).

Before the 1980s drilling program, at least two seismic surveys were run in the area.

NEWARK BASIN SCHEMATIC SHOWING FACIES INTERRELATIONSHIPS

Fig. 2



The first, called the NORPAC NB-1 line, was a publicly funded research line that has been reprocessed by a number of private companies. This line is located in eastern Bucks County, Pennsylvania, and runs essentially parallel to the Delaware River. An interpretation of this line is provided in Fig. 3.

A second line was shot by Exxon and has not to the author's knowledge been published in any technical journal. This line traverses the boundary between Montgomery and Bucks counties, Pa.

Both seismic lines show essentially the same basin makeup. Lower Paleozoic carbonates and metamorphic rocks of Paleozoic and Precambrian age distinctly define the base of the overlying half-graben. In the graben proper, clastic rocks (sandstone and conglomerates) transition into a layered, apparently denser rock in basin center (organic shale).

There is a broad and irregular transition zone between the two rock types suggesting facies transitions and, from the author's viewpoint, trap formation. The presence of diabase is also indicated as basal sills or as dikes associated with boundary faults. Analysis done by the author as part of an unpublished senior project suggests that the metamorphic effect of these dikes is limited to within one mile of the intrusion. There is no evidence to suggest that there has been any diminishment of the reservoir or source rocks by the diabase.

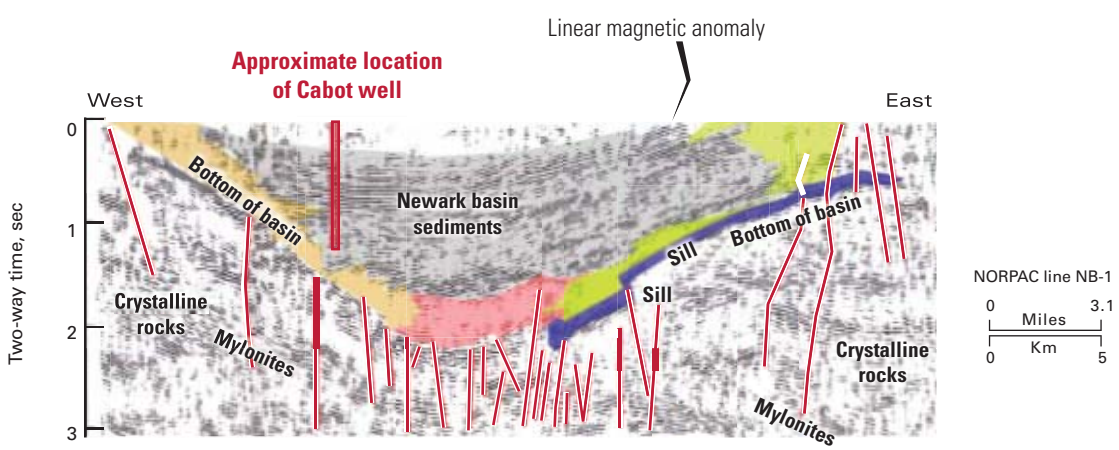
Log analysis

The author provides two sections of the lithodensity log for the Cabot well.

Apparently, a complete suite of logs was run for this well, but only the sonic log and the lithodensity log are available for analysis. The author has digitized these logs to clarify the recorded parameters on an otherwise smudged final

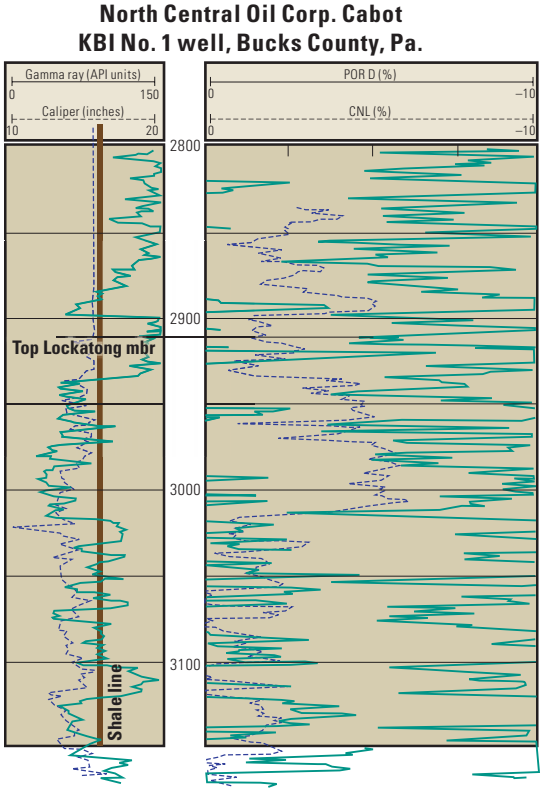
NEWARK BASIN SEISMIC LINE IN NORTHEASTERN BUCKS COUNTY, PA.

Fig. 3



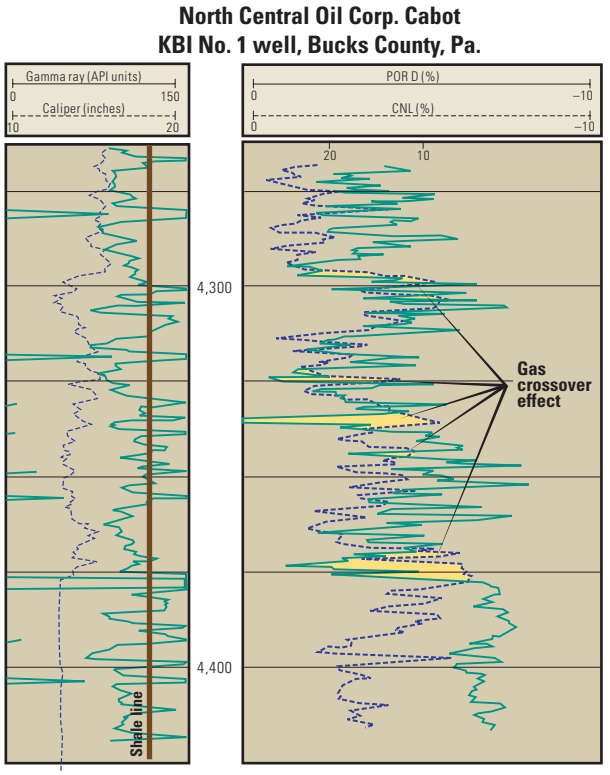
INTERVAL NO. 1, BRUNSWICK-LOCKATONG TRANSITION

Fig. 4



INTERVAL NO. 2, MIDDLE LOCKATONG

Fig. 5



copy log.

Fig. 4 shows the transition from the Brunswick to Lockatong member. The Brunswick is a reddish brown interbedded shale and siltstone that extends across the basin. The Lockatong, as mentioned above, is the traditional name given to the organic shale facies member.

The caliper log for the Lockatong suggests that there are multiple thin beds that may be separated by bed parting or fracturing. The gamma ray log suggests that these beds are interbedded siltstone and organic shale. Analysis of the neutron porosity and the density tool indicated that porosity development occurred in the organic shale member.

Similar developments are found in Fig. 5, which is taken from a slightly deeper interval in the Lockatong member. In addition, there appears to be registered a gas crossover effect in several intervals of organic shale/silt interfaces.

A gas crossover effect is a logging effect in which density log reads a higher porosity than the neutron log. Typically, these tools have an opposite response unless they measure a gas filled porous interval. Comparison of the caliper log and the porosity response suggests that there is a release of a signature gas along naturally occurring bed partings and fractures.

Synopsis

The results of drilling the two wells in the Newark basin of Pennsylvania provided an initial insight into subsurface conditions.

It allows a broad correlation of seismic data with subsurface conditions. It also exposed the fact that the subsurface characteristics of this basin are more complex than the "cookie cutter" geology that has been imposed upon it since the mid-1800s.

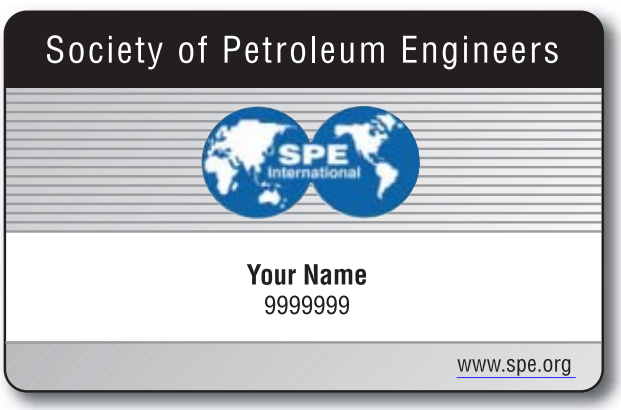
Reservoir analysis suggests that there is a thick, organically rich, siltstone-shale-mudstone complex in basin center that is apparently equal to other great fractured shale reservoirs.

With a thickness ranging from 2,500 ft to over 4,000 ft, the Lockatong member could host many significant local reservoirs that could produce economic amounts of relatively dry natural gas. In addition, there is a possibility that sandstones with porosity might lie in proximity to the organic shale, and could, under the proper conditions, be significantly large natural gas reservoirs.

Finally, the author believes his original model for the basin is still viable. If this is the case, then fluvial sand buildups in proximity to the organic shale could be present and could form significant sand reservoirs.

There is too little subsurface information available to the geological community to allow a more precise discussion of reservoir development or location at this time. What can be stated is that there is a good possibility that a significant reservoir in an economically attractive location may be present.

Opens locks.



Opens doors.

S O C I E T Y O F P E T R O L E U M E N G I N E E R S

You can wait for career opportunity to knock – or you can create your own with a membership in SPE. Our publications, conferences, workshops and technical forums give you chances to publish, present, influence thought, and make your mark. Our membership combines 69,000 of the brightest minds in the E&P industry, giving you access to peers and leaders all over the world who can help be your springboard to advancement. Find more keys to success at **www.spe.org**.

SPE International

The author will conclude with the comments of two geologists who do not wish to be identified. One geologist said, "This reservoir looks better than the Barnett, even at this early stage of development." The other said, "Given the limitations of the dataset and the variables of basin configuration, what we may be looking at is one of the last significant, completely undeveloped reservoirs left in the world."

The lacustrine reservoirs of the Newark basin hold great potential and should encourage further testing by drilling. ✦

References

1. Pyron, A.J., "The Mesozoic Basins of Eastern North America: Potential Reservoir or Explorationists Folly?," Eastern Section, AAPG, September, 1991.

2. Pyron, A.J., "Use of Space Based Detectors as a Strategic Tool to Evaluate the Hydrocarbon Potential of the United States," National Aeronautics & Space Administration Visiting Investigator Program, John C. Stennis Space Center, Mississippi, Report VIP-004-93, 1993.

3. Pyron, A.J., "The Mesozoic Basins of Eastern North America: Reservoirs in Waiting or Explorationist's Folly?," Northeast Geology and Environmental Science, Vol. 19, No. 3, 1997, pp. 143-154.

4. "The Mesozoic Basins of Eastern North America: Reservoirs in Waiting or Explorationist's Folly?," Pittsburgh Association of Petroleum Geologists, April, 1997.

5. Pyron, A.J., "Mesozoic basins of eastern North America: Exploration target whose time has come," OGJ, Vol. 96, No. 29, 1998, pp. 94-98.

6. Pyron, A.J., "The Mesozoic Basins of Eastern North America: Exploration Target Whose Time has Come," AAPG Eastern Section meeting, Columbus, Ohio, Oct. 7-10, 1998.

Bibliography

Bentman, Hilary, "Specter of gas drilling has some uneasy in Nockamixon," The Intelligencer, Nockamixon Township, Pa., Apr. 7, 2006.

Costain, John H., and Coruh, Cahit, "Tectonic Setting of Triassic Half Grabens in the Appalachians: Seismic Data Acquisition, Processing and Results," in "Extensional Tectonics and Stratigraphy of the North Atlantic Margins," Tankard, A.J., and Balkwill, H.R., eds., AAPG Memoir 46, 1989, 641 pp.

McCaslin, John C., "SE Pennsylvania hosts unusual wildcat," OGJ, May 27, 1985, p. 185.

Olsen, P.E., "Distribution of organic matter rich lacustrine rocks in the early Mesozoic Newark Supergroup," in Froelich, A.J., and Olsen, P.E., eds., "Proceedings of the 2nd U.S. Geological Survey Workshop on the Early Mesozoic Basins of the Eastern United States," 1986, 147 pp.

Schlische, Roy W., "Geology of the Newark Rift Basin," Internet presentation, 2006.

The author

Art Pyron is sole proprietor of Pyron Consulting. He has 26 years of experience in oil and gas exploration and appraisals, minerals investigations, environmental studies, and site remediation. He has an MS in geology from the University of Texas at El Paso.

Colombia

Emerald Energy PLC, London, set casing at 8,745 ft MD to test log-indicated hydrocarbon shows in the Cretaceous La Luna formation at its Aureliano-1 wildcat on the Fortuna Association Contract area in the Middle Magdalena Valley.

Maximum deviation through La Luna is 45°. Testing could take as long as 2 months. Emerald's interest in the area is 90%.

Guinea-Bissau

State owned Petroguin let contracts to CGGVeritas and First Exchange Corp. to distribute information related to its third license round, which closes on Apr. 30, 2007.

The round covers land and offshore acreage.

Maastrichtian and Albian sands offer shelf-based opportunities in closures associated with salt diapirism. Modern salt imaging techniques could bring new life to this underexploited play, where the petroleum system and reservoirs are certain and traps are yet to be found, CGGVeritas said.

On the shelf edge and slope, Cretaceous reefs offer further potential particularly where faulting that defines the shelf margin provides an additional trap-forming mechanism.

India

Canoro Resources Ltd., Calgary, was moving a drilling rig to its Sonakhet location on the AA-ON/7 exploration block in the Assam-Arakan basin in northeastern India.

The well is to test a large basement high and a Barail subcrop feature. Projected TD is is 1,500 m.

While drilling Sonakhet, the company will run a vertical seismic profile in its Amguri-10 appraisal well on the Amguri Development Block.

Israel

Israel's petroleum commissioner has offered an exploration/exploitation license until Mar. 29, 2007, for part of the former Heletz lease, 55 km south of Tel Aviv, terminated on June 29, 2006.

Heletz, discovered in 1955 as the eastern Mediterranean's first oil field, has recovered 17 million bbl of an estimated 19 million bbl of 29° gravity oil in place in Valanginian-Barremian Heletz sandstone at 1,480 m (OGJ, July 5, 2004, p. 41). The field, on 12.5 sq km, has 88 wells, of which six wells are producing 70 b/d. No secondary or tertiary method has been employed. The lease area is 28,910 acres.

Oil production continues until the grant of the new license by Lapidoth Ltd., contractor for the state and the

field's present operator.

The lease will be awarded for an initial 3 years and a possible 4-year extension, and an interested lessee must prove the potential for commercial production beyond that possible using production methods employed to date or from other formations.

Niger

China National Petroleum Corp.'s Niger subsidiary cemented liner to 3,500 m and plans to test four intervals in the Saha-1 exploration well on the Tenere Block in Niger, said participant TG World Energy Corp., Calgary.

TG World did not further describe the four intervals identified on logs. Testing began in early February and was to take at least several weeks.

Thailand

Pan Orient Energy Corp., Calgary, was testing the POE-9 oil discovery on Concession L44/43 onshore Thailand.

After flowing as much as 560 b/d of fluid, 15% water, before clean-up with small amounts of gas, the well was flowing 260 b/d of fluid, 1% water, on a $^{13}/_{64}$-in. choke. The flow is from the top 17 m of 50-m-thick volcanic zone 2 at 853 m after a light acid treatment. Porosity is calculated at 6-9%.

The well is to be placed on production right away, so other prospective zones will not be tested. Pan Orient will develop the field, subject to government approval, using at least one rig.

POE-9 is in the southern fault block of what is interpreted on seismic to be a 12 sq km structural closure segmented into four fault blocks.

Ukraine

Shelton Canada Corp., Edmonton, plans to acquire a 50% interest in the North Kerchenskaya concession in the southern Azov Sea with Ukrainian state Chernomornaftogas holding the other 50%.

On the concession is the North Kerchenskaya structure, where two gas wells defined an estimated 160 bcf of recoverable gas. Each well flowed 2.5 MMcfd from Miocene age reservoirs at 1,300 m. The field is 25 km offshore in 12 m of water.

The concession is adjacent to North Bulganakskoye and East Kazantipskoye, both producing gas from sediments of similar age.

Shelton already holds 50% interest in the West Birjuchja, North Birjuchja, and East Birjuchja concessions.

Arizona

Ridgeway Petroleum Corp., Houston, spudded the State 11-29-30 exploratory well in Apache County in search of carbon dioxide and helium in the Amos Wash member of the Permian Supai

formation (see chart, OGJ, July 5, 1999, p. 89).

Projected TD is 2,200 ft. The drillsite is 2 miles from the company's State 11-18-29 well that blew out during drilling in 2004.

The two-rig 2007 winter drilling program consists of as many as 12 wells to further evaluate reserves and productivity of the St. Johns helium and CO_2 field the company discovered in 1994. The company controls 200,000 acres in Arizona and New Mexico.

Louisiana

Gulfport Energy Corp., Oklahoma City, reported a new field discovery at East Hackberry in Cameron Parish, 80 miles west of Lafayette.

The Hackberry 2007-1 well cut 300 gross ft of Upper Oligocene Marg How sand with 155 ft of apparent net pay with 26% average porosity at 10,850 ft. It also found 18 ft of net pay in Upper Camerina at 11,700 ft.

The company was unable to log at 11,700-12,000 ft MTD, where there were indications of shows, and plans to set pipe and if possible drill out to explore the rest of the Camerina.

Completion of the 2007-1 and 2006-1 wells, the first two drilled on proprietary 3D seismic data, is to start later in the first quarter. The barge rig will move to drill the third well, and a land rig is to spud the first onshore well in the field in the quarter.

Montana

The Evaline 1-18 twin well, a Mississippian Lodgepole reef test in Valley County, is to be deepened 100 ft to the projected oil reservoir in mid-February after severe weather clears, said Touchstone Resources Ltd., Vancouver, BC.

A completion rig is on location. Coastal Petroleum Co., Apalachicola, Fla., operates the well (OGJ Online, Aug. 18, 2006).

Texas

Panhandle

Bankers Petroleum Ltd., Calgary, which was spudding a Palo Duro basin exploration well in early February, plans to sell 27% of its working interest in 375,000 net acres to Peninsula Merchant Syndications Corp., a private merchant bank.

The $19.5 million in proceeds is to be used to fund Bankers's 2007 exploration budget in the basin, where the Cogdell 1-64 well is drilling and two other wells are planned in the next 4 months.

Bankers is seeking permits to shoot a 3D seismic survey over part of its acreage.

Shock. Vibration. Rig-up hazards. 24/7 operation. Temperature extremes.

Lower operating cost makes Mesabi the right engine cooling solution.

Value-conscious drilling, well-service and geophysical contractors know that when downtime, repair expense and lost revenue are included in the cost equation, a "cheap" radiator can be very expensive. That's why a Mesabi radiator is the most economical engine cooling solution.

ENGINEERED QUALITY Each Mesabi radiator is engineered to meet exact cooling specifications and fit a specific physical layout. Built to ISO standards, every Mesabi radiator also inherits lessons learned from thousands of field tests.

NO SOLDERED SEAMS Mesabi's unique design absorbs shock, vibration, and thermal expansion by mounting individual tubes in headers with flexible rubber seals. There are no soldered seams to crack and leak, or corrode.

EASY FIELD REPAIR When accidents happen, damaged tubes can be replaced using simple hand tools without removing the radiator.

A BETTER BOTTOM LINE A Mesabi radiator's long, trouble-free service life means continual operating savings on every retrofit or OEM application.

MESABI®
Flexible Core Heat Exchangers

L & M Radiator Inc.

