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Report updates Iran's refinery project status
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Volume 107.3

FORECAST AND REVIEW

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COVER

The global economic slowdown will cause energy demand to contract this year, with oil demand declining worldwide and in the US, according to OGJ's Forecast & Review. This special report looks ahead to 2009 and back at 2008, detailing among other trends demand, supply, prices, and production. Apache Corp. drilled its Brunello-1 discovery in 2007 on Australia's North West Shelf and is exploring development options that include production for the domestic market or for export through an LNG development. Photo courtesy of Apache.

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General Interest — Quick Takes

Oil, gas equipment sales likely to slow in 2009

Global oil and gas equipment sales are expected to be slow for much of 2009 because of the economy and slumping oil prices in late 2008, said Freedonia Group Inc., a Cleveland industry research group.

The oil field equipment market is forecast to increase 2.9%/year during 2008-12 to reach $85 billion in 2012. Freedonia said this growth rate is a drastic deceleration from the 15.2%/year growth during 2002-07.

In its world oil field equipment study, Freedonia said the most rapid equipment demand growth through 2012 will come from a few countries in the developing world, especially Brazil, China, and Kazakhstan.

Nigeria and Angola also hold strong growth prospects if regional politics and the economy remain relatively stable, Freedonia said.

Natural gas drilling is forecast to grow especially fast in China and Qatar. In contrast, field maturity and declining production in the US, Mexico, Venezuela, Norway, and UK will suppress equipment markets in those countries.

"In Mexico and Venezuela, growth could become stronger if foreign, technologically advanced energy companies are allowed greater rights to drilling and exploration activities, a domain that is currently monopolized by inefficient state-controlled entities in both countries," Freedonia said.

Industry is expected to become more reliant on high-technology services such as directional drilling control and real time logging and measurement-while-drilling techniques.

"Despite the overall market exhibiting weak gains through 2012, prospects for certain products are more favorable, particularly for fixed-cutter drill bits and advanced well logging equipment," Freedonia said.

Large tubular goods markets are expected to benefit from increased drilling efficiency and gains in casing demand being bolstered by a trend toward greater footage drilled per rig.

US, Georgia sign accord on defense, energy

The US and Georgia have agreed to step up physical security of energy transit across the trans-Caucasus to European markets as part of the US-Georgia Charter on Strategic Partnership signed Jan. 9.

"We intend to build upon over a decade of cooperation among our two countries and Azerbaijan and Turkey, which resulted in the Baku-Tbilisi-Ceyhan and Baku-Supsa oil pipelines and the Baku-Tbilisi-Erzurum natural gas pipelines, to develop a new Southern Corridor to help Georgia and the rest of Europe diversify their supplies of natural gas by securing imports from Azerbaijan and Central Asia," the two nations said.

Before signing the document with her Georgian counterpart Grigol Vashadze, US Secretary of State Condoleeza Rice renewed US support for Georgia's territorial integrity in an allusion to the 2008 war between Georgia and Russia.

"The US…will always support Georgia's sovereignty and its territorial integrity, as well as its Euro-Atlantic aspirations and its integration into the institutions of the Euro-Atlantic," Rice said.

Russia invaded Georgia in August 2008 after the Tbilisi government tried to retake the breakaway region of South Ossetia by force. The conflict saw considerable disruption in the transit of oil and gas across the region, with Russian warplanes said to have targeted pipelines and railways.

China, Japan negotiate East China Sea pact

Japan and China will proceed with joint exploration for natural gas in the disputed East China Sea, but further negotiation is scheduled on China's continued unilateral activity in those waters.

In June 2008, the two sides agreed to explore jointly one area of the East China Sea, while continuing talks over development of two natural gas fields, Kashi and Kusunoki.

Earlier this month, Japan said it "cannot accept" China's development of the Tianwaitian (or Kashi as it is known in Japanese) gas field (OGJ Online, Jan. 5, 2009).

Egypt's proved gas reserves reach 76 tcf

Egyptian Natural Gas Holding Co. (EGAS) has announced that proved gas reserves in Egypt now total 76 tcf. This is up from the 2007 estimate of 72.3 tcf.

"Currently, the Mediterranean region contributes 81% of total gas reserves and will dominate over the coming years as the majority of large gas discoveries are expected to be achieved in this vital region," said EGAS Vice-Chairman for production and development Eng. Atef Youssef.

"The Western Desert and Nile Delta contribute around 11% and 2% respectively of the remaining recoverable reserves, with the Gulf of Suez making up just 6%. Most of the gas in the Gulf of Suez is either associated with oil reserves or exist as gas cap in the oil fields," Youssef said.

EGAS said that Egypt has adopted a process for reserves estimation and documentation in which EGAS and Egyptian General Petroleum Corp. (EGPC) are closely involved from the early stages of the exploration planning and approval process. Before drilling any exploratory well by the production sharing contract partner, approval must be given by EGAS or EGPC. Following the declaration of any discovery, the contractor must deliver a summary technical report including well data, proved reserves, and testing results to EGAS and EGPC.

EGAS and EGPC will review the report and then meet with the

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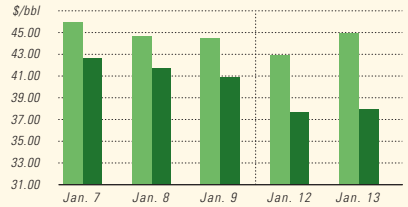

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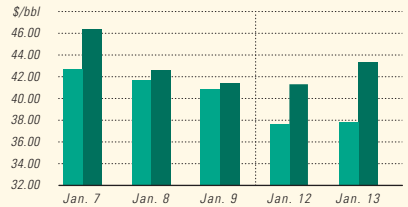
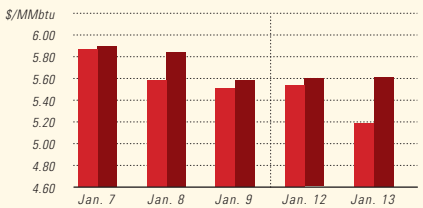
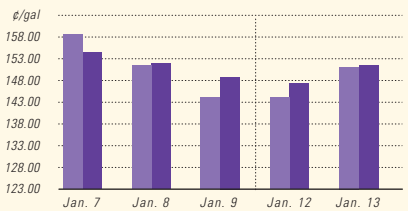


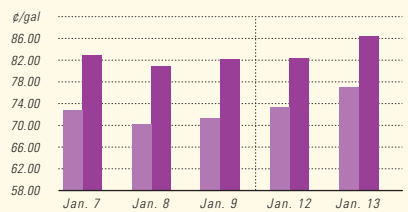
NYMEX NATURAL GAS / SPOT GAS - HENRY HUB



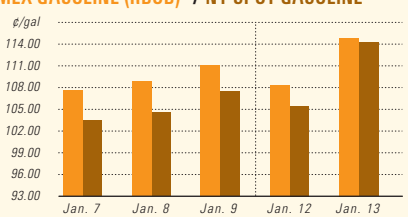
IPE GAS OIL / NYMEX HEATING OIL



PROPANE - MT. BELVIEU / BUTANE - MT. BELVIEU



NYMEX GASOLINE (RBOB)[1] / NY SPOT GASOLINE[2]



[1]Reformulated gasoline blendstock for oxygen blending.
[2]Nonoxygenated regular unleaded.

US INDUSTRY SCOREBOARD — 1/19

Latest week 1/2	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	9,035	9,236	–2.2	8,990	8,814	2.0
Distillate	4,205	4,194	0.3	4,318	4,209	2.6
Jet fuel	1,457	1,601	–9.0	1,482	1,546	–4.1
Residual	779	665	17.1	755	672	12.4
Other products	4,632	5,002	–7.4	4,291	4,873	–11.9
TOTAL DEMAND	20,108	20,698	–2.9	19,836	20,114	–1.4
Supply, 1,000 b/d						
Crude production	4,963	5,057	–1.9	4,935	5,093	–3.1
NGL production[2]	2,385	2,451	–2.7	2,385	2,123	12.3
Crude imports	9,631	9,841	–2.1	10,485	10,000	4.8
Product imports	3,238	3,051	6.1	3,213	3,492	–8.0
Other supply[3]	1,256	1,099	14.3	1,226	1,056	16.1
TOTAL SUPPLY	21,473	21,499	–0.1	22,244	21,765	2.2
Refining, 1,000 b/d						
Crude runs to stills	14,522	15,209	–4.5	14,522	14,799	–1.9
Input to crude stills	14,892	15,444	–3.6	14,892	15,086	–1.3
% utilization	84.6	88.5	—	84.6	85.8	—

Latest week 1/2	Latest week	Previous week[1]	Change	Same week year ago[1]	Change	Change, %
Stocks, 1,000 bbl						
Crude oil	325,419	318,737	6,682	282,841	42,578	15.1
Motor gasoline	211,437	208,103	3,334	213,063	–1,626	–0.8
Distillate	137,821	136,031	1,790	128,693	9,128	7.1
Jet fuel–kerosine	37,374	37,389	–15	39,716	–2,342	–5.9
Residual	33,878	35,808	–1,930	37,374	–3,496	–9.4
Stock cover (days)[4]			Change, %		Change, %	
Crude	22.5	21.9	2.7	18.4	22.3	
Motor gasoline	23.4	23.0	1.7	22.8	2.6	
Distillate	32.8	33.6	–2.4	28.7	14.3	
Propane	40.8	39.9	2.3	32.5	25.5	
Futures prices[5] **1/9**			**Change**		**Change**	**%**
Light sweet crude ($/bbl)	44.51	42.50	2.01	98.17	–53.66	–54.7
Natural gas, $/MMbtu	5.81	5.90	–0.09	7.71	–1.91	–24.7

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

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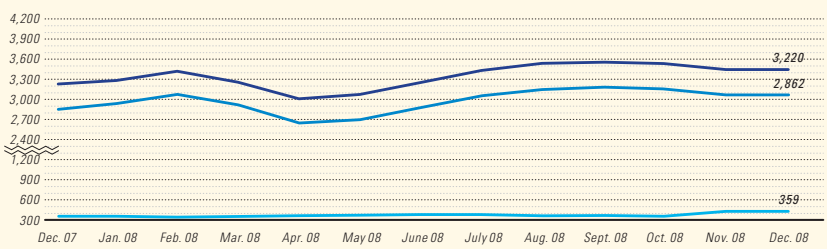
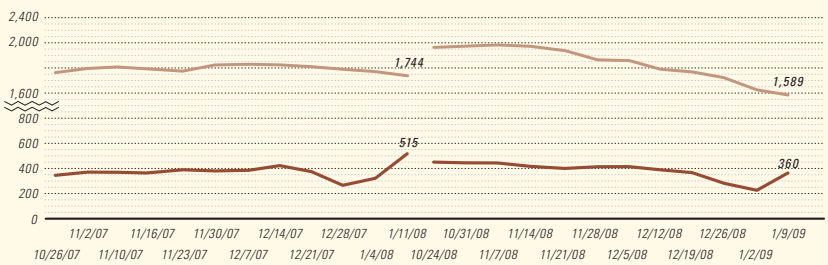


Note: Monthly average count

BAKER HUGHES RIG COUNT: US / CANADA



Note: End of week average count

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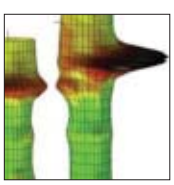

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contractor to discuss reserves and appraisal plans. EGAS and EGPC then present a technical report on the reserves added by the discovery on a P90 basis, which is equivalent to the proved category, to the Supreme Committee for Petroleum Wealth to discuss, review, approve, and declare the official figure of reserves. ✦

Exploration & Development — *Quick Takes*

Verenex adds 10th find in Libya's Ghadames

Combined maximum flow from the first 10 discoveries and two appraisal wells in Area 47 in Libya's Ghadames basin totaled 99,320 b/d of oil and 92.7 MMcfd of gas, said Verenex Energy Inc., Calgary.

The tenth discovery, H1-47/02, tested oil and gas from Ordovician Memouniat and Silurian Acacus. Verenex will release results from an 11th discovery, Il-47/02, the first well drilled in the central 3D seismic survey area in northwestern Block 2, after National Oil Corp. reviews them.

The company is preparing to test the K1-47/02 new field wildcat and is drilling the L1-47/02 new field wildcat.

The tenth find, H1-47/02, gauged 1,315 b/d of 42-64° gravity oil and 16.2 MMcfd of gas on 32/64-in. to 48/64-in. chokes. Tested were 73 ft of Memouniat sandstone and two intervals totaling 82 ft of Lower Acacus sandstone. TD is 10,475 ft.

Il-47/02, which went to TD 10,925 ft, extends the Lower Acacus and Memouniat play fairways into northwestern Block 2.

Formation evaluation of Jl-47/02, in southern Block 2, indicated hydrocarbons in Lower Acacus Basal Sand 1 and Upper Shoreface intervals. It is to be tested in late January.

In Basal Sand 1, the results indicated a thick oil column of 66 ft with an underlying water-oil contact that is at a different subsea depth than the contacts found in A1 field and the F1 well, suggesting that the J1 structure may be isolated. Testing may help confirm this interpretation.

Basal Sand 1 contains the majority of the contingent resources in A1 field and in other fields in southern Block 2.

The L1-47/02 new field wildcat that was spud Jan. 2 is 5 km southeast of the A1-47/02 oil and gas discovery on a prospect identified on 2008 2D seismic.

E.On Ruhrgas assumes Huntington operatorship

Oilexco North Sea Ltd. has lost operatorship of the Huntington license in the UK North after its partners voted unanimously to transfer it to E.On Ruhrgas UK Exploration & Production Ltd.

Ernst & Young has become the administrator of Oilexco, which failed to secure a loan from the banks amid the credit crunch for its drilling and development program.

"The operatorship change will ensure progression on the development in line with the partnership's plans," said Norwegian Energy Co. ASA, a partner in the field.

Huntington is potentially one of the largest discoveries in the last 5 years; it was put on a fast track to come on stream early in 2010. It is estimated to have up to 150 million bbl of oil in place.

Oilexco will become a nonoperating partner in the license, according to Noreco. The operatorship change became effective Jan. 12.

Buru Energy defers Canning exploration work

Buru Energy Ltd., Perth, has decided to defer its 2009 drilling program in the onshore Canning basin in the Kimberley region of northwest Western Australia to conserve cash while the company reviews its entire exploration portfolio.

Buru will use the deferral to try and identify drilling targets in areas closer to its existing oil fields, or in areas that enable cost-effective development using existing oil production infrastructure.

This includes the possibility of acquiring 3D seismic coverage over its Blina and Sundown oil fields about 100 km east of Broome in the hope of delineating low-risk drilling targets.

The company will also review its plans for the more isolated central and southern parts of the Canning basin that have high potential prospectivity, but greater exploration costs due to difficult access as well as native title and other approval issues.

In addition, Buru plans to halve its production at Blina and Sundown from a total of 200 b/d to 100 b/d to reduce field operating costs.

At present the company has cash reserves of $60 million (Aus.) and is scrutinizing a number of opportunities that have been offered by third parties outside its Canning base.

Buru was formed last year from the demerger of Arc Energy's Canning assets from the merger of Arc and Australian Worldwide Exploration.

Corridor sees busy 2009 in New Brunswick

One priority in the $59.9 million 2009 budget of Corridor Resources Inc., Halifax, is to drill an exploration well 4 km southeast of the 2008 South Branch G-36 (Caledonia) oil discovery.

This exploration well would evaluate the oil and gas potential of the Upper Hiram Brook formation and the shale gas potential of the Frederick Brook formation.

Corridor also plans to drill a step-out to the Caledonia discovery, where it shot 3D seismic last fall, and drill four McCully gas field appraisal and development wells.

The company also hopes to frac and test the Green Road G-41 well to evaluate Frederick brook shale gas potential in the Elgin subbasin. G-41 went to 2,422 m and cut 785 m of Frederick Brook gassy shale, siltstone, and minor sandstone. That included a massive, predominantly siltstone interval at 1,753-1,906 m that is friable and had strong shows of gas while drilling. Another 10 m of sheared, fractured black shale at 1,919-29 m was recovered as conventional core.

Other goals are to seek a joint venture partner to accelerate work at Elgin and other areas in the basin, and run a site survey at a proposed drilling location on the 45,000-acre Old Harry structure in 1,400 ft of water in the Gulf of St. Lawrence off Quebec (see map, OGJ, Sept. 28, 1998, p. 107). ✦

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Drilling & Production — *Quick Takes*

Ithaca installs Jacky facilities in UK North Sea

Ithaca Energy (UK) Ltd. has installed the wellhead platform and pipelines for its Jacky field in the Inner Moray Firth of the UK North Sea.

Two months of bad weather in the North Sea had caused a delay, so Ithaca hired, on short notice, the Hermod Heavy Lift Vessel to progress the project and ensure that the schedule for the pipelay and for finishing the well completion on time was not impacted. The company said these activities and the delay likely will increase development costs by 20-24% above the original estimate of £59.7 million because of shifts in the exchange rates of the UK pound, US dollar, and euro.

Jacky initially will produce 7,500 b/d in mid-March once the well completion and production well tie-in is finished.

The company will use the Ensco 92 jack up to enter the already-drilled Jacky in mid-February or early March to complete the well work, depending on previous well timing. Jacky will be an unmanned facility with the single well tied back to nearby Beatrice field facilities.

The Beatrice facility will be modified to accommodate Jacky's production, a company spokesman told OGJ. Ithaca plans to add another well at the end of the year if Jacky performs as expected, he added.

As part of the Jacky development project, Ithaca also is reinstating production from the closed-in Beatrice Bravo platform. The Bravo facility was producing about 800 b/d when Talisman Energy UK Ltd. shut in the facility in July 2007 because of corrosion of the pipeline between Bravo and the Alpha platform.

Jacky is owned by operator Ithaca, which has a 67.3% interest, and its partners Dyas 22.7% and North Sea Energy 10%. ✦

Processing — *Quick Takes*

BP to supply Vietnam's Dung Quat refinery

BP PLC has signed an agreement with state-run Petrovietnam Oil Corp. and operator Binh Son Refinery Co. to supply oil to Vietnam's 130,000-b/d Dung Quat refinery starting on Feb. 25.

Petrovietnam will negotiate with BP over the purchase of as much as 70,000 b/d of crude, which will gradually replace output from Vietnam's Bach Ho (White Tiger) field.

Analyst BMI said delivery of the crude will "pave the way" for BP to acquire at least part of the 49% stake open in Dung Quat. BMI cited a statement by Petrovietnam Chairman Dinh La Thang that international partners committed to supplying crude would be given preference as stakeholders in the facility.

Petrovietnam had planned to run the Dung Quat refinery on domestically produced Bach Ho oil, but it decided instead to bolster its foreign exchange earnings by using more imported Middle East oil and reserving Bach Ho for export markets.

The Dung Quat refinery, which is scheduled to begin operations on Feb. 25, is designed to process 3.5 million tonnes of oil during 2009, while its capacity is eventually set to increase to 6.5 million tonnes/year.

When it is fully operational, the Dung Quat refinery will meet 30% of domestic demand, producing LPG, propylene, 90RON and 92RON gasoline, kerosine, Jet A1, diesel oil, and fuel oil.

Earlier this week, Petrovietnam announced plans to build a 2 million-tonne underground storage facility at Long Son in Ba Ria-Vung Tau Province that is designed to hold products from the Dung Quat refinery.

Pertamina wins loan to expand Balongan refinery

A consortium of international banks has committed to provide Indonesia's state-owned PT Pertamina with $225 million financing, enabling it to build a polypropylene unit at its 125,000 b/d refinery in Balongan, West Java.

"The deal is for project financing," said Pertamina finance director Ferederick Siahaan, who added that Japan's Nippon Export & Investment Insurance (Nexi) would act as guarantor for the project.

In addition to Nexi, Ferederick said the consortium is comprised of a number of banks, including HSBC Holdings PLC, BNP Paribas SA, and Sumitomo Mitsui Banking Corp.

Pertamina last year announced plans to build the unit.

"The prospects for the polypropylene market are good," said Pertamina chief Ari Soemarno in May. "That is why we plan to build a polypropylene unit to meet domestic demand [for] plastic.

"We are seeking a partner," Ari said, adding that the new unit would turn Balongan's propylene into polypropylene to increase its value, while another company official said the plant would cost about $200 million and would have a production capacity of 200,000 tonnes/year.

In January 2008, Pertamina signed a contract with Japan's Toyo Engineering and Indonesia's Rekayasa Industri for an expansion project aimed at upgrading the refinery's residue catalyst cracking unit to switch from ethylene output to propylene.

Meanwhile, this month, officials expected the Balongan refinery, which has been shut since last October, to resume operations by Jan. 9. According to Pertamina Vice-Pres. Anang Rizkani Noor, "Everything is smooth and on schedule."

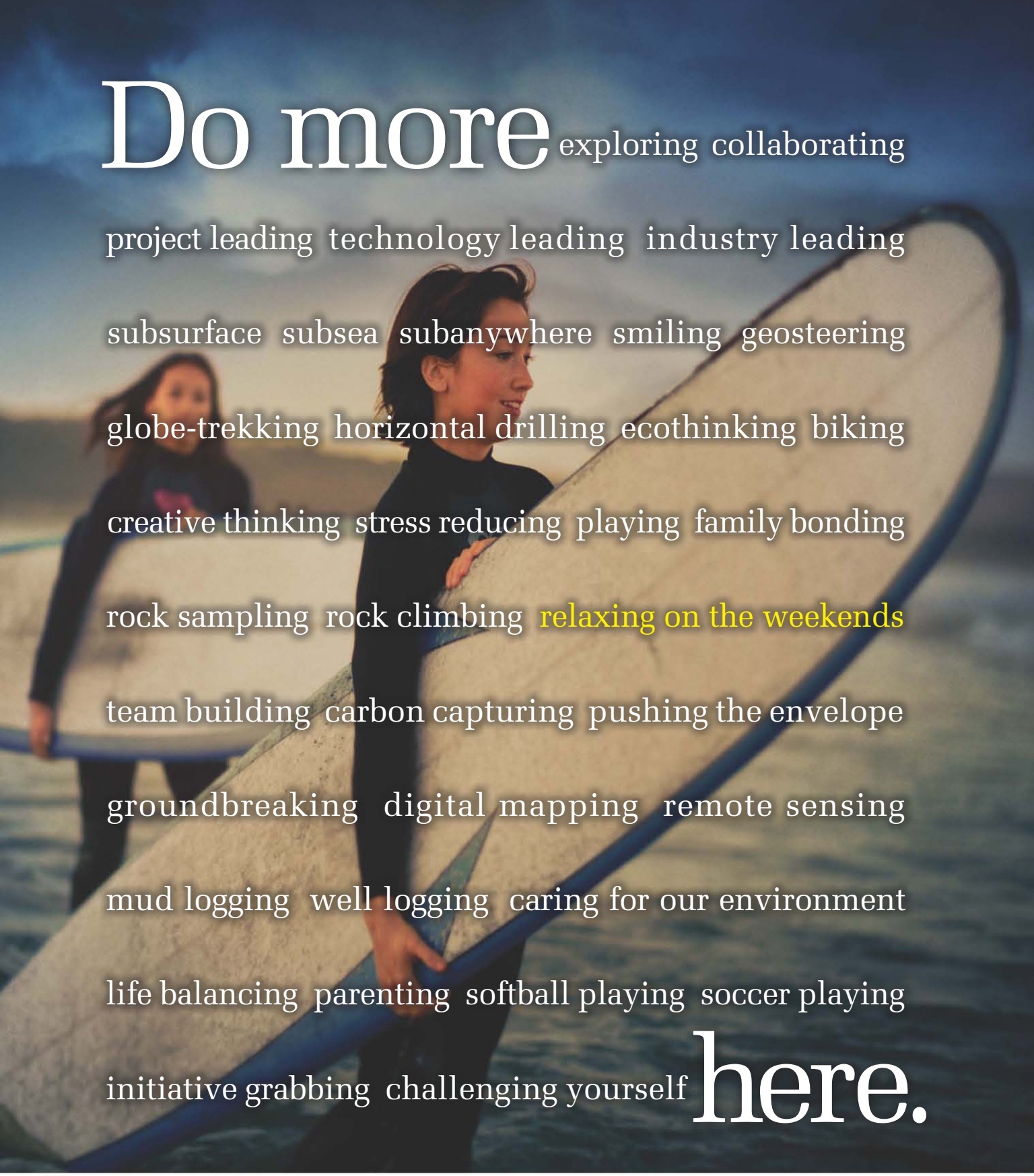
Pertamina shut the refinery on Oct. 18 to upgrade the RCC unit, and 10 days later, there was an explosion at the refinery's 58,000 b/d atmospheric hydrodemetalization unit. The refinery was restarted Dec. 17 but was shut again Dec. 21 due to what officials called "technical problems."

CSB to investigate Utah refinery blast, fire

A four-member team will travel to Woods Cross, Utah, to investigate a Jan. 12 explosion and fire that injured four people, the US Chemical Safety and Hazard Investigation Board said Jan. 13.

The fire at the Silver Eagle Refining Inc. refinery injured two employees and two contract workers who were standing about 10 ft from a tank filled with flammable hydrocarbons when it exploded, CSB said. All were hospitalized for treatment of second and third-degree burns.

Fire crews evacuated other employees and residents within a half-



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mile radius soon after the blast, which occurred around 5:30 p.m. MST. Evacuees waited at a high school before they were permitted to leave 4 hr later. The fire was extinguished by 3:45 a.m. on Jan. 13.

An official for Silver Eagle Refining, which bought the 10,250 b/d plant from ConocoPhillips in 2003, said the company would begin working immediately with federal and local investigators to determine the explosion and fire's cause.

CSB said that its crew, which was scheduled to arrive the afternoon of Jan. 14, would be lead by investigator supervisor Donald Holmstrom. ✦

Transportation — *Quick Takes*

EU considers action against Gazprom, Nafttogaz

European Commission Pres. Jose Manuel Barroso advised European companies "to take the matter to the courts" if OAO Gazprom and Naftogaz don't resume soon the movement of Russian gas to Europe via Ukraine.

Barroso also called for concerted action by European Union states to find alternative energy supplies if the "unacceptable and incredible" problem isn't resolved soon.

Barroso reiterated that EU members should use the €5 billion in the community budget to finance interconnections with other energy supplys.

The EU gas coordination group met Jan. 9 to identify helpful measures for countries suffering most from gas shortages, but concluded only inadequate short-term measures are available. Those measures include increased production from European countries, sharing larger withdrawals from storage, fuel switching, and limiting industrial consumption of gas. Even LNG would be of little help as terminals with spare capacity are not connected to those countries most in need of supply.

In an extraordinary session Jan. 12, energy ministers agreed on the need to develop transparency of physical gas flows, enhance storage capacity, increase strategic stocks, and make regional and bilateral solidarity arrangements.

An assessment of network connections identifying gaps and diversified routes and sources is to be submitted at the Feb. 19 energy council.

Transneft: ESPO's first stage on track for yearend

The first stage of Russia's East Siberia-Pacific Ocean pipeline (ESPO-1) will come on stream on Dec 25, 2009, according to Nikolai Tokarev, the head of the state-owned pipeline operator OAO Transneft.

"There are grounds to assume we will succeed," Tokarev said, adding that the revised budget for ESPO-1 had been approved at 390 billion rubles ($12.5 billion), with an extra 60 billion rubles ($1.94 billion) to be invested in the Kozmino terminal on Russia's Pacific Coast.

According to Tokarev, the estimated cost of building ESPO-1 rose 21% to 390 billion rubles from the original estimate of 322 billion rubles following an adjustment for inflation at yearend 2008.

ESPO-1 will extend 2,757 km from Taishet in East Siberia to Skovorodino in the Amur Region near the border with China, while the line's second stage, ESPO-2, will extend a further 2,100 km from Skovorodino to the port of Kozmino on Russia's Pacific Coast.

Altogether, ESPO-1 is designed to transport as much as 220.5 million bbl/year of oil to Skovorodino, while the combined ESPO-1 and ESPO-2 lines will transport as much as 367.5 million bbl/year of oil. While awaiting construction of ESPO-2, oil will be transported by rail from Skovorodino to Kozmino.

Tokarev said Transneft is ready to begin construction of ESPO-2 by yearend, but that the line's feasibility study is currently under scrutiny by Russia's State Environmental Review Agency.

In December, Natural Resources Minister Yury Trutnev said his ministry planned to conduct an analysis of the resources needed to fill the ESPO line, underlining his concerns that the global economic crisis could affect development of the necessary oil resources in Eastern Siberia.

"Just a couple of years ago, we gathered oil producers and received from them absolutely confident statements of production volumes, summed them up and received an absolutely calm picture of resources supply," Trutnev said.

"Today we are confident that this work needs to be done again. We need to make sure that everything is okay. Otherwise we may have concerns and therefore need to take appropriate measures," Trutnev said, adding, "We will do that in February."

Meanwhile, in making his announcements, Tokarev said that OAO Transneft will not be able to begin the construction of a proposed pipeline spur from Skovorodino to the Chinese border until 2010 at the earliest.

"We will complete the construction quickly and efficiently, but it won't be in 2009 since the issue of financing has yet to be resolved," Tokarev said, referring to a breakdown in negotiations with China that took place late last year.

Transneft and OAO Rosneft, which were expecting Chinese loans of $10 billion and $15 billion, respectively, for construction of the spur and for oil deliveries, were unable to complete talks with China National Petroleum Corp. by yearend 2008.

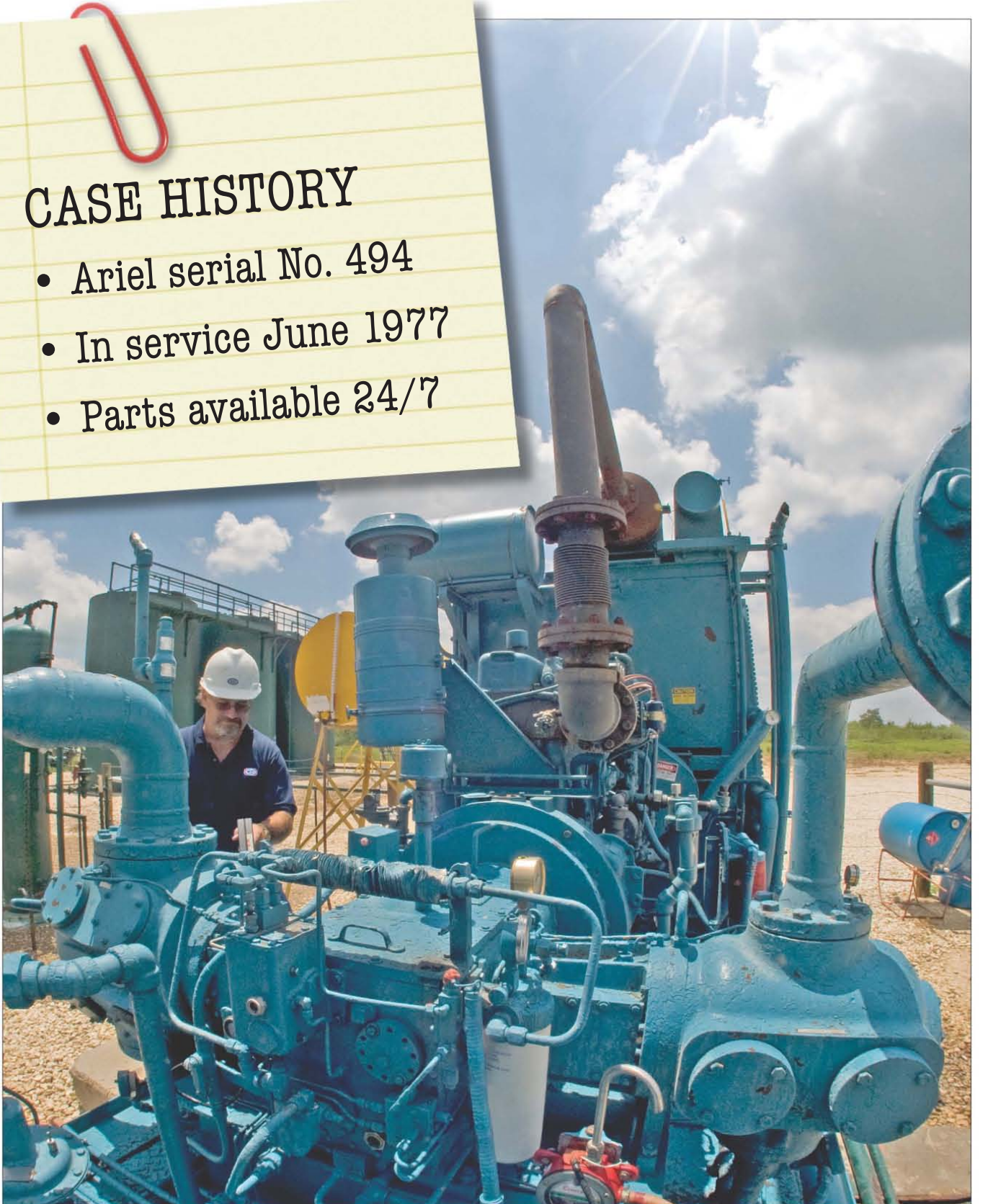
In early December, China said it expected to sign the agreements before yearend 2008, but the talks broke down due to a disagreement over interest rates for the loans, with China insisting on a floating rate, while Russia waning a fixed rate. Talks between the two sides are scheduled to resume in February, about the time the resources ministry plans to announce its revised analysis of the resources needed to fill the ESPO line. ✦

Correction

The headline for a story about ExxonMobil Corp.'s world demand outlook to 2030 should have read: World energy demand to reach 310 million boe/d in 2030 (OGJ, Jan. 12, 2009, p. 30). Also, the start of the third paragraph of that story should read as follows: Driven by growing populations and expanding economies, global energy demand is expected to increase to the equivalent of 310 million b/d in 2030 compared with the equivalent of 229 million b/d in 2005.