1414 East 37th Street
Hibbing MN 55746
Phone: 218 263 8993
Fax: 218 263 8234
Toll free in USA and Canada:
1 800 346 3500
Email: cool@mesabi.com
www.mesabi.com

Particle-impact drilling blasts away hard rock

Nina M. Rach
Drilling Editor

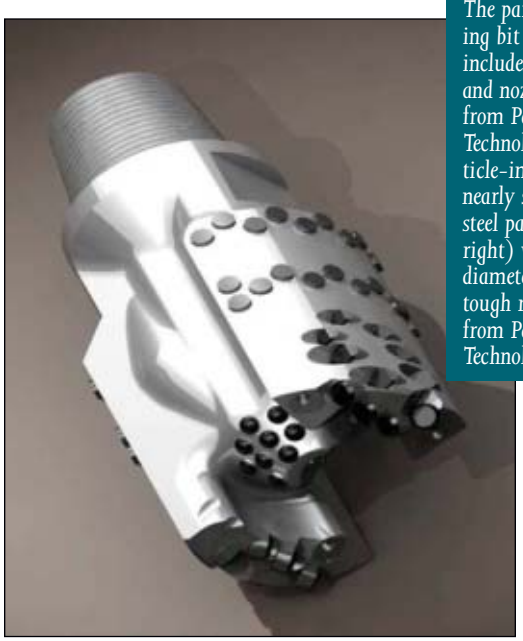
Houston-based Particle Drilling Technologies Inc. has successfully tested a new drilling system, designed to enhance the rate of penetration through hard rock.

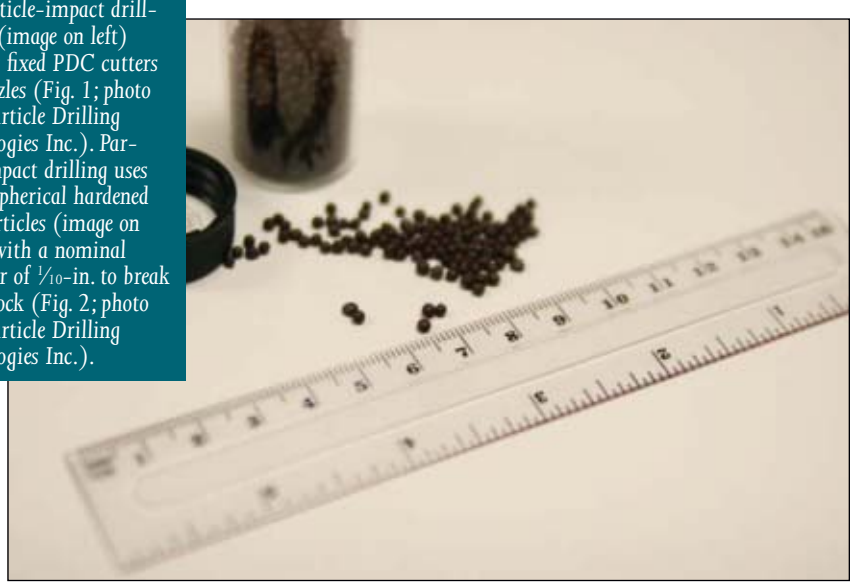
Particle-impact drilling (PID) is a closed-loop process in which hardened steel shot particles are injected into the drilling mud, circulated, and recovered from the mud system without allowing the shot to circulate through a rig's pumps and surface equipment. The process operates under normal rig pump pressures, and the particles entrained with the drilling fluid are accelerated through the nozzles in a specially designed fixed-cutter drillbit (Fig. 1).

Conventional drillbits crush and grind rock, but PID does not rely on weight-on-bit and torque to mechanically break the rock.

The PID drillbit combines minimal mechanical grinding with hydraulic blasting. It removes rock by blasting it with the hardened steel particles (50-55 Rc), which comprise about 2-3% of the drilling mud by volume and strike the rock more than 4 million times/min, according to PDTI (Fig. 2).

PDTI's Greg Galloway told OGJ that the company is





The particle-impact drilling bit (image on left) includes fixed PDC cutters and nozzles (Fig. 1; photo from Particle Drilling Technologies Inc.). Particle-impact drilling uses nearly spherical hardened steel particles (image on right) with a nominal diameter of 1/10-in. to break tough rock (Fig. 2; photo from Particle Drilling Technologies Inc.).


www.vamdrilling.com

DRILL PIPE
BOTTOM HOLE ASSEMBLY
PERFORMANCE DRILLING
SERVICES

The Oil Industry considers that Bigger is Better. Our Customers are always right.

"Bigger is Better?" the saying goes
and in the case of Drilling Products, the saying is right.
It even has a name : VAM DRILLING!

By merging OMSCO, SMFI and V&M TUBES drilling product line operations, the VALLOUREC group has established a new entity in the drilling equipment industry.

We, at VAM DRILLING, are committed to support our customers thru a wide range of drill string solutions, fully integrated production routes and a unique service network.

"Bigger is Better?" as long as you don't lose the values that made you successful.
Staying close and reactive with our business partners, we preserve our "Small is Beautiful" attitude!

VAM® DRILLING

Vallourec Group

Testing at TerraTek Inc. in July 2005 demonstrates that the PID bit cuts a near-gauge hole (Fig. 3a at left). A cross section of the test block shows the volume excavated by the impact of the steel particles (Fig. 3b at right; photos from Particle Drilling Technologies Inc.).

testing two bit sizes: 7⅞ in. and 8½ in. He said that the existing design (pre-January 2007) cuts the majority of hole and leaves less than ⅛-in. outer portion of gauge that is removed with the PDC cutters (Fig. 3).

The new design uses particle impact rather than PDC cutters to cut all the way to gauge. Although this creates the potential for overgauging, he noted there is very little downside. Fig. 4 shows the bottomhole pattern drilled by the PID bit in a hole drilled to gauge.

The surface components of the PID system include:

- Particle-injection system, between the mud pump and standpipe.
- Particle processing (separation) and containment unit (for recycled steel particles).

The spherical steel particles are currently injected from a hopper with a hydraulic frac pump truck, downstream from the rig's mud pumps (Fig. 5).

After circulating back uphole, the steel shot is collected by a triple screen "shot process kit" located before the shale shakers. The kit is based on a SWECO round-top separator, and the third (final) screen is passed over a rotating magnet to attract and capture the steel particles.

PDTI Senior Vice-Pres. Tommy Hardisty told OGJ that PID functions with conventional mud systems, 10-10.5 lb mud weight, 30-35 yield point, and 15-17 plastic viscosity. Where a fluid loss-control additive is necessary, the PID system works best with fine calcium.

The PID system and components are further described by US Patents 6,386,300 B1 and 6,581,700 B2.

The PID bit drills a distinctive bottomhole pattern (Fig. 4; photo from Particle Drilling Technologies Inc.).

Hard formations

ProDrill Services Inc. (PSI) and others developed the particle-impact drilling system and tested it in 2003 at the Rocky Mountain Oilfield Testing Center in Natrona County, Wyo.

PDTI acquired the technology in January 2004 and has continued to test and refine the PID system in a

variety of tough formations:

- In Utah, PDTI ran 12 full-scale test programs on several versions of the PID bit at TerraTek Inc., an independent drilling and completions laboratory acquired by Schlumberger in July 2006. TerraTek tested PID performance using shot rates of 12, 14, and 16.5 gpm and bit weights ranging from 5,000, 10,000, and 15,000 lb.

TerraTek ran the PID bits through the Sierra White granite, Carthage marble, Mancos shale, and Crab Orchard sandstone (June 2005).

- At the Gas Technology Institute's Catoosa facility near Tulsa (www.gticatoosa.com), the particle-impact system drilled through intervals including the Arbuckle dolomite, Verdigris limestone, Misener sandstone, Fayetteville shale, Oswego limestone, Pink limestone, and Mississippi limestone, with rock strengths from 25,000-50,000 psi (July; October-November 2005).

Hardisty said that the PID system drilled through a hard stringer at Catoosa, well known as "the wall," so smoothly that the drillers did not discern the changes in lithology.

Following the Catoosa testing, PDTI announced that it had retained Beeken TechQuest Ltd. to develop a more efficient and cost effective shot injector system.

PID was also tested in the Uinta basin, drilling the Lower Mesaverde section, mostly hard and abrasive sandstone with some shale.

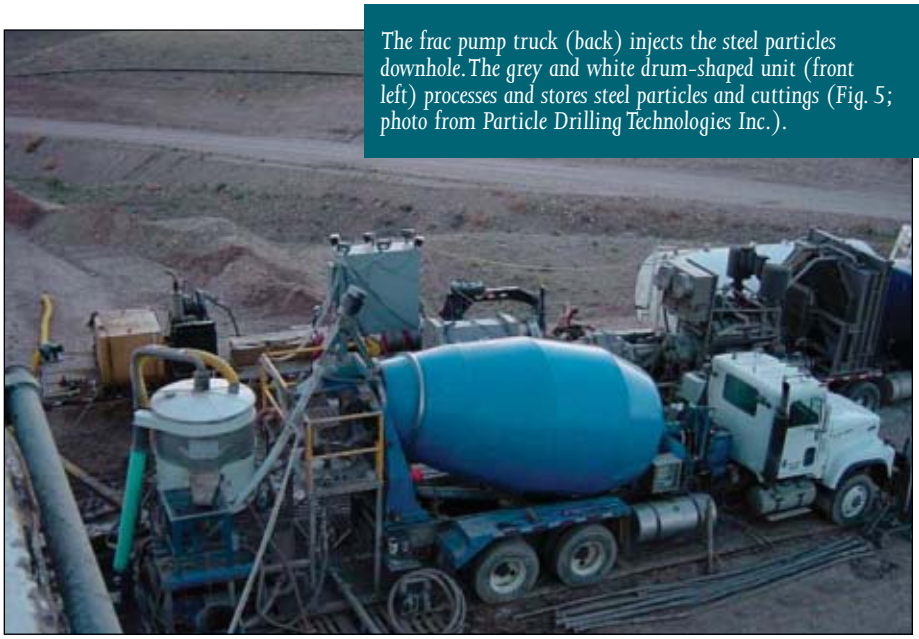
Commercial trials

In 2006, PDTI ran three commercial trials of particle-impact drilling on rigs operated by Nabors Drilling USA LP and Frontier Drilling Inc.

The first three trials were run with Gasco Production Co., a subsidiary of Gasco Energy Inc., Englewood, Colo., in May, November, and December, drilling at the Riverbend prospect, just south of the Monument Butte field in the Uinta basin, northeast Utah.

The next trial is being planned for another operator drilling in East Texas.

At the Utah trials, the PID system was successfully deployed and integrated into the rig during the May test, through formations that conventional bits typically drilled at less than 6 fph.



The frac pump truck (back) injects the steel particles downhole. The grey and white drum-shaped unit (front left) processes and stores steel particles and cuttings (Fig. 5; photo from Particle Drilling Technologies Inc.).

In a company announcement, PDTI Pres. and CEO Jim B. Terry said that "instantaneous drilling rates demonstrated...proof of concept at a depth greater than 10,000 ft in a real world drilling environment."

In the November test, Gasco used the PID system to drill a 92-ft interval in 7 hr. Subsequent conventional bits averaged 90 ft in each 24-hr period during the following 5 days. PDTI said the PID bit was in good shape after 43 hr drilling and circulating, including 12 hr drilling with steel particles.

In December, the PID system drilled a 120-ft interval through the lower Mesaverde sandstone in about 8 hr on-bottom drilling time. The system was being tested on a new Frontier Drilling rig, in subfreezing temperatures and high winds, and still resulted in a record continuous drilling run.

PDTI said it worked through several mechanical failures of surface equipment during the trials. During the first commercial trial in May, the particle-recovery unit failed. During the third commercial trial, a particle storage drum's drive line failed, but PDTI was able to repair it with replacement parts.

US markets

The harder the rock, the slower it drills, and the slower it drills, the more the well costs. Slow drilling through a hard section can disproportionately affect the cost of a well and render deep gas exploitation uneconomic. PDTI estimates that about half of all onshore, vertical gas wells encounter hard rock intervals.

In a presentation to investors in December 2006, PDTI said its technology may be most useful in wells that take more than 30 days to drill. The company examined the number of drilling days in three active regions for the 12-month period, September 2004-September 2005:

- Rockies, 46,121 days.
- Midcontinent, 24,015 days.
- Permian basin, 22,270 days.

Hardisty told OGJ that operators in the Uinta basin are concerned with drilling the Mesaverde, Castlegate, Blackhawk, Maury, and Dakota sandstones, among others.

In the Green River basin, there's difficult drilling below the Upper Cretaceous section; tough formations through and below the lower Mesa Verde. Hardisty also noted Chevron USA Inc.'s drilling through the Almond and Nugget formations in the Table Rock Unit, in Wyoming and some other areas

of the Green River basin.

Houston-based Ultra Petroleum Corp., Salt Lake City's Questar Corp., and others have attempted some deep drilling at Pinedale.

Future

Improving drilling performance can reduce well cost. Reducing drilling costs may render more reserves economic.

Last month, PDTI announced a 1-year gain-sharing contract with operator Gasco to use particle-impact drilling. The oil field services firm is building a second PID system, at an estimated cost of $1.6 million, to be finished in first-quarter 2007. The expected payback period for the second PID unit is about 8 months.

The company said subsequent systems should run about $600,000, with a shorter payback period. Terry told OGJ that PDTI is planning to have 10 sets of equipment available by the end of 2007, including injection and extraction equipment and bits.

PDTI says it will continue to improve the hardware and operating processes. Hardisty told OGJ that the company is refining the bit, adjusting nozzle configuration to be more robust and for drilling to gauge.

It will also test and deploy new injectors in 2007. The prototype of the extruder injection system was built and tested in the UK in December 2006, shipped to the US, and was being tested in PDTI's Houston research center in January 2007.

In a recent company announcement, Terry said PDTI would begin field trials using the new injection system in parallel with the existing injector, following successful testing (www.particledrilling.com).

It will also be very interesting to see whether the system will aid drilling through dense basalt. OGJ expects a ramp-up of activity in Washington's Columbia River basin that may provide opportunities to further test particle-impact drilling. ✦

PILATUS

How does one compare the incomparable? Take the Pilatus PC-12. Like that holiest of grails, the perfect mousetrap, a PC-12 has found a way to outperform today's ubiquitous light jet in all the ways that count. Such as going twice as far. Carrying twice as much. And doing it with a cabin twice the size. But unlike many a perfected solution, you won't pay a premium to get it. In fact, ownership of an entire PC-12 costs less than a quarter share of most fractional jets, with operating costs running less than half. Plus, with the freedom of total ownership, you take command of where you go, when you go, and how fast you'd like to get there and back. Now that's what we'd call a better mousetrap. To see for yourself, see PC12Advantage.com today.

Pilatus Business Aircraft, Ltd.
Tel: + 1 800 745 2887
www.PC12Advantage.com

BP, Baker run first expandable monobore liner extension system

Bob Coolidge
Bob Baker
BP America Inc.
Houston

Carl F. Stockmeyer
Mark Adam
Brent Emerson
Baker Oil Tools
Houston

In September 2006, BP and Baker Oil Tools achieved an industry milestone with the successful installation of the world's first monobore expandable liner extension system, in a commercial well in BP's Arkoma asset in southeast Oklahoma (Fig. 1).

The successful installation and expansion of 1,514 ft (461 m) of Baker's 8-in. linEXX solid expandable system below the 9⅝-in. parent casing proved the feasibility of solid expandable tubulars and enables operators to plan and drill deeper wells with larger hole sizes at the reservoir.

Earlier in the year, the successful installation of recess shoes in four North Sea wells set the stage for future monobore contingency applications of solid expandable tubulars to isolate trouble zones, such as reactive shales, subsalt environments, and low-fracture-gradient sections, and then drill ahead without having to reduce critical hole size.

The Baker system is currently the only solid expandable monobore liner extension system available on the market. Key enabling features and benefits of the system include:

- A casing shoe with a recessed internal diameter (ID) and location profile that enables the liner to be anchored on the bottom of the parent casing and then expanded into the shoe with no ID size restriction below the parent casing. The recess shoe distinguishes the Baker expandable system from others that have an ID size restriction from hanging off in the parent casing.
- An expandable liner hanger/packer that is set into the recess shoe and ties the 8-in. expandable liner to the parent casing string.
- Cementing is done postexpansion.
- A retrievable guide shoe that guides the expandable liner into the open hole.
- A top-down hydraulic expansion system that prevents losing the hole should a major restriction in the open hole (i.e., collapsed formation) cause expansion cones to become blocked downhole.

Technology development

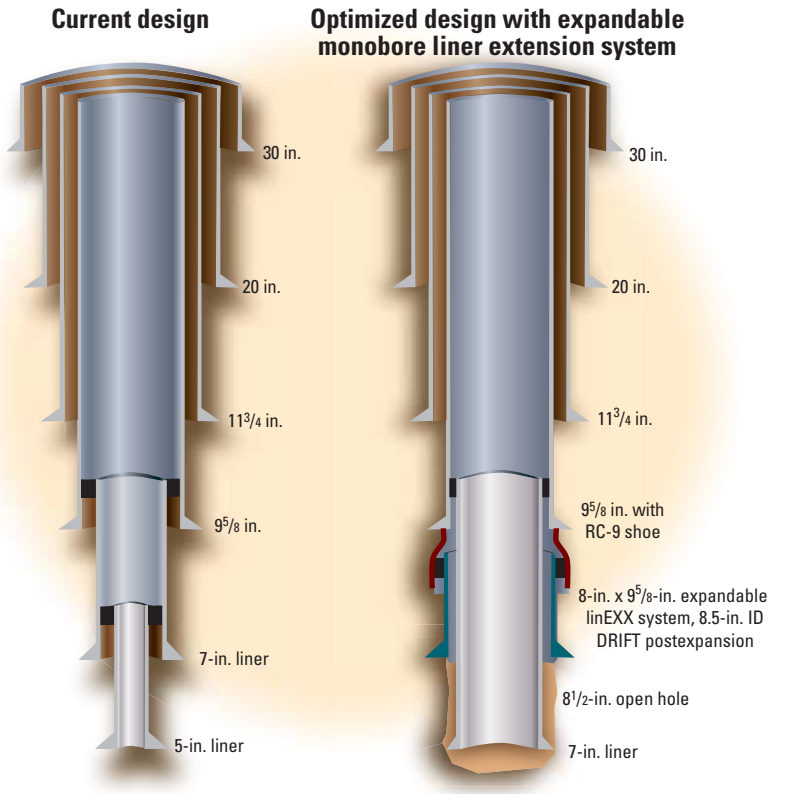
For years, the exploration and production (E&P) industry has sought an improved alternative to conventional, telescoping casing designs that reduce casing sizes as the well depth increases (Fig. 2).

When expandable metal technology was adapted to oilfield tubular products, efforts began immediately to use the technology to develop a solid expandable monobore well construction method that would allow for much

Prior to expansion, the linEXX assembly hangs in the derrick, as illustrated in this field trial application (Fig. 1).

CASING STRING DESIGNS

Fig. 2



deeper or deviated wells to be drilled without any loss in internal diameter.

Further, should an unexpected hole problem be encountered while drilling, a monobore well design allows the operator to set casing across the problem zone and continue wellbore construction without sacrificing hole size.

Ultimately, the reservoir can be entered with the initial-diameter production casing and thereby maintain the production capability that would have been compromised had a smaller-size casing been used to enter the production zone.

In addition to reducing casing costs, potential benefits of monobore well construction range from downsized drilling rigs and wellheads and resulting smaller footprint, to decreased mud and cement volumes and increased flow rates.

Baker Oil Tools began developing the linEXX monobore expandable liner system in 2002. The commercial field installation in 2006 included 4 years of full-scale field testing and modifications as part of the development process.

Critical success factors for the system included expandable material selection; qualification, development, and testing methods; development of an oversize recess shoe to maintain single-diameter casing without having to create a recess area downhole; and development of an expansion technique that would successfully address a number of stated operator concerns regarding pressure and wellbore integrity.

Casing selection

The expandable casing is a quench and tempered, carbon-manganese, low-alloy steel with minimum yield strength of 70 ksi, supplied in accordance with Baker Oil Tools material specifications. Chemical composition, heat treatment, microstructure, and mechanical properties are tightly controlled in order to improve ductility and ensure controlled uniform expansion. Dimensionally, the casing is nominally supplied in accordance with API 5CT, with slightly improved wall thickness tolerances (Fig. 3).

Upon receipt of the casing, Baker specifications require enhanced ultrasonic testing (UT) on 100% of the pipe volume, over and above that conventionally performed by the mill.

The proprietary ultrasonic system combines highly sensitive compression wave transducers with various obliquely angled shear wave transducers in a single, full-length, ultrasonic testing unit (FLUT). The profiled ultrasonic transducer shoe is run across the outer surface of each casing length using a water couplant. A patent-pending ultrasonic testing system and software, generate an accurate and representative picture of individual pipes. The latest version of the software creates a 3D digital picture of the casing by converting and collating the analog compression transducer data.

These data are further enhanced by introducing X-Y coordinates of indications recorded by the shear wave transducers and plotting these coordinates as red circular 'potential' defect indicators on a digital representation of the pipe body. The result is a comprehensive volumetric view of each casing length, which identifies midwall thickness defects as small as 0.0625 in. (1.59 mm) in diameter to within 0.025 in. (0.64 mm) of the outer surface, traceable back to a unique identification number. Baker Oil Tools now has the technology to segregate casing for successful expansion.