CASE HISTORY

- Ariel serial No. 494
- In service June 1977
- Parts available 24/7



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Hydrogen and thermodynamics

I daresay that, even as readers of this petroleum-oriented journal, most of us would like to see hydrogen become an economically viable transportation fuel that could supplement traditional automotive fuels. However, Duncan Macleod in his article "Oil industry ramps up for hydrogen vehicles" offers us little encouragement (OGJ, Dec. 8, 2008, p. 26). He writes glowingly of hydrogen as an ideal, pollution-free fuel, which cannot be denied, but he does not address the issue of the cost of the energy required to produce the hydrogen necessary to fuel the vaunted hydrogen economy.

The laws of thermodynamics are the problem. It simply takes more energy to extract hydrogen from water using electrolysis or to extract it from methane using steam reformation than can be obtained from the subsequent use of the extracted hydrogen as a fuel. This imbalance of more energy in than out is the barrier to a broadly based, economically viable hydrogen economy.

Small facilities using solar or wind power to produce locally used electrolytic hydrogen from water may have some potential. This is predicated on the assumption that solar or wind power used to generate the hydrogen could not otherwise be used. However, as soon as significant production of solar or wind-based power is developed at any single location, it would be siphoned away and put to more efficient use. This suggests that hydrogen can never be more than a boutique fuel with specialized niche markets.

I certainly would like to be proven wrong, but it's hard to argue with the laws of thermodynamics. If Mr. Macleod can offer some insight on this apparent dilemma, he should be invited to do so. Otherwise, the pursuit of the hydrogen economy brings to mind the age-old search for the perpetual motion machine!

Thomas Wyman
Palo Alto, Calif.

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

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2009

JANUARY

Oil & Gas Maintenance Technology Conference & Exhibition, Manama, (918) 831-9160, (918) 831-9161 (fax), e-mail: attendingOGMT@pennwell.com, website: www.oilandgas-maintenance.com. 19-21.

Pipeline Rehabilitation & Maintenance Conference, Manama, (918) 831-9160, (918) 831-9161 (fax), e-mail: attendingOGMT@pennwell.com, website: www.pipeline-rehab.com. 19-21.

SPE Hydraulic Fracturing Technology Conference, The Woodlands, Tex., (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 19-21.

World Future Energy Summit, Abu Dhabi, +971 2 444 6011, +971 2 444 3987 (fax), e-mail: sales@turretme.com, website: www.worldfutureenergysummit.com. 19-21.

API Exploration & Production Winter Standards Meeting, San Antonio, (202) 682-8000, (202) 682-8222 (fax), website: www.api.org. 19-23.

API/AGA Oil and Gas Pipeline Welding Practices Conference, San Antonio, (202) 682-8000, (202) 682-8222 (fax), website: www.api.org. 21-23.

International Process Analytical Technology Forum (IFPAC), Baltimore, (847) 543-6800, (847) 548-1811 (fax), e-mail: info@ifpacnet.org, website: www.ifpac.com. 25-28.

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

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

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

SIHGAZ International Hydrocarbon & Gas Fair, Hassi Messaoud, + 213 21 21 58 74, + 213 21 21 58 72/76 (fax), e-mail: contact@foirex.com, website: www.sihgaz2009.com. 28-31.

FEBRUARY

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

MARCH

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

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

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

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

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

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

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

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

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

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

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

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

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

Latin American Meeting on Energy Economics, Santiago, 56 2 3541411, 56 2 5521608 (fax), e-mail: info@elaee.org, website: www.elaee.org. 22-24.

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

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

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

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

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

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

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

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

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

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

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

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

APRIL

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

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

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

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

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

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

Middle East Petroleum & Gas Conference, Dubai, 65 62220230, 65 62220121 (fax), e-mail: info@cconnection.org, website: www.cconnection.org. 19-21.

ERTC Coking & Gasification Conference, Budapest, 44 1737 365100, +44

1737 365101 (fax), e-mail: events@gtforum.com, website: www.gtforum.com. 20-22.

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

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

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

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

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

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

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

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

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

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

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

MAY

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

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

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

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

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

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

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

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

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

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

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

NPRA Reliability & Maintenance Conference, Grapevine,

Tex., (202) 457-0480, (202) 457-0486 (fax), e-mail: info@npra.org, website: www.npra.org. 19-22.

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

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

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

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

JUNE

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

JULY

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

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

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

AUGUST

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

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

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

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

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

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

SEPTEMBER

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

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

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

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

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

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

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

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

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

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

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

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

OCTOBER

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

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

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

Driving habits transformed

Laura Bell
Statistics Editor

A recent Gallup poll entitled "Despite Cheaper Gas, New Driving Habits Sticking" caught this editor's eye.

In this poll, Gallup found that 64% of Americans reported changing their driving habits drastically due to higher gasoline prices during mid-2008. After returning to survey those drivers again after gasoline prices plummeted late last year, the pollsters found that a mere 12% had slipped back to their old driving routines.

Not surprisingly, in this mid-December 2008 survey, Gallup found that it was mostly upper-income Americans who did not change their driving habits and routines as a result of the rise in prices. Their disposable income was not directly affected by last summer's high pump prices. Instead, it was drivers from households with an annual income of less than $75,000 who were more likely to respond to the higher prices by taking a different approach to transportation.

Gallup noted, "As pump prices plunged, it should not be surprising that 19% of lower-income Americans say they have returned to their old driving habits, compared with 11% of middle-income and 8% of upper-income Americans."

Age also played a role in the survey results, as 61% of Americans aged 18-34 and 62% of Americans aged 55 and older said that they changed their driving habits, driving less due to higher prices.

But those aged 35-54 were the most likely to change their routines due to rising prices, with two-thirds saying that high gasoline prices were a deterrent. This is not unexpected, because those in the 35-54 age group are doing most of the driving by commuting to work and chauffeuring children to after-school activities.

Almost 20% of younger Americans said they would revert to their old driving habits once pump prices fell, compared with 12% for ages 35-54 and only 6% of those 55 years and older.

Comparing data

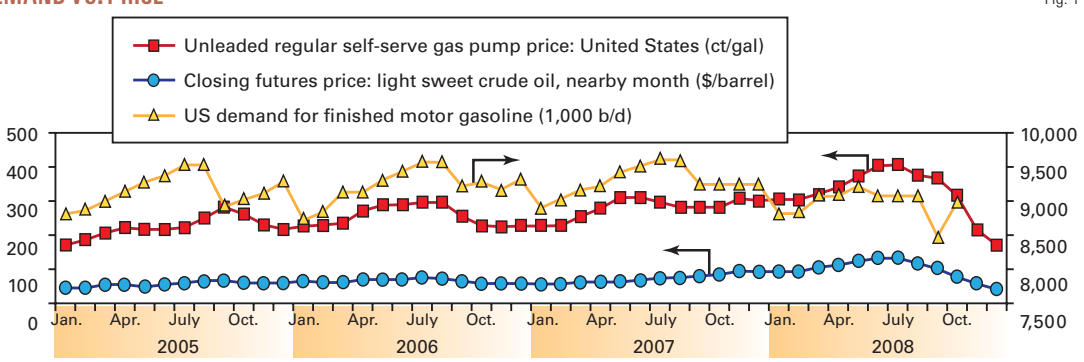
OGJ's weekly and monthly statistics will support the surveys' findings. In the graph below, note that when prices reached a certain level, motor gasoline demand started to decline. Motor gasoline demand primarily fell in mid-2008, once gasoline hit unprecedented prices of $3-4/gal.

Motor gasoline consumption typically follows a cyclical trend, rising and falling at certain times of the year. The graph indicates this cycle. Demand goes up slightly in the months of the summer driving season and begins to decline in September.

Even though demand rose from the beginning of last year to hit the highest point in May 2008—the start of driving season—at 9.216 million b/d, motor gasoline consumption began to slip, and consumers started to watch their driving habits during the summer months, as compared with the previous year and the same time period. ✦

DEMAND VS. PRICE

Fig. 1



Sources: US Department of Energy, Oil & Gas Journal, and Wall Street Journal

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Congress lurching leftward

Concern about a disintegrating economy hasn't daunted lawmakers who seem determined to force up the costs of energy. As Oil & Gas Journal's Nick Snow reported from Washington last week, industry trade associations have three main hopes for moderation of Congress's most extreme urges: concern by congressional leaders for the economy, growth in the number of centrist Democrats, and migration toward the political center by an incoming administration facing urgent national problems (OGJ, Jan. 12, 2009, p. 20). Senate and House leaders quickly are dispelling the first two of those hopes. If the last one has any validity, intraparty conflict between the White House and Capitol is inevitable.

Senate Majority Leader Harry Reid made his course clear by pushing forward, in a rare Sunday session Jan. 11, a lands bill that will create 2 million acres of wilderness (OGJ, Jan. 12, 2009, p. 18). To overcome a filibuster led by Sen. Tom Coburn (R-Okla.), Senate leaders last year created a package of 150 land, water, and other bills, many of them local spending measures. A dozen more bills joined the bundle, called the Omnibus Public Lands Management Act, this year. Sixty-six senators voted to take the bill to the Senate floor.

New bureaucracy

Oil and gas groups worry chiefly about the bill's sanction of the National Landscape Conservation System, which they fear will become a new bureaucracy that environmentalists will use to block exploration and production. Supporters of the system of course argue that the program simply protects unique terrain and that it has been under preparation for many years and just needed to break the Senate logjam. But lawmakers opposed to oil and gas leasing already are said to have plans to expand the system's 26 million acres.

That drilling and production should be excluded from some exceptional areas is beyond dispute. The politics of land use in the US, however, by treating drilling and production as wholly destructive of all natural values rather than the temporary and diminishing disturbances that they are, seeks mainly to lock away as many acres as possible without truly balancing values. No reason has emerged to see the new land bill as a departure from that one-way tendency. The Senate thus marches forward with an effort to curtail the wealth generation of resource development just when the US needs it most.

The House, meanwhile, has shifted leftward again with energy committee assignments. The first such lurch was the successful campaign last November by Henry Waxman of California to replace John Dingell of Michigan as chairman of the Energy and Commerce Committee. Dingell had been the committee's ranking Democrat for 28 years. Waxman, whose coup is believed to have had the tacit backing of House Speaker Nancy Pelosi, thought Dingell's support for the auto industry made him insufficiently aggressive in climate change legislation crafted by his committee. Dingell worked on the bill with Rep. Rick Boucher of Virginia, chairman of the Energy and Environment Subcommittee. Boucher's affiliation with the coal industry made him suspect with Waxman's environmentalist supporters.

No surprise

Boucher's displacement therefore came as no surprise (OGJ, Nov. 17, 2008, p. 72). It happened Jan. 8, when the energy committee announced Boucher would swap roles with Edward J. Markey of Massachusetts, chairman of the Communications, Technology, and Internet Subcommittee (see Washington Pulse Blog, OGJ Online). A fierce critic of the oil and gas industry, Markey is chairman of the House Select Committee on Energy Independence and Global Warming. In that role he orchestrated hearings last year at which he lambasted oil company chief executives for profiting from high oil prices and for investing in renewable energy sources at rates he deemed insufficient. Waxman and Markey won't have much time for centrist party colleagues.

The 111th Congress thus begins with an attempted land grab by the Senate and the radicalization of House energy leadership. Both developments bode ill for oil and gas supply, for the affordability of energy in general, and by association for US economic health. Barack Obama, who becomes president Jan. 20, has yet another problem. ✦

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Economic slump to suppress US, worldwide oil use in 2009

Marilyn Radler
Senior Editor-Economics

Laura Bell
Statistics Editor

US energy demand this year will shrink along with the economy, but total use of all forms of energy will decline by a smaller margin than during 2008.

Oil demand will contract for the second year in a row in 2009, but natural gas demand will increase. Economic weakness will be the biggest factor affecting demand for oil and gas in the US.

Coal demand will see a small decline from a year ago, nuclear energy demand will be unchanged, and the use of energy from renewable sources will post a small increase.

In 2008, strong worldwide oil demand growth coupled with limited spare oil production capacity to push crude and product prices to record levels.

Then, stung by high prices and collapsing economic conditions, oil demand shrunk and caused inventories to swell in the second half of 2008, lowering prices to the start of 2009.

The duration of price weakness hinges on the speed of economic recovery.

Worldwide oil demand

Global oil demand will contract this year by 400,000 b/d, as a 600,000 b/d decline in the countries of the Organization for Economic Cooperation and Development offsets a collective increase in oil demand among non-OECD countries.

In 2008, worldwide demand for oil declined to average 85.8 million b/d from 86 million b/d a year earlier, according to the International Energy Agency. This change also was marked by a large decline in the OECD and a 1.4 million b/d increase in the non-OECD countries, led by rapid demand growth in China, Latin America, and the Middle East.

But this year non-OECD oil demand growth will slow under the weight of global economic contraction. Oil demand in China will climb to average 8.1 million b/d from 7.9 million b/d last year. In 2007, China's oil demand averaged 7.5 million b/d.

Demand in other non-OECD Asia, the former Soviet Union, the Middle East, and Africa will be unchanged from 2008 while demand in non-OECD Europe declines marginally. Latin American demand will inch up to 6 million b/d this year.

Global oil production

Worldwide supplies of oil are also set to contract this year, provided that

pledged output cuts by the Organization of Petroleum Exporting Countries hold.

OPEC in December agreed to reduce its crude output by 2.2 million b/d, in addition to another 2 million b/d in cuts agreed to at meetings the organization held in September and October amid rapidly declining oil demand and even faster-declining oil prices.

OECD oil supply for 2009 is forecast to decline about 500,000 b/d in OECD European countries, hold steady in North America, and increase to 700,000 b/d from 600,000 b/d in the OECD Pacific countries.

Meanwhile, IEA expects that increases in oil production in Latin America and the former Soviet Union will propel non-OECD supplies to average 28.2 million b/d this year, up from 27.6 million b/d a year ago. The Paris-based agency's outlook also calls for small increases in output in China, other non-OECD Asia, and Africa, and a small production decline in non-OPEC Middle East output.

Adding processing gains and other biofuels to these estimates for 2009 supply, total non-OPEC production will average 50.1 million b/d, up from 49.6 million b/d last year.

OGJ estimates that OPEC output will decline appreciably from last year's average 32.1 million b/d, as the organization limits supply to ease pressure on full inventories and to bring crude prices back toward $75/bbl.

In keeping with the most recent IEA estimates, these OPEC figures include production in Indonesia, although the country exited the organization at the end of 2008. The agency estimated that Indonesia supplied about 850,000 b/d of oil in the final quarter of last year.

Even with a decline in OPEC output this year, stocks are likely to build. IEA foresees a climb in supplies of biofuels and natural gas liquids, as well as a small increase in processing gains from last year.

If OPEC crude production holds above 29 million b/d and demand

WORLDWIDE SUPPLY AND DEMAND

	2008 1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Year	2009 1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Year
	Million b/d									
DEMAND										
OECD										
North America	24.8	24.5	23.8	23.6	24.2	23.9	23.9	23.8	23.8	23.8
Europe	15.2	14.9	15.3	15.5	15.2	15.0	14.6	15.2	15.3	15.0
Pacific	8.9	7.8	7.5	8.3	8.1	8.6	7.7	7.5	8.2	8.0
Total OECD	**48.9**	**47.2**	**46.6**	**47.4**	**47.5**	**47.5**	**46.2**	**46.5**	**47.3**	**46.9**
Non–OECD										
FSU	4.1	4.1	4.4	4.4	4.2	4.2	4.2	4.2	4.2	4.2
Europe	0.8	0.8	0.7	0.8	0.8	0.7	0.7	0.7	0.8	0.7
China	7.9	8.0	8.1	7.9	7.9	8.0	8.0	8.1	8.2	8.1
Other Asia	9.6	9.6	9.1	9.3	9.4	9.4	9.4	9.3	9.5	9.4
Latin America	5.7	5.9	6.0	5.9	5.9	5.9	6.0	6.1	6.1	6.0
Middle East	6.7	7.0	7.3	6.8	6.9	6.8	6.8	7.0	7.1	6.9
Africa	3.1	3.2	3.0	3.1	3.1	3.1	3.1	3.1	3.2	3.1
Total Non–OECD	**37.9**	**38.5**	**38.6**	**38.2**	**38.3**	**38.1**	**38.2**	**38.5**	**39.1**	**38.5**
TOTAL DEMAND	**86.8**	**85.7**	**85.2**	**85.6**	**85.8**	**85.6**	**84.4**	**85.0**	**86.4**	**85.4**
SUPPLY										
OECD										
North America	14.2	14.1	13.6	13.9	14.0	14.1	13.9	13.9	14.2	14.0
Europe	4.9	4.8	4.5	4.6	4.7	4.5	4.1	4.0	4.2	4.2
Pacific	0.6	0.6	0.6	0.7	0.6	0.7	0.7	0.7	0.7	0.7
Total OECD	**19.7**	**19.5**	**18.8**	**19.3**	**19.3**	**19.4**	**18.8**	**18.6**	**19.1**	**19.0**
Non–OECD										
FSU	12.8	12.9	12.6	12.7	12.8	13.1	13.1	12.9	12.9	13.0
Europe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
China	3.8	3.8	3.8	3.9	3.8	3.9	3.9	3.9	3.9	3.9
Other Asia	2.7	2.6	2.6	2.6	2.6	2.7	2.7	2.7	2.7	2.7
Latin America	3.9	4.0	4.1	4.1	4.0	4.3	4.3	4.3	4.3	4.3
Middle East	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5
Africa	2.6	2.6	2.7	2.7	2.6	2.7	2.7	2.7	2.7	2.7
Total Non–OECD	**27.6**	**27.6**	**27.5**	**27.8**	**27.6**	**28.3**	**28.4**	**28.2**	**28.1**	**28.2**
Processing gains	2.2	2.2	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3
Other biofuels	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6
Total Non–OPEC	**49.9**	**49.7**	**48.9**	**49.8**	**49.6**	**50.5**	**50.1**	**49.6**	**50.1**	**50.1**
OPEC										
Crude	32.4	32.2	32.4	31.4	32.1	30.0	30.0	30.0	30.0	30.0
NGL	4.8	4.9	5.0	5.2	5.0	5.3	5.5	5.7	5.9	5.6
Total OPEC	**37.2**	**37.1**	**37.4**	**36.6**	**37.1**	**35.3**	**35.5**	**35.7**	**35.9**	**35.6**
Total supply	**87.1**	**86.8**	**86.3**	**86.4**	**86.7**	**85.8**	**85.6**	**85.3**	**86.0**	**85.7**
Stock change	0.2	1.1	1.1	0.8	0.9	0.2	1.2	0.3	(0.4)	0.4

Totals may not add due to rounding.
Source: International Energy Agency for all 2008 and for 2009 supply, OGJ estimates for 2009 demand.

US ENERGY DEMAND

	2007 Trillion btu	2008 Trillion btu	Change, %	2009 Trillion btu	Change, %	% share of total energy 2007	2008	2009
Oil	39,772	37,505	–5.7	36,090	–3.8	39.2	37.7	36.7
Gas	23,637	23,780	0.6	24,018	1.0	23.3	23.9	24.5
Coal	22,776	22,800	0.1	22,550	–1.1	22.4	22.9	23.0
Nuclear	8,415	8,400	–0.2	8,400	0.0	8.3	8.4	8.6
Hydro, other	6,968	7,100	1.9	7,150	0.7	6.9	7.1	7.3
Total	**101,568**	**99,585**	**–2.0**	**98,208**	**–1.4**	**100.0**	**100.0**	**100.0**

Source: 2007 US Energy Information Administration; 2008 and 2009 OGJ estimate and forecast.

OGJ FORECAST OF US SUPPLY AND DEMAND

	Year 2009 Volume 1,000 b/d	Year 2009 % change from 2008	Year [1]2008 Volume 1,000 b/d	Year [1]2008 % change from 2007
DOMESTIC DEMAND				
Motor gasoline	8,800	–2.0	8,980	–3.3
Dist. 1–4	7,259	–2.0	7,408	–3.3
Dist. 5	1,541	–2.0	1,572	–3.3
Jet fuel	1,465	–3.0	1,510	–6.9
Dist. 1–4	1,007	–3.0	1,038	–6.9
Dist. 5	458	–3.0	472	–6.9
Distillate	3,800	–3.7	3,945	–6.0
Dist. 1–4	3,288	–3.7	3,414	–6.0
Dist. 5	512	–3.7	531	–6.0
Residual	580	–4.9	610	–15.6
Dist. 1–4	455	–4.9	478	–15.6
Dist. 5	125	–4.9	132	–15.6
LPG and ethane	1,865	–4.8	1,960	–6.0
Dist. 1–4	1,820	–4.8	1,913	–6.0
Dist. 5	45	–4.8	47	–6.0
Other products	2,245	–9.8	2,490	–10.0
Dist. 1–4	1,977	–9.8	2,192	–10.0
Dist. 5	268	–9.8	298	–10.0
TOTAL DOMESTIC DEMAND	**18,755**	**–3.8**	**19,495**	**–5.7**
Dist. 1–4	15,806	–3.9	16,443	–5.7
Dist. 5	2,949	–3.4	3,052	–5.7
EXPORTS	**1,850**	**4.2**	**1,775**	**23.9**
Dist. 1–4	1,579	4.2	1,515	23.9
Dist. 5	271	4.2	260	24.5
TOTAL DEMAND	**20,605**	**–3.1**	**21,270**	**–3.8**
Dist. 1–4	17,385	–3.2	17,958	–3.8
Dist. 5	3,220	–2.8	3,312	–3.8
SUPPLY				
DOMESTIC PRODUCTION				
Crude & condensate	5,000	0.9	4,955	–2.2
Dist. 1–4	3,633	0.9	3,601	–2.2
Dist. 5	1,367	0.9	1,354	–2.2
NGL	1,785	–0.3	1,790	0.4
Dist. 1–4	1,721	–0.3	1,726	0.4
Dist. 5	64	–0.3	64	0.4
Total domestic production	**6,785**	**0.6**	**6,745**	**–1.5**
Dist. 1–4	5,354	0.5	5,327	–1.3
Dist. 5	1,431	0.9	1,418	–2.0
IMPORTS				
Crude oil	9,550	–2.3	9,777	–2.5
Dist. 1–4	8,455	–2.3	8,656	–2.5
Dist. 5	1,095	–2.3	1,121	–2.5
Products & unfinished oils	3,220	–3.6	3,340	–2.8
Dist. 1–4	2,878	–3.6	2,985	–2.8
Dist. 5	342	–3.6	355	–2.8
TOTAL IMPORTS	**12,770**	**–2.6**	**13,117**	**–2.6**
Dist. 1–4	11,333	–2.6	11,641	–2.6
Dist. 5	1,437	–2.6	1,476	–2.6
Processing gain, loss, etc.	1,028	–33.3	1,542	–7.3
Dist. 1–4	822	–33.3	1,233	–7.3
Dist. 5	206	–33.3	309	–7.3
TOTAL NEW SUPPLY	**20,583**	**–3.8**	**21,404**	**–2.6**
Dist. 1–4	17,510	–3.8	18,201	–2.6
Dist. 5	3,073	–4.0	3,203	–2.8
STOCK CHANGE	**(22)**	**—**	**134**	**—**
Dist. 1–4	125	—	243	—
Dist. 5	(147)	—	(109)	—
CRUDE RUNS TO STILLS	**14,850**	**1.3**	**14,664**	**–3.2**
TOTAL INPUT TO STILLS	**15,150**	**1.0**	**15,000**	**–2.9**
TOTAL REFINING CAPACITY	**17,700**	**0.5**	**17,610**	**0.9**
REFINING UTILIZATION (%)	**85.6**	**0.5**	**85.2**	**–3.8**
TOTAL INDUSTRY STOCKS[2]	**1,009**	**–0.8**	**1,017**	**5.1**
Refined products	689	–0.4	692	1.5
Crude oil	320	–1.5	325	13.6
SPR crude oil stocks	720	2.6	702	0.7
IMPORT DEPENDENCY				
Total imports % domestic demand	68.1		67.3	
Net imports % domestic demand	58.2		58.2	

[1]Preliminary estimate. [2]Million bbl at end of period

and other production estimates prove correct, inventories will climb about 400,000 b/d this year.

US economy, energy

The US economy will remain feeble this year until consumer and investor confidence returns. A strengthening of the financial system and an effective government stimulus plan will be necessary to underpin recovery. OGJ forecasts that GDP will decline 1% this year, erasing all 2008 economic growth.

A string of dismal economic results followed the bursting of the housing bubble last year. Home values plummeted in parts of the US, credit markets froze, stocks slumped, unemployment climbed, and consumer spending shrank on fears that more bad news was looming, creating a downward spiral.

The Bureau of Labor Statistics announced that in December the unemployment rate reached 7.2%, the highest rate in 16 years. In November, the rate was 6.8%, up from 6.6% a month earlier.

BLS also reported that the Consumer Price Index fell in November by 1.9% from the previous month. BLS said falling energy prices, particularly gasoline, drove the decline in the index. Excluding energy prices, the index was virtually unchanged.

Rising unemployment and deflation will weigh on the health of the US economy all year, but some recovery will begin to take hold before 2010.

OGJ forecasts that US energy demand will slip 1.4% this year to 98.2 quadrillion btu (quads), building on last year's gains in energy efficiency.

High oil prices last year forced a decline in demand, which resulted in improved energy efficiency. In the US in 2008, total energy demand fell 2% in spite of a 1% increase in economic output.

Energy sources

While overall US energy use this year will decline, some sources of energy will be in slightly higher demand than they were a year ago. Demand for

natural gas, hydroelectric power, and nonhydro renewable energy sources will increase by small margins.

Nuclear energy demand will be unchanged, and the use of coal will slip. Demand for oil will decline by the largest margin of all sources.

Oil demand will fall almost 4% this year, following last year's nearly 6% contraction under the weight of high prices. Exacerbated by the economic recession, this year's decline will be spread among all major petroleum products, as was last year's decline.

Demand for gas will increase on the strength of power demand in an anticipated warm summer cooling season. Driven by low prices, gas demand will climb to 24 quads from 23.78 quads last year.

Combined, the use of oil and gas in the US this year will account for 61.2% of all energy consumed; this is down from last year's combined 61.6% of energy demand.

The uptick in gas demand will take up some of the slack as coal demand dips 1.1% to 22.55 quads. A year ago coal demand grew to an estimated 22.8 quads from 22.78 quads. Coal will satisfy 23% of US energy demand this year.

The use of nuclear energy in 2009 will remain at last year's total of 8.4 quads and account for 8.6% of US energy demand. The number of operable nuclear units has held at 104 since 1998.

Demand for renewable energy, including hydroelectric power, solar, wind, and biofuels, will grow to 7.15 quads from 7.1 quads last year.

In 2008, a jump in the use of fuel ethanol and biodiesel propelled demand for renewable energy sources to almost 2% above its level of a year earlier. Hydroelectric power generation and wind electric generation also climbed last year but by smaller margins than ethanol and biodiesel.

US NATURAL GAS SUPPLY AND DEMAND

	2006	2007	2008	Change, % 2008/07	2009	Change, % 2009/08
	bcf				bcf	
Marketed production						
Texas	5,514	6,093	7,000	14.9	7,050	0.7
Louisiana	1,361	1,327	1,350	1.7	1,360	0.7
Federal Gulf of Mexico	2,902	2,771	2,420	–12.7	2,520	4.1
Other states	9,605	9,960	10,530	5.7	10,570	0.4
Total production	**19,382**	**20,151**	**21,300**	**5.7**	**21,500**	**0.9**
Imports						
Canada	3,590	3,783	3,595	–5.0	3,500	–2.6
Mexico	13	54	32	–40.7	20	–37.5
LNG	584	771	325	–57.8	300	–7.7
Total imports	**4,186**	**4,608**	**3,952**	**–14.2**	**3,820**	**–3.3**
Supplemental gas	66	61	54	–11.5	60	11.1
Losses, etc.*	(821)	(1,121)	(986)	–12.0	(1,000)	1.4
Total new supply	**22,813**	**23,699**	**24,320**	**2.6**	**24,380**	**0.2**
Supply from storage	(436)	177	(100)	–156.5	100	–200.0
Total supply	**22,377**	**23,876**	**24,220**	**1.4**	**24,480**	**1.1**
Exports	724	822	1,020	24.1	1,050	2.9
Total consumption	**21,653**	**23,054**	**23,200**	**0.6**	**23,430**	**1.0**

*Extraction losses and unaccounted for gas.
Source: 2006 and 2007 Energy Information Administration; 2008 and 2009 OGJ estimates and forecast.

OIL, GAS, PRODUCTS PRICES

	Crude oil		Products		Natural gas	
Year	Average US wellhead price	Average landed cost of imports	Unleaded gasoline pump price	No. 2 fuel oil wholesale price	Average US wellhead price	Average delivered commercial price
	$/bbl		¢/gal		$/Mcf	
1976	8.19	13.32	61.4	NA	0.58	1.64
1977	8.57	14.36	65.6	NA	0.79	2.04
1978	9.00	14.35	67.0	36.9	0.91	2.23
1979	12.64	21.45	90.3	56.9	1.18	2.73
1980	21.59	33.67	124.5	80.3	1.59	3.39
1981	31.77	36.47	137.8	97.6	1.98	4.00
1982	28.52	33.18	129.6	91.4	2.46	4.82
1983	26.19	28.93	124.1	81.5	2.59	5.59
1984	25.88	28.54	121.2	82.1	2.66	5.55
1985	24.09	26.67	120.2	77.6	2.51	5.50
1986	12.51	13.49	92.7	48.6	1.94	5.08
1987	15.40	17.65	94.8	52.7	1.67	4.77
1988	12.58	14.08	94.6	47.3	1.69	4.63
1989	15.86	17.68	102.1	56.5	1.69	4.74
1990	20.03	21.13	116.4	69.7	1.71	4.83
1991	16.54	18.02	114.0	62.2	1.64	4.81
1992	15.99	17.75	112.7	57.9	1.74	4.88
1993	14.25	15.72	110.8	54.4	2.04	5.22
1994	13.19	15.18	111.2	50.6	1.85	5.44
1995	14.62	16.78	114.7	51.1	1.55	5.05
1996	18.46	20.31	123.1	63.9	2.17	5.40
1997	17.23	18.11	123.4	59.0	2.32	5.80
1998	10.88	11.84	105.9	42.2	1.96	5.48
1999	15.56	17.23	116.5	49.3	2.19	5.33
2000	26.72	27.53	151.0	88.6	3.68	6.59
2001	21.84	21.82	146.1	75.6	4.00	8.43
2002	22.51	23.91	135.8	69.4	2.95	6.63
2003	27.56	27.69	159.1	88.1	4.88	8.40
2004	36.77	36.07	188.0	112.5	5.46	9.43
2005	50.28	49.29	229.5	162.3	7.33	11.34
2006	59.69	59.11	258.9	183.4	6.40	11.99
2007	66.52	67.97	280.1	207.2	6.39	11.31
2008*	94.15	93.30	303.5	287.0	8.05	11.98

*Estimated.
Source: 1976–2007 US Energy Information Administration; 2008 OGJ estimates.

US oil supply

US oil production will gain back some of what it lost last year as a result of hurricanes in the Gulf of Mexico. Crude and condensate production will average 5 million b/d, up 1% after sliding 2.2% last year.