In its preexpanded condition, the casing material complies with NACE MR0175-ISO 15156 hardness limitations for low-alloy steels. Controlled plastic deformation leads to an increase in tensile strength and, subsequently, increased hardness due to cold work hardening.

The casing is nominally supplied with a hardness of about 90 Hardness Rockwell 'B' scale (HRB); 95HRB max per Baker material specification (BMS) C141. This increases to 28 HRC (Hardness Rockwell 'C' scale) at the ID and to

OTC .07 TRANSFORMING THE INDUSTRY

OFFSHORE TECHNOLOGY CONFERENCE SM

2007 OFFSHORE TECHNOLOGY CONFERENCE || 30 APRIL - 3 MAY || RELIANT CENTER || HOUSTON, TEXAS, USA

REGISTER NOW!

www.otcnet.org/2007

21 HRC at the OD following expansion.

The difference in ID and OD hardness is directly proportional to the degree of plastic strain or expansion. For example, ID expansion of 18% (7.310-in. preexpansion to 8.625-in. postexpansion) vs. an OD expansion of 15.5% (8.000-in. preexpansion to 9.240 in. postexpansion).

Mass is conserved during expansion. The liner wall thickness thins only slightly, while the length shrinks about 4%. Burst and collapse ratings are 5,000 psi and 1,200 psi, respectively.

Proper handling of the casing and connections during every stage of manufacturing, inspection, and installation is critical to achieving a successful expansion and is therefore tightly controlled by an internal service company specification.

After expansion, the monobore liner extension system is pulled from the test well (Fig. 3).

Downhole recess shoe

An oversized casing shoe was developed to be installed with the parent casing string and provide a downhole recess area for the expanded pipe.

The shoe's recess ID and location profile enable the liner to be anchored on the bottom of the parent casing and then expanded into the shoe with no ID size restriction below the parent casing. This feature eliminates the ID size restriction that is present in other expandable liner systems that hang off in the parent casing.

The recess shoe is available in two versions: one that facilitates fluid and cement circulation of the expanded liner run below the recess shoe, and one that does not. Both versions are rated to 5,000 psi burst and 1,200 psi collapse (Fig. 4).

Top-down expansion

Engineers developed a top-down, hydraulic expansion system that relies on drill pipe pressure to expand the liner. The expansion method addresses operator concerns about not being able to retrieve the expansion cone from expandable products if catastrophic loss of expansion pressure occurs inside the expanded casing.

The expansion assembly consists of an anchor, hydraulic cylinder, and expansion cone. As pumping begins, slips extend from the anchor and lock the expansion assembly in place. Continued application of pressure down the workstring extends the hydraulic cylinder and moves the cone downhole in 14-ft incremental stroke lengths. The design does not rely on drill pipe set-down weight or overpull, or on a dart sealing process to assure pressure integrity during expansion.

Additionally, the method does not apply expansion pressure to the expandable casing. The top-down expansion method enables integration of a retrieval collet onto the bottom of the expansion assembly, which makes it possible to retrieve the guide shoe and leave an open ID through the entire length of the liner when it is fully expanded. Typical expansion rates are about 100 ft (30 m)/hr.

With top-down expansion, shrinkage in liner length occurs at the "free" end of the system. In this case, the 4% shrinkage in expandable liner length will cause a portion of the open hole at target depth (TD) to not be cased by the expandable system. To accommodate the shrinkage, prejob planning addresses drilling rat hole below the target zone.

Recess shoe installations

In 2006, recess shoes were successfully installed on 9⅝-in. casing strings in four North Sea wells in contingency applications. The wells were located in Statoil's Kristin, Kvitebjørn, and Antares high-pressure, high-temperature (HP HT), depletion-driven fields.

Statoil's conventional method of overcoming low-fracture-gradient-related problems posed by drilling into potentially depleted reservoirs has been to run a 7-in. liner followed by a 4½-in. completion. However, field development economics for Kristin and Kvitebjørn dictated 7-in. production liner into the reservoir.

Statoil decided to install 9⅞-in. RC9-R recess shoes in all three fields as contingencies to ensure an aggressive drilling program that could reach target depths of 13,944 ft (4,250 m) and adhere to development objectives. The

Connect

to the tools you need

Offshore and Onshore Pipeline Systems and Facilities

MAPSearch is your one-stop resource for the latest maps and data related to pipeline systems in the U.S, Canada and offshore Gulf of Mexico. We bring you hard-to-find information collected from pipeline operators and government and regulatory agencies on more than 700,000 miles of pipeline, facilities and interconnects – offshore and on.

Our pipeline-related products bring you

A choice of formats – printed map products or digital data in GIS format

In-depth information – including product transported, pipeline diameter, owner/operator, direction of flow, facility/pipeline interconnections and more

Complete coverage – Crude Oil, LPG/NGL, Natural Gas, Petrochemicals, Refined Products, Specialty Gases

Semiannual updates

MAPSearch
A PennWell Company

E-mail sales@mapsearch.com for more information. Or call 1-800-823-6277 to order.

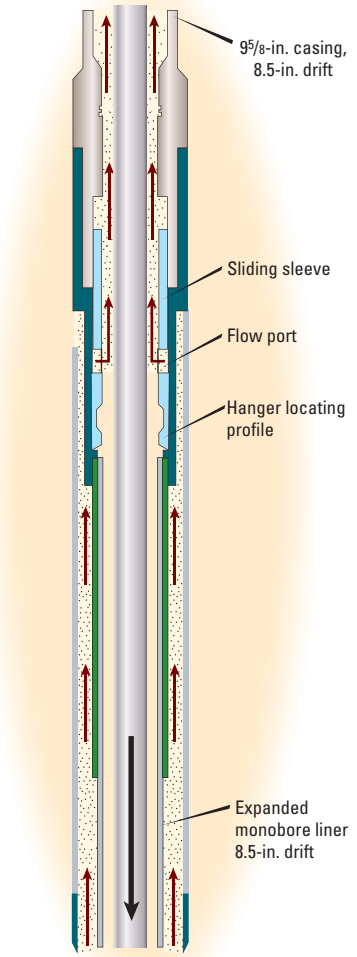
www.mapsearch.com

© 2007 PennWell Corporation (MAP703).

linEXX SYSTEM DEPLOYMENT

Fig. 4

Using RC9-R recess shoe



Run and set cement retainer, open returns port inside RC9-R shoe with shifting tool and pump cement

successful installation and drill-out of the recess shoes set the stage for future contingency applications of monobore expandable liner extension technology.

Oklahoma world-first

BP and Baker Oil Tools successfully ran the world's first solid expandable monobore liner extension in Oklahoma in 2006. A 12¾-in. vertical hole was air-drilled to about 4,100 ft (1,250 m), and then filled with oil-based mud (OBM) prior to running and expanding the tubulars (Fig. 5).

The 9⅝-in. parent casing and recess shoe were run to a depth of 2,589 ft (789 m). The casing was then latched and packed off in the surface wellhead. Cement was not pumped at this time to allow for contingency removal of the casing, if needed.

Utilizing running and handling procedures similar to those for chrome tubulars, 1,514 ft (461 m) of 8-in. OD unexpanded liner was run in hole and torque-turn equipment verified a typical makeup torque of about 4,300 ft-lb. The expandable liner hanger-packer was then made up to the expandable liner.

After making up the top-down expansion tool assembly, the 8-in. liner, hanger, and expansion tool assembly was run in the hole on drill pipe. The hanger was then positively located in the recess shoe profile and expanded into the shoe, using pressure to "stroke" the expansion tool.

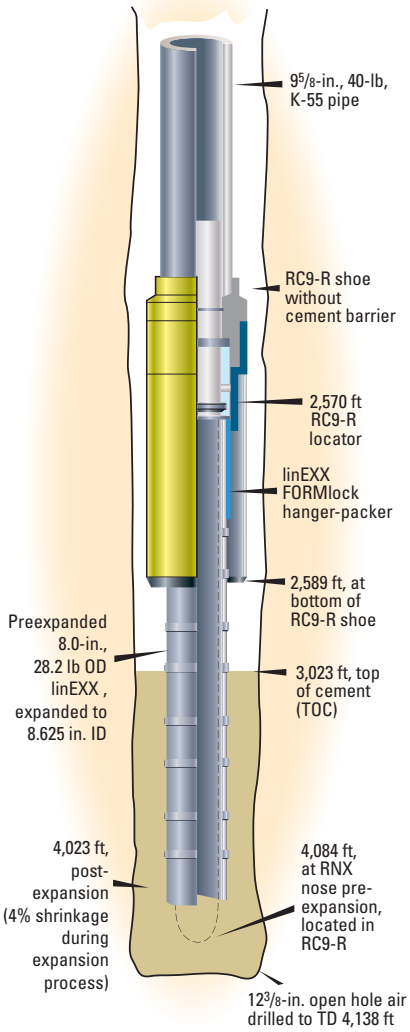
The liner was expanded 18% to 8.625 in. nominal ID and 8.50 drift ID in 14-ft (5 m) increments. The incremental expansion was completed as planned by applying drill pipe pressure to the expansion tool and then depressuring and slacking off to recock the tool until the entire 1,514-ft (461 m) length was expanded. A truck-mounted cement pump supplied the expansion pressure.

After retrieving the expansion assembly, postexpansion drift was verified by two independent methods. A drift run "directly to bottom" with a stiff three-point contact drilling assembly provided "mechanical" assurance. Subsequently, a caliper logging tool provided digital data to support the mechanical method. The combined verifications confirmed the ability to deliver a well with 8½-in. drift to meet BP's needs and expectations.

A cement retainer was run in hole and set near the bottom of the expanded liner. The liner was then cemented in place using the same pump truck that had supplied expansion pressure. Cement volume was selected to ensure that the planned formation integrity test would be achieved without taking cement returns into the 9⅝-in. casing through the recess shoe ports (contingency plan). No changes were required to the cement thickening time since top-down expansion allows the cement to be pumped after expansion.

MONOBORE LINER EXTENSION

Fig. 5



After successfully pressure testing the expanded liner, the retainer and excess cement were drilled out, and drilling continued with rotary steerable directional tools below the recess shoe. The liner extension system was isolated with the production casing before completing the well.

Future potential

The September 2006 installation of the world's first expandable monobore

liiner extension marked the culmination of an extensive collaborative qualification, testing, and field trial program between BP and Baker Oil Tools. Baker Oil Tools will continue to develop additional sizes and extend applications of the system to other areas. ✦

References

1. Coolidge, Bob, "Solid Expandable Technology: 9⅝-in. Monobore System," Wellconnected, internal BP publication, October 2006.

2. Carl F. Stockmeyer, David L. Tillman, John B. Weirich, Zdenek Sehnal, "Development and Commercial Deployment of an Expandable Monobore Liner Extension," Paper SPE 102150, presented at the 2006 SPE Annual Technical Conference and Exhibition, San Antonio, Sept. 24-27.

The authors

Robert Coolidge (Robert.Coolidge@bp.com) is a project manager for BP Exploration & Production's technology group in Houston. He has served in engineering, management, sales, technical service, project management, and technology development related to drill bits, solid expandable casing, wireline logging, and pipeline engineering throughout his career with other companies. Coolidge holds a BS (1977) in mechanical engineering from Purdue University. He is a past board member, chairman of the career management committee, and recipient of the distinguished service award in SPE's Gulf Coast Section, and is currently active in American Association of Drilling Engineers and American Petroleum Institute committees.

Robert V. Baker (bakerrv@bp.com) is the program manager for the solid expandables and wellbore pressure management programs in BP America's exploration & production technology group, Houston. He has also served as a drilling engineer and well site supervisor for BP, Vastar, Conoco, Exxon, and Shell. Baker earned a BS (1978) in civil engineering at California State Polytechnic University and is a registered professional engineer in Texas. He is a member of the Society of Petroleum Engineers and the American Association of Drilling Engineers.

Carl Stockmeyer (Carl.stockmeyer@bakerhughes.com) is a senior applications advisor with the open-hole and wellbore construction groups at Baker Oil Tools, Houston. His current responsibilities encompass expandable solid tubulars and new products in wellbore isolation, liners, and multilateral systems. Stockmeyer had 17 years of drilling, operations, and project experience prior to joining Baker Oil Tools in 2002. He has published several SPE and IADC papers on solid expandables and expandable sand screens, among other articles. Stockmeyer attended the University of New Orleans and the University of Southwestern Louisiana. He is a member of SPE.

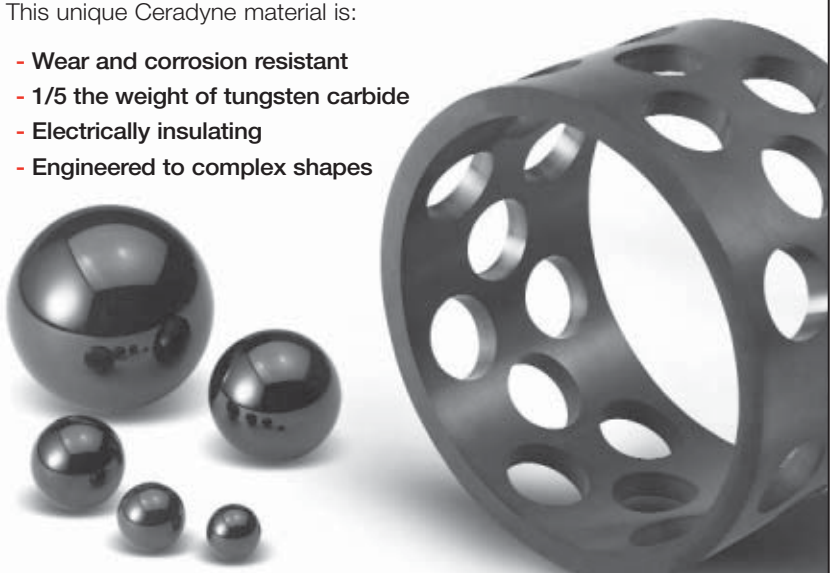
Mark Adam (mark.adam@bakeroiltools.com) is engineering program leader for monobore expandables at Baker Oil Tools, Houston. Adam has also served as manufacturing engineer at Baker Oil Tools. He holds a BSME (1998) from Rensselaer Polytechnic Institute and is a member of SPE and SME.

Brent Emerson (Brent.Emerson@bakeroiltools.com) is the director of marketing wellbore construction and open-hole completions at Baker Oil Tools. He is responsible for developing and commercializing multilateral, liner, expandable, and wellbore isolation systems. Emerson has worked throughout North America and the Asia-Pacific rim, serving as Baker Oil Tools' divisional product development and product management process owner, Asia Pacific regional marketing manager, engineering manager, and regional engineer. He graduated with a BS in mechanical engineering (1988) from the University of Texas at Austin and is a member of SPE, Technical Advancement of Multilaterals (TAML) group, and Expandable Technology Forum (ETF).

The Best Kept Materials Secret

For more than fifteen years, Ceralloy® Silicon Nitride components have outperformed other materials by reducing downtime and improving throughput in harsh oil exploration environments.
This unique Ceradyne material is:

- Wear and corrosion resistant
- 1/5 the weight of tungsten carbide
- Electrically insulating
- Engineered to complex shapes



ceradyne, inc.
ADVANCED TECHNICAL CERAMICS
Engineered Ceramic Specialists

(800) 839-2189
info@ceradyne.com
www.ceradyne.com

FSU refiners to build more isom capacity

A.A. Mirimanyan
A.G.Vikhman
Petrochim Engineering LLC
Moscow

Mikhail G.Rudin
WorleyParsons
New York City

The isomerization process is playing a significant role for refiners in the FSU as they try to maintain gasoline pool octane and comply with more stringent gasoline pool requirements. This article discusses current isomerization capacity in the FSU and refiners' plans to build new capacity.

In the FSU, as well as globally, the requirements for motor gasoline are becoming more and more stringent. New standards exclude the use of lead; reduce levels of benzene, sulfur, unsaturated hydrocarbons, and total aromatics; include limitations on oxygenate content; reduce saturated vapor pressure; and control fraction composition.

Such trends significantly affect the methods refiners use to produce motor fuels.

Isomerization

In recent years the isomerization process has become the strategic gasoline process that ensures octane characteristics of the overall gasoline pool. Current total worldwide capacity of isomerization units amounts to about 50 million tonnes/year. During the last 20 years in Europe, isomerization capacity has increased fourfold, and now the region constitutes one-third of worldwide capacity.

Isomerization significantly improves octane number of light gasoline cuts. In combination with other processes it also allows refiners to produce a gasoline with low benzene and sulfur content. Uncertainty about future regulations on the use of methyl tertiary butyl ether necessitates use of isomerization for producing gasoline.

Pentane and hexane isomerization is widely implemented in FSU refineries because it has the advantage of minimizing investment by using idle reactors within catalytic reforming or hydrotreating units.

Main advantages of isomerization also include the availability of considerable feedstock resources, unlike alkylation and dimerization processes.

Feed to an isomerization unit is a pentane-hexane mixture that boils up to 70° C. Its content in crude is 3-5% and even higher in gas condensates. Isomerization reactions are reversible; lower temperatures in the reactor enable the formation of high-octane isomers with branched structures.

Fig. 1 shows how MON of (equilibrium) isomerate depends on process temperature. It shows that octane numbers of paraffin C_5 hydrocarbons are higher than those of C_6 hydrocarbons. Conversely, isomerizing paraffin C_6 hydrocarbons provides some isomers with midlevel octane numbers (2- and 3-methylphentanes).

Because commercial-scale isomerization units use pentane-hexane cuts (IBP-70° C.) as a feedstock, the equilibrium curve for C_5-C_6 hydrocarbons shows the best ratio for the feedstock. In practice, octane numbers of reaction products are always lower than equilibrium numbers.

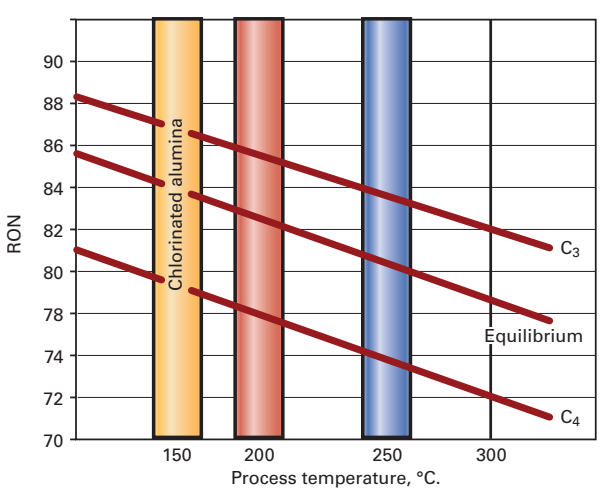
Table 1 shows that there are currently 16 commercial plants using high, middle, and low-temperature processes either operating, being designed, or under construction at refineries in the FSU.

Process catalysts

Major manufacturers of isomerization catalysts are UOP LLC, Axens, Shell Chemicals LP, Akzo Nobel NV, and Süd-Chemie AG. FSU-produced catalysts are

ISOMERATE OCTANE

Fig. 1



licensed and manufactured by NPP Neftekhim, VNIINeftekhim, Olcat, Promcatalysts, and Katakhim Corp.

Zeolitic catalysts

Zeolitic isomerization catalysts are a platinum-carrying zeolite (mordenite). This catalyst does not require use of any halogen as an activator or promoter. The catalyst works at 250-270° C. and an operating pressure of 1.8-3.5 MPa.

Zeolite-based isomerization catalysts provide products with lower octane numbers than chlorinated catalysts based on alumina. Like all zeolitic catalysts, however, they feature greater resistance to the effects of sulfur, water, and nitrogen, and easily regain their activity after regeneration. The catalysts' interregeneration service cycle is 2-3 years.

The Novokuibyshevsk refinery, the Khabarovsk refinery, and the Naftan refinery in Novopolotsk, Belarus, all use a Zeolitic catalyst, Hysopar, produced by Süd-Chemie. Its use is also planned at an isomerization unit at the Angarsk Petrochemical Plant (under design).

The only Russian zeolitic catalyst used is IPM-02 produced by VNIINeftekhim. This catalyst is used in the revamped catalytic reforming unit at the Ufa refinery.

UOP's zeolitic catalyst type HS-10 is not used at FSU refineries and Axens' catalyst, IP-632, is used in the isomerization section of a catalytic reforming unit at the Novoil refinery.