NGL production will average 1.785 million b/d, nearly unchanged from last year's 1.79 million b/d. In 2007, NGL production averaged 1.783 million b/d.

Oil production this year will get a

US PRODUCTION OF CRUDE OIL AND LEASE CONDENSATE

	[1]2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	Cumulative 1859–2008
	1,000 b/d										1,000 bbl
District 1:											
Fla., NY, Pa., W.Va.	21	21	22	23	19	20	20	20	21	22	2,801,200
Total Dist. 1	**21**	**21**	**22**	**23**	**19**	**20**	**20**	**20**	**21**	**22**	**2,801,565**
District 2:											
Illinois	26	26	28	28	30	32	34	28	33	33	3,632,161
Indiana	5	5	5	5	5	5	5	6	6	5	557,156
Kansas	107	100	98	93	93	93	86	93	94	80	6,373,922
Kentucky	8	7	6	7	7	7	8	8	9	8	782,657
Michigan	16	14	14	15	18	18	24	20	22	21	1,269,804
Nebraska	6	6	6	7	7	8	8	8	8	7	505,474
North Dakota	155	123	109	98	85	81	85	87	89	90	1,629,063
Ohio	15	15	15	15	16	15	20	17	18	16	1,119,419
Oklahoma	170	167	172	170	171	179	183	188	192	193	14,655,555
Others[2]	6	7	5	5	4	4	3	4	4	4	69,450
Total Dist. 2	**514**	**470**	**458**	**443**	**436**	**442**	**456**	**459**	**475**	**457**	**30,594,661**
District 3:											
Alabama	21	20	21	22	20	22	24	26	29	30	652,996
Arkansas	17	17	17	17	18	20	21	21	20	20	1,788,370
Louisiana	1,191	1,232	1,272	1,061	1,470	1,562	1,538	1,620	1,534	1,513	29,820,026
Mississippi	59	56	48	48	47	45	51	54	54	49	2,355,130
New Mexico	162	161	164	166	176	181	183	186	184	176	5,396,377
Texas	1,294	1,342	1,317	1,489	1,285	1,356	1,418	1,364	1,394	1,400	62,825,341
Total Dist. 3	**2,744**	**2,828**	**2,839**	**2,803**	**3,016**	**3,186**	**3,235**	**3,271**	**3,215**	**3,188**	**102,838,240**
District 4:											
Colorado	65	64	64	63	60	58	40	45	50	51	1,994,793
Montana	81	95	99	90	68	53	43	44	42	41	1,653,561
Utah	54	53	49	46	40	36	41	42	43	45	1,339,713
Wyoming	146	148	145	141	141	144	153	157	166	167	7,014,170
Total Dist. 4	**346**	**360**	**357**	**340**	**309**	**291**	**277**	**288**	**301**	**304**	**12,002,237**
District 5:											
Alaska	683	722	741	864	908	974	988	963	971	1,050	16,347,274
California	647	662	684	704	730	767	797	799	837	857	27,917,314
Nevada	1	1	1	1	1	1	2	2	2	2	52,186
Total Dist. 5	**1,331**	**1,385**	**1,426**	**1,569**	**1,639**	**1,742**	**1,787**	**1,764**	**1,810**	**1,909**	**44,316,774**
US total	**4,956**	**5,064**	**5,102**	**5,178**	**5,419**	**5,681**	**5,775**	**5,802**	**5,822**	**5,880**	**192,553,366**

[1]Preliminary. [2]Includes Missouri, South Dakota, and Tennessee.

boost from production in Shenzi, Tahiti, and Thunder Horse fields in the Gulf of Mexico, provided there are no major disruptions brought on by tropical storms.

Meanwhile, low product prices and reduced petrochemical manufacturing will suppress production of NGLs. Poor extraction economics will kill any incentive to produce more NGLs this year.

OGJ estimates that crude and condensate production in Alaska continued its decline to average 683,000 b/d last year, compared with 722,000 b/d a year earlier. The last year production in Alaska moved higher was 2002, when output jumped 2.6% and averaged 988,000 b/d.

States recording production declines last year also included Louisiana, California, Montana, and Texas.

Production in North Dakota in 2008 averaged 155,000 b/d, up from the year-earlier average of 123,000 b/d due to increased output from the Bakken shale formation. Production also climbed last year in Colorado, Utah, Alabama, Mississippi, and Oklahoma.

Inventories

Industry stocks of crude and products will finish 2009 down from their unusually high end-2008 levels.

Stocks of crude, excluding those in the Strategic Petroleum Reserve, at the end of last year totaled 325 million bbl, more than 13% higher than a year earlier. Throughout 2008, re-

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SUPPLY AND DEMAND FOR CRUDE IN THE US

	[1]2008	2007	2006	2005	2004	2003	2002	2001	2000	1999
	1,000 b/d									
SUPPLY										
Crude imports[2]	9,777	10,031	10,118	10,126	10,088	9,665	9,140	9,328	9,071	8,731
Crude production	4,955	5,064	5,102	5,178	5,419	5,681	5,746	5,801	5,822	5,881
Unaccounted for crude	78	39	25	76	143	54	110	117	155	191
Total supply	**14,810**	**15,134**	**15,245**	**15,380**	**15,650**	**15,400**	**14,996**	**15,246**	**15,048**	**14,803**
DEMAND										
Crude refinery runs	14,664	15,156	15,242	15,220	15,475	15,304	14,947	15,128	15,067	14,804
Crude exports	25	27	25	32	27	12	9	20	50	118
Crude into SPR	14	23	11	25	102	108	134	26	–73	–11
Total demand	**14,703**	**15,206**	**15,278**	**15,277**	**15,604**	**15,424**	**15,090**	**15,174**	**15,044**	**14,911**
Crude stock change (industry)	107	–72	–33	103	46	–24	–94	72	4	–108
Primary (industry)[3]	325	286	312	324	286	269	278	312	286	284
SPR	702	697	689	685	676	638	599	550	541	567
Total crude stocks (million bbl)	**1,027**	**983**	**1,001**	**1,009**	**962**	**907**	**877**	**862**	**827**	**851**

[1]Preliminary. [2]Includes imports for the Strategic Petroleum Reserve. [3]Includes Alaskan crude in transit.
Source: US Energy Information Administration.

US ENERGY CONSUMPTION AND EFFICIENCY

Year	GDP, billion 2000 $	Energy consumption, trillion btu	Energy consumption per GDP, 2000 $ (Mbtu)	Oil energy consumption, trillion btu	Oil energy consumption per GDP, 2000 $ (Mbtu)	Natural gas energy consumption, trillion btu	Natural gas energy consumption per GDP, 2000 $ (Mbtu)	Total oil and natural gas energy consumption, trillion btu	Total oil and gas energy consumption per GDP, 2000 $ (Mbtu)	Oil and natural gas energy % of total energy
1973	4,341.5	75,708	17.4	34,840	8.0	22,512	5.2	57,352	13.2	75.8
1974	4,319.6	73,991	17.1	33,455	7.7	21,732	5.0	55,187	12.8	74.6
1975	4,311.2	71,999	16.7	32,731	7.6	19,948	4.6	52,679	12.2	73.2
1976	4,540.9	76,012	16.7	35,175	7.7	20,345	4.5	55,520	12.2	73.0
1977	4,750.5	78,000	16.4	37,122	7.8	19,931	4.2	57,053	12.0	73.1
1978	5,015.0	79,986	15.9	37,965	7.6	20,000	4.0	57,965	11.6	72.5
1979	5,173.4	80,903	15.6	37,123	7.2	20,666	4.0	57,789	11.2	71.4
1980	5,161.7	78,122	15.1	34,202	6.6	20,394	4.0	54,596	10.6	69.9
1981	5,291.7	76,335	14.4	31,931	6.0	19,928	3.8	51,859	9.8	67.9
1982	5,189.3	73,234	14.1	30,231	5.8	18,505	3.6	48,736	9.4	66.5
1983	5,423.8	73,066	13.5	30,054	5.5	17,357	3.2	47,411	8.7	64.9
1984	5,813.6	76,693	13.2	31,051	5.3	18,507	3.2	49,558	8.5	64.6
1985	6,053.7	76,491	12.6	30,922	5.1	17,834	2.9	48,756	8.1	63.7
1986	6,263.6	76,722	12.2	32,196	5.1	16,708	2.7	48,904	7.8	63.7
1987	6,475.1	79,156	12.2	32,865	5.1	17,744	2.7	50,609	7.8	63.9
1988	6,742.7	82,774	12.3	34,222	5.1	18,552	2.8	52,774	7.8	63.8
1989	6,981.4	84,886	12.2	34,211	4.9	19,712	2.8	53,923	7.7	63.5
1990	7,112.5	84,652	11.9	33,553	4.7	19,603	2.8	53,156	7.5	62.8
1991	7,100.5	84,522	11.9	32,845	4.6	20,149	2.8	52,994	7.5	62.7
1992	7,336.6	85,866	11.7	33,527	4.6	20,835	2.8	54,362	7.4	63.3
1993	7,532.7	87,579	11.6	33,841	4.5	21,351	2.8	55,192	7.3	63.0
1994	7,835.5	89,248	11.4	34,670	4.4	21,842	2.8	56,512	7.2	63.3
1995	8,031.7	91,173	11.4	34,437	4.3	22,671	2.8	57,108	7.1	62.6
1996	8,328.9	94,175	11.3	35,673	4.3	23,085	2.8	58,758	7.1	62.4
1997	8,703.5	94,765	10.9	36,160	4.2	23,223	2.7	59,383	6.8	62.7
1998	9,066.9	95,183	10.5	36,817	4.1	22,830	2.5	59,647	6.6	62.7
1999	9,470.3	96,817	10.2	37,838	4.0	22,909	2.4	60,747	6.4	62.7
2000	9,817.0	98,975	10.1	38,264	3.9	23,824	2.4	62,088	6.3	62.7
2001	9,890.7	96,326	9.7	38,186	3.9	22,773	2.3	60,959	6.2	63.3
2002	10,048.8	97,858	9.7	38,227	3.8	23,558	2.3	61,785	6.1	63.1
2003	10,301.0	98,209	9.5	38,809	3.8	22,897	2.2	61,706	6.0	62.8
2004	10,675.8	100,351	9.4	40,294	3.8	22,931	2.1	63,225	5.9	63.0
2005	10,989.5	100,506	9.1	40,393	3.7	22,583	2.1	62,976	5.7	62.7
2006	11,294.8	99,856	8.8	39,958	3.5	22,191	2.0	62,149	5.5	62.2
2007	11,523.9	101,568	8.8	39,773	3.5	23,637	2.1	63,410	5.5	62.4
[1]2008	11,640.0	99,585	8.6	37,505	3.2	23,780	2.0	61,285	5.3	61.5
[2]2009	11,524.0	98,208	8.5	36,090	3.1	24,018	2.1	60,108	5.2	61.2

[1]Estimated. [2]Forecast.
Source: US Energy Information Administration.

finery utilization rates were lower than normal. Utilization hovered around 85% all year, except in September, when Gulf Coast refineries experienced hurricane-related outages.

Product stocks will end 2009 at 689 million bbl, down from 692 million a year earlier. Total motor gasoline inventories at the end of last year sagged from the end of 2007, but the amount of gasoline blending components in storage grew 8% over the period.

At the end of 2008, inventories of jet fuel, residual fuel oil, and unfinished oils all stood below their year-earlier levels. Over this period, though, industry stocks of distillate fuel oil, propane and propylene, and other oils grew.

The SPR will add about 18 million bbl of crude this year. The Department of Energy announced plans earlier this month to purchase crude to take advantage of the recent decline in prices.

And from January through May of

Crude imports by country of origin[1]

	[2]2008	2007	2006	2005	2004	2003	2002	2001	2000	1999
	1,000 b/d									
Algeria[3]	328	443	362	228	215	112	30	11	1	25
Angola	499	498	513	456	306	363	321	321	295	357
Australia	39	2	5	10	21	27	51	34	49	31
Canada	1,986	1,888	1,802	1,633	1,616	1,549	1,445	1,356	1,348	1,178
China	16	6	19	24	14	13	20	13	33	13
Colombia	180	137	141	156	142	166	235	260	318	452
Congo, Republic of	0	0	0	0	14	2	23	1	8	2
Congo	69	63	27	25	8	27	3	40	42	46
Ecuador	225	198	272	276	232	139	100	113	125	114
Gabon	74	63	60	127	142	131	143	140	143	168
Indonesia[3]	17	15	16	19	34	26	50	40	36	70
Iran[3]	0	0	0	0	0	0	0	0	0	0
Iraq[3]	655	484	553	527	655	481	459	795	620	725
Kuwait[3]	178	175	179	227	241	208	216	237	263	246
Malaysia	0	1	7	10	18	21	9	15	29	21
Mexico	1,141	1,409	1,577	1,556	1,598	1,569	1,500	1,394	1,313	1,254
Nigeria[3]	859	1,084	1,037	1,077	1,078	832	589	842	875	623
Norway	29	56	98	119	143	181	348	281	302	263
Oman	16	32	35	22	10	35	17	20	2	0
Qatar[3]	0	0	1	0	4	0	9	0	0	1
Saudi Arabia[3]	1,567	1,447	1,423	1,445	1,495	1,726	1,519	1,611	1,523	1,387
Trinidad & Tobago	21	48	67	64	49	67	68	51	56	40
United Arab Emirates[3]	4	9	5	9	5	10	10	21	3	0
United Kingdom	73	101	130	224	238	359	405	244	291	284
Venezuela[3]	1,057	1,148	1,142	1,241	1,297	1,183	1,201	1,291	1,223	1,150
Others	743	724	647	651	513	438	369	197	173	281
Total imports	**9,777**	**10,031**	**10,118**	**10,126**	**10,088**	**9,665**	**9,140**	**9,328**	**9,071**	**8,731**
Total from OPEC	**4,666**	**5,388**	**4,783**	**4,757**	**5,042**	**4,578**	**4,083**	**4,848**	**4,544**	**4,228**

[1]Includes imports for the Strategic Petroleum Reserve. [2]Preliminary. [3]OPEC member.
Source: US Energy Information Administration.

Exports of refined products and crude

	*2008	2007	2006	2005	2004	2003	2002	2001	2000	1999
	1,000 b/d									
Gasoline	165	127	142	136	124	125	124	133	144	111
Distillate	479	268	215	138	110	107	112	119	173	162
Residual	342	330	283	251	205	197	177	191	139	129
Lubricants	64	59	55	40	41	37	33	26	26	28
Coke	421	366	366	347	350	361	337	336	319	242
Asphalt and road oil	28	19	15	11	6	10	6	5	6	5
LPG	62	57	56	53	43	56	67	44	74	50
Other refined products	189	179	160	158	142	122	119	97	109	95
Total refined products	1,750	1,405	1,292	1,134	1,021	1,015	975	951	990	822
Crude	25	27	25	32	27	12	9	20	50	118
Total exports	**1,775**	**1,433**	**1,317**	**1,165**	**1,048**	**1,027**	**984**	**971**	**1,040**	**940**

*Preliminary
Source: US Energy Information Administration.

this year, the SPR will receive 5.4 million bbl of oil in payment for supply released to refiners in the fall of 2008 due to interruptions caused by Hurricanes Gustav and Ike, along with 120,000 additional "premium" barrels of oil that the refiners are required to pay.

The SPR will also receive 2.178 million bbl of royalty-in-kind oil, originally scheduled for delivery in 2008 and deferred until the spring of this year.

Refining

OGJ expects US refining activity to be a little stronger this year, with capacity utilization set to average about 86%. Operable capacity will average 17.7 million b/d vs. 17.61 million b/d last year.

In 2008, utilization averaged 85%, as spring maintenance caused the rate to dip to 83% in March, then hurricane-related interruptions to Gulf Coast refineries sent the September rate to just 74.6%.

While refiners continued to ramp up production of ultralow-sulfur diesel and scale back output of distillate with more than 500 ppm sulfur to meet fuel regulations, production of most other products was little changed during 2008.

Refiners paid more than ever for crude during 2008, and they saw their cash margins plunge from 2007 results.

With a July average of more than $129/bbl, the composite cost of domestic and imported crude to US refiners last year averaged about $95/bbl. This compares to the 2007 average of $67.98/bbl.

Refinery maintenance was heavy in the spring of 2007, and cash margins spiked in May of that year. High crude cost sent them tumbling during 2008, until September's outages gave margins a temporary boost. The 2008 average Gulf Coast cash refining margin was $9.01/bbl, according to Muse, Stancil & Co., down 29% from a year earlier.

Imports, exports

US imports of crude and products will slide this year as a result of wan-

IMPORTS OF REFINED PRODUCTS

	[1]2008	2007	2006	2005	2004	2003	2002	2001	2000	1999
	1,000 b/d									
Gasoline	348	413	475	603	496	518	498	454	427	382
Kerosene	1	3	5	7	2	6	5	5	2	1
Jet fuel–kerosene	113	217	186	190	127	109	107	148	162	128
Distillate	221	304	365	329	325	333	267	344	295	250
Residual	481	372	350	530	426	327	249	295	352	237
Unfinished oils	801	717	689	582	490	335	410	378	274	317
Other[2]	1,375	1,410	1,520	1,346	1,191	971	854	920	877	806
Total US	**3,340**	**3,436**	**3,590**	**3,587**	**3,057**	**2,599**	**2,390**	**2,543**	**2,389**	**2,121**

[1]Preliminary. [2]Includes plant condensate.
Source: US Energy Information Administration.

ROTARY RIG ACTIVITY BY STATES

	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998
Alabama	4.5	4.6	4.6	3.6	2.5	2.4	3.0	5.3	4.1	5.5	6.0
Alaska	8.3	8.4	8.0	9.3	9.9	9.7	11.2	13.4	8.2	5.0	12.0
Arizona	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Arkansas	50.4	45.4	24.0	9.3	6.4	2.1	0.8	1.5	3.9	2.5	6.2
California	41.2	35.4	33.3	27.2	23.9	21.1	22.3	36.4	24.1	19.0	27.9
Land	40.4	33.8	29.3	23.0	20.4	17.9	19.7	32.5	20.7	17.4	26.1
Offshore	0.8	1.6	4.0	4.2	3.5	3.2	2.6	3.9	3.4	1.6	1.8
Colorado	114.0	106.7	88.5	73.9	54.2	38.8	27.8	32.3	18.4	12.5	12.8
Florida	1.0	0.4	0.3	1.6	1.1	0.7	0.2	0.4	0.2	0.2	0.1
Idaho	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Illinois	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Indiana	1.7	2.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
Kansas	11.3	13.8	9.6	6.7	6.7	8.7	7.5	22.4	22.0	7.4	13.2
Kentucky	10.2	9.0	7.2	4.7	4.4	4.3	4.8	6.4	4.9	5.5	2.4
Louisiana	167.3	177.0	188.4	182.1	166.8	157.2	162.8	213.8	194.4	141.1	187.4
North	67.9	57.9	57.5	48.4	39.3	28.5	23.2	30.3	24.1	16.2	18.9
Inland waters	20.4	24.6	19.2	22.8	18.2	14.3	16.3	20.4	15.8	15.5	21.4
South	25.6	33.8	38.5	32.5	30.3	29.6	31.6	44.1	36.7	21.1	40.8
Offshore	53.3	60.7	73.2	78.4	79.1	84.8	91.7	119.0	117.9	88.3	106.4
Michigan	1.1	1.5	2.2	2.6	3.0	3.1	1.3	1.2	2.4	2.1	5.4
Mississippi	13.1	14.0	10.3	10.3	9.8	8.0	7.6	14.2	11.2	7.4	14.0
Montana	10.7	16.9	21.3	24.0	19.9	14.0	7.9	10.0	6.5	4.3	8.6
Nebraska	0.1	0.1	0.0	0.0	0.8	0.0	0.1	0.2	0.6	0.3	0.5
Nevada	3.3	2.2	1.3	1.9	1.5	1.2	0.0	0.0	0.0	0.0	0.0
New Mexico	78.6	78.1	93.8	82.8	67.2	64.4	41.5	68.2	67.9	36.0	44.7
New York	6.0	6.4	6.4	4.3	4.9	2.8	4.3	5.4	3.3	2.5	2.2
North Dakota	68.1	38.9	31.5	20.4	15.0	13.7	10.1	14.3	13.4	5.9	11.2
Ohio	11.6	13.2	7.5	9.2	6.7	7.4	8.7	9.6	8.5	10.5	10.1
Oklahoma	200.0	188.2	178.7	152.1	158.8	128.2	90.8	130.2	99.4	61.9	84.9
Pennsylvania	23.0	15.6	15.7	13.2	8.9	10.1	10.3	10.6	8.7	7.8	10.9
South Dakota	1.6	1.5	1.1	2.0	0.5	0.2	0.2	0.6	0.2	0.5	0.1
Texas	898.4	834.3	746.4	614.7	505.9	448.5	337.5	462.5	343.4	227.1	302.3
Gulf Coast	187.1	180.3	170.3	184.6	156.1	153.0	134.3	168.1	127.1	50.0	63.4
Offshore & inland waters	10.1	10.5	14.8	10.5	14.1	20.2	16.2	26.4	16.6	13.8	11.5
North	41.7	36.7	33.5	31.8	37.4	39.4	30.1	27.4	14.5	10.5	10.5
Panhandle	81.9	60.5	68.2	62.5	47.5	26.0	14.6	21.0	16.7	13.7	20.8
East	305.8	294.8	243.3	172.5	131.2	107.2	68.1	106.1	78.0	38.9	54.7
West Central	93.9	94.6	79.0	53.0	45.3	28.4	21.9	31.7	17.4	50.1	72.9
West	178.0	156.9	137.5	100.0	74.2	74.2	52.5	81.6	73.1	50.1	68.5
Utah	41.6	41.1	40.2	27.7	21.5	13.4	13.1	20.8	15.5	8.8	12.5
West Virginia	26.9	31.6	26.5	17.4	15.1	15.5	13.2	18.1	14.1	13.7	14.3
Wyoming	73.9	73.6	99.0	78.5	73.6	53.6	40.2	55.0	41.0	31.8	38.6
Others	10.6	7.6	2.6	3.6	1.5	1.2	2.2	3.6	2.0	5.7	2.6
Total US	**1,879.0**	**1,767.8**	**1,648.7**	**1,383.1**	**1,190.5**	**1,030.3**	**830.2**	**1,156.4**	**918.3**	**624.9**	**830.6**
Land	1,791.8	1,669.8	1,536.6	1,265.9	1,074.0	905.6	699.9	981.4	761.2	502.0	684.7
Inland Waters	22.0	25.7	22.2	23.7	19.4	16.8	17.7	21.9	17.3	16.6	22.1
Offshore	65.3	72.6	89.9	93.4	97.0	107.9	112.6	153.1	139.8	106.3	123.9
Canada–land	380.4	340.0	466.5	454.3	361.1	369.8	259.5	336.3	339.7	240.1	255.9
Canada–offshore	1.2	2.5	3.6	3.8	3.9	3.8	6.1	5.2	4.7	5.2	3.6
Grand total	**2,260.6**	**2,110.3**	**2,118.8**	**1,841.2**	**1,555.5**	**1,403.9**	**1,095.8**	**1,497.9**	**1,262.7**	**870.1**	**1,090.2**

Source: Baker Hughes Inc. Note: May not add due to independent rounding.

ing demand. Total industry imports declined 2.5% last year and will fall another 2.6% this year.

Crude imports will average 9.55 million b/d, and product imports will average 3.22 million b/d. Net imports will supply 58.2% of US oil demand.

The sources of the largest volumes of US crude and product imports last year were Canada, Mexico, Saudi Arabia, Venezuela, and Nigeria.

US exports of crude and products will average 1.85 million b/d this year, up 4.2%. Last year, weaker demand caused total oil exports to soar 24%

Marketed natural gas production[1]

	[2]2008	2007	2006	2005	2004	2003	2002	2001	2000	1999
	MMcfd									
Alaska	1,164	1,217	1,218	1,335	1,289	1,305	1,269	1,292	1,254	1,268
Louisiana	3,967	3,637	3,729	3,551	3,697	3,760	3,731	4,115	3,975	4,293
New Mexico	4,320	4,131	4,409	4,507	4,460	4,234	4,471	4,628	4,645	4,142
Oklahoma	5,514	4,945	4,627	4,491	4,524	4,572	4,250	4,426	4,419	4,367
Texas	20,293	16,694	15,106	14,456	13,845	14,460	14,085	14,473	14,432	13,848
Wyoming	6,590	5,557	4,976	4,491	4,350	4,125	3,983	3,737	2,974	2,661
Federal offshore	7,021	7,592	7,951	8,581	10,845	12,263	12,804	13,774	13,482	13,780
Others	9,486	11,435	11,085	10,442	10,314	10,159	9,984	9,912	10,004	9,901
Total	**58,356**	**55,209**	**53,101**	**51,855**	**53,326**	**54,877**	**54,578**	**56,357**	**55,184**	**54,260**
Volume change	3,147	2,108	1,246	–1,471	–1,550	299	–1,779	1,173	925	436
Percent change	5.7	4.0	2.4	–2.8	–2.8	0.5	–3.2	2.1	1.7	0.8
Imports	10,798	12,624	11,469	11,893	11,635	10,164	10,979	10,896	10,332	9,823
Exports	2,787	2,253	1,983	1,996	2,334	1,644	1,414	1,023	666	448

[1]Includes nonhydrocarbon gases. [2]Preliminary.
Source: US Energy Information Administration

Refinery runs by districts

	2008 Crude runs[1]	2008 Input to crude stills[1]	2008 % of operable capacity	Crude runs 2007	2006	2005	2004	2003	2002	2001	2000	1999
	1,000 b/d			1,000 b/d								
East Coast	1,345	1,309	79.2	1,426	1,418	1,534	1,508	1,516	1,455	1,413	1,485	1,456
Appalachian Dist. 1	90	90	93.0	87	94	93	89	88	85	86	86	92
Total Dist. 1	**1,435**	**1,399**	**80.0**	**1,513**	**1,512**	**1,627**	**1,597**	**1,605**	**1,541**	**1,499**	**1,571**	**1,548**
Ill., Ind., Ky.[2]	2,085	2,105	88.3	2,131	2,161	2,143	2,157	2,107	2,108	2,165	2,239	2,232
Minn., Wisc., Daks.	408	410	89.7	401	413	420	403	395	701	414	422	392
Okla., Kan., Mo.	732	733	87.9	694	723	735	729	710	701	724	712	706
Total Dist. 2	**3,225**	**3,247**	**88.4**	**3,226**	**3,297**	**3,298**	**3,288**	**3,212**	**3,511**	**3,303**	**3,373**	**3,330**
Texas:												Inland
593	602	89.5	570	610	579	604	572	554	574	573	557	
Gulf Coast	3,282	3,314	81.5	3,417	3,445	3,489	3,682	3,652	3,475	3,549	3,455	3,383
Louisiana Gulf	2,717	2,814	85.0	3,035	2,913	2,751	2,906	2,872	2,848	2,922	2,843	2,793
N. La., Ark.	184	174	82.2	187	197	186	151	156	148	154	178	188
New Mexico	107	107	87.8	106	95	95	94	81	84	79	90	90
Total Dist. 3	**6,883**	**7,011**	**83.6**	**7,315**	**7,260**	**7,098**	**7,438**	**7,332**	**7,109**	**7,278**	**7,139**	**7,012**
Total Dist. 4	537	540	89.4	542	553	558	556	528	520	500	505	498
Total Dist. 5	2,585	2,811	87.9	2,560	2,621	2,638	2,596	2,627	2,567	2,547	2,479	2,416
Total US	**14,664**	**15,008**	**85.2**	**15,156**	**15,242**	**15,220**	**15,475**	**15,304**	**15,247**	**15,128**	**15,067**	**14,804**

[1]Preliminary. [2]Includes Appalachian Dist. 2
Source: US Energy Information Administration

higher than a year earlier. Crude exports averaged 25,000 b/d, down from 2007, but product exports were higher.

Oil products

US oil product demand this year will be sluggish, but it will not drop as much as it did in 2008. OGJ forecasts that total domestic demand for products will average 18.755 b/d, down from 19.5 million b/d a year ago.

Demand for transportation fuels will be hit by the economy. Business and leisure travel as well as commercial transport will decline due to the pullback in spending.

Motor gasoline demand will decline by 2% to average 8.8 million b/d.

Last year, demand for the fuel fell more than 3%, declining for the first time since 1991. High pump prices deterred discretionary driving and spurred a trend toward the use of smaller and more energy-efficient vehicles.

For the week ending July 7, 2008, the pump price of regular unleaded gasoline in the US peaked at an average of $4.114/gal, according to the US Energy Information Administration. A year earlier the average was $2.959/gal.

By the end of last year, pump prices had sunk to levels not seen since early 2004. For the week ended Dec. 29, 2008, the pump price of regular unleaded averaged $1.613/gal. With geopolitical tensions pressuring oil prices, the pump price rebounded a bit to start this year, though, averaging $1.784/gal for the week ended Jan. 12.

While lower prices may encourage use, the poor economy will remain a drag on motor gasoline demand this year.

US REFINED PRODUCTS, NATURAL GAS LIQUIDS, AND CRUDE STOCKS

	[1]2008	2007	2006	2005	2004	2003	2002	2001	2000	1999
	1,000 bbl									
Gasoline[2]	210,600	219,369	213,226	209,735	219,081	208,167	210,609	211,465	197,429	195,142
Motor[3]	209,417	218,107	211,806	208,328	217,601	206,827	209,096	209,851	195,852	193,327
Aviation[3]	1,183	1,262	1,420	1,407	1,480	1,340	1,513	1,614	1,577	1,815
Special naphthas	1,413	1,571	1,609	1,524	1,800	2,006	2,038	2,006	2,112	2,351
Kerosene	1,789	2,804	3,373	5,092	4,885	5,584	5,463	5,388	4,107	4,871
Distillate	124,004	133,944	143,651	136,022	126,272	136,542	134,085	144,513	118,027	125,463
Residual	39,864	39,338	42,397	37,387	42,363	37,800	31,333	41,047	36,200	35,830
Kerosine jet fuel	39,888	39,458	39,129	41,741	40,086	38,767	39,123	41,871	44,409	40,447
Naphtha jet fuel	—	—	—	—	—	17	56	82	109	54
Natural gas liquids & LRG	120,671	105,870	125,109	118,206	111,085	100,889	113,285	128,272	87,722	94,721
Unfinished oils	91,280	81,209	83,782	85,723	81,380	75,904	75,766	87,700	84,217	86,254
Other refined products	62,491	58,736	66,349	53,926	56,512	55,364	59,447	61,784	67,030	56,075
Total products stocks	692,000	682,299	718,625	689,356	683,464	661,040	671,205	724,128	641,362	641,208
Crude stocks (ex. SPR)	325,000	286,105	312,276	323,704	285,741	268,875	277,614	311,980	285,507	284,482
Total stocks (ex. SPR)	**1,017,000**	**968,404**	**1,030,901**	**1,013,060**	**969,205**	**929,915**	**948,819**	**1,036,108**	**926,869**	**925,690**
SPR stocks	**702,000**	**696,941**	**688,605**	**684,544**	**675,600**	**638,388**	**599,091**	**550,241**	**540,678**	**567,241**
Total stocks (incl. SPR)	**1,719,000**	**1,665,345**	**1,719,506**	**1,697,604**	**1,644,805**	**1,568,303**	**1,547,910**	**1,586,349**	**1,467,547**	**1,492,931**

[1]Preliminary. [2]Includes reformulated, oxygenated, and other finished gasoline. [3]Includes blending components.
Source: US Energy Information Administration

Demand for jet fuel will ebb along with business and leisure travel this year. Airlines will become even more efficient, driving down jet fuel demand a further 3% after last year's 6.9% decline.

Distillate, other products

Distillate fuel oil demand will decline almost 4% this year, as less will be required for commercial transport. Diesel prices will remain at a premium to gasoline prices, although they have dropped from their mid-2008 high of $4.77/gal.

The most recent figures from EIA show that the price for highway (ultralow-sulfur) diesel averaged $2.324/gal for the week ended Jan. 12.

Demand for distillate averaged 3.945 million b/d last year, down from a year earlier by 6%.

About 80% of all distillate consumed in the US now is ultralow-sulfur diesel, with no more than 15 ppm sulfur. Most of the remaining distillate demand is for heating oil and is heavily dependent on weather.

Demand for residual fuel oil, mostly used in electric power generation, will decline about 5% this year. For 2008, resid demand was down more than 15%, as high oil prices discouraged use of the fuel.

The capacity of power generators to switch to resid as a fuel has greatly declined in favor of using natural gas, and resid demand has drastically declined since the early 1980s.

Slumping petrochemical production, construction, and fuel demand will suppress the use of all other products in the US this year. This group of products includes ethane, gasoline blending components, waxes, and other oils.

Demand for liquid petroleum gases will average 4.8% lower this year, following a 6% drop in 2008 to 1.96 million b/d. Meanwhile, at 2.245 million b/d, the use of all other products will slump 10%, the same decline as a year ago.

Natural gas

OGJ forecasts an increase in US gas demand this year of 1%, mostly related to power generation and home heating. Demand growth will be limited by a decline in industrial demand.

In 2008, gas demand climbed just 0.6% to an estimated 23.2 tcf as residential and commercial demand were nearly flat from a year earlier, according to early estimates. Electric power demand was slightly lower, canceling a small gain in industrial demand through the first 10 months of the year.

Gas prices plunged in the second half of last year along with oil prices as the amount of gas in storage climbed to the top of the 5-year range. US gas production grew for the year in spite of the Gulf of Mexico hurricanes.

Gas supplies will remain plentiful this year, and prices will be suppressed for a while, but production growth will slow. Drilling rates are declining already.

The Baker Hughes count of gas rigs reached as high as 1,606 in late August and September 2008; for the week ending Jan. 9, the count had fallen to 1,239 active gas-directed rotary rigs.

US production growth will be negligible in all areas except the deepwater Gulf of Mexico, where projects are based on long-term plans with large enough investments to be much less affected by price declines than projects elsewhere.

Gas output from the federal Gulf of Mexico will climb 4% this year, following last year's storm-related decline of almost 13%. Marketed production this year will increase 0.7% in both Texas and Louisiana and will grow a combined 0.4% in all other states.

Imports will decline 3.3% in total, with slumps in both LNG and volumes via pipeline from Canada and Mexico.

In 2008, higher prices elsewhere diverted LNG volumes from the US. As a result, the US imported 58% less LNG than a year earlier. OGJ expects volumes this year will total 300 bcf, an almost 8% decline from last year.

US gas exports will increase 3%, slowing from last year's 24% advance. About 100 bcf of this year's gas supply will come from storage, relieving some pressure on stocks.

The amount of working gas in storage finished 2008 at about 2.83 tcf vs. the end-2007 storage level of 2.8 tcf. ✦

Fewer wells to be drilled in US, Canada in 2009

Alan Petzet
Chief Editor-Exploration

Drilling in the US is declining in response to the 2008 oil and gas price collapse and financial crisis in the US, and further drops are expected in the US and Canada in 2009.

Rig counts in the rest of the world, however, have held up fairly well.

Capital spending cuts in connection with the US financial crisis begin in earnest in the third quarter of 2008. Most companies have alerted the investment community that they plan to monitor oil and gas prices closely during 2009 and adjust budgets accordingly. Many pledged to operate within cash flow this year.

It was impossible at this writing in early January to predict how low the US rig count might go before bottoming out.

Here are highlights of OGJ's early year drilling forecast for 2009:

- Operators will drill 43,384 wells in the US, down from an estimated 52,097 wells in 2008.
- All operators will drill 4,291 exploratory wells of all types, down from an estimated 5,474 last year.
- The Baker Hughes Inc. count of active US rotary rigs will average 1,503 rigs/week this year, down from 1,867 in 2008 and 1,768 in 2007.
- Operator will drill 16,290 wells in western Canada, down from an estimated 17,703 wells in 2008.

States and rigs

The 2008 US rig count average of 1,879 compared with 1,850 in OGJ's January 2008 forecast and 1,840 in OGJ's July 2008 forecast.

Drilling peaks in the larger states and districts varied from July in West Texas Dist. 8 at 144 units through 90 rigs in North Dakota in the first three weeks in November.

The US total peaked at 2,031 rigs in the weeks ended Aug. 29 and Sept. 12, and the count had fallen to 1,589 by Jan. 9, latest available at this writing. By that time, drilling in the two East Texas districts had held up better than most other areas of the country.

Texas drilling peaked at 958 rigs the week ended Aug. 29 and by Jan. 9 fell to 713.

Operators conducted drilling operations at 186 wells in Alaska in 2008, of which 14 were exploratory wells. OGJ looks for 180 wells to be drilled there in 2009.

Before prices turned south, regulators struggled to keep up with the activity. Colorado, for example, expected to have issued 7,600 drilling permits in 2008 compared with more than 6,300 in 2007. OGJ estimates that only 3,825 wells were drilled in the state in 2008 and looks for a drop of about 18% in 2009.

A Bureau of Land Management decision allowing coalbed methane development in the Montana portion of the Powder River basin isn't expected to result in appreciable drilling in 2009.

Operators drilled 14 holes in Arizona

A LOOK AT 30 YEARS OF US WELL COMPLETIONS

Year	Total wells[1]	Total footage	Total explor–atory wells	Year	Total wells[1]	Total footage	Total explor–atory wells
[2]2009	43,384	268,721,000	4,291	1994	23,324	130,654,000	3,788
[2]2008	52,097	325,566,000	5,474	1993	26,032	138,509,000	3,604
[2]2007	47,057	279,001,000	3,833	1992	23,921	123,456,000	3,494
2006	49,375	289,959,000	3,696	1991	28,417	141,391,000	4,399
2005	44,679	254,844,000	3,727	1990	30,615	149,518,000	5,074
2004	39,051	213,908,000	3,192	1989	28,363	134,901,000	5,251
2003	30,487	158,221,000	2,593	1988	32,238	155,164,000	6,350
2002	27,794	145,055,000	2,271	1987	36,253	163,848,000	6,903
2001	36,061	184,462,000	3,181	1986	39,015	177,641,000	7,156
2000	31,261	149,848,000	2,517	1985	70,806	316,778,000	12,208
1999	22,107	109,854,000	2,141	1984	84,983	368,796,000	15,138
1998	25,822	143,625,000	2,723	1983	75,738	316,617,464	13,845
1997	30,208	165,480,000	3,353	1982	83,889	375,382,919	15,882
1996	25,724	138,588,000	3,364	1981	89,234	406,520,453	17,430
1995	23,061	124,426,000	3,406	1980	69,486	311,444,837	12,870

Well counts in most recent years subject to reporting lag. [2]Estimated.
Source: 1975-2006 American Petroleum Institute.

OIL & GAS JOURNAL WELL FORECAST FOR 2009

State	2008 estimate Total comp.	Explor–atory wells	Field wells	Total ft (1,000)	2009 forecast Total comp.	Explor–atory wells	Field wells
Alabama	471	26	445	2,033	377	19	358
Alaska	186	14	172	1,226	180	15	165
Arizona	1	1	0	5	1	1	0
Arkansas	950	167	783	6,359	855	146	709
California land	3,155	117	3,038	7,960	2,775	97	2,678
California offshore	8	0	8	49	5	0	5
Colorado	3,825	1,056	2,769	23,053	3,135	821	2,314
Illinois	380	120	260	914	325	98	227
Indiana	130	41	89	196	112	33	79
Kansas	2,505	195	2,310	8,570	2,180	157	2,023
Kentucky	965	36	929	2,679	850	28	822
Louisiana	2,320	221	2,541	21,095	1,935	180	1,755
North	1,350	128	1,222	11,723	1,110	117	993
South	475	25	450	4,712	415	20	395
Offshore	495	68	427	4,660	410	43	367
Maryland	1	1	0	8	1	1	0
Michigan	490	85	405	801	415	65	350
Mississippi	250	24	226	2,242	202	18	184
Missouri	110	0	110	113	2	2	0
Montana	709	95	614	4,480	600	76	524
Nebraska	57	15	42	280	48	11	37
Nevada	5	1	4	35	2	2	0
New Mexico - East	1,145	79	1,066	9,090	925	58	867
New Mexico - West	915	15	900	5,409	750	11	739
New York	105	3	102	387	81	2	79
North Dakota	920	210	710	10,622	780	160	620
Ohio	1,155	114	1,041	4,813	965	85	880
Oklahoma	4,025	193	3,832	29,242	3,461	152	3,309
Pennsylvania	4,250	378	3,872	14,399	3,570	361	3,209
South Dakota	55	7	48	210	45	5	40
Tennessee	188	64	124	422	155	45	110
Texas	15,905	1,465	14,352	133,288	12,746	1,092	11,654
Dist. 1	605	54	463	3,879	480	40	440
Dist. 2	820	134	686	7,577	650	95	555
Dist. 3	950	131	819	8,122	755	91	664
Dist. 4	1,440	132	1,308	14,141	1,150	104	1,046
Dist. 5	1,775	67	1,708	19,434	1,340	46	1,294
Dist. 6	1,740	218	1,522	18,021	1,305	154	1,151
Dist. 7-B	1,240	52	1,188	7,762	995	42	953
Dist. 7-C	1,605	87	1,518	12,057	1,290	63	1,227
Dist. 8	2,160	132	2,028	14,489	1,925	112	1,813
Dist. 8-A	905	90	815	4,997	725	70	655
Dist. 9	1,255	34	1,221	7,844	1,005	32	973
Dist. 10	1,320	305	1,015	14,025	1,050	222	828
Offshore	90	29	61	940	76	21	55
Utah	1,160	234	926	9,103	985	186	799
Virginia	595	69	526	1,582	535	56	479
Washington	1	1	0	15	1	1	0
West Virginia	2,010	285	1,725	8,878	1,610	193	1,417
Wyoming	3,150	142	3,008	16,008	2,775	114	2,661
US total	**52,097**	**5,474**	**46,535**	**325,566**	**43,384**	**4,291**	**39,093**
Western Canada	17,703	3,581	14,122	59,920	16,290	3,258	13,032
Alberta	12,906	2,542	10,364	50,721	11,900	2,309	9,591
Saskatchewan	3,590	682	2,908	244	3,240	606	2,634
Brit. Columbia	877	317	560	7,801	860	308	552
Manitoba	330	40	290	1,154	290	35	255
NWT-Yukon	27	22	5	179	16	13	3
Eastern offshore	7	2	5	47	5	2	3
Eastern land	65	7	58	130	49	5	44

in 2008, and only one was an oil and gas test. The others are in a carbon dioxide delineation program near St. Johns in Apache County.

Canadian drilling

OGJ looks for a 7.8% drop in Canadian drilling in 2009, far less of a falloff than in the US.

The Canadian Association of Oilwell Drilling Contractors estimated that Canada's rig count will average 348 this year, a drop of 6% from 2008.

Horizontal drilling in shale gas plays in Northeast British Columbia and in the Bakken shale oil play in the Saskatchewan portion of the Williston basin are expected to markedly extend the average footage of Canadian wells, the group said.

International drilling

The "international" rig count, incorporating North America for the first time, didn't vary much throughout 2008, Baker Hughes reported.

However, the number of rigs working internationally outside the US and Canada averaged 3,346 in January-November 2008 compared with 3,107 in the same period of 2007.

Busy spots outside the US and Canada on the November 2008 count were Mexico with 78 land rigs and 29 marine units active, Saudi Arabia with 64 land rigs and 12 offshore units, and India with 55 land rigs and 27 offshore units.

Indonesia was running 46 land rigs and 15 offshore units, and Oman had 54 land rigs operating.

In Latin America, Argentina had 77 land rigs and one offshore unit running, Venezuela 68 land rigs and 12 water units, Brazil had 29 land rigs and 30 offshore rigs, and Colombia had 42 land rigs.

In Africa, Egypt led with 45 land rigs and 10 offshore rigs, while Algeria had 25 land rigs at work. Operators mobilized 14 land rigs and one offshore unit in Libya.

Twenty-three offshore rigs and 2 land units were working in the UK. ✦

Mulva: US should pursue comprehensive energy strategy

Nick Snow
Washington Editor

Broader economic problems should not keep the US from pursuing comprehensive energy and environmental strategies, according to ConocoPhillips Chief Executive Officer James J. Mulva.

"A year or 6 months ago, with gasoline prices triple what they are today, energy security was on the A-list of vital issues. So was climate change," Mulva told a luncheon audience Jan. 13 at the National Press Club. "Now, they have taken a back seat, replaced by new challenges," he said.

"But complex issues are often interrelated. For example, by restricting energy development at home, we export dollars for oil imports which means we also export jobs. The trade balance worsens. The dollar weakens. Government tax revenues fall. Otherwise minor geopolitical events in oil producing regions become urgent strategic threats," Mulva said.

President-elect Barack H. Obama's plan to create a Green Energy Economy makes long-term strategic, environmental, and economic sense, Mulva noted, adding that policymakers should be realistic about green energy's costs and the time it will take to develop these technologies.

"Our economy requires readily available energy today, not just the promise of it 10 or 20 years from now. This energy must be reasonably and competitively priced when compared to energy costs in other countries. Finally, we must avoid inadvertently creating unattainable public expectations. An energy transition will not occur overnight, at little cost and with no inconvenience," the executive said.

Four principles

Mulva said a comprehensive US energy and environmental policy should incorporate four principles: broadly diverse supplies, greater energy efficiency, technological innovation, and sound environmental stewardship, including addressing climate change.

"ConocoPhillips strongly supports development of alternative and renewable sources such as solar, wind, and geothermal power, biofuels and others. But…we also need more fossil fuels (oil, natural gas, and coal) as well as nuclear power. Alternative energy cannot come online fast enough at the scale required to replace these sources, not for decades to come. So the US must encourage more domestic oil and natural gas development. It could easily do so by opening for exploration some of the promising areas that are now off-limits. The public overwhelmingly agrees," he said.

A comprehensive US energy and environmental policy also should encourage development of nontraditional fossil fuels such as oil sands, oil shale, and gas hydrates, according to Mulva. Canada's oil sands are one of the world's largest hydrocarbon deposits, holding more than eight times current US reserves, and new technology could increase available volumes, he said.

"The US is the logical market for this oil. It already flows to refineries in the Midwest for processing. It creates domestic jobs, generates income and tax revenue, and increases regional fuel supplies. But there are some who want to stop this oil from coming here. They object to its carbon intensity and the impact of development," Mulva said.

"Canada and its citizens have already weighed the pros and cons. They are devising environmental standards that will account for the resulting greenhouse gas emissions. So the oil sands will be developed. Either we can bring this oil here to the US from a secure and friendly source, or watch it go to other countries instead," he said.

Energy efficiency

Improving US energy efficiency also is an important element of a comprehensive policy, the executive said. While the US has doubled its economic output per unit of energy consumed since the 1970s, it can still do more, he noted.

"This past summer, when gasoline prices went past $4/gal, the issue was supply. One of the best ways to address this question is to use less, which also has a positive impact on global climate change," Mulva said.

Any major new policy also will

"Our economy requires readily available energy today, not just the promise of it 10 or 20 years from now. This energy must be reasonably and competitively priced when compared to energy costs in other countries. Finally, we must avoid inadvertently creating unattainable public expectations. An energy transition will not occur overnight, at little cost and with no inconvenience." — ***ConocoPhillips CEO James J. Mulva***

GAO report sees duplications

The US Department of Energy should formally assess whether its oil and gas research and development projects would not have occurred without federal funding, the Government Accountability Office has recommended in a new report.

The Jan. 9 report examined a program that has shrunk dramatically over several years despite having developed technologies that significantly improved domestic exploration and production.

It noted that the US oil and gas industry spent at least $20 billion on R&D from 1997 through 2006, with a current focus mostly on near-term (within about 2 years) production challenges. It also said DOE spent roughly $1 billion on oil and gas R&D during the same period on both near and long-term projects.

Funding grew in fiscal 2007 and 2008 because Section 999 of the 2005 Energy Policy Act (EPACT) makes about $50 million/year available over 10 years and assigns 75% of that amount to a consortium of universities, industry groups, and independent research organizations, GAO said.

Under EPACT, DOE is charged with maximizing the value of US oil and gas resources by increasing supplies, reducing E&P costs, and minimizing environmental impacts, GAO said.

'Hundreds of projects'

"Overall, since 1997, DOE's funds have supported hundreds of near-term projects" including advanced drilling tools, resource imaging devices, enhanced oil recovery, and environmental protection, according to the report.

It said DOE relies on its knowledge of the oil and gas industry's R&D and uses a project selection process to ensure that its programs support the industry. But DOE does not assess whether the industry would conduct this R&D without federal support, GAO said.

"Such an assessment is not made because DOE's screening criteria do not specifically require this type of evaluation. Despite the lack of an assessment, DOE officials continue to believe that DOE's oil and gas R&D activities only minimally duplicate industry's R&D activities because of their extensive interaction with industry," the report said.

Methane hydrates exception

The report said that for several years the White House Office of Management and Budget has expressed concern that DOE's oil and gas R&D backs projects comparable to industry efforts. "However, OMB specifically acknowledged that [DOE's] methane hydrates [research] program is an exception that can provide a unique contribution," the report continued.

GAO also said it found instances where DOE funds near-term oil and gas R&D that companies would be unlikely to underwrite. For example, it said DOE worked with the US Bureau of Land Management on several projects to monitor impacts of oil and gas activity on wildlife, groundwater, and surface water in the Powder River basin.

The congressional watchdog service's evaluation affirms that more federally backed oil and gas R&D appears unlikely unless it's for longer-term projects, however. Producers obviously will need to work harder for R&D funding from other sources. ✦

need to encourage energy research and development, he said. The oil and gas industry already is making substantial investments and the government can encourage further R&D by granting incentives, he suggested.

Mulva also recommended that government funding concentrate on technologies with long lead times or highly advanced science on which the oil and gas industry can't focus. "We also would benefit too from greater support of the educational system, particularly in the scientific and engineering disciplines. Otherwise, we anticipate a severe shortage of industry technical personnel in the future," he said.

These priorities must be achieved with full environmental and economic awareness, which includes addressing global climate change, Mulva said. "We believe that the public will not allow new energy development unless the resulting carbon impact is addressed. Conversely, the public will not favor reductions in carbon emissions if, as a result, energy prices are forced upward too much or too fast. Both issues must be addressed together," he said.

A transparent process

Whether with a carbon tax or a cap-and-trade system, addressing global climate change will be costly, making a transparent policy development process essential, Mulva said. "We think the science is quite clear. We also think it's going to take a lot of commitment and a lot of adjustment. That's why it's important to keep talking about these issues. The train is leaving the station. People are forming their opinions," he said.

Mulva said ConocoPhillips belongs to the US Climate Action Partnership, which plans to release its comprehensive climate policy recommendations on Jan. 15. "They should convey a high degree of credibility and merit because of the broad and diverse membership of USCAP. It includes manufacturers of products from cars to medical devices to pharmaceuticals. There are energy producers and electric utilities. There

are companies engaged in mining, financial services and consulting. There are prominent environmental organizations," he said.

"In short, there is broad representation of business and industry, and of the environmental community. So the consensus recommendations are neither a one-sided, proindustry approach nor simply a proenvironment approach. They are balanced. They can and should serve as a guide to Congress as it crafts climate policy," Mulva said.

He noted that oil and gas executives consider prices in preparing budgets because of their potential cash flow impacts. But other factors also have an influence, including difficulty in obtaining permits for production and infrastructure improvements that has affected ConocoPhillips operations in the US, he said.

"Oil prices went up too quickly last summer. We also recognize that the economic recession since then has had an impact and brought prices down. We think today's prices will produce a response. We also think they need to be somewhat better to produce the necessary investments," Mulva said. ✦

Appeals court backs earlier Kerr-McGee deepwater ruling

Nick Snow
Washington Editor

A federal appeals court affirmed on Jan. 12 a US district court's ruling that Kerr-McGee Oil & Gas Corp. should not have to pay royalties on eight Gulf of Mexico deepwater leases from 1996 to 2000 despite price thresholds imposed by the US Department of the Interior.

Kerr-McGee, now part of Anadarko Petroleum Corp., argued that it should not have to pay royalties even though natural gas produced from the leases exceeded the leases' inflation-adjusted price threshold in 2003 because volume thresholds had not been reached. Congress established the thresholds as part of the 1995 Outer Continental Shelf Deepwater Royalty Relief Act that was designed to promote OCS exploration and production in deep water.

DOI disagrees with the US Fifth Circuit Court of Appeals ruling and is exploring every option, including appealing and continuing to work with Congress to resolve the matter, a spokesman told OGJ on Jan. 13.

"As we have said before, if the court's interpretation of Congress's action in 1995 is correct, certain leaseholders will be able to produce massive amounts of oil and gas without paying royalties to the United States without regard to the price, perhaps amounting to one of the biggest giveaways of federal resources by Congress in modern history," he said.

An Anadarko spokesman said on Jan. 13 that the appeals court's affirmation upheld clear congressional intent to assure that producers were afforded the royalty treatment granted as encouragement to make huge investments in the deepwater gulf.

Continued value

"The Deepwater Royalty Relief Act continues to provide value for American consumers in the form of energy that we and other deepwater operators have produced as well as the jobs that have been created and government revenue that has been enhanced through taxes paid, upfront bonuses paid, and record-setting lease sales," the Anadarko spokesman said.

Two oil and gas trade associations on Jan. 13 also applauded the US Fifth Circuit Court of Appeals ruling. The panel of judges unanimously affirmed that Congress established only a volume, and not a price, threshold when it passed the Deepwater Royalty Relief Act, said American Petroleum Institute Pres. Jack N. Gerard.

"That act was passed at a time of historically low crude oil prices as a means to increase production and sustain jobs in a struggling industry. It was enormously successful, helping to boost Gulf of Mexico production by 50% in less than a decade. This production, which Congress considered would likely remain in the ground for years without the royalty relief program, helps reduce our dependence on foreign oil and keep jobs at home," Gerard said.

The decision also ensures that the federal government's executive branch does not overstep authority it receives from Congress, said Independent Petroleum Association of America Pres. Barry Russell. The ruling upholds the US Constitutions system of checks and balances, he said.

"The intent of Congress with the Deepwater Royalty Relief Act was to provide an incentive for companies to obtain royalty relief based on the volumes of crude oil and natural gas produced, rather than on a price threshold. [DOI] subsequently installed a price threshold that would determine when those incentives would cease. The circuit court has now found the Interior Department's actions to be outside the scope of the law," Russell said. ✦

Panama popping with possibility

Panama has been out of the news for a while, but the oil and gas industry has plans for the place, and those plans are moving ahead smartly.

Panama's trade and industry ministry recently said that studies are almost finished for the construction of a 350,000 b/d refinery at Puerto Armuelles, about 550 km west of Panama City.

In 2007, the Panamanian government agreed to cooperate with Qatar Petroleum and Occidental Petroleum Corp. in the project, then valued at $7 billion, and the two companies commissioned Foster Wheeler Ltd. to conduct the studies.

Since then, Tesoro Corp. has entered the country with a throughput agreement that will allow the company to transport crude oil through a pipeline owned by Petroterminal de Panama (PTP).

Last May, PTP unveiled a plan to reverse the flow of its 130-km trans-Panamanian pipeline, built in 1982 to allow Alaska North Slope (ANS) crude to be shipped to US Gulf Coast refineries.

Mothballed line

The 800,000 b/d line was mothballed in 1996 as falling Alaskan oil production made ANS crude noncompetitive on the Gulf Coast. Eventually, PTP got the idea of reversing the line to allow oil from the Atlantic to be pumped to the Pacific.

The idea may have come from Venezuelan President Hugo Chavez, who once expressed interest in using the PTP pipeline to help ship his country's crude to China as a way of diversifying exports away from the US.

Chavez is out of the picture now, and PTP expects the reversal project to be ready for start-up during the third quarter of 2009.

The proposed reversal could shave 30 days off the transport of a crude cargo from West Africa to a US West Coast refinery—an idea that struck home with Tesoro.

Tesoro's agreement

After the completion of the project, Tesoro has agreed to ship 107,000 b/d of crude through the pipeline under a 7-year agreement.

The throughput agreement will allow Tesoro to economically deliver crude produced in Africa, the Atlantic region of South America, and the North Sea to the company's five Pacific Rim waterborne refineries.

Tesoro leases existing tankage from PTP but, in an added development, PTP is building dedicated tanks for Tesoro on both sides of the Isthmus of Panama, scheduled to be online in early 2010.

In September, PTP awarded CB&I, The Woodlands, Tex., a contract worth more than $40 million to design, fabricate, and construct petroleum storage tanks associated with the Trans-Panama Pipeline Expansion Project.

The tanks will be built at Chiriqui Grande on the Atlantic Coast and Puerto Armuelles on the Pacific Coast. Tesoro plans to use the pipeline and tanks to blend and distribute different grades of crude for its own use.

Not surprisingly, Tesoro Chairman, Pres., and Chief Executive Bruce Smith said, "This project is consistent with our strategic goal to increase optionality around crude oil selection." ✦

INGAA: Wider economic pressures could hamper gas pipeline financing

Nick Snow
Washington Editor

While US natural gas pipelines remain financially strong, broader economic conditions could challenge their ability to raise money to expand and maintain their systems, the Interstate Natural Gas Association of America warned on Jan. 14.

"The industry's ability to continue to invest in safe, reliable energy infrastructure is challenged by an inability to access capital on reasonable terms," INGAA Pres. Donald F. Santa said in a Jan. 14 letter to President-elect Barack H. Obama.

"Consequently, like other capital-intensive segments of the economy whose growth depends on access to external financing, the interstate natural gas pipeline industry would benefit from [a] tax policy that promoted investment in infrastructure, plant, and equipment," Santa said.

Accelerated depreciation, investment tax credits, and a reduced dividend tax rate could be part of such a policy, he said.

Santa noted that as transportation service providers, INGAA members "take great interest in the discussions concerning energy infrastructure in the upcoming economic stimulus legislation and future energy legislation."

Low-emission backup

Natural gas is in a position to play a significant role as the US makes the transition to a lower-carbon economy and complements renewable technologies such as wind and solar power by providing low-emission back-up generation, according to Santa.

Gas pipeline construction has increased dramatically in response to booming domestic supply develop-

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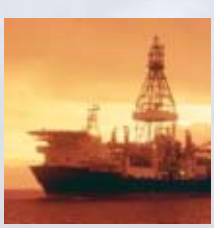

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ment, he added. "The interstate pipeline industry has invested $51 billion already in this decade to maintain and expand the US natural gas transmission network," Santa said, adding that 2008 likely will represent the largest single-year increase in gas pipeline capacity since the 1960s.

Santa said the US Federal Energy Regulatory Commission's regulatory regime for authorizing new pipeline construction and the pipeline rate certainty provided by the Natural Gas Act have been instrumental in this infrastructure development.

"While we do not believe that the natural gas pipeline industry needs federal funds to continue our infrastructure expansion and upgrades, we do believe that maintaining this regulatory certainty will be essential to raising additional private capital," he said.

The INGAA official specifically questioned proposals to change the Natural Gas Act by decentralizing the process for authorizing new pipeline construction and alter the ratemaking regime, which he said would place future and existing pipeline investments at greater risk.

"We urge policymakers to avoid changes to the pipeline regulatory program that would increase the cost of capital for, and drive investment away from, new natural gas pipeline infrastructure," Santa said. ✦

Petrobras keeping 5-year plan under wraps

Eric Watkins
Oil Diplomacy Editor

The long-awaited 5-year strategic plan spanning 2009-13 for Brazil's Petroleo Brasilerio SA (Petrobras)—already delayed several times—will be assessed by the company's board at the end of January, according to Paulo Roberto Costa, downstream director.

"We usually present our strategic plan to the board in September, but due to market volatility, the board requested a more detailed plan, which will be presented at the end of January," said Costa, referring to a meeting of the company's board scheduled for Jan. 23.

Meanwhile, Petrobras financial and investor relations director Almir Barbassa, refuting analysts' forecasts that Petrobras would issue debt in the next few days, said the firm will launch a bond issue only after it defines and announces the company's strategic plan for 2009-13.

Petrobras initially said it would announce the investment plan at the start of September. It then delayed the date to the beginning of October and then to the second half of October.

The firm then said its announcement would be made before yearend 2008, but even that date slid as company executives pondered the growing impact of the worldwide financial crisis on company projections.

In December, company president Sergio Gabrielli finally said that the announcement of the 5-year strategic plan would have to be pushed back yet again as the 2009 corporate budget was still being worked out.

At the time, Gabrielli said that investment in 2009 should total around 55 billion reais ($23 billion), a figure larger than that spent in 2008, but well below the 72 billion reais ($30 billion) Petrobras first presented to lawmakers in August.

"In the last 6 months, we saw a gigantic variation in oil prices," Gabrielli said in December. "We discussed the problems with making projections for [oil] prices and costs, so it was decided to wait [on the strategic plan] until there was greater clarity," he said.

At the time, Gabrielli said the enormous drop in international oil prices—from $150/bbl in August to just over $40/bbl in December—surprised company executives. "We knew that the price of oil was going to fall, but we didn't imagine it would be by so much," he said.

Despite the decline in international oil prices, Gabrielli said development of the company's promising subsalt oil reserves was still viable at current levels. "Given the actual international oil prices, the subsalt is viable," Gabrielli said, explaining that the board's decision was based on oil prices between $40-50/bbl. ✦

NOIA, other trade groups voice support for leasing off Virginia

Paula Dittrick
Senior Staff Writer

The National Ocean Industries Association and seven other industry trade groups issued a statement supporting the US Mineral Management Service's formal solicitation of comments about leasing off Virginia.

Virginia Gov. Timothy M. Kaine and other state officials indicated an interest in limited development off Virginia's coast. For decades, federal law limited Outer Continental Shelf leasing to parts of the Gulf of Mexico and Alaska.

The public comment period for initial information gathering for a proposed OCS Lease Sale 220 ended Jan. 13. The comment period had been extended from an initial deadline of Dec. 29, 2008.

The call for information does not indicate a decision to hold a lease sale, MMS said. Rather, the comment period

marks the first step in a multiyear process to decide whether to hold a sale, which is proposed for 2011.

During that comment period, NOIA and other trade organizations suggested MMS consider including the entire Mid-Atlantic OCS Planning Area for lease.

Trade groups involved

The comment was signed by representatives from NOIA, American Petroleum Institute, American Exploration & Production Council, Independent Petroleum Association of America, the International Association of Drilling Contractors, Petroleum Equipment Suppliers Association, International Association of Geophysical Contractors, and the US Oil & Gas Association.

"While we support leasing in the area identified in the notice, we strongly urge that the area identified for analysis be increased to include all of the Atlantic OCS planning areas, or at least the entire Mid-Atlantic planning area," said a Dec. 14 comment to the MMS from the groups.

An expansion of the area identified for analysis in the notice would allow MMS to gather information for the entire Mid-Atlantic planning area, the groups said. This information would be useful to MMS, to communities involved, and to industry in making decisions on future resource allocations, the groups said.

They also urged that the 50-mile coastal buffer zone be eliminated and that any future environmental impact statement to be done on proposed Lease Sale 220 consider what the groups called the oil and gas industry's "exemplary environmental and safety record."

There has not been a major spill of any type from an OCS production platform in nearly 30 years, the groups said.

The MMS 5-year leasing plan includes a setback of 50 miles from the coast. But the industry groups said they believe all areas of the OCS should be available for leasing and development of oil and gas.

"These areas can be developed in an environmentally safe manner with a minimal impact on coastal communities. The industry uses advanced technologies to minimize the impact of offshore oil and natural gas developments on coastal areas," the groups said. "By using improvements in technology related to subsea completions and directional drilling, the industry is able to minimize or eliminate potential visual impacts associated with permanent offshore platforms and structures." ✦

Costs rise despite economic slowdown, analysts say

Despite the global recession, construction costs for upstream oil and gas facilities have reached a record high, as have those for the design and construction of refining and petrochemical projects, say IHS Inc. and Cambridge Energy Research Associates (CERA) in their most recent upstream capital costs index (UCCI) and downstream capital costs index (DCCI).

Similar in concept to the consumer price index, the UCCI and DCCI are proprietary measures of project cost inflation. They provide a benchmark for comparing global costs and draw upon IHS and CERA proprietary databases and analytical tools.

UCCI

Continued high activity levels and tightness in the upstream services and equipment markets across the board led upstream costs to increase 9.2% in the past 6 months—a rate 3.2% higher than the previous 6 months.

The latest increase raised the IHS-CERA UCCI to 230 points from its previous high of 210. The values are indexed to the year 2000, meaning that a piece of equipment that cost $100 in 2000 would cost $230 today.

Driven by high demand and escalating fuel prices, cost increases reached even higher points during July and August, but have moderated as of the end of the third quarter.

"Hidden in these substantial increases are the first signs of what may be a change in direction," said Daniel Yergin, CERA chairman and IHS executive vice-president. "Moderation in the last 2 months of the third quarter was a response to the unfolding financial crisis and the spending cutbacks and points to a precursor to a downward turn in the direction of the UCCI."