Chlorinated catalysts

These catalysts have the highest isomerization activity for C_5 and C_6 hydrocarbons, controlled by a continuous supply of organic chlorine. They also feature extremely high stability and do not need regeneration. Chlorinated catalysts are used in the UOP-designed Penex units. Typical service times are 5 years/reactor and Penex units have two reactors.

Low-temperature isomerization using alumina-based chlorinated catalysts occurs at the Komsomolsk refinery (Axens IS-614A) and the Odessa refinery (UOP Penex-DIG I-8, I-82). These types of processes will be used at units under construction at the Achinsk refinery and Volgograd refinery.

Chlorinated catalysts require specific feedstock conditions: There are limits on the amounts of water, aromatics, C_{7+} hydrocarbons, olefins, sulfur, and nitrogen. Chlorinated catalysts also have complex and difficult catalyst loading and unloading operations and feature considerable corrosion of equipment if abnormal operating conditions occur.

Sulfated zircon catalyst

In 1996, a new catalyst grade, LPI-100, based on sulfated zircon was introduced by UOP and sold in the US. Its activity is considerably higher than zeolite catalyst activity, which allows operating the process at 80° C. or lower and obtaining a product with two to three points higher octane number. The catalyst activity is fully recoverable with an oxidizing regeneration step similar to that used for zeolitic catalysts.

Zircon-based catalysts are suitable in operating isomerization units designed for zeolitic catalysts. The service life between regenerations is 2-3 years.

Catalyst SI-2 created by NPP Neftekhim is a Russian equivalent of zirconium-based catalysts. NPP Neftekhim started building the Isomalk-2 process in 1998-99. Manufacturing of the SI-2 catalyst based on an NPP Neftekhim license is by Promcatalysts (Ryazan) and Angarsk Catalysts and Organic Synthesis Plant. In its first commercial application, the new technology proved to be more efficient than zeolite catalysts and close to the chlorinated alumina process.

The Isomalk-2 process has been installed at these FSU refineries:

- 2003. Revamp of a reforming unit at the Ufa refinery.
- July 2005. Start-up of a new isomerization unit with a capacity

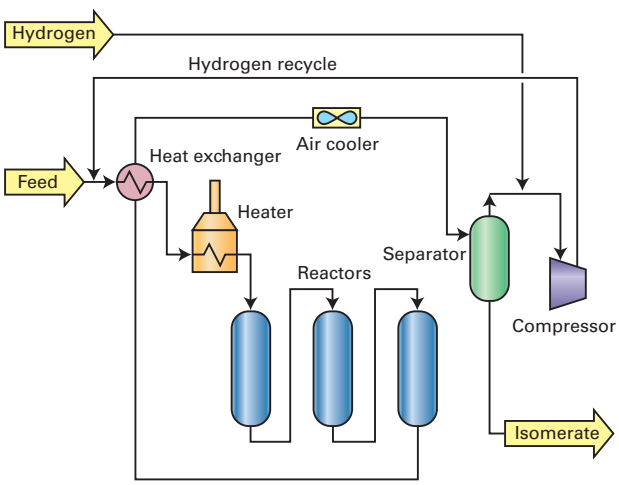
FSU ISOMERIZATION UNITS

Table 1

Parent company, refinery	Process	Catalyst
Russia		
Rosneft, Komsomolsk	Axens, low temperature	IS-614A
Lukoil, Volgograd	Penex-DIG (construction)	I-8, I-82
Lukoil, Nizhay Novgorod	Parlsom	LPI-100
Surgutneftegas, Kirishi	Isomalk-2	SI-2
Yukos, Novokuibyshevsk	CKS Isom	Hysopar
Yukos, Achinsk	Penex-DIG (construction)	I-8, I-82
Yukos, Angarsk Petrochemical Plant	CKS Isom (engineering)	Hysopar
Alliance, Khabarovsk	CKS Isom	Hysopar
TNK-BP, Ryazan	Isomalk-2	SI-2
Bashkirski Capital, CaNovoil (Ufa)	Axens, medium temperature	IP-632
Bashkirski Capital, Ufaneftekhim (Ufa)	Isomalk-2	SI-2
Bashkirski Capital, Ufa	Medium temperature	IMP-02
Salvneft,Yaroslavnefteorg-syntez	Parlsom (engineering)	LPI-100
Belarus		
Naftan	CKS Isom	Hysopar
Ukraine		
TNK-BP, Linos (Lisichansk)	Isomalk-2	SI-2
Lukoil, Odessa	Penex-DIG	I-8, I-82

ONCE-THROUGH ISOMERIZATION UNIT

Fig. 2



PERFORMANCE OF FSU ISOMERIZATION UNITS

Table 2

Refinery	Ufaneftekhim	Ryazan	Linos	Kirishi	Novokuibyshevsk	Khabarovsk	Naftan	Komsomolsk	Odessa	Ufa	Novoil (Ufa)
Isomerization process		Isomalk-2				CKS Isom		Low-temperature	Penex-DIG	Medium-temperature	
Catalyst		SI-2				Hysopar		IS-614A	I-8, I-82	IMP-02	IP-632
Process variables											
Feed rate, cu m/hr	40.0	75.0	30.0	85.5	37.3	24.0	23.4	20.6	18.97	31.0	50.0
Temperature upstream of reactor, °C.	170-180	125	130	133	256	245	256	149	172	260	250
Temperature downstream of reactor, °C.	193-195	147	148	168	280	268	273	152	187	280	260
Pressure upstream of reactor, MPa	3.0	2.8	2.7	2.94	1.93	2.71	2.17	3.38	3.1	2.6	2.3
Pressure downstream of reactor, MPa	2.8	2.6	2.5	2.70	1.83	2.68	2.09	3.34	3.0	2.5	2.1
Feed space velocity, hr[1]	2.5-2.6	1.9	1.7-2.0	2.0	1.5	1.5	1.5-2.0	1.5	1.5	2.0	1.5-2.0
Hydrogen-containing gas circulation ratio, cu m/cu m	700-800	500-600	600-700	540	510	600	510	—	—	600-700	500-800
Hydrogen-containing gas flow rate, cu m/hr	32,000	45,000	21,000	45,000	19,000	14,000	12,000	550-590	1,400-1,600	21,700	40,000
Isomerate output, wt %	98.0	98.0	98.0	99.1	97.0	96.7	98.0	95.7	95.4	97.0	98.0
Isomeratedensity at 20° C., kg/cu m	641.0	653.0	647.5	638.9	644.0	640.0	650.0	642.0	641.7	641.5	652.0
Isomerate MON	—	—	—	—	74.5	81.9	77.1	85.2	86.0	76.1	76.8
Isomerate RON	80.6	83.0	83.5	82.4	77.2	83.1	80.1	87.2	88.3	78.0	77.9
Unit specifications											
Once-through C_5 recirculation	+	+	+	+	+					+	+
Once-through, DIP C_6 recirculation						+	+	+	+		
Pentane isomerization level as i-C_5, %	69.1	73.0	73.6	73.7	52.78	73.7	56.7	55.1	69.7	52.0	No data
Hexanes isomerization level as 2-2 DMB, %	18.9	29.8	31.4	26.2	9.73	8.8	17.8	20.7	25.7	13.7	
Octane number increase	9.6	14.0	11.4	13.4	5.9	10.6	11.2	10.0	14.6	5.5	9.2
Product, octane-tonnes/hr	3,159.5	6,100.5	2,455.0	6,981.8	2,793.2	1,928.6	1,793.7	1,713.7	1,502.1	2,345.5	3,817.1

of 250,000 tonnes/year at the Linos refinery.

- *August 2005.* Conversion of an isomerization unit that used zeolitic catalyst to catalyst SI-2 at Ryazan refinery.
- *October 2005.* Conversion of an isoselectoforming unit at Kirishi refinery in the St. Petersburg region.

Commercial units

Table 2 shows performance data for pentane-hexane isomerization units operated in FSU refineries. It shows that FSU refiners during 2000-05 preferred isomerization technologies based on the zeolitic catalysts Hysopar, IPM-2, and domestic zirconium based catalyst SI-2.

Isomerization units were built in revamped catalytic reforming units in some refineries, in a hydrodealkylation unit at the Ryazan refinery, and in an ethylene production plant at the Linos refinery.

The Naftan refinery in Belarus, since the end of 2001, has operated a combined unit converted from a catalytic reformer. The unit contains these sections: hydrotreating the feed fraction (IBP-70° C.); fractionation of the hydrotreated fraction with extraction of isopentane; once-through isomerization of the deisopentanized cut (Fig. 2).

In 2004, a 120,000 tonne/year pentane-hexane isomerization unit was put into service at the Khabarovsk refinery. This unit is based on a technology similar to the one used at the CEPSA Algeciras refinery in Spain. This unit features isopentane withdrawal and return of a nonreacted pentane cut to the process.

A medium-temperature isomerization unit LSI-200 has been operating at the Novokuibyshevsk refinery since 2004. The process licenser is NPP Neftekhim, Krasnodar, and the engineering company is Lengipronefteknim, St. Petersburg. The design is based on once-through process that uses a zeolitic catalyst SI-2. While developing detailed documentation, the plant management decided to shift to a proven catalyst: Hysopar T-4500 produced by Süd-Chemie.

The Isomalk-2 process (Fig. 3) designed by NPP Neftekhim and using a sulfated zircon catalyst SI-2 has been successfully implemented at four refineries. The start-up of an isomerization unit at the Linos refinery considerably improves the ratio of high-octane and low-octane gasolines produced there. The share of AI-95 gasoline increased to 40% from 24%, and AI-92 gasoline to 45% from 35%, due to the reduced output of motor gasoline AI-80 to 14% from 40%.

In addition, analysis of isomerate composition shows that the catalyst SI-2 is considerably superior to zeolitic catalysts (octane number is five points higher) and is as efficient as chlorinated catalysts. The isomerization level of pentanes and hexanes is not reduced, while the resistance to catalyst poisons is much higher.

This low-temperature isomerization process features technological advantages. The level of pentane isomerization (Table 2) is quite high and within the range of 69.1-73.7%; hexane isomerization is within 18.9-31.4%. A maximum RON increase of up to 14 points was achieved.

An isoreforming unit has been operating at the Ufa refinery since 2003. VNIINeftekhim developed the catalyst, IMP-02. Main catalyst specifications are: platinum content of 0.38 wt %; bulk density about 0.7 g/cu cm; and an extrudate diameter of 0.3-2.1 mm. Unit capacity is 25 cu m/hr and isomerate output is 98 wt %.

Process conditions have been optimized during operations by reducting the of total hydrogen circulating gas-feedstock circulation ratio to 730-760 cu m/cu m and increasing temperature upstream of the reactor to 260-270° C.

The feed quality was very low: It contains only 22-26 wt % of n-pentanes and the end boiling point was 81-82° C. The isomerate was obtained with a MON of 76.6 and the increase accounted for 4.0-5.2 points only.

Improving the feed quality (fractional and hydrocarbon composition) as well as process stabilization enabled the operator to reach optimum performance of the zeolitic catalysts. Unit operating parameters were: feedstock fraction 28-70° C.; total content of C_5s was 60-65 vol % including n-C_5 of 35-39 vol %; hydrogen partial pressure was 2.1-2.2 MPa; circulation ratio was 550-650 cu m/cu m; feed space velocity was 2 hr^{-1}; process temperature was 270° C.; and the hydrogen content in circulating gas was 80 vol % minimum. Isomerate MON is 78-79.

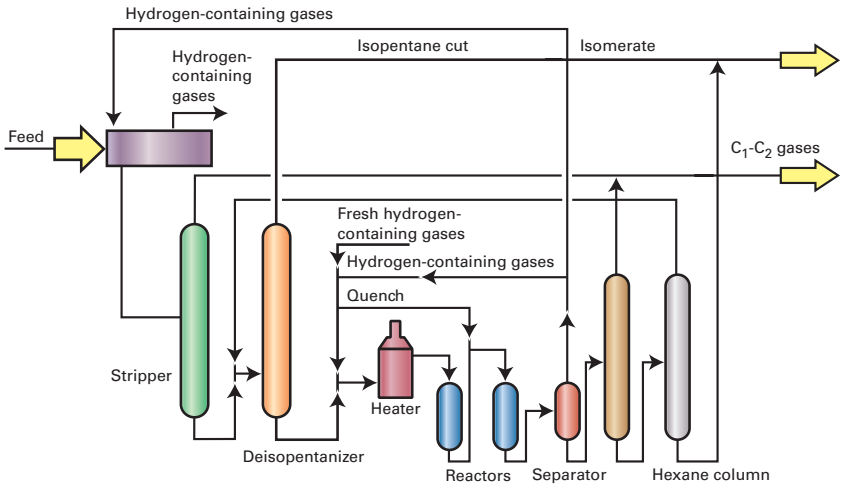
The first low-temperature pentane-hexane isomerization unit in Russia was commissioned in May 2002 at the Komsomolsk refinery in Far East Russia. The detailed design was from Ukrneftekhimproject, Kiev, based on the license from Axens. The unit (Table 2) operates very efficiently: Isomerate octane number is 87.2-87.9. The process efficiency is due to processing a feedstock with low hexane content.

The low-temperature isomerization process has some serious disadvantages that prevent it from wide implementation at FSU refineries. Specifically:

- Stringent requirements on the content of sulfur, nitrogen, water, benzene, C_{7+} hydrocarbons, and olefins in the feedstock.
- Constant injection of chlor-organics to maintain the catalyst activity.
- A complex and labor-instensive system for catalyst loading and unload-

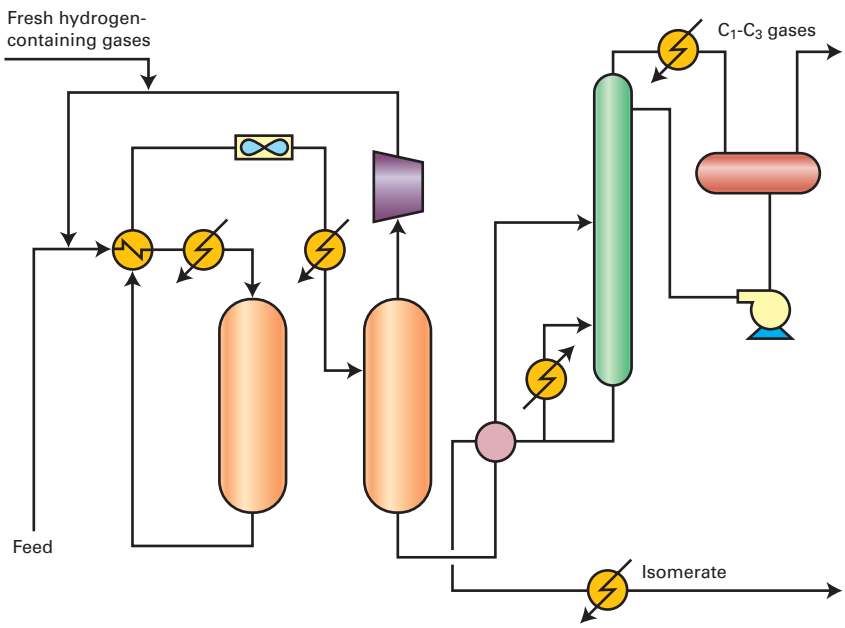
Isomerization with pentane recirculation

Fig. 3

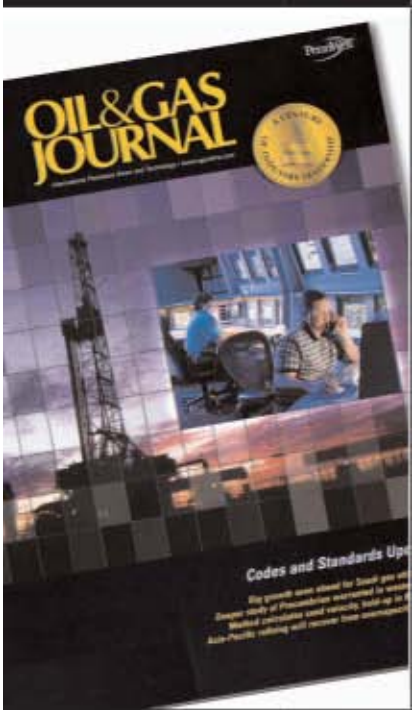


Parisom unit

Fig. 4



Why just tell them you're an expert when you can show them?



Article reprints are a low-cost, credible way to promote your business or technology.

For more information contact Sherry Humphrey at 918.832.9379 or sherryh@pennwell.com.

ing, and mandatory catalyst regeneration at manufacturer's catalyst plants.

• Equipment corrosion.

A Penex-DIG unit with a capacity of 120,000 tonnes/year of feedstock, licensed by UOP, was commissioned in September 2004 at the Odessa refinery in Ukraine. The unit consists of two reactors loaded with catalyst I-8 and I-82 in the amount of 14.2 and 15.2 tonnes, respectively. The first year of operation had a high efficiency with a specified octane of 88.0-89.2, an increase of up to 12 points, and a high conversion of n-pentane and hexane.

Construction of UOP low-temperature isomerization units (Penex-DIG) will be commissioned at the Achinsk and Volgograd refineries by 2008.

The light-naphtha isomerization process ParIsom (Fig. 4) is becoming popular among Russian oil companies; the main feature of the process is the catalyst LPI-100. The process features certain important advantages over isomerization based on zeolitic and chlorinated catalysts, namely:

• There is no need for organic chemicals to be injected to maintain catalyst activity, which allows the elimination of alkaline washing and avoids problems related to use and disposal of alkali.

• The higher activity of catalyst LPI-100 (at 80° C.) vs. zeolitic catalysts, which precludes the use of fire heating and reduces required capital investments.

• Possible process operations using high feed space velocities, which allows a reduction in the volume of catalyst and reactor size, a high isomerate output, and better octane characteristics.

• Low sensitivity of the catalyst to contaminants such as sulfur and water, which eliminates the need for feed dryers.

• It is an environment friendly and waste-free process.

Currently the process is implemented at the Nizhny Novgorod refinery and construction of a process unit is planned at the Yaroslavnefteorgsyntez refinery.

The unit configuration is similar to units operating with zeolitic catalysts. This process is cost competitive and in the future it will gain a leading role at Russian refineries. ✦

The authors

Akop Mirimanyan is the deputy general director for JSC Petrochim Engineering, Moscow. Previously, he worked as a project engineer and chief process engineer for the State Institute for Refinery and Process Engineering (Azgiproneftekhim), Baku, during 1961-89. In 1989-93, he was deputy chief engineer for Nizhniy Novgorod and in 1994-99, he was a refining consultant for Stork Comprimo BV. Mirimanyan holds a MEng (1957) from the Azerbaijan Petroleum Institute, Baku.

Alexey Vikhman is a general director for JSC Petrochim Engineering, Moscow, a position he has held since 1995. During 1974-95, he held positions as a junior research assistant, senior research assistant, laboratory head, and department head for VNIIneftemash. He holds a PhD in engineering from the I.M. Gubkin Moscow Oil & Gas Institute.

Mikhail Rudin (Mikhail.rudin@worleyparsons.com) is a chief technical advisor with WorleyParsons, New York City. He has worked for WorleyParsons since 2001 as an approvals manager and the Moscow Branch Manager. Before joining WorleyParsons, he worked for Lengipronftekhim, a St. Petersburg engineering company (1960-94) as a process manager and vice-president, Litwin Engineers & Constructors Inc., Raytheon Co., and Mustang Engineering Inc. Rudin has been involved in the design of downstream and upstream projects and is the author of more than 19 textbooks and reference books. He holds an MS in chemical engineering and PhD in organic chemistry from St. Petersburg Technology University.

DECOMMISSIONING—1

NEB case study shows abandonment pitfalls

Katherine E. Roblin
National Energy Board
Calgary

Pipeline abandonment must consider environmental remediation beyond simple closure or removal of the line in question.

In August and September 1996, Canada's National Energy Board heard and approved the abandonment of the entirety of Yukon Pipelines Ltd. (YPL), the first and (to date) only large-scale abandonment of an NEB-regulated pipeline. Although the NEB wrote its YPL leave-to-abandon order in 1996, and the majority of the pipeline and related infrastructure were removed soon after, the abandonment is still ongoing.

The leave-to-abandon order will not come into force until YPL demonstrates, to the satisfaction of the Board and in consideration of comments from other stakeholders, that soil and groundwater contamination associated with the pipeline has been successfully remediated.

This article provides an overview of the Board's regulatory requirements and responsibilities with respect to pipeline abandonment, typical environmental issues associated with pipeline abandonment, and types and examples of pipeline abandonments addressed by the Board to date. Subsequent parts will present a more detailed examination of the YPL pipeline abandonment and associated remediation activity, including a discussion of some of the technical and regulatory challenges associated with the project.