Of the seven localities tracked by the IHS-CERA UCCI, Asia, Russia, South America, and Africa saw the highest levels of cost change, registering increases of 11.8%, 10.3%, 10.3%, and 10.1%, respectively.

"Variations in cost escalation across regions over the past 6 months were most influenced by local activity levels, inflation, currency exchange rates, and steel costs," added Pritesh Patel, director for the capital costs analysis forum for upstream.

The increase was driven by a continued high level of upstream oil and gas activities and a marked increase in the cost of steel and subsea equipment. Upstream steel costs have grown by an unprecedented 32% from the first quarter to the third quarter because of raw material and scrap metal costs. Although significant compared with the 10% increase seen in the previous 6-month period, this increase is in line with the UCCI report issued 6 months ago.

Subsea equipment demand remains strong, with more deepwater developments planned—especially in South America and West Africa. Steel cost increases have added pressure to an already tight market, with an increase of 14% in the past 6 months, and there has been no change in lead times since the first quarter.

"This tight situation and the at-

tendant cost increases are generally expected to persist in the short term, as the market response in the oil and gas markets is primarily 'wait and see,'" added Patel. "However, there are forces at work that could create significant downward pressure on costs in the midterm, and possibly even the short term."

Patel noted that in certain market segments, supply and demand for services have begun to achieve balance and the global nature of the services and equipment industry means that oversupply in one area can quickly be used to address demand in others. In addition, the global economic crisis is putting the breaks on global oil demand, which was already decelerating in response to high prices.

DCCI

The DCCI rose to 187 points from 176 over the past 6 months—an increase of 6%. The values are indexed to the year 2000, and the index has risen 87% since then, meaning that a project that cost $100 in 2000 would cost $187 today.

"At the end of the third quarter, the impact of the slowing economy had just begun to affect the cost of construction materials," Yergin said. "General construction activity, even in the US, remained relatively strong and only slightly lower than total spending in the previous year, because strong nonresidential spending continued to offset the losses from residential construction. At the same time, demand for energy-related projects remained at high levels, continuing to constrain supply. However, the effects of the recession and the credit freeze will likely change the picture considerably in the months ahead."

"While some markets had significant increases, engineering and project management and labor both showed only small increases in the past 6 months, with any local inflation being offset by the recent strengthening of the US dollar," said Jackie Forrest, lead researcher for CERA's capital costs analysis forum for downstream.

Cost increases have been sustained by ongoing demand in the energy sectors; steep increases in the cost for carbon steel material, impacting the cost of manufactured goods made from carbon steel (structural beams, piping, and equipment); and high energy prices—West Texas Intermediate oil pricing averaging more than $120/bbl during the second and third quarters of 2008.

Of the 18 localities tracked by the DCCI, China and the US Gulf Coast saw the highest levels of cost change in the past 6 months, registering increases of 8.5% and 7.9%, respectively.

"Although the current credit crisis did little to slow construction costs this period, we expect growing credit issues and slower global growth to lead to lower costs for constructing downstream projects in the next period," Forrest said. "Credit issues will almost certainly have a growing and noticeable impact on future general construction activity in the United States and other regions."

Forest said, "It is important to note, however, that governments around the world are working hard to restore liquidity, and it still remains to be seen how far these measures will go in bridging the gap and providing the funding needed for the long list of general construction projects currently planned globally."

Construction levels for planned downstream projects are almost three times busier than the recent past, and although CERA does not expect all of these facilities to be built, the level of construction activity for downstream projects is projected to remain relatively strong until at least 2010 as existing, committed projects are under construction.

Past 2010, downstream project activity levels are expected to slow, with lower refining margins and lower expectations for economic growth working to slow plans for yet-to-be-started downstream projects. ✦

USAEE: US economic growth likely to be slight in 2009

Marilyn Radler
Senior Editor-Economics

The faltering economy and its effects on oil and gas production were among the main topics discussed at the December North American conference of the US Association for Energy Economics in New Orleans.

Dennis Lockhart, president and chief executive officer of the Federal Reserve Bank of Atlanta, gave the keynote speech and outlined his views on the current downturn in US economic activity. The Atlanta Fed expects employment to weaken further. Personal consumption and home values will decline over the next few months, while falling commodity prices, including oil prices, will ease global inflation pressure.

Lockhart said the Atlanta Fed expects little US economic growth in 2009, adding that recovery will require house price stability, consumer confidence, and credit market confidence.

Unconventional resources

Turning to oil and gas, the conference addressed unconventional resources—shale gas, oil sands, and oil shale—and the risks their development faces.

Marshall Carolus of Intek Inc. outlined some of the hurdles facing the development of US oil shale, a resource that totals 6 trillion bbl. One such hurdle is access to land, as about 70% of this oil shale lies beneath federal land. Environmental permitting is also an obstacle to development, as are low oil prices.

But conversion technologies for producing oil shale are advancing rapidly,

Carolus said. He added that sustained production potential for this resource in the US is up to 2.5 million b/d.

Deepwater gulf

Brian Reinsborough, president of Nexen Petroleum USA Inc., told the conference that the prospect for long-term oil demand growth is strong, which is one of the reasons his company operates in the deepwater Gulf of Mexico.

Also making the deepwater gulf attractive is the facts that it has large undiscovered resources and its fiscal regime is stable and attractive, among other reasons, Reinsborough said. Reinsborough added that there are challenges to operating there, including resource constraints as people and rigs move to operate in other parts of the world.

Independent operators will cut exploration and production activity as a result of lower oil and gas prices in the current recession, Reinsborough said, as those companies struggle with financing, while major operators will review their exploration plans, reduce costs, and exploit opportunities for mergers and acquisitions.

He sees the recession as being short-lived and says projects may slow in the short run, but deepwater projects are long-term focused. Assuming that capital is available to contract owners, deepwater rigs—which are still in short supply—will continue to drill, he said. ✦

BMI: Indonesian oil production decline to continue

Eric Watkins
Oil Diplomacy Editor

Indonesia will see a 17.5% decline in oil production by 2018, with the country's crude volumes falling steadily to 800,000 b/d, according to the most recent Indonesia Oil and Gas Report from analyst BMI.

In its report, BMI forecasts that Indonesia will account for 4.32% of Asia-Pacific regional oil demand by 2013, while providing 10.91% of its supply.

It said Asia-Pacific regional oil use of 21.4 million b/d in 2001 reached 25.68 million b/d in 2007. It should average 26.32 million b/d in 2008 and then rise to 29.65 million b/d by 2013.

Regarding natural gas, in 2007 the Asia-Pacific region consumed 421 billion cu m (bcm), with demand of 595 bcm targeted for 2013.

Production of 336 bcm in 2007 should reach 483 bcm in 2013, but implies net imports rising from 85 bcm/year in 2007 to 111 bcm in 2012.

Indonesia's share of gas consumption in 2007 was 8.04%, while its share of production was 19.87%.

By 2012 its share of gas consumption is forecast to be 7.47%, with the country accounting for 18% of supply.

Lower OPEC basket price

In third quarter 2008, BMI estimates that the Organization of Petroleum Exporting Countries' basket price averaged $113.60/bbl, down 3.4% from second quarter 2008. The OPEC basket price averaged $112.41/bbl in August and $97.16/bbl in September.

The estimated third-quarter 2008 average prices for the main marker blends are now $115.67/bbl for Brent crude, $117.22/bbl for West Texas Intermediate, and $113.43/bbl for Russian Urals (Mediterranean delivery).

BMI said its forecast for 2008 as a whole is unchanged from the last oil market report. "We are still assuming an OPEC basket price average of $110/bbl for 2008," the analyst said.

Based on recent price differentials, this implies Brent at $113.33/bbl, WTI averaging $114.58/bbl, and Urals at $110.36/bbl.

"Our central view is that the OPEC basket price will fall from $110/bbl in 2008 to $96[/bbl] in 2009, before settling around $90/bbl in 2010 onwards," BMI said.

Indonesian GDP growth

BMI forecasts Indonesian real gross domestic product growth at 6.1% for 2008, down from 6.3% in 2007.

"We foresee 5% growth in 2009, 5.2% in 2010, 5% in 2011, followed by 5.1% in 2012, and 5.5% in 2013," the analyst said.

Efforts are being made by the Indonesian authorities to encourage investment in new oil and gas supply, in order to stem the decline in production.

Numerous international oil companies work in partnership with national oil company Pertamina and the state.

"We are estimating oil and gas liquids production of no more than 930,000 b/d by 2013, although the country is expected to pump 975,000 b/d in 2008," BMI said.

Consumption on the rise

Consumption is forecast to increase by around 2.5%/year to 2013.

BMI said its estimates imply demand of 1.28 million b/d by the end of the forecast period. The import requirement would therefore be 350,000 b/d by 2013.

Gas production rising to an estimated 87 bcm by 2013 should provide end-period export potential of 43 bcm, with supply risk on the downside.

Oil consumption between 2007 and 2018 is set to increase by 22.1%, with growth slowing to an assumed 2%/year towards the end of the period and the country using 1.41 million b/d by 2018.

Gas production is expected to rise from around 67 bcm in 2007 to a possible 92 bcm by 2018.

With demand growth of 49%, this provides an export capability peaking at almost 48 bcm in 2012, before falling to 42 bcm by 2018, largely in the form of LNG. ✦

IRAQ'S E&D FUTURE—1

Iraq's oil prospects face political impediments

Tariq Shafiq
Petrolog & Associates
London

Iraq's proved reserves of 115 billion bbl are housed in some 80 oil fields (Fig. 1). Of these, seven oil fields have been fully developed and another 15 partly developed.

The remaining 58 fields rank between appraised or discovered but not yet delineated or appraised.

It should be noted, however, that there is a concentration of reserves in few fields. The seven largest fields, for example, Rumaila South and North, Kirkuk, East Baghdad, Majnoon, West Qurna, and Zubair, contain two-thirds of total reserves.

Iraq may prove to have the greatest endowed oil reserve base in the world, whose true extent has not as yet been fully explored or developed. Its proved reserves are 145.5 billion bbl of oil and its potential reserves are in excess of 215 billion bbl.

Its historically sustained optimum oil production level was 3.5 million b/d, while its production today is 2.5 million b/d. As such, Iraq's production capacity has always lagged its potential.

Finding cost

Until recently, 157 exploration wells were drilled in Iraq to investigate 116 structures, of which 122 wells were successful in finding oil or gas, proving reserves of some 145 billion bbl housed in the 80 fields.

Almost every oil field has multiple reservoirs. As a result, the drilling success rate is almost eight for 10, and the discovery rate is seven out of 10 (Fig. 2).

It is no surprise, therefore, that the finding cost has been less than 0.5¢/bbl in 1997 dollars. Allowing for inflation and as the search progresses into more difficult and deeper horizons and smaller oil fields, the finding cost would be higher, but it would still be a fraction of a dollar for a long time.

Development cost

According to the author's experience and based on the findings of the Petrolog & Associates 1997 study, average Iraq development cost at the field's boundary was of the order of $1,000/daily bbl; to erect facilities to produce a rate of 1 b/d for the foreseen future requires a capital investment of $1,000.

The cost runs from as low as $750 rising to $3,150/daily bbl, reflecting very high economy of scales though varying well productivity in the range of 4,000 b/d to 20,000 b/d in fields situated in rather plain unrugged land areas.

New development until a few years ago would have had a similar wide, though higher, cost range of up to $3,000/daily bbl for expansion and $5,000-6,000/daily bbl for grassroots oil field development. This higher cost would account for lower well productivity (500 b/d to 5,000 b/d), deeper and more difficult drilling conditions, shallow water in the marsh areas, and early application of water injection. However, the high inflationary trend over the last 2-3 years could have doubled this cost to $6,000 for expansion and $10,000-12,000 for grassroots oil field development. Oil field development cost still remains among the lowest worldwide.

In terms of cost per barrel, the finding and development costs in Iraq should be $1.50-2.25/bbl, the least expensive worldwide.

IRAQ OIL IN A GLOBAL CONTEXT

Table 1

Country or region	Production		Proved + 15% & potential	Oil resource base total, billion bbl
	Billion bbl	% total		
UAE	24	15.1	135	159 (55.5 from peak)
Kuwait	35.8	20.3	140	176 (55.2 from peak)
Iran	58.3	23.5	190	248 (65.7 from peak)
Iraq	30.5	8	380	410 (174 from peak)
Saudi Arabia	106.4	22.6	365	471 (129 from peak)
Middle East majors	255	17.4	1,209	1,464 (477 from peak)
World	1,016	34.1	1,964	2,980 (474 from peak)
World excluding Middle East majors	761	50.2	754	1,515 (–3.5 from peak)

Source: Petrolog & Associates

Table 1 summarizes Iraq's oil statistics in comparison with the other Middle East major producers and the contribution of each to the global energy market at the year beginning 2007.

Iraq's oil resource is on par with Saudi Arabia, but its resource base is the least depleted. Its resource provides the most oil reserves (174 billion bbl) prior to peak oil setting in post-midpoint reserves depletion.

It is, therefore, worthwhile to diagnose the impediments that have limited Iraq oil production to date to 2.5 million b/d while Saudi Arabia has managed, decades away, around 10 million b/d under a system of state monopoly.

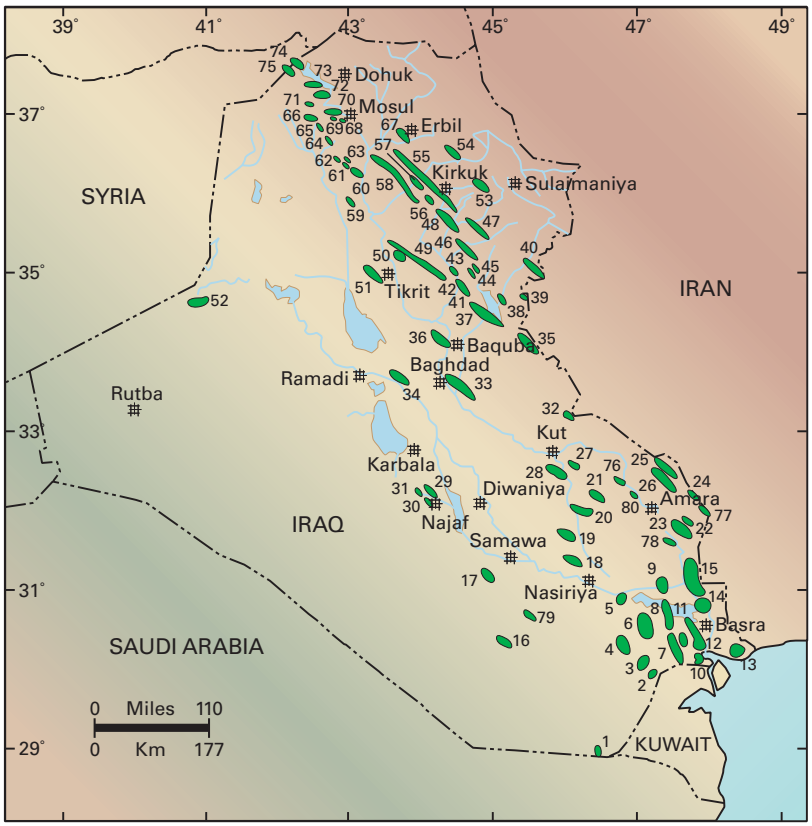
Iraq, as the table shows, has thus far produced only 8% of its oil source base while it has over 19% of the world reserves and over 31% of the total production of the Middle East major producers. Iraq's reserves shall provide the global energy market with the most reserves (174 billion bbl of oil) that defers the setting in of peak oil when world oil production starts declining. Such contribution to the global energy market is imminent.

Iraq's reserves shall provide the global energy market with the most reserves (174 billion bbl of oil) that defers the setting in of peak oil.

The table aims to provide a conceptual conclusion. It is based on: Published proved reserves for January 2007, oil recovery upgraded from world average of 35% to 50% which is within easy reach of today's technology, potential discovery in each country is assumed 20% of published proved reserves except Iraq, which is given Petrolog & Associates' researched estimate of 215 billion bbl.

LOCATION OF OIL STRUCTURES IN IRAQ

Fig. 1



1	Abu Khaima	21	Dujaila	41	Kashm al Ahmar	61	Majmah
2	Jerishan	22	Noor	42	Injana	62	Najman
3	Rachi	23	Halfaya	43	Judaida	63	Qasab
4	Luhais	24	Jabal Fauqi	44	Gilabat	64	Adaiyah
5	Subba	25	Abu Ghirab	45	Qamar	65	Ibrahim
6	Ratawi	26	Buzurgan	46	Pulkhana	66	Sasan
7	Rumaila S.	27	Dhafiriya	47	Kor Mor	67	Demir Dagh
8	Rumaila N.	28	Ahdab	48	Jambur	68	Qalian
9	W. Qurna	29	Kifl	49	Hamrin	69	Atshan
10	Safwan	30	W. Kifl	50	Saddam	70	Alan
11	Tuba	31	Marjan	51	W. Tikrit	71	Gusair
12	Zubair	32	Badra	52	Akkas	72	Butmah
13	Siba	33	E. Baghdad	53	Chemchemal	73	Ain Zalah
14	Nahr Umr	34	Falluja	54	Taq Taq	74	Mushorah
15	Majnoon	35	Naft Khaneh	55	Kirkuk	75	Sufaya
16	Salman	36	Balad	56	Khabbaz	76	Amara
17	Samawa	37	Mansuriya	57	Bai Hassan	77	Huwaiza
18	Nasiriya	38	Nau Duman	58	Qara Chauq	78	Rifae
19	Gharraf	39	Jaria Pika	59	Sadid	79	Diwan
20	Abu Amud (Rafidain)	40	Chia Surkh	60	Qaiyarah	80	Kumait

Vital concepts

Iraq's cumulative oil production is 30.5 billion bbl, only 8% of its oil resource base of 330-380 billion bbl (based on enhanced recovery).

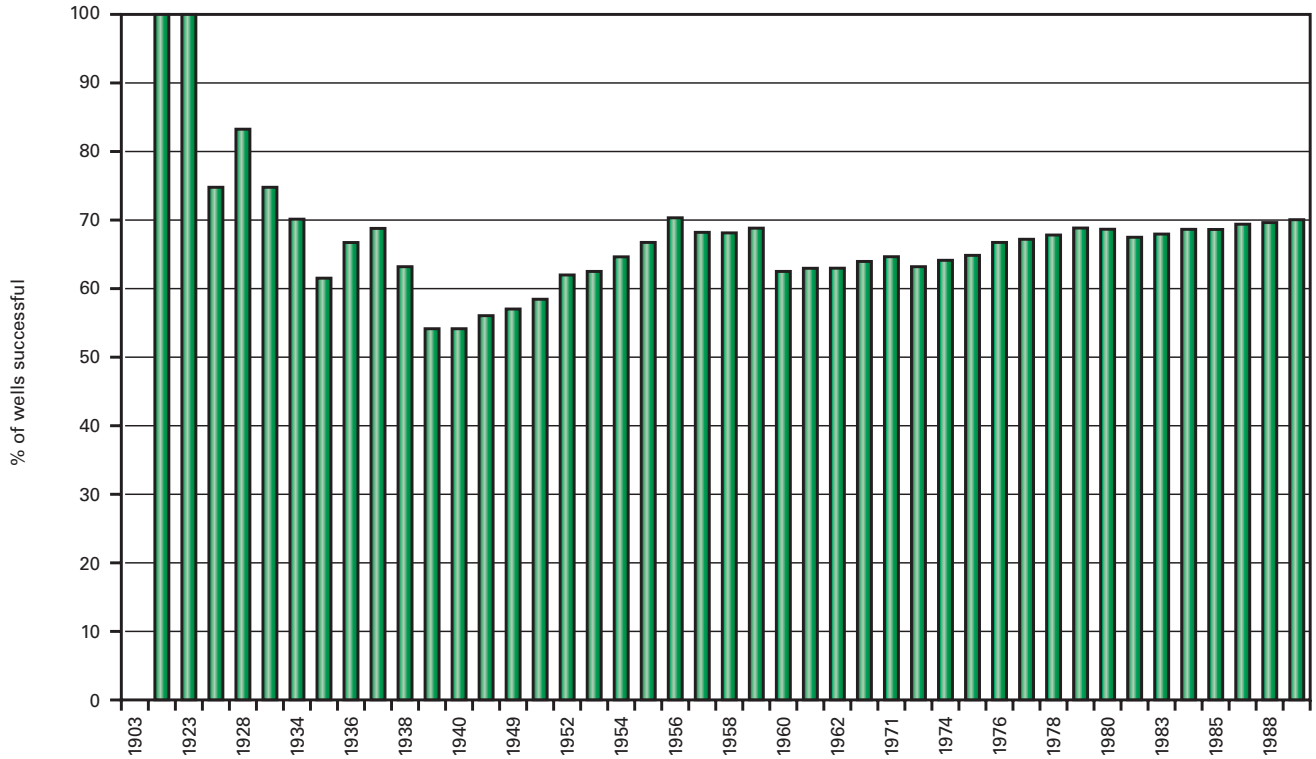
Iraq's proved reserves are 115 billion bbl, and its potential exceeds 215 billion bbl. These figures put it on par with Saudi Arabia. It would take Iraq 300 years to deplete its reserves at the production rate of 3 million b/d, 180 years at 5 million b/d, and 90 years at 10 million b/d.

Fast-track development is required but has not been achieved yet.

Iraq's present production is 2-2.5 million b/d, and its historical high is 3.5 million. Due to past and present

CUMULATIVE EXPLORATION SUCCESS RATES

Fig. 2



impediments, Iraq's developed production rates have always lagged its proved reserve capacity.

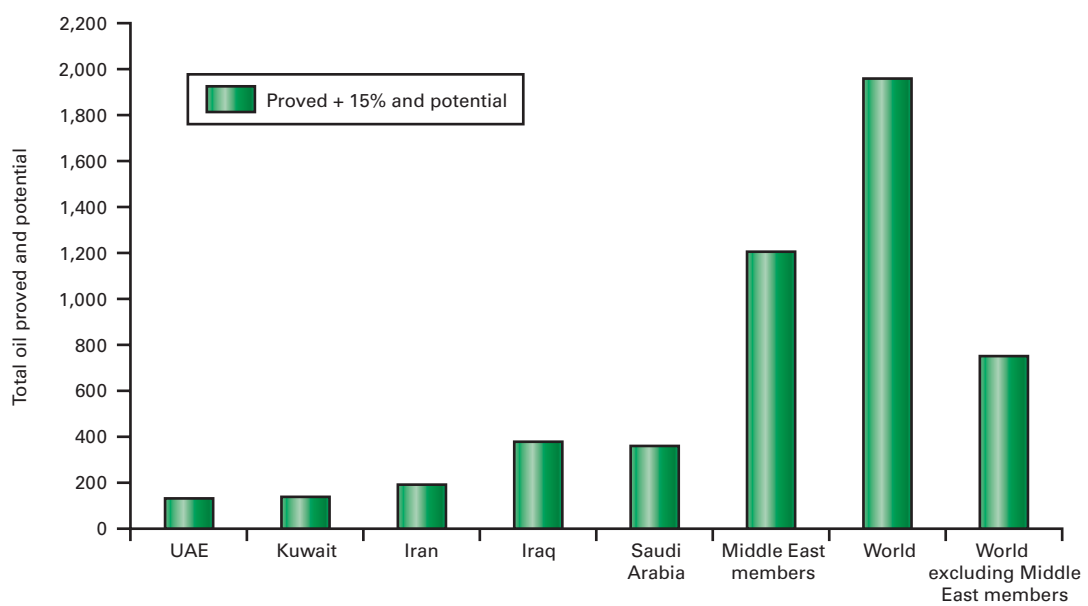
Iraq's priority, therefore, should be to rehabilitate its infrastructure, build capacity, and monetize reserves.

With ample proved reserves and the present low production rate, Iraq can develop a production plateau of 10 million b/d, which can be maintained for a decade without the need for additional new reserves. To start, it would take Iraq 1.5-2 decades to reach 10 million b/d.

Further exploration for reserves equates to additional frozen investment, generating no return. Exploration should be conducted to improve geological prospecting and enhanced development planning.

PROVED AND POTENTIAL OIL BY COUNTRY OR REGION

Fig. 3



The policy of granting wholesale exploration contracts of the latest amended draft petroleum law, based on controversial long-term contracts, is unnecessary and divisive. Announced at this time, when the country is in desperate need for peace within its factions, is most unwise.

Iraq's recovery factor has averaged 25-31%, while technology elsewhere has achieved 50-60% and 70% is the target. The Iraq of today lacks state-of-the-art technology and management know-how, due to years of war, sanctions, and lately, occupation, terror, and failing infrastructure and institutions.

Clearly, Iraq requires international oil company support. The question is, on what contract model basis, whether production-sharing agreement or service contracts for know-how, with or without investment?

Iraq's present proved reserves could support a production rate in excess of 12 million b/d.

Iraq is a founding member of OPEC and rightly adopts a policy of crude oil price stabilization and conservation. An open exploration and production policy under contracts employing IOCs' technical support as well as their capital investment would create the problem of having to cap exports while investing. IOCs require unrestricted production. Service or management contracts employing IOCs latest technology and management with remuneration choice in cash or kind suggests itself as an appropriate model.

Iraq's present proved reserves could support a production rate in excess of 12 million b/d as potential reserves are discovered and developed to sustain the plateau. Today, however, Iraq's production facilities are dilapidated, looted, sabotaged, or war-torn, to the extent that in September 2003, its production rate sank to around 1 million b/d from a prewar rate in March 2003 of 2.8 million b/d.

Rehabilitation of infrastructure and monetizing reserves should, therefore, be the priority.

Iraq's enormous proved reserves and potential make it the only major Middle East member with relatively untapped and inexpensive oil resources. At the same time, it raises an alarm amongst Iraqis, fearing continuing occupation and interference in the country's political and economic future.

Iraqis have lived and seen all the major Middle East member producers for 4 decades of state control of oil exploration and development with pivotal if not total role given to their national oil companies.

No doubt privatization rubs against the skin of Iraqis.

Next: Impediments to progress in exploiting Iraq's world-class oil resource. ✦

Discoveries boost output on Fell Block in Chile

GeoPark Holdings Ltd., Buenos Aires, said it is completing its $57 million 2008 capital program on the 440,000-acre Fell Block in southern Chile's Austral basin.

GeoPark said it ended 2008 with production of 6,250 boed. Earlier this year the company said more than 90% of its output, 77% of which is gas, comes from the Fell Block.

The company drilled 14 wells, shot 3D seismic, expanded pipelines, and placed nine wells on production, including four new field discoveries. Most recent to go on production are Aonikenk oil field and Manekenk gas field.

The Manekenk discovery well tested at 7.3 MMcfd of gas, 102 b/d of condensate, and 20 b/d of water, natural, from Cretaceous Springhill at 2,951 m.

Three wells recently drilled and cased will be tested in the first quarter of 2009.

GeoPark began production on the Fell Block in 2006 from Molino, Ovejero, and Nika gas-condensate fields. ✦

Argentina

Otto Energy Ltd., Perth, finalized a farmout from Oromin Explorations Ltd., Vancouver, BC, on the 7,694-sq km Santa Rosa Block in Argentina's Cuyana basin.

Oromin approved the exploration work program and $4.1 million budget and plans to start drilling in the first half of 2009. The block lies east of the basin's oil and gas producing area.

Otto is to obtain a 32.48% indirect working interest by funding the first $1.4 million of spending. It will contribute its pro-rata share thereafter.

Gabon

Italy's Eni acquired rights to six exploration licenses totaling more than 8,000 sq km in Gabon.

The D3 and D4 blocks are in shallow water in the North Gabonese basin, and the E2, F3, F4, and F7 blocks are in the country's onshore basin.

The licenses have 4-year initial terms followed by 4-year and 3-year options.

Iran

Italy's Eni SpA will conduct third phase development of Darkhowain oil field north of Abadan in southwestern Iran, said press reports that quoted a top National Iranian Oil Co. official.

With third-phase development, Darkowain's output will rise to 160,000 b/d from 100,000 b/d at present, the official said (see map, OGJ, Jan. 7,

2008, p. 34). Eni, which operates the field's second-phase expansion, hadn't confirmed the report on its web site by Jan. 9.

NIOC discovered the field in 1978 and began developing it in 1997.

Tajikistan

Tethys Petroleum Ltd. assumed operation of the East Olimtoi-09 exploration well on the Bokhtar production sharing contract area in Tajikistan. Projected to 12,467 ft, the well has been drilled to 6,605 ft.

The well is to test a structure mapped on the edge of a salt dome in the Kulob megasynclinorium in the southeastern part of the PSC just north of the Panj River that forms the border with Afghanistan. It targets oil and gas in the Lower Paleogene Bukhara and Alay formations that are productive nearby.

Tethys also tested gas at rates estimated at as much as 2.8 MMcfd on a 30/64-in. choke with 588 psig flowing tubinghead pressure from the No. 22 well in Khoja Sartez gas-condensate field.

Ukraine

The Kashtan Petroleum Joint Venture plans to further redevelop Lelyaki oil field in Ukraine in 2009.

The most recent work involved Well 307, drilled to 1,960 m. It encountered oil-saturated porous zones of 5 m measured depth in the lowermost K zone and 8.6 m MD in the P1+P2 dolomite zone. Completed in the K zone, it is averaging 284 b/d of oil, of which 128 b/d is net to participant Shelton Canada Corp., Calgary.

Shelton's net production from Lelyaki exceeds 400 b/d of 41° gravity oil. Wells 304A and 308 are to be drilled next, and four other suspended wells are to be reentered and sidetracked in 2009 at a much lower capital cost than new drilling.

New Brunswick

Contact Exploration Inc., Calgary, placed the N-78-2328 well at New Brunswick's Stoney Creek field on production at 30 b/d of oil at a drawdown estimated at 15% of near-virgin pressure.

The well, on which the first modern frac in the field was run on Dec. 9-10, 2008, was swabbed at rates as high as 200 b/d after the frac.

Contact, with 100% interest, drilled the well to TD 1,115 m through the Hiram Brook, Fredericks Brook, and Dawson Settlement formations. It ran fracs on two zones in Dawson Settlement.

The frac jobs transported 10 tonnes of sand each to the intervals at 878-899 m and 864-871 m.

Gas indications were recorded while drilling eight intervals in the Hiram Brook formation of the Upper Albert Group.

Quebec

Gastem, Montreal, and private Canbriam Energy Inc., Calgary, took a farmout from an undisclosed farmor on 92,104 acres of Mundiregina permits in Quebec's St. Lawrence Lowlands.

Gastem may earn a 17% interest and Canbriam 68%. The seller will maintain a 15% carried interest.

The Mundiregina permits are in the Ordovician Utica shale fairway southwest of Gastem's Yamaska permit, where two horizontal wells are being flow-tested. Gastem and Cambrian committed to shoot seismic and drill six wells by the end of 2010.

Gulf of Mexico

TGS-NOPEC Geophysical Co., Houston, launched a 300-block multiclient 3D seismic survey in the eastern Gulf of Mexico's DeSoto Canyon area off Pensacola, Fla.

The MV BOS Arctic has shot 25% of the Hernando project and is scheduled to complete the acquisition in May of 2009. Participants will receive fast-track data covering 1,100 sq km of the 6,900 sq km area before the March 2009 lease sale.

Project deliverables will include prestack time migration and anisotropic Kirchhoff and wave equation prestack depth migrations. Gravity data are also being collected.

Oklahoma

CREDO Petroleum Corp., Denver, gauged a flowing deeper pool oil and gas discovery from Siluro-Devonian Hunton in Major County, Okla.

Logs and other data indicate that the Ball 1-18 Anadarko basin shelf well is commercial in the Chester, Mississippian, and Hunton formations. The Hunton flowed at the rate of 535 b/d of oil and 1-2 MMcfd of gas from 13 ft of highly porous and permeable dolomite. Shut-in casing and tubing pressure are 2,600 psi. TD is 9,750 ft.

The well also has more than 150 of Mississippian pay and 35 ft of Chester pay. Credo is operator with 50% working interest. It will take 10-12 wells to fully develop the company's 1,280 gross acre Pool-Proffitt prospect in the Hunton, Mississippian, Chester, Inola, and Red Fork formations.

Texas

Panhandle

An unconventional gas resource play in Pennsylvanian Atoka shale is emerging in the Anadarko basin in the Texas Panhandle and far western Oklahoma.

Continental Resources Inc., Enid, Okla., said it had 34,000 net acres in the play in mid-December 2008. The play stretches about 85 miles from Peek field in Ellis County, Okla., west to Lipscomb, Ochiltree, eastern Hansford, northeastern Roberts, and northernmost Hemphill counties in the Texas Panhandle.

Continental said EOG Resources Inc., Houston, has completed 26 horizontal wells at as much as 7 MMcfd/well and attributed 400 bcf of Atoka recovery potential to its 60,000 net acres.

CNX Gas drills record Marcellus shale well

Nina M. Rach
Drilling Editor

Pittsburgh-based CNX Gas Corp., an exploration and production company that has drilled hundreds of coalbed-methane wells in the Appalachian basin, drilled its first horizontal Marcellus shale wells in Pennsylvania in 2008. The CNX No. 3 well was spud June 3 and began producing 6.5 MMcfd of natural gas in December.[1]

The CNX No. 3 was drilled horizontally through the Marcellus formation on company-owned mineral land in the Rogersville Quadrangle, Greene County, Pa. (Fig. 1).

The well was drilled to a vertical depth of 8,140 ft in the Huntersville Chert, penetrating 83 vertical ft of Marcellus shale. The well was logged, plugged back, and then CNX cut a horizontal section of 3,395 ft for a total measured depth of 10,738 ft. The well was completed with a five-stage slick-water fracture treatment using 3 million lb of proppant.

Tale of two rigs

CNX used two rigs to drill three horizontal Marcellus shale wells (3, 2, and 2a):

- Crown Drilling's Rig 7 to drill the tophole.
- Les Wilson Inc.'s Rig 25, to drill the horizontal section to TD.

Top holes

CNX wrote a day-rate contract to use Crown Drilling Rig No. 7, a Speedstar 185 with top drive and hook load capacity of 185,000 lb. The rig's maximum depth capability is about 8,500 ft in an air-drilled hole.

CNX used it to drill a vertical Marcellus well, CNX No. 4, and top holes of three horizontal wells: CNX No. 3, No. 2, and No. 2A.

Crown Drilling Rig 7 moved on location and set 33 ft of 20-in. diameter conductor pipe in June. The Crown Drilling crew drilled a 17½-in. diameter hole with air to a depth sufficient to set 556 ft of 13⅜-in.-diameter surface casing. They next drilled a 12¼-in. hole with foam mist to 2,680 ft.

CNX then logged the hole in support of the company's coalbed-methane development drilling program. After logging, Crown set and cemented 2,630 ft of 9⅝-in. intermediate casing (36 lb/ft, J-55 grade).

On June 16, 2008, Crown Rig No. 7 moved off the CNX No. 3 well and went on to drill top holes the CNX No. 2 and CNX No. 2A. Both wells were drilled from a single surface location, about a half-mile northeast of the CNX No. 3.

After the three horizontal wells, the rig returned to its previous task of drilling horizontal coalbed-methane wells for CNX. It also drilled three vertical Marcellus wells for CNX:

- GHCV No. 12—targeted to the Marcellus but came in "natural" in U Devonian sands.
- GHCV No. 8.
- GHCV No. 2.

Heavier rig

Privately held Les Wilson Inc., based in Carmi, Ill., drilled three horizontal wells for CNX under a day-rate contract. Les Wilson Rig 25 is an IDECO model H-44 double, capable of handling a 318,000 lb hook load. CNX Gas added a top drive. The rig drilled the CNX No. 3, CNX No. 2, and CNX No. 2A, and

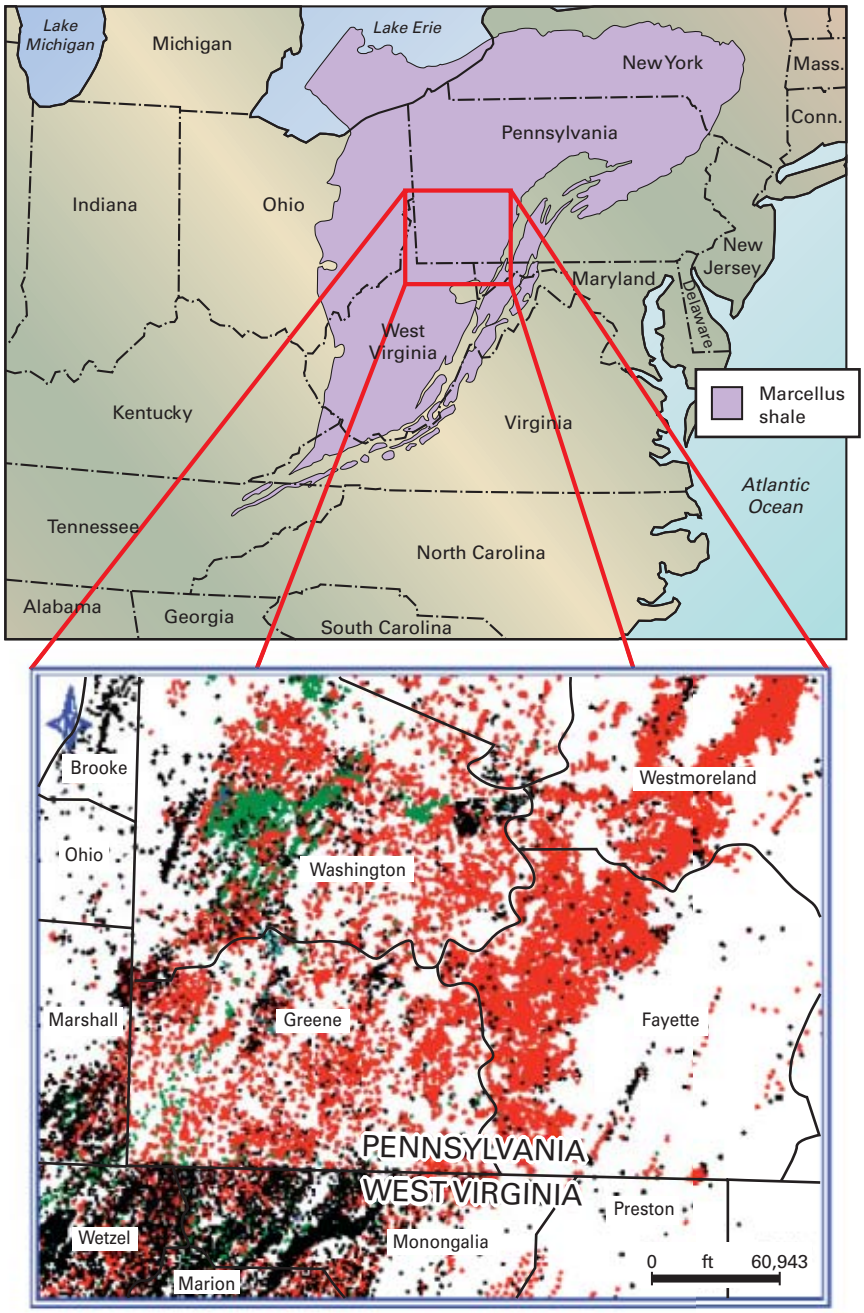
CNX NO. 3 WELL, GREENE COUNTY, PA.

Table 1

	Fluid, bbl	100-mesh sand, lb	40/70-mesh sand, lb	Avg. pressure, psi	Average bbl/min
Stage 1	17,150	155,700	446,000	8,247	105
Stage 2	17,356	136,000	464,000	8,048	105
Stage 3	17,498	156,000	444,000	7,217	102
Stage 4	17,256	156,000	444,000	7,825	98.0
Stage 5	16,950	153,000	437,000	7,203	102.5

DRILLING DENSITY, SOUTHWESTERN PENNSYLVANIA

Fig. 1



Source: Data assembled by John Corbett, CNX Gas, from public drilling data, Pennsylvania and West Virginia. Green=oil, red=gas, black=plugged and abandoned wells or wells with unknown status.

was then released and demobilized to Mississippi.

Drilling, logging

On June 21, the Les Wilson Drilling Co. Rig 25 moved onto location and rigged up (Fig. 2). Workers installed a 5,000 lb, 9⅝-in. casinghead and mounted the blowout preventer. Drillers ran an 8¾-in. diamond bit, bit sub, 8-in. air hammer, and 6½-in. drill collars in the hole. They tested BOPs and flowlines and once the safety protocols were completed, the company began drilling the production hole (Fig. 3).

On June 30, operations were suspended for a 5-hr safety inspection when a gas monitor malfunctioned. Once it was determined there was no threat to the safety of the crews or residents of the area, drilling operations resumed.

Les Wilson crews drilled the 8¾-in. hole to a total depth of 8,121 ft, with "good gas shows and occasional high torque (which is indicative of natural fractures) in the Marcellus," according to John C. Corbett, petroleum geologist at CNX Gas.

CNX ran another set of openhole wireline logs in the well to evaluate the Marcellus and to determine a point at which to place the horizontal leg. The well was then plugged back to 6,136 ft. The plug was dressed to 6,200 ft and the directional assembly was run in the hole. The hole was drilled to a kickoff point of 7,300 ft.

On July 21, 2008, at 7,527 ft, while a Les Smith drilling crew was drilling the curve with a foam-mist, the soap injector failed and the drill pipe became stuck. To free the drillstring, the bottomhole assembly and two joints of drill pipe were left on bottom. Attempts to fish the BHA were unsuccessful, and on July 24 a new kickoff plug was set at 6,600 ft. After dressing the plug and rolling the hole with mud, Les Smith drillers ran a new BHA and resumed drilling at a measured pace until it determined that the well was kicked off.

The cuttings were at first all cement as CNX began to try to get off the kickoff plug and out of the old wellbore. Then the cuttings were 95% cement and 5% formation, and then, as they began to cut into new formation, cuttings were 50% cement and 50% formation, Corbett said.

On July 30, 2008, at a depth of 6,900 ft, the cuttings were finally comprised solely of formation. The contractor then began "drilling the curve" (the horizontal) at 7,300 ft. The build was 8°-12°/100 ft through most of the curve. Houston-based Scientific Drilling International provided directional control.

Before the driller landed the lateral,

Les Wilson Rig 25 drills the CNX No. 3 well, CNX Gas's first horizontal Marcellus shale well, which began producing at a rate of 6.5 MMcfd in December (Fig. 2; photo by Harry Giglio from CNX Gas Corp.).

the mud weight was raised to 12.5 ppg, and the directional BHA, including the Smith FHi21 roller cone bit, was tripped out for the horizontal assembly.

A driller operates a control panel board on Les Wilson Rig 25, drilling a Marcellus shale well in Pennsylvania (Fig. 3; photo by Harry Giglio from CNX Gas Corp.).

This included a 2.0 motor (mud motor and 2° bent sub) and an 8¾-in. Smith six-blade PDC bit.

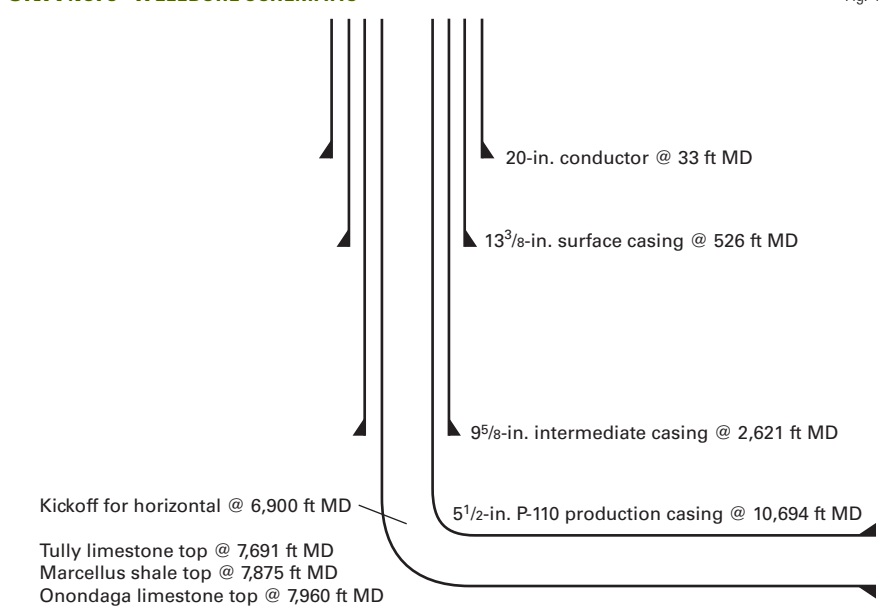
The lateral was drilled above the most organic part of the Marcellus in a calcareous shale interval in order to avoid hole problems. A 12.5-13.5 ppg mud was used throughout the lateral.

CNX reached TD of 10,738 ft on Aug. 11, 2008 (Fig. 4). The drillstring was tripped out and 10,694 ft of 5½-in., 20 lb/ft, P-110 casing was run in the hole and cemented by Halliburton.

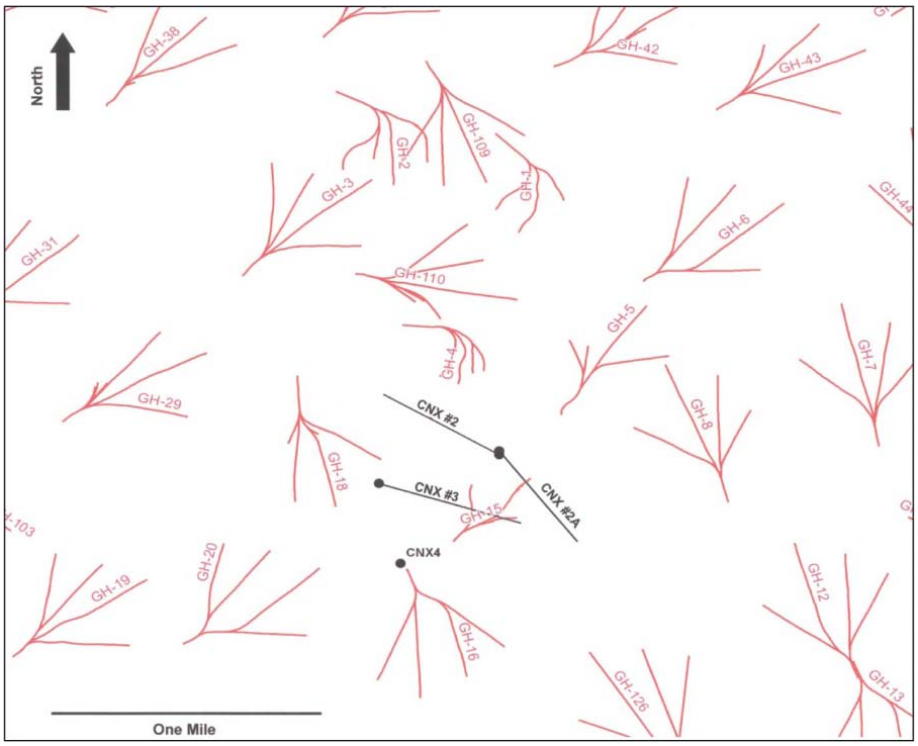
Stimulation

CNX completed the well in five stages with slick water fracs (fresh water with a polyacrylamide friction reducer and a surfactant). BJ Services Co. fracture-stimulated the well in five

CNX NO. 3* WELLBORE SCHEMATIC Fig. 4



*Greene County, Pa.



CNX Gas Corp. is developing coalbed methane resources above the deeper Marcellus program. The orange, birdfoot-like features are CBM wellbore paths drilled with as many as four laterals from a single wellhead. In the Greene Hill area, the three horizontal Marcellus wellbore paths are shown in black with circles at the top hole locations (Fig. 5; from CNX Gas).

stages, pumping the first stage on Sept. 15, 2008 (see Table 1). Key Energy Services provided the coiled tubing unit with 2-in.diameter tubing.

Infrastructure

CNX Gas has a 100% working interest in the well and a 100% net revenue interest because CNX Gas does not pay a royalty to the surface owner. Because of the gathering infrastructure already in place from its CBM operations, CNX Gas was able to place the well on line immediately after retrieving frac fluids. Also, gas from production in southwestern Pennsylvania, as in other areas of Appalachia, typically receives a premium over NYMEX pricing.

Fig. 5 shows wellbore paths in CNX Gas Corp.'s CBM development above the deeper Marcellus program. The orange, bird foot-like features are CBM wells that are drilled with as many as four laterals from a single wellhead.

Corbett told OGJ the CBM production is low-btu gas that CNX has been treating to get the btu's up to pipeline quality. The Marcellus gas is on the rich side and will need to be treated down to pipeline quality over much of the basin. CNX has the opportunity to blend the two streams to produce pipeline quality gas.

Production

On Oct. 22, CNX Gas reported that the CNX No. 3 well began flowing into the sales meter on Oct. 2, with an initial production rate of 1.2 MMcfd and 4,000 lb of back pressure.[2]

On Dec. 15, CNX reported that the well was producing 6.5 MMcfd of natural gas, "A record daily production rate for any well in the company's history and believed to be among the highest reported by any Marcellus shale producer," said the company in a press release.

CNX had gradually reduced the backpressure on the well since Oct. 2, allowing daily production to increase to about 4 MMcfd. On Dec. 12, new

CNX Gas installed surface equipment Dec. 12, 2008, at the CNX No. 3, the company's first horizontal well, enabling it to flow at 6.5 MMcfd (Fig. 6; photo by Sam McLaughlin, CNX Gas Corp. vice-president, northen Appalachia operations).

surface equipment was installed that enabled the well to flow at 6.5 MMcfd, with pressure still being held at 2,640 lb (Fig. 6). Cumulative production from the well before Dec. 12, 2008, was 106 MMcf.

Nicholas J. DeIuliis, president and chief executive officer of CNX Gas, said the company's horizontal drilling expertise came from drilling "160 horizontal coalbed methane wells before drilling its first horizontal Marcellus shale well."[1]

Future

CNX Gas told OGJ it picked up the Les Wilson No. 30 rig under a day-rate contract to begin its 2009 horizontal program. The rig has a 420,000-lb hook load, which will enable the company to drill more than two horizontal wells from the same location.

CNX Gas finished drilling its second and third verticals in October and hydraulically fractured one in December. It will frac the third vertical (GHCV No. 6) and one horizontal (CNX 2A) this month.

CNX Gas will provide updates on these wells during the company's next earnings conference call, scheduled for Jan. 28, 2009. ✦

References

1. "CNX Gas Announces Record Marcellus Production; Increased Production Guidance," news release, Dec. 15, 2008, www.cnxgas.com.
2. "CNX Gas Reports Record Third Quarter Results," news release, Oct. 22, 2008, www.cnxgas.com.

OIL SHALE—1

US, world possess rich resource base

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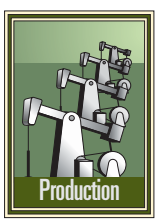


Oil shale contains a massive energy resource that potentially can contribute greatly to the world's energy supply.

This resource occurs worldwide, with the Western US having the largest amounts.

When processed, the kerogen extracted from the oil shale can become superior quality jet fuel, diesel, naphtha, and other high value products. Kerogen content in oil shale ranges from 10 to more than 60 gal/ton.

This article, the first of a four-part series, focuses on the oil shale resource base, especially in the US. The second article will detail proven and emerging technologies for producing the resource from the shale.

The third part will describe the economic viability of an oil shale industry, both on a project level and the potential benefits that the industry could provide to local, state, and national economies.

The final article covers the potential environmental impacts and mitigation strategies for an oil shale industry in the US.

Resource base

Oil shale is a hydrocarbon-bearing rock that occurs in nearly 100 major deposits in 27 countries. In-place hydrocarbons contained in the shales may exceed 10 trillion bbl.

The US, Russia, Congo (former Zaire), Brazil, Italy, Morocco, Jordan, Australia, and Estonia are nations having the most known resource (Fig. 1). Russia has an estimated 247 billion bbl, while Estonia has about 16 billion bbl.[1] The US, however, has the most oil shale resources in the world.

One estimate is that oil shale in the US contains more than 6 trillion bbl of oil equivalent. The US's oil shale is concentrated in an eastern range, Alaska, and in the western states of Colorado, Utah, and Wyoming.

An estimate is that more than 1.8 trillion bbl of oil equivalent is trapped in shale on federal lands in the states of Colorado, Utah, and Wyoming (Fig. 2). The western oil shale may have 800 billion bbl that is recoverable ultimately (Fig. 3).

US oil shales are carbonate rock, generally marlstone that is rich in organic sedimentary material called

COUNTRIES WITH OIL SHALE DEPOSITS

Fig. 1

Source: Reference 6

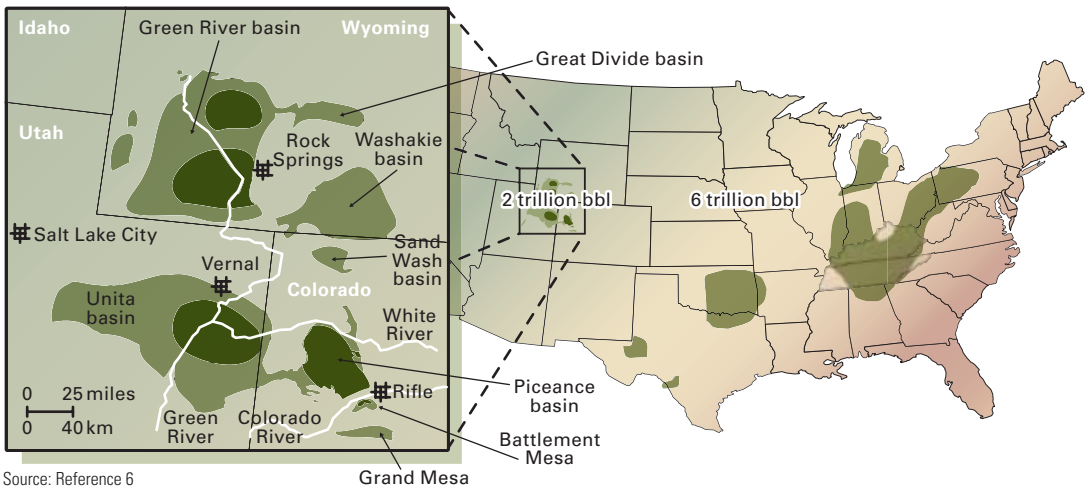
kerogen. Oil shales are younger in geologic age than crude oil-bearing formations, and natural forces of pressure and temperature have not yet converted the sediments to crude oil.

Oil shale generally lies shallower (less than 3,000 ft) than the deeper and warmer geologic zones required for forming oil. The origins of oil shale can be categorized into three basic groups:[1]

1. Terrestrial that has organic origins similar to coal-forming swamps.
2. Lacustrine that has organic origins from fresh or brackish water algae.
3. Marine that has organic origins from saltwater algae, acritarchs, and dinoflagellates.

US OIL SHALE RESOURCES

Fig. 2



Source: Reference 6

US OIL SHALE RICHNESS

	Richness, gal/ton		
	5-10	10-25	25-100
Colorado, Wyoming and Utah (Green River), billion bbl	4,000	2,800	1,200
Central and Eastern states, billion bbl	2,000	1,000	
Alaska, billion bbl	Large	200	250
Total, billion bbl	6,000+	4,000	2,000+

Source: Reference 2 and others

Resource quality

Various studies have extensively characterized US oil shales. Shales with yields greater than 25 gal/ton are viewed generally as the most economically attractive and, hence, the most favorable for initial development.

The table lists the richness of various oil shale deposits in three US areas.[2] The oil shale from each region has unique characteristics.

Western shale contains the most concentrated hydrocarbon deposits on earth. About 1.8 trillion bbl of oil shale are thought to be in place in deposits greater than 15 gal/ton in Colorado, Utah, and Wyoming. Recovery of even a small fraction of this resource would represent a significant energy source to supplement oil supply for many decades.

Large areas of the US contain oil shale deposits, but those in Colorado, Utah, and Wyoming are the most promising for oil shale production in the immediate future. Various studies have identified and characterized extensively these western oil shale resources, particularly those in the Green River formation.

The western region underlies 17,000 sq miles or 11 million acres in Colorado (Piceance Creek basin), Utah (Uinta basin), and Wyoming (Green River and Washakie basins).

Results from more than 250,000 assays on core and outcrop samples for the Green River oil shale show that the richest zone, known as the Mahogany zone, is in the Parachute Creek member of the Green River formation.

This zone is found throughout the formation, is relatively shallow, and has consistent bedding. Because of this, the zone's richness is well known, giving a high degree of certainty as to resource quality (Fig. 4).

US western oil shales have a higher concentration on a resource-per-acre basis than Alaskan North Slope oil or Alberta's tar sands.[3] The Piceance basin, which contains more than 80% of the recoverable resources of the Green River formation, underlies a 35 mile by 35-mile (1,225 sq miles) area of western Colorado.

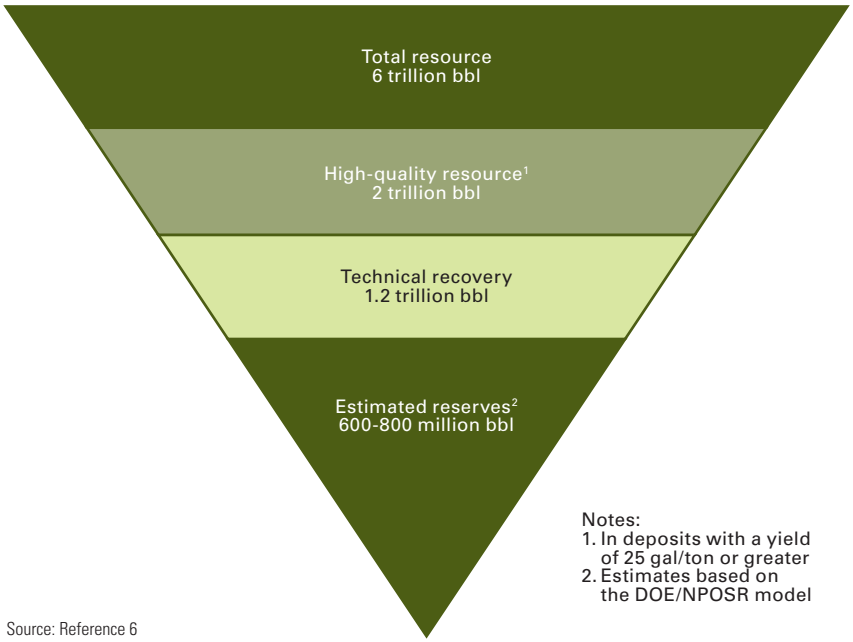
Other significant, less concentrated deposits are in the Devonian, Antrim, and Chattanooga shale formations in several eastern and southern states and parts of Alaska.

Oil shale deposits underlie much of the eastern US, ranging from Mississippi to New York. These deposits are not as concentrated as the western shale deposits, and they contain a different type of organic carbon than the western shale. As a result, conventional retorting of eastern shale yields less oil and a higher carbon residue, compared with western shale.

Because of these differences, industry has focused its interest in oil shale commercialization on the richer, more concentrated oil shale deposits in the western states.

RESOURCE VOLUME

Fig. 3



Source: Reference 6

Nevertheless, eastern shale has the potential to become an important addition to US unconventional fuel supplies. Near-surface mineable resources are an estimated 423 billion bbl.[4] Of the accessible deposits, 98% are in Kentucky, Ohio, Tennessee, and Indiana.

One area in particular, the Kentucky Knobs region, has accessible resources of 16 billion bbl at a minimum grade of 25 gal/ton.

With processing technology advances, for example the addition of hydrogen to the retorting process, potential oil yields could approach those of western shale.

Eastern shale has some advantages over the western shale. Five of these are:

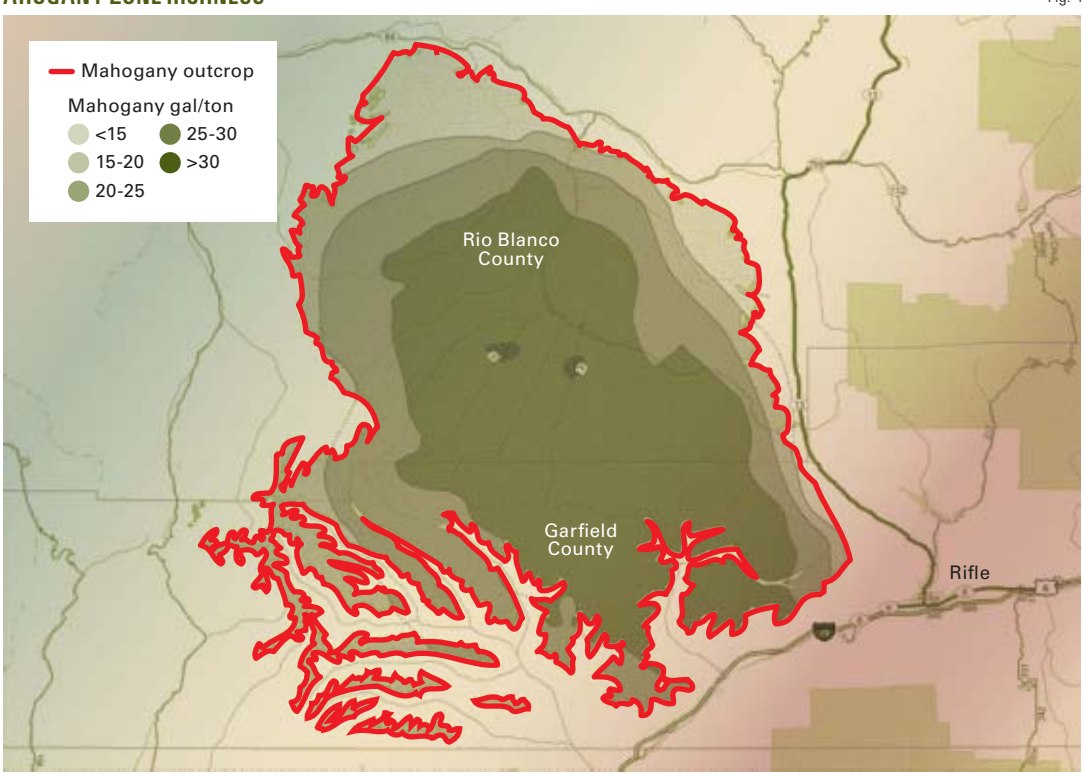
1. Eastern shale is closer to major demand centers and this would reduce transportation costs.
2. Companies could move the liquid produced by barge to a refinery for processing. This would eliminate the need for local upgrading and for constructing large new pipelines.
3. Because the resource is diverse, eastern shale development should have fewer associated environmental problems.
4. Because the eastern area is more populated, the area should have fewer infrastructure and socio-economic problems than in the west.
5. The eastern states also have numerous coal mines and industrial plants, so that public acceptance and permitting of oil shale facilities may be easier.

Oil shale deposits also occur in Nevada, Montana, Alaska, Kansas, and elsewhere, but these are either too small or too low-grade or have not yet been well explored to be considered for near-term development.

Fig. 5 compares resource concentration per acre. Colorado has 1.3 million bbl/acre compared with 70,000 bbl/acre

MAHOGANY ZONE RICHNESS

Fig. 4



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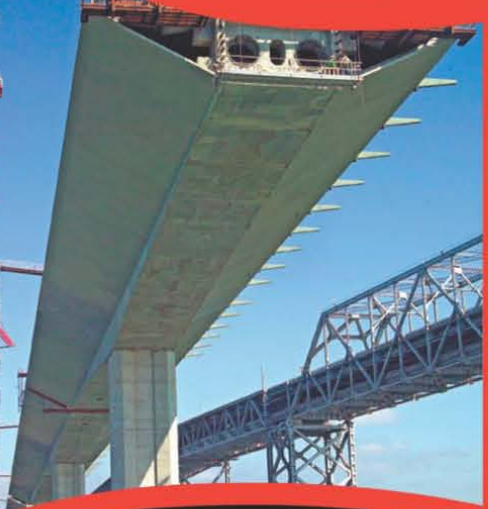

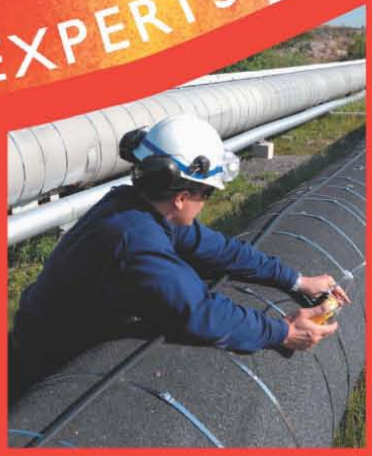

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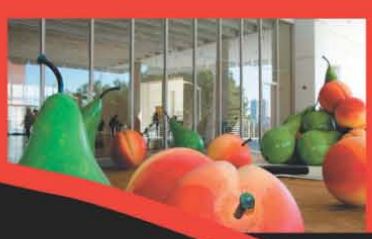

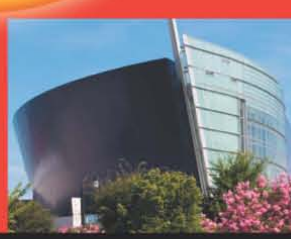

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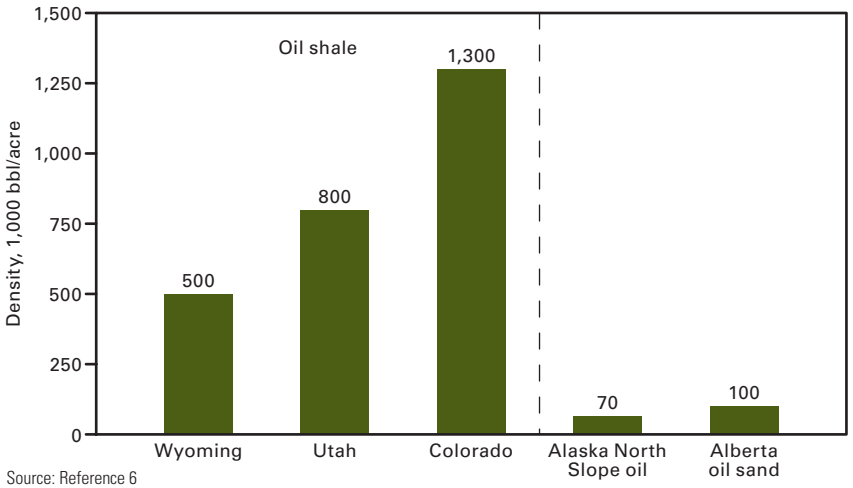
RESOURCE DENSITY COMPARISON

Fig. 5



Source: Reference 6

on Alaska's North Slope.[3] More than 700 billion bbl of US oil shale resource occurs in concentrations richer than currently produced Alberta tar sand.