Regulatory requirements

The NEB Act and Canadian Environmental Assessment Act (CEA Act), as well as associated regulations, standards, and guidelines define the NEB's regulatory requirements and responsibilities with respect to pipeline abandonment. The following summary provides regulatory context for the cases discussed later in the article.

Under paragraph 74(1)(d) of the NEB Act, "A company shall not, without the leave of the Board, ...abandon the operation of a pipeline." A company, therefore, must apply for and receive a "leave-to-abandon" order from the Board before it can abandon operation of its pipeline facilities.

When this order comes into force, the company's authorization to operate the pipeline (granted under section 52 or 58 of the NEB Act) is canceled. Consequently, the subject pipeline facilities cease to meet the definition of a pipeline under section 2 of the NEB Act and NEB jurisdiction is terminated.

Sections 19 and 24 of the NEB Act also have important implications with respect to pipeline abandonment. Nothing in the NEB Act grants the Board authority to impose conditions upon a leave-to-abandon order. Subsection 19(1), however, permits the Board to direct that an order shall come into force at a future time or upon satisfaction of conditions imposed by the Board. Section 24 prescribes that any hearing with respect to pipeline abandonment must be public (a public hearing may be either oral or written).

In addition to considering environmental issues in the context of the Canadian public interest in making a decision under paragraph 74(1)(d) of the NEB Act, the Board must first perform an environmental assessment of the pipeline abandonment under sections 5 and 11 of the CEA Act. Typically, the environmental assessment for a pipeline abandonment project takes the form of an environmental screening (per section 18 of the CEA Act). Sections 16 and 18 of the CEA Act provide for public participation and consideration of public comments in the screening of a project. The Board integrates such public involvement into the public hearing process under the NEB Act.

The environmental screening conducted by the Board must consider the environmental effects of the pipeline abandonment project and "measures that are technically and economically

Based on a presentation to the ASME International Pipeline Conference, Calgary, Sept. 25-29, 2006.

YPL PIPELINE ROUTE

Fig. 1

feasible and that would mitigate any significant adverse environmental effects of the project" (per section 16 of the CEA Act).

If the Board determines, pursuant to paragraph 20(1)(a) of the CEA Act, that, taking into account appropriate mitigation measures, the abandonment is not likely to cause significant adverse environmental effects, the Board may then issue its leave-to-abandon order. In doing so, the Board has the responsibility, per subsection 20(2) of the CEA Act, to ensure that mitigation measures taken into account in its decision are then implemented.

The leave-to-abandon order, however, terminates the Board's jurisdiction and consequently its ability to ensure implementation of mitigation measures. In order to nonetheless meet its obligations under the CEA Act, the Board may use subsection 19(1) of the NEB Act to delay official leave to abandon until the physical abandonment activities have been completed and conditions with respect to environmental mitigation have been fulfilled.

According to subsection 15(3) of the CEA Act, for any physical work requiring an environmental assessment (for example, pipeline construction), the Board must consider every undertaking likely to be carried out in relation to that work, including abandonment.

In practice, because abandonment of most pipelines occurs in the distant future, this consideration typically takes the form of a standardized statement that "any environmental effects associated with the abandonment phase are likely to be similar to those caused by the construction phase. Pursuant to the NEB Act, an application will be required to abandon the facility, at which time the environmental effects will be assessed by the NEB."[1]

Standards

Onshore Pipeline Regulations, 1999 (OPR-99) also governs NEB-regulated pipelines under the NEB Act. These regulations are goal-oriented (a blend of performance-based and prescription-based) and contain many provisions that apply to the full life of a pipeline, including abandonment. Section 1 defines abandon as "to remove permanently from service" and Section 50 states that an application pursuant to paragraph 74(1)(d) of the NEB Act "shall include the rationale for the abandonment and the measures to be employed in the abandonment."

CSA Standard Z662-03, Oil and Gas Pipeline Systems (CSA Z662) applies to NEB-regulated pipelines transporting liquid or gaseous hydrocarbons. CSA Z662 defines piping, abandoned, as "piping that is removed from service and not maintained for later return to service" and includes more prescriptive requirements for pipeline abandonment than OPR-99.

Based on a 1996 discussion paper, Clause 10.14.1 specifies "the decision to abandon a section of piping, in place or through removal, shall be made on the basis of an assessment that includes consideration of current and future land use and the potential for safety hazards and environmental damage to be created by ground subsidence, soil contamination, groundwater contamination, erosion, and the creation of water conduits." Clauses 10.14.2 and 12.10.2.3 provide further details pertaining to the physical abandonment of the piping.[2]

Guidance Notes for the Onshore Pipeline Regulations, 1999, includes guidance with respect to regulatory requirements for pipeline abandonment.

The NEB Filing Manual includes guidance with respect to information to be included in abandonment applications in order for the NEB to make its decisions under the NEB Act and CEA Act.

The NEB continues to work on revisions to OPR-99 to distinguish between pipeline abandonment (permanent cessation of operation that results in discontinuance of service) and decommissioning (like "abandonment" but without discontinuance of service to

end users).[3-5] These amendments would provide regulatory clarity for projects such as diversion, replacement, or discontinued use of an old pipeline segment where a new or existing segment of pipeline would continue to provide the same service.

Companies currently apply to undertake such projects under Section 52, 58, or 74 of the NEB Act, none of which adequately accommodate these applications.[3] The revised regulations would ensure that applications to decommission a pipeline receive examination and regulatory oversight of technical and environmental issues similar to those for abandonment, but without requiring the regulatory process necessary to address the effects of abandonment on end users.

Environmental effects

Pipeline abandonment can involve removal of the pipeline or abandonment in place, each with characteristic environmental effects discussed in detail in the Pipeline Abandonment Steering Committee's 1996 discussion paper on pipeline abandonment technical and environmental issues.[2]

Pipeline abandonment by removal may be desirable when abandoning the pipeline in place could obstruct future land use or development, or result in a safety hazard. Pipeline abandonment in place may be desirable in areas sensitive to land disturbance such as environmentally sensitive areas, unstable or highly erodible areas, or crossings with water bodies, roads, railways or other pipelines. Large-scale pipeline abandonments typically use a combination of both options, with some segments abandoned in place and others removed depending on site-specific requirements.

Environmental effects of pipeline removal are similar to those of pipeline construction. Typical considerations include access, protection of cultural features and environmentally sensitive areas, topsoil conservation, erosion prevention, vegetation management, contingency planning, surface reclamation, and post-construction monitoring.

Abandonment in place still entails some ground disturbance, with similar environmental considerations but on a smaller scale. Whichever abandonment option an operator chooses, attention should be given to additional issues of ground subsidence, drainage, and contamination of soil, groundwater, and surface water.

Regulations state that where pipelines are abandoned in place "ground subsidence would be negligible for pipelines up to 323.9 mm in diameter," but should be assessed on a site-specific basis for larger pipelines.[2] The settling of soil disturbed by pipeline removal may also cause subsidence. Ground subsidence may channel surface runoff, resulting in topsoil loss, erosion, and siltation of water bodies.

The creation of water conduits associated with abandoned pipelines can lead to drainage of water bodies, flooding of previously dry low areas, and transport of contaminants. This problem is typically associated with corrosion of pipelines abandoned in place, allowing groundwater to enter, exit, and flow though the abandoned pipe, but preferential groundwater flow through uncompacted trench material following pipeline removal can create similar problems.

Typical mitigation measures for these subsidence and drainage issues include strategic placement of plugs and grouting, compaction of disturbed subsoil, and appropriate pipeline cleaning prior to abandonment in place.

Appropriate pipeline cleaning reduces residual contamination regardless of the abandonment option selected. If the operator chooses to remove the pipeline, it should first be emptied and cleaned sufficiently to prevent the release of contaminants when cutting the pipe into segments. If the pipeline is to be abandoned in place, cleaning should be sufficient to prevent contamination of the surrounding environment when the pipe corrodes and becomes a water conduit.

The other contamination issue presenting a wildcard regarding the time and money required for pipeline abandonment and reclamation is historical contamination from operational releases, leaks, and spills. Although abandonment does not cause historical contamination, it must be remediated for the protection of human and environmental health before the affected land is released for nonpipeline use.

As is the case for other pipeline abandonment issues, operators must seek meaningful input from stakeholders, including pertinent regulatory bodies, landowners, and land managers when addressing historical contamination. Landowner concerns may include health effects of residual hydrocarbon concentrations, effect on future land use, and effect on property value.

NEB decisions

Decisions made by the NEB during the past 15 years illustrate how the Board's treatment of abandonment has evolved and provide context for the YPL abandonment.

Before 1996, minor abandonment applications considered by the Board included 3 Trans-Northern Pipelines Inc. (TNPI) projects in 1993 (Table 1). NEB did not hold hearings in these cases and the end users had no further need for the facilities.

Environmental screenings considered factors including soil and groundwater contamination and revegetation. The NEB orders granted TNPI immediate leave to abandon the facilities and then (except for MO-22-93) added conditions pertaining to the abandonment. These conditions required TNPI to conduct environmental site assessments (ESAs) for contamination and undertake remediation if required.

PRE-1996 ABANDONMENT EXAMPLES, TNPI

Table 1

Facility	Abandonment method	Board order
Port Hope meter station	Removed	MO-21-93
Prescott meter station	Removed	
3.4-km Prescott lateral	Filled with nitrogen and maintained with cathodic protection	
524-m segment of Sun Canadian Pipeline (through previously abandoned meter station)	Filled with nitrogen and maintained with cathodic protection	MO-22-93
Markham meter station	Removed	MO-25-93
300-m Markham lateral	Removed	
Hamilton meter station	Removed	MO-T2-1-96
1.9-km Hamilton lateral	Filled with grout and abandoned in place	

The then-current federal environmental quality guidelines, as adopted by the Canadian Council of Ministers of the Environment (CCME), defined contamination.[6-9]

The 1996 hearing scrutinized pipeline abandonment much more closely with respect to the abandonment in place of the last 21.9 km of a pipeline owned by Manito. Because this segment was the only portion of the pipeline crossing a provincial border, the pipeline abandonment order (MO-5-96, pursuant to Hearing Order MH-1-96) resulted not only in the termination of the Board's jurisdiction over the abandoned pipeline segment, but in the termination of the Board's jurisdiction over the entirety of the remaining pipeline (located wholly in Saskatchewan).

Debate surrounding the pipeline abandonment was based primarily on economics and questions of jurisdiction, leading to intense discussion regarding when and how the Board's jurisdiction would terminate and what government body would be responsible for regulatory oversight of contaminant remediation and ongoing environmental protection. Although Manito proposed remediation activities at some future date in conjunction with abandonment and remediation of associated production facilities under provincial regulation, the Board ordered Manito to remediate contaminated soils prior to "leave to abandon" the facilities.

Then-current CCME and provincial guidelines and background concentrations defined contamination. Other environmental issues addressed by Manito and considered by the Board included pipeline cleaning, creation of groundwater conduits, removal of surface facilities, surface water control, and waste management.

In contrast to the TNPI abandonment orders, the Board stipulated that leave-to-abandon would not come into force until certain conditions (including contaminant remediation) were met, placing conditions on the timing of the order coming into effect (per subsection 19(1) of the NEB Act) instead of

on the abandonment itself (per paragraph 74(1)(d) of the NEB Act).[10 11]

In November 1997, once satisfied that Manito had met all the conditions of leave-to-abandon, including remediation of contamination attributed to operation of the pipeline, the Board declared the abandonment complete.[12] This case set the stage for the YPL abandonment.

Following the YPL abandonment, cases considered by the Board have dealt primarily with projects that would be considered decommissionings under proposed OPR-99 revisions. For example, in 2002-03, TNPI applied under paragraph 74(1)(d) of the NEB Act to replace or re-route several pipeline segments as part of larger facilities construction applications. The Board noted that there would be no discontinuance of service as a result of these activities and decided that the activities could thus be addressed under section 52 of the NEB Act in conjunction with the overall construction activities for which TNPI had applied.

Abandonment, however, still guided consideration of issues pertaining to the environment and the termination of NEB jurisdiction. Environmental issues considered included historical soil and groundwater contamination and potential corrosion-created water conduits, which would then leach pipe materials into the groundwater. The NEB ordered TNPI to remediate any detected contamination to meet both federal and provincial guidelines.[13-16]

By contrast, in 2004, the Board issued Enbridge Pipelines Inc. an abandonment order (XO-E101-22-2004) pursuant to paragraph 74(1)(d) of the NEB Act for an old line segment that Enbridge was going to remove with no change in service. No hearing was conducted. Similar to the 1993 TNPI orders, leave-to-abandon came into force without delay and conditions were attached to the abandonment itself. Environmental issues considered included possible historical soil and groundwater contamination, potential naturally occurring radioactive materials (NORMs), topsoil conservation, and reclamation of disturbed areas.

The NEB ordered Enbridge to report any contamination encountered and how it would be remediated. Contamination was not defined in terms of provincial or federal guidelines.[17]

The proposed decommissioning revisions to OPR-99 would provide greater regulatory clarity and consistency regarding cases such as these.

Acknowledgments

The author acknowledges her colleagues at the National Energy Board for their assistance with management and review of this file and preparation of this article. She also thanks Dan Bulat of Envirotech Engineering for assistance with the review of this article. ✦

References

1. National Energy Board, "Environmental Screening Report [for Profico Energy Management Ltd. Construction of a 2.5 km Inter-Provincial Pipeline]," https://www.neb-one.gc.ca/ll-eng/livelink.exe/fetch/2000/90464/90550/324575/369450/378254/A0R7Q5_-_Environmental_Screening.pdf?nodeid=378373&vernum=0, August 2005.

2. Pipeline Abandonment Steering Committee (Technical and Environmental Subcommittees), "Pipeline Abandonment: A Discussion Paper on Technical and Environmental Issues," http://www.neb-one.gc.ca/safety/aband_e.htm, November 1996.

3. National Energy Board, "Proposed Amendment to the Onshore Pipeline Regulations, 1999—Decommissioning of Pipelines and Related Facilities," https://www.neb-one.gc.ca/ll-eng/livelink.exe/fetch/2000/90463/259919/259591/A0H1G2_-_Proposed_Amendment_to_the_OPR_1999_-_Decommissioning_of_Pipelines_and_Related_Facilities.pdf?nodeid=259592&vernum=0, February 2003.

4. National Energy Board, "Decommissioning of Pipelines and Related Facilities, Proposed Amendments to the Onshore Pipeline Regulations, 1999 and National Energy Board Processing Plant Regulations, Proposed Decommissioning Exemption Order," http://www.neb-one.gc.ca/ActsRegulations/PLDecommissioningExeptionOrder031010_e.htm, October 2003.

5. National Energy Board, "National Energy Board Workshop 2003: NEB Workshop Proceedings," http://www.neb-one.gc.ca/Publications/NEBWorkshops/2003NEBWorkshopProceedings_e.pdf, pp. 5-7, 60, 2004.

6. National Energy Board, "Environmental Screening Document [for File No: 3400-T2-19, Trans-Northern Pipelines Inc., application to abandon Port Hope Meter Station, Prescott Meter Station and Prescott Lateral]," September 1993.

7. National Energy Board, "Environmental Screening Document [for File No: 3400-T002-21, Trans-Northern Pipelines Inc., two projects on pipeline leased from Sun-Canadian Pipe Line Company Limited]," September 1993.

8. National Energy Board, "Environmental Screening Document [for File No: 3400-T002-22, Trans-Northern Pipelines Inc. abandonment of Markham Meter station and Lateral and Hamilton Meter Station and Lateral]," November 1993.

9. National Energy Board, "Environmental Screening Report [for Trans-Northern Pipelines Inc., or the Company, application dated Sept. 2, 1996, for the abandonment of the Hamilton Lateral and Hamilton Meter Station in the Province of Ontario]," March 1996.

10. National Energy Board, "Environmental Screening Report [for Manito Pipelines Ltd., application dated Jan. 31, 1996, by Murphy Oil Co. Ltd. on behalf of Manito for the abandonment of the operation of the Blackfoot-Dulwich Pipeline System (the pipeline system), located in the Provinces of Alberta and Saskatchewan]," June 1996.

11. National Energy Board, "Reasons for Decision, Manito Pipelines Ltd., MH-1-96, Facilities Abandonment," https://www.neb-one.gc.ca/ll-eng/livelink.exe/fetch/2000/90464/90552

/92267/92704/92706/1996-07-01_Reasons_for_Decision_MH-1-96.pdf?nodeid=92722&vernum=0, July 1996.

12. National Energy Board, "Manito Pipeline Ltd., Abandonment of Blackfoot to Dulwich Pipeline as set out in Board Order Mo-5-96," November 1997.

13. National Energy Board, "National Energy Board Environmental Screening Report, Trans-Northern Pipelines Inc. Capacity Expansion and Line Reversal, Montréal, Quebec to Mississauga, Ontario, File 3200-T002-1, OH-1-2003," https://www.neb-one.gc.ca/ll-eng/livelink.exe/fetch/2000/90464/90552/160186/375400/244176/272181/304480/A0J4H3_-_Environmental_Screening.pdf?nodeid=304481&vernum=0, July 2003.

14. National Energy Board, "Reasons for Decision, Trans-Northern Pipelines Inc., OH-1-2003, Facilities," https://www.neb-one.gc.ca/ll-eng/livelink.exe/fetch/2000/90464/90552/160186/375400/244176/287450/287449/A0I8U6_-_Reasons_For_Decision.pdf?nodeid=287647&vernum=0, July 2003.

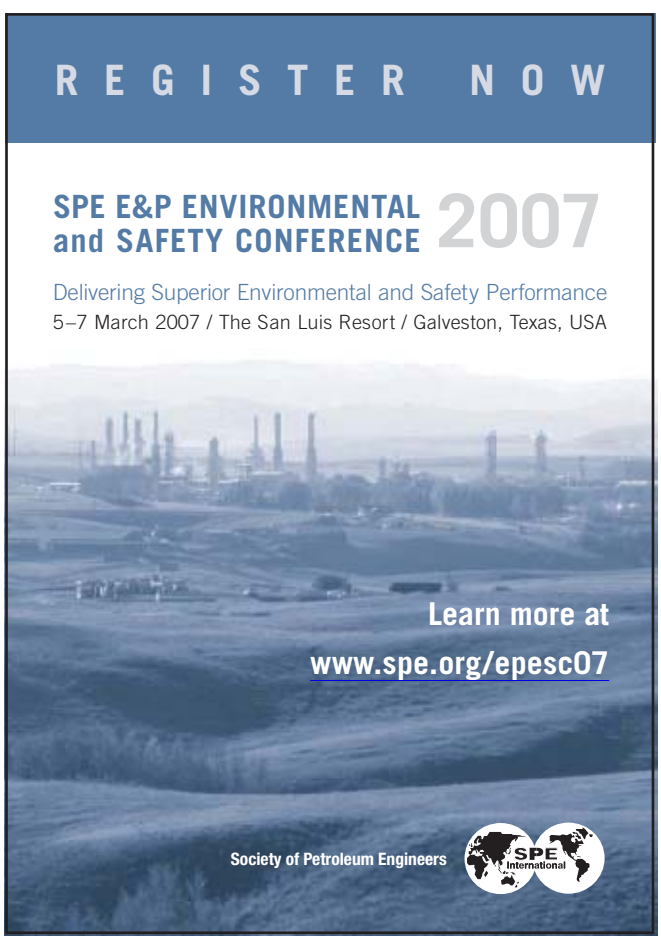
15. National Energy Board, "Environmental Screening Report [for Trans-Northern Pipelines Inc. Relocation of a Segment of Pipeline and Lowering of two Segments of Pipeline in the City of Hamilton, Ontario]," https://www.neb-one.gc.ca/ll-eng/livelink.exe/fetch/2000/90464/90552/160186/375399/285095/287791/304619/A0J4K3_-_Environmental_Screening.pdf?nodeid=304620&vernum=0, November 2003.

16. National Energy Board, "Reasons for Decision, Trans-Northern Pipelines Inc., OHW-1-2003, Facilities," https://www.neb-one.gc.ca/ll-eng/livelink.exe/fetch/2000/90464/90552/160186/375399/285095/304847/304739/A0J4J9_-_Reasons_For_Decision.pdf?nodeid=304740&vernum=0, November 2003.

17. National Energy Board, "Environmental Screening Report [for Enbridge Pipelines Inc. Removal of 3.2 km of pipeline that has been deactivated since 1987]," https://www.neb-one.gc.ca/ll-eng/livelink.exe/fetch/2000/90464/90552/92263/368163/335069/338654/A0L2L9_-_Enbridge_Pipelines_Inc._-_Order_XO-E101-22-2004_-_Environmental_Screening?nodeid=338655&vernum=0, October 2004.