As industry demonstrates the commercial viability of oil shale, a subset, almost certainly in a range near 100 billion bbl, would become a prospect for reclassification to proved reserves.

A reasonable assumption is that first commercial oil production from oil shale will yield at least 30 gal/ton. Zones richer than about 40 gal/ton are generally too thin to be selectively recovered at a practical scale.

Beds with average 30 gal/ton commercial thickness are found throughout the Colorado and Utah resources. In previous activity, Unocal Corp. reported yields averaging 38 gal/ton, at least in the early stages, and is believed to have averaged about 34 gal/ton during the life of its project.[3]

Resource access

The US government owns and manages about 73% of the lands that contain much of the oil shale deposits in the west. These lands contain about 80% of the known recoverable resource in Colorado, Utah, and Wyoming.

Private company ownership of oil shale lands, in 1978, was about 21% in Piceance basin (Colorado), 9% in Uinta basin (Utah), 24% in Green River basin (Wyoming), and 10% in Washakie basin (Wyoming).[5 6] State governments, localities, and native tribes also own oil shale lands.

Privately owned lease holdings are concentrated near the southern margins of Colorado's Piceance Creek basin where the oil shale outcrops at surface. Oil leases on private lands have sufficient contiguous oil shale resources to support commercial-scale operations up to a maximum of 400,000 b/d.[7] Mining and surface processing would limit the production from any one development to about 100,000 b/d.

In contrast, public lands are concentrated near the center of Piceance Creek basin where oil shale thickness increases from 200 ft at the basin margins to more than 1,500 ft near the basin's deposition center. With increased thickness, oil shale richness correspondingly increases.

Federally owned land could easily support several large projects with a production capacity on each lease of 100,000-300,000 b/d.

Because of difference in thickness and quality, private developers will be reluctant to develop private lands first, so long as the possibility exists that the higher-grade resources on public lands will become available to potential competitors. Large-scale commercial oil shale development, therefore, is unlikely without the federal government making public lands available for lease or exchange. Trading federal lands with states or private resource holders would

The authors

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enhance logical development patterns.

Conflicts between surface and subsurface uses may occur through priorities of resource management plans or through legislated priorities such as threatened and endangered species critical habitat, wilderness areas, and the like.

The US Department of Interior's process to develop an environmental impact statement for oil shale development on public lands will address these potential conflicts. ✦

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Report updates Iran's refinery project status

Iran has announced many refining and upgrading projects to increase the supply of transportation fuels. Many of these projects, however, will not proceed due to lack of funding.

A recent report, "Iran's Gasoline Imports and US Politics: An Update on Iran's Refining Buildup," discusses Iran's refining projects and evaluates the likelihood of completion for each one.

The report from FACTS Global Energy, Singapore, notes that expansion and upgrading projects currently under way are likely to be completed. New refinery projects, to supply both exports and domestic demand, are having difficulty obtaining funding.

Gasoline demand, politics

According to the report, Iran's need for gasoline imports is temporary and domestic production will be sufficient to supply Iranian demand beyond 2012-13. US sanctions on gasoline exports to Iran will therefore have no effect on the country.

Sanctions will instead motivate Iran to seriously curtail demand by forcing large volumes of gasoline to nonregulated prices, according to the report. These sanctions can save Iran several billions of dollars immediately, and could be a blessing in disguise for the Ahmadinejad government.

Iran is embarking on a large refining expansion and upgrading program. By 2012-13, Iran will not need any gasoline imports and may be an exporter after that. Iran's gasoline demand is unlikely to grow much because the government intends to push more gasoline into nonregulated price market to force lower domestic consumption, according to the report.

Iran also plans to build new refineries, which the report says are doubtful. There are current projects that will resolve Iran's gasoline deficit.

Iran's gasoline imports

According to the report, Iran's gasoline imports averaged 180,000 b/d in 2007 with a peak of 233,000 b/d. Although Iran had planned to introduce gasoline rationing through smart cards, it feared political backlash and expected consumer resistance.

The threat of US sanctions gave Iranians the justification they needed to impose rationing with limited public resistance in summer 2007. Imports fell about 50% immediately and saved Iran about $2-3 billion/year.

The report stated that demand is currently rising slowly and imports for 2008 will average 112,000 b/d, a decline of nearly 40% from 2007.

The most important effect of all of these changes was the elimination of gasoline smuggling out of Iran and the emergence of a free market price.

Regarding Iran's refining projects, many ask whether Iran can find enough capital, whether the projects will actually materialize, and whether they find the contractors to build the refineries.

Due to an emerging global refining surplus and, particularly, an unprecedented gasoline surplus, product imports make sense for Iran. Domestic criticisms and international concern over imports, however, have compelled Iran to build new refineries including upgrading projects and grassroots refineries. This will significantly increase gasoline supply.

Refining projects—real?

Regarding Iran's refining projects, many ask whether Iran can find enough

capital, whether the projects will actually materialize, and whether they find the contractors to build the refineries, according to the report. These questions translate the global cost escalation and refining delays to the Iranian situation.

Real projects?

Real projects, of which FACTS has first-hand knowledge, are upgraders and expansions. These are all real, ongoing, and despite delays, there is a reasonable completion date, according to the study.

Iran's refineries have focused on diesel production and neglected gasoline production. As of yearend 2008, Iran only has a small 20,000-b/d FCC unit in Abadan, no coking, and 145,000 b/d of hydrocracking. Iran is moving heavily into FCC and resid catalytic cracking (RCC) to maximize gasoline production, according to the study.

Iran is building three of the largest FCC-RCC units in the world—94,000 b/d in Arak, 91,000 b/d in Isfahan, and 79,000 b/d in Abadan. These three projects alone will produce enough gasoline to eliminate all imports in the short term, the report said.

The Abadan upgrade will be finished in 2010, Arak in 2011-12, and Isfahan in 2012-2013. There will be virtually no additional diesel output from these projects.

There will also be crude distillation expansions in Lavan, Arak, Tabriz, and Isfahan refineries. The report said that there were definite distillation expansions of 300,000 b/d, and catalytic cracking expansions of 279,000 b/d, from a current level of 20,000 b/d, that would maximize gasoline yield.

The report said that distillate treating unit capacity will increase tenfold from 56,000 b/d. This will allow Iran to produce distillate products at Euro Spec 4 and 5 levels, comparable to US and European distillates, by the middle of the next decade.

An almost-real project

Persian Gulf Star Project consists of three 120,000-b/d condensate splitters at the Bandar Abbas refinery. These three units will process 360,000 b/d of South Pars condensate, but will produce no naphtha, the report said. Their role is to maximize gasoline production.

The three units will cost $5-6 billion and will produce 64% gasoline and 36% diesel. The project has been delayed due to financing problems and the departure of contractor Snamprogetti.

The project is currently under way with Sinopec Design Institute and other Chinese affiliates performing the construction; equipment has already been ordered, according to the report. The condensate price is linked to its product yield to ensure the project's profitability. The project will probably be completed in 2012, and 2013 at the latest.

Iran is embarking on a large refining expansion and upgrading program. By 2012-13, Iran will not need any gasoline imports and may be an exporter after that.

This project will produce about 230,000 b/d of gasoline and 130,000 b/d of diesel. About 70% of the gasoline will be exported, according to the report. Before Iran's rationing program, all products were slated for the domestic market; but with lower gasoline demand growth, most will be exported.

Future projects

The report said that Iran has several new refining projects planned. None have financing and there is uncertainty that any or all will go forward.

These include three export refineries:

- Hormuz refinery in Southern Iran is a 300,000 b/d, heavy crude oil refinery with a delayed coker, hydrocracker, and FCC. Its cost is about $5-7 billion. Its feed will be 100,000 b/d of Iran Heavy, supplemented by other heavy crudes: Soroush, Nowruz, Azadegan, Yadavaran, etc.

Front-end engineering and design has already begun and multiple contracts awarded to domestic contractors, in particular, Sazeh Consultants. Start date is 2012-13.

- Fars refinery is a 120,000-b/d condensate splitter feeding South Pars condensate and adjacent to the Shiraz refinery. Petrofield, representing SKS of Malaysia has a 40% interest, NIORDC owns 40%, and NIOC Pension Fund owns 20%. Start date is 2013.
- Caspian refinery is a 150,000-b/d refinery based on Caspian crudes and will export products to Caspian countries. No further details are available.

Iran is also planning three refineries for domestic production:

- Shahriar refinery will be adjacent to, and integrated with, the Tabriz refinery. It will have a capacity of 150,000 b/d and will be FCC-based.
- Anahita refinery will have a capacity of 150,000 b/d and will replace the Kermanshah refinery.
- Khuzestan refinery will have a capacity of 300,000 b/d and will replace the Abadan refinery.

FACTS feels that all of these refineries are long shots. There is no imperative for the export projects and there is no need for additional domestic products. It makes more sense to upgrade or expand existing refineries when the need arises, the report said.

KBC and its affiliate PEL have completed marketing studies for several of these refineries, giving the green light to NIORDC. Given the emerging refining surplus, FACTS thinks it is surprising that Iran has been told that there is a market for these refined products.

Currently the Hormuz and Fars refineries have some momentum, but all the other projects are "waiting in the wings." There is no budget, no financing, and no detail plans drawn. The report doubts that any of these will happen by 2015, if at all. ✦

Conversion, scrapping keep rates firm as demand erodes

Christopher E. Smith
Pipeline Editor

Tanker market earnings for the half-year ended September 2008 firmed 43.7%, accelerating the strength seen in the previous 6 months. A combination of large tankers being withdrawn for conversion to offshore structures or bulk carriers and scrapping kept vessel supply constrained even as high crude and product prices chipped away at demand. Clarkson Research Services Ltd. detailed the reasons behind these market movements as well as offered forecasts of future market direction in its Autumn 2008 "Shipping Review and Outlook: A Half-Yearly Review of the Shipping Market."

According to Clarkson data, the tanker market, consisting of both modern and early-1990s VLCCs, modern Suezmax, modern Aframax, and both dirty and clean products carriers, averaged $49,272/day in earnings from March 2008 to September 2008, a 43.7% increase from the $34,280/day seen September 2007-March 2008. Greater than 65% increases in Suezmax and Aframax earnings, to $86,661/day and $58,535/day respectively, led the upward momentum, with earnings for all segments moving up from the previous 6 months (Table 1).

Another example of market strength, according to Clarkson, were the January-July 2008 increases seen in VLCC rates, which peaked at more than $169,000/day, compared with the more than $53,000/day spot rate seen in January.

Even with the overall strength of the market, however, Clarkson cited the deepening problems in the global economy and financial sector as reinforcing the idea that the recent bull market was ending.

The conversion of single-hull tankers combined with 3.6 million dwt of scrapping reduced tanker-fleet growth to only 1.5% for the first 9 months of 2008, well below the 4.4% increase forecast for the year (OGJ, June 23, 2008, p. 66). Clarkson has revised its 2008 growth forecast to 4%—to 401.4 million dwt—but notes that this remains stronger than expected and that 59 million dwt of tankers are scheduled to be delivered in 2009.

This article will detail some of the other findings in a few of the numerous vessel categories covered twice each year by Clarkson in its Shipping Market Outlooks.

Market outlook

Surging oil prices encouraged importers to lift their oil earlier than usual, fueling strength in the tanker market despite steady demand erosion, according to Clarkson. Clarkson said that spot earnings improved across most major sectors, though not as rapidly as in the previous 6 months. The average clean products spot rate increased 64%. Suezmax spot rates slipped 1% from the previous 6 months, but remained 27% above their 10-year average.

Crude tankers of all other categories gained ground against 10-year average spot rates over the past 6 months. The spot rate for 30,000 dwt clean product tankers also increased to $36,023/day from $20,689/day in the preceding 6 months. Rates for a 1-year time-charter of the same vessel type, however, rose just 5%, to $23,000/day, according to Clarkson.

Ship values for all segments but clean products continued to increase,

TANKER EARNINGS Table 1

Vessel type	September 2007-March 2008 $/day	March-September 2008 $/day	% change
VLCC (modern)	85,492	112,256	31.3
VLCC (early '90s)	79,262	104,621	32.0
Suezmax (modern)	51,806	86,661	67.3
Aframax (modern)	35,439	58,535	65.2
Products (dirty)	29,202	42,596	45.9
Products (clean)	22,373	30,243	35.2
Weighted average	34,280	49,272	43.7

with the value of 5-year old Aframax vessels reaching $79 million from $70 million in March 2008. Clean product tanker values (30,000 dwt) were unchanged at $47 million.

VLCC

By Sep. 1, 2008, the VLCC fleet totalled 147.6 million dwt, down from 148.3 million dwt 8 months earlier as single-hulled vessels continued to be converted to floating, production, storage, and offloading vessels and very large ore carriers (Fig. 1, Table 2). A total of 76.8 million dwt of VLCCs is forecast to be delivered by year-end 2011, creating a supply surplus shortly after the strict 2010 phaseout of single-hulled vessels. The fleet order book increased 44.5% during the first 8 months of 2008, with a more than 300% increase in contracting for new vessels.

Clarkson described the VLCC sector as tumultuous for the 6 months ending Sept. 1, 2008, with spot earnings for 1990s-build vessels falling from $164,232/day at the end of July to $29,420/day by Aug. 22. For the entire 6 months, however, spot earnings averaged $104,621/day, compared with $79,262/day for the previous 6 months.

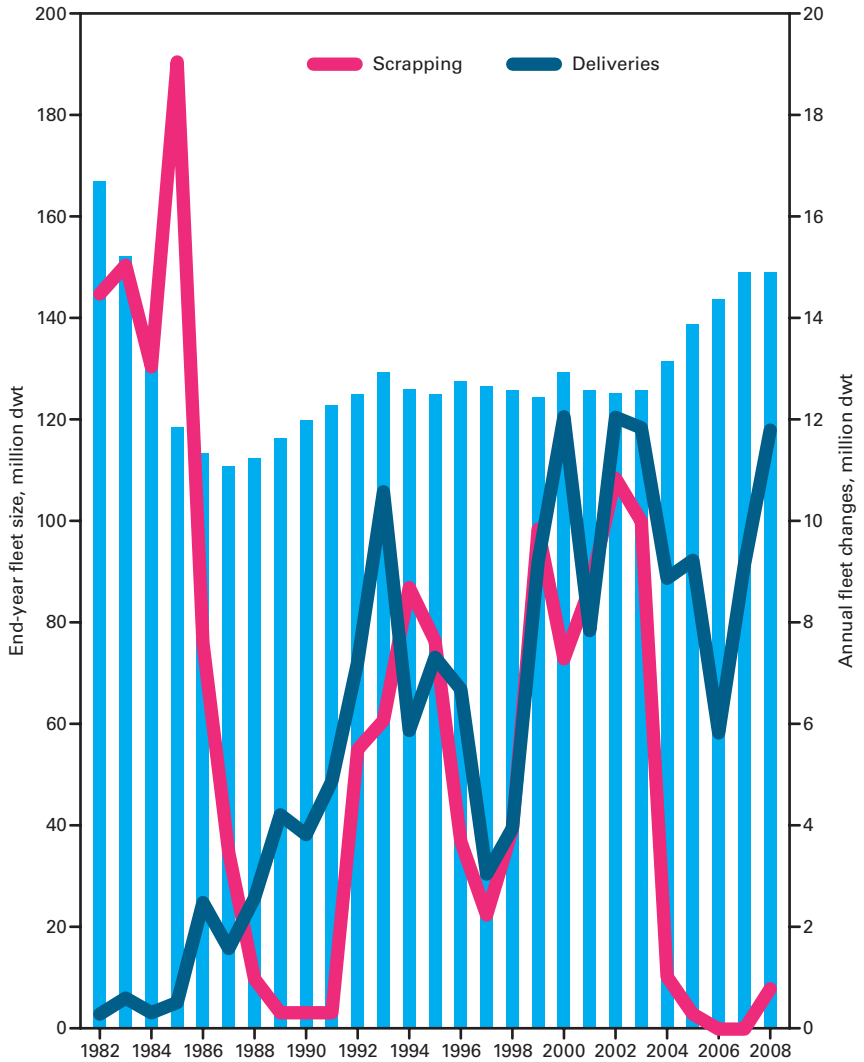
The time charter market also firmed, with 1-year rates for 1990s-build tonnage reaching $62,500/day by September 2008 compared with $52,500/day at end-2007.

Clarkson noted that then-high oil prices and the continued economic instability of the OECD all but wiped out OECD demand growth during the first 9 months of 2008 and that continued demand from China and India during the period propped up the VLCC market. It expected that large refineries coming online in Jamnagar, India, and Huizhou, China, would continue to support the VLCC market.

Clarkson anticipated short-term strength fuelled by heating and fuel oil demand during the northern hemisphere winter but predicted the looming order book would dwarf the phaseout of single-hulled vessels in the medium term. Further forward, market sentiment remained positive as owners anticipated a growth in tonne-miles would boost demand.

VLCC FLEET DEVELOPMENT

Fig. 1



Source: Clarkson Research Services

VLCC MARKET SUMMARY

Table 2

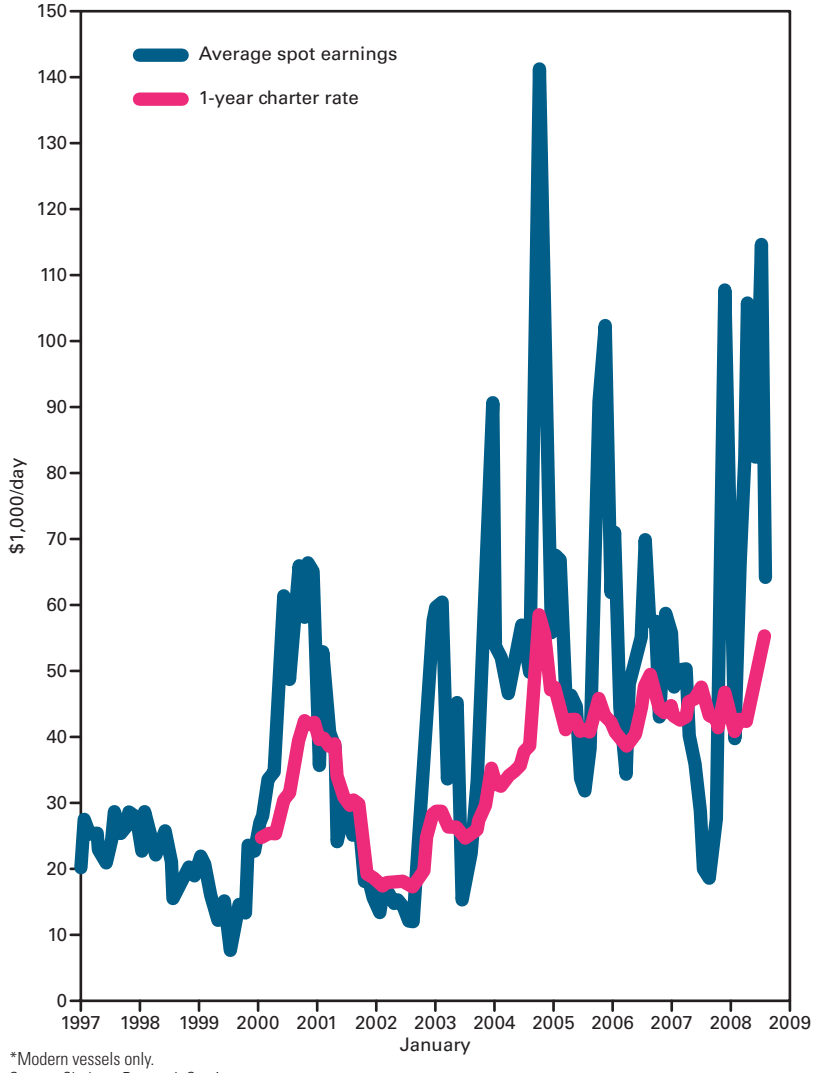
World-scale rates	End 2007	September 2008	% change
AG-West	180	83	–54.2
AG-Far East	275	95	–65.5
Med-UK	205	125	–39.0
Revenue, $/day			
Average spot earnings, early '90s	186,368	47,318	–74.6
1-year time-charter rate, early '90s	52,500	62,500	19.0
Asset values, $ million			
Newbuild price, 300,000 dwt	146	160	9.3
5-year old, 300,000 dwt	135	165	22.2
Tonnage supply, million dwt			
Fleet	148.3	147.6	–0.5
Orderbook	56.4	81.4	44.5

Suezmax

On Sept. 1, 2008, the Suezmax fleet totaled 54.8 million dwt, flat for the 6 months as conversions and scrapping matched 1.4 million dwt of deliveries. A heavy delivery schedule, particularly in 2009, will see the fleet reach 62.7 million dwt by the end of that year, according to Clarkson.

SUEZMAX EARNINGS, TIME CHARTER RATES*

Fig. 2



*Modern vessels only.
Source: Clarkson Research Services

Spot earnings for modern vessels peaked July 25 at $153,088/day, the highest rate ever recorded. By Sept. 1, however, earnings had slipped to $57,247/day. Even with the spot softening, time-charter rates for 1-year on a modern vessel firmed 12.9% from the end of 2007 to $35,000/day. Rates for modern vessels only showed a similar pattern to the overall Suezmax class, with average spot earnings and 1-year time charter rates converging (Fig. 2).

Clarkson expects spot rates in the Suezmax sector to remain steady in the short term, while noting that ongoing unrest in Nigeria could soften demand. In the medium term, however, rates may come under pressure as potential vessel oversupply emerges. Increased production from non-Nigerian West Africa and the former Soviet Union, however, could absorb some of this oversupply, according to Clarkson.

Aframax

On Sept. 1, 2008, the Aframax fleet had increased to 78.2 million dwt. Another 4.8 million dwt scheduled for delivery over the balance of 2008, only partially offset by demolitions and conversions, will grow the fleet to 81.9 million dwt by yearend 2008, according to Clarkson.

Aframax earnings ended 2007 at $56,560/day and slipped over the next 8 months to $41,730/day, averaging $52,096/day for the period. Unlike the other crude-carrier classes, time charter rates also slipped 2.3% over the first 8 months of 2008, reaching $22,500/day for a 1-year term.

Clarkson sees the relatively smaller order book in the Aframax sector possessing less potential for medium-term oversupply than is expected for VLCC and Suezmax vessels. Clarkson also described declining North Sea production over the next 5 years as bullish for Aframax's as European import demand looked to longer-haul supply sources.

Products

Clarkson reports strong earnings in the products market during the 6 months ending Sept. 1, 2008. Spot earnings for clean product tankers averaged $30,779/day, up from $27,961/day for the year-earlier period. Dirty carriers averaged $43,699/day. Clarkson ascribed the strength in earnings to a combination of pre-Olympic stock building in China and extra hurricane-related demand on the US Gulf Coast.

On Sept. 1, 2008, the 10,000-60,000 dwt product tanker market stood at 85.9 million dwt. Clarkson expects the fleet to reach 91.8 million dwt by end-2008 and 102.4 million dwt by end-2009, a 26% increase on the end-2007 fleet.

This growth in the fleet could lead to tonnage oversupply. Combined with uncertain demand growth, Clarkson expects that rates could come under pressure.

Chemical

Sept. 1, 2008, saw spot freight rates moving up across the chemical segment from yearend 2007, according to Clarkson. Rates for 15,000 tonnes Persian Gulf-Far East rose 21.8%, with Houston to Rotterdam for 5,000 tonnes rising 23%.

Persian Gulf-Mediterranean rates showed the sharpest increase, rising 41.3% (15,000 tonnes). Healthy demand allowed ship owners to pass

rising bunker costs on to charterers. Crew costs also continued to rise as the qualified pool shrank.

As with the other tanker segments, Clarkson sees heavy ordering in recent years as creating a potential oversupply unless the credit crisis affects the owners' ability to finance newbuilds. Buoyant biofuels markets and expanded Middle East production tempered bearish sentiment in the chemicals segment.

LNG

Clarkson described the LNG segment as depressed by uncertainty regarding potential completion dates of several liquefaction and regasification projects. New contracting for LNG carriers depends more heavily on the shipment needs of particular projects than other tanker segments, with the spot market for LNG vessels typically limited.

In the first 8 months of 2008, 30 vessels totaling 5.27 million cu m were delivered to the fleet, the average size being 155,735 cu m. This new tonnage, combined with production delays, had about 70 vessels available on the spot market as of Sept. 1, 2008, depressing charter rates accordingly. In total, 31 vessels were scheduled for delivery in the last 4 months of 2008, 45 in 2009, and 21 in 2010, but only five new vessels were contracted in the first 8 months of 2008.

Prospects for major growth longer term, according to Clarkson, continue to depend on the success of Russian and Iranian development plans. Iran in particular, says Clarkson, could stimulate demand if all of its plans come to fruition.

Failure to approve new projects and on-schedule vessel delivery, however, could extend the current rate softness forward, according to Clarkson. ✦

MIRATECH Corp.,

Tulsa, has announced a series of key executive appointments. They are part of a major expansion of the company that includes a 28% overall increase in staff and a relocation to new offices in Tulsa that nearly doubles its square footage. William "Bill" Clary was promoted to CEO. Clary, a 16-year company veteran, previously was vice-president of sales, marketing, and engineering. Kevin O' Sullivan was promoted to president and COO from his former position of vice-president of operations. David Zenthoefer was promoted to vice-president, sales, from his previous position of sales director; he will oversee MIRATECH's gas compression, power generation, locomotive, and marine markets. Prior to joining MIRATECH, Zenthoefer spent 7 years in a sales position with Hilti Corp. He holds an MBA from the University of Tulsa. John Sartain was promoted to vice-president, engineering, from his previous position of director, engineering. Sartain joined MIRATECH in 1999 as a University of Tulsa mechanical engineering graduate and has served in the engineering department. Don Lambert was promoted to vice-president, customer operations, from his previous position of director, customer operations. A 14-year MIRATECH veteran, Lambert is a University of Tulsa mechanical engineering graduate and has served in the engineering, sales, and operations departments. Kathy Whiteis joins MIRATECH as marketing director. She has more than 20 years of marketing experience in the IT consulting and professional services industries and holds a marketing degree from Northeastern State University. Mark McKenney joins MIRATECH as gas compression division manager. He previously spent 15 years with Hilti, most recently as its strategic business director. A graduate of East Stroudsburg University in Pennsylvania, McKenney's expertise is in marketing, strategy development, and sales management. Other recent staff additions include Debora Calderon, inside sales; Jessica Galassie, research and development manager; Russell Ryan, technical project manager; Elise Kelly, strategic account manager; Adam Merillat, application engineer; Jeremy Gardner, design engineer; and John Smith III, drafter.


Clary


O'Sullivan


Zenthoefer


Lambert


Whiteis

MIRATECH provides emission solutions for industrial engine applications, mainly natural gas and diesel reciprocating engines used in natural gas production, oil and gas drilling, power generation, locomotive, marine, and fluid pumping markets as well as engineering, service, and support.

Cameron,

Houston, has acquired Precision Downhole Pumps, a US-based manufacturer of artificial lift equipment. Precision, based in Iola, Kan., will be integrated into the surface systems division of Cameron's drilling and production systems group in Houston. The acquisition will increase the size and geographic reach of Cameron's existing artificial lift businesses with manufacturing in Iola and a distribution channel throughout the US. In addition, it will broaden the scope of Cameron products and services offered in the US, including sucker rods, as well as support Cameron's artificial lift market internationally.

Precision designs, builds, distributes, and services rod lift pumping systems and associated services and has been supplying sucker rod pump parts and accessories to the rod lift market for 20 years.

Cameron is a leading provider of flow equipment products, systems, and services to worldwide oil, gas, and process industries.

Gaffney, Cline & Associates,

Houston, has appointed Cesar Emilio Guzzetti to manage its operations in the Southern Cone of Latin America. He has more than 25 years of global project evaluation experience in negotiations, engineering, and operations, with a focus on exploration projects and expanding production in developed fields. Guzzetti most recently served as engineering manager and deputy general manager for Hunt Oil in Peru. Prior to that, he held management and technical positions with Tecpetrol SA and Perez Companc. Guzzetti has a BS in mechanical engineering from the University of Buenos Aires and an MBA and a petroleum engineering PhD from Louisiana Tech University.

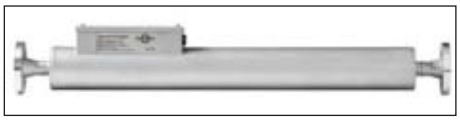
Gaffney Cline is an independent petroleum consultancy that specializes in providing strategic, commercial, management, and technical assistance to national oil companies, governments, international oil and gas companies, and financial institutions.

Roxar ASA,

Stavanger, has named Serena Arif regional manager, Europe and Africa, for its flow measurement division. Previously, she was cofounder and business development manager at PolyOil, which Roxar acquired in May 2008. Arif will be based in Roxar's Aberdeen office. Prior to that, she was a production engineer in the plastics industry. Arif has a degree in applied polymer chemistry at Napier University in Edinburgh.


Arif

Roxar's flow measurement division consists of an extensive downhole, topside, and subsea product range. The company is the oil and gas industry's largest provider of subsea instrumentation for reservoir interpretation, modeling, and simulation; well and completion; and production and process solutions, in addition to its consultancy services.



Meter offers explosionproof-flameproof version

Here's an explosionproof-flameproof certified version of the Micro Motion 7835 custody transfer density meter.

This new version includes all features and performance of the 7835 density meter.

Certified to ATEX II 2 G EEx d IIC T6 and T4 (EN50014 and EN50020 for use in Europe), this range of liquid density meters is suited for custody transfer and fiscal applications as well as routine control applications in chemical operations.

The 7835 Series offers high accuracy measurement in what the firm says is a low maintenance and highly versatile unit. The vibrating element is manufactured from Ni-Span-C for long term stability and low temperature coefficient. All other wetted parts are ANSI 316L stainless steel. There are no moving parts or seals, and the unit is unaffected by vibration or by variations in flow and pressure. Its straight-through design is easy to install and clean and minimizes pressure drop for better energy efficiency, the company notes.

Depending on the functionality required, meters can be specified as a frequency output sensor version (requires external signal converter or flow computer) or as a transmitter version with integral communications (Modbus RS-485 and two 4-20 ma outputs).

Source: **Emerson Process Management,** Box 4100, St. Louis, MO 63136.

Power transmission, motion control web site launched

New web site www.AltraEnergyOiland-Gas.com provides engineers and professionals in the industry with a resource for application-specific power transmission and motion control solutions.

The new on-line resource is organized into categories of steam turbines, fans and blowers, gas turbines, nuclear power pumps, wind turbines, tidal power turbines, inclined conveyors, cooling towers, and conveyors. Equipment with application in coal fired plants and ethanol plants is also presented on the web site.

Within the application categories are products, photos, features, and benefits of each brand solution that can be applied to improve operational efficiency, productivity, speed, and reliability.

Internet links are provided to the company's brands highlighted on the web site, including Ameridrives Couplings, Bibby Transmissions, TB Wood's, Formsprag Clutch, Marland Clutch, Twiflex Ltd., Boston Gear, Wichita Clutch, and Industrial Clutch. Another link is provided to a literature portal with information grouped by brand and market served.

Source: **Altra Industrial Motion,** 449 Gardner St., South Beloit, IL 61080.

Imports of crude and products

	Districts 1–4		District 5		Total US		
	1-2 2009	12-26 2008	1-2 2009	12-26 2008	1-2 2009	12-26 2008	*1-4 2008
	1,000 b/d						
Total motor gasoline	785	1,079	67	66	852	1,145	1,020
Mo. gas. blending comp.	582	905	67	66	649	971	520
Distillate	257	121	50	29	307	150	131
Residual	322	308	0	119	322	427	381
Jet fuel–kerosine	51	54	5	0	56	54	166
Propane–propylene	243	149	16	10	259	159	110
Other	772	210	–4	23	768	233	770
Total products	**3,012**	**2,826**	**201**	**313**	**3,213**	**3,139**	**3,098**
Total crude	**9,384**	**8,121**	**1,101**	**1,128**	**10,485**	**9,249**	**9,806**
Total imports	**12,396**	**10,947**	**1,302**	**1,441**	**13,698**	**12,388**	**12,904**

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

Purvin & Gertz LNG netbacks—Jan. 9, 2009

Receiving terminal	Liquefaction plant					
	Algeria	Malaysia	Nigeria	Austr. NW Shelf	Qatar	Trinidad
	$/MMbtu					
Barcelona	12.08	9.44	10.68	9.34	10.00	10.60
Everett	6.32	4.45	6.00	4.56	4.93	6.57
Isle of Grain	8.16	6.21	7.59	6.12	6.71	7.62
Lake Charles	3.67	2.06	3.48	2.20	2.36	4.18
Sodegaura	7.07	11.18	7.33	8.82	8.18	6.51
Zeebrugge	9.93	7.51	8.97	7.31	8.05	8.98

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

Crude and product stocks

District	Crude oil	Motor gasoline		Jet fuel, kerosine	Fuel oils		Propane–propylene
		Total	Blending comp.[1]		Distillate	Residual	
	1,000 bbl						
PADD 1	15,173	62,863	36,629	8,008	54,322	12,089	3,045
PADD 2	79,511	48,057	18,405	7,215	29,771	1,222	18,072
PADD 3	162,357	66,565	35,341	11,911	37,126	15,548	32,479
PADD 4	13,818	6,944	2,249	427	2,701	290	[1]2,417
PADD 5	54,560	27,008	22,856	9,813	13,901	4,729	—
Jan. 2, 2009	**325,419**	**211,437**	**115,480**	**37,374**	**137,821**	**33,878**	**56,013**
Dec. 26, 2008	**318,737**	**208,103**	**113,468**	**37,389**	**136,031**	**35,808**	**55,784**
Jan. 4, 2008[2]	**282,841**	**213,063**	**105,252**	**39,716**	**128,693**	**37,374**	**51,223**

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

Refinery report—Jan. 2, 2009

District	Refinery operations		Refinery output				
	Gross inputs	Crude oil inputs	Total motor gasoline	Jet fuel, kerosine	Fuel oils: Distillate	Fuel oils: Residual	Propane–propylene
	1,000 b/d						
PADD 1	1,311	1,295	2,290	82	429	61	68
PADD 2	3,271	3,234	2,457	196	1,053	59	187
PADD 3	7,219	7,091	2,778	727	2,344	234	677
PADD 4	504	500	283	28	182	12	[1]126
PADD 5	2,587	2,402	1,307	431	542	122	—
Jan. 2, 2009	**14,892**	**14,522**	**9,115**	**1,464**	**4,550**	**488**	**1,058**
Dec. 26, 2008	**14,521**	**14,190**	**8,939**	**1,274**	**4,542**	**549**	**977**
Jan. 4, 2008[2]	**15,921**	**15,771**	**9,116**	**1,511**	**4,489**	**587**	**1,203**
	17,610 Operable capacity		**84.6% utilization rate**				

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

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

OIL&GAS JOURNAL online research center

OGJ crack spread

	*1–09–09	*1–11–08	Change	Change, %
	$/bbl			
SPOT PRICES				
Product value	53.10	102.73	–49.63	–48.3
Brent crude	44.91	96.79	–51.88	–53.6
Crack spread	8.19	5.95	2.24	37.7
FUTURES MARKET PRICES				
One month				
Product value	54.51	103.97	–49.46	–47.6
Light sweet crude	44.51	94.70	–50.19	–53.0
Crack spread	10.00	9.28	0.73	7.8
Six month				
Product value	62.20	106.14	–43.94	–41.4
Light sweet crude	55.93	92.55	–36.62	–39.6
Crack spread	6.28	13.59	–7.32	–53.8

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

OGJ GASOLINE PRICES

	Price ex tax 1-7-09	Pump price* 1-7-09	Pump price 1-9-08
	¢/gal		
(Approx. prices for self-service unleaded gasoline)			
Atlanta	115.7	162.2	309.7
Baltimore	116.2	158.1	307.5
Boston	121.0	162.9	309.9
Buffalo	102.9	163.8	319.6
Miami	115.1	166.7	317.7
Newark	121.7	154.3	305.3
New York	111.8	172.7	308.9
Norfolk	115.7	154.1	312.0
Philadelphia	121.2	171.9	306.7
Pittsburgh	125.6	176.3	309.4
Wash., DC	142.3	180.7	307.3
PAD I avg	119.0	165.8	310.4
Chicago	127.9	192.3	341.6
Cleveland	131.1	177.5	309.8
Des Moines	130.7	171.1	306.3
Detroit	119.2	178.6	307.3
Indianapolis	118.2	177.6	309.8
Kansas City	129.3	165.3	297.6
Louisville	130.4	171.3	306.4
Memphis	123.7	163.5	307.4
Milwaukee	123.7	175.0	309.0
Minn.-St. Paul	125.3	169.3	306.0
Oklahoma City	118.7	154.1	295.0
Omaha	116.2	161.5	307.2
St. Louis	130.2	166.2	306.4
Tulsa	123.8	159.2	297.2
Wichita	119.4	162.8	294.9
PAD II avg	124.5	169.7	306.8
Albuquerque	124.4	160.8	305.3
Birmingham	119.0	158.3	298.2
Dallas-Fort Worth	120.7	159.1	293.1
Houston	112.9	151.3	294.1
Little Rock	119.6	159.8	298.5
New Orleans	120.1	158.5	306.7
San Antonio	117.2	155.6	295.3
PAD III avg	119.1	157.6	298.7
Cheyenne	108.4	140.8	291.3
Denver	109.8	150.2	302.6
Salt Lake City	109.5	152.4	303.9
PAD IV avg	109.2	147.8	299.3
Los Angeles	119.5	186.6	330.3
Phoenix	125.4	162.8	294.2
Portland	149.2	192.6	315.3
San Diego	130.4	197.5	338.3
San Francisco	125.5	192.6	353.3
Seattle	133.3	189.2	321.3
PAD V avg	130.5	186.9	325.4
Week's avg.	**121.9**	**167.5**	**308.5**
Dec. avg.	**125.5**	**171.1**	**300.6**
Nov. avg.	**169.9**	**215.5**	**307.6**
2009 to date	**121.9**	**167.5**	—
2008 to date	**262.1**	**305.6**	—

*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

	1-2-09 ¢/gal		1-2-09 ¢/gal
Spot market product prices			
Motor gasoline (Conventional-regular)		Heating oil No. 2	
New York Harbor	105.95	New York Harbor	145.97
Gulf Coast	110.20	Gulf Coast	141.72
Los Angeles	145.85	Gas oil	
Amsterdam-Rotterdam-Antwerp (ARA)	86.12	ARA	147.85
Singapore	109.57	Singapore	139.40
Motor gasoline (Reformulated-regular)		Residual fuel oil	
New York Harbor	103.45	New York Harbor	87.50
Gulf Coast	108.26	Gulf Coast	85.64
Los Angeles	152.85	Los Angeles	124.38
		ARA	79.68
		Singapore	84.27

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

BAKER HUGHES RIG COUNT

	1-9-09	1-11-08
Alabama	3	1
Alaska	13	7
Arkansas	49	47
California	35	42
Land	34	40
Offshore	1	2
Colorado	91	103
Florida	1	0
Illinois	0	0
Indiana	2	1
Kansas	22	14
Kentucky	3	8
Louisiana	183	139
N. Land	94	48
S. Inland waters	10	18
S. Land	23	27
Offshore	56	46
Maryland	0	1
Michigan	0	1
Mississippi	14	11
Montana	10	12
Nebraska	0	0
New Mexico	60	69
New York	4	5
North Dakota	68	47
Ohio	12	10
Oklahoma	155	190
Pennsylvania	22	21
South Dakota	0	0
Texas	713	859
Offshore	6	11
Inland waters	1	2
Dist. 1	11	15
Dist. 2	27	35
Dist. 3	50	67
Dist. 4	62	92
Dist. 5	143	181
Dist. 6	114	118
Dist. 7B	20	34
Dist. 7C	57	54
Dist. 8	91	117
Dist. 8A	26	19
Dist. 9	46	47
Dist. 10	59	67
Utah	32	39
West Virginia	26	30
Wyoming	61	73
Others—NV-4; TN-3; VA-2; WA-1	10	14
Total US	**1,589**	**1,744**
Total Canada	**360**	**515**
Grand total	**1,949**	**2,259**
Oil rigs	341	327
Gas rigs	1,239	1,409
Total offshore	70	59
Total cum. avg. YTD	**1,623**	**1,759**

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

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

SMITH RIG COUNT

Proposed depth, ft	Rig count	1-9-09 Percent footage*	Rig count	1-11-08 Percent footage*
0–2,500	72	1.3	62	3.2
2,501-5,000	91	52.7	101	52.4
5,001-7,500	224	17.8	219	26.9
7,501-10,000	361	1.9	436	1.8
10,001-12,500	315	1.9	426	4.2
12,501-15,000	326	—	277	0.3
15,001-17,500	159	—	117	—
17,501-20,000	71	—	71	—
20,001-over	36	—	30	—
Total	**1,655**	**6.1**	**1,739**	**8.1**
INLAND	24		38	
LAND	1,580		1,649	
OFFSHORE	51		52	

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

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

OGJ PRODUCTION REPORT

	[1]1-9-09	[2]1-11-08
	1,000 b/d	
(Crude oil and lease condensate)		
Alabama	19	21
Alaska	686	725
California	647	651
Colorado	61	62
Florida	6	6
Illinois	26	26
Kansas	100	100
Louisiana	1,138	1,245
Michigan	15	15
Mississippi	60	59
Montana	94	90
New Mexico	165	162
North Dakota	175	135
Oklahoma	171	168
Texas	1,299	1,329
Utah	54	53
Wyoming	150	147
All others	65	70
Total	**4,931**	**5,064**

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

US CRUDE PRICES

	1-9-09 $/bbl*
Alaska-North Slope 27°	49.32
South Louisiana Sweet	38.75
California-Kern River 13°	26.85
Lost Hills 30°	35.65
Wyoming Sweet	25.83
East Texas Sweet	36.75
West Texas Sour 34°	29.50
West Texas Intermediate	37.25
Oklahoma Sweet	37.25
Texas Upper Gulf Coast	32.75
Michigan Sour	30.25
Kansas Common	36.25
North Dakota Sweet	24.00

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

WORLD CRUDE PRICES

$/bbl[1]	1-2-09
United Kingdom-Brent 38°	34.33
Russia-Urals 32°	34.20
Saudi Light 34°	35.21
Dubai Fateh 32°	36.67
Algeria Saharan 44°	37.44
Nigeria-Bonny Light 37°	39.85
Indonesia-Minas 34°	36.63
Venezuela-Tia Juana Light 31°	35.42
Mexico-Isthmus 33°	35.31
OPEC basket	36.65
Total OPEC[2]	35.48
Total non-OPEC[2]	33.98
Total world[2]	34.80
US imports[3]	32.49

[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]

	1-2-09	12-26-08	1-2-08	Change, %
	bcf			
Producing region	902	888	881	**2.4**
Consuming region east	1,540	1,589	1,538	**0.1**
Consuming region west	388	400	381	**1.8**
Total US	**2,830**	**2,877**	**2,800**	**1.1**
	Oct. 08	**Oct. 07**	**Change, %**	
Total US[2]	**3,399**	**3,567**	**–4.7**	

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

INTERNATIONAL RIG COUNT

Region	Dec. 2008 Land	Dec. 2008 Off.	Dec. 2008 Total	Dec. 07 Total
WESTERN HEMISPHERE				
Argentina	70	0	70	87
Bolivia	3	0	3	2
Brazil	29	30	59	46
Canada	359	2	361	360
Chile	1	0	1	2
Colombia	42	0	42	40
Ecuador	13	0	13	9
Mexico	83	28	111	98
Peru	4	3	7	8
Trinidad	0	4	4	5
United States	1716	66	1782	1811
Venezuela	66	12	78	71
Other	1	0	1	2
Subtotal	**2,387**	**145**	**2,531**	**2,541**
ASIA-PACIFIC				
Australia	15	11	26	21
Brunei	1	3	4	3
China-offshore	0	20	20	22
India	55	27	82	84
Indonesia	46	15	61	66
Japan	2	0	2	2
Malaysia	0	19	19	11
Myanmar	1	1	2	7
New Zealand	3	1	4	5
Papua New Guinea	2	0	2	1
Philippines	3	0	3	1
Taiwan	0	0	0	0
Thailand	2	10	12	11
Vietnam	0	4	4	4
Other	0	1	1	3
Subtotal	**130**	**112**	**242**	**241**
AFRICA				
Algeria	27	0	27	29
Angola	0	6	6	5
Congo	1	2	3	3
Gabon	1	0	1	4
Kenya	0	0	0	0
Libya	14	1	15	15
Nigeria	3	4	7	9
South Africa	0	1	1	0
Tunisia	2	1	3	5
Other	3	1	4	4
Subtotal	**51**	**16**	**67**	**74**
MIDDLE EAST				
Abu Dhabi	9	3	12	13
Dubai	2	0	2	1
Egypt	49	11	60	50
Iran	0	0	0	0
Iraq	0	0	0	0
Jordan	1	0	1	0
Kuwait	11	0	11	11
Oman	52	0	52	53
Pakistan	21	0	21	19
Qatar	1	9	10	16
Saudi Arabia	64	10	74	76
Sudan	0	0	0	0
Syria	20	0	20	19
Yemen	15	0	15	16
Other	1	0	1	0
Subtotal	**246**	**33**	**279**	**274**
EUROPE				
Croatia	0	0	0	1
Denmark	0	3	3	2
France	1	0	1	1
Germany	10	0	10	5
Hungary	3	0	3	2
Italy	4	0	4	5
Netherlands	0	5	5	2
Norway	0	25	25	19
Poland	1	0	1	2
Romania	16	2	18	3
Turkey	6	0	6	5
UK	4	18	22	22
Other	3	0	3	8
Subtotal	**48**	**53**	**101**	**77**
Total	**2,862**	**359**	**3,220**	**3,207**

Definitions, see OGJ Sept. 18, 2006, p. 42.
Source: Baker Hughes Inc.
Data available in OGJ Online Research Center.

OIL IMPORT FREIGHT COSTS*

Source	Discharge	Cargo	Cargo size, 1,000 bbl	Freight (Spot rate) worldscale	$/bbl
Caribbean	New York	Dist.	200	215	1.82
Caribbean	Houston	Resid.	380	217	2.07
Caribbean	Houston	Resid.	500	241	2.29
N. Europe	New York	Dist.	200	213	2.92
N. Europe	Houston	Crude	400	159	3.20
W. Africa	Houston	Crude	910	145	3.21
Persian Gulf	Houston	Crude	1,900	58	2.39
W. Africa	N. Europe	Crude	910	146	2.39
Persian Gulf	N. Europe	Crude	1,900	66	1.97
Persian Gulf	Japan	Crude	1,750	72	1.75

*Dec. 2008 average.
Source: Drewry Shipping Consultants Ltd. Data available in OGJ Online Research Center.

WATERBORNE ENERGY INC. US LNG IMPORTS

Country	Nov. 2008	Dec. 2008	Nov. 2007	Change from a year ago, %
	MMcf			
Algeria	—	—	—	—
Egypt	9,110	5,820	3,030	200.7
Equatorial Guinea	—	—	—	—
Nigeria	—	—	—	—
Norway	—	2,980	—	—
Qatar	—	—	—	—
Trinidad and Tobago	13,590	22,590	23,540	–42.3
Total	**22,700**	**31,390**	**26,570**	**–14.6**

Source: Waterborne Energy Inc.
Data available in OGJ Online Research Center.
Data not available at press time.

PROPANE PRICES

	Nov. 2008	Dec. 2008	Nov. 2007	Dec. 2007
	¢/gal			
Mont Belvieu	73.79	61.03	155.64	152.95
Conway	79.93	70.62	151.67	151.69
Northwest Europe	71.47	69.55	168.75	175.08

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

MUSE, STANCIL & CO. REFINING MARGINS

	US Gulf Coast	US East Coast	US Mid-west	US West Coast	North-west Europe	South-east Asia
	$/bbl					
Dec. 2008						
Product revenues	48.18	47.15	48.53	51.56	49.87	48.50
Feedstock costs	–41.36	–43.77	–39.11	–34.50	–41.41	–42.21
Gross margin	6.82	3.38	9.42	17.06	8.46	6.29
Fixed costs	–2.11	–2.44	–2.38	–2.77	–2.38	–1.85
Variable costs	–1.77	–1.24	–1.59	–2.69	–1.46	–0.67
Cash operating margin	**2.94**	**–0.30**	**5.45**	**11.60**	**4.62**	**3.77**
Nov. 2008	6.70	2.71	7.67	5.93	6.55	3.66
YTD avg.	9.01	3.05	11.53	13.27	6.35	3.81
2007 avg.	12.60	6.65	18.66	20.89	5.75	2.26
2006 avg.	12.54	6.38	14.97	23.69	5.88	1.06
2005 avg.	12.53	6.98	12.31	20.55	5.51	1.52

Source: Muse, Stancil & Co. See OGJ, Jan. 15, 2001, p. 46
Data available in OGJ Online Research Center.

MUSE, STANCIL & CO. GASOLINE MARKETING MARGINS

Nov. 2008	Chicago*	Houston	Los Angeles	New York
	¢/gal			
Retail price	233.49	204.84	245.44	238.85
Taxes	52.25	38.40	55.55	48.65
Wholesale price	144.94	133.80	141.50	150.17
Spot price	121.90	123.86	130.58	130.43
Retail margin	35.83	32.64	48.39	40.03
Wholesale margin	23.04	9.94	10.92	19.74
Gross marketing margin	**58.87**	**42.58**	**59.31**	**59.77**
Oct. 2008	86.56	96.25	64.67	84.89
YTD avg.	33.48	32.24	28.23	41.25
2007 avg.	26.96	23.12	19.05	31.10
2006 avg.	19.74	20.34	18.03	27.90
2005 avg.	19.77	16.26	20.39	27.13

*The wholesale price shown for Chicago is the RFG price utilized for the wholesale margin. The Chicago retail margin includes a weighted average of RFG and conventional wholesale purchases.
Source: Muse, Stancil & Co. See OGJ, Oct. 15, 2001, p. 46.
Data available in OGJ Online Research Center.
Note: Margins include ethanol blending in all markets.

MUSE, STANCIL & CO. ETHYLENE MARGINS

	Ethane	Propane	Naphtha
	¢/lb ethylene		
Dec. 2008			
Product revenues	35.57	57.59	65.84
Feedstock costs	–14.56	–34.88	–43.37
Gross margin	21.01	22.71	22.47
Fixed costs	–5.38	–6.36	–7.19
Variable costs	–4.74	–5.57	–7.47
Cash operating margin	**10.89**	**10.78**	**7.81**
Nov. 2008	19.70	21.98	12.03
YTD avg.	20.99	22.72	–6.11
2007 avg.	14.41	14.14	–7.42
2008 avg.	19.53	22.44	1.34
2005 avg.	14.43	20.68	1.28

Source: Muse, Stancil & Co. See OGJ, Sept. 16, 2002, p. 46.
Data available in OGJ Online Research Center.

MUSE, STANCIL & CO. US GAS PROCESSING MARGINS

Dec. 2008	Gulf Coast	Mid-continent
	$/Mcf	
Gross revenue		
Gas	5.59	4.41
Liquids	0.59	1.57
Gas purchase cost	6.22	5.92
Operating costs	0.07	0.15
Cash operating margin	**–0.10**	**–0.09**
Nov. 2008	–0.06	0.54
YTD avg.	0.45	1.61
2007 avg.	0.44	1.47
2006 avg.	0.26	0.97
2005 avg.	–0.06	0.25
Breakeven producer payment, % of liquids	112%	103%

Source: Muse, Stancil & Co. See OGJ, May 21, 2001, p. 54.
Data available in OGJ Online Research Center.

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	§	
GULF COAST OIL CORPORATION,	§	**CASE NO. 08-50213**
	§	
CENTURY RESOURCES, INC.,	§	**CASE NO. 08-50214**
and	§	
NEW CENTURY ENERGY CORP.,	§	**CASE NO. 08-50215**
	§	
Debtors.	§	**Chapter 11**
	§	**Jointly Administered Under 08-50213**

NOTICE OF PUBLIC AUCTION AND SALE HEARING

PLEASE TAKE NOTICE that on December 19, 2008, Gulf Coast Oil Corporation ("Gulf Coast"), Century Resources, Inc. ("Century Resources"), and New Century Energy Corp. ("New Century"), and debtors and debtors-in-possession in the above-captured chapter 11 cases (collectively, the "Debtors" or "Sellers") filed with the United States Bankruptcy Court for the Southern District of Texas, Houston Division (the "Court") a motion for the authority to sell all or substantially all of the assets (the "Sale Motion"). Among other things, the Debtors seek the Court's approval, pursuant to Sections 105, 363 and 365 of Chapter 11 United States Code (the "Bankruptcy Code"), of:

(i) the sale at auction (a "Sale") of all or substantially all of the Debtors' assets (the "Assets") free and clear of all liens, claims, and encumbrances (with all liens, claims and encumbrances to attach to the proceeds in the same priority and validity that existed on the Assets); and pursuant to an asset purchase agreement entered between the Debtor and the purchaser of the Assets;
(ii) the assumption and assignment of certain executory contracts and unexpired leases;
(iii) following the auction; approval of the Sale; and
(iv) other related matters.

The assets include over 19,000 net acres in McMullen, Matagorda, Wharton, Jim Hogg, and Goliad County, Texas. Key highlights of the operated properties include:

- 1.5 MMBBL of proved oil reserves (Aug '08) 10.2 BCF of proved gas reserves (Aug '08)
- 650 BPD (Dec '08)1.2 MMCFPD (Dec '08)
- Most properties 100% WI
- Behind-Pipe Potential and possible development opportunities on owned acreage

PLEASE TAKE FURTHER NOTICE that the terms and conditions of the proposed sale to the Proposed Purchasers are set forth in the Sale Motion. *All bids must be received by the Debtors no later than 12:00 noon Eastern time on January 23, 2009 to be considered by Debtors.*

PLEASE TAKE FURTHER NOTICE that the terms and conditions of the Sale Procedures (the "Sale Procedures") are set forth in the Sale Motion. *All interested bidders should carefully read the Sale Motion.*

PLEASE TAKE FURTHER NOTICE that, pursuant to the terms of the Sale Motion, an auction (the "Auction") to sell the Assets will be conducted at the United States Courthouse, Courtroom 400, 515 Rusk Ave., Houston, TX 77002, on January 27, 2009, at 9:30 a.m. (prevailing Central time) (the "Auction Date"). Only a Qualifying Bidder (as defined in the Sale Motion) and their advisors who submit a Qualified Bid by no later than 12:00 PM Eastern Time on January 23, 2009, as well as other parties specified in the Sale Motion, will be permitted to participate in and/or make any statements on the record at the Auction.

PLEASE TAKE FURTHER NOTICE that the Auction is subject to the terms and conditions of the Sale Motion, which shall control in the event of any conflict and the Debtors encourage parties in interest to review such documents in their entirety. A copy of the Sale Motion may be obtained by written request made to counsel to the Debtors, David Zdunkewicz, 600 Travis, Suite 400, Houston, TX 77002, Telephone: (713) 220-4200, Facsimile: (713) 238-7106 or via email dzdunkewicz@andrewskurth.com.

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In Russia-Ukraine gas row, everyone loses something

The new gas-price showdown between Russia and Ukraine is a complex affair in which all parties lose.

While it's a misleading gloss to say only—as some reports do—that Moscow cut off wintertime gas supply to Europe, European consumers indeed have experienced another untimely interruption of crucial Russian deliveries.

Gazprom, the Russian gas monopoly, at the beginning of this month suspended sales in Ukraine amid a price dispute. A few days later it cut almost all shipments through Ukraine, saying the transit country was using opacity of its gas operations to siphon supplies destined for Europe.

The Editor's Perspective

by Bob Tippee, Editor

Russia's move looked especially heavy-handed when no less an authority than President Vladimir Putin announced the curtailment. Moscow has never been subtle with its political pressure on the Western-leaning, economically distressed government in Kiev. But politics isn't the only story. Gazprom last year wanted to raise the price of gas sold in Ukraine from $180/thousand cu m (Mcm) to $250/Mcm, still below the average $400/Mcm it received at the time under oil-indexed fixed contracts in Europe. When Ukraine balked, Gazprom countered with an improbable $480/Mcm.

The company reasonably can argue that it had to end gas sales to Ukraine because the commerce lost legal footing when the contract expired Jan. 1. It also probably suspects Ukraine of hoping to win European Union help in the price negotiations.

European officials in fact reacted feverishly to the disruption of gas deliveries to 15 countries, some suffering extreme cold. At this writing they were trying to coax Russian and Ukrainian officials into a deal that would allow international monitoring of Ukraine's gas network and enable flow to restart.

Politically, commercially, or both, everyone directly involved stands to lose something.

Just as undelivered gas means chill in Europe, it represents uncollected revenue at Gazprom. The disruption underscores the bargaining weakness of unconsolidated European gas buyers. Ukraine will emerge as either powerless victim or opportunistic schemer. And Russia's reputation as a secure source of gas, already damaged when this happened 3 years ago, has weakened further.

A potential winner, by interesting contrast, is the European coal business.

(Online Jan. 9, 2009; author's e-mail: bobt@ogjonline.com)

Market Journal

by Sam Fletcher, Senior Writer

Market rally remains 'elusive'

A sustained rally in oil and gas commodity prices "will be elusive" as markets search for a self-supporting recovery and a reduction in asset market volatility into 2010, predicted Adam Sieminski, chief energy economist, Deutsche Bank, Washington, DC, in his first report of the new year.

"Commodity indices posted their worst performance in recorded history last year, primarily due to the collapse in spot prices," Sieminski said. Moreover, he said, "We expect global oil demand growth to be significantly worse in 2009 than consensus forecasts." He predicts crude prices "will not hit rock bottom until the end of this year as Organization of Petroleum Exporting Countries production cuts work their way through the system and global growth starts to recover." He said a necessary condition for commodity prices to recover requires a significant reduction in risk aversion levels.

Meanwhile, Sieminski said, "The US natural gas outlook is being tempered by the US recession and the possibility that new LNG export facilities in Asia and the Middle-East will offload product in North America. However, the US gas rig count is falling rapidly and, in our view, this suggests that gas production could be contracting by up to 1% by the second half of 2009."

In a separate report, Olivier Jakob at Petromatrix, Zug, Switzerland, noted that in the first full week of commodity trading in 2009, West Texas Intermediate reversed most of its price gains from the last week of 2008, trading in a wide $10/bbl range.

Jakob reported, "The average volume trading in crude oil futures during 2008 made a new record. If we bring the annual volume traded in crude oil futures to a barrels per day basis, then in 1995 a volume corresponding to the daily world production was traded each day on the futures exchanges. In 2000 the volume trading on futures was double the world production. That jumped to three times over in 2005, and in 2008 it was close to eight times the daily world production of crude oil that was traded each day in crude oil futures. This jump in volume has also brought a jump in volatility and is an input that needs to be taken in consideration when making a price forecast, or comparing current prices to history."

The curse of Sisyphus

Sieminski said commodity markets currently are "suffering the curse of Sisyphus," the ancient king of Corinth who, according to Greek mythology, was punished by the gods for his trickery by being condemned for all eternity to roll a heavy boulder up a high hill only to watch it roll down again each time before he reached the top.

"Like Sisyphus, we believe the ability of world growth to push commodity prices, and specifically energy and industrial metal prices, higher in 2009 will be fraught with difficulties," said Sieminski. "In fact the current episode of volatility, as measured by the Chicago Board Options Exchange Volatility Index, is second only to 1929. We believe the longer asset market volatility takes to subside, the larger the downside risks to global growth and commodity prices will be."

He said, "In terms of duration, if the current high level of volatility continues until March, it would be on a par with events in 1932."

Sieminski said, "What may interrupt this negative price outlook is not only new money being put to work in the complex but also the aggressive monetary and fiscal action being adopted by central banks and governments around the world. For example, in the next few weeks both the US and Europe will announce new fiscal stimulus measures to cushion the economic downturn."

Another view

Sisyphus's curse is usually seen as an allegory for a repetitive attempt to complete an unrewarding, backbreaking task. But Albert Camus, an Algerian-born French author, philosopher, and journalist who won the Nobel prize for literature in 1957, provided a different interpretation in the Myth of Sisyphus, a 1942 philosophical essay. Each time the boulder crashes down the hillside returning to its lowest level, Sisyphus standing near the summit before starting down to try again is at that moment "superior to his fate," Camus argued, adding, "He is stronger than his rock."

He said, "Sisyphus teaches the higher fidelity that negates the gods and raises rocks. ...The struggle itself toward the heights is enough to fill a man's heart. One must imagine Sisyphus happy."

That same description might apply to many of the oilmen who stick with this industry through all of its booms and busts.

(Online Jan. 12, 2009; author's e-mail: samf@ogjonline.com)

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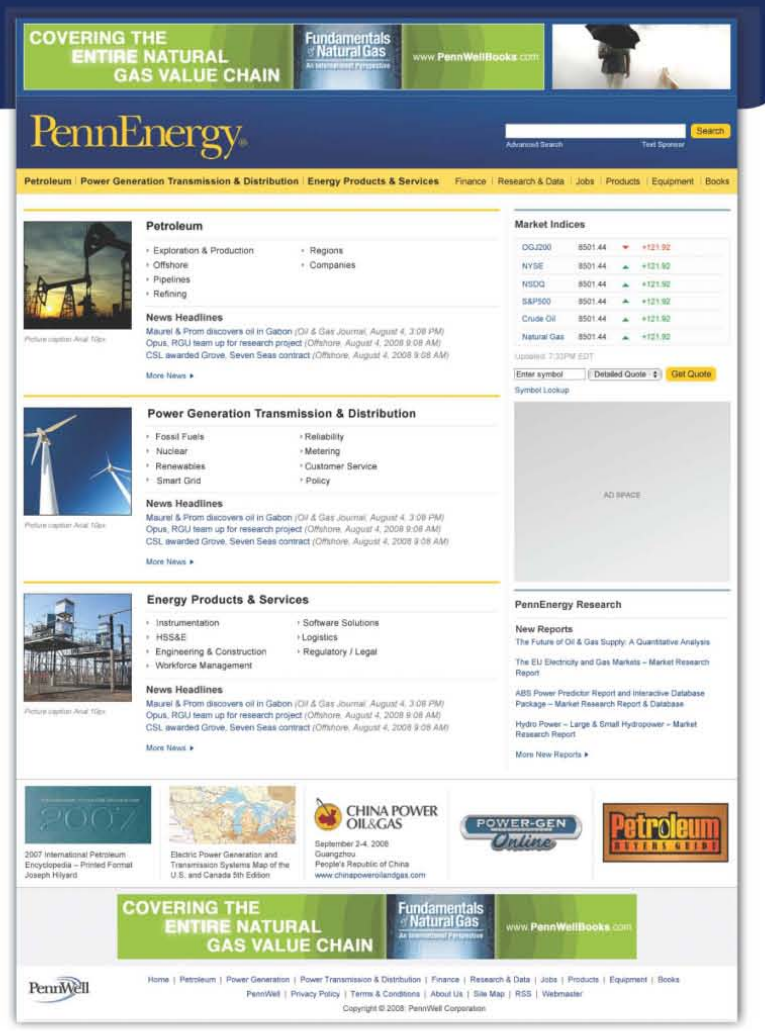

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