The author

Katherine E. Roblin (kroblin@neb-one.gc.ca) is an environmental specialist at the National Energy Board, Calgary. She has also served as an environmental engineer at O'Connor Associates Environmental Inc. She holds a BS in engineering (1996) from Queen's University at Kingston, Ont. She is a member of the Association of Professional Engineers, Geologists, and Geophysicists of Alberta (APEGGA) and the Canadian Land Reclamation Association.



Equipment/Software/Literature

Tool measures environmental, air quality parameters

The new Multinorm universal instrument monitors indoor environmental and air quality parameters.

Available measurements include air temperature, air velocity, relative humidity, dewpoint, illuminance, luminance, CO, CO_2, and sound (Class 1 and 2) analyses.

Additional features include luminance measurement, contrast, globe temperature, thermocouple (contact temperature), predictive mean vote, predictive percentage of dissatisfied, and wet bulb globe temperature.

It can operate in two modes. In the on-line mode, it displays current measurements; or, in the logger mode, it automatically stores all measurement values per logging interval.

Software is included for data analysis, charting, and reporting. Firmware is upgradable for future new probe additions.

Source: **Carltex Inc.**, Box 120, Centerport, NY 11721.

New expansion joints for corrosive environments

New PTFE molded expansion joints are spool-type flexible couplings designed to compensate for movement and abate noise in severe corrosive environments such as chemical and petrochemical plants.

Engineered, designed, and built for use in extreme applications, expansion joints can be used where metallic joints/lap joints, or PTFE and FEP-lined types may have been previously specified or used.

Expansion joints are available in two, three, four, or five convolutions in a variety of dimensions and operating temperatures. Joints are delivered complete with ductile iron flanges and control units ready for immediate installation in the field. Flanges in other alloys are available by special order. Inquire for availability of other materials. Flanges are protected to resist atmosphere corrosion and are tapped to the ANSI standard drilling of 150 lb.

Control units are assembled with flanges to prevent joints from excessive axial elongation. The company sets the tie-rods at the factory at the maximum face-to-face working limits, with lock nuts protecting against overextension. Other expansion joints offered by this firm include traditional spool type, eccentric or concentric reducers, and offset designs, spherical arch, and nonmetallic ducting joints.

Source: **Holz Rubber Co. Inc.**, 1129 S. Sacramento St., Lodi, CA 95240.

Services/Suppliers

Stress Engineering Services Inc.

Houston, has appointed Kimberly Flesner, David Garrett, Ramon San Pedro, and Matthew Stahl as principals in the firm's upstream practice.

Flesner currently manages the company's materials engineering and forensic practice areas, and has more than 20 years of experience in those fields. She holds a BS degree from the University of Michigan and MS degree from the University of Texas.

Garrett developed SES software for designing floating systems, including combined floater-mooring-risers systems. He earned his BS and MS degrees from Louisiana State University, and his PhD from Rice University.

San Pedro specializes in the design, analysis, and testing of mechanical connections, including riser load ring assemblies, threaded connectors, bolted flange joints, and clamp-hub connectors. He received BS and MS degrees from the Massachusetts Institute of Technology.

Stahl is primarily focused on analysis and testing to support offshore drilling operations. He is a graduate of Worcester Polytechnic Institute, Rensselaer Polytechnic Institute, and Texas A&M University.

Stress Engineering Services Inc. is an engineering consulting organization and test laboratory serving the upstream and downstream petroleum industry and consumer products companies with expert design and failure analysis services.

Petris Technology Inc.

Houston, has announced that David Archer has joined the company as vice-president, with responsibility for product management and expansion of Petris' presence through industry alliances.

Archer holds a BS degree in mathematics from Texas Christian University, and master's and PhD degrees in mathematical sciences from Rice University. He previously was president and CEO of POSC, Petrotechnical Open Standards Consortium.

Petris Technology Inc., founded in 1994, provides practical IT-based solutions for clients leveraging its expertise in data management, drilling and wellbore data management, GIS, and professional services.

Compagnie Générale de Géophysique (CGG)

Paris, has announced a merger between Veritas DGC Inc. and a subsidiary of CGG. The combined company has been named Compagnie Générale de Géophysique-Veritas (CGGVeritas)

CGGVeritas is a leading international pure-play geophysical company delivering a wide range of technologies, services, and equipment through Sercel, to its broad base of customers throughout the global oil and gas industry.

Flowserve Corp.

Dallas, has announced the opening of new administrative headquarters in Essen, Germany. The new facility houses a quick response center and learning resource center for its operations in Europe, Middle East, and Africa.

Flowserve Corp. is a global provider of fluid motion and control products and services used in chemical refining and manufacturing applications.

API IMPORTS OF CRUDE AND PRODUCTS

	Districts 1-4		District 5		Total US		
	2-2 2007	[1]1-26 2007	2-2 2007	[1]1-26 2007	2-2 2007	[1]1-26 2007	2-3 2006
	1,000 b/d						
Total motor gasoline	170	266	45	0	215	266	318
Mo. gas. blending comp.	475	830	73	48	548	878	408
Distillate[2]	261	382	9	13	270	395	337
Residual	136	169	23	23	159	192	485
Jet fuel-kerosine	88	141	146	163	234	304	217
LPG	314	328	3	2	317	330	324
Unfinished oils	473	503	71	75	544	578	498
Other	326	234	15	9	341	243	401
Total products	**2,243**	**2,853**	**385**	**333**	**2,628**	**3,186**	**2,988**
Canadian crude	1,722	1,414	26	327	1,748	1,741	1,797
Other foreign	6,394	7,484	882	596	7,276	8,080	7,720
Total crude	**8,116**	**8,898**	**908**	**923**	**9,024**	**9,821**	**9,517**
Total imports	**10,359**	**11,751**	**1,293**	**1,256**	**11,652**	**13,007**	**12,505**

[1]Revised. [2]Includes No. 4 fuel oil.
Source: American Petroleum Institute.
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

	*2-2-07	*2-3-06	Change	Change, %
	$/bbl			
SPOT PRICES				
Product value	64.87	70.91	–6.04	–8.5
Brent crude	55.93	64.19	–8.26	–12.9
Crack spread	8.95	5.94	3.01	50.7
FUTURES MARKET PRICES				
One month				
Product value	65.61	73.51	–7.90	–10.7
Light sweet crude	57.09	66.58	–9.49	–14.3
Crack spread	8.52	6.93	1.59	22.9
Six month				
Product value	72.16	81.73	–9.57	–11.7
Light sweet crude	60.17	69.09	–8.92	–12.9
Crack spread	11.99	12.64	–0.65	–5.2

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

API CRUDE AND PRODUCT STOCKS

	Crude oil	Motor gasoline		Jet fuel	Fuel oils		Unfinished oils
		Total	Blending comp.[1]	Kerosine	Distillate	Residual	
	1,000 bbl						
PAD I	13,226	58,040	27,691	9,589	58,626	19,148	8,981
PAD II	68,952	52,995	15,695	7,420	27,559	1,503	12,462
PAD III	182,168	67,819	28,008	14,047	34,602	17,551	42,085
PAD IV	14,002	6,738	1,898	495	3,509	353	2,679
PAD V	[1]50,270	30,941	23,194	8,979	11,194	6,538	19,722
Feb. 2, 2007	**[1]328,618**	**216,033**	**94,486**	**40,530**	**135,490**	**45,093**	**85,929**
Jan. 26, 2007[3]	**327,150**	**219,106**	**97,710**	**40,818**	**142,372**	**45,839**	**86,212**
Feb. 3, 2006	**320,904**	**219,499**	**76,430**	**43,490**	**136,276**	**39,856**	**89,046**

[1]Included in total motor gasoline. [2]Includes 6.739 million bbl of Alaskan crude in transit by water. [3]Revised.
Source: American Petroleum Institute.
Data available in OGJ Online Research Center.

API REFINERY REPORT—FEB. 2, 2007

	REFINERY OPERATIONS					REFINERY OUTPUT			
District	Total refinery input	Crude runs	Input to crude stills	Operable capacity	Percent operated	Total motor gasoline	Jet fuel, kerosine	Fuel oils: Distillate	Fuel oils: Residual
	1,000 b/d					1,000 b/d			
East Coast	3,187	1,396	1,411	1,618	87.2	1,606	97	459	116
App. Dist. 1	87	75	78	95	82.1	40	0	18	0
Dist. 1 total	**3,274**	**1,471**	**1,489**	**1,713**	**86.9**	**1,646**	**97**	**477**	**116**
Ind., Ill., Ky.	2,298	2,146	2,201	2,355	93.5	1,201	138	546	43
Minn., Wis., Dak.	390	384	388	442	87.8	339	26	122	7
Okla., Kan., Mo.	767	651	651	786	82.8	463	37	228	3
Dist. 2 total	**3,455**	**3,181**	**3,240**	**3,583**	**90.4**	**2,003**	**201**	**896**	**53**
Inland Texas	926	564	588	647	90.9	409	36	177	6
Texas Gulf Coast	3,818	3,141	3,231	4,031	80.2	1,378	324	879	156
La. Gulf Coast	3,501	3,136	3,146	3,264	96.4	1,144	376	781	101
N. La. and Ark.	205	167	177	215	82.3	138	7	34	5
New Mexico	121	83	89	113	76.8	162	0	29	0
Dist. 3 total	**8,571**	**7,091**	**7,231**	**8,270**	**87.4**	**3,231**	**743**	**1,900**	**268**
Dist. 4 total	**667**	**538**	**561**	**596**	**94.1**	**302**	**23**	**172**	**14**
Dist. 5 total	**2,657**	**2,331**	**2,463**	**3,173**	**77.6**	**1,633**	**379**	**483**	**155**
Feb. 2, 2007	**18,624**	**14,612**	**14,984**	**17,335**	**86.4**	**8,815**	**1,443**	**3,928**	**566**
Jan. 26, 2007*	**18,589**	**14,468**	**14,816**	**17,335**	**85.5**	**8,845**	**1,428**	**3,949**	**673**
Feb. 3, 2005	**16,717**	**14,524**	**15,127**	**17,115**	**88.4**	**8,244**	**1,498**	**3,941**	**625**

*Revised.
Source: American Petroleum Institute.
Data available in OGJ Online Research Center.

OGJ GASOLINE PRICES

	Price ex tax 1-31-07	Pump price* 1-31-07	Pump price 2-1-05
	¢/gal		
(Approx. prices for self-service unleaded gasoline)			
Atlanta	180.3	220.0	232.4
Baltimore	182.1	224.0	237.0
Boston	184.1	226.0	234.0
Buffalo	184.9	245.0	253.7
Miami	182.1	232.4	244.7
Newark	186.1	219.0	247.4
New York	172.2	232.3	257.1
Norfolk	176.4	214.0	227.2
Philadelphia	197.2	247.9	244.4
Pittsburgh	179.3	230.0	246.9
Wash., DC	196.5	234.9	247.7
PAD I avg.	183.7	229.6	243.0
Chicago	172.9	223.8	250.8
Cleveland	163.6	210.0	228.4
Des Moines	164.7	205.1	221.8
Detroit	154.0	203.2	230.7
Indianapolis	157.2	202.2	224.2
Kansas City	165.0	201.0	217.2
Louisville	170.2	207.1	222.8
Memphis	172.2	212.0	226.8
Milwaukee	167.8	219.1	234.8
Minn.-St. Paul	162.7	203.1	222.9
Oklahoma City	159.7	195.1	214.8
Omaha	161.7	208.1	222.9
St. Louis	167.1	203.1	224.9
Tulsa	166.6	202.0	217.5
Wichita	154.7	198.1	216.9
PAD II avg.	164.0	206.2	225.2
Albuquerque	175.6	212.0	230.4
Birmingham	176.3	215.0	226.4
Dallas-Fort Worth	178.6	217.0	227.7
Houston	170.4	208.8	223.8
Little Rock	172.8	213.0	228.1
New Orleans	177.6	216.0	237.5
San Antonio	174.6	213.0	223.2
PAD III avg.	175.1	213.5	228.2
Cheyenne	172.6	205.0	213.6
Denver	172.4	212.8	219.6
Salt Lake City	181.0	223.9	220.2
PAD IV avg.	175.3	213.9	217.8
Los Angeles	197.6	256.1	253.0
Phoenix	198.5	235.9	232.9
Portland	222.6	265.9	213.1
San Diego	208.4	266.9	249.1
San Francisco	210.0	268.5	249.2
Seattle	214.0	266.4	233.9
PAD V avg.	208.5	260.0	238.5
Week's avg.	**178.2**	**221.8**	**231.7**
Jan. avg.	**181.7**	**225.3**	**227.3**
Dec. avg.	**184.9**	**228.5**	**216.5**
2007 to date	**181.7**	**225.3**	—
2006 to date	**185.8**	**228.2**	—

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

REFINED PRODUCT PRICES

	1-26-07 ¢/gal		1-26-07 ¢/gal
Spot market product prices			
Motor gasoline (Conventional-regular)		Heating oil No. 2	
New York Harbor	143.76	New York Harbor	159.11
Gulf Coast	145.10	Gulf Coast	156.05
Los Angeles	168.78	Gas oil	
Amsterdam-Rotterdam-Antwerp (ARA)	137.39	ARA	157.45
Singapore	147.38	Singapore	160.48
Motor gasoline (Reformulated-regular)		Residual fuel oil	
New York Harbor	143.76	New York Harbor	90.19
Gulf Coast	144.90	Gulf Coast	92.26
Los Angeles	177.40	Los Angeles	123.44
		ARA	89.70
		Singapore	103.84

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

BAKER HUGHES RIG COUNT

	2-2-07	2-3-06
Alabama	2	5
Alaska	11	11
Arkansas	37	19
California	38	33
Land	30	29
Offshore	3	4
Colorado	95	86
Florida	0	2
Illinois	0	0
Indiana	1	0
Kansas	15	7
Kentucky	10	6
Louisiana	183	170
N. Land	54	58
S. Inland waters	18	18
S. Land	45	36
Offshore	66	57
Maryland	0	0
Michigan	1	3
Mississippi	16	5
Montana	21	25
Nebraska	0	0
New Mexico	83	95
New York	9	4
North Dakota	33	26
Ohio	12	9
Oklahoma	172	157
Pennsylvania	14	16
South Dakota	0	0
Texas	803	684
Offshore	12	10
Inland waters	1	1
Dist. 1	23	20
Dist. 2	28	25
Dist. 3	58	57
Dist. 4	91	81
Dist. 5	153	123
Dist. 6	128	98
Dist. 7B	34	29
Dist. 7C	47	37
Dist. 8	103	78
Dist. 8A	29	31
Dist. 9	36	28
Dist. 10	60	66
Utah	45	29
West Virginia	32	25
Wyoming	77	95
Others—ID-1; TN-4; VA-3	8	3
Total US	**1,714**	**1,513**
Total Canada	**660**	**727**
Grand total	**2,374**	**2,240**
Oil rigs	264	197
Gas rigs	1,446	1,313
Total offshore	81	74
Total cum. avg. YTD	**1,714**	**1,481**

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	2-2-07 Rig count	2-2-07 Percent footage*	2-3-06 Rig count	2-3-06 Percent footage*
0-2,500	51	—	34	2.9
2,501-5,000	92	54.3	97	43.2
5,001-7,500	230	23.0	201	17.4
7,501-10,000	418	3.3	333	4.5
10,001-12,500	406	2.2	325	1.2
12,501-15,000	255	0.3	309	—
15,001-17,500	121	1.6	117	0.8
17,501-20,000	74	—	62	—
20,001-over	42	—	22	—
Total	**1,689**	**7.6**	**1,500**	**6.5**
INLAND	31		37	
LAND	1,596		1,409	
OFFSHORE	62		54	

*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]2-2-07	[2]2-3-06
	1,000 b/d	
(Crude oil and lease condensate)		
Alabama	17	21
Alaska	775	829
California	689	696
Colorado	57	60
Florida	6	6
Illinois	30	29
Kansas	92	96
Louisiana	1,360	1,167
Michigan	13	14
Mississippi	51	48
Montana	91	97
New Mexico	161	161
North Dakota	98	99
Oklahoma	167	171
Texas	1,362	1,293
Utah	43	45
Wyoming	140	140
All others	63	71
Total	**5,215**	**5,043**

[1]OGJ estimate. [2]Revised.

Source: Oil & Gas Journal.
Data available in OGJ Online Research Center.

US CRUDE PRICES

$/bbl*	2-2-07
Alaska-North Slope 27°	49.99
South Louisiana Sweet	60.00
California-Kern River 13°	47.55
Lost Hills 30°	55.45
Southwest Wyoming Sweet	55.27
East Texas Sweet	57.15
West Texas Sour 34°	46.75
West Texas Intermediate	55.50
Oklahoma Sweet	55.50
Texas Upper Gulf Coast	52.25
Michigan Sour	48.50
Kansas Common	54.75
North Dakota Sweet	49.25

*Current major refiner's posted prices except North Slope lags 2 months. 40° gravity crude unless differing gravity is shown.

Source: Oil & Gas Journal.
Data available in OGJ Online Research Center.

WORLD CRUDE PRICES

$/bbl[1]	1-26-07
United Kingdom-Brent 38°	53.80
Russia-Urals 32°	49.88
Saudi Light 34°	48.23
Dubai Fateh 32°	50.73
Algeria Saharan 44°	55.58
Nigeria-Bonny Light 37°	56.17
Indonesia-Minas 34°	53.51
Venezuela-Tia Juana Light 31°	48.05
Mexico-Isthmus 33°	47.94
OPEC basket	51.46
Total OPEC[2]	50.17
Total non-OPEC[2]	50.10
Total world[2]	50.14
US imports[3]	46.94

[1]Estimated contract prices. [2]Average price (FOB) weighted by estimated export volume. [3]Average price (FOB) weighted by estimated import volume.

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

US NATURAL GAS STORAGE[1]

	1-26-07	1-19-07	Change
	Bcf		
Producing region	807	852	–45
Consuming region east	1,465	1,585	–120
Consuming region west	299	320	–21
Total US	**2,571**	**2,757**	**–186**
	Oct. 06	**Oct. 05**	**Change, %**
Total US[2]	**3,452**	**3,194**	**8.1**

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

Statistics

WORLDWIDE CRUDE OIL AND GAS PRODUCTION

	Nov. 2006	Oct. 2006	11 month average production 2006	11 month average production 2005	Chg. vs. prev. yr. Volume	Chg. vs. prev. yr. %	Nov. 2006	Oct. 2006	Cum. 2006
	Crude, 1,000 b/d						Gas, bcf		
Argentina	605	657	638	646	–8	–1.3	123.2	131.4	1,451.52
Bolivia	45	45	45	41	4	9.0	38.0	40.0	429.00
Brazil	1,766	1,762	1,716	1,628	88	5.4	28.3	29.1	320.41
Canada	2,648	2,613	2,503	2,342	162	6.9	484.9	520.3	5,531.18
Colombia	522	528	528	526	2	0.4	17.0	17.0	176.53
Ecuador	516	518	536	517	19	3.7	0.3	0.3	3.40
Mexico	3,163	3,173	3,282	3,329	–48	–1.4	166.9	172.3	1,782.72
Peru	120	107	115	112	4	3.2	5.7	6.5	56.92
Trinidad	150	145	148	148	—	—	104.0	107.0	1,154.15
United States	5,254	5,195	5,133	5,197	–64	–1.2	1,611.0	1,655.0	17,652.00
Venezuela[1]	2,430	2,510	2,563	2,711	–148	–5.5	78.0	82.0	897.00
Other Latin America	78	79	79	80	–1	–1.4	7.2	7.5	80.51
Western Hemisphere	**17,298**	**17,331**	**17,287**	**17,277**	**9**	**0.1**	**2,664.5**	**2,768.5**	**29,535.34**
Austria	17	17	17	17	—	1.9	4.5	4.5	55.55
Denmark	350	353	334	379	–45	–11.8	31.7	25.1	316.01
France	22	22	21	22	—	–0.8	3.1	3.5	38.11
Germany	66	67	69	70	–1	–1.4	54.8	53.7	595.59
Italy	116	109	111	115	–4	–3.9	30.0	31.0	351.60
Netherlands	17	15	23	31	–8	–24.4	200.0	150.0	2,605.00
Norway	2,466	2,380	2,489	2,699	–210	–7.8	286.3	237.8	2,787.22
Turkey	40	41	41	42	–1	–1.3	2.4	2.5	28.39
United Kingdom	1,536	1,553	1,520	1,675	–156	–9.3	246.1	239.3	2,693.37
Other Western Europe	4	4	5	5	—	–8.6	0.2	0.2	18.13
Western Europe	**4,633**	**4,561**	**4,631**	**5,055**	**–424**	**–8.4**	**859.1**	**747.4**	**9,488.97**
Azerbaijan	750	680	630	434	196	45.3	22.0	18.0	246.00
Croatia	16	16	17	18	–1	–4.6	5.0	4.8	52.45
Hungary	16	16	17	20	–4	–18.1	9.3	9.3	98.47
Kazakhstan	1,200	1,200	1,070	993	77	7.8	55.0	80.0	773.00
Romania	96	97	98	100	–2	–1.5	17.0	18.0	189.00
Russia	9,550	9,550	9,480	9,179	301	3.3	1,950.0	1,850.0	20,655.00
Other FSU	450	450	500	427	73	17.0	420.0	400.0	4,785.00
Other Eastern Europe	46	45	45	49	–4	–7.9	43.9	43.9	472.22
Eastern Europe and FSU	**12,124**	**12,054**	**11,857**	**11,219**	**637**	**5.7**	**2,522.2**	**2,424.0**	**27,271.14**
Algeria[1]	1,340	1,350	1,348	1,350	–2	–0.1	275.0	285.0	3,002.00
Angola	1,453	1,350	1,398	1,222	177	14.5	2.3	2.4	25.50
Cameroon	85	86	88	82	6	7.0	—	—	—
Congo (former Zaire)	20	20	20	20	—	—	—	—	—
Congo (Brazzaville)	240	240	240	240	—	—	—	—	—
Egypt	660	660	671	696	–25	–3.7	38.0	42.0	442.00
Equatorial Guinea	320	320	320	320	—	—	0.1	0.1	0.66
Gabon	230	230	235	234	2	0.8	0.3	0.3	3.34
Libya[1]	1,730	1,750	1,706	1,639	67	4.1	20.0	22.0	236.50
Nigeria[1]	2,200	2,240	2,222	2,402	–180	–7.5	72.0	75.0	774.00
Sudan	300	300	292	290	2	0.6	0.0	0.0	0.00
Tunisia	75	65	66	72	–5	–7.3	6.6	6.8	73.95
Other Africa	263	264	269	240	29	11.9	10.0	10.2	110.59
Africa	**8,916**	**8,876**	**8,876**	**8,807**	**69**	**0.8**	**424.2**	**443.7**	**4,668.54**
Bahrain	170	170	172	174	–2	–1.3	26.0	27.0	287.25
Iran[1]	3,800	3,830	3,878	3,891	–13	–0.3	255.0	265.0	2,953.00
Iraq[1]	1,840	1,940	1,912	1,835	77	4.2	5.0	5.3	56.80
Kuwait[1,2]	2,495	2,510	2,504	2,420	84	3.5	30.0	31.0	335.50
Oman	720	730	742	757	–15	–2.0	56.0	58.5	637.50
Qatar1	800	810	822	795	26	3.3	112.0	117.0	1,261.00
Saudi Arabia[1,2]	8,765	8,930	9,146	9,296	–150	–1.6	160.0	170.0	1,934.00
Syria	400	410	425	461	–36	–7.9	14.8	15.4	168.50
United Arab Emirates[1]	2,530	2,670	2,627	2,448	179	7.3	128.0	135.0	1,436.00
Yemen	360	350	348	348	—	—	—	—	—
Other Middle East	—	—	—	—	—	4.2	7.8	7.9	82.68
Middle East	**21,880**	**22,350**	**22,576**	**22,426**	**150**	**0.7**	**794.6**	**832.1**	**9,152.23**
Australia	473	519	422	446	–24	–5.5	110.8	119.0	1,253.05
Brunei	215	214	205	186	19	10.3	32.0	33.1	386.46
China	3,682	3,660	3,691	3,629	62	1.7	181.6	172.3	1,897.56
India	691	692	679	662	17	2.6	80.0	88.0	866.85
Indonesia[1]	860	860	895	945	–50	–5.3	179.0	185.0	2,069.00
Japan	14	14	15	16	—	–2.8	7.7	8.0	100.39
Malaysia	760	770	747	772	–25	–3.2	140.0	145.0	1,539.00
New Zealand	15	10	15	15	–1	–3.6	12.0	12.0	126.20
Pakistan	66	60	64	64	—	–0.4	117.4	113.0	1,275.57
Papua New Guinea	55	55	57	46	11	23.1	0.5	0.5	5.50
Thailand	203	190	210	184	26	14.2	72.2	72.7	786.00
Vietnam	340	340	346	340	6	1.7	15.0	15.0	165.00
Other Asia-Pacific	33	33	33	35	–2	–6.9	63.0	65.5	711.35
Asia-Pacific	**7,407**	**7,417**	**7,379**	**7,341**	**38**	**0.5**	**1,011.0**	**1,029.0**	**11,181.92**
TOTAL WORLD	**72,258**	**72,589**	**72,605**	**72,126**	**480**	**0.7**	**8,275.6**	**8,244.7**	**91,298.14**
OPEC	28,790	29,400	29,624	29,733	–109	–0.4	1,314.0	1,372.3	14,954.80
North Sea	4,374	4,301	4,359	4,764	–404	–8.5	623.9	546.9	6,575.37

[1]OPEC member. [2]Kuwait and Saudi Arabia production each include half of Neutral Zone. Totals may not add due to rounding.
Source: Oil & Gas Journal. Data available in OGJ Online Research Center.

Classified Advertising

Your marketplace for the oil and gas industry

DEADLINE for CLASSIFIED ADVERTISING is 10 A.M. Tuesday preceding date of publication. Address advertising inquiries to CLASSIFIED SALES, 1-800-331-4463 ext. 6301, 918-832-9301, fax 918-831-9776, email: glendah@pennwell.com.

- *DISPLAY CLASSIFIED: $350 per column inch, one issue. 10% discount three or more CONSECUTIVE issues. No extra charge for blind box in care. Subject to agency commission. No 2% cash discount.*
- *UNDISPLAYED CLASSIFIED: $3.50 per word per issue. 10% discount for three or more CONSECUTIVE issues. $70.00 minimum charge per insertion. Charge for blind box service is $50.50 No agency commission, no 2% cash discount. Centered heading, $8.75 extra.*
- *COMPANY LOGO: Available with undisplayed ad for $75.00. Logo will be centered above copy with a maximum height of 3/8 inch.*
- *NO SPECIAL POSITION AVAILABLE IN CLASSIFIED SECTION.*
- *PAYMENT MUST ACCOMPANY ORDER FOR CLASSIFIED AD.*

EMPLOYMENT

APPLICATIONS ENGINEER

Schlumberger Technology Corporation is seeking an Applications Engineer for its facility in Garden Grove, CA to identify available Electric Submersible Pump (ESP) sales opportunities and take action to obtain contracts at the best price and promote sales of all Schlumberger-REDA products and services throughout the client base; serve as the primary contact for the assigned client list on all matters related to local sales; establish and maintain a profile for each assigned client company; establish and maintain strong business relationships with key contacts at the assigned client companies; expand client base as required; identify leads and opportunities within assigned client base, for all ESP products and services and effectively communicate these opportunities within Schlumberger; generate quotations, proposals, and contracts for client sales, at the best possible prices, under the direction of the sales manager or coordinator; develop a working knowledge of all Artificial Lift disciplines; maintain commitment and involvement in QHSE and continuous improvement in risk reduction. Position requires a Bachelor's degree, or equivalent as determined by properly evaluated credentials, in Mechanical, Electrical or Petroleum Engineering. Please send resume to: Schlumberger Personnel, Attention: Yarla Sanchez Pelayo, Job Code # OGJ2807, 4900 California Avenue, Suite 401-A, Bakersfield, CA 93309 or by e-mail to: ypelayo@bakersfield.oilfield.slb.com EOE.

WS OPERATIONS MANAGER

Schlumberger Technology Corporation is seeking a Well Site Operations Manager for its facility in Perryton, TX to manage the day-to-day operations of the Well Services department; provide on-call support to clients and crews regarding scheduled Well Services projects; coordinate with sales and technical staff the bidding process for different clients; create and develop a marketing strategy for Well Services; coordinate and provide resources for maintenance service for all Well Service's equipment; perform job audits on the field as necessary; coordinate and lead the Quality, Health, Safety and Environment (QHSE) program; create and coordinate the career development and training plan for Well Service's employees; plan the capital expenditure (CAPEX) for Well Services on a year to year basis, monitor and control financial indicators such as profit and loss statements, balance sheets statements, inventory days, receivables and invoicing, fixed asset control. Position requires a Bachelor's degree, or equivalent as determined by properly evaluated credentials in an Engineering field, plus five (5) years of experience in the job offered or five (5) years progressive experience in Field Engineering. Alternatively, the Company will accept a Master's degree or equivalent as determined by properly evaluated credentials in an Engineering field, in lieu of a Bachelor's degree, or equivalent as determined by properly evaluated credentials in an Engineering field, plus five (5) years of experience in the job offered or five (5) years of progressive experience in Field Engineering. Please send resume to: Schlumberger Personnel. Attention: Jennifer Freeman-Skinner, Job Code # OGJ2807, 201 NW 63rd, Suite 200, Oklahoma City, OK 73116 or by e-mail to: jfreeman2@slb.com and include Job Code # OGJ2807. EOE.

Senior Geophysicist

William M. Cobb & Associates, a worldwide consulting firm, is seeking a senior geophysicist to perform integrated seismic and geological evaluation.

Ten years petroleum industry experience; geophysics, geology, physics, math or engineering degrees; 2D & 3D interpretation, carbonate and siliciclastic; land and offshore evaluation experience required.

Expertise with Kingdom Software (SMT), integrating 3D seismic attributes in complex multi-well projects, advanced geoscience degree is desired.

Applicant must be legally entitled to permanently work in the United States.

Competitive compensation package.

Please send resume to office@wmcobb.com

Development Associate
Process Development
(Job #0700229)

With annual sales of $7.7 billion, Praxair, Inc. is a global, Fortune 300 company that supplies atmospheric, process and specialty gases, high-performance coatings, and related services and technologies. Our Research & Development Division is currently seeking a Development Associate in TONAWANDA, NY:

You will be responsible for developing new processes for the production and purification of gases such as oxygen, nitrogen, argon, xenon, krypton and neon; leading and supporting efforts to develop Praxair's next generation of air separation plants by working within multidisciplinary teams to design, simulate and optimize the air separation process based on state of the art equipment technology – new fast growing market applications such as very large steel mills, gasification for power and chemicals, enhanced oil recovery are requiring larger and more advanced air separation designs; interfacing with Business and Engineering organizations to understand and define plant requirements; working closely with Engineering, Execution and Operations organizations to evaluate alternate concepts based on cost, constructability, and plant operation; and obtaining patents and contributing to intellectual property strategy around key new technologies and processes.

To qualify, you must be a highly motivated, PhD/MS Chemical Engineer with 2-10 years experience and the drive to take new process concepts from inception to final commercialization. BS Chemical Engineers with strong relevant backgrounds will be considered. A background in process development and simulation is desired.

To apply, visit our web site at www.praxair.com, Click on Careers, Career Opportunities and Search for Experienced Professional Career Opportunities. Click on the job title from the complete Job List or search by job number (0700229). An equal opportunity employer, m/f/d/v.

PRAXAIR, INC.

Weatherford in Houston, Texas is looking for a SENIOR BUSINESS DEVELOPMENT MANAGER to support global sales & operational personnel for Sand Control/Well Screens product line. Req's.: 7 yrs exp in-job. Please fax or e-mail resume to D. Porter, Weatherford HR, at 281-966-1536 or don.porter@weatherford.com

Jacobs Engineering Group, Inc. seeks degreed and experienced Project Controls, Management Group to work in Houston, TX. Manage the development and control of project plans, budgets and schedules. Fax resume to T. Helms at (281) 564-0404. Put job code JEG-05204 on resume.

ASSISTANT PROFESSOR OF PETROLEUM ENGINEERING
University of Missouri – Rolla

The Department of Geological Sciences and Engineering at the University of Missouri – Rolla invites applications from qualified candidates for a tenure-track assistant professor position in Petroleum Engineering. The candidate must have an earned doctorate degree in Petroleum Engineering or a closely related discipline and will be expected to teach undergraduate and graduate classes in Petroleum Engineering. Other responsibilities of the position include developing and maintaining externally funded research programs, supervising graduate student research and establishing a strong publication record. Participation in university and department activities such as undergraduate student recruitment and advising is also expected. Prior industrial experience and professional registration is preferred, but not required. All areas of specialization will be considered especially in the areas of drilling and well completions.

The Petroleum Engineering program at the University of Missouri – Rolla is ABET accredited and offers degrees at the BS, MS and PhD levels. The program is an integral part of the Department of Geological Sciences and Engineering. Our Department currently has 17 full-time faculty with established BS, MS and PhD programs in Geological Engineering, Geology and Geophysics in addition to Petroleum Engineering. This combination of disciplines offers synergies for collaborative research and provides a broad spectrum of opportunities for nurturing tomorrow's leaders in the earth sciences and engineering. Additional information can be found at: http://gse.umr.edu/.

Review of applications will begin March 15, 2007 and continue until the position is filled. Applicants should forward an application with resume' and names of three references to:

Human Resource Services
Reference number 00035621
University of Missouri – Rolla
113 University Center
Rolla MO 65409

The University of Missouri – Rolla is an equal opportunity employer. Females, under-represented minorities and persons with disabilities are encouraged to apply.

Classified Advertising

EMPLOYMENT

قطر للبترول
Qatar Petroleum
www.qp.com.qa

ENGINEERING AND GEOSCIENCE OPPORTUNITIES
Oil & Gas Development and Exploration

If you are looking for challenging and exciting work, Qatar Petroleum offers great opportunities in exploration, oil and gas development, reservoir management and studies of current oil and gas fields. Qatar Petroleum operates major oil fields with substantial oil production and the world's largest non-associated gas field, making Qatar the world's leading LNG producer. Qatar Petroleum is also undertaking integrated full field studies of all its oil reservoirs, and major development of its gas fields. These are significant, large-scale projects spanning multiple years, involving integration of all subsurface data into comprehensive full field reservoir models. They use the latest industry technology and software in addition to having very large datasets to work with. The work is complex, challenging and very fulfilling. You will have the opportunity to contribute directly to the future development of Qatar Petroleum's oil and gas fields. Qatar Petroleum is now seeking qualified candidates (ideally with advanced degrees) in the following disciplines to assist in their ongoing projects:

- **Geologists/Senior Geologists** *(Ref HH424654)*
  B.Sc. Geology, 8+ yrs as a production or exploration geologist.
- **Reservoir Engineers/Senior Reservoir Engineers** *(Ref HH424656)*
  B.Sc. Petroleum Eng, Chem Eng, or Mech Eng, 8+yrs experience in reservoir engineering operations and exploration.
- **Petroleum Engineers/Senior Petroleum Engineers** *(Ref HH424652)*
  B.Sc. in Petroleum Eng, Chem Eng, or Mech Eng, 8+yrs experience in optimization of production or exploration in large oil/gas fields.
- **Petrophysicists/Senior Petrophysicists** *(Ref HH424653)*
  B.Sc. Petroleum Eng, Mech Eng, or Geology, 8+yrs experience in petrophysical operations or exploration.
- **Development Geophysicist/Senior Development Geophysicist** *(Ref HH424655)*
  B.Sc. Geology or Geophysics, 8+yrs experience in field and reservoir studies or exploration.

Qatar Petroleum is the National Oil Company of the State of Qatar. Working in Qatar offers a secure, family-oriented lifestyle where expatriate employees and their families are encouraged to fully participate in the community. All posts offer excellent locally **tax-free** salaries together with a comprehensive expatriate package including family status, accommodation and furniture allowances, life insurance and medical coverage, generous annual leave with paid airfares, and other allowances.

Interested candidates should forward their CV quoting the relevant reference number to Alison Martin at **alison.martin@jobs.hudson.com**

Due to the high volume of response, only candidates selected for interview will be contacted.

Hudson

Hudson offers the services of an employment agency for permanent work and an employment business for temporary work.

EQUIPMENT FOR SALE

Solar Taurus 60

5.2 MW • Mobile Gen Sets
FOR SALE

- Solar Maintained - Low Time
- 13 Units (Gen 1) & (Gen 2)
- 8 Natural Gas - 5 Dual Fuel
- Low Nox 25 ppm
- Complete Packages
- Mobile PCR U.G. Switchgear
- 60 Hz ○ 13.8 kV
- 50 Hz Conversion Available

Mid America Engine, Inc.
662-895-8444 · Fax: 662-895-8228
Keith: keith@maegen.com
Art: art@maegen.com

CONSULTANTS

Brazil: EXPETRO can be your guide into this new investment frontier.

Effective strategic analysis, quality technical services, compelling economic/regulatory advice, and realistic approach regarding Brazilian business environment - 120 specialists upstream, downstream, gas and biofuels. Email: contato@expetro.com.br. Web: www.expetro.com.br - Rio de Janeiro, Brazil.

LEASES

Oklahoma State Leases
Ready to drill or Farmout 4,000' oil 80,000 BO potential. www.princetonnaturalgas.com
949-443-9900

MISCELLANEOUS

BAFFLING PROBLEM SOLVED!
Please Visit
www.luvrsep.com
HOTCO Engineering
(800) TREAT11

COMPUTER SOFTWARE

MICA Petroleum Economics
Windows software for evaluating oil and gas reserves. Free production data for 13 states. Contact Petrocalc Corporation at www.petrocalc.com or 719-520-1790.

EQUIPMENT FOR SALE

REFRIGERATION AND J.T. PLANTS

7.5 MMSCFD, 1000 PSI, NATCO

4.0 MMSCFD, 1000 PSI, NATCO

6.5 MMSCFD, 1250 PSI X 400 PSI, H&H J.T.

2.0 MMSCFD, 1000 PSI, PROCESS EQPT.

OTHERS AVAILABLE

PLEASE CALL 318-425-2533, 318-458-1874

regardres@aol.com

SURPLUS GAS PROCESSING/REFINING EQUIPMENT

NGL/LPG PLANTS: 10 - 600 MMCFD
AMINE PLANTS: 10 – 2,700 GPM
SULFUR PLANTS: 10 - 180 TPD
COMPRESSION: 100 - 20,000 HP
FRACTIONATION: 1000 – 25,000 BPD
HELIUM RECOVERY: 75 & 80 MMCFD
We offer engineered surplus equipment solutions.

Bexar Energy Holdings, Inc.
Phone 210 342-7106
www.bexarenergy.com
Email: matt.frondorf@bexarenergy.com

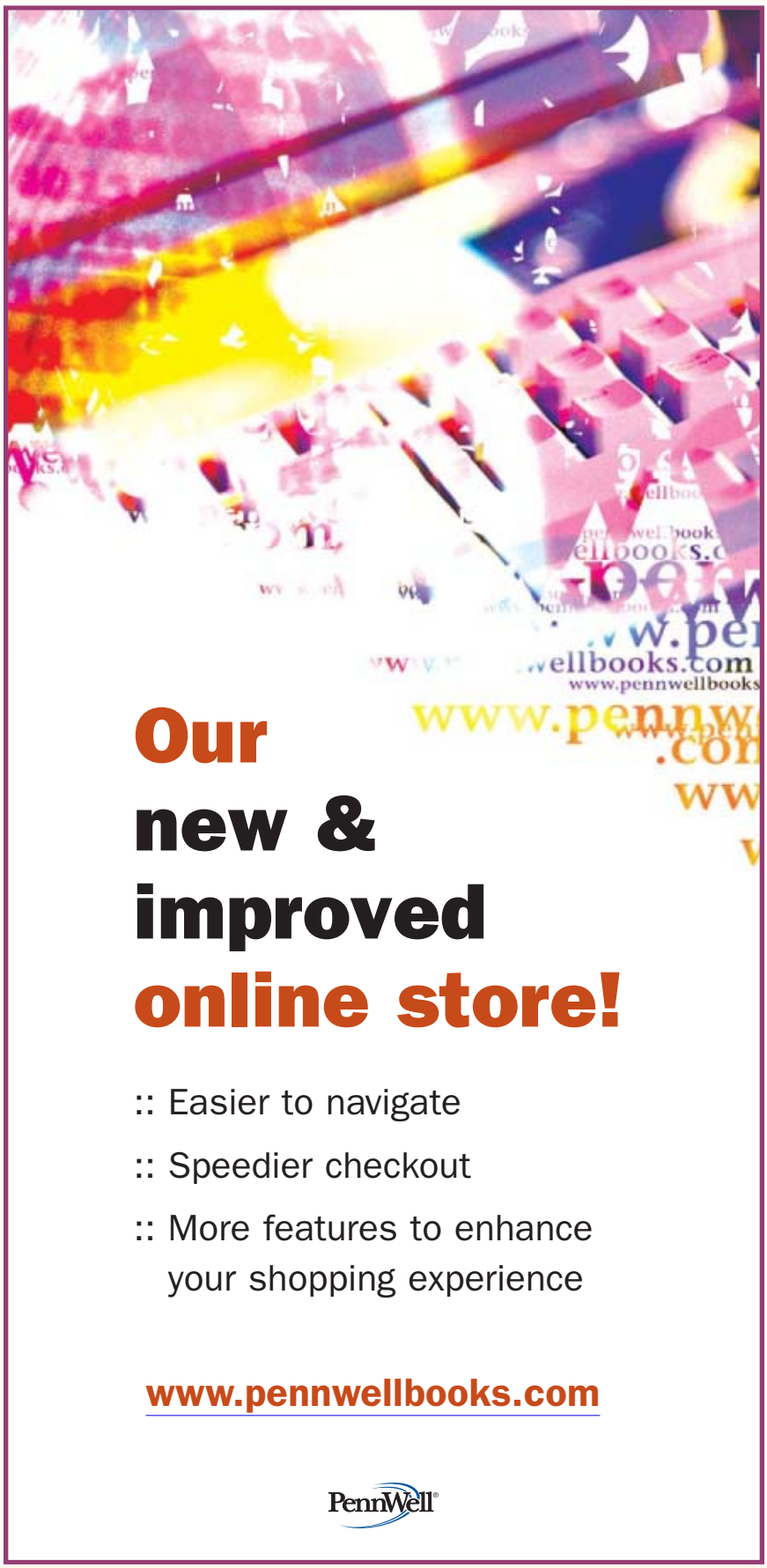
AMINE TREATING AND JT PLANTS
FOR SALE OR LEASE
Two New 60 GPM Amine Plants
One Refurbished 75 GPM Amine Plant
Various JT Plants
Installation & Operations Services
AVAILABLE IMMEDIATELY

TRANSTEX GAS SERVICES
Contact Greg Sargent or Barry Harwell
Phone: 713-654-4440
www.transtexgas.com
Email: info@transtexgas.com

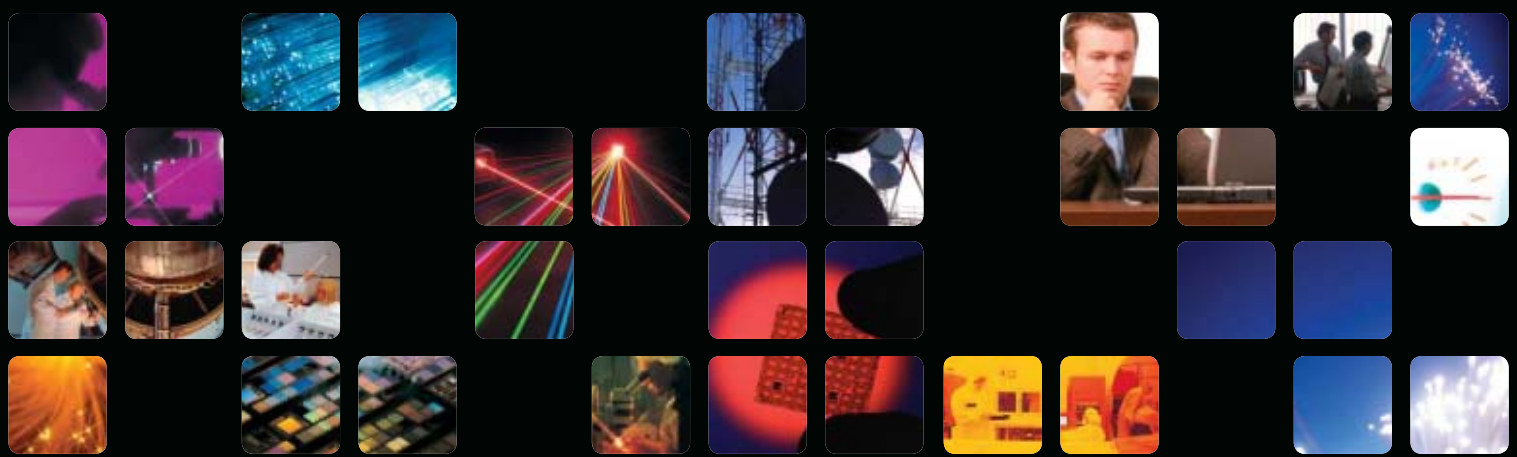
BUSINESS OPPORTUNITIES

EXPLORATION OPPORTUNITY

Offset Location to Major producing wells (30MMcfg/d/1000 B/D) 10-12BCFG Potential 3D Seismic. 1% W.I Units, up to 1/8th of Well
Call for Details 281 660-2106



PennTechJOBS



Post. Search. Work!

Redefining job search for Engineers like you!

- Thousands of new industry jobs (Apply for free!)
- Confidential resume posting available
- E-mail job alerts for instant notification of the latest postings
- Salary Wizards (Are you getting paid enough?)

Post your profile today: www.PennTechJOBS.com

Member Employers:

AEROJET · Agilent Technologies · AMD · ARM · ATI · Bechtel · BinOptics · Boeing · Coherent · EDO corporation · Fairchild Semiconductor · Gentex Corporation · International IOR Rectifier · ITT Engineered for life · JDSU · JUKI Lowest Cost of Ownership · MSK · polatis · SRA

Advertising Sales / Advertisers Index

Houston
Regional Sales Manager, Marlene Breedlove, 1700 West Loop South, Suite 1000, Houston, TX 77027; Tel: (713) 963-6293, Fax: (713) 963-6228, E-mail: marleneb@pennwell.com. Regional Sales Manager, Charlene Burman; Tel: (713) 963-6274, Fax: (713) 963-6228; E-mail: cburman@pennwell.com

Southwest / South Texas/Western States/ Gulf States/Mid-Atlantic
1700 West Loop South, Suite 1000, Houston, TX 77027; P.O. Box 1941 Houston, TX 77251; Regional Sales Manager; Marlene Breedlove, Tel: (713) 963-6293, Fax: (713) 963-6228; E-mail: marleneb@pennwell.com

Northeast/New England/Midwest/North Texas/ Oklahoma/Alaska
1700 West Loop South, Suite 1000, Houston, TX 77027; Tel: (713) 963-6244, Fax: (713) 963-6228; Regional Sales Manager, Charlene Burman; Tel: (713) 963-6274, Fax: (713) 963-6228; E-mail: cburman@pennwell.com.

Scandinavia/The Netherlands/Middle East/Africa
David Betham-Rogers, 11 Avenue du Marechal Leclerc, 61320 Carrouges, France; Tel: 33 2 33 282584, Fax: 33 2 33 274491; David Betham-Rogers, E-mail: davidbr@pennwell.com.

United Kingdom
Carole Winstanley, ADBIZ MEDIA LTD, 252 Union Street, Aberdeen, AB10 1TN, Scotland, United Kingdom; Tel: +44 (0) 1224 791178; Fax: +44 (0) 5601 151590; E-mail: adbizmedia@btconnect.com.

France/Belgium/Spain/Portugal/Southern Switzerland/Monaco
Daniel Bernard, 8 allee des Herons, 78400 Chatou, France; Tel: 33 (0)1 3071 1224, Fax: 33 (0)1 3071 1119; E-mail: danielb@pennwell.com, France, Belgium, Spain, Portugal, Southern Switzerland, Monaco.

Germany/Austria/Denmark/Northern Switzerland/Eastern Europe/Russia
Verlagsburo Sicking, Emmastrasse 44, 45130, Essen, Germany. Tel: 49 0201 77 98 61, Fax: 49 0201 781 741; E-mail: wilhelms@pennwell.com. Wilhelm F. Sicking, Germany, Austria, Denmark, Northern Switzerland, Eastern Europe, Russia, Former Soviet Union.

Japan
e. x. press Co., Ltd., Hirakawacho TEC Building, 2-11-11, Hirakawa-cho, Chiyoda-ku, Tokyo 102-0093, Japan, Tel: 81 3 3556 1575, Fax: 81 3 3556 1576; E-mail: manami.konishi@ex-press.jp; Manami Konishi

Brazil
Grupo Expetro/Smartpetro, Att: Jean-Paul Prates and Bernardo Grunewald, Directors, Ave. Erasmo Braga 22710th and 11th floors Rio de Janeiro RJ 20024-900 BRAZIL; Tel: (55-21) 3084 5384, Fax: (55-21) 2533 4593; E-mail: jpprates@pennwell.com.br and bernardo@pennwell.com.br

Singapore/Australia/Asia-Pacific
Singapore, Australia, Asia Pacific, 19 Tanglin Road #09-07, Tanglin Shopping Center, Singapore 247909, Republic of Singapore; Tel: (65) 6 737-2356, Fax: (65) 6 734-0655; Michael Yee, E-mail: yfyee@singnet.com.sg

India
Interads Limited, 2, Padmini Enclave, Hauz Khas, New Delhi-110 016, India; Tel: +91-11-6283018/19, Fax: +91-11-6228928; E-mail: rajan@interadsindia.com. Mr. Rajan Sharma.

Italy
Jean-Pierre Bruel, sas di Jean-Pierre Bruel, Via Trieste 17-22066, Mariano Commense (Co), Italy; Tel: 39-031-51494, Fax: 39-031-751482; E-mail: medias@pcbrianza.net

This index is provided as a service. The publisher does not assume any liability for errors or omission.

OIL&GAS JOURNAL Previous Page | Contents | Zoom In | Zoom Out | Front Cover | Search Issue | Next Page qMags

From the Subscribers Only area of OIL&GAS JOURNAL online research center www.ogjonline.com

Energy bill tries to annul question on royalty relief

The energy bill passed by the House Jan. 18 tries to annul a question at the core of the year-long, price-threshold controversy about deepwater royalty relief.

Section 203 of the Clean Energy Act of 2007 "reaffirms" authority of the secretary of the interior to limit royalty relief when oil and gas prices are high.

But in the Deepwater Royalty Relief Act of 1995, Congress appears to have said something quite different for deepwater Gulf of Mexico leases awarded in the 5 years following Nov. 28, 1995.

The Editor's Perspective

by Bob Tippee, Editor

The prevalent assumption in the controversy is that the Department of the Interior's Minerals Management Service failed to insert price thresholds in deepwater leases granted in 1998 and 1999.

But a close reading of the 1995 legislation makes you wonder if it was those years that MMS got right.

The act's discussion of price thresholds stipulates leases in existence and producing on Nov. 28, 1995, and determined by Interior to deserve relief. For nonproducing deepwater leases and those awarded during the next 5 years, the law mandates royalty relief and says nothing about price thresholds. And for those leases, the law sets volumetric limits to relief in a section presented as an exception to the clause—the one that the new House bill would reaffirm—authorizing the interior secretary to suspend royalties and condition suspensions on price levels.

Instead of price thresholds supposedly missing in 1998 and 1999, the controversy might more appropriately focus on whether MMS should have included thresholds in leases awarded in 1996, 1997, and 2000. The possibility that this is so has produced lawsuits.

What's interesting in all this is how little attention has befallen the issue of MMS's authority to include price thresholds in deepwater leases issued during 1995-2000.

Political opportunity oozes from a controversy involving money that oil companies didn't pay the government. That they had no legal commitment to pay anything easily can be ignored.

But where's the political opportunity in money that oil companies did pay that maybe never should have been collected?

It's a most inconvenient question, which the House bill, if enacted, quietly will eliminate.

(Online Feb. 2, 2007; author's e-mail: bobt@ogjonline.com)

Market Journal

by Sam Fletcher, Senior Writer

Cold boosts crude price above $59/bbl

The March contract for benchmark US crude closed above $59/bbl on the New York market for the first time in 2007 on Feb. 2 on the strength of forecasts that a severe cold front would hike heating demand 36% above normal in the Northeastern US, the largest heating oil market.

Energy markets ended January with a bang as the same crude contract closed at $58.14/bbl Jan. 31. However, it retreated to $57.30/bbl Feb. 1, ending a 2-day rally, because of a smaller-than-expected withdrawal of natural gas from US underground storage. The Energy Information Administration reported the withdrawal of 186 bcf of gas in the week ended Jan. 26. That was below the consensus of Wall Street analysts and compared with withdrawals of 179 bcf the previous week and 88 bcf in the same period last year. Gas storage totaled 2.6 tcf, 152 bcf more than a year ago and 454 bcf above the 5-year average.

The March crude contract closed at $59.02/bbl after trading at $57.05-59.25/bbl Feb. 2, as colder weather and increased demand reminded traders that members of the Organization of Petroleum Exporting Countries had agreed to cut production by 500,000 b/d to an official ceiling of 25.8 million b/d effective Feb. 1. While compliance with OPEC's October pledge to cut production by 1.2 million b/d in December remains spotty, Saudi Arabia's commitment to reduce its output by 158,000 b/d this month helped boost crude prices.

The crude contract "rallied back to finish the week $3.60/bbl higher for the second week in a row," said Olivier Jakob at Petromatrix GMBH, Zug, Switzerland. "We are now back to the fourth-quarter 2006 value range, and while we remain positive on the medium term direction, we will take a more conservative and neutral approach short term until we get more data confirmation that could justify the continuation of the rally."

Other market factors

At Banc of America Securities LLC, New York, analyst Robert S. Morris reported, "Strong US economic data provided a further boost to oil prices with the expectation that a faster growing economy would ultimately spur greater crude oil and gasoline demand. Finally, tensions between Iran and the West continued to escalate as Tehran announced that it would hook up 3,000 centrifuges this month to begin large-scale uranium enrichment despite threats from the UN Security Council that it would impose further sanctions later this month if Iran did not roll back its enrichment program."

Meanwhile, oil unions in Nigeria threatened to strike because of escalating violence in that country's most prolific producing area. "Leaders of Nigeria's top oil unions said a withdrawal of staff from the Niger Delta remains a possibility," said analysts in the Houston office of Raymond James & Associates Inc. on Feb. 5, the original target date for the strike.

"Violence in the Niger Delta has increased over the last 12 months with over 200 people being kidnapped. Recently, an attack by local militants forced Royal Dutch Shell PLC to halt 477,000 b/d, almost a quarter of the nation's production," the analysts said. A total withdrawal of workers would force crude production from the delta region, they said, "to come to a screeching halt."

In other news, Venezuelan President Hugo Chavez threatened to seize control of at least 60% of four heavy-crude joint ventures in the eastern Orinoco Belt by May 1. Those projects produce 600,000 b/d.

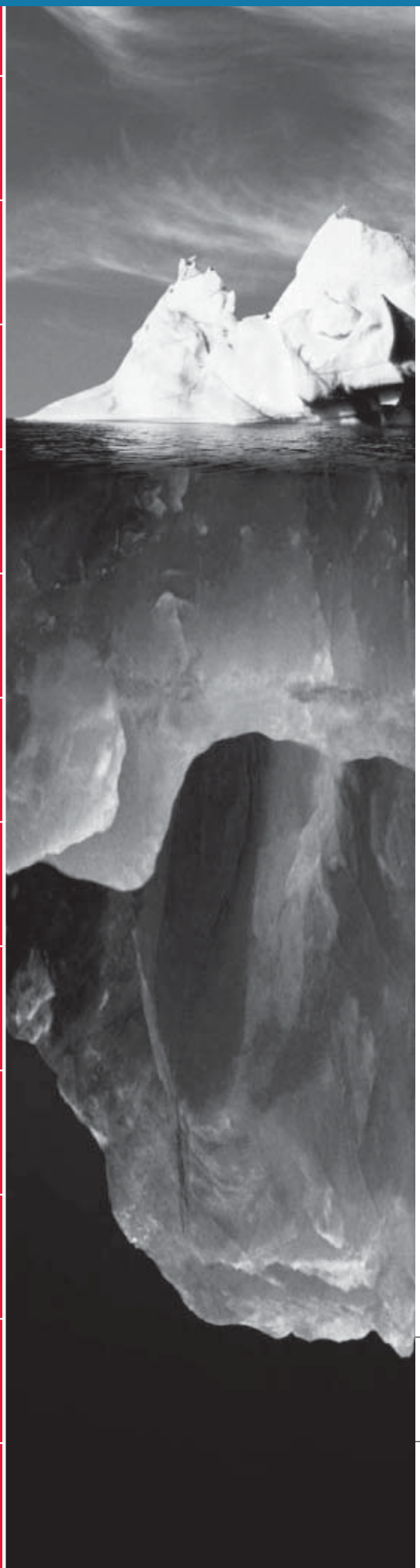
The March natural gas contract lost 5.4¢ to $7.48/MMbtu Feb. 2 on NYMEX. On the US spot market, however, natural gas at Henry Hub, La., jumped 32.5¢ to $8.16 MMbtu. "Composite spot natural gas prices surged more than 11% last week with the extended outlook for continued colder-than-normal temperatures," said Morris of Banc of America Securities. "In fact, a roughly 30% surge in this natural gas price index since mid-January can be largely attributed to a sharp reversal in the weather outlook."

EIA said distillate fuel inventories fell 2.6 million bbl to 140 million bbl the week ended Jan. 26, with a drop in heating oil offsetting a rise in diesel. That was the first decline in distillate inventory in 7 weeks. US crude inventories increased for a third week, up 2.5 million bbl to 324.9 million bbl. Gasoline stocks jumped by 3.8 million bbl to 224.6 million bbl in the same period. "The gasoline stock build was higher than expected due to high imports, but the gasoline demand was very robust while the cold weather started to draw down heating oil stocks in the Northeast," Jakob of Petromatrix said.

(Online Feb. 5, 2007; author's e-mail: samf@ogjonline.com)

OIL&GAS JOURNAL Previous Page | Contents | Zoom In | Zoom Out | Front Cover | Search Issue | Next Page qMags

AUSTIN
DALLAS
DUBAI
HONG KONG
HOUSTON
LONDON
MOSCOW
NEW YORK
RIYADH
WASHINGTON



LNG Projects Require Lawyers Who Know to Look BENEATH THE SURFACE.

Conducting a global LNG operation can be a colossal venture. There are a lot of components below the surface that must fit together precisely. And underestimating the smallest detail can have large, unintended consequences with long-term impact. Baker Botts lawyers know this, and bring a careful eye and practiced skill to LNG projects all over the world.

For more than three decades, we've worked in close partnership with our clients, resolving legal issues related to LNG import and export projects around the world. We have worked on groundbreaking projects, including the first greenfield LNG export projects in South America and Equatorial Guinea, the first project to bring LNG to the West Coast of North America and some of the first LNG imports into China, India and Brazil.

We have broad experience and a deep understanding of all facets of an LNG project.

Why? Because we know LNG cold.

BAKER BOTTS L.L.P.

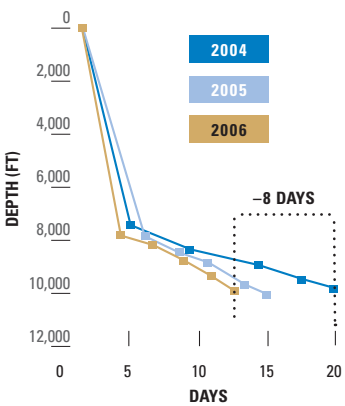
For more details, visit www.bakerbotts.com

DEEPER UNDERSTANDING. BETTER SOLUTIONS.

"Global Oil and Gas Law Firm of the Year,"
2005 and 2006 International Who's Who of Business Lawyers

©2006 Baker Botts L.L.P.

Engineered for Speed



New ZX technology beats the best 2004 drilling time by over 8 days in this highly abrasive East Texas formation.

HUGHES CHRISTENSEN ZX TECHNOLOGY

The Genesis ZX series takes extreme drilling to the next level, with high-performance PDC bits designed for longevity and speed in the most challenging formations. ZX technology enhances the toughness and durability of the layered diamond cutters, sustaining higher rates of penetration through hard and abrasive intervals. On target, ahead of schedule, and under budget — ZX gets the job done. Only from Hughes Christensen. The Drill Bit Company.

BAKER HUGHES Hughes Christensen

Worldwide Headquarters The Woodlands, Texas Tel: 713 625 6654 Fax: 713 625 6655

For more information, visit our website www.bakerhughes.com
© 2006 Baker Hughes Inc. All rights reserved.